IBM Reliable Scalable Cluster Technology for Linux

# Technical Reference

SA22-7893-10

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SA22-7893-10

**Note**
Before using this information and the product it supports, read the information in “Notices” on page 499.

**Eleventh Edition (April 2006)**

This edition applies to:
- version 1, release 5 of IBM Cluster Systems Management (CSM) for Linux on Multiplatforms (product number 5765-E88)
- version 1, release 5 of CSM for Linux on POWER (product number 5765-G16)
- version 2, release 1 of IBM Tivoli System Automation for Multiplatforms (product number 5724-M00)

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# Contents

# About this book

This book describes the Reliable Scalable Cluster Technology (RSCT) commands, files, scripts, and utilities for Linux®.

## Who should use this book

This book is intended for system administrators who want to use RSCT commands for the Linux operating system. The system administrator should be experienced with UNIX® and networked systems.

## Conventions and terminology used in this book

## Conventions

Table 1 describes the typographic conventions used in this book.

*Table 1. Typographic conventions*

| Convention | Usage |
|---|---|
| **bold** | **Bold** words or characters represent system elements that you must use literally, such as: command names, file names, flag names, and path names. |
| `constant width` | Examples and information that the system displays appear in `constant-width` typeface. |
| *italic* | *Italicized* words or characters represent variable values that you must supply.<br><br>*Italics* are also used for book titles, for the first use of a glossary term, and for general emphasis in text. |
| **{** *item* **}** | Braces indicate required items. |
| **[** *item* **]** | Brackets indicate optional items. |
| *item***...** | Ellipses indicate items that can be repeated. |
| \| | 1. In the left margin of the book, vertical lines indicate technical changes to the information.<br>2. In synopsis statements, vertical lines are used as *pipe* characters. See “How to read synopsis statements” for more information. |
| **** | In command examples, a backslash indicates that the command continues on the next line. For example:<br>`mkcondition -r IBM.FileSystem -e "PercentTotUsed > 90" \`<br>`-E "PercentTotUsed < 85" -m d "FileSystem space used"` |

### How to read synopsis statements

Synopsis statements represent what you enter on the command line. These statements also contain characters that you do not enter on the command line, which are included to show the various options and parameters you can enter as part of the command. Such characters include braces ( **{ }** ), brackets ( **[ ]** ), and pipe characters ( | ). For example:

**mkcondition –c** *existing_condition*[**:***node_name*] [**–r** *resource_class*]
[**–e** *event_expression*] [**–E** *rearm_expression*] [**–d** *event_description*]

[**–D** *rearm_description*] [**–n** *node_name1*[**,***node_name2*...]] [**–p** *node_name*] [**–s***"selection_string"*] [**–m l** | **m** | **p** ] [ **–S c** | **w** | **i** ] [**–h**] [**–TV**] *condition*

Synopsis statements in this book and in the RSCT man pages use the following conventions:

- Items that must be entered literally on the command line are shown in **bold**. These items include the command name, options, and other literal characters, such as commas ( **,** ).
- Variables that you must replace with a value are shown in *italics*. These items include command parameters and parameters that follow options. For example, the expression **-n** *node_name* might become **-n node1** on the command line.
- Options and parameters that are enclosed in neither brackets nor braces are required.

  Options and parameters that are enclosed in braces are also required.
- Optional options and parameters are enclosed in brackets.
- The pipe character indicates that you choose among the options shown. For example, the expression { **-a** | **-b** | **-c** } indicates that you *must* choose either **-a**, or **-b**, or **-c**. The expression [ **-a** | **-b** | **-c** ] indicates that you *can* choose either **-a**, or **-b**, or **-c**.
- Ellipses ( **...**) indicate that you can repeat the parameter. For example, the expression:

  [**–n** *node_name1*[**,***node_name2*...]]

  indicates that if you use the **–n** option, you *must* follow it with at least one node name. You *can* enter as many node names as you'd like, separated by commas. For example:

  ```
  -n node1,node2,node3,node4,node5
  ```

## Terminology

This book uses the terminology conventions shown in Table 2:

*Table 2. Terminology*

| Term | Usage |
|---|---|
| HPS | A shorthand notation for the *High Performance Switch,* which works in conjunction with a specific family of IBM® pSystem servers |

See the "Glossary" on page 503 for definitions of some of the other terms that are used in this book.

## Prerequisite and related information

The core Reliable Scalable Cluster Technology (RSCT) publications are:

- *RSCT: Administration Guide*, SA22-7889, provides an overview of the RSCT components and describes how to:
  - Create and administer RSCT peer domains.
  - Manage and monitor resources using the resource monitoring and control (RMC) subsystem.
  - Administer cluster security services for RSCT peer domains and CSM management domains.

- *RSCT: Diagnosis Guide*, SA23-2202, describes how to diagnose and resolve problems related to the various components of RSCT. This book is a companion volume to *RSCT: Messages*, which lists the error messages that may be generated by each RSCT component. While *RSCT: Messages* describes the appropriate user responses to messages that are generated by RSCT components, this book contains additional and more detailed diagnostic procedures.
- *RSCT: Messages*, GA22-7891, lists the error messages that may be generated by each RSCT component. For each message, this manual provides an explanation of the message, and describes how you should respond to it.
- *RSCT for AIX 5L™: Technical Reference*, SA22-7890, and *RSCT for Linux: Technical Reference*, SA22-7893, provide detailed reference information about all of the RSCT commands, daemons, files, and scripts.

In addition to these core RSCT publications, the library contains the following publications of interest:

- *RSCT: RMC Programming Guide and Reference*, SA23-1346, describes the resource monitoring and control application programming interface (RMC API). This book is intended for programmers who want to create applications that use the RMC API to connect to the RMC subsystem to leverage its resource management and monitoring capabilities.
- *RSCT: Group Services Programming Guide and Reference*, SA22-7888, contains information for programmers who want to write new clients that use the group services subsystem's application programming interface (GSAPI) or who want to add the use of group services to existing programs. This book is intended for programmers of system management applications who want to use group services to make their applications highly available.
- *RSCT for AIX 5L: LAPI Programming Guide*, SA22-7936, provides conceptual, procedural, and reference information about the low-level application programming interface (LAPI). LAPI is part of the AIX® implementation of RSCT only; it is not available with RSCT for Linux. LAPI is a message-passing API that provides optimal communication performance on the High Performance Switch (HPS), which works in conjunction with a specific family of IBM pSystem servers.
- *RSCT for AIX 5L: Managing Shared Disks*, SA22-7937, describes the shared disk management facilities of IBM @server Cluster 1600 server processors — the optional virtual shared disk and recoverable virtual shared disk components of RSCT for AIX 5L. These components are part of the AIX implementation of RSCT only; they are not available with RSCT for Linux. This book describes how you can use these components to manage cluster disks to enable multiple nodes to share the information they hold. The book includes an overview of the components and explains how to plan for them, install them, and use them to add reliability and availability to your data storage.

For access to all of the RSCT documentation, refer to the **IBM @server Cluster information center**. This Web site, which is located at **http://publib.boulder.ibm.com/infocenter/clresctr**, contains the most recent RSCT documentation in HTML and PDF formats. The **Cluster information center** also includes an *RSCT Documentation Updates* file, which contains documentation corrections and clarifications, as well as information that was discovered after the RSCT books were published. Check this file for pertinent information (about required software patches, for example).

The current RSCT books and earlier versions of the library are also available in PDF format from the **IBM Publications Center** Web site, which is located at

**http://www.ibm.com/shop/publications/order**. It is easiest to locate a manual in the **IBM Publications Center** by supplying the manual's publication number. The publication number for each of the RSCT books is listed after the book title in the preceding list.

## Using LookAt to find message explanations

LookAt is an online facility that lets you look up explanations for most of the IBM messages you encounter, as well as for some system abends and codes. You can use LookAt from the following locations to find IBM message explanations:

- The Internet. You can access IBM message explanations directly from the LookAt Web site:

  **http://www.ibm.com/eserver/zseries/zos/bkserv/lookat**
- Your wireless handheld device. You can use the LookAt Mobile Edition with a handheld device that has wireless access and an Internet browser (for example: Internet Explorer for Pocket PCs, Blazer, Eudora for Palm OS, or Opera for Linux handheld devices). Link to the LookAt Mobile Edition from the LookAt Web site.

## How to send your comments

Your feedback is important in helping to provide accurate, high-quality information. If you have any comments about this book or any other RSCT documentation:

- Go to the **IBM @server Cluster information center** home page at:

  **http://publib.boulder.ibm.com/infocenter/clresctr**

  Click on the **Contact us** link to go to our feedback page, where you can enter and submit your comments.
- Send your comments by e-mail to: **mhvrcfs@us.ibm.com**

  Include the book title and order number, and, if applicable, the specific location of the information about which you have comments (for example, a page number, table number, or figure number).
- Fill out one of the forms at the back of this book and return it by mail, by fax, or by giving it to an IBM representative.

# Part 1. The system resource controller (SRC)

# Chapter 1. SRC commands

# lssrc

## Name

**lssrc** – displays the status of a subsystem, a group of subsystems, or a subserver.

## Synopsis

To display all status:

**lssrc** [**-h** *host*] **–a**

To display group status:

**lssrc** [**-h** *host*] **–g** *group-name*

To display subsystem status:

**lssrc** [**-h** *host*] [**–l**] **–s** *subsystem*

To display status by PID:

**lssrc** [**-h** *host*] [**–l**] **–p** *subsystemPID*

## Description

The **lssrc** command sends a request to the system resource controller (SRC) to get status on a subsystem, a group of subsystems, or all subsystems. This command sends a subsystem request packet to the daemon to be forwarded to the subsystem for a subserver status or a long subsystem status.

You can choose whether to request a short or long status for a subserver. When the **–l** option is absent, the status request is assumed to be a short status. A short status of a subsystem, group of subsystems, or all subsystems is handled by the SRC.

When the **–l** option is present for a subsystem, a status request is taken to the subsystem and the subsystem sends the status back. The **–l** option is supported only for subsystems that do not use signals as their communication method. For either a long or short status of a subserver, the subsystem is sent a status request packet, and the subsystem sends the status back.

## Options

**–a** Displays the current status of all defined subsystems.

**–g** *group-name*
Specifies a group of subsystems for which to get status. The command will fail if the subsystem object class does not contain *group-name*.

**–h** *host*
Specifies the foreign host on which this status action is requested. The local user must be running as **root**. The remote system must be configured to accept remote SRC requests. That is, the **srcmstr** daemon (see **/etc/inittab**) must be started with the **–r** option and the **/etc/hosts.equiv** file or the **.rhosts** file must be configured to allow remote requests.

**–l** Requests that a subsystem send its current status in long form. Long status

requires that a status request be sent to the subsystem; it is the responsibility of the subsystem to return the status.

**–p** *subsystemPID*
Specifies a particular instance of the *subsystemPID* parameter for which to get status, or a particular instance of the subsystem to which the status subserver request is to be taken.

**–s** *subsystem*
Specifies a subsystem for which to get status. *subsystem* can be the actual subsystem name or the synonym for the subsystem. The command will fail if the subsystem object class does not contain *subsystem*.

## Files

| | |
|---|---|
| **/etc/objrepos/SRCsubsys** | Specifies the SRC Subsystem Configuration Object Class |
| **/etc/objrepos/SRCsubsvr** | Specifies the SRC Subserver Configuration Object Class |
| **/etc/objrepos/SRCnotify** | Specifies the SRC Notify Configuration Object Class |
| **/etc/services** | Defines the sockets and protocols used for Internet services |
| **/dev/SRC** | Specifies the AF_UNIX (UNIX domain) socket file |
| **/dev/.SRC-unix** | Specifies the location for temporary socket files |

## Standard error

Error messages are written to standard error.

## Exit status

**0** The command has run successfully.

*a non-zero value*
The command was not successful.

## Security

Only **root** users can run this command.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

| | |
|---|---|
| **/usr/bin/lssrc** | Contains the **lssrc** command |

## Examples

1. To get the status of all subsystems that are known on the local node, enter:
   ```
   lssrc -a
   ```
2. To get the status of a group services subsystem called **cthags**, enter:
   ```
   lssrc -s cthags
   ```

The status of all instances of the **cthags** subsystem on the local node is returned.

3. To get the status of the subsystem by PID (for PID 1234, for example), enter:

   ```
   lssrc -p 1234
   ```

   This gets the status of the subsystem with the subsystem PID of 1234 on the local node.
4. To get the status of the **cthags** subsystem group, enter:

   ```
   lssrc -g cthags
   ```

   This gets the status of all instances of subsystems in the **cthags** group on the local node.
5. To get the status of the **tester** subserver that belongs to the **srctest** subsystem, enter:

   ```
   lssrc -t tester -p 1234
   ```

   This gets the status of **tester** subserver that belongs to the **srctest** subsystem with the subsystem PID of 1234 on the local node.

## Author

Myung Bae - cluster@us.ibm.com

## See also

Commands: **nlssrc**

# Part 2. The resource monitoring and control (RMC) subsystem

# Chapter 2. RMC control commands

# cfgrmcsnmp

## Name

**cfgrmcsnmp** – controls RMC's ability to receive traps on Linux hosts.

## Synopsis

**cfgrmcsnmp** [**-u**] [**-h**]

## Description

The **cfgrmcsnmp** command sets up or uninstalls RMC's ability to receive traps on Linux hosts. This command checks the appropriate daemons and either creates the **/usr/share/snmp/snmptrapd.conf** file or appends to it.

The **trap2rmc** command is configured when the **cfgrmcsnmp** command has been run. The **snmptrapd.conf** file is installed or appended to in the **/usr/share/snmp/** directory. This configuration file contains entries to call **trap2rmc** when traps are received. The installation script also restarts the **snmptrapd** daemon, so once the installation is complete, trap logging will be done automatically without the user needing to set anything up. However, if the **/usr/share/snmp/snmptrapd.conf** file exists, it will be saved as a backup file (**/usr/share/snmp/snmptrapd.conf.orig**) and the administrator will need to configure the two configuration files manually to get the desired results. If the UCD-SNMP daemon (**snmptrapd**) has been removed before installation begins, the installation will not try to install the UCD-SNMP package.

## Options

**–u** Uninstalls RMC's ability to receive traps in the audit log.

**–h** Writes this command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Files

**/usr/share/snmp/snmptrapd.conf**
Contains entries to call **trap2rmc** when traps are received

**/usr/share/snmp/snmptrapd.conf.orig**
Backup file for **/usr/share/snmp/snmptrapd.conf**

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/install/bin/cfgrmcsnmp**
Contains the **cfgrmcsnmp** command

## Author

cluster@us.ibm.com

## See also

Commands: **trap2rmc**

Files: **snmptrapd.conf**

# chrmcacl

## Name

**chrmcacl** – updates the resource monitoring and control (RMC) ACL file.

## Synopsis

**chrmcacl** [ **-a** | **-d** | **-r** | **-h** ]

## Description

Use this command to update the RMC ACL file (**/var/ct/cfg/ctrmc.acls**). If this file does not exist, **chrmcacl** copies the default ACL file from **/usr/sbin/rsct/cfg/ctrmc.acls** to **/var/ct/cfg/ctrmc.acls**. This command reads update information from standard input. This input must be in ACL file format, so it must consist of one or more stanzas, in which each stanza begins with a stanza name that is followed by zero or more stanza lines. A stanza is terminated by a blank line, a comment line, another stanza, or end-of-file. See the description of the RMC ACL file in the *RSCT: Administration Guide* for details.

With no options specified, **chrmcacl** does whole stanza addition, replacement, or deletion. If the input stanza does not exist in the ACL file, it is added. If the input stanza has a match in the ACL file, the input stanza replaces the existing ACL file stanza. If the input stanza contains no stanza lines and has a match in the ACL file, the existing ACL file stanza is removed.

If the **-a**, **-r**, or **-d** option is specified, **chrmcacl** does individual stanza line addition, replacement, or deletion. Stanza lines are matched based on the user identifier and object type tokens, in the stanza line, within matching stanzas. Matches must be exact; in other words, there is no wildcard matching.

When the **-a** option is used, the permissions specified in the input stanza line are added to the permissions from the matching stanza line in the ACL file. If this results in an effective change in permissions, the new permissions are updated in the ACL file. If there is no matching stanza line in the ACL file, the input stanza line is added to the matching stanza in the ACL file.

When the **-r** option is used, the input stanza line unconditionally replaces the matching stanza line in the ACL file. If there is no matching stanza line in the ACL file, the input stanza line is added to the matching stanza in the ACL file. For the **-a** and **-r** options, if the input stanza has no match in the ACL file, the complete input stanza is added to the ACL file.

When the **-d** option is used, any matching stanza lines in the ACL file are deleted. If, as a result, the matching stanza in the ACL file has no stanza lines, the stanza is removed from the ACL file.

As a by-product of this command, the stanza lines within each stanza are ordered from the most specific user identifiers and object types to less specific user identifiers and object types.

The **chrmcacl** command employs file locking, which is used by other RSCT components, to serialize updates and prevent file corruption. Therefore, it is recommended that you use this command to update the ACL file, rather than by modifying the file directly.

When the ACL file is updated, the previous version is first saved as **/var/ct/cfg/ctrmc.acls.orig**. If there are no effective changes or if there are any errors, the ACL file is not updated.

Changes to the ACL file take effect the next time the RMC subsystem is started. To get the ACL file changes to take effect immediately, run this command:

```
refresh -s ctrmc
```

## Options

**–a** Adds the permissions of the input stanza lines to the matching stanza lines within the matching ACL file stanzas.

**–d** Deletes the matching stanza lines within the matching ACL file stanzas.

**–r** Replaces the matching stanza lines within the matching ACL file stanzas with the input stanza lines.

**–h** Writes the command's usage statement to standard error.

## Files

| | |
|---|---|
| **/usr/sbin/rsct/cfg/ctrmc.acls** | Default location of the **ctrmc.acls** file |
| **/var/ct/cfg/ctrmc.acls** | Location of the modifiable **ctrmc.acls** file |
| **/var/ct/cfg/ctrmc.acls.orig** | Location of the previous version of the modifiable **ctrmc.acls** file |

## Standard input

This command reads update information from standard input.

## Standard error

Error messages are written to standard error.

When the **-h** option is specified, this command's usage statement is written to standard error.

## Exit status

**0** The command has run successfully.

**1** The command was not successful.

## Security

Privilege control: only the root user should have execute (**x**) access to this command.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/install/bin/chrmcacl**
Contains the **chrmcacl** command

## Examples

1. If the **/var/ct/cfg/ctrmc.acls** file already contains the **IBM.Sensor** stanza, but not the **OTHER** stanza, and given the following input to **chrmcacl** (with no options specified):

```
IBM.Sensor
    joe@Host1.CoX.com   *    rw
    Host1.CoX.com       *    r

OTHER
    Host1.CoX.com       C    r
```

   the **IBM.Sensor** stanza is replaced by the input stanza and the **OTHER** stanza is added to the file upon successful completion of the command.

2. With the **/var/ct/cfg/ctrmc.acls** file that is a result of example 1 and given the following input to **chrmcacl** (with no options specified):

```
IBM.Sensor

OTHER
    Host1.CoX.com       *    r
```

   the **IBM.Sensor** stanza is deleted and the **OTHER** stanza is replaced by the input stanza upon successful completion of the command.

3. With the **/var/ct/cfg/ctrmc.acls** file that is a result of example 2 and given the following input to **chrmcacl** (with the **-a** option specified):

```
OTHER
    Host1.CoX.com       *    w
```

   the **OTHER** stanza in the file will be:

```
OTHER
    Host1.CoX.com       *    rw
```

   upon successful completion of the command.

4. With the **/var/ct/cfg/ctrmc.acls** file that is a result of example 3 and given the same input to **chrmcacl** as in example 3 (with the **-r** option specified), the **OTHER** stanza in the file will be:

```
OTHER
    Host1.CoX.com       *    w
```

   upon successful completion of the command.

5. Given the following stanza in the **/var/ct/cfg/ctrmc.acls** file:

```
IBM.Sensor
    joe@Host1.CoX.com   C    rw
    joe@Host1.CoX.com   R    r
    Host1.CoX.com       *    r
```

   and the following input to **chrmcacl** (with the **-d** option specified):

```
IBM.Sensor
    joe@Host1.CoX.com   R    r
```

   the **IBM.Sensor** stanza in the file will be:

```
IBM.Sensor
    joe@Host1.CoX.com   C       rw
        Host1.CoX.com   *       r
```

   upon successful completion of the command.

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about the RMC ACL file

Files: **ctrmc.acls**

# rmcctrl

## Name

**rmcctrl** – manages the resource monitoring and control (RMC) subsystem.

## Synopsis

**rmcctrl** { **-a** | **-A** | **-d** | **-k** | **-K** | **-m** {**R** | **E** | **D**} | **-M** {**R** | **E** | **D**} | **-p** | **-P** | **-q** | **-Q** | **-s** | **-t** *n* | **-T** | **-u** *n* | **-U** | **-v** *n* | **-V** | **-w** n | **-W** | **-x** | **-X** | **-z** | **-h** }

## Description

The **rmcctrl** command controls the operation of the resource monitoring and control (RMC) subsystem. The subsystem is under the control of the system resource controller (SRC) with a subsystem name of **ctrmc** and a subsystem group name of **rsct**. The RMC subsystem definition is added to the subsystem object class and then started when Reliable Scalable Cluster Technology (RSCT) is installed. In addition, a script is added to the **rc** directory structure, which is Linux-distribution-dependent, so that the RMC subsystem is started automatically when the system is booted up.

**Note:** While the RMC subsystem can be stopped and started by using the **stopsrc** and **startsrc** commands, it is recommended that the **rmcctrl** command be used to perform these functions.

## Options

**–a** Adds the RMC subsystem to the subsystem object class and places an entry at the end of the **/etc/inittab** file.

**–A** Adds and starts the RMC subsystem.

**–d** Deletes the RMC subsystem from the subsystem object class and removes the RMC entry from the **/etc/inittab** file.

**–k** Stops the RMC subsystem.

**–K** Stops the RMC subsystem and all resource managers.

**–m** Specifies the RMC subsystem client message policy. This policy applies to messages sent between the RMC subsystem and any command listed in the *RSCT for Linux: Technical Reference*, when the command is run on a different node than the RMC subsystem (in other words, the CT_CONTACT environment variable is set). These messages are sent using TCP/IP.

This option is only supported on RSCT version 2.3.1.0 or later. The ″Enabled″ policy must be used if the commands are from an earlier version of RSCT.

**R** Indicates that the client message policy is ″Required″. ″Required″ means that the connection remains open only if message authentication can (and will) be used.

**E** Indicates that the client message policy is ″Enabled″. ″Enabled″ is the default; message authentication is used if both sides of the connection support it.

**D** Indicates that the client message policy is ″Disabled″. ″Disabled″ means that message authentication is not used.

**–M** Specifies the RMC subsystem daemon message policy. This policy applies

to messages sent between the RMC subsystem daemons within a management domain cluster. These messages are sent using the User Datagram Protocol (UDP).

This option is only supported on RSCT release 2.3.5.0 or later and RSCT release 2.4.1.0 or later. When specified, the indicated message policy takes effect the next time the RMC subsystem is started.

**R** Indicates that the daemon message policy is ″Required″. ″Required″ means that two daemons communicate only if message authentication can (and will) be used.

**E** Indicates that the daemon message policy is ″Enabled″. ″Enabled″ is the default; message authentication is used if the sending and receiving daemons support it.

**D** Indicates that the daemon message policy is ″Disabled″. ″Disabled″ means that message authentication is not used. Disabling message authentication may result in the loss of function if all of the nodes in the cluster are not configured the same.

**–p** Enables remote client connections.

**–P** Disables remote client connections.

**–q** Enables remote client connections the next time the RMC subsystem is started.

**–Q** Disables remote client connections the next time the RMC subsystem is started.

**–s** Starts the RMC subsystem.

**–t** *n* Sets the client message timeout value to *n* seconds. Within this amount of time:

- The first message of the start session protocol must arrive after the RMC subsystem accepts a client connection
- Any complete client message must be received by the RMC subsystem, once the beginning of the message has been received

If either of these time limits is exceeded, the client session is closed. The minimum acceptable value is **10**; the maximum is **86400**.

When specified, this value takes effect the next time the RMC subsystem is started.

**–T** Sets the client message timeout value to the default value of **10** seconds.

When specified, this value takes effect the next time the RMC subsystem is started.

**–u** *n* Sets the start session timeout value to *n* seconds. Within this amount of time, the start session processing must complete for a new client session; otherwise, the session is closed. The minimum acceptable value is **60**; the maximum is **86400**.

When specified, this value takes effect the next time the RMC subsystem is started.

**–U** Sets the start session timeout value to the default value of **300** seconds.

When specified, this value takes effect the next time the RMC subsystem is started.

**–v** *n* Sets the first command timeout value to *n* seconds. If a first command timer is set when a client session is established with the RMC subsystem, the first command must arrive within the specified number of seconds after the start session processing completes; otherwise, the session is closed. The minimum acceptable value is **10**; the maximum is **86400**.

When specified, this value takes effect the next time the RMC subsystem is started.

**–V** Sets the first command timeout value to the default value of **10** seconds.

When specified, this value takes effect the next time the RMC subsystem is started.

**–w** *n* Sets the first command threshold value to *n* client sessions. Once the number of client sessions exceeds this value, the RMC subsystem enables a first command timer on each new, unauthenticated session. If the threshold is set to **0**, the first command timeout function is disabled. The maximum value is **150**.

When specified, this value takes effect the next time the RMC subsystem is started.

**–W** Sets the first command threshold value to the default value of **150** client sessions.

When specified, this value takes effect the next time the RMC subsystem is started.

**–x** Enables first command timeouts for non-**root** authenticated client sessions and for unauthenticated client sessions.

When specified, this value takes effect the next time the RMC subsystem is started.

**–X** Disables first command timeouts for non-root authenticated sessions.

When specified, this value takes effect the next time the RMC subsystem is started.

**–z** Stops the RMC subsystem and all resource managers, but the command does not return until the RMC subsystem and the resource managers are actually stopped.

**–h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Exit status

**0** The command has run successfully.

**1** The command was not successful.

## Security

Privilege control: only the root user should have execute (**x**) access to this command.

## Location

**/usr/sbin/rsct/bin/rmcctrl** Contains the **rmcctrl** command

## Examples

1. To add the RMC subsystem, enter:
   ```
   rmcctrl -a
   ```
2. To start the RMC subsystem, enter:
   ```
   rmcctrl -s
   ```
3. To stop the RMC subsystem, enter:
   ```
   rmcctrl -k
   ```
4. To delete the RMC subsystem, enter:
   ```
   rmcctrl -d
   ```

## Author

Michael Schmidt - cluster@us.ibm.com

# trap2rmc

## Name

**trap2rmc** – formats a trap received from the SNMP manager into a user-readable message and enters it in the IBM.AuditLog.

## Synopsis

**trap2rmc**

## Description

The **trap2rmc** command is configured when the **cfgrmcsnmp** command has been run. A new **snmptrapd.conf** file is installed in the **/usr/share/snmp/** directory. This configuration file contains entries to call **trap2rmc** when traps are received. The installation script also restarts the **snmptrapd** daemon, so once the installation is complete, trap logging will be done automatically without the user needing to set anything up. However, if the **/usr/share/snmp/snmptrapd.conf** file exists, it will be saved as a backup file (**/usr/share/snmp/snmptrapd.conf.orig**) and the administrator will need to configure the two configuration files manually to get the desired results. If the UCD-SNMP daemon (**snmptrapd**) has been removed before installation begins, the installation will not try to install the UCD-SNMP package. Instead, it will still install the **/usr/share/snmp/snmptrapd.conf** file, but it will have no effect.

## Files

**/usr/share/snmp/snmptrapd.conf**

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

| | |
|---|---|
| **/usr/sbin/rsct/trap2rmc** | Contains the **trap2rmc** command |

## Author

cluster@us.ibm.com

## See also

Commands: **cfgrmcsnmp**

Files: **snmptrapd.conf**

# Chapter 3. RMC commands

# chrsrc

## Name

**chrsrc** – changes the persistent attribute values of a resource or a resource class.

## Synopsis

To change the persistent attribute values of a *resource,* using data that is...

- entered on the command line:

  **chrsrc –s** *"selection_string"* [**–v**] [**–a**] [**–h**] [**–TV**] *resource_class attr=value...*

  **chrsrc –r** [**–v**] [**–a**] [**–h**] [**–TV**] *resource_handle attr=value...*

- predefined in an input file:

  **chrsrc –f** *resource_data_input_file* **–s** *"selection_string"* [**–v**] [**–a**] [**–h**] [**–TV**] *resource_class*

  **chrsrc –f** *resource_data_input_file* **–r** [**–v**] [**–a**] [**–h**] [**–TV**] *resource_handle*

To change the persistent attribute values of a *resource class,* using data that is...

- entered on the command line:

  **chrsrc –c** | **–C** *domain_name1*, *domain_name2*, ... *domain_name_n* [**–v**] [**–a**] [**–h**] [**–TV**] *resource_class attr=value...*

- predefined in an input file:

  **chrsrc –f** *resource_data_input_file* **–c** | **–C** *domain_name1*, *domain_name2*, ... *domain_name_n* [**–v**] [**–a**] [**–h**] [**–TV**] *resource_class*

## Description

The **chrsrc** command changes the persistent attribute values of a resource or a resource class. By default, this command changes the persistent attribute values of a *resource.* Use the **-r** option to change only the persistent attribute values of the resource that is linked with *resource_handle*. Use the **-s** option to change the persistent attribute values of all of the resources that match *selection_string*. To change the persistent attributes of a *resource class,* use the **-c** option.

The **chrsrc** command cannot change dynamic attributes, nor can it change persistent attributes that are designated as **read_only**. To verify that all of the attribute names that are specified on the command line or in *resource_data_input_file* are defined as persistent attributes and are *not* designated as **read_only**, use the **-v** option. When the **chrsrc** command is run with the **-v** option, the specified attributes are not changed, but are instead merely verified to be persistent and not designated as **read_only**. Once you run **chrsrc -v** to verify that the attributes that are specified on the command line or in *resource_data_input_file* are valid, you can issue the **chrsrc** command without the **-v** option to actually change the attribute values. Note, however, that just because an attribute "passes" when **chrsrc -v** is run does not ensure that the attribute can be changed. The underlying resource manager that controls the specified resource determines which attributes can be changed by the **chrsrc** command. After **chrsrc** is run without the **-v** option, an error message will indicate whether any specified attribute could not be changed.

You can use CSM defined node groups as node name values to refer to more than one node. For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*attr*=*value*...
: Specifies one or more pairs of attributes and their associated value. If the **-f** option is specified, *attr*=*value* pair parameters should not be entered on the command line. *attr* is any defined persistent attribute name. Use the **lsrsrcdef** command to display a list of the defined persistent attributes and their data types for the specified resource. The value entered must be the appropriate data type for the specified attribute. For example, if **NodeNumber** is defined as a **Uint32** data type, enter a positive numeric value.

*resource_class*
: Specifies a resource class name. Use the **lsrsrcdef** command to display a list of defined resource class names.

*resource_handle*
: Specifies a resource handle that is linked with the resource that you want to change. Use the **lsrsrc** command to display a list of valid resource handles. The resource handle must be enclosed within double quotation marks, for example:

```
"0x4017 0x0001 0x00000000 0x0069684c 0x0d4715b0 0xe9635f69"
```

## Options

**–a**
: Specifies that this command applies to *all* nodes in the cluster. The CT_MANAGEMENT_SCOPE environment variable determines the cluster scope. If CT_MANAGEMENT_SCOPE is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management domain and a peer domain exist, **chrsrc -a** with CT_MANAGEMENT_SCOPE not set will change the management domain. In this case, to change the peer domain, set CT_MANAGEMENT_SCOPE to **2**.

**–c**
: Changes the persistent attribute values for *resource_class*.

**–C** *domain_name1*, *domain_name2*, *... domain_name_n*
: Changes the class attributes of a globalized resource class on the specified RSCT peer domains that are defined on the management server. Globalized classes are used in peer domains and management domains for resource classes that contain information about the domain. To change class attributes of a globalized resource class on all peer domains defined on the management server, use the **-c** option with the **-a** option instead of **-C**.

**–f** *resource_data_input_file*
: Specifies the name of the file that contains resource attribute information.

**–r**
: Changes the persistent attribute values for the specific resource that matches *resource_handle*.

**–s** *"selection_string"*
: Changes the persistent attribute values for all of the resources that match *selection_string*. *selection_string* must be enclosed within either double or single quotation marks. If *selection_string* contains double quotation marks, enclose it in single quotation marks, for example:

```
-s 'Name == "testing"'
```

```
-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

**–v** Verifies that all of the attribute names specified on the command line or in the input file are defined as persistent attributes and are *not* designated as **read_only**. The **chrsrc** command does *not* change any persistent attribute values when you use this option.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** No resources were found that match the selection string.

## Security

The user needs write permission for the *resource_class* specified in **chrsrc** to run **chrsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chrsrc** Contains the **chrsrc** command

## Examples

1. To change the **Int32**, **Uint32** and **SD** persistent resource attributes in resource class **IBM.Foo** for the resources that have a **Name** equal to **c175n05**, enter:

   ```
   chrsrc -s 'Name == "c175n05"' IBM.Foo \
   Int32=-9999 Uint32=9999\
   SD='["testing 1 2 3",1,{2,4,6}]'
   ```

2. To change the **Int32**, **Uint32** and **SD** resource attributes in resource class **IBM.Foo** for the resource that has a **Name** starting with **c175n**, using *resource_data_input_file* with the following contents:

   ```
   PersistentResourceAttributes::
   resource 1:
        Int32  = -9999
        Uint32 = 9999
        SD     = ["testing 1 2 3",1,{2,4,6}]
   ```

   enter:

   ```
   chrsrc -f /tmp/IBM.Foo.chrsrc \
   -s 'Name ?= "c175n"' IBM.Foo
   ```

3. To change the **Name** persistent resource attribute for the resource that has a resource handle equal to ″0x0001 0x4005 0x35ae868c 0x00000000 0xfeef2948 0x0d80b827″, enter:

   ```
   chrsrc -r "0x0001 0x4005 0x35ae868c 0x00000000 0xfeef2948 0x0d80b827" Name="c175n05"
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

"rmccli " on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations and about how to use expressions and selection strings

Commands: **lsrsrc**, **lsrsrcdef**, **mkrsrc**, **nodegrp**, **rmrsrc**

# lsactdef

## Name

**lsactdef** – displays the action definitions of a resource or a resource class.

## Synopsis

To display the action definitions of a *resource:*

**lsactdef** [**–p** *property*] [**–s i** | **o**] [**–e**] [**–a**] [**–l** | **–i** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class* [ *action1* [ *action2* ... ] ]

To display the action definitions of a *resource class:*

**lsactdef –c** [**–p** *property*] [**–s i** | **o**] [**–e**] [**–a**] [**–l** | **–i** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class* [ *action1* [ *action2* ... ] ]

To display all resource class names:

**lsactdef**

## Description

The **lsactdef** command displays a list of the action definitions of a resource or a resource class. By default, this command displays the action definitions of a *resource.* To see the action definitions of a *resource class,* specify the **-c** option.

If you do not specify any actions on the command line, this command only displays actions that are defined as **public**. To override this default, use the **-p** option or specify on the command line the names of the actions that have definitions you want to display.

To see the structured data definition that is required as input when this action is invoked, specify the **-s i** option. To see the structured data definition linked with the output that results from invoking this action, specify the **-s o** option.

By default, this command does not display action descriptions. To display action definitions and descriptions, specify the **-e** option.

## Parameters

*resource_class*
: Specifies the name of the resource class with the action definitions that you want to display. If *resource_class* is not specified, a list of all of the resource class names is displayed.

*action1* **[***action2...***]**
: Specifies one or more actions. If *resource_class* is specified, zero or more action names can be specified. If no actions are specified, all of the action definitions for *resource_class* are displayed. Enter specific action names to control which actions are displayed and in what order. Use blank spaces to separate action names.

## Options

**–a** Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment

variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management and peer domain exist, **lsactdef -a** with CT_MANAGEMENT_SCOPE not set will list the management domain. In this case, to list the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–c** Displays the action definitions for *resource_class*.

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (:). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses the specified delimiter. Use this option to specify a delimiter other than the default colon (:). An example is when the data to be displayed contains colons. Use this option to specify a delimiter of one or more characters.

**–e** Specifies expanded format. Displays descriptions along with the action definitions.

**–i** Specifies input format. Generates a template of *resource_data_input_file*. The output is displayed in long (stanza) format. The attribute's SD element data types are displayed as the value in the *attr=value* pairs. It is suggested that when you use this option, the output of the **lsactdef** command be directed to a file. This option overrides the **–s o** option.

**–l** Specifies ″long″ format — one entry per line. This is the default display format. If the **lsactdef** command is issued with the **-l** option, but without a resource class name, the **-l** option is ignored when the command returns the list of defined resource class names.

**–p** *property*
Displays actions with the specified *property*. By default, only the definitions for public actions are displayed. To display all action definitions regardless of the action property, use the **-p 0** option.

**Action properties:**

| | |
|---|---|
| 0x0001 | **long_running** |
| 0x0002 | **public** |

A decimal or hexadecimal value can be specified for the property. To request the action definitions for all actions that have one or more properties, ″OR″ the properties of interest together and then specify the ″OR″ed value with the **-p** option. For example, to request the action definitions for all actions that are **long_running** or **public**, enter:

```
-p 0x03
```

**–s i | o**
Displays the structured data definition for the action input or action response.

**i** Displays the action input structured data definitions. This is the default.

**o** Displays the action response (output) structured data definitions.

**–t** Specifies table format. Each attribute is displayed in a separate column, with one resource per line.

**–x** Suppresses header printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

The user needs read permission for the *resource_class* specified in **lsactdef** to run **lsactdef**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsactdef** Contains the **lsactdef** command

## Examples

1. To list the names of all of the resource classes, enter:

   ```
   lsactdef
   ```

   The output will look like this:

   ```
   class_name
   "IBM.Association"
   "IBM.AuditLog"
   "IBM.AuditLogTemplate"
   "IBM.Condition"
   "IBM.EventResponse"
   "IBM.Host"
   "IBM.Program"
   "IBM.Sensor"
   "IBM.ManagedNode"
   ...
   ```

2. To list the public resource action definitions for resource class IBM.AuditLog, enter:

   ```
   lsactdef IBM.AuditLog
   ```

   The output will look like this:

   ```
   Resource Action Definitions for
   class_name: IBM.AuditLog
   action 1:
           action_name    = "GetRecords"
           display_name   = ""
           description    = ""
           properties     = {"public"}
           confirm_prompt = ""
           action_id      = 0
           variety_list   = {{1..1}}
           variety_count  = 1
           timeout        = 0
   action 2:
           action_name    = "DeleteRecords"
           display_name   = ""
           description    = ""
           properties     = {"public"}
           confirm_prompt = ""
           action_id      = 1
           variety_list   = {{1..1}}
           variety_count  = 1
           timeout        = 0
   ....
   ```

3. To list the structured data definition required for invoking the action on resources in resource class IBM.AuditLog, action GetRecords, enter:

```
lsactdef -s i IBM.AuditLog GetRecords
```

The output will look like this:

```
Resource Action Input for: IBM.AuditLog
action_name GetRecords:
sd_element 1:
        element_name      = "MatchCriteria"
 display_name      = ""
 description       = ""
        element_data_type = "char_ptr"
 element_index     = 0
sd_element 2:
        element_name      = "IncludeDetail"
 display_name      = ""
 description       = ""
        element_data_type = "uint32"
        element_index     = 1
```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC commands

Books:

- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrcdef**

# lsrsrc

## Name

**lsrsrc** – displays attributes and values for a resource or a resource class.

## Synopsis

To display the attributes and values for a *resource:*

**lsrsrc** [**–s** *"selection_string"*] [ **–A p** | **d** | **b** ] [**–p** *property*] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] [*resource_class*] [*attr*...]

**lsrsrc –r** [**–s** *"selection_string"*] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] [*resource_class*]

To display the attributes and values for a *resource class:*

**lsrsrc –c** [ **–A p** | **d** | **b** ] [**–p** *property*] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

**lsrsrc –C** *domain_name1*, *domain_name2*, ... *domain_name_n* [ **–A p** | **d** | **b** ] [**–p** *property*] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display a list of all of the resource classes:

**lsrsrc**

## Description

The **lsrsrc** command displays the persistent and dynamic attributes and their values for a resource or a resource class.

When no attribute names are specified:

- only attributes that are defined as **public** are displayed. Use the **-p** option to override this default.
- the **-A p** | **d** | **b** option controls whether persistent attributes or dynamic attributes or both — and their values — are displayed.

When one or more attribute names are specified, these names and their values are displayed in the order specified, provided that each of the specified attribute names is valid.

To display a list of the attributes and values for a resource class, specify the **-c** option.

Specify the **-r** option to display only the resource handles associated with the resources for the specified resource class.

By default, the resource attributes and values are displayed in long format. Use the **-t**, **-d**, or **-D** option for the resources to be displayed in table format or delimiter-formatted output.

For best performance, specify either the **-A p** option or only persistent attributes as parameters.

Any attribute that has a data type defined as **ct_none** (for example, a **Quantum**) is not listed by the **lsrsrc** command. RMC does not return attribute values for attributes that are defined as **Quantum**. To list attribute definitions, use the **lsrsrcdef** command.

You can use CSM defined node groups as node name values to refer to more than one node.For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*resource_class*
Specifies the name of the resource class with the resources that you want to display.

*attr*... Specifies one or more attribute names. Both persistent and dynamic attribute names can be specified to control which attributes are displayed and their order. Zero or more attributes can be specified. Attributes must be separated by spaces. If no attribute names are specified, the **-A p** | **d** | **b** option controls whether persistent attributes or dynamic attributes or both are displayed. When no attribute names are specified, only attributes that are defined as **public** are displayed. Use the **-p** option to override this default.

## Options

**–a** Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management and peer domain exist, **lsrsrc -a** with CT_MANAGEMENT_SCOPE not set will list the management domain. In this case, to list the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–A p | d | b**
Specifies an attribute type. By default only persistent attributes are displayed. This option can be used only when no attribute names are specified on the command line.

**p** Displays only persistent attributes.

**d** Displays only dynamic attributes.

**b** Displays both persistent and dynamic attributes.

For best performance, specify the **-A p** option.

**–c** Displays the attributes for the resource class. This option overrides the **-r** option.

**–C** *domain_name1*, *domain_name2*, *... domain_name_n*
Displays the class attributes of a globalized resource class on the specified RSCT peer domains that are defined on the management server. Globalized classes are used in peer domains and management domains for resource classes that contain information about the domain. To display class attributes of a globalized resource class on all peer domains defined on the management server, use the **-c** option with the **-a** option instead of

**-C**. The command returns the name of the peer domain in the form of an attribute **ActivePeerDomain**. This is not an actual attribute, but is presented as such to indicate which peer domain is being displayed.

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (:). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses the specified delimiter. Use this option to specify something other than the default colon (:). An example is when the data to be displayed contains colons. Use this option to specify a delimiter of one or more characters.

**–i** Generates a template of *resource_data_input_file* that can then, after appropriate editing, be used as input to the **mkrsrc** command. The output is displayed in long (stanza) format. All required and optional attributes that can be used to define a resource are displayed. The attribute data type is displayed as the value in the *attr=value* pairs. It is suggested that when you use this option, the output of the **lsrsrc** command be directed to a file. This option overrides the **–s** and **–A d** options.

**–l** Specifies long formatted output. Each attribute is displayed on a separate line. This is the default display format. If the **lsrsrc** command is issued with the **-l** option, but without a resource class name, the **-l** option is ignored when the command returns the list of defined resource class names.

**–p** *property*
Displays attributes with the specified *property*. By default, only public attributes are displayed. To display all of the attributes regardless of the property, use the **-p 0** option. Use this option in conjunction with the **-A** option when no attributes are specified on the command line.

***Persistent attribute properties:***

| | |
|---|---|
| **0x0001** | **read_only** |
| **0x0002** | **reqd_for_define** (required) |
| **0x0004** | **inval_for_define** (not valid) |
| **0x0008** | **option_for_define** (optional) |
| **0x0010** | **selectable** |
| **0x0020** | **public** |

***Dynamic attribute properties:***

| | |
|---|---|
| **0x0020** | **public** |

A decimal or hexadecimal value can be specified for the property. To display attributes and their values for all attributes that have one or more properties, ″OR″ the properties of interest together and then specify the ″OR″ed value with the **-p** option. For example, to display attributes and their values for all persistent attributes that are either **reqd_for_define** or **option_for_define**, enter:

```
lsrsrc -p 0x0a
```

**–r** Displays the resource handles for the resources that match the specified selection string or all resources when no selection string is specified.

**–s** ″*selection_string*″
Specifies a selection string. All selection strings must be enclosed within

either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'
-s 'Name ?= "test"'
```

Only persistent attributes may be listed in a selection string. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

**–t** Specifies table format. Each attribute is displayed in a separate column, with one resource per line.

**–x** Suppresses header printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

The user needs read permission for the *resource_class* specified in **lsrsrc** to run **lsrsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsrsrc** Contains the **lsrsrc** command

## Examples

1. To list the names of all of the resource classes, enter:

   ```
   lsrsrc
   ```

   The output will look like this:

   ```
   class_name
   "IBM.Association"
   "IBM.Condition"
   'IBM.EventResponse"
   "IBM.Host"
   "IBM.Ethernet"
   "IBM.TokenRing"
   ...
   ```

2. To list the persistent attributes for resource IBM.Host that have four processors, enter:

   ```
   lsrsrc -s "NumProcessors == 4" -A p -p 0 IBM.Host
   ```

   The output will look like this:

   ```
   Resource Persistent Attributes for: IBM.Host
   resource 1:
           Name           = "c175n05.rnd.unixrulz.com"
           ResourceHandle = "0x4008 0x0001 0x00000000 0x0069684c 0x0d7f55d5 0x0c32fde3"
           Variety        = 1
           NodeList       = {1}
           NumProcessors  = 4
           RealMemSize    = 1073696768
   ```

3. To list the public dynamic attributes for resource IBM.Host on node 1, enter:

```
lsrsrc -s 'Name == "c175n05.rnd.unixrulz.com"' -A d IBM.Host
```

   The output will look like this:

```
Resource Dynamic Attributes for: IBM.Host
resource 1:
        ProcRunQueue        = 1.03347987093142
        ProcSwapQueue       = 1.00548852941929
        TotalPgSpSize       = 65536
        TotalPgSpFree       = 65131
        PctTotalPgSpUsed    = 0.61798095703125
        PctTotalPgSpFree    = 99.3820190429688
        PctTotalTimeIdle    = 0
        PctTotalTimeWait    = 51.5244382399734
        PctTotalTimeUser    = 12.8246006482343
        PctTotalTimeKernel  = 35.6509611117922
        PctRealMemFree      = 66
        PctRealMemPinned    = 4
        RealMemFramesFree   = 173361
        VMPgInRate          = 0
        VMPgOutRate         = 0
        VMPgFaultRate       = 0
         ...
```

4. To list the Name, Variety, and ProcessorType attributes for the IBM.Processor resource on all the online nodes, enter:

```
lsrsrc IBM.Processor Name Variety ProcessorType
```

   The output will look like this:

```
Resource Persistent Attributes for: IBM.Processor
resource 1:
        Name          = "proc3"
        Variety       = 1
        ProcessorType = "PowerPC_604"
resource 2:
        Name          = "proc2"
        Variety       = 1
        ProcessorType = "PowerPC_604"
resource 3:
        Name          = "proc1"
        Variety       = 1
        ProcessorType = "PowerPC_604"
resource 4:
        Name          = "proc0"
        Variety       = 1
        ProcessorType = "PowerPC_604"
```

5. To list both the persistent and dynamic attributes for the resource class IBM.Condition, enter:

```
lsrsrc -c -A b -p 0 IBM.Condition
```

   The output will look like this:

```
Resource Class Persistent and Dynamic Attributes for: IBM.Condition
resource 1:
        ResourceType = 0
        Variety      = 0
```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

"rmccli " on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrcdef**, **mkrsrc**, **nodegrp**,

# lsrsrcdef

## Name

**lsrsrcdef** – displays definition information for a resource or a resource class.

## Synopsis

For a *resource*...

To display the definition:

**lsrsrcdef** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display the persistent attribute definitions:

**lsrsrcdef –A p** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display the dynamic attribute definitions:

**lsrsrcdef –A d** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

For a *resource class*...

To display the definition:

**lsrsrcdef –c** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display the persistent attribute definitions:

**lsrsrcdef –c –A p** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display the dynamic attribute definitions:

**lsrsrcdef –c –A d** [**–p** *property*] [**–e**] [**–s**] [ **–l** | **–i** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–a**] [**–h**] [**–TV**] *resource_class* [*attr*...]

To display a list of all of the resource class names:

**lsrsrcdef**

## Description

The **lsrsrcdef** command displays the definition of a resource or a resource class or the persistent or dynamic attribute definitions of a resource or a resource class. By default:

- if no *attr* parameters are specified on the command line, this command displays the definitions for **public** attributes. To override this default, use the **-p** option or specify the name of the attribute you want to display.
- this command does not display attribute descriptions. To display attribute definitions and descriptions, specify the **-e** option.

## Parameters

*resource_class*
Specifies the name of the resource class with the attribute definitions you want to display.

*attr* If a *resource_class* parameter is specified, zero or more attribute names can be specified. If no *attr* parameter is specified, the definition for all of the attributes for the resource are displayed. Specify individual attribute names to control which attributes are displayed and their order. Specify only persistent attribute names when the **-A p** option is used. Specify only dynamic attribute names when the **-A d** option is used. Attributes must be separated by spaces.

## Options

**–a** Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management and peer domain exist, **lsrsrcdef -a** with CT_MANAGEMENT_SCOPE not set will display the management domain. In this case, to display the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–A p | d**
Specifies the attribute type. You can display either persistent or dynamic attribute definitions. Use this option with the **-c** option to display the persistent or dynamic attribute definitions of a resource class.

**p** Displays only persistent attributes

**d** Displays only dynamic attributes

**–c** Displays the definition of a resource class definition. To display the persistent attribute definitions for a resource class, specify this option with the **-A p** option. To display the dynamic attribute definitions for a resource class, specify this option with the **-A d** option.

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (:). Use the **-D** option to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses the specified delimiter. Use this option to specify something other than the default colon (:). An example is when the data to be displayed contains colons. Use this option to specify a delimiter of one or more characters.

**–e** Specifies expanded format. By default, the descriptions of the definitons are not displayed. Specify this option to display the definitions and the descriptions.

**–i** Generates a template of *resource_data_input_file* that can then, after appropriate editing, be used as input to the **mkrsrc** command. The output is displayed in long (stanza) format. All required and optional attributes that can be used to define a resource are displayed. The attribute data type is displayed as the value in the *attr=value* pairs. It is suggested that when you use this option, the output of the **lsrsrcdef** command be directed to a file. This option overrides the **–s** and **–A d** options.

**–l** Specifies ″long″ format — one entry per line. This is the default display format. If the **lsrsrcdef -l** command is issued without a resource class name, this option is ignored when the command returns the list of defined resource class names.

**–p** *property*
Displays attribute definitions for attributes with the specified *property*. By default, only the definitions for **public** attributes are displayed. To display all attribute definitions regardless of the property, use the **-p 0** option.

***Persistent attribute properties:***

| | |
|---|---|
| **0x0001** | **read_only** |
| **0x0002** | **reqd_for_define** (required) |
| **0x0004** | **inval_for_define** (not valid) |
| **0x0008** | **option_for_define** (optional) |
| **0x0010** | **selectable** |
| **0x0020** | **public** |

***Dynamic attribute properties:***

| | |
|---|---|
| 0x0020 | **public** |

A decimal or hexadecimal value can be specified for the property. To request the attribute definitions for all attributes that have one or more properties, ″OR″ the properties of interest together and then specify the ″OR″ed value with the **-p** option. For example, to request the attribute definitions for all persistent attributes that are either **reqd_for_define** or **option_for_define**, enter:

```
lsrsrcdef -p 0x0a
```

**–s** Displays the structured data definition. Specify this option for the structured data definition to be expanded so that each element definition of the structured data attributes is displayed.

**–t** Specifies table format. Each attribute is displayed in a separate column, with one resource per line.

**–x** Suppresses header printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

The user needs write permission for the *resource_class* specified in **lsrsrcdef** to run **lsrsrcdef**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsrsrcdef** Contains the **lsrsrcdef** command

## Examples

1. To display the names of all of the resource classes defined on the system, enter:

   ```
   lsrsrcdef
   ```

   The output will look like this:

   ```
   class_name
   "IBM.ATMDevice"
   "IBM.Association"
   "IBM.AuditLog"
   "IBM.AuditLogTemplate"
   "IBM.Condition"
   "IBM.EthernetDevice"
   "IBM.EventResponse"
   ...
   ```

2. To display the resource class definitions for resource IBM.Host, enter:

   ```
   lsrsrcdef -c IBM.Host
   ```

   The output will look like this:

   ```
   Resource Class Definition for: IBM.Host
   resource class 1:
           class_name         = "IBM.Host"
           class_id           = 8
           properties         = {"has_rsrc_insts","mtype_subdivided"}
           display_name       = ""
           description        = ""
           locator            = "NodeList"
           class_pattr_count  = 1
           class_dattr_count  = 3
           class_action_count = 0
           pattr_count        = 6
           dattr_count        = 47
           action_count       = 0
           error_count        = 0
           rsrc_mgr_count     = 1
   rsrc_mgrs 1:
           mgr_name  = "IBM.HostRM"
           first_key = 1
           last_key  = 1
   ```

3. To display the resource class persistent attribute definitions for resource IBM.Host, enter:

   ```
   lsrsrcdef -c -A p -p 0 IBM.Host
   ```

   The output will look like this:

   ```
   Resource Class Persistent Attribute Definitions for: IBM.Host
   attribute 1:
           program_name              = "Variety"
           display_name              = ""
           group_name                = ""
           properties                = {"read_only","inval_for_define"}
           description               = ""
           attribute_id              = 0
           group_id                  = 255
           data_type                 = "uint32"
           variety_list              = {{1..1}}
           variety_count             = 1
           default_value             = 0
   ```

4. To display the resource persistent attribute definitions and descriptions for resource IBM.Host, enter:

   ```
   lsrsrcdef -A p -p 0 -e IBM.Host
   ```

The output will look like this:

```
Resource Persistent Attribute Definitions for: IBM.Host
attribute 1:
        program_name       = "Name"
        display_name       = "Name"
        group_name         = "General"
        properties         = {"reqd_for_define","public","selectable"}
        description        = "Identifies the current name of the host
                              as returned by command."
        attribute_id       = 0
        group_id           = 0
        data_type          = "char_ptr"
        variety_list       = {{1..1}}
        variety_count      = 1
        default_value      = ""
attribute 2:
        program_name       = "ResourceHandle"
        display_name       = "Resource Handle"
        group_name         = "Internal"
        properties         = {"read_only","inval_for_define","selectable"}
        description        = "A globally unique handle that identifies the host.
                              Every resource is assigned a resource handle,
                              which is used internally for identifying and
                              locating each resource.  The resource handle
                              is fixed in size and avoids the problems of
                              name space collisions across different types
                              of resources."
        attribute_id       = 1
        group_id           = 255
        data_type          = "rsrc_handle_ptr"
        variety_list       = {{1..1}}
        variety_count      = 1
        default_value      = "0x0000 0x0000 0x00000000 0x00000000 0x00000000 0x00000000"
attribute 3:
        program_name       = "Variety"
        display_name       = "Variety"
        group_name         = "Internal"
 ...
```

5. To display the public dynamic attributes for resource IBM.Host, enter:

```
lsrsrcdef -A d IBM.Host
```

The output will look like this:

```
Resource Dynamic Attribute Definitions for: IBM.Host
attribute 1:
        program_name           = "ProcRunQueue"
        display_name           = ""
        group_name             = ""
        properties             = {"public"}
        description            = ""
        attribute_id           = 1
        group_id               = 1
        data_type              = "float64"
        variable_type          = 0
        variety_list           = {{1..1}}
        variety_count          = 1
        init_value             = 0
        min_value              = 0
        max_value              = 100
        expression             = "(ProcRunQueue - ProcRunQueue@P) >= (ProcRunQueue@P * 0.5)"
        expression_description = ""
        rearm_expression       = "ProcRunQueue < 50"
        rearm_description      = ""
        PTX_name               = ""
attribute 2:
...
```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

- “resource_data_input ” on page 74
- “rmccli ” on page 79, for general information about RMC commands

Books:

- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **mkrsrc**

# mkrsrc

## Name

**mkrsrc** – defines a new resource.

## Synopsis

To define a new resource, using data that is...

- entered on the command line:
  **mkrsrc** [**–v**] [**–h**] [**–TV**] *resource_class attr*=*value...*
- predefined in an input file:
  **mkrsrc –f** *resource_data_input_file* [**–v**] [**–h**] [**–TV**] *resource_class*

To display the names and data types of the command arguments:

**mkrsrc –l** [**–h**] *resource_class*

To see examples of the **mkrsrc** command for a resource class:

**mkrsrc –e** [**–h**] [**–TV**] *resource_class*

## Description

The **mkrsrc** command requests that the RMC subsystem define a new resource instance for the class specified by the *resource_class* parameter. At least one persistent attribute name and its value must be specified either as a parameter or by a resource definition file using the **-f** option.

Before you run **mkrsrc**, you should run the **lsrsrcdef** command to determine which attributes are designated as **reqd_for_define** (required) or **option_for_define** (optional). Only attributes that are designated as **reqd_for_define** or **option_for_define** can be defined using the **mkrsrc** command. The **lsrsrcdef** command also identifies the datatype for each attribute. The value specified for each attribute must match this datatype.

To verify that all of the attribute names that are specified on the command line or in *resource_data_input_file* are defined as persistent attributes and are designated as **reqd_for_define** or **option_for_define**, use the **-v** option. When the **mkrsrc** command is run with the **-v** option, the resource is not defined. Instead, the resource attributes are merely verified to be persistent and designated as **reqd_for_define** or **option_for_define**. Once you have run **mkrsrc -v** to verify that all of the attributes that are specified on the command line or in *resource_data_input_file* are valid, you can issue the **mkrsrc** command without the **-v** option to define the new resource.

## Parameters

*resource_class*
: Specifies the resource class name of the resource to be defined.

*attr*=*value...*
: Specifies the attributes of the resource being defined. When defining a new resource instance, there are specific required attributes for each resource that must be defined. These attributes can be specified as parameters on the command line or defined in an input file by using the **-f** option.

*attr* The name of a persistent attribute for this resource. This attribute must be designated as **reqd_for_define** or **option_for_define**. Use the **lsrsrcdef** command to check the designation.

*value* The value for this persistent attribute. The data type for this value must match the defined data type for the value of this attribute. Use the **lsrsrcdef** command to verify the data type for each attribute.

## Options

**–e** Displays examples of **mkrsrc** command-line input for:

1. required attributes only
2. required and optional attributes

**–f** *resource_data_input_file*
Specifies the name of the file that contains resource attribute information.

**-l** Lists the command arguments and data types. Some resource managers accept additional arguments that are passed to the define request. Use this option to list any defined command arguments and the data types of the command argument values.

**–v** Verifies that all of the attribute names specified on the command line or in the input file are defined as persistent attributes and are designated as **reqd_for_define** or **option_for_define**. The **mkrsrc** command does *not* define any resources when you use this option.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

The command output and all verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

The user needs write permission for the *resource_class* specified in **mkrsrc** to run **mkrsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkrsrc** Contains the **mkrsrc** command

## Examples

1. To create a new resource in the **IBM.Host** class, assuming you already know which persistent attributes are required when defining a resource of this class, enter:

   ```
   mkrsrc IBM.Host Name=c175n05
   ```

2. To create a new resource in the **IBM.Processor** class by first generating a template to aid in the defining of these resources, enter:

   ```
   lsrsrcdef -i IBM.Processor > /tmp/IBM.Processor.rdef
   ```

   Then, edit the file **/tmp/IBM.Processor.rdef** and enter values for all of the attributes, substituting the type for an appropriate value, or leaving it blank for the default value.

Finally, enter:

```
mkrsrc -f /tmp/IBM.Processor.rdef IBM.Processor
```

3. To create two new **IBM.Host** resources using the information defined in file **/tmp/IBM.Host.rdef**, enter:

   ```
   mkrsrc -f /tmp/IBM.Host.rdef IBM.Host
   ```

   where the file **/tmp/IBM.Host.rdef** looks like this:

   ```
   PersistentResourceAttributes::
   resource 1:
       Name        = c175n04

   resource 2:
       Name        = c175n05
   ```

4. This example creates a new resource in the **IBM.Foo** class. In this class, **Name** and **NodeList** are required attributes. The **Binary**, **SD**, **StringArray**, and **SDArray** attributes are optional. This example shows how to enter the more difficult data types from the command line. The data types for the optional attributes (**Binary**, **SD**, **StringArray**, and **SDArray**) are self-explanatory. Enter:

   ```
   mkrsrc IBM.Foo Name=c175n05 \
   NodeList={1} \
   Binary="0xaabbccddeeff00" \
   SD='[testing123,1,{2,4,6}]' \
   StringArray='{"testing 1 2 3",testing123,"testing 1 2 3"}' \
   SDArray='{["testing 1 2 3",1,{1,3,5}],[testing,2,{2,4,6}]}'
   ```

   **Note:** As discussed in “rmccli ” on page 79, attribute values for certain data types (structured data, arrays of structured data, and arrays containing strings enclosed in double quotation marks) should be enclosed in single quotation marks.

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

- “resource_data_input ” on page 74
- “rmccli ” on page 79, for general information about RMC commands

Books:

- *RSCT: Administration Guide*, for information about RMC operations

Commands: **chrsrc**, **lsrsrc**, **lsrsrcdef**, **rmrsrc**

# refrsrc

## Name

**refrsrc** – refreshes the resources within the specified resource class.

## Synopsis

**refrsrc** [**–h**] [**–TV**] *resource_class*

## Description

The **refrsrc** command refreshes the resources within the specified resource class. Use this command to force the resource monitoring and control (RMC) subsystem to detect new instances of resources in cases where the configuration could be altered by operating system commands (**mkfs**, for example).

This command makes a request to the RMC subsystem to refresh the configuration of the resources within a resource class. The request is actually performed by the linked resource manager.

Any application that is monitoring resources in the specified resource class may receive events as the configuration is refreshed.

## Parameters

*resource_class* Specifies the resource class name.

## Options

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes.

The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

To run the **refrsrc** command, you need read permission for the resource class that you specify with the command. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/refrsrc** Contains the **refrsrc** command

## Examples

1. To refresh the configuration of the resources in class IBM.FileSystem, enter:

```
refrsrc IBM.FileSystem
```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC commands

Books:

- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **lsrsrcdef**

# resetrsrc

## Name

**resetrsrc** – resets a resource (that is, forces it offline).

## Synopsis

To reset one or more resources, using data entered on the command line:

**resetrsrc -s** *"selection_string"* [**–h**] [**–TV**] *resource_class* [*arg*=*value...*]

**resetrsrc -r** [**–h**] [**–TV**] *resource_handle* [*arg*=*value...*]

To reset one or more resources using command arguments that are predefined in an input file:

**resetrsrc -f** *resource_data_input_file* **-s** *"selection_string"* [**–h**] [**–TV**] *resource_class*

**resetrsrc -f** *resource_data_input_file* **-r** [**–h**] [**–TV**] *resource_handle*

To display the names and data types of the command arguments:

**resetrsrc -l** [**–h**] *resource_class*

## Description

The **resetrsrc** command requests that the resource monitoring and control (RMC) subsystem force one or more resources offline. The request is actually performed by the appropriate resource manager.

To reset one or more resources, use the **-s** option to force offline all of the resources that match the specified selection string. To reset one specific resource, use the **-r** option to specify the resource handle that represents that specific resource.

The successful completion of this command does not guarantee that the resource is offline, only that the resource manager successfully received the request to force this resource offline. Monitor the resource's dynamic attribute **OpState** to determine when the resource is actually forced offline. Register an event for the resource, specifying the **OpState** attribute, to know when the resource is actually offline. Or, intermittently run the **lsrsrc** command until you see that the resource is offline (the value of **OpState** is **2**). For example:

```
lsrsrc -s 'Name == "/filesys1"' -t IBM.FileSystem Name OpState
```

Use the **-l** option to determine whether the specified resource class accepts any additional command arguments.

You can use CSM defined node groups as node name values to refer to more than one node.For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*resource_class*
Specifies the name of the resource class that contains the resources that you want to force offline.

*resource_handle*
Specifies the resource handle that corresponds to the resource you want to force offline. Use the **lsrsrc** command to obtain a list of valid resource handles. The resource handle must be enclosed within double quotation marks, for example:

```
"0x4017 0x0001 0x00000000 0x0069684c 0x0d4715b0 0xe9635f69"
```

*arg*=*value...*
Specifies one or more pairs of command argument names and values.

*arg* Specifies the argument name.

*value* Specifies the value for this argument. The value's data type must match the definition of the argument's data type.

Command arguments are optional. If any *arg*=*value* pairs are entered, there should be one *arg*=*value* pair for each of the command arguments defined for the offline function for the specified resource class.

Use **resetrsrc -l** to get a list of the command argument names and data types for the specific resource class.

## Options

**-f** *resource_data_input_file*
Specifies the name of the file that contains resource attribute information. The contents of the file would look like this:

```
PersistentResourceArguments::
argument1 = value1
argument2 = value2
```

**-l** Lists the command arguments and data types. Some resource managers accept additional arguments that are passed to the offline request. Use this option to list any defined command arguments and the data types of the command argument values.

**-r** Forces offline the specific resource that matches the specified resource handle.

**-s** *"selection_string"*
Specifies the selection string. All selection strings must be enclosed within either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'

-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** No resources were found that match the specified selection string.

## Security

The user needs write permission for the *resource_class* specified in **resetrsrc** to run **resetrsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/resetrsrc** Contains the **resetrsrc** command

## Examples

Suppose you have a peer domain called **foo** with three defined nodes: **nodeA**, **nodeB**, and **nodeC**. **nodeA** has two Ethernet cards: **ent0** and **ent1**.

1. Suppose **nodeA** is online and **ent0** (on **nodeA**) is also online. To force **ent0** offline on **nodeA**, run this command on **nodeA**:

   ```
   resetrsrc -s 'Name == "ent0"' IBM.EthernetDevice
   ```

2. Suppose **nodeA** and **nodeB** are online, **ent0** (on **nodeA**) is also online, and you are currently logged on to **nodeB**. To force **ent0** offline on **nodeA**, run this command on **nodeB**:

   ```
   resetrsrc -s 'NodeName == "A" AND Name == "ent0"' IBM.EthernetDevice
   ```

3. Suppose **nodeA** and **nodeB** are online and file system **/filesys1** is defined and mounted on **nodeB**. To force **/filesys1** offline on **nodeB**, run this command on **nodeA**:

   ```
   resetrsrc -s 'NodeName == "B" AND Name == "/filesys1"' IBM.FileSystem
   ```

4. Suppose the resource handle for **ent0** on **nodeA** is:

   ```
   0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e
   ```

   To force **ent0** offline on **nodeA**, run this command on **nodeA**:

   ```
   resetrsrc -r "0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e"
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

"resource_data_input " on page 74

"rmccli " on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **nodegrp**, **startrsrc**, **stoprsrc**

# rmrsrc

## Name

**rmrsrc** – removes a defined resource.

## Synopsis

To remove one or more resources...

- entered on the command line:

  **rmrsrc –s** *"selection_string"* [**–a**] [**–h**] [**–TV**] *resource_class*

  **rmrsrc –r** *"resource_handle"* [**–a**] [**–h**] [**–TV**]

- predefined in an input file:

  **rmrsrc –f** *resource_data_input_file* **–s** *"selection_string"* [**–a**] [**–h**] [**–TV**] *resource_class*

  **rmrsrc –f** *resource_data_input_file* **–r** *"resource_handle"* [**–a**] [**–h**] [**–TV**]

To display the names and data types of the command arguments:

**rmrsrc –l** [**–h**] *resource_class*

## Description

The **rmrsrc** command removes — or "undefines" — the specified resource instance (or instances). The **rmrsrc** command makes a request to the resource monitoring and control (RMC) subsystem to undefine a specific resource instance. The resource manager of the resource removes the resource.

The first format of this command requires a resource class name parameter and a selection string specified using the **-s** option. All resources in the specified resource class that match the specified selection string are removed. If the selection string identifies more than one resource to be removed, it is the same as running this command once for each resource that matches the selection string.

The second format of this command allows the actual resource handle linked with a specific resource to be specified as the parameter. It is expected that this form of the command would be more likely used from within a script.

You can use CSM defined node groups as node name values to refer to more than one node.For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*resource_class*
: Specifies the resource class name. The resource instances for this resource class that match the selection string criteria are removed.

## Options

**–a**
: Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the **CT_MANAGEMENT_SCOPE** environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command

will run once for the first valid scope found. For example, if both a management and peer domain exist, **rmrsrc -a** with **CT_MANAGEMENT_SCOPE** not set will apply to the management domain. In this case, to apply to the peer domain, set **CT_MANAGEMENT_SCOPE** to **2**.

**–f** *resource_data_input_file*
Specifies the name of the file that contains resource argument information.

**-l** Lists the command arguments and data types. Some resource managers accept additional arguments that are passed to the remove request. Use this option to list any defined command arguments and the data types of the command argument values.

**–r** *"resource_handle"*
Specifies a resource handle. The resource handle must be specified in this format:

*"***0x***nnnn* **0x***nnnn* **0x***nnnnnnnn* **0x***nnnnnnnn* **0x***nnnnnnnn* **0x***nnnnnnnn"*

where *n* is a hexadecimal character. The resource handle uniquely identifies a particular resource instance that should be removed.

**–s** *"selection_string"*
Specifies a selection string. All selection strings must be enclosed within either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'
-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

The command output and all verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** No resources were found that match the selection string.

## Security

To run the **rmrsrc** command, you need write permission for the resource class that you specify with the command. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmrsrc** Contains the **rmrsrc** command

## Examples

1. To remove the resource named **c175n05** from the **IBM.Host** resource class, enter:

   ```
   rmrsrc -s 'Name == "c175n05"' IBM.Host
   ```

2. To remove the resource that is linked with resource handle **0x4017 0x0001 0x00000000 0x0069684c 0x0d52332b3 0xf3f54b45**, enter:

   ```
   rmrsrc -r "0x4017 0x0001 0x00000000 0x0069684c 0x0d52332b3 0xf3f54b45"
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **mkrsrc**, **nodegrp**

# runact

## Name

**runact** – runs an action on a resource class.

## Synopsis

**runact –s** *"selection_string"* [**–f** *resource_data_input_file*] [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class action* [*in_element0*=*value in_element1*=*value* ... *in_element_n*=*value*] [*rsp_element*...]

**runact –r** [**–f** *resource_data_input_file*] [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class action* [*in_element0*=*value in_element1*=*value* ... *in_element_n*=*value*] [*rsp_element*...]

**runact –c** [**–f** *resource_data_input_file*] [**–n** *node_name*] [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class action* [*in_element0*=*value in_element1*=*value* ... *in_element_n*=*value*] [*rsp_element*...]

**runact –C** *domain_name1*, *domain_name2*, ... *domain_name_n* [**–f** *resource_data_input_file*] [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] *resource_class action* [*in_element0*=*value in_element1*=*value* ... *in_element_n*=*value*] [*rsp_element*...]

## Description

The **runact** command requests that the RMC subsystem run the specified action on the specified resource class.

Before you run this command, use the **lsactdef** command to list the resource class actions that are supported by this resource class. Also, use the **lsactdef** command to list the required input action elements that must be specified when invoking an action. The **lsactdef** command also identifies the data type for each input element. The value specified for each input element must match this data type.

## Parameters

*resource_class*
: Specifies the name of the resource class with the actions that you want to invoke.

*action*
: Specifies the name of the action to be invoked.

*in_element_n*=*value*
: Specifies the action input element names and values. If you use the **-f** option, don't enter any *in_element_n*=*value* pairs on the command line.

  *in_element_n* is any of the input structured data element names. There should be one *in_element_n*=*value* pair for each of the defined structured data (SD) input elements for the specified action. Use **lsactdef** with the **-s i** option to list the input elements for a particular resource class and action. Use **lsactdef -i** to generate an input file template, which, after appropriate editing, can be used as the input file.

*value* must be the appropriate data type for the specified element. For example, if NodeNumber is defined as a uint32 data type, enter a positive numeric value.

*rsp_element* Specifies one or more of action response structured data element names. If you specify one or more element names, only those elements are displayed in the order specified. If you do not specify any element names, all elements of the response are displayed.

## Options

**–c** Invokes the action on the resource class.

**–C** *domain_name1*, *domain_name2*, *... domain_name_n*
Invokes a class action on a globalized resource class on the specified RSCT peer domains that are defined on the management server. Globalized classes are used in peer domains and management domains for resource classes that contain information about the domain. To invoke the class action on a globalized resource class on all peer domains defined on the management server, set **CT_MANAGEMENT_SCOPE=3** and use the **-c** option.

**–f** *resource_data_input_file*
Specifies the name of the file that contains resource action input elements and values. Use the **lsactdef** command with the **-i** option to generate a template for this input file.

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (:). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses the specified delimiter. Use this option to specify a delimiter other than the default colon (:). An example is when the data to be displayed contains colons. Use this option to specify a delimiter of one or more characters.

**–l** Specifies ″long″ format — one entry per line. This is the default display format.

**–n** *node_name*
Specifies the name of the node on which to run the class action. You can only use this option in conjunction with the **-c** option.

**–r** *″resource_handle″*
Specifies a resource handle. The resource handle must be specified in this format:

″**0x***nnnn* **0x***nnnn* **0x***nnnnnnnn* **0x***nnnnnnnn* **0x***nnnnnnnn* **0x***nnnnnnnn*″

where *n* is a hexadecimal character. Use this option to invoke the action on the resource that matches *resource_handle*.

**–s** *″selection_string″*
Specifies a selection string. All selection strings must be enclosed within either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'
-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

**–t** Specifies table format. Each attribute is displayed in a separate column, with one resource per line.

**–x** Suppresses header printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

## Security

To run the **runact** command, you need write permission for the resource class that you specify with the command. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/runact** Contains the **runact** command

## Examples

1. To invoke the TestClassAction resource class action on the resource class **IBM.Foo**, enter:

   ```
   runact -c IBM.Foo TestClassAction Int32=99
   ```

   The output will look like this:

   ```
   Resource Class Action Response for: TestClassAction
   sd_element 1:
      Int32 = 99
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

- “resource_data_input ” on page 74
- “rmccli ” on page 79, for general information about RMC commands

Books:

- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsactdef**

# startrsrc

## Name

**startrsrc** – starts a defined resource (that is, brings it online).

## Synopsis

To start one or more resources, using data entered on the command line:

**startrsrc -s** *"selection_string"* [**-n** *node_name*] [**–h**] [**–TV**] *resource_class* [*arg*=*value...*]

**startrsrc -r** [**-n** *node_name*] [**–h**] [**–TV**] *resource_handle* [*arg*=*value...*]

To start one or more resources using command arguments that are predefined in an input file:

**startrsrc -f** *resource_data_input_file* **-s** *"selection_string"* [**-n** *node_name*] [**–h**] [**–TV**] *resource_class*

**startrsrc -f** *resource_data_input_file* **-r** [**-n** *node_name*] [**–h**] [**–TV**] *resource_handle*

To list the names and data types of the command arguments:

**startrsrc -l** [**–h**] *resource_class*

## Description

The **startrsrc** command requests that the resource monitoring and control (RMC) subsystem bring one or more resources online. The request is actually performed by the appropriate resource manager.

To start one or more resources, use the **-s** option to bring online all of the resources that match the specified selection string. To start one specific resource, use the **-r** option to specify the resource handle that represents that specific resource.

The successful completion of this command does not guarantee that the resource is online, only that the resource manager successfully received the request to bring this resource online. Monitor the resource's dynamic attribute **OpState** to determine when the resource is actually brought online. Register an event for the resource, specifying the **OpState** attribute, to know when the resource is actually online. Or, intermittently run the **lsrsrc** command until you see that the resource is online (the value of **OpState** is **1**). For example:

```
lsrsrc -s 'Name == "/filesys1"' -t IBM.FileSystem Name OpState
```

Use the **-l** option to determine whether the specified resource class accepts any additional command arguments.

You can use CSM defined node groups as node name values to refer to more than one node.For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*resource_class*
Specifies the name of the resource class that contains the resources that you want to bring online.

*resource_handle*
Specifies the resource handle that corresponds to the resource you want to bring online. Use the **lsrsrc** command to obtain a list of valid resource handles. The resource handle must be enclosed within double quotation marks, for example:

```
"0x4017 0x0001 0x00000000 0x0069684c 0x0d4715b0 0xe9635f69"
```

*arg*=*value...*
Specifies one or more pairs of command argument names and values.

*arg* Specifies the argument name.

*value* Specifies the value for this argument. The value's data type must match the definition of the argument's data type.

Command arguments are optional. If any *arg*=*value* pairs are entered, there should be one *arg*=*value* pair for each of the command arguments defined for the online function for the specified resource class.

Use **startrsrc -l** to get a list of the command argument names and data types for the specific resource class.

## Options

**-f** *resource_data_input_file*
Specifies the name of the file that contains resource attribute information. The contents of the file would look like this:

```
PersistentResourceArguments::
argument1 = value1
argument2 = value2
```

**-l** Lists the command arguments and data types. Some resource managers accept additional arguments that are passed to the online request. Use this option to list any defined command arguments and the data types of the command argument values.

**-n** *node_name*
Specifies the node name of the node where the resource is to be brought online. Use this option to bring a floating resource online on a different node when the node where it had been online may be down. The node name is one of the names contained in the **NodeNameList** attribute.

Do *not* specify this option if you want the resource to be brought online on the node where it is known.

**-r** Brings online the specific resource that matches the specified resource handle.

**-s** *"selection_string"*
Specifies the selection string. All selection strings must be enclosed within

either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'

-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** No resources were found that match the specified selection string.

## Security

The user needs write permission for the *resource_class* specified in **startrsrc** to run **startrsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/startrsrc** Contains the **startrsrc** command

## Examples

Suppose you have a peer domain called **foo** with three defined nodes: **nodeA**, **nodeB**, and **nodeC**. **nodeA** has two Ethernet cards: **ent0** and **ent1**.

1. Suppose **nodeA** is online and **ent0** (on **nodeA**) is offline. To bring **ent0** online on **nodeA**, run this command on **nodeA**:

   ```
   startrsrc -s 'Name == "ent0"' IBM.EthernetDevice
   ```

2. Suppose **nodeA** and **nodeB** are online, **ent0** (on **nodeA**) is offline, and you are currently logged on to **nodeB**. To bring **ent0** online on **nodeA**, run this command on **nodeB**:

   ```
   startrsrc -s 'Name == "ent0'" -n nodeA IBM.EthernetDevice
   ```

3. Suppose file system **/filesys1** is defined, but not mounted on **nodeB**. To bring **/filesys1** online on **nodeB**, run this command on **nodeA**:

   ```
   startrsrc -s 'Name == "/filesys1"' -n nodeB IBM.FileSystem
   ```

4. Suppose the resource handle for **ent0** on **nodeA** is:

   ```
   0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e
   ```

   To bring **ent0** online on **nodeA**, run this command on **nodeA**:

   ```
   startrsrc -r "0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e"
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

"resource_data_input " on page 74

"rmccli " on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **nodegrp**, **resetrsrc**, **stoprsrc**

# stoprsrc

## Name

**stoprsrc** – stops a resource (that is, takes it offline).

## Synopsis

To stop one or more resources, using data entered on the command line:

**stoprsrc -s** *"selection_string"* [**–h**] [**–TV**] *resource_class* [*arg*=*value...*]

**stoprsrc -r** [**–h**] [**–TV**] *resource_handle* [*arg*=*value...*]

To stop one or more resources using command arguments that are predefined in an input file:

**stoprsrc -f** *resource_data_input_file* **-s** *"selection_string"* [**–h**] [**–TV**] *resource_class*

**stoprsrc -f** *resource_data_input_file* **-r** [**–h**] [**–TV**] *resource_handle*

To list the names and data types of the command arguments:

**stoprsrc -l** [**–h**] *resource_class*

## Description

The **stoprsrc** command requests that the resource monitoring and control (RMC) subsystem take one or more resources offline. The request is actually performed by the appropriate resource manager.

To stop one or more resources, use the **-s** option to take offline all of the resources that match the specified selection string. To stop one specific resource, use the **-r** option to specify the resource handle that represents that specific resource.

The successful completion of this command does not guarantee that the resource is offline, only that the resource manager successfully received the request to take this resource offline. Monitor the resource's dynamic attribute **OpState** to determine when the resource is actually taken offline. Register an event for the resource, specifying the **OpState** attribute, to know when the resource is actually offline. Or, intermittently run the **lsrsrc** command until you see that the resource is offline (the value of **OpState** is **2**). For example:

```
lsrsrc -s 'Name == "/filesys1"' -t IBM.FileSystem Name OpState
```

Use the **-l** option to determine whether the specified resource class accepts any additional command arguments.

You can use CSM defined node groups as node name values to refer to more than one node.For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

## Parameters

*resource_class* Specifies the name of the resource class that contains the resources that you want to take offline.

*resource_handle*
Specifies the resource handle that corresponds to the resource you want to take offline. Use the **lsrsrc** command to obtain a list of valid resource handles. The resource handle must be enclosed within double quotation marks, for example:

```
"0x4017 0x0001 0x00000000 0x0069684c 0x0d4715b0 0xe9635f69"
```

*arg*=*value...*
Specifies one or more pairs of command argument names and values.

*arg* Specifies the argument name.

*value* Specifies the value for this argument. The value's data type must match the definition of the argument's data type.

Command arguments are optional. If any *arg*=*value* pairs are entered, there should be one *arg*=*value* pair for each of the command arguments defined for the offline function for the specified resource class.

Use **stoprsrc -l** to get a list of the command argument names and data types for the specific resource class.

## Options

**-f** *resource_data_input_file*
Specifies the name of the file that contains resource attribute information. The contents of the file would look like this:

```
PersistentResourceArguments::
argument1 = value1
argument2 = value2
```

**-l** Lists the command arguments and data types. Some resource managers accept additional arguments that are passed to the offline request. Use this option to list any defined command arguments and the data types of the command argument values.

**-r** Takes offline the specific resource that matches the specified resource handle.

**-s** *"selection_string"*
Specifies the selection string. All selection strings must be enclosed within either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks. For example:

```
-s 'Name == "testing"'

-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource conitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** No resources were found that match the specified selection string.

## Security

The user needs write permission for the *resource_class* specified in **stoprsrc** to run **stoprsrc**. Permissions are specified in the access control list (ACL) file on the contacted system. see the *RSCT: Administration Guide* for information about the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/stoprsrc** Contains the **stoprsrc** command

## Examples

Suppose you have a peer domain called **foo** with three defined nodes: **nodeA**, **nodeB**, and **nodeC**. **nodeA** has two Ethernet cards: **ent0** and **ent1**.

1. Suppose **nodeA** is online and **ent0** (on **nodeA**) is also online. To take **ent0** offline on **nodeA**, run this command on **nodeA**:

   ```
   stoprsrc -s 'Name == "ent0"' IBM.EthernetDevice
   ```

2. Suppose **nodeA** and **nodeB** are online, **ent0** (on **nodeA**) is also online, and you are currently logged on to **nodeB**. To take **ent0** offline on **nodeA**, run this command on **nodeB**:

   ```
   stoprsrc -s 'NodeName == "A" AND Name == "ent0"' IBM.EthernetDevice
   ```

3. Suppose **nodeA** and **nodeB** are online and file system **/filesys1** is defined and mounted on **nodeB**. To take **/filesys1** offline on **nodeB**, run this command on **nodeA**:

   ```
   stoprsrc -s 'NodeName == "B" AND Name == "/filesys1"' IBM.FileSystem
   ```

4. Suppose the resource handle for **ent0** on **nodeA** is:

   ```
   0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e
   ```

   To take **ent0** offline on **nodeA**, run this command on **nodeA**:

   ```
   stoprsrc -r "0x406b 0x0001 0x00000000 0x0069564c 0x0dc1f272 0xb9de145e"
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

“resource_data_input ” on page 74

“rmccli ” on page 79, for general information about RMC commands

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **lsrsrc**, **nodegrp**, **resetrsrc**, **startrsrc**

# Chapter 4. RMC man pages

# resource_data_input

## Name

**resource_data_input** – describes how to use an input file for passing resource class information, such as resource attribute names and values, to the resource monitoring and control (RMC) command-line interface (CLI).

## Description

You can use the **-f** option with most RMC commands to specify the name of a resource data input file when you want to pass resource persistent attribute values and other information to the RMC CLI. This is useful when typing information on the command line would be too cumbersome or too prone to typographical errors. The data in this file is used for defining resources or for changing the persistent attribute values of a resource or resource class. This file has no set location. It can be a temporary file or a permanent file, depending on your requirements.

The **chrsrc**, **mkrsrc**, **resetrsrc**, **rmrsrc**, **runact**, **startrsrc**, and **stoprsrc** commands read this file when they are issued with the **-f** option. The **lsactdef**, **lsrsrc**, and **lsrsrcdef** commands generate a file with this format when they are issued with the **-i** option.

Keywords are used in the input file to indicate which type of data is listed in the related stanza:

**ResourceAction**
: Resource action element names and values for the resource action when invoking an action. The **runact** command reads in the resource action elements. These elements are ignored if the input file is read by **runact -c**.

**ResourceClassAction**
: Resource class action element names and values for the resource class action when invoking an class action. The **runact** command reads in the resource action elements.

**PersistentResourceArguments**
: Resource command argument names and values for those commands that accept them: **mkrsrc**, **resetrsrc**, **rmrsrc**, **startrsrc**, and **stoprsrc**. Command arguments are optional and are defined by the resource class. Specify the **-l** option with these commands to see the command arguments for a resource class.

**PersistentResourceAttributes**
: Persistent attribute names and values for one or more resources for a specific resource class used to define a new resource or change attribute values for an existing resource. The persistent resource attributes are read in by the commands **mkrsrc** and **chrsrc**. These attributes are ignored if the input file is read by the **chrsrc** command that has been specified with the **-c** option.

**PersistentResourceClassAttributes**
: Persistent attribute names and values for a resource class used to change the attribute values of an existing resource class. The persistent resource class attributes are read in by the command **chrsrc** only when the **-c** option is specified.

In general, a *resource_data_input* file is a flat text file with the following format. **Bold** words are literal. Text that precedes a single colon (**:**) is an arbitrary label and can be any alphanumeric text.

```
PersistentResourceAttributes::
# This is a comment
    label:
      AttrName1  = value
      AttrName2  = value
      AttrName3  = value
    another label:
        Name        = name
        NodeNumber  = 1

:
:
 ::

PersistentResourceClassAttributes::
# This is a comment
    label:
      SomeSettableAttrName   = value
      SomeOtherSettableAttrName  = value
    ::
:
:

PersistentResourceArguments::
# This is a comment
    label:
      ArgName1  = value
      ArgName2  = value
      ArgName3  = value
    ::
:
:
```

See the **Examples** section for more details.

Some notes about formatting follow:

- The keywords **PersistentResourceAttributes**, **PersistentResourceClassAttributes**, and **PersistentResourceArguments** are followed by two colons (**::**).
- The order of the keyword stanzas is not significant in the file. For example, **PersistentResourceClassAttributes** could precede **PersistentResourceClass**. It does not affect the portion of the data that is read in by the calling CLI.
- Individual stanza headings (beneath the keywords) are followed by one colon (**:**), for example: `c175n05 resource info:`
- White space at the beginning of lines is not significant. Tabs or spaces are suggested for readability.
- Any line with a pound sign (**#**) as the first printable character is a comment.
- Each entry on an individual line is separated by white space (spaces or tabs).
- Blank lines in the file are not significant and are suggested for readability.
- There is no limit to the number of resource attribute stanzas included in a particular **PersistentResourceAttributes** section.
- There is no limit to the number of resource class attribute stanzas included in a particular **PersistentResourceClassAttributes** section. Typically, there is only one instance of a resource class. In this case, only one stanza is expected.
- If only one resource attribute stanza is included in a particular **PersistentResourceAttributes** section, the *label:* line can be omitted. This also applies to the **ResourceAction** section.

- If only one resource class attribute stanza is included in a particular **PersistentResourceClassAttributes** section, the *label:* line can be omitted. This also applies to the **ResourceClassAction** section.
- Values that contain spaces must be enclosed in quotation marks.
- A double colon (**::**) indicates the end of a section. If a terminating double colon is not found, the next **Reserved Keyword** or **end of file** signals the end of a section.
- Double quotation marks included within a string that is surrounded by double quotation marks must be escaped. (\″).

  **Note:** Double quotation marks can be nested within single quotation marks. These are examples:

  – `"Name == \"testing\""`

  – `'Name == "testing"'`

    This syntax is preferred if your string is a selection string and you are going to cut and paste to the command line.
- Single quotation marks included within a string that is surrounded by single quotation marks must be escaped. (\’).

  **Note:** Single quotation marks can be nested within double quotation marks. Here are some examples:

  – `'Isn\'t that true'`

  – `"Isn't that true"`

    This syntax is preferred if you are going to cut and paste to the command line.
- The format you use to enter data in a *resource_data_input* file may not be the same format used on the command line. The shell you choose to run the commands in has its own rules with regard to quotation marks. Refer to the documentation for your shell for these rules, which determine how to enter data on the command line.

## Implementation specifics

This man page is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/man/resource_data_input.7**

## Examples

1. This sample **mkrsrc** command:

   ```
   mkrsrc -f /tmp/my_resource_data_input_file IBM.Foo
   ```

   uses the sample input file **/tmp/my_resource_data_input_file** for the **IBM.Foo** resource class. The contents of the input file look like this:

   ```
   PersistentResourceAttributes::
   # Resource 1 - only set required attributes
   resource 1:
       Name="c175n04"
       NodeList = {1}
   # Resource 2 - setting both required and optional attributes
   # mkrsrc -e2 IBM.Foo displays required and optional
   # persistent attributes
   ```

```
resource 2:
    Name="c175n05"
    NodeList = {1}
    Int32 = -99
    Uint32 = 99
    Int64 = -123456789123456789
    Uint64 = 123456789123456789
    Float32 = -9.89
    Float64 = 123456789.123456789
    String = "testing 123"
    Binary = 0xaabbccddeeff
    RH = "0x0000 0x0000 0x00000000 0x00000000 0x00000000 0x00000000"
    SD = [hello,1,{2,4,6,8}]
    Int32Array = {-4, -3, -2, -1, 0, 1, 2, 3, 4}
    Int64Array = {-4,-3,-2,-1,0,1,2,3,4}
    Uint32Array = {0,1,2,3,4,5,6}
    Uint64Array = {0,1,2,3,4,5,6}
    Float32Array = {-3.3, -2.2, -1.2, 0, 1, 2.2, 3.3}
    Float64Array = {-3.3, -2.2, -1.2, 0, 1, 2.2, 3.3}
    StringArray = {abc,"do re mi", 123}
    BinaryArray = {"0x01", "0x02", "0x0304"}
    RHArray     = {"0x0000 0x0000 0x00000000 0x00000000 0x00000000 0x00000000",
                   "0xaaaa 0xaaaa 0xbbbbbbbb 0xcccccccc 0xdddddddd 0xeeeeeeee"}
    SDArray     = {[hello,1,{0,1,2,3}],[hello2,2,{2,4,6,8}]}
```

2. This sample **chrsrc** command:

   ```
   chrsrc -f  /tmp/Foo/ch_resources -s 'Name == "c175n05"' IBM.Foo
   ```

   uses the sample input file **/tmp/Foo/ch_resources** to change the attribute values of existing **IBM.Foo** resources. The contents of the input file look like this:

   ```
   PersistentResourceAttributes::
   # Changing resources that match the selection string entered
   # when running chrsrc command.
    resource 1:
           String            = "this is a string test"
           Int32Array        = {10,-20,30,-40,50,-60}
   ```

3. This sample **rmrsrc** command:

   ```
   rmrsrc -l IBM.Foobar
   ```

   shows the optional command arguments:

   ```
   rmrsrc IBM.Foobar FooInt32=int32 FooUint32=uint32
   ```

4. This sample **rmrsrc** command:

   ```
   rmrsrc -f /tmp/Foobar/rm_resources -s 'Name == "c175n05"' IBM.Foobar
   ```

   uses the sample input file **/tmp/Foobar/rm_resources** to specify the optional command arguments for **rmrsrc**. The contents of the input file look like this:

   ```
   PersistentResourceArguments::
   # Specifying command arguments when running rmrsrc command.
   resource 1:
    FooInt32      =   1
           FooUint32     =   0
   ```

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

Commands: **chrsrc**, **lsactdef**, **lsrsrcdef**, **mkrsrc**, **rmrsrc**

“rmccli ” on page 79

# rmccli

## Name

**rmccli** – provides general information about resource monitoring and control (RMC) and related commands.

## Description

This man page provides general information about RMC and related commands, including datatypes, terminology, and references to related information.

**Command structure and use**

The RMC commands may be grouped into categories representing the different operations that can be performed on resource classes and resources:

- Creating and removing resources: **mkrsrc**, **rmrsrc**
- Modifying resources: **chrsrc**, **refrsrc**
- Viewing definitions and data: **lsrsrc**, **lsrsrcdef**
- Viewing actions: **lsactdef**
- Running actions: **runact**

The RMC commands can be run directly from the command line or called by user-written scripts. In addition, the RMC commands are used as the basis for higher-level commands, such as the event response resource manager (ERRM) commands.

**Data display information**

The options that control the display function for the RMC CLI routines, in order of precedence, are:

1. **–l** for long display. This is the default display format.

   For example, the command:

   ```
   lsrsrc -s 'Name == "c175n05"' IBM.Foo Name NodeList SD Binary RH Int32Array
   ```

   produces output that looks like this:

```
Persistent Attributes for Resource: IBM.Foo
resource 1:
        Name       = "c175n05"
        NodeList   = {1}
        SD         = ["testing 1 2 3",1,{0,1,2}]
        Binary     = "0xaabbcc00 0xeeff"
        RH         = "0x0000 0x0000 0x00000000 0x00000000 0x00000000 0x00000000"
        Int32Array = {1,5,-10,1000000}
```

2. **–t** for tabular display.

   For example, the command:

   ```
   lsrsrc -s 'Name ?= "Page"' -t IBM.Condition Name EventExpression
   ```

   produces output that looks like this:

```
Persistent Attributes for Resource: IBM.Condition

Name                 EventExpression
"Page space out rate" "VMPgSpOutRate > 500"
"Page fault rate"     "VMPgFaultRate > 500"
"Page out rate"       "VMPgOutRate > 500"
"Page in rate"        "VMPgInRate > 500"
"Page space in rate"  "VMPgSpInRate > 500"
```

3. **–x** for suppressing headers when printing.

4. **–d** for colon (:) delimited display.
   For example, the command:
   ```
   lsrsrc -xd -s 'Name == "c175n05"' IBM.Foo Name Int32 Uint32Array SD Binary
   ```
   produces output that looks like this:
   ```
   c175n05:-100:{}:["hel  lo1",1,{0,1,2}]:"0xaabbcc00 0xeeff":
   ```
   Note the use of the **–x** option along with the **–d** option.
5. **–D** *delimiter* for string-delimited display.
   For example, the command:
   ```
   lsrsrc -xD:: -s 'Name == "c175n05"' IBM.Foo Name Int32 Uint32Array SD Binary
   ```
   produces output that looks like this:
   ```
   c175n05::-100::{}::["hel  lo1",1,{0,1,2}]::"0xaabbcc00 0xeeff"::
   ```
   Note the use of the **–x** option along with the **–D** *Delimiter* option.

When output of any list command (**lsrsrc**, **lsrsrcdef**) is displayed in the tabular output format, the printing column width may be truncated. If more characters need to be displayed (as in the case of strings) use the **–l** option to display the entire field.

**Data input formatting**

Binary data for attributes of binary type can be entered in the following formats:

- ″0x*nnnnnnnn* 0x*nnnnnnnn* 0x*nnnn*...″
- ″0x*nnnnnnnnnnnnnnnnnnnn*...″
- 0x*nnnnnnnnnnnnnnnn*...

Integer data for attributes of one of the integer types can be entered as:

- A decimal constant that begins with a non-zero digit (**Int32=45**, for example)
- An octal constant that begins with a prefix of **0**, which is optionally followed by a combination of decimal numbers in the range **0** to **7** (**Int32=055**, for example)
- A hexadecimal constant that begins with a prefix of **0x** or **0X** followed a combination of decimal numbers in the range **a** to **f** and **A** to **F** (**Int32=0x2d**, for example)

Be careful when you specify strings as input data. Strings that contain:

- No white space or non-alphanumeric characters can be entered as input without enclosing quotation marks
- White space or other alphanumeric characters must be enclosed in quotation marks
- Single quotation marks (') must be enclosed by double quotation marks (″), as shown in this example: `"this is a string with 'single quotation marks'"`

Selection strings must be enclosed in double quotation marks, unless the selection string itself contains double quotation marks, in which case the selection string must be enclosed in single quotation marks. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

- Sample selection string input: `"NodeNumber == 1"`

- Selection string input where double quotation marks are part of the selection string: `'Name == "c175n05"'`

Structured data (SD) types must be enclosed in square brackets: `[hello,1,{2,4,6,8}]`

When supplying structured data (SD) as command-line input to the RMC commands, enclose the SD in single quotation marks: `SD='[hello,1,{2,4,6,8}]'`

Arrays of any type must be enclosed in braces {}:

- Array of integers: `{-4, -3, -2, -1, 0, 1, 2, 3, 4}`
- Array of strings: `{abc, "do re mi", 123}`
- Array of structured data: `{[hello,1,{0,1,2,3}],[hello2,2,{2,4,6,8}]}`

Arrays of any type with more than one element must be enclosed in quotation marks. For example:

- mkrsrc IBM.Foo Name=testing NodeList={1} Uint32Array='{1,2,3}'
- mkrsrc IBM.Foo Name=testing NodeList='{1}' Uint32_array='{1,2,3}'

Arrays of strings and arrays of structured data must always be enclosed in quotation marks.

When supplying arrays of structured data or arrays containing strings enclosed in quotation marks as command-line input to the RMC commands, enclose the entire array in single quotation marks:

- Array of strings: `mkrsrc IBM.Foo Name="c175n05" NodeList={1} StringArray='{"a string","a different string"}'`
- Array of structured data: `mkrsrc IBM.Foo Name="c175n05" NodeList={1} SDArray='{["string 1",1,{1,1}],["string 2",2,{1,2,3}]}'`

For more examples, see the **resource_data_input** man page.

**Data output formatting**

String data is always displayed in either double or single quotation marks, as shown below:

- A description attribute that equals the string ″This is a string that contains white space″ is displayed using long format as:

  ```
  Description = "This is a string that contains white space"
  ```

- A description attribute value that equals an empty string ″″ is displayed in long format as:

  ```
  Description = ""
  ```

- A description attribute value that equals a string that contains a new-line character at the end of the string is displayed in long format as:

  ```
  Description = "This string ends with a new-line character..."
  ```

- A selection string containing double quotation marks is displayed in long format as:

  ```
  SelectionString = 'Name == "c175n05"'
  ```

- A name attribute value that equals the string ″c175n05″ is displayed in long format as:

  ```
  Name = "c175n05"
  ```

Binary data is displayed as follows:

"0x*nnnnnnnn* 0x*nnnnnnnn* 0x*nnnnnnnn* 0x*nnnnnnnn*"

**Naming conventions**

The following variable names are used throughout the RMC command man pages:

| Variable | Description |
|---|---|
| *attr* | The name of a resource class or a resource attribute |
| *resource_class* | The name of a resource class |

**Node groups**

You can use CSM defined node groups as node name values to refer to more than one node. For information about working with CSM node groups and using the CSM **nodegrp** command, see the *CSM: Administration Guide* and the *CSM: Command and Technical Reference*.

**Terminology**

**attribute**

Attributes are either persistent or dynamic. A resource class is defined by a set of persistent and dynamic attributes. A resource is also defined by a set of persistent and dynamic attributes. Persistent attributes define the configuration of the resource class and resource. Dynamic attributes define a state or a performance-related aspect of the resource class and resource. In the same resource class or resource, a given attribute name can be specified as either persistent or dynamic, but not both.

**resource**

An entity in the system that provides a set of services. Examples of hardware entities are processors, disk drives, memory, and adapters. Examples of software entities are database applications, processes, and file systems. Each resource in the system has one or more attributes that define the state of the resource.

**resource class**

A broad category of system resource, for example: node, file system, adapter. Each resource class has a container that holds the functions, information, dynamic attributes, and conditions that apply to that resource class. For example, the “/tmp space used” condition applies to a file system resource class.

**resource manager**

A process that maps resource and resource-class abstractions into calls and commands for one or more specific types of resources. A resource manager can be a standalone daemon, or it can be integrated into an application or a subsystem directly.

To see all of the resource classes defined in the system, run the **lsrsrc** command without any options or parameters. To see all of the resources defined in the system for the **IBM.FileSystem** resource class, enter:

```
lsrsrc IBM.FileSystem
```

**selection string**

Must be enclosed within either double or single quotation marks. If the selection string contains double quotation marks, enclose the entire selection string in single quotation marks, for example:

```
-s 'Name == "testing"'

-s 'Name ?= "test"'
```

Only persistent attributes can be listed in a selection string. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

## Options

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

All RMC commands include a **-T** option and a **-V** option. Use the **-T** option only when your software service organization instructs you to turn tracing on. Trace messages are not translated. Use the **-V** option, which indicates ″verbose″ mode, to see more information about the command. Verbose messages are contained in message catalogs and are translated based on the locale in which you are running and other criteria.

## Environment

**CT_CONTACT**
When the CT_CONTACT environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Implementation specifics

This man page is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/man/rmccli**

## Author

Stephanie Beals - cluster@us.ibm.com

## See also

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about RMC operations

Commands: **nodegrp**

“resource_data_input ” on page 74

# Part 3. RSCT peer domains: creating and administering

# Chapter 5. Configuration resource manager commands

# addrpnode

## Name

**addrpnode** – adds one or more nodes to a peer domain definition.

## Synopsis

**addrpnode** [**–c**] [**–h**] [**–TV**] *node_name1* [*node_name2* ... ]

**addrpnode** [**–c**] { **–f** | **–F** { *file_name* | *"–"* } } [**–h**] [**–TV**]

## Description

**Before running addrpnode:**
To set up the proper security environment, run the **preprpnode** command on each node that is to be added to the peer domain.

The **addrpnode** command adds the specified nodes to the online peer domain in which it (**addrpnode**) is run. This command must be run on a node that is online to the peer domain in which the new nodes are to be added. Though a node can be defined in multiple peer domains, it can only be online in one peer domain. To add one or more nodes to the peer domain, more than half of the nodes must be online.

To enable **addrpnode** to continue when there is an error on one of the nodes, use the **-c** option.

The **addrpnode** command does *not* bring the added nodes online in the peer domain. To do this, use the **startrpnode** command.

## Parameters

*node_name1* **[***node_name2* **... ]**
Specifies the node (or nodes) to be added to the peer domain definition. The node name is the IP address or the long or short version of the DNS host name. The node name must resolve to an IP address.

## Options

**–c** Continues processing the command as long as at least one node can be added to the peer domain.

By default, if the **addrpnode** command fails on any node, it will fail on all nodes. The **-c** option overrides this behavior, so that the **addrpnode** command will run on the other nodes, even if it fails on one node.

**–f | –F {** *file_name* **|** *"–"* **}**
Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-f** *"-"* or **-F** *"-"* to specify **STDIN** as the input file.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard input

When the **-f** ″**-**″ or **-F** ″**-**″ option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **addrpnode** command needs write permission for the **IBM.PeerDomain** resource class and the **IBM.PeerNode** resource class on each node that is to be added to the peer domain. This is set up by running the **preprpnode** command on each node to be added. Specify the names of all the nodes online in the peer domain with the **preprpnode** command. This gives the online nodes the necessary authority to perform operations on the nodes to be added.

## Restrictions

This command must be run on a node that is online in the peer domain in which the new nodes are to be added.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/addrpnode** Contains the **addrpnode** command

## Examples

To add the nodes **nodeB** and **nodeC** to the peer domain **ApplDomain** where **nodeA** is already defined and online to **ApplDomain**, run this command on **nodeA**:

```
addrpnode nodeB nodeC
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lsrpnode**, **mkrpdomain**, **preprpnode**, **rmrpnode**, **startrpdomain**, **startrpnode**

# chcomg

## Name

**chcomg** – changes a previously-defined communication group for a peer domain.

## Synopsis

To change an attribute of a communication group:

**chcomg** [ **–s** *sensitivity* ] [ **–p** *period* ] [ **–t** *priority* ] [**–b**] [**–r**] [ **–x b** | **r** | **br** ] [ **–e** *NIM_path* ] [ **–m** *NIM_parameters* ] [**–h**] [**–TV**] *communication_group*

To change a reference in an interface resource to a different communication group:

**chcomg** [**–i n:***network_interface1*[**:***node1*][**,***network_interface2*[**:***node2*]...] | **–S n:***"network_interface_selection_string"*] [**–h**] [**–TV**] *communication_group*

## Description

The **chcomg** command changes an existing communication group definition with the name specified by the *communication_group* parameter for the online peer domain. The communication group is used to define heartbeat rings for use by topology services and to define the tunables for each heartbeat ring. The communication group determines which devices are used for heartbeating in the peer domain.

The **chcomg** command must be run on a node that is currently online in the peer domain where the communication group is defined. One or more attributes can be changed with one **chcomg** command, but at least one change is required.

The **-e** and **-m** options are used to set the network interface module (NIM) path and parameters. The NIM path is the path to the NIM that supports the adapter types used in the communication group. The NIM parameters are passed to NIM when it is started.

The **chcomg** command can also be used to assign a communication group to an interface resource. Use the **-i** option to assign the communication group to a specific interface resource name. The interface resource can be limited to one on a particular node. An interface resource can also be specified using the **-S** option and a selection string. This is used when specifying the interface resource name is not sufficient. Before a communication group can be removed, any interface resources that refer to it must be reassigned.

More than half of the nodes must be online to change a communication group in the domain.

## Parameters

*communication_group*
: Specifies the name of an existing communication group to be changed in the peer domain.

## Options

**-s** *sensitivity*
Specifies the heartbeat sensitivity. This is the number of missed heartbeats that constitute a failure. The sensitivity is an integer that is greater than or equal to **4**.

**-p** *period*
Specifies the period, which is the number of seconds between heartbeats. The value of *period* can be an integer or a floating-point number that is greater than or equal to **1**.

**-t** *priority*
Specifies the priority. The priority indicates the importance of this communication group with respect to others. It is used to order the heartbeat rings. The lower the number, the higher the priority. The highest priority is **1**.

**-b** Specifies that broadcast will be used if the underlying media support it. The **-b** option cannot be used when specifying **-x b**.

**-r** Specifies that source routing will be used if the underlying media support it. The **-r** option cannot be used when specifying **-x r**.

**–x b | r | br**
Excludes control for the heartbeat mechanism. This indicates that one or more controls for heartbeat mechanisms should not be used even if the underlying media support it. The following can be excluded:

**b** Specifies that broadcast should not be used even if the underlying media support it.

**r** Specifies that source routing should not be used even if the underlying media support it.

Excluding more than one control is specified by listing the feature option letters consecutively (**-x br**).

**-i n:***network_interface1***[:***node1***] [,***network_interface2***[:***node2***]...**
Assigns this communication group to the network interface resource defined by the network interface resource name and optionally the node name where it can be found.

If **-i** is specified, **-S** cannot be specified.

**-S n:** *"network_interface_selection_string"*
Assigns this communication group to the interface specified by the network interface selection string.

If **-S** is specified, **-i** cannot be specified.

**-e** *NIM_path*
Specifies the network interface module (NIM) path name. This character string specifies the path name to the NIM that supports the adapter types in the communication group.

**-m** *NIM_parameters*
Specifies the NIM start parameters. This is a character string that is passed to the NIM when starting it.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **chcomg** command needs write permission for the **IBM.CommunicationGroup** resource class. Write permission for the **IBM.NetworkInterface** resource class is required to set the communication group for a network interface resource. By default, **root** on any node in the peer domain has read and write access to these resource classes through the configuration resource manager.

## Restrictions

This command must be run on a node that is defined and online to the peer domain where the communication group is to be changed.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chcomg** Contains the **chcomg** command

## Examples

In these examples, node **nodeA** is defined and online to peer domain **ApplDomain**.

1. To change the communication group **ComGrp1** for **ApplDomain** to a sensitivity of 4 and period of 3, run this command on **nodeA**:

   ```
   chcomg -s 4 -p 3 ComGrp1
   ```

2. To change the communication group **ComGrp1** for **ApplDomain** to use broadcast, run this command on **nodeA**:

   ```
   chcomg -b ComGrp1
   ```

3. To change the communication group **ComGrp1** for **ApplDomain** to no longer use source routing, run this command on **nodeA**:

   ```
   chcomg -x r ComGrp1
   ```

4. To change the communication group **ComGrp1** for **ApplDomain**, to use a NIM path of **/usr/sbin/rsct/bin/hats_nim**, and to use NIM parameters **-l 5** to set the logging level, run this command on **nodeA**:

   ```
   chcomg -e /usr/sbin/rsct/bin/hats_nim -m "-l 5" ComGrp1
   ```

5. To assign the communication group **ComGrp1** for **ApplDomain** to the network interface resource named **eth0** on **nodeB**, run this command on **nodeA**:

   ```
   chcomg -i n:eth0:nodeB ComGrp1
   ```

6. To assign the communication group **ComGrp1** for **ApplDomain** to the network interface resource that uses the subnet 9.123.45.678, run this command on **nodeA**:

   ```
   chcomg -S n:"Subnet == '9.123.45.678'" ComGrp1
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lscomg**, **lsrpdomain**, **lsrpnode**, **mkcomg**, **preprpnode**, **rmcomg**

# lscomg

## Name

**lscomg** – displays information about the communication groups of a peer domain.

## Synopsis

**lscomg** [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–i**] [**–h**] [**–TV**] [*communication_group*]

## Description

The **lscomg** command displays information about the communication groups that are defined to the online peer domain on which the command runs. If you specify the name of a communication group, the **lscomg** command displays information about that communication group only.

Some of the communication group information that is displayed follows:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the communication group |
| **Sensitivity** | The number of missed heartbeats that constitute a failure |
| **Period** | The number of seconds between heartbeats |
| **Priority** | The relative priority of the communication group |
| **Broadcast** | Indicates whether broadcast should be used if it is supported by the underlying media |
| **SourceRouting** | Indicates whether source routing should be used if it is supported by the underlying media |
| **NIMPath** | The path to the Network Interface Module (NIM) that supports the adapter types in the communication group |
| **NIMParameters** | The NIM start parameters |

### Interface resources

Use the **-i** option to display information about the interface resources that refer to *communication_group*. If you specify the **-i** option, **lscomg** displays the following information:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the interface resource that refers to *communication_group* |
| **NodeName** | The host name of the interface resource that refers to *communication_group* |
| **IPAddress** | The IP address of the interface resource that refers to *communication_group* |
| **SubnetMask** | The subnet mask of the interface resource that refers to *communication_group* |
| **Subnet** | The subnet of the interface resource that refers to *communication_group* |

## Parameters

*communication_group*
Specifies the name of the communication group about which you want to display information. You can specify a communication group name or a substring of a communication group name for this parameter. If you specify a substring, the command displays information about any defined communication group with a name that contains the substring.

## Options

**-l** Displays the information on separate lines (long format).

**-t** Displays the information in separate columns (table format). This is the default format.

**-d** Displays the information using delimiters. The default delimiter is a colon (**:**). Use the **-D** option if you want to change the default delimiter.

**-D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default colon (**:**) — when the information you want to display contains colons, for example. You can use this option to specify a delimiter of one or more characters.

**-x** Excludes the header (suppresses header printing).

**-i** Displays information about the interface resource that refers to *communication_group*.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The communication group definition does not exist.

## Security

The user of the **lscomg** command needs read permission for the **IBM.CommunicationGroup** resource class. Read permission for the **IBM.NetworkInterface** resource class is required to display the network interface information. By default, **root** on any node in the peer domain has read and write access to these resource classes through the configuration resource manager.

## Restrictions

This command must be run on a node that is defined and online to the peer domain on which the communcation group exists.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lscomg** Contains the **lscomg** command

## Examples

In these examples, **nodeA** is defined and online to peer domain **ApplDomain**.

1. To display general information about the communication groups for **ApplDomain**, run this command on **nodeA**:

   ```
   lscomg
   ```

   The output will look like this:

```
Name  Sensitivity  Period  Priority  Broadcast  SourceRouting  NIMPath                     NIMParameters
ComG1      2          2        1        no          yes        /usr/sbin/rsct/bin/hats_nim      -l 5
```

2. To display information about the interface resources that refer to the communication group **ComGrp1** for the peer domain **ApplDomain**, run this command on **nodeA**:

   ```
   lscomg -i ComGrp1
   ```

   The output will look like this:

```
Name    NodeName    IPAddr          SubnetMask       Subnet
eth0    n24         9.234.32.45     255.255.255.2    9.235.345.34
eth0    n25         9.234.32.46     255.255.255.2    9.235.345.34
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **chcomg**, **lsrpdomain**, **lsrpnode**, **mkcomg**, **preprpnode**, **rmcomg**

# lsrpdomain

## Name

**lsrpdomain** – displays peer domain information for the node.

## Synopsis

**lsrpdomain** [**–o** | **–O**] [**–l** | **–t** | **–d** | **–D** *delimiter*] [**–x**] [**–h**] [**–TV**] [*peer_domain*]

## Description

The **lsrpdomain** command displays information about the peer domains that the node where the command runs belongs to. Use the command's options and parameters to specify which information you want to display and how you want to display it. When you specify the name of a peer domain, the command displays information about that peer domain only. The **-o** and **-O** options also limit the information this command displays. The **-o** option displays information only about the online peer domain. The **-O** option displays information only about peer domains that are offline.

By default, the **lsrpdomain** command displays information in table format (**-t**).

Some of the peer domain information that is displayed follows:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the peer domain |
| **RSCTActiveVersion** | The version of RSCT that is active in the peer domain |
| **MixedVersions** | Indicates whether more than one version of RSCT is active in the peer domain |
| **TSPort** | The topology services port number |
| **GSPort** | The group services port number |
| **OpState** | The current state of the peer domain |

## Parameters

*peer_domain* Specifies the name of the peer domain about which you want to display information. You can specify a peer domain name or a substring of a peer domain name for this parameter. If you specify a substring, the command displays information about any defined peer domain with a name that contains the substring.

## Options

**-o** Displays information about the node's online peer domain.

**-O** Displays information about peer domains that are offline for the node.

**-l** Displays the information on separate lines (long format).

**-t** Displays the information in separate columns (table format). This is the default.

**-d** Displays the information using delimiters. The default delimiter is a colon (**:**). Use the **-D** option if you want to change the default delimiter.

**-D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default colon (**:**) — when the information you want to display contains colons, for example. You can use this option to specify a delimiter of one or more characters.

**-x** Excludes the header (suppresses header printing).

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The peer domain definition does not exist.

## Security

The user of the **lsrpdomain** command needs read permission for the **IBM.PeerDomain** resource class on the node on which the command runs. By

default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run on the node for which the peer domain information is requested.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsrpdomain** Contains the **lsrpdomain** command

## Examples

1. To display general information about the peer domains to which **nodeA** belongs, run this command on **nodeA**:

   ```
   lsrpdomain
   ```

   The output will look like this:

   ```
   Name          OpState       RSCTActiveVersion     MixedVersions   TSPort  GSPort
   ApplDomain    Online        2.4.5.0               No              12347   12348
   ```

2. To display general information about the peer domains to which **nodeA** belongs, with the default delimiter (but without the heading), run this command on **nodeA**:

   ```
   lsrpdomain -xd
   ```

   The output will look like this:

   ```
   ApplDomain:Online:2.4.5.0:No:12347:12348:
   ```

3. To display general information about the peer domains to which **nodeA** belongs, in long format, run this command on **nodeA**:

   ```
   lsrpdomain -l
   ```

   The output will look like this:

   ```
   Name              = ApplDomain
   OpState           = Online
   RSCTActiveVersion = 2.4.5.0
   MixedVersions     = No
   TSPort            = 12347
   GSPort            = 12348
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lsrpnode**, **mkrpdomain**, **preprpnode**, **rmrpdomain**, **startrpdomain**, **stoprpdomain**

# lsrpnode

## Name

**lsrpnode** – displays information about one or more of the nodes that are defined in the online peer domain.

## Synopsis

**lsrpnode** [ **–o** | **–O** | **–L** ] [**–i**] [ **–l** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–h**] [**–TV**] [*node_name*]

**lsrpnode –p** *peer_domain* [ **–l** | **–t** | **–d** | **–D** *delimiter* ] [**–x**] [**–h**] [**–TV**]

## Description

The **lsrpnode** command displays information about one or more of the nodes that are defined in the online peer domain. Use the command's options and parameters to specify which information you want to display and how you want to display it. When you specify a node name, the command displays information about that node only. The **-o**, **-O**, and **-L** options also limit the information this command displays. The **-o** option displays information about nodes that are online. The **-O** option displays information about nodes that are offline. The **-L** option displays information about the local node, which is the node the command runs on.

By default, the **lsrpnode** command displays information in table format (**-t**).

Some of the node information that is displayed follows:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the node in the peer domain. |
| **OpState** | The operational state of the node. |
| **RSCTVersion** | The version of RSCT that is active in the node. |

The following fields are displayed when you specify the **-i** option:

| | |
|---|---|
| **NodeNum** | The node number used by topology services and group services. This number is unique within the cluster. |
| **NodeID** | The unique node identifier. |

## Parameters

*node_name* Specifies the name of the node about which you want to display information. You can specify a node name or a substring of a node name for this parameter. If you specify a substring, the command displays information about any defined node with a name that contains the substring.

## Options

**-o** Displays information about the nodes that are online in the peer domain.

**-O** Displays information about the nodes that are offline in the peer domain.

**-L** Displays information about the local node only, which is the node that the command runs on.

**–p** *peer_domain*
Displays information about nodes defined in an *offline* peer domain that the local node belongs to. (By default, the **lsrpnode** command displays information about the nodes that are defined in the domain where you are currently *online*.) However, this information might not reflect changes that are made to the domain after the local node is taken offline, because an offline node might not have the latest configuration.

The **-p** option ignores the **CT_CONTACT** environment variable.

**-i** Displays the node number and node ID for the node. The node number is used by topology services and group services and is unique within the cluster. The node ID is the unique node identifier.

**-l** Displays the information on separate lines (long format).

**-t** Displays the information in separate columns (table format). This is the default format.

**-d** Displays the information using delimiters. The default delimiter is a colon (**:**). Use the **-D** option if you want to change the default delimiter.

**-D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default colon (**:**) — when the information you want to display contains colons, for example. You can use this option to specify a delimiter of one or more characters.

**-x** Excludes the header (suppresses header printing).

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **lsrpnode** command needs read permission for the **IBM.PeerNode** resource class on the node this command runs on. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run on a node that is online in the peer domain.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Examples

1. To display general information about the nodes in the online peer domain that **nodeA** belongs to, run this command on **nodeA**:

   ```
   lsrpnode
   ```

   The output will look like this:

   ```
   Name    OpState   RSCTVersion
   nodeA   Online    2.4.5.0
   nodeB   Online    2.4.5.0
   nodeC   Offline   2.4.5.0
   ```

2. To display general information about the nodes in the online peer domain that **nodeA** belongs to, with the default delimiter (but without the heading), run this command on **nodeA**:

   ```
   lsrpnode -xd
   ```

   The output will look like this:

   ```
   nodeA:Online:2.4.5.0:
   nodeB:Online:2.4.5.0:
   nodeC:Offline:2.4.5.0:
   ```

3. To display general information about the nodes in the online peer domain that **nodeA** belongs to, in long format, run this command on **nodeA**:

   ```
   lsrpnode -l
   ```

   The output will look like this:

```
Name        = nodeA
OpState     = Online
RSCTVersion = 2.4.5.0

Name        = nodeB
OpState     = Online
RSCTVersion = 2.4.5.0

Name        = nodeC
OpState     = Offline
RSCTVersion = 2.4.5.0
```

4. To display general information about the nodes in the online peer domain that **nodeA** belongs to, including the node number and node ID, run this command on **nodeA**:

   ```
   lsrpnode -i
   ```

   The output will look like this:

   ```
   Name    OpState   RSCTVersion   NodeNum   NodeID
   nodeA   Online    2.4.5.0       2         40a514bed9d82412
   nodeB   Online    2.4.5.0       1         47fe57098f4ec4d9
   ```

## Location

**/usr/sbin/rsct/bin/lsrpnode** Contains the **lsrpnode** command

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **preprpnode**, **startrpnode**, **stoprpnode**

# mkcomg

## Name

**mkcomg** – creates a new communication group definition for a peer domain.

## Synopsis

**mkcomg** [**–s** *sensitivity*] [**–p** *period*] [**–t** *priority*] [ **–x b** | **r** | **br** ] [**–e** *NIM_path*] [**–m** *NIM_parameters*] [**–i n:***network_interface1*[**:***node1*] [**,***network_interface2*[**:***node2*]...] | **–S n:***"network_interface_selection_string"*] [**–h**] [**–TV**] *communication_group*

## Description

The **mkcomg** command creates a new communication group definition for an online peer domain with the name specified by the *communication_group* parameter. The communication group is used to define heartbeat rings for use by topology services and to define the tunables for each heartbeat ring. The communication group determines which devices are used for heartbeating in the peer domain. There can be more than one communication group in a peer domain.

The **mkcomg** command must be run on a node that is currently online in the peer domain where the communication group is to be defined. More than half of the nodes must be online to create a new communication group for the domain.

The **-e** and **-m** options are used to set the network interface module (NIM) path and parameters. The NIM path is the path to the NIM that supports the adapter types used in the communication group. The NIM parameters are passed to NIM when it is started. If **-m** is not specified, the parameters predefined by topology services are used.

The communication group can be assigned to one or more interface resources. Use the **-i** option to assign the communication group to a specific interface resource name. The interface resource can be limited to one on a particular node. An interface resource can also be specified using the **-S** option and a selection string. This is used when specifying the interface resource name is not sufficient. The **-i** and **-S** options cannot be used together. The **chcomg** command can also be used to assign a communication group to an interface resource.

## Parameters

*communication_group*
: Specifies the name of the new communication group that is to be created for the online peer domain. The name can contain any printable character.

## Options

**-s** *sensitivity*
: Specifies the heartbeat sensitivity. This is the number of missed heartbeats that constitute a failure. The sensitivity value is an integer greater than or equal to 2. The default value is 4.

**-p** *period*
: Specifies the number of seconds between heartbeats. The period is an integer greater than or equal to 1. The default value is 1.

**-t** *priority*
Specifies the priority. This value indicates the importance of this communication group with respect to others. It is used to order the heartbeat rings. The lower the number means the higher the priority. The highest priority is 1. The default value is 1 for IP networks and 255 for RS232 networks.

**–x b | r | br**
Excludes controls for heartbeat mechanisms. This option indicates that one or more controls for heartbeat mechanisms should not be used even if the underlying media support it. The following features can be excluded:

**b** Specifies that the broadcast feature should not be used even if the underlying media support it. If **-x b** is not specified, the broadcast feature will be used if the underlying media support it.

**r** Specifies that the source routing feature should not be used even if the underlying media support it. If **-x r** is not specified, the source routing feature will be used if the underlying media support it.

To exclude more than one control, specify the feature characters consecutively: **-x br**.

**-e** *NIM_path*
Specifies the network interface module (NIM) path name. This character string specifies the path name to the NIM that supports the adapter types in the communication group.

**-m** *NIM_parameters*
Specifies the NIM start parameters. This character string is passed to the NIM when starting it.

**-i n:***network_interface1***[:***node1***] [,***network_interface2***[:***node2***]...**
Assigns this communication group to the network interface resource defined by the network interface resource name and optionally the node name where it can be found.

If **-i** is specified, **-S** cannot be specified.

**-S n:***"network_interface_selection_string"*
Assigns this communication group to the interface specified by the network interface selection string.

If **-S** is specified, **-i** cannot be specified.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **mkcomg** command needs write permission for the **IBM.CommunicationGroup** resource class. Write permission for the **IBM.NetworkInterface** resource class is required to set the communication group for a network interface resource. By default, **root** on any node in the peer domain has read and write access to these resource classes through the configuration resource manager.

## Restrictions

This command must be run on a node that is defined and online to the peer domain where the communication group is to be defined.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkcomg** Contains the **mkcomg** command

## Examples

1. To define the communication group **ComGrp1** for the peer domain **ApplDomain** and **nodeA** is defined and online to **ApplDomain**, run this command on **nodeA**:

```
mkcomg ComGrp1
```

2. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, using a sensitivity of 1 and period of 3, and **nodeA** is defined and online to **ApplDomain**, run this command on **nodeA**:

   ```
   mkcomg -s 1 -p 3 ComGrp1
   ```

3. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, not using broadcast, using a priority of 3, and **nodeA** is defined and online to **ApplDomain**, run this command on nodeA:

   ```
   mkcomg -x b -t 3 ComGrp1
   ```

4. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, not using broadcast, not using source routing, and **nodeA** is defined and online to **ApplDomain**, run the following command on **nodeA**:

   ```
   mkcomg -x br ComGrp1
   ```

5. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, using a NIM path of **/usr/sbin/rsct/bin/hats_nim**, NIM parameters **-l 5** to set the logging level, and **nodeA** is defined and online to **ApplDomain**, run this command on **nodeA**:

   ```
   mkcomg -e /usr/sbin/rsct/bin/hats_nim -m "-l 5" ComGrp1
   ```

6. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, assign **ComGrp1** to the network interface resource named **eth0** on **nodeB**, and **nodeA** is defined and online to **ApplDomain**, run this command on **nodeA**:

   ```
   mkcomg -i n:eth0:nodeB ComGrp1
   ```

7. To define the communication group **ComGrp1** for the peer domain **ApplDomain**, assign **ComGrp1** to the network interface resource that uses the subnet 9.123.45.678, and **nodeA** is defined and online to **ApplDomain**, run this command on **nodeA**:

   ```
   mkcomg -S n:"Subnet == 9.123.45.678" ComGrp1
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lscomg**, **lsrpdomain**, **lsrpnode**, **mkrpdomain**, **preprpnode**, **rmcomg**, **startrpdomain**

# mkrpdomain

## Name

**mkrpdomain** – creates a new peer domain definition.

## Synopsis

To create a peer domain definition...

- ...by specifying node names on the command line:

  **mkrpdomain** [**–t** *TS_port*] [**–g** *GS_port*] [ **–Q** *quorum_type* | *quorum_type_name* ] [**–c**] [**–m** *fanout*] [**–h**] [**–TV**] *peer_domain node_name1* [*node_name2* ... ]

- ...using a list of node names in an input file:

  **mkrpdomain –f** | **–F** { *file_name* | *"–"* } [**–t** *TS_port*] [**–g** *GS_port*] [**–Q** {*quorum_type* | *quorum_type_name*}] [**–c**] [**–m** *fanout*] [**–h**] [**–TV**] *peer_domain*

## Description

The **mkrpdomain** command creates a new peer domain definition with the name specified by the *peer_domain* parameter. The nodes specified by *node_name* are defined to the new peer domain. A peer domain can be used to provide high-availability services when configuring application and system resources.

The **preprpnode** command must have been run on each of the nodes to be defined to the peer domain. The **preprpnode** command prepares the security environment for the peer domain operations. See the **preprpnode** command for more information about peer domain definition requirements. Only those nodes that have the appropriate security setup will be successfully defined to the peer domain.

If the UDP port numbers for group services and topology services are not available on all of the nodes to be defined to the peer domain, the **mkrpdomain** command will fail. The command will also fail if the peer domain name is already being used or if any node cannot be successfully defined to the peer domain. Use the **-c** option to enable **mkrpdomain** to continue when there is an error on one of the nodes.

The peer domain quorum rules can be modified using the **-Q** option. The quorum rules determine under what conditions operational changes, such as starting or stopping resources, and configuration changes, such as adding or removing a node, can be made. Start-up quorum defines how many nodes are contacted to get configuration information to start the peer domain. In a typical environment, two quorum rule types are used: **normal** and **quick**. For the **quick** quorum type, only one node is contacted before starting the peer domain. Operational and configuration quorum rules are the same. To see what quorum rule types are available on a node, run:

```
lsrsrc -c IBM.PeerDomain AvailableQuorumTypes
```

The **mkrpdomain** command does not bring the peer domain online automatically. To bring the peer domain online, run the **startrpdomain** command. You can add nodes to the peer domain using the **addrpnode** command. To remove nodes from the peer domain, use the **rmrpnode** command.

A node can be defined in more than one peer domain but it can be online in only one peer domain at a time.

## Parameters

*peer_domain*
Specifies the name of the new peer domain to be created. You can only use these ASCII characters in the peer domain name: **A** to **Z**, **a** to **z**, **0** to **9**, **.** (period), and _ (underscore). In addition, the peer domain name *cannot* be **IW**.

*node_name1* **[***node_name2* **... ]**
Specifies the node (or nodes) to include in this peer domain definition. The node name is the IP address or the long or short version of the DNS hostname. The node name must resolve to an IP address.

## Options

**-t** *TS_port*
Specifies the topology services port number. This UDP port is used for daemon-to-daemon communication. Any unused port in the range 1024 to 65535 can be assigned. The command will fail if the specified port is unavailable. The default is 12347.

**-g** *GS_port*
Specifies the group services port number. This UDP port is for daemon-to-daemon communication. Any unused port in the range 1024 to 65535 can be assigned. The command will fail if the specified port is unavailable. The default is 12348.

**–c**
Continues to run the **mkrpdomain** command on the remaining nodes.

By default, if the **mkrpdomain** command fails on any node, it will fail on all nodes. The **-c** option overrides this behavior, so that the **mkrpdomain** command will run on the other nodes, even if it fails on one node.

**-Q** *quorum_type* **|** *quorum_type_name*
Specifies the quorum rules that are used for start-up, operational, and configuration quorum. Start-up quorum defines how many nodes are contacted to obtain configuration information before starting the peer domain. Operational quorum defines how many nodes must be online in order to start and stop resources and how tie breaking is used. Configuration quorum defines how many nodes must be online to make changes to the peer domain (adding or removing a node, for example). To see what quorum rule types are available on a node, run:

```
lsrsrc -c IBM.PeerDomain AvailableQuorumTypes
```

The valid values are:

**0 | normal**
Specifies normal quorum rules. This is the default. For start-up quorum, at least half of the nodes will be contacted for configuration information. For configuration quorum, more than half of the nodes must be online to make configuration changes. For operational quorum, the cluster or subcluster must have a majority of the nodes in the peer domain. If a tie exists between subclusters, the subcluster that holds the tiebreaker has operational quorum.

**1 | quick**
Specifies quick quorum rules. For start-up quorum, even if no other nodes can be contacted, the node will still come online. For configuration quorum, more than half of the nodes must be online

to make configuration changes. For operational quorum, the cluster or subcluster must have a majority of the nodes in the peer domain. If a tie exists between subclusters, the subcluster that holds the tiebreaker has operational quorum.

**-m** *fanout*
Specifies the maximum number of threads to use in parallel operations for the specified peer domain. This value is stored as a persistent attribute in the peer domain's **IBM.PeerNode** class. *fanout* can be an integer from **16** to **2048**. If this option is not specified, the default value (**128**) is used.

**–f | –F {** *file_name* **|** *"–"* **}**
Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-f** *"-"* or **-F** *"-"* to specify **STDIN** as the input file.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Files

The **/etc/services** file is modified.

## Standard input

When the **-f** *"-"* or **-F** *"-"* option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **mkrpdomain** command needs write permission to the **IBM.PeerDomain** resource class on each node that is to be defined to the peer domain. This is set up by running the **preprpnode** command on each node that is to be defined to the domain, specifying the name of the node on which the user will run **mkrpdomain**.

## Restrictions

Any node to be defined to the peer domain must be reachable from the node on which this command runs.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkrpdomain**
Contains the **mkrpdomain** command

## Examples

1. To define a peer domain called **ApplDomain** that consists of a node called **nodeA**, run this command on **nodeA**:
   ```
   mkrpdomain ApplDomain nodeA
   ```
2. To define a peer domain called **ApplDomain** that consists of three nodes called **nodeA**, **nodeB**, and **nodeC**, run this command on **nodeA**, **nodeB**, or **nodeC**:
   ```
   mkrpdomain ApplDomain nodeA nodeB nodeC
   ```
3. To define a peer domain called **ApplDomain** that consists of two nodes called **nodeA** and **nodeB**, with a topology services port number of 1200 and a group services port number of 2400, run this command on **nodeA** or **nodeB**:
   ```
   mkrpdomain -t 1200 -g 2400 ApplDomain nodeA nodeB
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpdomain**, **lsrpnode**, **preprpnode**, **rmrpdomain**, **rmrpnode**, **startrpdomain**, **stoprpdomain**

# preprpnode

## Name

**preprpnode** – prepares a node to be defined to a peer domain.

## Synopsis

**preprpnode** [**–k**] [**–h**] [**–TV**] *node_name1* [*node_name2* ... ]

**preprpnode –f** | **–F** { *file_name* | *"–"* } [**–k**] [**–h**] [**–TV**]

## Description

The **preprpnode** command prepares security on the node on which the command is run so it can be defined in a peer domain. It allows for peer domain operations to be performed on this node and must be run before the node can join a peer domain using the **mkrpdomain** or **addrpnode** command.

Before the **mkrpdomain** command is issued on a node, the **preprpnode** command must be run on each node to be defined to the new peer domain, using the name of the node that is to run the **mkrpdomain** command as the parameter. This gives the **mkrpdomain** node the necessary authority to create the peer domain configuration on each new node and set up additional security.

Before the **addrpnode** command is issued on a node, the **preprpnode** command must be run on each node that is to be added, using the names of all online nodes as the parameters. This gives the online nodes the authority to perform the necessary operations on the new node.

The **preprpnode** command performs the following:

1. Establishes trust with the node names specified on the command by adding their public keys to the trusted host list.
2. Modifies the resource monitoring and control (RMC) access control list (ACL) file to enable access to peer domain resources on this node from the other nodes in the peer domain. This allows peer domain operations to occur on the node. The RMC subsystem is refreshed so that these access changes will take effect.
3. RMC remote connections are enabled.

If the nodes that are to be defined to a peer domain are already in a management domain, you do not need to exchange public keys. You can use the **-k** option to omit this step.

## Parameters

*node_name1* **[***node_name2* **... ]**
Specifies the node (or nodes) from which peer domain commands can be accepted. Typically, this is the name of the node that will be running the **mkrpdomain** command when forming the peer domain. When adding to the peer domain, it is a list of the nodes that are currently online in the peer domain. The node name is the IP address or the long or short version of the DNS host name. The node name must resolve to an IP address.

## Options

**–f | –F {** *file_name* **|** *"–"* **}**
Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-f** *"-"* or **-F** *"-"* to specify **STDIN** as the input file.

**–k** Specifies that the command should not exchange public keys.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Files

The access control list (ACL) file — **/var/ct/cfg/ctrmc.acls** — is modified. If this file does not exist, it is created.

## Standard input

When the **-f** *"-"* or **-F** *"-"* option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **preprpnode** command needs write permission to the access control list (ACL) file. Permissions are specified in the ACL file. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Restrictions

This command must run on a node that will be defined to the peer domain.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/preprpnode**
Contains the **preprpnode** command

## Examples

1. Suppose **mkrpdomain** will be issued from **nodeA**. To prepare **nodeB**, **nodeC**, and **nodeD** to be defined to a new peer domain, **AppIDomain**, run this command on **nodeB**, on **nodeC**, and then on **nodeD**:

   ```
   preprpnode nodeA
   ```

2. Suppose **nodeA** and **nodeB** are online in **AppIDomain**. To prepare **nodeC** to be added to the existing domain, run this command on **nodeC**:

   ```
   preprpnode nodeA nodeB
   ```

   Alternatively, create a file called **onlineNodes** with these contents:

   ```
   nodeA
   nodeB
   ```

   Then, run this command on **nodeC**:

   ```
   preprpnode -f onlineNodes
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpdomain**, **lsrpnode**, **mkrpdomain**

Files: **ctrmc.acls**

# rmcomg

## Name

**rmcomg** – removes a communication group that has already been defined from a peer domain.

## Synopsis

**rmcomg** [**–q**] [**–h**] [**–TV**] *communication_group*

## Description

The **rmcomg** command removes the definition of the existing communication group with the name specified by the *communication_group* parameter for the online peer domain. The communication group is used to define heartbeat rings for use by topology services and to define the tunables for each heartbeat ring. The communication group determines which devices are used for heartbeating in the peer domain.

The **rmcomg** command must be run on a node that is currently online in the peer domain where the communication group is defined. More than half of the nodes must be online to remove a communication group from the domain.

The communication group must not be referred to by an interface resource. Use the **chcomg** command to remove references made by interface resources to a communication group.

## Parameters

*communication_group*
: Specifies the name of the defined communication group that is to be removed from the peer domain.

## Options

**-q** Specifies quiet mode. The command does not return an error if the communication group does not exist.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
: Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
: When the CT_IP_AUTHENT environment variable exists, the RMC daemon

uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The communication group does not exist.

## Security

The user of the **rmcomg** command needs write permission for the **IBM.CommunicationGroup** resource class. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run on a node that is defined and online to the peer domain where the communication group is to be removed.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmcomg** Contains the **rmcomg** command

## Examples

In this example, **nodeA** is defined and online to **ApplDomain**. To remove the communication group definition **ComGrp1** for the peer domain **ApplDomain**, run this command on **nodeA**:

```
rmcomg ComGrp1
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **chcomg**, **lscomg**, **lsrpdomain**, **lsrpnode**, **mkcomg**, **preprpnode**

# rmrpdomain

## Name

**rmrpdomain** – removes a peer domain that has already been defined.

## Synopsis

**rmrpdomain** [**–f**] [**–q**] [**–h**] [**–TV**] *peer_domain*

## Description

The **rmrpdomain** command removes the peer domain definition that is specified by the *peer_domain* parameter. The peer domain that is to be removed must already be defined. This command must be run on a node that is defined in the peer domain. When **rmrpdomain** is run on a node that is online to the peer domain, it removes the peer domain definition on all nodes defined to the peer domain that are reachable from that node. If a node defined to the peer domain is not reachable, that node's local peer domain definition is not removed. To remove the local peer domain definition when the peer domain is not online or when the node is not online to the peer domain, run the **rmrpdomain** command on that node and specify the **-f** option.

The most efficient way to remove a peer domain definition is to make sure the peer domain is online. Then, from a node that is online to the peer domain, run the **rmrpdomain** command. If there are nodes that are not reachable from the node on which the **rmrpdomain** command was run, on each of those nodes, run the **rmrpdomain** command using the **-f** option. This can be done at a later time if the node itself is not operational.

The **-f** option must also be used to override a subsystem's rejection of the peer domain removal. A subsystem may reject the request if a peer domain resource is busy, for example. Specifying the **-f** option in this situation indicates to the subsystems that the peer domain definition must be removed.

The **rmrpdomain** command does not require configuration quorum. Therefore, this command is still successful if it is issued to a minority sub-cluster. Later, the majority sub-cluster may become active. If so, the domain is still removed.

## Parameters

*peer_domain* Specifies the name of the defined peer domain that is to be removed.

## Options

**-f** Forces the peer domain to be removed. The force option is required to remove a peer domain definition:

- from the local node when the node is not online to the peer domain.
- when a subsystem may reject the request, as when resources are allocated, for example.

**-q** Specifies quiet mode. The command does not return an error if the peer domain does not exist.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Files

The **/etc/services** file is modified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The peer domain definition does not exist.

## Security

The user of the **rmrpdomain** command needs write permission to the **IBM.PeerDomain** resource class on each node that is to be defined to the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

The node on which this command is run must be defined to the peer domain and should be able to reach all of the nodes that are defined to the peer domain. The node's local peer domain definition will not be removed if the node is not reachable.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmrpdomain**
Contains the **rmrpdomain** command

## Examples

1. To remove the peer domain definition of **ApplDomain** where **nodeA**, **nodeB**, and **nodeC** are defined and online to *ApplDomain*, and all are reachable to each other, run this command on *nodeA*, **nodeB**,or **nodeC**:

   ```
   rmrpdomain ApplDomain
   ```

2. To remove the local peer domain definition of **ApplDomain** on **nodeD** when **nodeD** is not online to the peer domain, the peer domain is offline, or the peer domain does not exist, run this command on **nodeD**:

   ```
   rmrpdomain -f ApplDomain
   ```

3. To remove the peer domain definition of **ApplDomain** where **nodeA**, **nodeB**, and **nodeC** are defined and online to **ApplDomain**, all are reachable to each other, and to prevent a subsystem from rejecting the request, run this command on **nodeA**, **nodeB**, or **nodeC**:

   ```
   rmrpdomain -f ApplDomain
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

"rmccli " on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpdomain**, **lsrpnode**, **mkrpdomain**, **preprpnode**, **rmrpnode**, **startrpdomain**, **stoprpdomain**

Files: **/etc/services**

# rmrpnode

## Name

**rmrpnode** – removes one or more nodes from a peer domain definition.

## Synopsis

**rmrpnode** [**–f**] [**–q**] [**–h**] [**–TV**] *node_name1* [*node_name2* ...]

**rmrpnode –F** { *file_name* | *"–"* } [**–f**] [**–q**] [**–h**] [**–TV**]

## Description

The **rmrpnode** command removes one or more nodes from the online peer domain where the command is run. The command must be run on a node that is online to the peer domain in which the nodes are to be removed. The nodes that are to be removed must be offline to the peer domain and must be reachable from the node where the command is run. To take nodes offline, use the **stoprpnode** command.

Specifying the **-f** option forces the specified nodes to be removed from the peer domain. If the **-f** option is not specified, more than half of the nodes must be online to remove one or more nodes from the domain.

## Parameters

*node_name1* **[***node_name2* **...]**

Specifies the peer domain node names of the nodes to be removed from the peer domain definition. You can remove one or more nodes using the **rmrpnode** command. You must specify the node names in exactly the same format as they were specified with the **addrpnode** command or the **mkrpdomain** command. To list the peer domain node names, run the **lsrpnode** command.

## Options

**-f** Forces the specified nodes to be removed from the peer domain.

**-q** Specifies quiet mode. The command does not return an error if the specified nodes are not in the peer domain.

**–F {** *file_name* **|** *"–"* **}**

Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-F** *"-"* to specify **STDIN** as the input file.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard input

When the **-F** ″**-**″ option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The node does not exist in the peer domain.

## Security

The user of the **rmrpnode** command needs write permission for the **IBM.PeerNode** resource class on each node that is to be removed from the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run on a node that is online in the peer domain in which the nodes are to be removed. The nodes to be removed must also be offline to the peer domain.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmrpnode** Contains the **rmrpnode** command

## Examples

To remove the peer domain definitions of nodes **nodeB** and **nodeC** from the peer domain **ApplDomain**, when **nodeA** is defined and online to **ApplDomain**, and **nodeB** and **nodeC** are reachable from **nodeA**, run this command from **nodeA**:

```
rmrpnode nodeB nodeC
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpnode**, **preprpnode**, **startrpnode**, **stoprpnode**

# startrpdomain

## Name

**startrpdomain** – brings a peer domain that has already been defined online.

## Synopsis

**startrpdomain** [ **–A** | **–L** ] [**–t** *timeout*] [ **–Q** *quorum_type* | *quorum_type_name* ] [**–m** *fanout*] [**–h**] [**–TV**] *peer_domain*

## Description

The **startrpdomain** command brings a defined peer domain online by starting the resources on each node belonging to the peer domain.

The **startrpdomain** command must be run on a node that is defined to the peer domain. The command invites all offline nodes defined to the peer domain to come online in the peer domain every time the command is run for the peer domain. The command can be run more than once in the peer domain. If all the nodes defined in the peer domain are already online, no action is performed.

The **startrpdomain** command determines the peer domain configuration to use to bring the peer domain online by examining the peer domain configuration on the nodes defined to the peer domain. The latest version of the peer domain configuration information that is found is used to bring the peer domain online. By default, the latest version of the peer domain configuration found on at least half of the nodes is used. Specifying the **-A** option causes the latest version of the peer domain configuration found on all of the nodes defined in the peer domain to be used. Specifying the **-L** option causes the configuration on the local node to be used.

In determining the latest version of the peer domain configuration information, a configuration timeout defines when to stop checking versions and begin to bring the peer domain online. The default timeout value is 120 seconds. The timeout value can be changed using the **-t** option. The timeout value should be at least long enough so that the latest version of the peer domain configuration information from at least half of the nodes can be found.

A node can only be online to one peer domain at a time. The **startrpdomain** command cannot be run on a node for a peer domain when another peer domain is already online for that node.

## Parameters

*peer_domain* Specifies the name of a previously-defined peer domain that is to be brought online.

## Options

**-A** Finds and uses the latest version of the peer domain configuration information from all of the nodes in the peer domain. This option cannot be specified if the **-L** option is specified. If neither option (**-A** or **-L**) is specified, the latest version of the peer domain configuration information from at least half of the nodes in the peer domain is used.

**-L** Uses the latest version of the peer domain configuration information that is on the local node. This option cannot be specified if the **-A** option is

specified. If neither option (**-A** or **-L**) is specified, the latest version of the peer domain configuration information from at least half of the nodes in the peer domain is used.

**-t** *timeout*
Specifies the timeout value in seconds. This option limits the amount of time used to find the latest version of the peer domain configuration. When the timeout value is exceeded, the latest version of the peer domain configuration information found thus far is used. The timeout value should be long enough so that the latest version of the peer domain configuration information from at least half of the nodes can be found. The default timeout value is 120 seconds.

**-Q** *quorum_type* | *quorum_type_name*
Enables you to override the startup quorum mode. This can be specified as an integer quorum type or quorum type name. If you do not specify this option, startup quorum mode will be specified using the **mkrpdomain** command's **-Q** option (or the default quorum mode for your environment) when you created the peer domain. You can override the quorum startup mode only if the quorum mode has been defined as **normal** or **quick**. The valid values are:

**0** | **normal**
Specifies normal start-up quorum rules. Half of the nodes will be contacted for configuration information.

**1** | **quick**
Specifies quick start-up quorum rules. One node will be contacted for configuration information.

**-m** *fanout*
Specifies the maximum number of threads to use for this start operation. The **-m** option overrides the default *fanout* value for the specified peer domain. This value is stored as a persistent attribute in the peer domain's **IBM.PeerNode** class. *fanout* can be an integer from **16** to **2048**.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The peer domain definition does not exist.

## Security

The user of the **startrpdomain** command needs write permission for the **IBM.PeerDomain** resource class on each node that is defined to the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run from a node that is defined to the peer domain.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/startrpdomain**
Contains the **startrpdomain** command

## Examples

In these examples, **nodeA** is one of the nodes defined to **ApplDomain**.

1. To bring **ApplDomain** online, run this command on **nodeA**:

   ```
   startrpdomain ApplDomain
   ```

2. To bring **ApplDomain** online using all of the nodes in the peer domain to obtain the latest version of the peer domain configuration information, run this command on **nodeA**:

   ```
   startrpdomain -A ApplDomain
   ```

3. To bring **ApplDomain** online using a peer domain configuration timeout value of 240 seconds (to make sure that at least half of the nodes in the peer domain are used), run this command on **nodeA**:

   ```
   startrpdomain -t 240 ApplDomain
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lsrpdomain**, **lsrpnode**, **mkrpdomain**, **preprpnode**, **stoprpdomain**

# startrpnode

## Name

**startrpnode** – brings one or more nodes online to a peer domain.

## Synopsis

**startrpnode** [**–h**] [**–TV**] *node_name1* [*node_name2* ...]

**startrpnode –f** | **–F** { *file_name* | *"–"* } [**–h**] [**–TV**]

## Description

The **startrpnode** command brings one or more offline nodes online to a peer domain. The peer domain is determined by the online peer domain where the command is run. The command must be run from a node that is online to the desired peer domain.

The node that is being brought online must have already been defined to be in this peer domain using the **addrpnode** command or the **mkrpdomain** command. The node must not be online to any other peer domain.

## Parameters

*node_name1* **[***node_name2* **...]**
Specifies the peer domain node names of the nodes to be brought online to the peer domain. You can bring one or more nodes online using the **startrpnode** command. You must specify the node names in exactly the same format as they were specified with the **addrpnode** command or the **mkrpdomain** command. To list the peer domain node names, run the **lsrpnode** command.

## Options

**–f | –F {** *file_name* **|** *"–"* **}**
Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-f** *"-"* or **-F** *"-"* to specify **STDIN** as the input file.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the

RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard input

When the **-f** ″**-**″ or **-F** ″**-**″ option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **startrpnode** command needs write permission for the **IBM.PeerNode** resource class on each node that is to be started in the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run from a node that is online to the peer domain. The node that is to be brought online must be offline to the peer domain, must not be online to any other peer domain, and must be reachable from where the command is run.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/startrpnode**
Contains the **startrpnode** command

## Examples

In this example, **nodeA** is defined and online to **AppIDomain**, **nodeB** is reachable from **nodeA**, and **nodeB** is not online to **AppIDomain** or any other peer domain. To bring **nodeB** online to **AppIDomain**, run this command from **nodeA**:

```
startrpnode nodeB
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpnode**, **preprpnode**, **rmrpnode**, **stoprpnode**

# stoprpdomain

## Name

**stoprpdomain** – bakes an online peer domain offline.

## Synopsis

**stoprpdomain** [**–f**] [**–h]** [**–TV**] *peer_domain*

## Description

The **stoprpdomain** command takes all of the nodes that are currently online in the peer domain offline. The peer domain definition is not removed from the nodes.

The command must be run on a node that is online in the peer domain. If the command is run on a node that is offline to the peer domain, no action is performed.

The **-f** option must be used to override a subsystems rejection of the request to take the peer domain offline. A subsystem may reject the request if a peer domain resource is busy, such as in the case of a shared disk. Specifying the **-f** option in this situation indicates to the subsystems that the peer domain must be brought offline regardless of the resource state.

## Parameters

*peer_domain* Specifies the name of the online peer domain that is to be brought offline.

## Options

**-f** Forces the subsystems to accept the stop request when it otherwise would not.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT

environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

**6** The peer domain definition does not exist.

## Security

The user of the **stoprpdomain** command needs write permission for the **IBM.PeerDomain** resource class on each node that is defined to the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Restrictions

This command must be run on a node that is online in the peer domain.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/stoprpdomain**
Contains the **stoprpdomain** command

## Examples

In these examples, **nodeA** is one of the nodes defined and is online to **ApplDomain**.

1. To take **ApplDomain** offline, run this command on **nodeA**:
   ```
   stoprpdomain ApplDomain
   ```
2. To take **ApplDomain** offline while making sure the stop request will not be rejected by any subsystem, run this command on **nodeA**:
   ```
   stoprpdomain -f ApplDomain
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **lsrpdomain**, **lsrpnode**, **mkrpdomain**, **preprpnode**, **startrpdomain**

# stoprpnode

## Name

**stoprpnode** – bakes one or more nodes offline from a peer domain.

## Synopsis

**stoprpnode** [**–f**] [**–h**] [**–TV**] *node_name1* [*node_name2*...]

**stoprpnode –F** { *file_name* | *"–"* } [**–f**] [**–h**] [**–TV**]

## Description

The **stoprpnode** command takes an online node offline from a peer domain. The peer domain is determined by the online peer domain where the command is run. The command must be run from a node that is online to the desired peer domain.

The **-f** option must be used to override a subsystem's rejection of the request to take a node offline. A subsystem may reject the request if a node resource is busy, such as in the case of a shared disk. Specifying the **-f** option in this situation indicates to the subsystems that the node must be brought offline regardless of the resource state.

If this command is used to take more than one node offline by specifying more than one *node_name* parameter, and the node that this command is running on is in the list, it will be brought offline last.

## Parameters

*node_name1* **[***node_name2***...]** Specifies the peer domain node names of the nodes that are to be brought offline from the peer domain. You must specify the node names in exactly the same format as they were specified with the **addrpnode** command or the **mkrpdomain** command. To list the peer domain node names, run the **lsrpnode** command.

## Options

**-f** Forces the subsystems to accept the stop request when it otherwise would not.

**–F { *file_name* | *"–"* }**
Reads a list of node names from *file_name*. Each line of the file is scanned for one node name. The pound sign (**#**) indicates that the remainder of the line (or the entire line if the **#** is in column 1) is a comment.

Use **-F** *"-"* to specify **STDIN** as the input file.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

## Standard input

When the **-F** ″**-**″ option is specified, this command reads one or more node names from standard input.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect flag was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **stoprpnode** command needs write permission for the **IBM.PeerNode** resource class on each node that is to be stopped in the peer domain. By default, **root** on any node in the peer domain has read and write access to this resource class through the configuration resource manager.

## Location

**/usr/sbin/rsct/bin/stoprpnode**
Contains the **stoprpnode** command

## Restrictions

This command must be run on a node that is online to the peer domain. The node to be brought offline must be reachable from the node on which the command is run.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Examples

In these examples, **nodeA** and **nodeB** are online to **AppIDomain**.

1. To take **nodeB** offline, run this command on **nodeA**:

   ```
   stoprpnode nodeB
   ```

2. To take **nodeB** offline and force the offline request, run this command on **nodeA**:

   ```
   stoprpnode -f nodeB
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79, for general information about RMC-related commands

Books: *RSCT: Administration Guide*, for information about peer domain operations

Commands: **addrpnode**, **lsrpnode**, **preprpnode**, **rmrpnode**, **startrpnode**

# Part 4. Cluster configuration

# Chapter 6. Configuration commands

# ctadmingroup

## Name

**ctadmingroup** – defines a cluster administration group.

## Synopsis

To define a group:

**ctadmingroup** [**-h**] [**-TV**] *group_name*

To remove a group:

**ctadmingroup -u** [**-h**] [**-TV**] [*group_name*]

## Description

The **ctadmingroup** command is used to define a cluster administration group. This command sets group ownership for trace files, so users who belong to a cluster administration group have the permissions needed to examine trace files that are produced by Reliable Scalable Cluster Technology (RSCT) subsystems. **ctadmingroup** changes existing trace files to the new permissions and group ownership. Trace files that are created after **ctadmingroup** is run will contain the new permissions. Note that this command does not create the specified group, nor does it add users to this group; it only gives users of this group access to the trace files.

If you run **ctadmingroup** with:

- a different group name, the new group that is specified becomes the cluster administration group, thereby replacing the previous group.
- no options or parameters, it displays the group name and ID of the cluster administration group. If no cluster administration group is defined, this command does not produce any output.
- the **-u** option, it removes the cluster administration group. After the group is removed, users who belong to that group may not be able to examine trace files. If no cluster administration group is defined, this command does not produce any output.

The location of the security subsystem's trace file is configurable. To determine the location of the trace file, **ctadmingroup** refers to the **/var/ct/cfg/ctcasd.cfg** file (if it is present) and the **/usr/sbin/rsct/cfg/ctcasd.cfg** file.

## Parameters

*group_name*
: Specifies the name of the cluster administration group. This group must already exist in the group database (**/etc/group**, for example).

## Options

**-u** Removes the cluster administration group. After the group is removed, users who belong to that group may not be able to examine trace files. If no cluster administration group is defined, this command does not produce any output.

**-h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Files

| | |
|---|---|
| **/etc/group** | The group database. |
| **/var/ct/cfg/ctgroups** | Stores the administration group name and caches the corresponding group ID. |
| **/var/ct/cfg/ctcasd.cfg** | The primary location of the cluster security configuration file, which contains the location of the security subsystem's trace file. |
| **/usr/sbin/rsct/cfg/ctcasd.cfg** | The secondary location of the cluster security configuration file. The **ctadmingroup** command refers to this file if the **/var/ct/cfg/ctcasd.cfg** file is not present. |

## Exit status

**0** The command has run successfully.

**1** The group name that was specified on the command line is not in the group database.

**2** An internal error occurred.

**3** An incorrect option was entered on the command line.

**4** An incorrect operand was entered on the command line.

## Security

Only **root** users can run this command.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Restrictions

Unpredictable results could occur if the mapping of the group name and group ID is changed after the command is run.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/ctadmingroup**
Contains the **ctadmingroup** command

## Examples

1. To display the group name and ID of the cluster administration group, enter:
   ```
   ctadmingroup
   ```

## Author

cluster@us.ibm.com

## See also

Files: **ctcasd.cfg**, **ctgroups**, **/etc/group**

# Chapter 7. Configuration files

# ct_class_ids

## Name

**ct_class_ids** – contains the mapping of resource class names to resource class IDs for the RMC subsystem.

## Description

The **ct_class_ids** file contains the mapping of resource class names to resource class IDs for the RMC subsystem. This is a read-only file; the contents cannot be modified.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/cfg/ct_class_ids**
Contains the **ct_class_ids** file

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide* , for a list of the CIM classes included in this file that are converted to RMC classes

Commands: **mkcimreg**

# ct_has.pkf

## Name

**ct_has.pkf** – default location for the local node's cluster security services public key file.

## Description

The **/var/ct/cfg/ct_has.pkf** file is the default location where the ctcasd demon will expect to find the local node's public key file. The public key is stored in a proprietary binary format.

The **ctcasd.cfg** file permits the system administrator to specify an alternate location for this file. The **ctskeygen -p** command permits the administrator to create this file in an alternate location. If an alternate location is used, the file must meet all the criteria listed in the **Security** section of this man page. The file must not be recorded to a read-only file system, because this will prohibit the system administrator for modifying the contents of this file in the future.

If the **ctcasd** daemon cannot locate this file during its startup, it will check for the presence of the **ct_has.qkf** file. If both files are missing, the daemon assumes that it is being started for the first time after installation, and creates an initial private and public key file for the node. The daemon also creates the initial trusted host list file for this node. This file contains an entry for **localhost** and the host names and IP addresses associated with all AF_INET-configured adapters that the daemon can detect. Inadvertent authentication failures could occur if the public and private key files were accidentally or intentionally removed from the local system before the daemon was restarted. **ctcasd** will create new keys for the node, which will not match the keys stored on the other cluster nodes. If RSCT host-based authentication (HBA) suddenly fails after a system restart, this is a possible source of the failure.

If the public key file is missing but the private key file is detected, the daemon concludes that the local node is misconfigured and terminates. A record is made to persistent storage to indicate the source of the failure.

## Security

This file is readable to all users on the local system. Write permission is not granted to any system user.

By default, this file is stored in a locally-mounted file system. The **ctcasd.cfg** file permits system administrators to change the location of the file. Should system administrators use a different location, it is the administrator's responsibility to assure that the file is always accessible to the local node, and that all users from this local node can read the file. If the storage location does not meet these criteria, users and applications will be unable to authenticate to trusted services using RSCT host-based authentication (HBA).

If the system administrator chooses to place this file in a networked file system, the administrator must assure that no two nodes are attempting to use the same physical file as their own public key file. Because public keys differ between nodes, if two nodes attempt to use the same public key file, at least one of them will always obtain the incorrect value for its public key. This will cause applications and users from that node to fail authentication to trusted services within the cluster.

## Restrictions

Cluster security services supports only its own private and public key formats and file formats. Secured Remote Shell formats are currently unsupported. Settings for the HBA_USING_SSH_KEYS attribute are ignored.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

| | |
|---|---|
| **/var/ct/cfg/ct_has.pkf** | Contains the **ct_has.pkf** file |

## Author

Robert Gensler- cluster@us.ibm.com

## See also

Commands: **ctskeygen**

Daemons: **ctcasd**

Files: **ct_has.qkf**, **ct_has.thl**

# ct_has.qkf

## Name

**ct_has.qkf** – default location for the cluster security services private key file for the local node.

## Description

The **/var/ct/cfg/ct_has.qkf** file is the default location where the ctcasd demon will expect to find the local node's private key file. The private key is stored in a proprietary binary format.

The **ctcasd.cfg** file permits the system administrator to specify an alternate location for this file. The **ctskeygen -q** command permits the administrator to create this file in an alternate location. If an alternate location is used, the file must meet all the criteria listed in the **Security** section of this man page. The file must not be recorded to a read-only file system, because this will prohibit the system administrator for modifying the contents of this file in the future

If the **ctcasd** daemon cannot locate this file during its startup, it will check for the presence of the **ct_has.pkf** file. If both files are missing, the daemon will assume that it is being started for the first time after installation, and create an initial private and public key file for the node. The daemon also creates the initial trusted host list file for this node. This file contains an entry for **localhost** and the host names and IP addresses associated with all AF_INET-configured adapters that the daemon can detect. Inadvertent authentication failures could occur if the public and private key files were accidentally or intentionally removed from the local system before the daemon was restarted. **ctcasd** will create new keys for the node, which will not match the keys stored on the other cluster nodes. If RSCT host-based authentication (HBA) suddenly fails after a system restart, this is a possible source of the failure.

If the private key file is missing but the public key file is detected, the daemon concludes that the local node is misconfigured and terminates. A record is made to persistent storage to indicate the source of the failure.

## Security

This file is readable and accessible only to the root user. Access to all other users is not provided.

By default, this file is stored in a locally mounted file system. The **ctcasd.cfg** file permits system administrators to change the location of the file. Should system administrators use a different location, it is the administrator's responsibility to assure that the file is always accessible to the local node, and that only the root user from this local node can access the file. If the storage location does not meet these criteria, the security of the node and the cluster should be considered compromised.

## Restrictions

Cluster security services supports only its own private and public key formats and file formats. Secured Remote Shell formats are currently unsupported. Settings for the HBA_USING_SSH_KEYS attribute are ignored.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ct_has.qkf** Location of the **ct_has.qkf** file

## Author

Ya-Huey Juan - cluster@us.ibm.com

## See also

Commands: **ctskeygen**

Daemons: **ctcasd**

Files: **ct_has.pkf**, **ct_has.thl**

# ct_has.thl

## Name

**ct_has.thl** – default location for the local node's cluster security services trusted host list file.

## Description

The **/var/ct/cfg/ct_has.thl** file is the default location where the **ctcasd** demon will expect to find the local node's trusted host list file. The contents of this file are stored in a proprietary binary format.

The trusted host list maps each host identity within the peer domain or management domain to the host's cluster security services public key. The **ctcasd** daemon uses this list to determine which nodes on the network are trusted, and to locate the public keys for these nodes to decrypt RSCT host-based authentication (HBA) credentials transmitted from another host within the cluster. If a host is not listed in a node's trusted host list, or if the public key recorded for that host is incorrect, the host will not be able to authenticate to that node using RSCT host-based authentication.

The **ctcasd.cfg** file permits the system administrator to specify an alternate location for this file. If an alternate location is used, the file must meet all the criteria listed in the **Security** section of this man page. The file must not be recorded to a read-only file system, because this will prohibit the system administrator for modifying the contents of this file in the future.

If the **ctcasd** daemon cannot locate this file during its startup, it will check for the presence of the **ct_has.pkf** file. If both files are missing, the daemon will assume that it is being started for the first time after installation, and create an initial private and public key file for the node. The daemon also creates the initial trusted host list file for this node. This file contains an entry for **localhost**, along with the IP addresses and the host names associated with all AF_INET-configured adapters that the daemon can detect. Inadvertent authentication failures could occur if the public and private key files were accidentally or intentionally removed from the local system before the daemon was restarted. **ctcasd** will create new keys for the node, which will not match the keys stored on the other cluster nodes. If RSCT host-based authentication suddenly fails after a system restart, this is a possible source of the failure.

## Security

This file is readable by all users on the local system. Write access is not provided to any system user.

By default, this file is stored in a locally-mounted file system. The **ctcasd.cfg** file permits system administrators to change the location of the file. If the system administrator uses a different location, it is the administrator's responsibility to make sure the file is always accessible to the local node, and that all users from this local node can access the file. If the storage location does not meet these criteria, users and applications will be unable to authenticate to trusted services using RSCT host-based authentication.

If the system administrator chooses to place this file in a networked file system, the administrator must assure that no two nodes are attempting to use the same physical file as their own trusted host list file, or that the file does not contain an

entry for localhost. By default, the trusted host list contains an entry for **localhost**, which maps the local system's public key to this value. If multiple hosts share the same trusted host list file, attempts by users or applications to contact localhost for trusted services may fail because the entry maps to an incorrect public key value.

## Restrictions

- Cluster security services supports only its own private and public key formats and file formats.
- Cluster security services does not provide an automated utility for creating, managing, and maintaining trusted host lists throughout the cluster. This is a procedure left to either the system administrator or the cluster management software.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ct_has.thl** Location of the **ct_has.thl** file

## Author

Robert Gensler- cluster@us.ibm.com

## See also

Commands: **ctkeygen**, **ctsthl**

Daemons: **ctcasd**

Files: **ct_has.pkf**, **ct_has.qkf**

# ctcasd.cfg

## Name

**ctcasd.cfg** – provides operational parameters to the cluster security services daemon **ctcasd**.

## Description

The **ctcasd.cfg** configuration file defines the operational parameters to the cluster security services daemon **ctcasd**. The **ctcasd** daemon reads this file when it (the daemon) initializes. The **ctcasd** daemon expects to find this configuration file in either the **/var/ct/cfg** directory (preferred) or in the **/usr/sbin/rsct/cfg** directory (default). System administrators can modify the contents of the file stored in the **/var/ct/cfg** directory, but should not modify the default version of the file in **/usr/sbin/rsct/cfg** unless instructed to do so by the cluster software service provider.

This file is ASCII-formatted, and can be modified using any available text editor. One attribute can be defined per line within this file. Attributes are specified as follows:

*attribute=value*

The following attributes are defined:

**Attribute** **Definition**

**TRACE** Indicates whether daemon tracing is activated. Valid values are: **ON** and **OFF**. If this attribute is *not* listed in the **ctcasd.cfg** file, tracing is activated by default (**TRACE=ON**). For coexistence with earlier versions of RSCT, **TRACE=false** is interpreted as **TRACE=OFF**.

**TRACEFILE** Specifies the fully-qualified path name where daemon tracing information is to be recorded. If this attribute is *not* listed in the **ctcasd.cfg** file, tracing information is recorded in **/var/ct/IW/log/ctsec/ctcasd/trace**.

**TRACELEVELS**

Indicates the tracing granularity employed by the daemon when tracing is activated. The possible trace categories are:

**_SEC:Errors**
Captures error information in the trace log. Valid values are: **1**, **2**, **4**, and **8**.

**_SEC:Info**
Traces the general execution progress of the daemon. Valid values are: **0**, **1**, **4**, and **8**.

The default value for this attribute is:
**TRACELEVELS=_SEC:Info=1,_SEC:Errors=1** When setting the values of these trace categories, keep in mind that the lower the number is, the less intrusive (and less detailed) the trace will be. Multiple traces can be enabled at once. For example, if an administrator wants to enable a trace that captures basic execution information and highly-detailed error information, the specification for TRACELEVELS would be:
**TRACELEVELS=_SEC:Info=1,_SEC:Errors=8**

**TRACESIZE** Specifies the size of the trace file in bytes. The default value is 1 megabyte.

**RQUEUESIZE** Indicates the maximum length permitted for the daemon's internal run queue. If this value is not set, a default value of 64 is used.

**MAXTHREADS**
The limit to the number of working threads that the daemon may create and use at any given time (the ″high water mark″). If this value is not set, a default value of 10 is used.

**MINTHREADS**
The number of idle threads that the daemon will retain if the daemon is awaiting further work (the ″low water mark″). If this value is not set, a default value of 4 is used.

**THREADSTACK**
Sets the internal memory used by the daemon for thread stack space. The value is expressed in bytes. If no value is specified, the default system thread stack size is used. This value should not be modified by the administrator unless instructed to do so by IBM Service.

**HBA_USING_SSH_KEYS**
Indicates whether the daemon is making use of Secured Remote Shell keys. Acceptable values are **true** and **false**. If this value is not defined, a default value of **false** is used. See **Restrictions**.

**HBA_PRVKEYFILE**
Provides the full path name of the file that contains the local node's private key. If this value is not set, the default location of **/var/ct/cfg/ct_has.qkf** is used.

**HBA_PUBKEYFILE**
Provides the full path name of the file that contains the local node's public key. If this value is not set, the default location of **/var/ct/cfg/ct_has.pkf** is used.

**HBA_THLFILE**
Provides the full path name of the file that contains the local node's trusted host list. If this value is not set, the default location of **/var/ct/cfg/ct_has.thl** is used.

**HBA_KEYGEN_METHOD**
Indicates the method to be used by **ctcasd** to generate the private and public keys of the local node if the files containing these keys do not exist. Acceptable values are those that can be provided as arguments to the **ctskeygen -m** command. If no value is provided for this attribute, the default value of **rsa512** is used.

**HBA_CRED_TIMETOLIVE**
Sets the credential life span, which is the length of time for which the host-based authentication mechanism considers the credential to be valid. Setting a credential life span enables the RSCT host-based authentication (HBA) security mechanism to detect outdated credentials, and to refuse authentication to applications that present expired credentials.

The credential life span begins when a credential is created, and extends for the minutes or seconds that you specify for the `HBA_CRED_TIMETOLIVE` keyword. When you set a value for this

keyword, use the letter **m** to indicate minutes and **s** for seconds. If you do not specify a letter, the HBA security mechanism assumes the value specified to be in seconds.

**Default:** The HBA_CRED_TIMETOLIVE keyword does not have a default value. If you do not set a value, or set a value of 0, the HBA security mechanism does not check for credentials that have expired.

**Guidelines:**

- Do not set a credential life span on any node unless all nodes in your cluster have a common agreement on the current time of day. The time of day clocks on all systems within the operational cluster must be set within a reasonable tolerance of each other, typically within a few seconds. This requirement includes any hardware management consoles (HMCs) that are contained within the operational cluster.
- Time zone differences between systems are permitted within the cluster, because the time-of-day clocks measure time in Coordinated Universal Time (UTC).
- If your cluster uses Network Time Protocol (NTP), or another protocol that synchronizes network time, the nodes of your cluster will already have a common agreement on the current time of day. If you are not using such a protocol:
  1. Use the **date** command on each node in the cluster to synchronize the time-of-day clocks.
  2. Set the **HBA_CRED_TIMETOLIVE** keyword.

**Examples:**
- **HBA_CRED_TIMETOLIVE=90s**
- **HBA_CRED_TIMETOLIVE=10m**
- **HBA_CRED_TIMETOLIVE=10m 15s**

**HBA2_CRED_CTX_LIFETIME**

Specifies the life span of a security context that is established between a client and a server. The value assigned to this parameter represents the amount of time, in seconds, for which the security context established between a client and a server is valid. After the specified amount of time passes, the security context can no longer be used to authorize the client or provide such services as message integrity and confidentiality. A value of **-1** represents an infinite lifetime for security contexts. In other words, the security contexts do not expire. If the configuration parameter is missing from the configuration file or has no value assigned to it, **ctcasd** uses a default value of **-1**.

**HBA2_CRED_TIMETOLIVE**

Specifies the ″time-to-live″ value for context control data buffers (CCDBs). The value assigned to this parameter represents the amount of time the CCDBs are allowed to ″live″. A value of **0** for this parameter is interpreted as no time-to-live value and the replay attack protection is disabled. If this parameter is missing from the configuration file, has no value assigned to it, or is less than the minimum allowed (300 seconds) or greater than the maximum allowed (600 seconds), **ctcasd** uses the default value of 450 seconds.

**HBA2_NONCE_FILEMIN**
Specifies the minimum number of replay data touples that **ctcasd** tracks in its on-disk replay cache file. The default value for this parameter is 4096 replay data touples, for a total file size of 64KB. If no value is present in the configuration file or if the parameter does not exist, **ctcasd** assumes the default value.

**SERVICES** Lists the internal cluster security services library services that the daemon supports. This entry should not be modified by system administrators unless they are explicitly instructed to do so by the cluster security software service provider.

## Files

**/usr/sbin/rsct/cfg/ctcasd.cfg** Default location of the **ctcasd.cfg** file

**/var/ct/cfg/ct_has.pkf** Default location of the local node's public key

**/var/ct/cfg/ct_has.qkf** Default location of the local node's private key

**/var/ct/cfg/ct_has.thl** Default location of the local node's trusted host list

**/var/ct/IW/log/ctsec/ctcasd/trace**
Default location where tracing information is recorded

## Restrictions

Cluster security services supports only its own private and public key formats and file formats. Secured Remote Shell formats are currently unsupported. Settings for the HBA_USING_SSH_KEYS attribute are ignored.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/var/ct/cfg/ctcasd.cfg** Contains the **ctcasd.cfg** file

## Examples

This example shows the default contents of the configuration file:

```
TRACE=ON
TRACEFILE=/var/ct/IW/log/ctsec/ctcasd/trace
TRACELEVELS=_SEC:Info=1,_SEC:Errors=1
TRACESIZE=1003520
RQUEUESIZE=
MAXTHREADS=
MINTHREADS=
THREADSTACK=131072
HBA_USING_SSH_KEYS=false
HBA_PRVKEYFILE=
HBA_PUBKEYFILE=
HBA_THLFILE=
HBA_KEYGEN_METHOD=rsa512
HBA_CRED_TIMETOLIVE=
HBA2_CRED_CTX_LIFETIME=
HBA2_CRED_TIMETOLIVE=
HBA2_NONCE_FILEMIN=
SERVICES=hba CAS
```

After modification, the contents of the configuration file might look like this:

```
TRACE=ON
TRACEFILE=/var/ct/IW/log/ctsec/ctcasd/trace
TRACELEVELS=SEC:Info=1,_SEC:Errors=8
TRACESIZE=1003520
RQUEUESIZE=64
MAXTHREADS=10
MINTHREADS=4
THREADSTACK=131072
HBA_USING_SSH_KEYS= false
HBA_PVTKEYFILE=/var/ct/cfg/qkey
HBA_PUBKEYFILE=/var/ct/cfg/pkey
HBA_THLFILE=/var/ct/cfg/thl
HBA_KEYGEN_METHOD=rsa512
HBA_CRED_TIMETOLIVE=90s
HBA2_CRED_CTX_LIFETIME=
HBA2_CRED_TIMETOLIVE=
HBA2_NONCE_FILEMIN=
SERVICES=hba CAS
```

## Author

Bruce Potter - cluster@us.ibm.com

## See also

Commands: **ctadmingroup**, **ctskeygen**, **date**

Daemons: **ctcasd**

Files: **ct_has.pkf**, **ct_has.qkf**, **ct_has.thl**

# ctrmc.acls

## Name

**ctrmc.acls** – contains a node's resource monitoring and control (RMC) access control list (ACL).

## Description

RMC implements authorization using an access control list (ACL) file. Specifically, RMC uses the ACL file on a particular node to determine the permissions that a user must have in order to access resource classes and their resource instances. A node's RMC ACL file is named **ctrmc.acls** and is installed in the **/usr/sbin/rsct/cfg** directory. You can allow RMC to use the default permissions set in this file, or you can use the **chrmcacl** command to modify these defaults. See "chrmcacl " on page 12 for more information.

For more information about the RMC ACL file, see the *RSCT: Administration Guide*.

For information about how access controls are implemented for the **IBM.LPCommands** resource class and its resources, see "lpacl " on page 402.

## Files

| | |
|---|---|
| **/usr/sbin/rsct/cfg/ctrmc.acls** | Default location of the **ctrmc.acls** file |
| **/var/ct/IW/log/mc/default** | Location of any errors found in the modified **ctrmc.acls** file |

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

| | |
|---|---|
| **/var/ct/cfg/ctrmc.acls** | Contains the **ctrmc.acls** file |

## Author

cluster@us.ibm.com

## See also

"lpacl " on page 402

Books: *RSCT: Administration Guide*

Commands: **chrmcacl**

# ctsec_map.global, ctsec_map.local

## Name

**ctsec_map.global**, **ctsec_map.local** – associates operating system user identifiers on the local system with network security identifiers for authorization purposes.

## Description

RSCT trusted services use the identity mapping definition files **ctsec_map.global** and **ctsec_map.local** to determine whether an RSCT client application's user should be granted access to specific RSCT functions and resources. These files are used to associate security network identifiers that are used by RSCT's cluster security services with user identifiers on the local system. RSCT trusted services use these files to determine what association, if any, exists for the RSCT client, and then use this association while examining the RSCT access controls to determine whether the RSCT client should be granted access.

Two identity mapping definition files can be used:

- The **ctsec_map.global** file contains associations that are to be recognized on all nodes within the cluster configuration
- The **ctsec_map.local** file contains associations that are specific to a particular node

In a cluster configuration, all **ctsec_map.global** files should be the same. Any local system additions that are required for that specific system should be made in the **ctsec_map.local** file.

RSCT provides a default **ctsec_map.global** file in the **/usr/sbin/rsct/cfg** directory. Do *not* change this file. If you need to add more associations for the cluster, copy this file to the **/var/ct/cfg** directory. Make any changes to this new file: **/var/ct/cfg/ctsec_map.global**. Any entries that exist in the default **ctsec_map.global** file must exist in the replacement version of the file in the **/var/ct/cfg** directory, or the RSCT trusted services may refuse access to other RSCT trusted services peers. RSCT does not provide a default **ctsec_map.local** file. The administrator can create this file, which must reside in the **/var/ct/cfg** directory as well.

**ctsec_map.global** and **ctsec_map.local** are ASCII-formatted files that can be viewed and modified using a text editor. Each line in the file constitutes an entry. Blank lines and lines that start with a pound sign (**#**) are ignored. Each entry is used to either associate a security network identifier with a local operating system user identifier, or to expressly state that no association is allowed for a security network identifier.

Ordering of entries within these files is important. Cluster security services parses the **ctsec_map.global**and **ctsec_map.local** files as follows:

1. If the **/var/ct/cfg/ctsec_map.local** file exists, cluster security services checks for associations in this file
2. If the **/var/ct/cfg/ctsec_map.global** file exists, cluster security services checks for associations in this file
3. Otherwise, cluster security services checks for associations within the **/usr/sbin/rsct/cfg/ctsec_map.global**, if this file exists

The first entry that successfully grants or denies an association for a security network identifier in this search path is the one that cluster security services uses. If

entries in both the **ctsec_map.global**and **ctsec_map.local** files grant differing associations to the same security network identifier, cluster security services will use the association stated by the entry in the **ctsec_map.local** file. Also, if two entries within the **ctsec_map.global** file grant different associations to the same security network identifier, cluster security services will use the association granted by the entry listed earlier in the **ctsec_map.global** file. You can use the **ctsidmck** command to verify the association rule that is used by cluster security services for specific security network identifiers.

Cluster security services recognizes these characters as reserved: **<**, **>**, **:**, **=**, **!**, **@**, *****, and considers these, along with white space characters, as token separators. The wildcard character ***** is permitted, but should not be used multiple times between other token separator characters. Contents of the identity mapping definition files use the following Backus-Nour format:

```
<mapping_entry> ::= <mechanism_mnemonic> ':' <mapping>>

<mechanism_mnemonic> ::= 'unix', 'krb5'

<mapping> ::= <explicit mapping> | <mapping_rule>

<explicit_mapping> ::= <source_mapping> '=' <local_user_identity>
                       | '!' <source_mapping>

<source_mapping> ::= <network_identity> | <match_pattern>'*'

<target_mapping> ::= <mapped_identity> | '*'

<network_identity> ::= <user_name>'@'<registry_name>

<user_name> ::= <match_pattern>'*' | '*'

<registry_name> ::= <match_pattern> | '*' | <mpm_defined_reserved_word>

<mpm_defined_reserved_word> ::= '<'<alphanumeric_string>'>'

<mapped_identity> ::= <alphanumeric_string>

<match_pattern> ::= null string | <alphanumeric_string>

<alphanumeric_string> ::= any non-empty array of alphanumeric characters not
                          consisting of the reserved token separator characters
```

An <mpm_defined_reserved_word> is a special instruction to the underlying security mechanism associated with the security network identifier that instructs the mechanism to interpret the identifier in a specific manner. The following reserved words are defined:

**<iw>** A reserved word for security network identities using the RSCT host-based authentication (HBA) security mechanism. This keyword maps the HBA **root** network identity of the local node to the **root** user. When the cluster security services identity mapping program processes the **ctsec_map.global** file, it replaces the **<iw>** keyword with the node ID of the node.

**<cluster>**
A reserved word for security network identities using the HBA security mechanism. The mapping entry is applied to a security network identifier if the identifier is known to originate from any host within the cluster that is currently active for the local node.

**<any_cluster>**
A reserved word for security network identities using the HBA security

mechanism. The mapping entry is applied to a security network identifier if the identifier is known to originate from any host within any cluster that the local node is currently defined. The local node does not need to be active within that cluster when the mapping is applied.

**<realm>**
A reserved word for security network identities using the Kerberos version 5 mechanism. The mapping entry is applied to a security network identity if the identifier is known to originate within the Kerberos realm that is currently active. See **Restrictions.**

## Security

- The default identity mapping definition file **/usr/sbin/rsct/cfg/ctsec_map.global** is readable by all system users, but permissions prevent this file from being modified by any system user.
- When creating the override identity mapping definition files **/var/ct/cfg/ctsec_map.global** and **/var/ct/cfg/ctsec_map.local**, make sure that the files can be read by any system user, but that they can only be modified by the root user or other restrictive user identity not granted to normal system users.
- By default, these files reside in locally-mounted file systems. While it is possible to mount the **/var/ct/cfg** directory on a networked file system, this practice is discouraged. If the **/var/ct/cfg/ctsec_map.local** file were to reside in a networked file system, any node with access to that networked directory would assume that these definitions were specific to that node alone when in reality they would be shared.

## Restrictions

RSCT does not support the Kerberos version 5 mechanism. Any entries using the mechanism mnemonic **krb5** or the reserved word **<realm>** will not be applied.

## Implementation specifics

These files are part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. The default file is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/cfg/ctsec_map.global**
Contains the default identity mapping definition file.

**/var/ct/cfg/ctsec_map.global**
Contains the replacement for the default global identity mapping definition file. Any entries that exist in the default **ctsec_map.global** file must be replicated in this file, or necessary access required by RSCT trusted services clients will be refused. This file contains identity mapping definitions expected to be recognized by all nodes within the cluster. It is expected that this file will have the same contents for each node within the cluster.

**/var/ct/cfg/ctsec_map.local**
Contains additional identity mapping definitions specific to the local node. This file adds identity mapping definitions to the set recognized for the entire cluster. Entries within this file are applied before entries from the **ctsec_map.global** file. It is expected that the contents of this file will vary from node to node within the cluster, and provide mappings required for clients that access the local node only.

## Examples

These reserved characters: **<**, **>**, **:**, **=**, **!**, and **@**, are interpreted as token separators, as are white space characters.

**Examples of valid identity mapping definition entries:**

**unix:zathras@epsilon3.ibm.com=zathras**

This entry grants the association for the RSCT host-based authentication (HBA) security mechanism identity **zathras@epsilon3.ibm.com** to the local user identifier **zathras**. This entry will not be applied to other HBA identities.

**unix:!zathras@greatmachine.net**

This entry denies any local user identity association for the HBA identity **zathras@greatmachine.net**. This entry will not be applied to other HBA identities.

**unix:entilzah@<cluster>=root**

The <cluster> reserved word will match any HBA identity containing the user name **entilzah** that originates from any host within the currently-active cluster. This will grant associations for such HBA identities as **entilzah@anglashok.ibm.com** and **entilzah@mimbar.ibm.com** to the local user **root** when the local node is active within the cluster that also contains the hosts **anglashok.ibm.com** and **mimbar.ibm.com**. Associations will not be granted for such HBA identities as **entilzah@whitestar.ibm.com** if the host **whitestar.ibm.com** is not part of the cluster that is currently active.

**unix:entilzah@<any_cluster>=root**

The <cluster> reserved word will match any HBA identity containing the user name **entilzah** that originates from any host within the currently-active cluster. This will grant associations for HBA identities such as **entilzah@anglashok.ibm.com** and **entilzah@mimbar.ibm.com** to the local user **root** when the local node is active within the cluster that also contains the hosts **anglashok.ibm.com** and **mimbar.ibm.com**. Associations will also be granted for HBA identities such as **entilzah@whitestar.ibm.com** to the local user **root** if the host **whitestar.ibm.com** is part of any cluster known to the local host.

**unix:zathras@*=zathras**

The ***** character in this entry will match any HBA identity that contains the user name **zathras** from any host to the local user identifier **zathras**. This will grant associations for HBA identities such as **zathras@epsilon3.ibm.com** and **zathras@greatmachine.net** to the local user identifier **zathras**.

**unix:zathras@*.ibm.com=zathras**

The ***** character in this entry will match any HBA identity that contains the user name **zathras** and a host name ending with an **ibm.com** network domain to the local user identifier **zathras**. This will grant associations for HBA identities such as **zathras@epsilon3.ibm.com** and **zathras@newibm.com** to the local user identifier **zathras**.

**unix:*@epsilon3.ibm.com=zathras**

The ***** character in this entry will match any HBA identity from the host **epsilon3.ibm.com** and associate that client to the local user **zathras**. This will grant associations for HBA identities such as **zathras@epsilon3.ibm.com** and **draal@epsilon3.ibm.com** to the local user identifier **zathras**.

**unix:*@epsilon3.ibm.com=*** The * characters in this entry will match any HBA identity from the host **epsilon3.ibm.com** and associate that client to the local user whose name matches the user name from the security network identifier. This will grant associations for HBA identities such as **zathras@epsilon3.ibm.com** to the local user **zathras** and **draal@epsilon3.ibm.com** to the local user identifier **draal**.

**unix:!*@epsilon3.ibm.com** The * characters in this entry will match any HBA identity from the host **epsilon3.ibm.com** and deny any association for that client to any local user. This will deny associations for HBA identities such as **zathras@epsilon3.ibm.com** and **draal@epsilon3.ibm.com**, but will not deny associations for the UNIX HBA network identifier **zathras@greatmachine.net**.

**unix:*@*=*** The * characters in this entry will match any HBA identity from any host and associate that client to the local user whose name matches the user name from the security network identifier. This will grant associations for HBA identities such as **zathras@epsilon3.ibm.com** to the local user **zathras** and **entilzah@anglashok.ibm.com** to the local user identifier **entilzah**.

**Examples of identity mapping definition entries that are *not* valid:**

***:zathras@epsilon3.ibm.com=zathras**
The security mechanism cannot be determined. Each entry must explicitly name a security mechanism that needs to be applied to interpret the entry.

**unix:zathras@epsilon3.ibm.com=z***
The local user identity to use is ambiguous.

**unix:zathras@*.ibm.*=zathras**
This entry repeats wildcard characters between the token separators **@** and **=**, which makes the entry ambiguous.

**unix:*athra*@epsilon3.ibm.com=zathras**
This entry repeats wildcard characters between the token separators **:** and **@**, which makes the entry ambiguous.

**unix:*=*** The wildcard character * is ambiguous. It cannot be determined if the wildcard character applies to the identity name or the identity location.

## Author

cluster@us.ibm.com

## See also

Commands: **ctsidmck**

# snmptrapd.conf

## Name

**snmptrapd.conf** – contains entries to call the **trap2rmc** command when traps are received.

## Description

This configuration file contains entries to call the **trap2rmc** command when traps are received.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/share/snmp/snmptrapd.conf**
Contains the **snmptrapd.conf** file

## Author

cluster@us.ibm.com

## See also

Commands: **cfgrmcsnmp**, **trap2rmc**

# unix.map

## Name

**unix.map** – defines the operating system identity used for service provider applications on the node by the RSCT host-based authentication (HBA) security mechanism.

## Description

Applications that use the cluster security services library must obtain an identity from the security mechanisms supported by the library. These identities are specific to the individual security mechanisms supported by cluster security services. Because cluster security services supports multiple security mechanisms and multiple applications, the cluster security services library must be informed of which identity to use for an application when interacting with a specific security mechanism on its behalf.

The default security mechanism used by the cluster security services library is the RSCT host-based authentication (HBA) security mechanism. The **unix.map** file defines the identities used by the core cluster applications when interacting with the HBA security mechanism. The cluster security services library expects to locate this file in **/var/ct/cfg/unix.map** (preferred) or **/usr/sbin/rsct/cfg/unix.map** (default).

This file is ASCII-text formatted, and can be modified with a standard text editor. However, this file should not be modified unless the administrator is instructed to do so by the cluster software service provider. If this configuration file is to be modified, the default **/usr/sbin/rsct/cfg/unix.map** file should not be modified directly. Instead, the file should be copied to **/var/ct/cfg/unix.map**, and modifications should be made to this copy. The default configuration file should never be modified.

All entries within this file use the following format:

```
SERVICE:service_name:user_name_running_the_service
```

| Attribute | Definition |
|---|---|
| **SERVICE** | Required keyword |
| *service_name* | Specifies the name commonly used to refer to the application. For example, this could be the name used by the system resource controller to refer to this application. |
| *user_name_running_the_service* | Specifies the operating system user identity used to execute the application process. It is the owner identity that would be seen for the application process in the **ps** command output. |

## Files

| | |
|---|---|
| **/usr/sbin/rsct/cfg/unix.map** | Default location of the unix.map file |

## Restrictions

This file should not be modified unless the administrator is instructed to do so by the cluster software service provider. Incorrect modification of this file will result in authentication failures for the applications listed in this file and possibly their client applications. If this configuration file is to be modified, the default

**/usr/sbin/rsct/cfg/unix.map** file should not be modified directly. Instead, the file should be copied to **/var/ct/cfg/unix.map**, and modifications should be made to this copy. The default configuration file should never be modified.

## Implementation specifics

This file is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/var/ct/cfg/unix.map** Contains the **unix.map** file

## Examples

This example shows the default contents of the configuration file:

```
SERVICE:ctrmc:root
SERVICE:rmc:root
SERVICE:ctloadl:loadl
SERVICE:ctdpcl:root
SERVICE:ctpmd:root
```

## Author

cluster@us.ibm.com

## See also

Commands: **ps**

Daemons: **ctcasd**

# Chapter 8. Common Information Model (CIM) resource manager commands

# lsassocmap

## Name

**lsassocmap** – displays an association map.

## Synopsis

**lsassocmap** [**–c** *association_class*] [**–h**] [**–TV**] [*endpoint*...]

## Description

The **lsassocmap** command displays the association classes available on a cluster, including the endpoints of each association. Names and endpoints of Common Information Model (CIM) association classes that have been registered with the CIM resource manager are displayed in table format, similar to the output of the **lscondresp** command.

If you specify **lsassocmap** without any parameters, all association classes, endpoints, and ″roles″ are displayed. A *role* is the name of the class's reference property in the association class definition. Roles can be used as parameters to the **-o** and **-R** options of the **lsrsrcassoc** command to filter output. See "lsrsrcassoc " on page 172 for more information.

The **-c** option limits the associations displayed to only those provided by a specific association class. You can specify any number of classes using the *endpoint* parameter; only associations containing those classes as references (endpoints) are displayed.

## Parameters

*endpoint***...**
Specifies one or more endpoint classes. Only association classes containing references to one of the *endpoint* classes are displayed.

## Options

**–c** *association_class*
Displays associations for *association_class*.

**–h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

When the **-T** option is specified, this command's trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The specified association class could not be found.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsassocmap** Contains the **lsassocmap** command

## Examples

To display associations that are available in a cluster, enter:

```
lsassocmap
```

The output will look like this:

```
Association Class             Role 1          Associator 1           Role 2         Associator 2          Node
cimv2.Linux_RunningOS         Antecedent      Linux_OperatingSystem  Dependent      Linux_ComputerSystem  c175nf14
cimv2.Linux_OSProcess         GroupComponent  Linux_OperatingSystem  PartComponent  Linux_UnixProcess     c175nf14
cimv2.Linux_CSProcessor       GroupComponent  Linux_ComputerSystem   PartComponent  Linux_Processor       c175nf14
cimv2.Linux_HostedFileSystem  GroupComponent  Linux_ComputerSystem   PartComponent  CIM_FileSystem        c175nf14
```

## Author

cluster@us.ibm.com

## See also

Commands: **lsrsrcassoc**, **lscondresp**, **mkcimreg**

# lsrsrcassoc

## Name

**lsrsrcassoc** – retrieves a list of resources that are associated with a class using an association provider.

## Synopsis

**lsrsrcassoc** [**-s** *"source_selection_string"*] [**-c** *association_class*] [**-d** *association_endpoint_class*] [**-S** *"destination_selection_string"*] [**-o** *role*] [**-R** *result_role*] [**–h**] [**–TV**] *source_class_name* [*property_list*...]

## Description

The **lsrsrcassoc** command is an interface into the Common Information Model resource manager (CIMRM) association query mechanism, allowing users to learn the relationships among CIM resources. Association providers that have been registered with CIMRM are called to retrieve association data. Before using **lsrsrcassoc**, it may be helpful to run the **lsassocmap** command to find out which association classes are known to the resource monitoring and control (RMC) subsystem.

You must specify a source class name with the **lsrsrcassoc** command. With no options specified, **lsrsrcassoc** retrieves all resources associated with every resource of this class. Options can be used to filter which associated resources are displayed.

The command's output is similar to that of **lsrsrc**. Resources associated with a given source resource are displayed with their class name and one attribute per line to facilitate searching and filtering the output.

## Parameters

*source_class_name*
Specifies the source class in the association.

*property_list*
Specifies one or more property names. Only these properties (or attributes, in RMC terminology) of associated resources are displayed. If you do not specify this parameter, all property names are displayed.

## Options

**–s** *source_selection_string*
Specifies that only resources of the source class that match the selection string are used in the search for associated resources.

**–S** *destination_selection_string*
Specifies that only resources of the associated classes that match this selection string are displayed.

**–c** *association_class*
Limits the association search to only those resources tied to the source class through *association_class*.

**–d** *association_endpoint*
Limits the search of associated resources to just those that are members of this class.

**–o** *role*
The CIM association interface defines the Role parameter as the name of the property referring to the class on the source side of the association. Typical values for this are ″GroupComponent″ or ″PartComponent″, though the specific name must come from the association class definition.

**–R** *result_role*
Used like the **-o** option, except this is the name of the property that refers to the destination side of the association.

**–h** Writes the command's usage statement to standard output.

**-T** Writes the command's trace messages to standard error. For your software service organization's use only.

**-V** Writes the command's verbose messages to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

When the **-T** option is specified, this command's trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with the command-line interface (CLI) script.

**2** An incorrect option was specified on the command line.

**3** An incorrect parameter was specified on the command line.

**4** The source endpoint class was not found.

**5** The destination endpoint class was not found.

**6** The association class was not found.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsrsrcassoc** Contains the **lsrsrcassoc** command

## Examples

To view instances of **cimv2.Linux_UnixProcess** that are associated with **cimv2.Linux_OperatingSystem** on the specified node, enter:

```
lsrsrcassoc -c cimv2.Linux_OSProcess -s 'Name=~"c175nf14"' -S \
'Name=~"emacs"' cimv2.Linux_OperatingSystem Handle Parameters
```

In this example:

- **-c cimv2.Linux_OSProcess** is the association class whose provider is used.

- **-s 'Name=~″c175nf14″'** is the selection string against the **cimv2.Linux_OperatingSystem** instances (we only want objects associated with the OS instance representing the node **c175nf14**).
- **-S 'Name=~″emacs″'** is the selection string against **cimv2.Linux_UnixProcess** objects; only those with **Name** attributes that contain the pattern **emacs** are returned.
- **cimv2.Linux_OperatingSystem**, which is the ″source object″ parameter, is one of the classes in the association.
- **Handle Parameters** are properties that the provider is asked to return. **Handle** is the PID of the process; **Parameters** is a list of arguments to the process.

The output will look like this:

```
Resource Persistent Attributes for cimv2.Linux_UnixProcess
resource 1:
Handle = "2781"
Parameters = {"emacs", "-u", "foo.C"}
resource 2:
Handle = "2782"
Parameters = {"emacs", "bar.C"}
resource 3:
Handle = "2783"
Parameters = {"emacs","foo_bar.C"}
resource 4:
Handle = "2784"
Parameters = {"emacs","bar_foo.C"}
resource 5:
Handle = "2785"
Parameters = {"emacs","CIMRC.C"}
resource 6:
Handle = "26994"
Parameters = {"emacs","lsassocmap.pl"}
```

## Author

cluster@us.ibm.com

## See also

Commands: **lsassocmap**, **lsrsrc**, **mkcimreg**

# mkcimreg

## Name

**mkcimreg** – registers Common Information Model (CIM) classes and Common Manageability Programming Interface (CMPI) providers with RMC.

## Synopsis

To register a class:

**mkcimreg** [**–l** *include_directory*]... [**–f**] [**–h**] *class_MOF_file*...

To register a provider:

**mkcimreg** [**–l** *include_directory*]... [**–p** *provider_directory*] [**–h**] *provider_MOF_file*...

To compile the CIM schema:

**mkcimreg** [**–l** *include_directory*]... **–b** *CIM_schema_path* [**–h**]

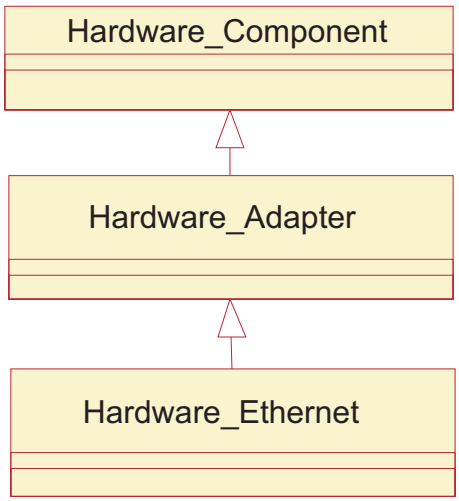
## Description

The **mkcimreg** command registers CIM classes and CMPI providers with RMC. Command output includes files needed for CIMRM to work with CIM classes.

Use the **-l** option to add directories to the search path for MOF files. Any number of MOF files can be provided on the command line.

You must use the **-f** option to register a class that already exists in the current namespace. Without this option, class registration is rejected in case the class that has been registered before is already on the system. With this option, any existing class registration data is overwritten with the definition provided in the MOF.

If you upgrade a class using the **-f** option (that is, if the class definition has changed somehow), you must re-register all classes that are subclasses of the upgraded class so that the changes introduced into the new class propagate to its subclasses. This must be done in ″descending″ order, because changes propagate from parent to child. The hierarchy is:



If, for example, **Hardware_Component** is upgraded using **mkcimreg -f**, **Hardware_Adapter** and then **Hardware_Ethernet** must both be registered afterward, in that order.

The **-p** option indicates that the managed object format (MOF) file on the command line contains provider registration information. The provider library's directory is expected as this option's parameter. Provider library names follow the CMPI/Pegasus convention of appending **lib** to the beginning of the **ProviderName** property. For example, the provider with the property **ProviderName=Linux_Processor** is searched for in the **ProviderDirectory** under the name **libLinux_Processor.so**. Auxiliary libraries required by providers that are not explicitly declared in the MOF file must be either in the directory supplied on the command line, or in a standard system directory such as **/usr/lib** or **/lib**.

Version 2.9 of the CIM schema is shipped with CIMRM. If you want to upgrade to a higher version, use the **-b** option to install a new CIM schema. The **CIM_Schema***version***.mof** file must be passed as the parameter to this option. For example, to compile another version of the schema, the command would look like this:

```
mkcimreg -I $SCHEMA_DIR -b CIM_Schema.mof
```

**$SCHEMA_DIR**, which indicates a search path for schema MOF files, is not required, but could help **mkcimreg** find the required MOF files if they are not in the current working directory from which the command is run. The schema file (**CIM_Schema***version***.mof**) contains the entire CIM schema, usually in the form of a series of **#include** statements that bring in other schema MOF files.

After a CIM schema is compiled with the **-b** option, **mkcimreg** will not need further access to the schema MOF files. User classes registered by **mkcimreg** against previous versions of the CIM schema need to be registered again for changes from the new schema version to be reflected in derived classes.

**After you register any classes:**
You must restart RMC.

## Restarting RMC

As the final step in the CIM class registration process, the RMC subsystem must be restarted. The sequence of commands to run follows:

1. To shut down the RMC subsystem, enter:

   ```
   /usr/sbin/rsct/bin/rmcctrl -k
   ```

   **When you shut down RMC:**
   Any RMC-dependent resource monitoring that is in place at the time of shutdown is deactivated. Environments that rely on RMC or any of its resource managers for high availability or other critical system functions may become temporarily disabled.

2. Wait until the following command lists the status of **ctrmc** as ″inoperative″:

   ```
   lssrc -s ctrmc
   ```

3. Shut down the CIM resource manager and confirm it has been stopped:

```
stopsrc -s IBM.CIMRM
lssrc -s IBM.CIMRM
```

4. To restart the RMC subsystem, enter:

```
/usr/sbin/rsct/bin/rmcctrl -A
```

## Parameters

*class_MOF_file*...
: Specifies one or more CIM class definitions as Managed Object Format (MOF) files.

*provider_MOF_file*...
: Specifies one or more provider registration files as Managed Object Format (MOF) files.

## Options

**–I** *include_directory*...
: Specifies one or more additional directories to be searched for MOF files.

**–f**
: Overwrites any existing class registration data with the definition that is provided in the MOF.

**–p** *provider_directory*
: Specifies a path to the provider library.

**–b** *CIM_schema_path*
: Compiles the Distributed Management Task Force (DMTF) CIM schema file.

**–h**
: Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Exit status

**0**
: The command has run successfully.

**1**
: An internal command error occurred.

**2**
: An error occurred with the command-line interface (CLI) script.

**3**
: An incorrect option was specified on the command line.

**4**
: An incorrect parameter was specified on the command line.

**5**
: A class registration error occurred.

## Security

This command requires **root** authority.

## Restrictions

You cannot register a class that derives from a class that has not yet been registered.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkcimreg** Contains the **mkcimreg** command

## Examples

1. To register the CIM class **Linux_ComputerSystem** if the MOF file is located in the directory **$CIMDEFS**, enter:

   ```
   mkcimreg $CIMDEFS/Linux_ComputerSystem.mof
   ```

   You must also register the CMPI provider for this class.
2. To register a CMPI provider when the registration MOF file **Linux_ComputerSystemRegistration.mof** is located in the directory **$CIMDEFS**, and the provider library is in the directory **$CMPIHOME**, enter:

   ```
   mkcimreg -p $CMPIHOME $CIMDEFS/Linux_ComputerSystemRegistration.mof
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about viewing instance property values

Commands: **lssrc**, **rmcctrl**, **stopsrc**

Files: **ct_class_ids**

# Part 5. Monitoring resources

# Chapter 9. Event-response resource manager (ERRM) commands

# chcondition

## Name

chcondition – changes the attributes of a defined condition.

## Synopsis

To change a condition's attributes:

**chcondition** [**–r** *resource_class*] [**–e** *event_expression*]
[**–E** *rearm_expression*] [**–d** *event_description*] [**–D** *rearm_description*]
[**–m l** | **m** | **p** ] [**–n** *node_name1*[**,***node_name2*...]] [**–s** *"selection_string"*]
[**–S c** | **w** | **i** ] [**–h**] [**–TV**] *condition*[**:***node_name*]

To rename a condition:

**chcondition –c** *new_condition* [**–h**] [**–TV**] *condition*[**:***node_name*]

To lock or unlock a condition:

**chcondition** { **-L** | **-U** } [**–h**] [**–TV**] *condition*[**:***node_name*]

## Description

The **chcondition** command changes the attributes of a defined condition. If you use the **-c** option to change the name of the condition, any condition/response associations remain intact.

If a particular condition is needed for system software to work properly, it may be locked. A locked condition cannot be modified or removed until it is unlocked. If the condition you specify with the **chcondition** command is locked, it will not be modified; instead, an error is generated informing you that the condition is locked. To unlock a condition, you can use the **-U** option. However, because a condition is typically locked so that system software works properly, you should exercise caution before unlocking it. To lock a condition, so that it cannot be modified, use the **-L** option.

## Parameters

*condition* Specifies the name of an existing condition that is defined on *node_name*.

*node_name* Specifies the node in a domain where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–c** *new_condition*
Assigns a new name to the condition. *new_condition*, which replaces the current name, is a character string that identifies the condition. If *new_condition* contains one or more spaces, it must be enclosed in quotation marks. A name cannot be null, consist of all spaces, or contain embedded double quotation marks.

**–r** *resource_class*
Specifies which resource class this condition will monitor. The **lsrsrcdef** command can be used to list the resource class names.

**–e** *"event_expression"*
Specifies an *event expression,* which determines when an event occurs. An event expression consists of a dynamic attribute or a persistent attribute of *resource_class*, a mathematical comparison symbol (**>** or **<**, for example), and a constant. When this expression evaluates to TRUE, an event is generated.

**–E** *"rearm_expression"*
Specifies a *rearm expression.* After *event_expression* has evaluated to TRUE and an event is generated, the rearm expression determines when monitoring for the *event_expression* will begin again. Typically,the rearm expression prevents multiple events from being generated for the same event evaluation. The rearm expression consists of a dynamic attribute of *resource_class*, a mathematical comparison symbol (**>**, for example), and a constant.

**–d** *"event_description"*
Describes the event expression.

**–D** *"rearm_description"*
Describes the rearm expression.

**–s** *"selection_string"*
Specifies a selection string that is applied to all of the *resource_class* attributes to determine which resources *event_expression* should monitor. The default is to monitor all resources within *resource_class*. The resources used to evaluate the selection string is determined by the management scope (the **-m** option). The selection string must be enclosed within double or single quotation marks. For information on how to specify selection strings, see *RSCT: Administration Guide*.

**–S c** | **w** | **i**
Specifies the severity of the event:
**c** Critical
**w** Warning
**i** Informational (the default)

**–m l** | **m** | **p**
Specifies the management scope to which the condition applies. The management scope determines how the condition is registered and how the selection string is evaluated. The scope can be different from the current configuration, but monitoring cannot be started until an appropriate scope is selected. The valid values are:

**l** Specifies *local* scope. The condition applies only to the local node (the node where the condition is defined). Only the local node is used in evaluating the selection string.

**m** Specifies *management domain* scope. The condition applies to the management domain in which the node where the condition is defined belongs. All nodes in the management domain are used in evaluating the selection string. The node where the condition is defined must be the management server in order to use management domain scope.

**p** Specifies *peer domain* scope. The condition applies to the peer

domain in which the node where the condition is defined belongs. All nodes in the peer domain are used in evaluating the selection string.

**–n** *node_name1***[,***node_name2***...]**
Specifies the host name for a node (or a list of host names separated by commas for multiple nodes) where this condition will be monitored. Node group names can also be specified, which are expanded into a list of node names. You must specify the **-m** option with a value of **m** or **p** if you want to use the **-n** option. This way, you can monitor conditions on specific nodes instead of the entire domain.

**–L** Locks a condition so it cannot be modified or removed. When locking a condition using the **-L** option, no other operation can be performed by this command.

**–U** Unlocks a condition so it can be modified or removed. If a condition is locked, this is typically because it is essential for system software to work properly. For this reason, you should exercise caution before unlocking it. When unlocking a condition using the **-U** flag, no other operation can be performed by this command.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope

**1** Specifies *local* scope

**2** Specifies *peer domain* scope

**3** Specifies *management domain* scope

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **chcondition** command needs write permission to the **IBM.Condition** resource class on the node where the condition is defined. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chcondition**
Contains the **chcondition** command

## Examples

These examples apply to standalone systems:

1. To change the condition name from ″FileSystem space used″ to ″Watch FileSystem space″, run this command:

   ```
   chcondition -c "Watch FileSystem space"  "FileSystem space used"
   ```

2. To change a rearm expression and rearm description for a condition with the name ″tmp space used″, run this command:

   ```
   chcondition -E "PercentTotUsed < 80" \
   -D "Start monitoring tmp again after it is less than 80 percent full" \
   "tmp space used"
   ```

In the following examples, which apply to management domains, the node on which the command is run is on the management server.

1. To change the condition with the name ″FileSystem space used″ on the management server to check for space usage that is greater than 95%, run this command:

   ```
   chcondition -e "PercentTotUsed > 95" "FileSystem space used"
   ```

2. To change the condition with the name ″NodeB FileSystem space used″ on **NodeB** to check for space usage that is greater than 95%, run this command:

```
chcondition -e "PercentTotUsed > 95" \
"NodeB FileSystem space used":NodeB
```

This example applies to a peer domain:

1. To change the condition defined on **NodeA** with the name ″FileSystem space used″ to check for space usage that is greater than 95%, run this command:

```
chcondition -e "PercentTotUsed > 95" \
"FileSystem space used":NodeA
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about ERRM operations and about how to use expressions and selection strings

Commands: **lscondition**, **lscondresp**, **mkcondition**, **nodegrp**, **rmcondition**

# chresponse

## Name

chresponse – adds or deletes the actions of a response or renames a response.

## Synopsis

To add an action to a response:

**chresponse –a –n** *action* [ **–d** *days_of_week*[**,***days_of_week...*]]
[**–t** *time_of_day*[**,***time_of_day...*]] [**–s** *action_script*] [**–r** *return_code*]
[**–e a** | **r** | **b**] [**–o**] [**–E** *env_var*=*value*[**,***env_var*=*value...*]]
[**–u**] [**–h**] [**–TV**] *response*[**:***node_name*]

To delete an action from a response:

**chresponse –p –n** *action* [**–h**] [**–TV**] *response*[**:***node_name*]

To rename a response:

**chresponse –c** *new_response* [**–h**] [**–TV**] *response*[**:***node_name*]

To lock or unlock a response:

**chresponse** { **-L** | **-U** } [**–h**] [**–TV**] *response*[**:***node_name*]

## Description

The **chresponse** command adds an action to a response or deletes an action from a response. Actions define commands to be run when the response is used with a condition and the condition occurs. The **chresponse** command can also be used to rename a response.

If a particular response is needed for system software to work properly, it may be locked. A locked response cannot be modified or removed until it is unlocked. If the response you specify with the **chresponse** command is locked, it will not be modified; instead, an error is generated informing you that the response is locked. To unlock a response, you can use the **-U** option. However, because a response is typically locked for system software to work properly, you should exercise caution before unlocking it. To lock a response, so that it cannot be modified, use the **-L** option.

## Parameters

*response* Specifies the name of the response to be changed.

*node_name* Specifies the node where the response is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–a** Adds the action specification to *response*.

**–p** Deletes *action* from *response*.

**–c** *new_response*
Specifies a new name to assign to the response. The new name must not already exist. The new name replaces the current name. The *new_response* name is a character string that identifies the response. If the name contains spaces, it must be enclosed in quotation marks. A name cannot consist of all spaces, be null, or contain embedded double quotation marks.

**–n** *action*
Specifies the name of the action. When the **–a** option is used, this is the name of the action being defined. When the **–p** option is used, this is the name of the action to be deleted. Action names must be unique within a response. Only one action can be defined at a time.

**–d** *days_of_week*[**,***days_of_week...*]

Specifies the days of the week when the action being defined can be run. *days_of_week* and *time_of_day* together define the interval when the action can be run.

Enter the numbers of the days separated by a plus sign (**+**) or as a range of days separated by a hyphen (**-**). More than one *days_of_week* parameter can be specified, but the parameters must be separated by a comma (**,**). The number of *days_of_week* parameters specified must match the number of *time_of_day* parameters specified. The default is all days. If no value is specified but a comma is entered, the default value is used. The values for each day follow:

**1** Sunday
**2** Monday
**3** Tuesday
**4** Wednesday
**5** Thursday
**6** Friday
**7** Saturday

**–t** *time_of_day*[**,***time_of_day...*]
Specifies the time range when *action* can be run, consisting of the start time followed by the end time, separated by a hyphen. *days_of_week* and *time_of_day* together define the interval when the action can be run.

The time is in 24–hour format (*hhmm*), where the first two digits represent the hour and the last two digits represent the minutes. The start time must be less than the end time because the time is specified by day of the week. More than one *time_of_day* parameter can be specified, but the parameters must be separated by a comma (**,**). The number of *days_of_week* parameters specified must match the number of *time_of_day* parameters specified. The default is **0000-2400**. If no value is specified but a comma is entered, the default value is used.

**–s** *action_script*
Specifies the fully-qualified path for the script or command to run for the action being defined. See the man pages for **displayevent**, **logevent**, **msgevent**, **notifyevent**, and **wallevent** for descriptions of predefined response scripts that are provided with the application.

**–r** *return_code*
Specifies the expected return code for *action_script*. The actual return code of *action_script* is compared to the expected return code. A message is

written to the audit log indicating whether they match. If the **–r** option is not specified, the actual return code is written to the audit log, and no comparison is performed.

**–e a** | **r** | **b**
Specifies the type of event that causes the action being defined to run:

**a** Specifies an event. This is the default.

**r** Specifies a rearm event.

**b** Specifies both an event and a rearm event.

**–o** Directs all standard output from *action_script* to the audit log. The default is not to keep standard output. Standard error is always directed to the audit log.

**–E** *env_var*=*value*[**,***env_var*=*value...*]
Specifies any environment variables to be set before *action_script* is run. If multiple *env_var*=*value* variables are specified, they must be separated by commas.

**–u** Specifies that the action is to be run when a monitored resource becomes undefined.

**–L** Locks a response so it cannot be modified or removed. When locking a response using the **-L** option, no other operation can be performed by this command.

**–U** Unlocks a response so it can be modified or removed. If a response is locked, this is typically because it is essential for system software to work properly. For this reason, you should exercise caution before unlocking it. When unlocking a response using the **-U** option, no other operation can be performed by this command.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the

RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user of the **chresponse** command needs write permission to the **IBM.EventResponse** resource class on the node where the response is defined. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chresponse**

Contains the **chresponse** command

## Examples

These examples apply to standalone systems:

1. In this example, the action named ″E-mail root″ cannot be the only action. To delete ″E-mail root″ from the response named ″E-mail root anytime″, run this command:

   ```
   chresponse -p -n "E-mail root" "E-mail root anytime"
   ```

2. In this example, the action named ″E-mail root″ will be used Monday through Friday from 8 AM to 6 PM, will use the command **/usr/sbin/rsct/bin/notifyevent root**, will save standard output in the audit log, and will expect return code 5 from the action. To add ″E-mail root″ to the response named ″E-mail root anytime″, run this command:

```
chresponse  -a  -n "E-mail root" -d 2-6 -t 0800-1800 \
-s "/usr/sbin/rsct/bin/notifyevent root" -o  -r 5  \
"E-mail root anytime"
```

3. To rename the response ″E-mail root anytime″ to ″E-mail root and admin anytime″, run this command:

```
chresponse  -c "E-mail root and admin anytime" "E-mail root anytime"
```

These examples apply to management domains:

1. To delete the action named ″E-mail root″ from the response named ″E-mail root anytime″ that is defined on the management server, run this command on the management server:

```
chresponse -p -n "E-mail root" "E-mail root anytime"
```

2. In this example, the action named ″E-mail root″ will be used Monday through Friday from 8 AM to 6 PM, will use the command **/usr/sbin/rsct/bin/notifyevent root**, will save standard output in the audit log, and will expect return code 5 from the action. To add ″E-mail root″ to the response ″E-mail root anytime″ that is defined on the management server, run this command on the management server:

```
chresponse  -a  -n "E-mail root" -d 2-6 -t 0800-1800 \
-s "/usr/sbin/rsct/bin/notifyevent root" -o  -r 5  \
"E-mail root anytime"
```

3. To delete the action named ″E-mail root″ from the response named ″E-mail root anytime″ that is defined on the managed node **nodeB**, run this command on the management server:

```
chresponse -p -n "E-mail root" "E-mail root anytime":nodeB
```

These examples apply to peer domains:

1. In this example, the action named ″E-mail root″ will be used Monday through Friday from 8 AM to 6 PM, will use the command **/usr/sbin/rsct/bin/notifyevent root**, will save standard output in the audit log, and will expect return code 5 from the action. To add ″E-mail root″ to the response ″E-mail root anytime″ that is defined on node **nodeA** in the domain, run this command on any node in the domain:

```
chresponse  -a  -n "E-mail root" -d 2-6 -t 0800-1800 \
-s "/usr/sbin/rsct/bin/notifyevent root" -o  -r 5  \
"E-mail root anytime":nodeA
```

2. To delete the action named ″E-mail root″ from the response named ″E-mail root anytime″ that is defined on node **nodeA** in the domain, run this command on any node in the domain:

```
chresponse -p -n "E-mail root" "E-mail root anytime":nodeA
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **lscondresp**, **lsresponse**, **mkcondresp**, **mkresponse**, **rmresponse**

# lscondition

## Name

lscondition – lists information about one or more conditions.

## Synopsis

**lscondition** [**–a**] [ **–m** | **–n** | **–e** ] [ **–C** | **–l** | **–t** | **–d** | **–D** *delimiter* ] [**–A**] [**–q**] [**–U**] [**–x**] [**–h**] [**–TV**] [*condition1* [**,***condition2*,...]**:***node_name*]

## Description

The **lscondition** command lists the following information about defined conditions:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the condition |
| **Node** | The location of the condition (for management domain scope or peer domain scope) |
| **MonitorStatus** | The status of the condition |
| **ResourceClass** | The resource class that is monitored by this condition |
| **EventExpression** | The expression that is used in monitoring this condition |
| **EventDescription** | A description of the **EventExpression** field |
| **RearmExpression** | The expression used in determining when monitoring should restart for this condition after an event has occurred |
| **RearmDescription** | A description of the **RearmExpression** field |
| **SelectionString** | The selection string that is applied to the attributes of **ResourceClass** to determine which resources are included in the monitoring of this condition |
| **Severity** | The severity of the condition: critical, warning, or informational |
| **NodeNames** | The host names of the nodes where the condition is registered |
| **MgtScope** | The RMC scope in which the condition is monitored |
| **Locked** | Specifies whether the resource is locked or unlocked |

For a list of all conditions, enter the **lscondition** command without any condition names specified. A list of all the condition names is returned with the monitoring status for each condition. The default format in this case is tabular. Specifying a node name following the condition names limits the display to the conditions defined on that node. You can list all of the conditions on a node by specifying a colon (**:**) followed by the node name. The node name is a node within the management scope, which is determined by the CT_MANAGEMENT_SCOPE environment variable. The management scope determines the list of nodes from which the conditions are listed. For local scope, only conditions on the local node are listed. Otherwise, the conditions from all nodes within the domain are listed.

For all of the information about all condition names, specify the **-A** option with the **lscondition** command. The **-A** option causes all information about a condition to be listed when no condition names are specified. When all of the information about all conditions is listed, the default format is long. If you specify one of the monitoring-status options (**-e**, **-m**, or **-n**), the conditions with the specified status are listed.

When more than one condition is specified, the condition information is listed in the order in which the condition names are entered.

By default, when a condition name is specified with the **lscondition** command, all of the condition's attributes are displayed.

## Parameters

*condition1* **[,***condition2***,...]**
: Specifies the name of an existing condition that is defined on the host name *node_name*. You can specify more than one condition name. This parameter can be a condition name or a substring of a condition name. When it is a substring, any defined condition name that contains the substring will be listed.

*node_name*
: Specifies the node where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–a**
: Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management and peer domain exist, **lscondition -a** with CT_MANAGEMENT_SCOPE not set will list the management domain. In this case, to list the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–m**
: Lists only those conditions that are being monitored without error.

**–n**
: Lists only those conditions that are not being monitored.

**–e**
: Lists only those conditions that are monitored in error.

**–C**
: Displays a **mkcondition** command template based on the condition. By modifying this template, you can create new conditions. If more than one condition is specified, the template for each **mkcondition** command appears on a separate line. This option is ignored when no conditions are specified. This option overrides the **–l** option.

**–l**
: Produces long-formatted output. Displays the condition information on separate lines.

**–t**
: Displays the condition information in separate columns (table format).

**–d**
: Produces delimiter-formatted output. The default delimiter is a colon (**:**). Use the **–D** option if you want to change the default delimiter.

**–D** *delimiter*
: Produces delimiter-formatted output that uses the specified delimiter. Use

this option to specify something other than the default, colon (:). An example is when the data to be displayed contains colons. Use this option to specify a delimiter of one or more characters.

**–A** Displays all of the attributes of the condition.

**–q** Does not return an error when the condition does not exist.

**–U** Indicates whether the resource is locked.

**–x** Suppresses header printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs read permission for the **IBM.Condition** resource class to run **lscondition**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lscondition** Contains the **lscondition** command

## Examples

These examples apply to standalone systems:

1. To list all conditions and their monitoring status, run this command:

   ```
   lscondition
   ```

   The output will look like this:

   ```
    Name                      Node          MonitorStatus
   "FileSystem space used"   "nodeA"       "Monitored"
   "tmp space used"          "nodeA"       "Not monitored"
   "var space used"          "nodeA"       "Error"
   ```

2. To list general information about the condition ″FileSystem space used″ in long form, run this command:

   ```
   lscondition "FileSystem space used"
   ```

   The output will look like this:

   ```
   Name             = "FileSystem space used"
   Node             = "nodeA"
   MonitorStatus    = "Monitored"
   ResourceClass    = "IBM.FileSystem"
   EventExpression  = "PercentTotUsed > 99"
   EventDescription = "Generate event when space used is
                       greater than 99 percent full"
   RearmExpression  = "PercentTotUsed < 85"
   RearmDescription = "Start monitoring again after it is
                       less than 85 percent"
   SelectionString  = ""
   Severity         = "w"
   NodeNames        = "{}"
   MgtScope         = "l"
   ```

3. To list the command that would create the condition ″FileSystem space used″, run this command:

```
lscondition -C "FileSystem space used"
```

The output will look like this:

```
mkcondition -r IBM.FileSystem -a PercentTotUsed \
-e "PercentTotUsed > 99" -E "PercentTotUsed < 85" \
-d "Generate event when space used is greater than 99 percent full" \
-D "Start monitoring after it is less than 85 percent" \
-S w "FileSystem space used"
```

4. To list all conditions that have the string **space** in their names, run this command:

```
lscondition space
```

The output will look like this:

```
Name             = "FileSystem space used"
MonitorStatus    = "Monitored"
⋮
Name             = "tmp space used"
MonitorStatus    = "Not Monitored"
⋮
Name             = "var space used"
MonitorStatus    = "Monitored"
⋮
```

5. To list the conditions that are in error, run this command:

```
lscondition -e
```

The output will look like this:

```
Name               MonitorStatus
"var space used"   "Error"
```

This example applies to clustered systems:

1. To list all conditions and their monitoring status, run this command:

```
lscondition -a
```

The output will look like this:

```
Name                      Node        MonitorStatus
"FileSystem space used"   "nodeA"     "Monitored"
"tmp space used"          "nodeB"     "Not monitored"
"var space used"          "nodeC"     "Error"
```

## Author

Grant McLaughlin - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **chcondition**, **lscondresp**, **mkcondition**, **rmcondition**

# lscondresp

## Name

lscondresp – lists information about a condition and any of its condition/response associations.

## Synopsis

To list the link between a condition and one or more responses:

**lscondresp** [**–a** | **–n**] [ **–l** | **–t** | **–d** | **–D** *delimiter* ] [**–q**] [**–U**] [**–x**] [**–z**] [**–h**] [**–TV**] [*condition*[**:***node_name*] [*response1* [*response2*...]]]

To list all of the links to one or more responses:

**lscondresp** [ **–a** | **–n** ] [ **–l** | **–t** | **–d** | **–D** *delimiter*] [**–q**] [**–x**] [**–z**] **–r** [**–U**] [**–h**] [**–TV**] *response1*[**:***node_name*] [*response2*...]

## Description

The **lscondresp** command lists information about a condition and its linked responses. A link between a condition and a response is called a *condition/response association.* The information shows which responses are linked with a condition and whether monitoring is active for a condition and its linked response. The following information is listed:

| ***Field*** | ***Description*** |
|---|---|
| **Condition** | The name of the condition linked with a response. |
| **Response** | The name of the response linked with the condition. |
| **State** | The state of the response for the condition. The state indicates whether a specified response is active or not. |
| **Node** | The location of the condition and the response. |
| **Locked** | Indicates whether the resource is locked or unlocked. |

To list a particular condition and response pair, specify the condition and the response. To list all responses to a condition, specify the condition only. To list all conditions to which a response is linked, specify the response and the **-r** option. To list all conditions and their linked responses, do not specify any condition or response parameters.

Specifying a node name limits the display to the condition/response associations that are defined on that node. List all of the condition/response associations on a node by specifying a colon (**:**) followed by the node name. The node name is a node within the management scope determined by the CT_MANAGEMENT_SCOPE environment variable. The management scope determines the list of nodes from which the condition/response associations are listed. For local scope, only condition/response associations on the local node are listed. For management domain scope and peer domain scope, the condition/response associations from all nodes within the domain are listed.

When neither the **–a** option nor the **–n** option is specified, all selected conditions for the responses are listed. Tabular format is the default.

## Parameters

*condition* The *condition* can be a condition name or a substring of a condition name. When it is a substring, any defined condition name that contains the substring and is linked to the response will be listed.

*response1* **[***response2***...]**
This parameter can be a response name or a substring of a response name. You can specify more than one response name. When it is a substring, any defined response name that contains the substring and is linked to the condition will be listed.

*node_name* Specifies the node where the condition or response is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–a** Lists only those responses that are active for the condition.

**–n** Lists only those responses that are not active for the condition.

**–l** Displays the condition information and response information on separate lines (long format).

**–t** Displays the condition information and response information in separate columns (table format).

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (**:**). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses *delimiter*. Use this option to specify something other than the default colon (**:**). For example, when the data to be displayed contains colons, use this option to specify another delimiter of one or more characters.

**–q** Does not return an error if either the *condition* or the *response* does not exist.

**–U** Indicates whether the resource is locked.

**–x** Suppresses header printing.

**–z** Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management and peer domain exist, **lscondresp -z** with CT_MANAGEMENT_SCOPE not set will list the management domain. In this case, to list the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–r** Lists information about all of the condition/response associations for the specified responses. Use this option to indicate that all command parameters specified are responses, not conditions.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs read permission for the **IBM.Association** resource class to run **lscondresp**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lscondresp** Contains the **lscondresp** command

## Examples

To see which resources are locked, run this command:

```
lscondresp -U
```

The output will look like this:

```
Condition             Response                 Node     State         Locked
"/tmp space used"     "E-mail root off-shift"  "nodeA"  "Not active"  "Yes"
"Page space in rate"  "E-mail root anytime"    "nodeA"  "Not active"  "No"
```

These examples apply to standalone systems:

1. To list all conditions with their linked responses, run this command:

   ```
   lscondresp
   ```

   The output will look like this:

   ```
   Condition                Response                      Node       State
   "FileSystem space used"  "Broadcast event on-shift"    "nodeA"    "Active"
   "FileSystem space used   "E-mail root anytime"         "nodeA"    "Not Active"
   "Page in Rate"           "Log event anytime"           "nodeA"    "Active"
   ```

2. To list information about the condition ″FileSystem space used″, run this command:

   ```
   lscondresp "FileSystem space used"
   ```

   The output will look like this:

   ```
   Condition                Response                      Node       State
   "FileSystem space used"  "Broadcast event on-shift"    "nodeA"    "Active"
   "FileSystem space used   "E-mail root anytime"         "nodeA"    "Not Active"
   ```

3. To list information about the condition ″FileSystem space used″ for responses that are active, run this command:

   ```
   lscondresp -a  "FileSystem space used"
   ```

   The output will look like this:

   ```
   Condition                Response                      Node       State
   "FileSystem space used"  "Broadcast event on-shift"    "nodeA"    "Active"
   ```

4. To list information about the condition ″FileSystem space used″ with the linked response ″Broadcast event on-shift″, run this command:

   ```
   lscondresp  "FileSystem space used" "Broadcast event on-shift"
   ```

The output will look like this:

```
Condition                Response                      Node       State
"FileSystem space used"  "Broadcast event on-shift"   "nodeA"    "Active"
```

5. To list all conditions that have the string **space** in their names with their linked responses, run this command:

   ```
   lscondresp space
   ```

   The output will look like this:

   ```
   Condition                Response                      Node       State
   "FileSystem space used"  "Broadcast event on-shift"   "nodeA"    "Active"
   "FileSystem space used   "E-mail root anytime"        "nodeA"    "Not Active"
   ```

These examples apply to management domains:

1. In this example, the condition ″FileSystem space used″ is defined on the management server. To list information about ″FileSystem space used″, run this command on the management server:

   ```
   lscondresp "FileSystem space used"
   ```

   The output will look like this:

   ```
   Condition                 Response                      Node       State
   "FileSystem space used"   "Broadcast event on-shift"   "nodeB"    "Active"
   "FileSystem space used"   "E-mail root anytime"        "nodeB"    "Not Active"
   ```

2. In this example, the condition ″FileSystem space used″ is defined on the managed node **nodeC**. To list information about ″FileSystem space used″, run this command on the management server:

   ```
   lscondresp "FileSystem space used":nodeC
   ```

   The output will look like this:

   ```
   Condition                 Response                      Node     State
   "FileSystem space used"   "Broadcast event on-shift"   "nodeC"    "Active"
   "FileSystem space used"   "E-mail root anytime"        "nodeC"    "Not Active"
   ```

This example applies to a peer domain:

1. In this example, the condition ″FileSystem space used″ is defined in the domain. To list information about ″FileSystem space used″, run this command on one of the nodes in the domain:

   ```
   lscondresp "FileSystem space used"
   ```

   The output will look like this:

   ```
   Condition                Response                      Node       State
   "FileSystem space used"  "Broadcast event on-shift"   "nodeD"    "Active"
   "FileSystem space used"  "E-mail root anytime"        "nodeD"    "Not Active"
   "FileSystem space used"  "Broadcast event on-shift"   "nodeE"    "Active"
   "FileSystem space used"  "E-mail root anytime"        "nodeE"    "Not Active"
   ```

## Author

Grant McLaughlin - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **mkcondition**, **mkcondresp**, **mkresponse**, **rmcondresp**, **startcondresp**, **stopcondresp**

# lsresponse

## Name

lsresponse – lists information about one or more responses.

## Synopsis

**lsresponse** [**–a**] [ **–C** | **–l** | **–t** | **–d** | **–D** *delimiter* ] [**–A**] [**–q**] [**–U**] [**–x**] [**–h**] [**–TV**] [*response1*[**,***response2*,...] **:***node_name*]

## Description

The **lsresponse** command lists the following information about defined responses:

| ***Field*** | ***Description*** |
|---|---|
| **ResponseName** | The name of the response. |
| **Node** | The location of the response. |
| **Action** | The name of an action. |
| **DaysOfWeek** | The days of the week when the action can be run. **DaysOfWeek** and **TimeOfDay** together define the interval when the action can be run.<br><br>The values for the days can be separated by plus signs (**+**) or displayed as a range of days separated by a hyphen (**-**). Multiple **DaysOfWeek** values are separated by commas (**,**). The number of **DaysOfWeek** values must match the number of **TimeOfDay** values. The values for each day follow:<br>**1** Sunday<br>**2** Monday<br>**3** Tuesday<br>**4** Wednesday<br>**5** Thursday<br>**6** Friday<br>**7** Saturday |
| **TimeOfDay** | The time range when **Action** can be run, consisting of the start time followed by the end time separated by a hyphen. **DaysOfWeek** and **TimeOfDay** together define the interval when the action can be run.<br><br>The time is in 24-hour format (*hhmm*), where the first two digits represent the hour and the last two digits represent the minutes. Multiple **TimeOfDay** values are separated by commas (**,**). The number of **DaysOfWeek** values must match the number of **TimeOfDay** values. |
| **ActionScript** | The script or command to run for the action. |
| **ReturnCode** | The expected return code for **ActionScript**. |
| **CheckReturnCode** | Indicates whether the actual return code for |

| | |
|---|---|
| | **ActionScript** is compared to its expected return code. The values are: **y** (yes) and **n** (no). |
| **EventType** | The type of event that causes the action to be run: event, rearm event, or both. |
| **StandardOut** | Indicates whether standard output is directed to the audit log. The values are: **y** (yes) and **n** (no). |
| **EnvironmentVars** | Indicates any environment variables that will be set before the action is run. |
| **UndefRes** | Indicates whether the action is to be run if a monitored resource becomes undefined. The values are: **y** (yes) and **n** (no). |
| **Locked** | Indicates whether the resource is locked or unlocked. |

To get a list of all response names, run the **lsresponse** command alone without any response names specified. A list of all response names is returned. The default format in this case is tabular.

Specifying a node name after the response names limits the display to the responses defined on that node. List all of the responses on a node by specifying a colon (**:**) followed by the node name. The node name is a node within the management scope determined by the CT_MANAGEMENT_SCOPE environment variable. The management scope determines the list of nodes from which the responses are listed. For local scope, only responses on the local node are listed. Otherwise, the responses from all nodes within the domain are listed.

To see all the information about all response names, specify the **-A** option with the **lsresponse** command. The **-A** option causes all information about a response to be listed when no response names are specified. When all of the information about all responses is listed, the long format is the default.

When more than one response is specified, the response information is listed in the order in which the responses are entered.

## Parameters

*response1***[,***response2***,...]**
: This parameter can be a response name or a substring of a response name. You can specify more than one response name. When it is a substring, any defined response name that contains the substring is listed.

*node_name*
: Specifies the node where the response is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–a**
: Specifies that this command applies to all nodes in the cluster. The cluster scope is determined by the CT_MANAGEMENT_SCOPE environment variable. If it is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command

will run once for the first valid scope found. For example, if both a management and peer domain exist, **lsresponse -a** with CT_MANAGEMENT_SCOPE not set will list the management domain. In this case, to list the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–C** Displays the **mkresponse** command that can be used to create the response and one of its actions. If more than one response is specified, each **mkresponse** command appears on a separate line. This option is ignored when no responses are specified. This option overrides the **–l** option.

**–l** Displays the response information on separate lines (long form).

**–t** Displays the response information in separate columns (table form).

**–d** Specifies delimiter-formatted output. The default delimiter is a colon (:). Use the **–D** option if you wish to change the default delimiter.

**–D** *delimiter*
Specifies delimiter-formatted output that uses the specified delimiter. Use this option to specify something other than the default, colon (:). For example, when the data to be displayed contains colons, use this option to specify another delimiter of one or more characters.

**–A** Displays all of the attributes of the response.

**–q** Does not return an error when **response** does not exist.

**–U** Indicates whether the resource is locked.

**–x** Suppresses headers when printing.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs read permission for the **IBM.EventResponse** resource class to run **lsresponse**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsresponse** Contains the **lsresponse** command

## Examples

1. To list all of the responses, run this command:

   ```
   lsresponse
   ```

   The output will look like this:

   ```
   ResponseName
   "E-mail root anytime"
   "E-mail root first shift"
   "Critical notifications"
   "Generate SNMP trap"
   ```

2. To see which resources are locked, run this command:

   ```
   lsresponse -U
   ```

The output will look like this:

```
ResponseName                    Node      Locked
"Broadcast event on-shift"      "nodeA"   "No"
"E-mail root off-shift"         "nodeA"   "No"
"E-mail root anytime"           "nodeA"   "No"
"Log event anytime"             "nodeA"   "No"
"Informational notifications"   "nodeA"   "No"
"Warning notifications"         "nodeA"   "No"
"Critical notifications"        "nodeA"   "No"
"Generate SNMP trap"            "nodeA"   "No"
```

3. To list general information about the response ″Critical notifications″, run this command:

```
lsresponse "Critical notifications"
```

The output will look like this:

```
ResponseName     = "Critical notifications"
Node             = "nodeA"
Action           = "Log Critical Event"
DaysOfWeek       = 1+2+7
TimeOfDay        = 0000-2400
ActionScript     = "/usr/sbin/rsct/bin/logevent /tmp/criticalEvents"
ReturnCode       = 0
CheckReturnCode  = "y"
EventType        = "b"
StandardOut      = "y"
EnvironmentVars  = '"Env1=5","Env=10"'
UndefRes         = "n"

ResponseName     = "Critical notifications"
Node             = "nodeA"
Action           = "E-mail root"
DaysOfWeek       = 6+2,6+2,6+5
TimeOfDay        = 1700-2400,0000-0800,0000-2400
ActionScript     = "/usr/sbin/rsct/bin/notifyevent root"
ReturnCode       = 0
CheckReturnCode  = "y"
EventType        = "b"
StandardOut      = "y"
EnvironmentVars  = ""
UndefRes         = "n"
```

4. To list the command that would create the response ″Critical notifications″ along with one of its actions, run this command:

```
lsresponse -C "Critical notifications"
```

The output will look like this:

```
mkresponse -n "Log Critical Event" -d 1+2+7 -t 0000-2400 \
-s "usr/sbin/rsct/bin/logevent /tmp/criticalEvents"  \
-e b -r 0 "Critical notifications"
```

5. To list all responses that have the string **E-mail** in their names, run this command:

```
lsresponse "E-mail"
```

The output will look like this:

```
ResponseName = "E-mail root anytime"
Action       = "E-mail root"
:
ResponseName = "E-mail root first shift"
Action       = "E-mail root"
```

## Author

Grant McLaughlin - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **chresponse**, **lscondresp**, **mkcondresp**, **mkresponse**, **rmresponse**

# mkcondition

## Name

mkcondition – creates a new condition definition which can be monitored.

## Synopsis

**mkcondition –r** *resource_class* **–e** *event_expression* [**–E** *rearm_expression*] [**–d** *event_description*] [**–D** *rearm_description*] [**–m l** | **m** | **p** ] [**–n** *node_name1*[**,**node_name2...]] [**–s** *"selection_string"*] [**–p** *node_name*] [**–S c** |**w** |**i**] [**–h**] [**–TV**] *condition*

**mkcondition –c** *existing_condition*[**:***node_name*] [**–r** *resource_class*] [**–e** *event_expression*] [**–E** *rearm_expression*] [**–d** *event_description*] [**–D** *rearm_description*] [**–n** *node_name1*[**,***node_name2*...]] [**–p** *node_name*] [**–s** *"selection_string"*] [**–m l** | **m** | **p** ] [ **–S c** | **w** | **i** ] [**–h**] [**–TV**] *condition*

## Description

The **mkcondition** command creates a new condition with the name specified by the *condition* parameter. The condition is used to monitor a resource for the occurrence of the condition (or event). Use the **mkresponse** command to define one or more responses to an event. You can then link the conditions to the responses using the **mkcondresp** command, or you can use the **startcondresp** command to link the responses and start monitoring.

In a cluster environment, use the **-p** option to specify the node in the domain that is to contain the condition definition. If you are using **mkcondition** on the management server and you want the condition to be defined on the management server, do *not* specify the **-p** option. If the **-p** option is not specified, the condition is defined on the local node. If the node where the condition will be defined is:

- in a cluster of nodes, the condition can monitor resources on more than one node. Use the **-n** option to specify the nodes on which the condition will be monitored.
- the management server in a management domain, a management scope (**-m**) of local (**l**) or management domain (**m**) can be specified to indicate how the condition applies. The selection string will be evaluated using the entire management domain when management scope is set to the management domain and the node is the management server.
- a managed node in a management domain, only a management scope (**-m**) of local (**l**) can be used.
- in a peer domain, a management scope (**-m**) of peer domain (**p**) or local (**l**) can be used to indicate how the condition and the selection string apply.
- in both a management domain and a peer domain, a management scope (**-m**) of management domain (**m**), peer domain (**p**), or local (**l**) can be used to indicate how the condition and its selection string apply.

To lock a condition, so that it cannot be modified or removed, use the **chcondition** command with the **-L** option.

## Parameters

*condition* The *condition* name is a character string that identifies the condition. If the name contains spaces, it must be enclosed in

quotation marks. A name cannot consist of all spaces, be null, or contain embedded double quotation marks.

## Options

**–c** *existing_condition*[**:***node_name*]
Copies an existing condition. The existing condition is defined on *node_name*. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable. If any other options are specified, update the new condition as indicated by the options. Links with responses are not copied.

**–r** *resource_class*
Specifies the resource class to be monitored by this condition. You can display the resource class names using the **lsrsrcdef** command.

**–e** *"event_expression"*
Specifies an *event expression,* which determines when an event occurs. An event expression consists of a dynamic attribute or a persistent attribute of *resource_class*, a mathematical comparison symbol (**>** or **<**, for example), and a constant. When this expression evaluates to TRUE, an event is generated.

**–E** *"rearm_expression"*
Specifies a *rearm expression.* After *event_expression* has evaluated to TRUE and an event is generated, the rearm expression determines when monitoring for the *event_expression* will begin again. Typically,the rearm expression prevents multiple events from being generated for the same event evaluation. The rearm expression consists of a dynamic attribute of *resource_class*, a mathematical comparison symbol (**>**, for example), and a constant.

**–d** *"event_description"*
Describes the event expression.

**–D** *"rearm_description"*
Describes the rearm expression.

**–n** *node_name1*[**,***node_name2***...**]
Specifies the host name for a node (or a list of host names separated by commas for multiple nodes) where this condition will be monitored. Node group names can also be specified, which are expanded into a list of node names. You must specify the **-m** option with a value of **m** or **p** if you want to use the **-n** option. This way, you can monitor conditions on specific nodes instead of the entire domain.

**–s** *"selection_string"*
Specifies a selection string that is applied to all of the *resource_class* attributes to determine which resources should be monitored by the *event_expression*. The default is to monitor all resources within the *resource_class*. The resources used to evaluate the selection string is determined by the management scope (the **-m** option). The selection string must be enclosed within double or single quotation marks. For information on how to specify selection strings, see *RSCT: Administration Guide*.

**–S c** | **w** | **i**
Specifies the severity of the event:
**c** Critical
**w** Warning

**i** Informational (the default)

**–m l | m | p**
Specifies the management scope to which the condition applies. The management scope determines how the condition is registered and how the selection string is evaluated. The scope can be different from the current configuration, but monitoring cannot be started until an appropriate scope is selected. The valid values are:

**l** Specifies *local* scope. This is the default. The condition applies only to the local node (the node where the condition is defined; see the **-p** option). Only the local node is used in evaluating the selection string.

**m** Specifies *management domain* scope. The condition applies to the management domain in which the node where the condition is defined belongs (see the **-p** option). All nodes in the management domain are used in evaluating the selection string. The node where the condition is defined must be the management server in order to use management domain scope.

**p** Specifies *peer domain* scope. The condition applies to the peer domain in which the node where the condition is defined belongs (see the **-p** option). All nodes in the peer domain are used in evaluating the selection string.

**–p** *node_name*
Specifies the name of the node where the condition is defined. This is used in a cluster environment and the node name is the name by which the node is known in the domain. The default *node_name* is the local node on which the command runs. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

If you are using **mkcondition** on the management server and you want the condition to be defined on the management server, do *not* specify the **-p** option.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT

environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Condition** resource class to run **mkcondition**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkcondition**
Contains the **mkcondition** command

## Examples

These examples apply to standalone systems:

1. To define a condition with the name ″FileSystem space used″ to check for percentage of space used greater than 90% and to rearm when the percentage is back down below 85%, enter:

```
mkcondition -r IBM.FileSystem  \
-e "PercentTotUsed > 90" -E "PercentTotUsed < 85" \
"FileSystem space used"
```

2. To define a condition with the name ″tmp space used″ to check for percentage of space used greater than 90% for **/tmp** and to rearm when the percentage is back down below 85%, including comments, enter:

```
mkcondition -r IBM.FileSystem  \
-e "PercentTotUsed > 90" -E "PercentTotUsed < 85" \
-d "Generate event when tmp > 90% full"  \
-D "Restart monitoring tmp again after back down < 85% full"\
-s 'Name=="/tmp"'  "tmp space used"
```

3. To define a condition with the name ″Space used″ as a copy of ″FileSystem space used″, enter:

```
mkcondition -c "FileSystem space used"  "Space used"
```

4. To define a condition with the name ″var space used″ as a copy of ″tmp space used″, but change the selection to **/var**, enter:

```
mkcondition -c "tmp space used" -s 'Name=="/var"' \
"var space used"
```

5. To define a condition with the name ″vmstat is running″ to monitor when user **joe** is running the **vmstat** program in a 64-bit environment, enter:

```
mkcondition -r "IBM.Program" \
-e "Processes.CurPidCount > 0" -E "Processes.CurPidCount  <= 0"  \
-d "Generate event when user starts vmstat" \
-D "Restart monitoring when vmstat is terminated" \
-s ProgramName == \"vmstat64\" && Filter==\"ruser==\\\"joe\\\"\"" \
-S "i" -m "l" "vmstat is running"
```

6. To define a condition with the name ″my application terminated″ to monitor when a script or a program has ended, enter:

```
mkcondition -r "IBM.Program" \
-e "Processes.CurPidCount <= 0" -E "Processes.CurPidCount  > 0"  \
-d "Generate event when application is down" \
-D "Rearm the event when application is running" \
-s ProgramName == \"myscript\" -m "l" "my application terminated"
```

These examples apply to management domains:

1. To define a condition with the name ″FileSystem space used″ to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor all nodes in the domain, run this command on the management server:

```
 mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -m d "FileSystem space used"
```

2. To define a condition with the name ″FileSystem space used″ to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor nodes **nodeA** and **nodeB** in the domain, run this command on the management server:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -n nodeA,nodeB -m d \
"FileSystem space used"
```

3. To define a condition with the name ″nodeB FileSystem space used″ on **nodeB** to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor the condition with local scope, run this command on the management server:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -m l -p nodeB \
"nodeB FileSystem space used"
```

4. To define a condition with the name ″local FileSystem space used″ to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor the local node, run this command on a managed node:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -m l "local FileSystem space used"
```

These examples apply to peer domains:

1. To define a condition on **nodeA** with the name ″FileSystem space used″ to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor all nodes in the domain, run this command:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -m p -p nodeA "FileSystem space used"
```

2. To define a condition on **nodeC** with the name ″FileSystem space used″ to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor nodes **nodeA** and **nodeB** in the domain, run this command:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -n nodeA,nodeB -m p -p nodeC \
"FileSystem space used"
```

3. To define a condition with the name ″local FileSystem space used″ on **nodeB** to check for percentage of space used greater than 90%, to rearm when the percentage is back down below 85%, and to monitor the local node only, run this command:

```
mkcondition -r IBM.FileSystem  -e "PercentTotUsed > 90" \
-E "PercentTotUsed < 85" -m l "local FileSystem space used"
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *CSM: Administration Guide*, for information about node groups
- *CSM: Command and Technical Reference*, for information about the **nodegrp** command
- *RSCT: Administration Guide*, for information about ERRM operations and about how to use expressions and selection strings

Commands: **chcondition**, **lscondition**, **mkcondresp**, **mkresponse**, **nodegrp**, **rmcondition**, **startcondresp**

# mkcondresp

## Name

mkcondresp – creates a link between a condition and one or more responses.

## Synopsis

**mkcondresp** [**–h**] [**–TV**] *condition*[**:***node_name*] *response1* [*response2*...]

## Description

The **mkcondresp** command creates a link between a condition and one or more responses. A link between a condition and a response is called a *condition/response association.* This command creates one or more condition/response associations; it does not start monitoring. In a cluster environment, the condition and the response must be defined on the same node. You can start monitoring for this condition and its linked responses later using the **startcondresp** command.

To lock a condition/response association, use the -L option with one of these commands: **rmcondresp**, **startcondresp**, or **stopcondresp**.

## Parameters

*condition* Specifies the name of the condition to be linked to the response. The condition is always specified first.

*node_name* Specifies the node in the domain where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

*response1* **[***response2***...]**
Specifies one or more response names. All responses are linked to *condition*.

## Options

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the

system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Association** resource class to run **mkcondresp**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkcondresp**
Contains the **mkcondresp** command

## Examples

These examples apply to standalone systems:

1. To link the condition ″FileSystem space used″ to the response ″Broadcast event on-shift″, run this command:

   ```
   mkcondresp "FileSystem space used" "Broadcast event on-shift"
   ```

2. To link the condition ″FileSystem space used″ to the responses ″Broadcast event on-shift″ and ″E-mail root anytime″, run this command:

   ```
   mkcondresp "FileSystem space used" "Broadcast event on-shift" "E-mail root anytime"
   ```

These examples apply to management domains:

1. To link the condition ″FileSystem space used″ on the management server to the response ″Broadcast event on-shift″ (also on the management server), run this command on the management server:

   ```
   mkcondresp "FileSystem space used" "Broadcast event on-shift"
   ```

2. To link the condition ″FileSystem space used″ on the management server to the response ″Broadcastevent on-shift″, run this command on one of the nodes in the domain:

   ```
   mkcondresp "FileSystem space used":nodeA "Broadcast event on-shift"
   ```

This example applies to peer domains:

1. To link the condition ″FileSystem space used″ on node **nodeA** to the response ″Broadcastevent on-shift″ (also on **nodeA**), run this command on one of the nodes in the domain:

   ```
   mkcondresp "FileSystem space used":nodeA "Broadcast event on-shift"
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations and about how to use expressions and selection strings

Commands: **lscondresp**, **mkcondition**, **mkresponse**, **rmcondresp**, **startcondresp**, **stopcondresp**

# mkresponse

## Name

mkresponse – creates a new response definition.

## Synopsis

To create a response with no actions:

**mkresponse** [**–p** *node_name*] [**–h**] [**–TV**] *response*

To create a response with one action:

**mkresponse –n** *action* [**–d** *days_of_week*[**,***days_of_week...*]]
[**–t** *time_of_day*[**,***time_of_day...*]] **–s** *action_script* [**–r** *return_code*]
[**–e a** | **r** | **b** ] [**–o**] [**–E** *env_var*=*value*[**,***env_var*=*value...*]]
[**–u**] [**–p** *node_name*] [**–h**] [**–TV**] *response*

To copy a response:

**mkresponse –c** *existing_response*[**:***node_name*] [**–p** *node_name*] [**–h**] [**–TV**]
*response*

## Description

The **mkresponse** command creates a new response definition with the name specified by the *response* parameter. One action can also be specified when the response is defined. Actions define commands to be run when the response is used with a condition and the condition occurs. The action defines days of the week when the action can be used, the time of day for those days of the week, the script or command to be run, what type of event causes the command to be run, the expected return code of the script or command, and whether to keep standard output. The days and times are paired so that different times can be specified for different days. A response with no actions only logs the events.

In a cluster environment, use the **-p** option to specify the node in the domain that is to contain the response definition. If you are using **mkresponse** on the management server and you want the response to be defined on the management server, do *not* specify the **-p** option. If the **-p** option is not specified, the response is defined on the local node.

Use the **chresponse** command to add actions to a response or to remove actions from a response. Use the **startcondresp** command to start monitoring. The **startcondresp** command links a response to a condition, if they are not already linked.

To lock a response, so that it cannot be modified or removed, use the **chresponse** command with the **-L** option.

## Parameters

*response* The *response* name is a character string that identifies the response. If the name contains spaces, it must be enclosed in quotation marks. A name cannot consist of all spaces, be null, or contain embedded double quotation marks.

## Options

**–c** *existing_response*[**:***node_name*]
Copies an existing response. Links with conditions are not copied. The existing response is defined on the node known as *node_name* in a cluster. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable. If any other options are specified, update the new response as indicated by the options.

**–n** *action*
Specifies the name of the action being defined. Only one action can be defined when the response is created. Use the **chresponse** command to add more actions to the response.

**–d** *days_of_week*

Specifies the days of the week when the action being defined can be run. *days_of_week* and *time_of_day* together define the interval when the action can be run.

Enter the numbers of the days separated by a plus sign (+) or as a range of days separated by a hyphen (-). More than one *days_of_week* parameter can be specified, but the parameters must be separated by a comma (,). The number of *days_of_week* parameters specified must match the number of *time_of_day* parameters specified. The default is all days. If no value is specified but a comma is entered, the default value is used. The values for each day follow:

**1** Sunday
**2** Monday
**3** Tuesday
**4** Wednesday
**5** Thursday
**6** Friday
**7** Saturday

**–t** *time_of_day*
Specifies the time range when *action* can be run, consisting of the start time followed by the end time, separated by a hyphen. *days_of_week* and *time_of_day* together define the interval when the action can be run.

The time is in 24–hour format (*hhmm*) where the first two digits represent the hour and the last two digits represent the minutes. The start time must be less than the end time because the time is specified by day of the week. More than one *time_of_day* parameter can be specified, but the parameters must be separated by a comma (,). The number of *days_of_week* parameters specified must match the number of *time_of_day* parameters specified. The default value is 0000-2400. If no value is specified but a comma is entered, the default value is used.

**–s** *action_script*
Specifies the fully-qualified path for the script or command to run for the action being defined. See the man pages for **displayevent**, **logevent**, **msgevent**, **notifyevent**, and **wallevent** for descriptions of the predefined response scripts provided with the application.

**–r** *return_code*
Specifies the expected return code for *action_script*. If the expected return code is specified, the actual return code of *action_script* is compared to the expected return code. A message is written to the audit log indicating

whether they match. If the **–r** option is not specified, the actual return code is written to the audit log, and no comparison is performed.

**–e a** | **r** | **b**
Specifies the type of event that causes the action being defined to run:

**a** Event. This is the default.

**r** Rearm event.

**b** Both event and rearm event.

**–o** Directs all standard output from *action_script* to the audit log. The default is not to keep standard output. Standard error is always directed to the audit log.

**–E** *env_var*=*value*[**,***env_var*=*value***...]**
Specifies any environment variables to be set before running the action. If multiple *env_var*=*value* variables are specified, they must be separated by commas.

**–u** Specifies that the action is to be run when a monitored resource becomes undefined.

**–p** *node_name*
Specifies the name of the node where the response is defined. This is used in a cluster environment and the node name is the name by which the node is known in the domain. The default *node_name* is the local node on which the command runs. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

If you are using **mkresponse** on the management server and you want the response to be defined on the management server, do *not* specify the **-p** option.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the

RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.EventResponse** resource class to run **mkresponse**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mkresponse**
Contains the **mkresponse** command

## Examples

These examples apply to standalone systems:

1. To define a response with the name ″Log event in audit log″, run this command:

   ```
   mkresponse "Log event in audit log"
   ```

2. To define a response with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used any time Saturday and Sunday and uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, run this command:

```
 mkresponse -n "E-mail root" -d 1+7  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e b   \
"E-mail root anytime"
```

3. To define a response with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used anytime Saturday and Sunday but only 8 am to 5 pm Monday through Friday and that uses the command **/usr/sbin/rsct/bin/notifyevent root** for events, run this command:

```
mkresponse -n "E-mail root"     \
-d 1+7,2-6  -t 0000-2400,0800-1700  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e a  \
"E-mail root anytime"
```

4. To define a response with the name ″E-mail root anytime″ that has an action named ″E-mail root″ to be used any time Saturday and Sunday, that uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, and that sets the environment variable LANG to en_US, run this command:

```
mkresponse -n "E-mail root" -d 1+7  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e b \
-E LANG="en_US"  "E-mail root anytime"
```

5. To define a response with the name ″E-mail root first shift″ that has an action named ″E-mail root″ to be used Monday through Friday from 8 am to 6 pm, that uses the command **/usr/sbin/rsct/bin/notifyevent root** for rearm events, and that saves standard output in the audit log, expecting return code 5, run this command:

```
mkresponse -n "E-mail root" -d 2-6  -t 0800-1800  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e r  -o   \
-r 5  "E-mail root first shift"
```

6. To define a response with the name ″Critical notifications″ as a copy of ″Warning notifications″, enter:

```
mkresponse -c "Warning notifications" "Critical notifications"
```

These examples apply to management domains:

1. To define a response on the management server with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used any time Saturday and Sunday and uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, run this command on the management server:

```
 mkresponse -n "E-mail root" -d 1+7  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e b   \
"E-mail root anytime"
```

2. To define a response on the managed node **nodeB** with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used any time Saturday and Sunday and uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, run this command on the management server:

```
 mkresponse -n "E-mail root" -d 1+7  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e b   \
-p nodeB "E-mail root anytime"
```

3. To define a response on the managed node **nodeB** with the name ″nodeB Warning notifications″ as a copy of ″nodeA Warning notifications″ on the managed node **nodeA**, run this command on the management server:

```
mkresponse -c "nodeA Warning notifications":nodeA \
-p nodeB "nodeB Warning notifications"
```

These examples apply to peer domains:

1. To define a response on the current node with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used any time Saturday and

Sunday and uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, run this command from any node in the domain:

```
mkresponse -n "E-mail root" -d 1+7  \
-s "/usr/sbin/rsct/bin/notifyevent root" -e b   \
"E-mail root anytime"
```

2. To define a response on the node **nodeB** in the domain with the name ″E-mail root anytime″ that has an action named ″E-mail root″, to be used any time Saturday and Sunday, that uses the command **/usr/sbin/rsct/bin/notifyevent root** for both events and rearm events, and that sets two environment variables (PAGE ALL and TIMER SET), run this command from any node in the domain:

   ```
    mkresponse -n "E-mail root" -d 1+7  \
   -s "/usr/sbin/rsct/bin/notifyevent root" -e b   \
   -p nodeB -E 'ENV1="PAGE ALL", ENV2="TIMER SET"' \
   "E-mail root anytime"
   ```

3. To define a response on the node **nodeB** in the domain with the name ″nodeB Warning notifications″ as a copy of ″nodeA Warning notifications″ on the node **nodeA** in the domain, run this command from any node in the domain:

   ```
   mkresponse -c "nodeA Warning notifications":nodeA \
   -p nodeB "nodeB Warning notifications"
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **chresponse**, **lsresponse**, **mkcondition**, **mkcondresp**, **rmresponse**, **startcondresp**

# rmcondition

## Name

rmcondition – removes a condition.

## Synopsis

**rmcondition** [**–f**] [**–q**] [**–h**] [**–TV**] *condition*[**:***node_name*]

## Description

The **rmcondition** command removes the condition specified by the *condition* parameter. The condition must already exist to be removed. When the condition must be removed even if it has linked responses, use the **-f** option to force the condition and the links with the responses to be removed. If the **-f** option is not specified and links with responses exist, the condition is not removed. This command does not remove responses.

If a particular condition is needed for system software to work properly, it may be locked. A locked condition cannot be modified or removed until it is unlocked. If the condition you specify on the **rmcondition** command is locked, it will not be removed; instead an error will be generated informing you that the condition is locked. To unlock a condition, you can use the **-U** option of the **chcondition** command. However, since a condition is typically locked because it is essential for system software to work properly, you should exercise caution before unlocking it.

## Parameters

*condition* Specifies the name of a condition to be removed.

*node_name* Specifies the node where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–f** Forces the condition to be removed even if it is linked to responses. The links with the responses are removed as well as the condition, but the responses are not removed.

**–q** Does not return an error when *condition* does not exist.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the

RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Condition** resource class to run **rmcondition**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmcondition**
Contains the **rmcondition** command

## Examples

These examples apply to standalone systems:

1. To remove the condition definition named ″FileSystem space used″, run this command:

```
rmcondition "FileSystem space used"
```

2. To remove the condition definition named ″FileSystem space used″ even if the condition is linked with responses, run this command:

```
rmcondition -f "FileSystem space used"
```

This example applies to management domains:

1. In this example, the current node is the management server. To remove the condition definition named ″nodeB FileSystem space used″ that is defined on managed node **nodeB**, run this command:

```
rmcondition "FileSystem space used:nodeB"
```

This example applies to peer domains:

1. To remove the condition definition named ″nodeA FileSystem space used″ that is defined on node **nodeA**, run this command from any node in the domain:

```
rmcondition "nodeA FileSystem space used:nodeA"
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **chcondition**, **lscondition**, **lscondresp**, **mkcondition**

# rmcondresp

## Name

rmcondresp – deletes the link between a condition and one or more responses.

## Synopsis

To delete the link between a condition and one or more responses:

**rmcondresp** [**–q**] [**–h**] [**–TV**] *condition*[**:***node_name*] [*response* [*response*...]]

To delete all of the links to one or more responses:

**rmcondresp** [**–q**] **–r** [**–h**] [**–TV**] *response1* [*response2*...][**:***node_name*]

To lock or unlock the condition/response association:

**rmcondresp** { **-L** | **-U** } [**–h**] [**–TV**] *condition*[**:***node_name*] *response*

## Description

The **rmcondresp** command deletes the link between a condition and one or more responses. A link between a condition and a response is called a *condition/response association.* The response is no longer run when the condition occurs. Use the **-r** option to specify that the command parameters consist only of responses. This deletes all links to conditions for these responses. If only a condition is specified, links to all responses for that condition are deleted.

If a particular condition/response association is needed for system software to work properly, it may be locked. A locked condition/response association cannot be removed by the **rmcondresp** command. If the condition/response association you specify on the **rmcondresp** command is locked, it will not be removed; instead an error will be generated informing you that this condition/response association is locked. To unlock a condition/response association, you can use the **-U** option. However, because a condition/response association is typically locked because it is essential for system software to work properly, you should exercise caution before unlocking it.

## Parameters

*condition* Specifies the name of the condition linked to the response. The condition is always specified first unless the **-r** option is used.

*response* Specifies the name of a response or more than one response. The links from the specified responses to the specified condition are removed.

*node_name* Specifies the node where the condition is defined. If the **-r** option is used, it is the node where the response is defined. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–q** Does not return an error when either *condition* or *response* does not exist.

**–r** Indicates that all command parameters are responses. There are no

conditions specified. This command removes condition/response associations from all conditions that are linked to the specified responses.

**–L** Locks a condition/response association so it cannot be started, stopped, or removed. When locking a condition/response association using the **-L** option, no other operation can be performed by this command.

**–U** Unlocks a condition/response association so it can be started, stopped, or removed. If a condition/response association is locked, this is typically because it is essential for system software to work properly. For this reason, you should exercise caution before unlocking it. When unlocking a condition/response association using the **-U** option, no other operation can be performed by this command.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Association** resource class to run **rmcondresp**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmcondresp**
Contains the **rmcondresp** command

## Examples

These examples apply to standalone systems:

1. To delete the link between the condition ″FileSystem space used″ and the response ″Broadcast event on-shift″, run this command:

   ```
   rmcondresp "FileSystem space used" "Broadcast event on-shift"
   ```

2. To delete the links between the condition ″FileSystem space used″ and all of its responses, run this command:

   ```
   rmcondresp "FileSystem space used"
   ```

3. To delete the links between the condition ″FileSystem space used″ and the responses ″Broadcast event on-shift″ and ″E-mail root anytime″, run this command:

   ```
   rmcondresp "FileSystem space used" "Broadcast event on-shift" "E-mail root anytime"
   ```

4. To delete the links between the response ″Broadcast event on-shift″ and all of the conditions that use it, run this command:

   ```
   rmcondresp -r "Broadcast event on-shift"
   ```

These examples apply to management domains:

1. To delete the link between the condition ″FileSystem space used″ on the management server and the response ″Broadcast event on-shift″, run this command on the management server:

   ```
   rmcondresp "FileSystem space used" "Broadcast event on-shift"
   ```

2. To delete the links between the condition ″FileSystem space used″ on the managed node **nodeB** and the responses ″Broadcast event on-shift″ and ″E-mail root anytime″, run this command on the management server:

```
rmcondresp  "FileSystem space used":nodeB \
"Broadcast event on-shift" "E-mail root anytime"
```

These examples apply to peer domains:

1. To delete the links between the condition ″FileSystem space used″ on **nodeA** in the domain and the responses ″Broadcast event on-shift″ and ″E-mail root anytime″, run this command on any node in the domain:

```
rmcondresp "FileSystem space used":nodeA \
"Broadcast event on-shift" "E-mail root anytime"
```

2. To delete the links between all conditions on **nodeA** in the domain and the response ″Broadcast event on-shift″, run this command on any node in the domain:

```
rmcondresp -r "Broadcast event on-shift":nodeA
```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **lscondresp**, **mkcondition**, **mkcondresp**, **mkresponse**, **startcondresp**, **stopcondresp**

# rmresponse

## Name

rmresponse – removes a response.

## Synopsis

**rmresponse** [**–f**] [**–q**] [**–h**] [**–TV**] *response*[**:***node_name*]

## Description

The **rmresponse** command removes the response specified by the *response* parameter. The response must already exist in order to be removed. When the response must be removed even if it is linked with conditions, specify the **-f** option. This forces the response and the links with the conditions to be removed. If the **-f** option is not specified and links with conditions exist, the response is not removed. This command does not remove conditions.

If a particular response is needed for system software to work properly, it may be locked. A locked response cannot be modified or removed until it is unlocked. If the response you specify on the **rmresponse** command is locked, it will not be removed; instead an error will be generated informing you that the response is locked. To unlock a response, you can use the **-U** option of the **chresponse** command. However, since a response is typically locked because it is essential for system software to work properly, you should exercise caution before unlocking it.

## Parameters

*response* Specifies the name of a defined response to be removed.

*node_name* Specifies the node in a cluster where the response is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

## Options

**–f** Forces the response to be removed even if it is linked with conditions. The links with the conditions are removed as well as the response, but the conditions are not removed.

**–q** Does not return an error when *response* does not exist.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the

RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.EventResponse** resource class to run **rmresponse**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmresponse**
Contains the **rmresponse** command

## Examples

These examples apply to standalone systems:

1. To remove the response definition named ″Broadcast event on-shift″, run this command:

   ```
   rmresponse  "Broadcast event on-shift"
   ```

2. To remove the response definition named ″Broadcast event on-shift″ even if the response is linked with conditions, run this command:

   ```
   rmresponse -f "Broadcast event on-shift"
   ```

This example applies to management domains:

1. In this example, the current node is the management server. To remove the response definition named ″Broadcast event on-shift″ on managed node **nodeB**, run this command:

   ```
   rmresponse  "Broadcast event on-shift":nodeB
   ```

This example applies to peer domains:

1. To remove the response definition named ″Broadcast event on-shift″ defined on node **nodeA**, run this command from any node in the domain:

   ```
   rmresponse  "Broadcast event on-shift":nodeA
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **chresponse**, **lscondresp**, **lsresponse**, **mkcondresp**, **mkresponse**

# startcondresp

## Name

startcondresp – starts monitoring a condition that has one or more linked responses.

## Synopsis

To start monitoring a condition:

**startcondresp** [**–h**] [**–TV**] *condition*[**:***node_name*] [*response* [*response*...]]

To lock or unlock the condition/response association:

**startcondresp** { **-L** | **-U** } [**–h**] [**–TV**] *condition*[**:***node_name*] *response*

## Description

The **startcondresp** command starts the monitoring of a condition that has a linked response. A link between a condition and a response is called a *condition/response association.* In a cluster environment, the condition and the response must be defined on the same node. After monitoring is started, when the condition occurs, the response is run. If no responses are specified, monitoring is started for all responses linked to the condition. This causes all of the linked responses to run when the condition occurs. If more than one response is specified, monitoring is started only for those linked responses.

If one or more responses are specified and the responses are not linked with the condition, the **startcondresp** command links the specified responses to the condition, and monitoring is started. Use the **mkcondresp** command to link a response to a condition without starting monitoring.

If a particular condition/response association is needed for system software to work properly, it may be locked. A locked condition/response association cannot be started by the **startcondresp** command. If the condition/response association you specify on the **startcondresp** command is locked, it will not be started; instead an error will be generated informing you that this condition/response association is locked. To unlock a condition/response association, you can use the **-U** option. However, because a condition/response association is typically locked because it is essential for system software to work properly, you should exercise caution before unlocking it. To lock a condition/response association so it cannot be started, stopped, or removed, reissue this command with the **-L** option.

## Parameters

*condition* Specifies the name of the condition linked to the response. The condition is always specified first.

*node_name* Specifies the node in the domain where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

*response* Specifies the name of one or more responses. Specifying more than one response links the responses to the condition if they are not already linked and starts monitoring for the specified responses.

## Options

**–L** Locks a condition/response association so it cannot be started, stopped, or removed. When locking a condition/response association using the **-L** option, no other operation can be performed by this command.

**–U** Unlocks a condition/response association so it can be started, stopped, or removed. If a condition/response association is locked, this is typically because it is essential for system software to work properly. For this reason, you should exercise caution before unlocking it. When unlocking a condition/response association using the **-U** option, no other operation can be performed by this command.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Association** resource class to run **startcondresp**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/startcondresp**
Contains the **startcondresp** command

## Examples

These examples apply to standalone systems:

1. To start monitoring for the condition ″FileSystem space used ″ by using the response ″Broadcast event on-shift″, whether or not the response is linked with the condition, run this command:

   ```
   startcondresp  "FileSystem space used" "Broadcast event on-shift"
   ```

2. To start monitoring for the condition ″FileSystem space used ″ by using all of its linked responses, run this command:

   ```
   startcondresp "FileSystem space used"
   ```

3. To start monitoring for the condition ″FileSystem space used ″ by using the response ″Broadcast event on-shift″ and ″E-mail root anytime″, whether or not they are linked with the condition, run this command:

   ```
   startcondresp "FileSystem space used" "Broadcast event on-shift" "E-mail root anytime"
   ```

These examples apply to management domains:

1. To start monitoring for the condition ″FileSystem space used″ on the management server using the response ″Broadcast event on-shift″, whether or not the response is linked with the condition, run this command on the management server:

   ```
   startcondresp  "FileSystem space used" "Broadcast event on-shift"
   ```

2. To start monitoring for the condition ″FileSystem space used″ on the managed node **nodeB** using the response ″Broadcast event on-shift″, whether or not the response is linked with the condition, run this command on the management server:

   ```
   startcondresp  "FileSystem space used":nodeB "Broadcast event on-shift"
   ```

This example applies to peer domains:

1. To start monitoring for the condition ″FileSystem space used″ on **nodeA** in the domain using the response ″Broadcast event on-shift″ (also on **nodeA** in the domain), whether or not the response is linked with the condition, run this command on any node in the domain:

   ```
   startcondresp  "FileSystem space used":nodeA "Broadcast event on-shift"
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **lscondresp**, **mkcondition**, **mkcondresp**, **mkresponse**, **stopcondresp**

# stopcondresp

## Name

stopcondresp – stops the monitoring of a condition that has one or more linked responses.

## Synopsis

To stop monitoring a condition:

**stopcondresp** [**–q**] [**–h**] [**–TV**] *condition*[**:***node_name*] [*response* [*response*...]]

To lock or unlock the condition/response association:

**stopcondresp** { **-L** | **-U** } [**–h**] [**–TV**] *condition*[**:***node_name*] *response*

## Description

The **stopcondresp** command stops the monitoring of a condition that has one or more linked responses. If no response is specified, all of the linked responses for the condition are stopped. If one or more responses is specified, only those responses that are linked to the condition are stopped. When the condition occurs, the response is not run. If no responses are active for a condition, the condition is no longer monitored.

If a particular condition/response association is needed for system software to work properly, it may be locked. A locked condition/response association cannot be stopped by the **stopcondresp** command. If the condition/response link you specify on the **stopcondresp** command is locked, it will not be stopped; instead an error will be generated informing you that the condition/response association is locked. To unlock a condition/response association, you can use the **-U** option. A condition/response association is typically locked because it is essential for system software to work properly, so you should exercise caution before unlocking it.

## Parameters

*condition* Specifies the name of the condition linked to the response. The condition is always specified first.

*node_name* Specifies the node in the domain where the condition is defined. If *node_name* is not specified, the local node is used. *node_name* is a node within the scope determined by the CT_MANAGEMENT_SCOPE environment variable.

*response* Specifies the names of one or more responses. Monitoring is stopped for the specified responses. (If a specified response is not linked to the condition, it is ignored.)

## Options

**–q** Does not return an error when either *condition* or *response* does not exist or when the *condition* linked with *response* is not being monitored.

**–U** Unlocks a condition/response association so it can be started, stopped, or removed. If a condition/response association is locked, this is typically because it is essential for system software to work properly. For this reason,

you should exercise caution before unlocking it. When unlocking a condition/response association using the **-U** option, no other operation can be performed by this command.

**–L** Locks a condition/response association so it cannot be started, stopped, or removed. When locking a condition/response association using the **-L** option, no other operation can be performed by this command.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error. For your software service organization's use only.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the event-response resource manager (ERRM). The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

The user needs write permission for the **IBM.Association** resource class to run **stopcondresp**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/stopcondresp**
Contains the **stopcondresp** command

## Examples

These examples apply to standalone systems:

1. To stop monitoring for the condition ″FileSystem space used ″ which has the response ″Broadcast event on-shift″ linked with it, run this command:
   ```
   stopcondresp "FileSystem space used" "Broadcast event on-shift"
   ```
2. To stop monitoring for the condition ″FileSystem space used ″ using all of its linked responses, run this command:
   ```
   stopcondresp  "FileSystem space used"
   ```

This example applies to management domains:

1. To stop monitoring for the condition ″FileSystem space used ″ on the managed node **nodeB** which has the response ″Broadcast event on-shift″ linked with it, run this command on the management server:
   ```
   stopcondresp "FileSystem space used:nodeB" "Broadcast event on-shift"
   ```

This example applies to peer domains:

1. To stop monitoring for the condition ″FileSystem space used ″ on the node **nodeA** which has the response ″Broadcast event on-shift″ linked with it, run this command on any node in the domain:
   ```
   stopcondresp "FileSystem space used:nodeA" "Broadcast event on-shift"
   ```

## Author

Joseph Chaky - cluster@us.ibm.com

## See also

“rmccli ” on page 79

Books:

- *RSCT: Administration Guide*, for information about ERRM operations

Commands: **lscondresp**, **mkcondition**, **mkcondresp**, **mkresponse**, **startcondresp**

# Chapter 10. ERRM scripts

# displayevent

## Name

**displayevent** – sends a message about an event or a rearm event to a specified X-window display.

## Synopsis

**displayevent** [**-h**] *x-display*

## Description

The **displayevent** script sends a message about an event or a rearm event to a specified X-window display. When an event or a rearm event occurs, the event-response resource manager (ERRM) captures and posts information about the event or the rearm event in environment variables that it (the ERRM) generates.

The **displayevent** script can be used as an action that an event-response resource runs. You can also use this script as a template to create other user-defined actions. To find out how an event-response resource runs an action command, see *RSCT: Administration Guide*.

This script returns event information about the following ERRM environment variables, which are described in *RSCT: Administration Guide*:

```
ERRM_COND_SEVERITY ERRM_TYPE occurred:
  Condition:  ERRM_COND_NAME
  Node:  ERRM_NODE_NAME
  Resource:  ERRM_RSRC_NAME
  Resource Class:  ERRM_RSRC_CLASS_NAME
  Resource Attribute:  ERRM_ATTR_NAME
  Attribute Type:  ERRM_DATA_TYPE
  Attribute Value:  ERRM_VALUE
  Time:  local time
```

This example is a template of the message that appears on the specified X-window display when an event or a rearm event occurs for which **displayevent** is a response action. For the **Time:** field, this script returns the local time when the event or the rearm event is observed. **ERRM_TIME** is the environment variable that the ERRM supplies. The value of **ERRM_TIME** is localized and converted to readable form (*hh:mm:ss mm/dd/yy*) before it is displayed.

This script captures the values of the environment variables and writes a message to the specified X-window display.

## Parameters

*x-display*
: Specifies the X-window display to which the event or rearm event is written.

## Options

**–h** Writes this script's usage statement to standard output.

## Standard output

When the **-h** option is specified, this script's usage statement is written to standard output.

## Exit status

**0** The script has run successfully.

**1** An error occurred when the script was run.

## Restrictions

This script must be run on the host where the ERRM is running.

## Implementation specifics

This script is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/displayevent**
Contains the **displayevent** script

## Examples

1. Suppose the command **/usr/sbin/rsct/bin/displayevent adminhost:0** is an action in the critical-notification response, which is associated with the **/var space used** condition on the resource **/var**. The threshold of the event expression that is defined for this condition is met, and an event occurs. The critical-notification response takes place, and **displayevent** is run. The following message appears on the X-window display of the node **adminhost**:

```
Critical event occurred:
  Condition:  /var space used
  Node:  localnode
  Resource:  /var
  Resource Class:  IBM.FileSystem
  Resource Attribute:  PercentTotUsed
  Attribute Type:  Int32
  Attribute Value:  91
  Time:  12:21:25 02/27/04
```

## Author

Bruce Potter - cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about the event-response resource manager (ERRM) and the ERRM environment variables

# elogevent, logevent

## Name

**elogevent**, **logevent** – logs event information that the event-response resource manager (ERRM) generates to a specified log file.

## Synopsis

elogevent [**-h**] *log_file*

logevent [**-h**] *log_file*

## Description

The **elogevent** script always return messages in English. The language in which the messages of the **logevent** script are returned depends on the locale settings.

When an event occurs, these scripts capture information about the event, which is posted by the event-response resource manager (ERRM), in environment variables that it (the ERRM) generates.

These scripts can be used as actions that an event-response resource runs. You can also use these scripts as templates to create other user-defined actions. To find out how an event-response resource runs an action command, see *RSCT: Administration Guide* .

These scripts return event information about the ERRM environment variables that are described in *RSCT: Administration Guide* . In addition, these scripts return the local time when the event is reported. **ERRM_TIME** is the environment variable that the ERRM supplies. The value of **ERRM_TIME** is localized and converted to readable form before it is displayed.

## Parameters

*log_file*

Specifies the name of the file where event information is logged. An absolute path for the *log_file* parameter should be specified.

The size of the *log_file* is not limited, and it will not overwrite itself. The file size will increase indefinitely unless the administrator periodically removes entries.

If *log_file* already exists, event information is appended to it. If *log_file* does not exist, it is created so that event information can be written to it.

## Options

**–h** Writes the script's usage statement to standard output.

## Standard output

When the **-h** option is specified, the script's usage statement is written to standard output.

## Exit status

**0** The script has run successfully.

**1** A required *log_file* is not specified.

**2** The *log_file* path is not valid.

## Restrictions

- These scripts must be run on the node where the ERRM is running.
- The user who runs these scripts must have write permission for the *log_file* where the event information is logged.

## Implementation specifics

These scripts are part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/elogevent** Contains the **elogevent** script

**/usr/sbin/rsct/bin/logevent** Contains the **logevent** script

## Examples

1. To log information, specify **/tmp/event.log**. ERRM runs this command:

   ```
   /usr/sbin/rsct/bin/logevent/tmp/event.log
   ```

   The **/tmp/event.log** file does not need to exist when the command is run.
2. To see the contents of the **/tmp/event.log** file, run this command:

   ```
   cat /tmp/event.log
   ```

   The following sample output shows a warning event for the **/var** file system (a file system resource):

   ```
   ============================================================================
   Event reported at Fri Feb 27 12:21:25 2004

   Condition Name:                         /var space used
   Severity:                               Warning
   Event Type:                             Event
   Expression:                             PercentTotUsed>90

   Resource Name:                          /var
   Resource Class Name:                    IBM.FileSystem
   Data Type:                              CT_UINT32
   Data Value:                             91
   ```

## Author

Ya-Huey Juan - cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide* , for information about the event-response resource manager (ERRM) and the ERRM environment variables

# enotifyevent, notifyevent

## Name

**enotifyevent**, **notifyevent** – sends information that the event-response resource manager (ERRM) generates about an event to a specified user ID.

## Synopsis

**enotifyevent** [**-h**] [*user-ID*]

**notifyevent** [**-h**] [*user-ID*]

## Description

The **enotifyevent** script always return messages in English. The language in which the messages of the **notifyevent** script are returned depends on the locale settings.

When an event occurs, these scripts capture information about the event, which is posted by the event-response resource manager (ERRM), in environment variables that it (the ERRM) generates.

These scripts can be used as actions that an event-response resource runs. You can also use these scripts as templates to create other user-defined actions. To find out how an event-response resource runs an action command, see *RSCT: Administration Guide* .

These scripts return event information about the ERRM environment variables that are described in *RSCT: Administration Guide* . In addition, these scripts return the local time when the event is reported. **ERRM_TIME** is the environment variable that the ERRM supplies. The value of **ERRM_TIME** is localized and converted to readable form before it is displayed.

These scripts send event information to the specified user ID. When a user ID is specified, it is assumed to be valid, and it is used without verifying it. If a user ID is not specified, the user who is running the command is used as the default.

*user-ID* is the optional ID of the user to whom the event information will be mailed. If *user-ID* is not specified, the user who is running the command is used as the default.

## Options

**–h** Writes the script's usage statement to standard output.

## Standard output

When the **-h** option is specified, the script's usage statement is written to standard output.

## Exit status

**0** Command has run successfully.

## Restrictions

1. These scripts must be run on the node where the ERRM is running.

## Implementation specifics

These scripts are part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/enotifyevent** Contains the **enotifyevent** script

**/usr/sbin/rsct/bin/notifyevent** Contains the **notifyevent** script

## Examples

1. Specify **user1** to send mail to a user. The event-response resource manager then runs the following command:

   ```
   /usr/sbin/rsct/bin/notifyevent user1
   ```

2. The following example shows how a warning event for the **/var** file system (a file system resource) is formatted and logged:

   ```
   ============================================================================
   Event reported at Fri Feb 27 12:21:25 2004

   Condition Name:      /var space used
   Severity:     Warning
   Event Type:       Event
   Expression:       PercentTotUsed>90

   Resource Name:     /var
   Resource Class Name:    IBM.FileSystem
   Data Type:     CT_UINT32
   Data Value:     91
   ```

## Author

Ya-Huey Juan - cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide* , for information about the event-response resource manager (ERRM) and the ERRM environment variables

# ewallevent, wallevent

## Name

**ewallevent**, **wallevent** – broadcasts an event or a rearm event to all users who are logged in.

## Synopsis

**ewallevent** [**-c**] [**-h**]

**wallevent** [**-c**] [**-h**]

## Description

The **ewallevent** script always return messages in English. The language in which the messages of the **wallevent** script are returned depends on the locale settings.

These scripts broadcast a message about an event or a rearm event to all users who are currently logged in to the host when the event or the rearm event occurs. When an event or a rearm event occurs, the event-response resource manager (ERRM) captures and posts event or rearm event information in environment variables that it (the ERRM) generates. These scripts can be used as actions that an event-response resource runs. You can also use these scripts as templates to create other user-defined actions.

To find out how an event-response resource runs an action command, see *RSCT: Administration Guide* .

Messages are displayed in the following format at the consoles of all users who are logged in when an event or a rearm event occurs for which the script is a response action:

```
Broadcast message from user@host (tty) at hh:mm:ss...

severity event_type occurred for Condition condition_name
on the resource resource_name of resource_class_name at hh:mm:ss mm/dd/yy
The resource was monitored on node_name and resided on {node_names}.
```

These scripts return event information about the ERRM environment variables that are described in *RSCT: Administration Guide* . In addition, these scripts return the local time when the event or the rearm event occurs. **ERRM_TIME** is the environment variable that the ERRM supplies. The value of **ERRM_TIME** is localized and converted to readable form before it is displayed.

These scripts capture the values of the ERRM environment variables and write a message to the user consoles that are currently logged in.

## Options

**–c** Instructs **wallevent** to broadcast the value of an ERRM event. When the **-c** option is specified, **wallevent** broadcasts the messages that are contained in the **ERRM_VALUE** environment variable.

**–h** Writes the script's usage statement to standard output.

## Standard output

When the **-h** option is specified, the script's usage statement is written to standard output.

## Exit status

**0** Script has run successfully.

**1** Error occurred when the script was run.

## Restrictions

1. These scripts must be run on the node where the ERRM is running.

## Implementation specifics

These scripts are part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/ewallevent** Contains the **ewallevent** script

**/usr/sbin/rsct/bin/wallevent** Contains the **wallevent** script

## Examples

1. Suppose the **wallevent** script is a predefined action in the critical-notification response, which is associated with the **/var space used** condition on the resource **/var**. The threshold of the event expression defined for this condition is met, and an event occurs. The critical-notification response takes place, and **wallevent** is run. The following message is displayed on the consoles of all users who are logged in:

   ```
   Broadcast message from joe@neverland.com (pts/6) at 18:42:03...

   Critical event occurred for Condition /var space used
   on the resource /var of filesys of IBM.FileSystem at 18:41:50 03/28/02
   The resource was monitored on c174n05 and resided on {c174n05}.
   ```

2. When a rearm event occurs for the **/var space used** condition on the resource **/var**, the following message is displayed on the consoles of all users who are logged in:

   ```
   Broadcast message from joe@neverland.com (pts/6) at 18:42:03...

   Critical rearm event occurred for Condition /var space used
   on the resource /var of filesys of IBM.FileSystem at 18:41:50 03/28/02
   The resource was monitored on c174n05 and resided on {c174n05}.
   ```

## Author

Ya-Huey Juan - cluster@us.ibm.com

## See also

Books: see *RSCT: Administration Guide* for information about the event-response resource manager (ERRM) and about how to use ERRM environment variables

# msgevent

## Name

**msgevent** – sends an event or a rearm event to a specified user's console.

## Synopsis

**msgevent** [**-h**] *user* [*tty*]

## Description

The **msgevent** script displays a message about an event or a rearm event on the console of a specified user. If *tty* is specified, the message is sent to that *tty*; otherwise, **msgevent** chooses a *tty* that belongs to *user*. When an event or a rearm event occurs, the event-response resource manager (ERRM) captures and posts information about the event or the rearm event in environment variables that it (the ERRM) generates.

The **msgevent** script can be used as an action that an event-response resource runs. You can also use this script as a template to create other user-defined actions. To find out how an event-response resource runs an action command, see *RSCT: Administration Guide*.

This script returns event information about the following ERRM environment variables, which are described in *RSCT: Administration Guide*:

```
ERRM_COND_SEVERITY ERRM_TYPE occurred:
  Condition:  ERRM_COND_NAME
  Node:  ERRM_NODE_NAME
  Resource:  ERRM_RSRC_NAME
  Resource Class:  ERRM_RSRC_CLASS_NAME
  Resource Attribute:  ERRM_ATTR_NAME
  Attribute Type:  ERRM_DATA_TYPE
  Attribute Value:  ERRM_VALUE
  Time:  local time
```

This example is a template of the message that is displayed on the specified console or *tty* when an event or a rearm event occurs for which **msgevent** is a response action. For the **Time:** field, this script returns the local time when the event or the rearm event is observed. **ERRM_TIME** is the environment variable that the ERRM supplies. The value of **ERRM_TIME** is localized and converted to readable form (*hh:mm:ss mm/dd/yy*) before it is displayed.

The **msgevent** script captures the values of these ERRM environment variables and displays a message on the specified user's console.

## Options

**–h** Writes this script's usage statement to standard output.

## Standard output

When the **-h** option is specified, this script's usage statement is written to standard output.

## Exit status

**0** Script has run successfully.

**1** Error occurred when script was run.

## Restrictions

This script must be run on the host where the ERRM is running.

## Implementation specifics

This script is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/msgevent** Contains the **msgevent** script

## Examples

1. Suppose the command **/usr/sbin/rsct/bin/msgevent root** is an action in the critical-notification response, which is associated with the **/var space used** condition on the resource **/var**. The threshold of the event expression defined for this condition is met, and an event occurs. The critical-notification response takes place, and **msgevent** is run. This message is displayed on a tty belonging to **root**:

```
Critical event occurred:
  Condition:  /var space used
  Node:  localnode
  Resource:  /var
  Resource Class:  IBM.FileSystem
  Resource Attribute: PercentTotUsed
  Attribute Type: Int32
  Attribute Value: 91
  Time: 18:43:03 03/28/02
```

## Author

Bruce Potter - cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about the event-response resource manager (ERRM) and the ERRM environment variables

# snmpevent

## Name

**snmpevent** – sends ERRM events to an SNMP agent.

## Synopsis

**snmpevent** [**-H** *host-name*] [**-c** *community*] [**-h**]

## Description

You can also use the **snmpevent** script as a template to create other user-defined actions. To find out how an event-response resource runs an action command, see *RSCT: Administration Guide* .

The **snmpevent** script is used by a predefined ERRM response called **Generate SNMP trap**. (See the *RSCT: Administration Guide* for more information.) When **Generate SNMP trap** is the response, **snmpevent** sends an SNMP trap with an object ID of **enterprises.2.6.193.0.1**. With **snmpevent**, you can specify the host to which the trap should be sent and the community name that will be used. The host is specified with the **-H** option, followed by the host name or IP address of the host. The default host is **localhost**. The community name, which follows the **-c** option, should be a string. The default community is **public**. Two environment variables, SNMP_HOST and SNMP_COMMUNITY, can also be defined. If an environment variable is specified, the corresponding default value (**localhost** or **public**) will be overridden. Likewise, if a parameter is specified on the command line (using **-H** or **-c**), the corresponding environment variable will be overridden.

The format of the trap that is sent corresponds to the environment variables set by ERRM when a response is called. For each variable, there is an associated object ID (OID) that is mapped into the trap. These object IDs and variables are described in the **ibmRSCT** management information base (MIB):

```
ERRM_COND_SEVERITY = 2.6.193.1.1.1.2
ERRM_TYPE = 2.6.193.1.1.1.3
ERRM_COND_NAME = 2.6.193.1.1.1.4
ERRM_NODE_NAME = 2.6.193.1.1.1.5
ERRM RSRC_NAME = 2.6.193.1.1.1.6
ERRM_RSRC_CLASS_NAME = 2.6.193.1.1.1.7
ERRM_ATTR_NAME = 2.6.193.1.1.1.8
ERRM_DATA_TYPE = 2.6.193.1.1.1.9
ERRM_VALUE = 2.6.193.1.1.1.10
```

For descriptions of these environment variables, see *RSCT: Administration Guide*.

The **snmpevent** command captures the values of these environment variables and formats a generic message that is sent as a trap through a call to the **snmptrap** command.

## Options

**–H** *host-name*
: Specifies the host name of the node that contains the SNMP manager. This is the host to whom the trap will be sent to.

**–c**
: Specifies the SNMP community to be used. This can be any string the SNMP manager will accept. The default is **public**.

**–h**
: Writes this script's usage statement to standard output.

## Standard output

When the **-h** option is specified, this script's usage statement is written to standard output.

## Exit status

**0** The script has run successfully.

**1** An error occurred when the script was run.

## Restrictions

This script must be run on the node where the ERRM is running.

## Implementation specifics

This script is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/snmpevent** Contains the **snmpevent** script

## Examples

1. This example shows you how to define a condition called **NodeChanged**. The condition will be **ConfigChanged=1**, which means that any time one of the attributes of the managed nodes changes, ERRM will be alerted. Define this condition by running this command:

   ```
   mkcondition -r IBM.ManagedNode -e ConfigChanged=1 NodeChanged
   ```

   Now run:

   ```
   lscondition
   ```

   to see the condition listed. The predefined response **Generate SNMP trap** is already there by default. To verify this, run:

   ```
   lsresponse
   ```

   Now you have a condition and a response. To tie these together, run this command:

   ```
   mkcondresp NodeChanged "Generate SNMP trap"
   ```

   Run:

   ```
   lscondresp
   ```

   to make sure everything is in place. Finally, to complete the setup, run this command:

   ```
   startcondresp NodeChanged "Generate SNMP trap"
   ```

   To change the console port number of node **c5bn15** to **3**, run this command:

   ```
   chnode c5bn15 consolePortNum=3
   ```

   If everything is set up correctly, an SNMP trap will be sent to **localhost**. The output looks like this:

```
Feb 27 12:21:25 vallard snmptrapd[10188]:
localhost.localdomain [127.0.0.1]: Trap
system.sysUpTime.0 = Timeticks: (147781404) 17 days, 2:30:14.04,
```

```
.iso.org.dod.internet.snmpV2.snmpModules.snmpMIB.snmpMIBObjects.snmpTrap.snmpTrapOID.0 = OID:
enterprises.2.6.193.0.1, enterprises.2.6.193.1.1.1.2 = 3, enterprises.2.6.193.1.1.1.3 = 1,
enterprises.2.6.193.1.1.1.4 = "NodeChanged", enterprises.2.6.193.1.1.1.5 = "localnode",
enterprises.2.6.193.1.1.1.6 = "c5bn15.ppd.pok.ibm.com", enterprises.2.6.193.1.1.1.7 = "ManagedNode",
enterprises.2.6.193.1.1.1.8 = "ConfigChanged", enterprises.2.6.193.1.1.1.9 = "CT_UINT32",
enterprises.2.6.193.1.1.1.10 = "1"
```

The predefined response **Generate SNMP trap** called **/usr/sbin/rsct/bin/snmpevent**, which sent the trap with the ERRM variables assigned to the object IDs (OIDs).

## Author

Vallard Benincosa - cluster@us.ibm.com

## See also

Commands: **lscondition**, **lscondresp**, **lsresponse**, **mkcondition**, **mkcondresp**, **mkresponse**, **snmptrap**, **startcondresp**, **stopcondresp**

Daemons: **snmptrapd**

Files: **snmptrapd.conf**

Books: *RSCT: Administration Guide* , for information about the event-response resource manager (ERRM) and the ERRM environment variables

# Chapter 11. Sensor resource manager commands

# chsensor

## Name

**chsensor** — changes the attributes of a resource monitoring and control (RMC) sensor.

## Synopsis

**chsensor** [**-i** *seconds*] [ **–a** | **–n** *host1* [ **,** *host2* **,** ... ] ] [**–h**] [ **–v** | **–V** ] *sensor_name attr1*=*value1* [*attr2*=*value2* ...]

## Description

The **chsensor** command changes the attributes of a resource monitoring and control (RMC) sensor. Use the *sensor_name* parameter to specify which sensor you are changing.

The **chsensor** command runs on any node. If you want **chsensor** to run on all of the nodes in a domain, use the **-a** option. If you want **chsensor** to run on a subset of nodes in a domain, use the **-n** option.

## Parameters

*sensor_name*
Specifies the name of the sensor to change.

*attr1*=*value1* **[***attr2*=*value2* **...]**
Specifies one or more sensor attributes and the new values to which they will be set. You can change the values of these attributes:

**Name** Specifies the new name of the sensor. If the new name is a string that contains spaces or special characters, it must be enclosed in quotation marks.

**ControlFlags** Specifies that special handling is required for this sensor instead of the default behavior. You can specify one of these values:

**0** Indicates that no special handling is required. This is the default.

**1** Indicates that the command in this sensor will be run any time, even at the initial stage (when **lssensor** is called or when monitoring is just started.) It is not recommanded that you specify this value, unless you expect the command to run very soon. Setting this value could block other requests to the sensor resource manager, so that those requests will not be processed until the command ends.

**2** Indicates that output from the command in the **SavedData** field is not saved permanently to **SavedData** persistent resource attributes. If this value is not specified, the sensor resource manager updates data in the registry's resource table whenever the command's standard output contains the line: **SavedData=***"any-string"*.

**3** Indicates a combination of values **1** and **2**.

**4** Indicates that the sensor resource manager will run the command when monitoring is stopped.

**5** Indicates a combination of values **1** and **4**.

**6** Indicates a combination of values **2** and **4**.

**7** Indicates a combination of values **1**, **2**, and **4**.

**UserName** Specifies the name of a user whose privileges will be used to run the command. The user should already be defined on the system.

**Description** Provides a description of the sensor and what it is monitoring.

**ErrorExitValue**

Specifies which exit values will be interpreted as errors, as follows:

**0** No exit values are interpreted as errors.

**1** Exit values other than **0** are interpreted as errors.

**2** An exit value of **0** is interpreted as an error.

If the exit value indicates an error as specified by this attribute, no dynamic attribute values (except **ExitValue**) are updated.

## Options

**–a** Changes sensors that match the specified name on all nodes in the domain. The CT_MANAGEMENT_SCOPE environment variable determines the cluster scope. If CT_MANAGEMENT_SCOPE is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management domain and a peer domain exist, **chsensor -a** with CT_MANAGEMENT_SCOPE not set will run in the management domain. In this case, to run in the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–i** *seconds*
Specifies the interval in which the sensor command is run to update the values of the sensor attributes. *seconds* is an integer value and must be greater than or equal to **10**. The sensor command is run at the specified interval only when a sensor resource is monitored. If the interval is set to **0**, the sensor command will not be automatically run. Using the **refsensor** command is independent of interval updates.

**–n** *host1* **[ ,** *host2* **, ... ]**
Specifies the node on which the sensor should be changed. By default, the sensor is changed on the local node. This option is only appropriate in a management domain or a peer domain.

**–h** Writes the command's usage statement to standard output.

**–v** | **–V**
Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the **CT_CONTACT** environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If this environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled.

The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An incorrect combination of options and parameters has been entered.

**6** No sensor resources were found.

*n* Based on other errors that can be returned by the RMC subsystem.

## Security

The user needs write permission for the **IBM.Sensor** resource class in order to run **chsensor**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chsensor** Contains the **chsensor** command

## Examples

1. To change the **Name** attribute of the **SensorA** sensor to **Sensor1A**, enter:
   ```
   chsensor SensorA Name=Sensor1A
   ```
2. To change the update interval of the **SensorA** sensor to **10**, enter:
   ```
   chsensor -i 10 SensorA
   ```

## Author

cluster@us.ibm.com

## See also

“rmccli ” on page 79, for information about *attr*=*value* syntax

Books: *RSCT: Administration Guide*, for information about the ACL authorization file

Commands: **lssensor**, **mksensor**, **refsensor**, **rmsensor**

# lssensor

## Name

**lssensor** — displays the sensors that are defined to the resource monitoring and control (RMC) subsystem.

## Synopsis

**lssensor** [ **–a** | **–n** *host1*[**,***host2*...] ] [**–h**] [ **–v** | **–V** ] [ **–A** | *sensor_name1* [*sensor_name2*...] ]

## Description

The **lssensor** command displays the attributes of one or more sensors. If you don't specify any sensor names, the **lssensor** command lists the names of all of the sensors. Use the **-A** option to list all of the sensors and all of their attributes and values.

Using **lssensor** *sensor_name* or **lssensor -A** causes the sensor command to run. The sensor command is the command or script that is defined to set the sensor attribute values. It is specified using the **mksensor** command.

The **lssensor** command lists the following information about defined sensors:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the sensor |
| **Command** | The command that is run to update the sensor attributes |
| **ConfigChanged** | Information about changes to access or to persistent attributes |
| **ControlFlags** | Indicates whether any special handling is required for this sensor |
| **Description** | This field is not used |
| **ErrorExitValue** | Indicates how the exit value is interpreted by the sensor resource manager |
| **ExitValue** | The exit code from the command that is running |
| **Float32** | The type **float32** attribute for this sensor resource |
| **Float64** | The type **float64** attribute for this sensor resource |
| **Int32** | The type **int32** attribute for this sensor resource |
| **Int64** | The type **int64** attribute for this sensor resource |
| **NodeNameList** | The name of the node where the sensor resource is defined |
| **RefreshInterval** | The interval in seconds in which the sensor attribute values are updated by running the sensor command |
| **SavedData** | A specific output string from the command |
| **SD** | Contains all dynamic resource attributes except **ConfigChanged**, **Quantum**, and **ExitValue** as its elements |

| | |
|---|---|
| **String** | The type string attribute for this sensor resource |
| **Uint32** | The type **uint32** attribute for this sensor resource |
| **Uint64** | The type **uint64** attribute for this sensor resource |
| **UserName** | The user ID that is used when run the sensor command is run |

The **lssensor** command runs on any node. If you want **lssensor** to run on all of the nodes in a domain, use the **-a** option. If you want **lssensor** to run on a subset of nodes in a domain, use the **-n** option.

## Parameters

*sensor_name1* **[***sensor_name2***...]**
Specifies the names of one or more sensors to display.

## Options

**–a** Lists sensors that match the specified name on all nodes in the domain. The CT_MANAGEMENT_SCOPE environment variable determines the cluster scope. If CT_MANAGEMENT_SCOPE is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management domain and a peer domain exist, **lssensor** -a with CT_MANAGEMENT_SCOPE not set will run in the management domain. In this case, to run in the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–A** Displays all of the sensors with their attributes and values.

**–n** *host1***[,***host2***...]**
Specifies the node from which the sensor should be listed. By default, the sensor is listed from the local node. This option is only appropriate in a management domain or a peer domain.

**–h** Writes the command's usage statement to standard output.

**–v** | **–V**
Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the **CT_CONTACT** environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If this environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT

environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled.

The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An incorrect combination of options and parameters has been entered.

**6** No sensor resources were found.

*n* Based on other errors that can be returned by the RMC subsystem.

## Security

The user needs read permission for the **IBM.Sensor** resource class in order to run **lssensor**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lssensor** Contains the **lssensor** command

## Examples

1. To list the names of all of the sensors, enter:

   ```
   lssensor
   ```

   The output will look like this:

   ```
   sensor1
   sensor2
   sensor3
   ```

2. To list the names and attributes of all sensors, enter:

   ```
   lssensor -A
   ```

   The output will look like this:

```
Name = sensor1
 ActivePeerDomain =
 Command = /usr/local/bin/sensorcmd1
 ConfigChanged = 0
 ControlFlags = 1
 Description =
 ErrorExitValue = 1
 ExitValue = 0
 Float32 = 1.06381e+06
 Float64 = 1.06381e+06
 Int32 = 1063814
 Int64 = 1063814
 NodeNameList = {somenode.pok.ibm.com}
 RefreshInterval = 60
 SavedData = Last SavedData
 SD = [string from sensor1,1063814,1063814,1063814,1063814,1.06381e+06,1.06381e+06]
 String = string from sensor1
 Uint32 = 1063814
 Uint64 = 1063814
 UserName = root
-------------------
 Name = CFMRootModTime
 ActivePeerDomain =
 Command = /opt/csm/csmbin/mtime/cfmroot
 ConfigChanged = 0
 ControlFlags = 0
 Description =
 ErrorExitValue = 1
 ExitValue = 0
 Float32 = 0
 Float64 = 0
 Int32 = 0
 Int64 = 0
 NodeNameList = {somenode.pok.ibm.com}
 RefreshInterval = 60
 SavedData =
 SD = [,0,0,0,0,0,0]
 String =
 Uint32 = 0
 Uint64 = 0
 UserName = root
-------------------
 Name = ErrorLogSensor
 ActivePeerDomain =
 Command = /opt/csm/csmbin/monerrorlog
 ConfigChanged = 0
 ControlFlags = 0
 Description =
 ErrorExitValue = 1
 ExitValue = 0
 Float32 = 0
 Float64 = 0
 Int32 = 0
 Int64 = 0
 NodeNameList = {somenode.pok.ibm.com}
 RefreshInterval = 60
 SavedData =
 SD = [,0,0,0,0,0,0]
 String =
 Uint32 = 0
 Uint64 = 0
 UserName = root
-------------------
.
.
.
```

3. To list the attributes of **sensor2**, enter:

```
lssensor sensor2
```

The output will look like this:

```
Name = sensor2
Command = /usr/local/bin/sensorcmd2
ConfigChanged = 0
ControlFlags = 0
Description =
ErrorExitValue = 1
ExitValue = 127
Float32 = 0
Float64 = 0
Int32 = 0
Int64 = 0
NodeNameList = {somenode.pok.ibm.com}
RefreshInterval = 60
SavedData =
SD = [,0,0,0,0,0,0]
String =
Uint32 = 0
Uint64 = 0
UserName = root
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about the ACL authorization file

Commands: **chsensor**, **mksensor**, **refsensor**, **rmsensor**

# mksensor

## Name

**mksensor** — defines a sensor to the resource monitoring and control (RMC) subsystem.

## Synopsis

**mksensor** [**–n** *host*] [**–i** *seconds*] [ **–c** *n* ] [ **–e 0** | **1** | **2** ] [**–u** *user-ID*] [**–h**] [ **–v** | **–V** ] *sensor_name* [*″*]*sensor_command*[*″*]

## Description

The **mksensor** command defines a sensor resource to the resource monitoring and control (RMC) subsystem. A *sensor* is an RMC resource with attributes that you can monitor. You can use the event-response resource manager (ERRM) commands to set up monitoring of the sensor attributes. The response actions defined will run when a monitored sensor event occurs. This enables administrators to extend RMC monitoring capabilities without having to write a resource manager.

The sensor resource manager sets the values of the sensor attributes after these attributes have been monitored. The sensor resource manager updates the attribute values at defined intervals using commands or scripts that you specify with the *sensor_command* parameter.

You can also update the sensor values using the **chsensor** command or the **refsensor** command. Use the **lssensor** command to list the sensor attributes and values. To remove a sensor, use the **rmsensor** command.

The sensor is identified by the *sensor_name* parameter that is specified as part of the **mksensor** command. The *sensor_command* parameter specifies what will be run by the sensor resource manager to set values to the attributes of this sensor. The sensor consists of the following attributes that can be set by *sensor_command*:

**Float32** The type float32 attribute for this sensor resource.

**Float64** The type float64 attribute for this sensor resource.

**Int32** The type int32 attribute for this sensor resource.

**Int64** The type int64 attribute for this sensor resource.

**Quantum** The type quantum attribute for this sensor resource.

**String** The type string attribute for this sensor resource.

**Uint32** The type uint32 attribute for this sensor resource.

**Uint64** The type uint64 attribute for this sensor resource.

The *sensor_command* parameter sets attribute values by sending the values to standard output in a format that the sensor resource manager can parse. The format is *attr*=*value*. For example, if *sensor_command* sets the **Int32** attribute to **57**, it writes **Int32=57** to standard output. To set more than one attribute value, *sensor_command* can write multiple *attr*=*value* pairs to standard output. The *attr*=*value* pairs can be on one or more lines. If the standard output of *sensor_command* is not in *attr*=*value* form, it is assumed to be a string and the value is placed in the **String** attribute.

Use the **-e** option to control how the exit values from *sensor_command* are interpreted. Depending on this setting, when the exit value of the *sensor_command* is considered to be an error, the sensor attributes are not set and information is written to the audit log.

The sensor command runs using the user ID that creates the sensor resource. Once a sensor resource is monitored, *sensor_command* is run at intervals specified by the **-i** option, which is expressed in seconds. The default interval is **60** seconds if none is specified. Specify a value of **0** to indicate that *sensor_command* is not to run at intervals. In this case, the **refsensor** command is typically used to update the sensor values.

The **mksensor** command can be run on any node. If you are in a management or peer domain, you can use the **-n** option to define the sensor on a node in the domain.

## Parameters

*sensor_name*
Specifies the name of the sensor to be defined.

**[**″**]***sensor_command***[**″**]**
Specifies a command or script that the sensor resource manager will use to set the attribute values of the sensor. You should not call any of the sensor resource manager commands (**chsensor**, **lssensor**, **mksensor**, **refsensor**, or **rmsensor**) as part of this parameter.

If *sensor_command* contains any blank characters or any special charaters that can be interepreted by the shell, it must be enclosed in double quotation marks.

When *sensor_command* is enclosed in double quotation marks, you must include a backslash escape character (****) before an ″inner″ double quotation mark. You must also include a **** before a dollar sign (**$**). See Example 2 for more information.

## Options

**–n** *host*
Specifies the node on which the sensor should be defined. By default, the sensor is defined on the local node. This option is only appropriate in a management domain or a peer domain.

**–i** *seconds*
Specifies the interval in which *sensor_command* is run to update the values of the sensor attributes. *seconds* is an integer value and must be greater than or equal to **10**. *sensor_command* is run at the specified interval only when a sensor resource is monitored. The default interval is **60** seconds. If the interval is set to **0**, *sensor_command* will not be run automatically. Using the **refsensor** command is independent of interval updates.

**–c** *n* Specifies whether special handling is required for this sensor. *n* can be one of these values:

**0** Indicates that no special handling is required. This is the default.

**1** Indicates that the command in this sensor will be run any time, even at the initial stage (when **lssensor** is called or when monitoring is just started.) It is not recommanded that you specify this value, unless you expect the command to run very soon. Setting this value could block

other requests to the sensor resource manager, so that those requests will not be processed until the command ends.

**2** Indicates that output from the command in the **SavedData** field is not saved permanently to **SavedData** persistent resource attributes. If this value is not specified, the sensor resource manager updates data in the registry's resource table whenever the command's standard output contains the line: **SavedData=***"any-string"*.

**3** Indicates a combination of values **1** and **2**.

**4** Indicates that the sensor resource manager will run the command when monitoring is stopped.

**5** Indicates a combination of values **1** and **4**.

**6** Indicates a combination of values **2** and **4**.

**7** Indicates a combination of values **1**, **2**, and **4**.

**–e 0 | 1 | 2**
Specifies how the sensor resource manager interprets the exit values of *sensor_command*, as follows:

**0** No exit value from *sensor_command* is an error.

**1** An exit value other than **0** from *sensor_command* is an error.

**2** An exit value of **0** from *sensor_command* is an error.

The default value is **1**. The sensor attributes are not updated when the exit value is interpreted as an error. For an error, information is written to the audit log.

**–u** *user-ID*
Specifies the name of a user whose privileges will be used to run the sensor command. The user should already be defined on the system. The default value for *user-ID* is the user name that is associated with the current effective user ID.

**–h** Writes the command's usage statement to standard output.

**–v | –V**
Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the **CT_CONTACT** environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If this environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled.

The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An incorrect combination of options and parameters has been entered.

*n* Based on other errors that can be returned by the RMC subsystem.

## Security

The user needs write permission for the **IBM.Sensor** resource class in order to run **mksensor**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Restrictions

You should not call any of the sensor resource manager commands (**chsensor**, **lssensor**, **mksensor**, **refsensor**, or **rmsensor**) as part of the *sensor_command* parameter, as this could cause a deadlock.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mksensor** Contains the **mksensor** command

## Examples

1. To create a sensor called **Sensor1** that runs the script **/usr/bin/updateSensor1**, which will update the sensor attributes every 30 seconds (once monitored), enter:

   ```
   mksensor -i 30 Sensor1 "/usr/bin/updateSensor1"
   ```

   The contents of **/usr/bin/updateSensor1** could be something like this:

   ```
   #!/usr/bin/perl
   my $int32 = some_fn_that_generates_i32_value;
   my $string = some_fn_that_generates_string_value;
   print "Int32=$int32 String=$string";
   exit 0;
   ```

A sample condition could be:

```
mkcondition -r IBM.Sensor -s "Name==Sensor1" -e "Int32 > 100" Sensor1Int32
```

Using the response ″**E-mail root anytime**″, a ″start monitoring″ command could be:

```
startcondresp Sensor1Int32 "E-mail root anytime"
```

2. To create a sensor called **Sensor1** with a *sensor_command* value of

   **df -m /var | sed '1d' | sed 's/%//g' | /bin/awk '{ print ″Int32=″$4}'**,

   enter:

   ```
   mksensor Sensor1 "df -m /var | sed '1d' | sed 's/%//g' | /bin/awk \
   '{ print \"Int32=\"\$4}'"
   ```

   When *sensor_command* is enclosed in double quotation marks, you must include a backslash escape character (****) before an ″inner″ double quotation mark. You must also include a **** before a dollar sign (**$**). So in this example, the sensor command substring ″**Int32=**″**$4** becomes ****″**Int32=**″**\$4** when it is part of **mksensor** command.

## Author

cluster@us.ibm.com

## See also

“rmccli ” on page 79, for information about *attr*=*value* syntax

Books: see *RSCT: Administration Guide*, for information about the ACL authorization file and about monitoring resources with the ERRM commands

Commands: **chsensor**, **lssensor**, **mkcondition**, **mkresponse**, **refsensor**, **rmsensor**, **startcondresp**

# refsensor

## Name

**refsensor** — refreshes a sensor defined to the resource monitoring and control (RMC) subsystem.

## Synopsis

**refsensor** [**–a** | **–n** *host1*[**,***host2*...] ] [**–h** ] [ **–v** | **–V** ] *sensor_name* [ *attr1*=*value1* [*attr2*=*value2*] ... ]

## Description

The **refsensor** command refreshes a sensor resource that is defined to the resource monitoring and control (RMC) subsystem. A sensor is an RMC resource that has attributes that can be monitored. The sensor can be refreshed using **refsensor** in one of two ways: either by running the sensor command that is defined for the sensor resource or by specifying values for specific sensor attributes. The sensor must be monitored for **refsensor** to run successfully.

To have **refsensor** update specific sensor attributes, specify one or more *attr*=*value* parameters. Only the attributes specified will be updated. No other sensor attributes will be updated. The sensor attributes that can be specified as parameters are:

**Float32** The type float32 attribute for this sensor resource.

**Float64** The type float64 attribute for this sensor resource.

**Int32** The type int32 attribute for this sensor resource.

**Int64** The type int64 attribute for this sensor resource.

**Quantum** The type quantum attribute for this sensor resource.

**String** The type string attribute for this sensor resource.

**Uint32** The type uint32 attribute for this sensor resource.

**Uint64** The type uint64 attribute for this sensor resource.

For example, to update the sensor attributes **Int32** and **Float32** only for the sensor named **Sensor1**, enter:

```
refsensor Sensor1 Int32=45 Float32=7.8
```

No other sensor attributes will be updated.

When the **refsensor** command runs, it does not affect the interval, if any, that is defined for running the sensor command. That is, if a monitored sensor is being updated every 60 seconds, running **refsensor** does not cause the interval timer to be reset back to 60 seconds.

The **refsensor** command runs on any node. If you want **refsensor** to run on all of the nodes in a domain, use the **-a** option. If you want refsensor to run on a subset of nodes in a domain, use the **-n** option.

## Parameters

*sensor_name*
Specifies the name of the sensor to be refreshed.

*attr*=*value*
Specifies which sensor attributes will be refreshed and the values to which they will be set.

## Options

**–a** Refreshes sensors that match the specified name on all nodes in the domain. The CT_MANAGEMENT_SCOPE environment variable determines the cluster scope. If CT_MANAGEMENT_SCOPE is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management domain and a peer domain exist, **refsensor -a** with CT_MANAGEMENT_SCOPE not set will run in the management domain. In this case, to run in the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–n** *host*
Specifies the node on which the sensor should be refreshed. By default, the sensor is refreshed on the local node. This option is only appropriate in a management domain or a peer domain.

**–h** Writes the command's usage statement to standard output.

**–v** | **–V**
Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the **CT_CONTACT** environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC) daemon on the specified host. If this environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled.

The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An incorrect combination of options and parameters has been entered.

**4** The sensor is not monitored and cannot be refreshed.

**6** No sensor resources were found.

*n* Based on other errors that can be returned by the RMC subsystem.

## Security

The user needs write permission for the **IBM.Sensor** resource class in order to run **refsensor**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/refsensor** Contains the **refsensor** command

## Examples

1. To refresh the sensor called **Sensor1** so that its defined sensor command is run, enter:

   ```
   refsensor Sensor1
   ```

2. To refresh the sensor called **Sensor1** so that **Int32** is set to **50**, **Float32** is set to **123.45**, and **String** is set to ″**test input**″, enter:

   ```
   refsensor Sensor1 Int32=50 Float32=123.45 String="test input"
   ```

## Author

cluster@us.ibm.com

## See also

“rmccli ” on page 79, for information about *attr*=*value* syntax

Books: see *RSCT: Administration Guide*, for information about the ACL authorization file

Commands: **chsensor**, **lssensor**, **mksensor**, **rmsensor**

# rmsensor

## Name

**rmsensor** — removes a sensor from the resource monitoring and control (RMC) subsystem.

## Synopsis

**rmsensor** [**–a** | **–n** *host1*[**,***host2*...] ] [**–h**] [**–v** | **–V**] *sensor_name1* [*sensor_name2*...]

## Description

The **rmsensor** command removes the sensor specified by name from the sensor resource class in the resource monitoring and control (RMC) subsystem.

If the sensor is being monitored, monitoring will be stopped, but the ERRM resources defined for monitoring are not removed. To remove them as well, use the **rmcondition**, **rmresponse**, or **rmcondresp** command against the monitoring resources that were used for this sensor.

The **rmsensor** command runs on any node. If you want **rmsensor** to run on all of the nodes in a domain, use the **-a** option. If you want **rmsensor** to run on a subset of nodes in a domain, use the **-n** option.

## Parameters

*sensor_name1* **[***sensor_name2***...]**
Specifies the names of one or more sensors to remove.

## Options

**–a** Removes sensors that match the specified name on all nodes in the domain. The CT_MANAGEMENT_SCOPE environment variable determines the cluster scope. If CT_MANAGEMENT_SCOPE is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found. For example, if both a management domain and a peer domain exist, **rmsensor -a** with CT_MANAGEMENT_SCOPE not set will run in the management domain. In this case, to run in the peer domain, set CT_MANAGEMENT_SCOPE to 2.

**–n** *host1***[,***host2***...]**
Specifies the node from which the sensor should be removed. By default, the sensor is removed from the local node. This option is only appropriate in a management domain or a peer domain.

**–h** Writes the command's usage statement to standard output.

**–v** | **–V**
Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
When the **CT_CONTACT** environment variable is set to a host name or IP address, the command contacts the resource monitoring and control (RMC)

daemon on the specified host. If this environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The resource class or resources that are displayed or modified by the command are located on the system to which the connection is established.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the the session with the RMC daemon to monitor and control the resources and resource classes. The management scope determines the set of possible target nodes where the resources and resource classes can be monitored and controlled.

The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Exit status

**0** The command has run successfully.

**1** An incorrect combination of options and parameters has been entered.

**6** No sensor resources were found.

*n* Based on other errors that can be returned by the RMC subsystem.

## Security

The user needs write permission for the **IBM.Sensor** resource class in order to run **rmsensor**. Permissions are specified in the access control list (ACL) file on the contacted system. See *RSCT: Administration Guide* for details on the ACL file and how to modify it.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmsensor** Contains the **rmsensor** command

## Examples

1. To remove the sensor **sensor1**, enter:

```
rmsensor sensor1
```

## Author

cluster@us.ibm.com

## See also

Commands: **chsensor**, **lssensor**, **mksensor**, **refsensor**, **rmcondition**, **rmresponse**, or **rmcondresp**

Books: *RSCT: Administration Guide*, for information about the ACL authorization file

# Part 6. Auditing resources

# Chapter 12. Audit log resource manager commands

# lsaudrec

## Name

**lsaudrec** – lists records from the audit log.

## Synopsis

**lsaudrec** [**–l**] [**–a** | **–n** *node_name1*[**,***node_name2*]...] [**–S** *subsystem_name*] [**–s** *selection_string*] [**–x**] [**–h**] [ *field_name1* [*field_name2*...] ]

## Description

You can use the **lsaudrec** command to list records in the audit log. The audit log is a facility for recording information about the system's operation. It can include information about the normal operation of the system as well as failures and other errors. It augments the syslog functionality by conveying the relationship of the error relative to other system activities. All detailed information about failures is still written to the Linux syslog.

Records are created in the audit log by subsystems that have been instrumented to do that. For example, the event response subsystem runs in the background to monitor administrator-defined conditions and then invokes one or more actions when a condition becomes true. Because this subsystem runs in the background, it is difficult for the operator or administrator to understand the total set of events that occurred and the results of any actions that were taken in response to an event. Because the event response subsystem records its activity in the audit log, the administrator can easily view its activity as well as that of other subsystems using this command.

Each record in the audit log contains named fields. Each field contains a value that provides information about the situation corresponding to the record. For example, the field named **Time** indicates the time at which the situation occurred. Each record has a set of common fields and a set of subsystem-specific fields. The common fields are present in every record in the audit log. The subsystem-specific fields vary from record to record. Their names are only significant when used with a subsystem name because they may not be unique across all subsystems. Each record is derived from a template that defines which subsystem-specific fields are present in the record and defines a format string that is used to generate a message describing the situation. The format string may use record fields as inserts. A subsystem typically has many templates.

The field names can be used as variables in a *selection string* to choose which records are displayed. A selection string is an expression that is made up of field names, constants, and operators. The syntax of a selection string is similar to an expression in the C programming language or the SQL ″where″ clause. The selection string is matched against each record using the referenced fields of each record to perform the match. Any records that match are displayed. The selection string is specified with the **-s** option. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

You can also specify field names as parameters to this command to choose which fields are displayed and the order in which they are displayed. The common field names are:

| *Field* | *Description* |
|---|---|
| **Time** | The time when the situation occurred that the record corresponds to. The value is a 64-bit integer and represents the number of microseconds since Unix Epoch (00:00:00 GMT January 1, 1970). See the constants below for specifying the time in more user-friendly formats. |
| **Subsystem** | The subsystem that generated the record. This is a string. |
| **Category** | Indicates the importance of the situation corresponding to the audit record, as determined by the subsystem that generated the record. The valid values are: **0** (informational) and **1** (error). |
| **SequenceNumber** | The unique 64-bit integer that is assigned to the record. No other record in the audit log will have the same sequence number. |
| **TemplateId** | The subsystem-dependent identifier that is assigned to records that have the same content and format string. This value is a 32-bit unsigned integer. |
| **NodeName** | The name of the node from which the record was obtained. This field name cannot be used in a selection string. |

In addition to the constants in expressions that are described in the *RSCT: Administration Guide*, you can use the following syntax for dates and times with this command:

**#***mmddhhmmyyyy*
: This format consists of a sequence of decimal characters that are interpreted according to the pattern shown. The fields in the pattern are, from left to right: *mm* = month, *dd* = day, *hh* = hour, *mm* = minutes, *yyyy* = year. For example, **#010523042004** corresponds to January 5, 11:04 PM, 2004. The fields can be omitted from right to left. If not present, the following defaults are used: year = the current year, minutes = 0, hour = 0, day = 1, and month = the current month.

**#-***mmddhhmmyyyy*
: This format is similar to the previous one, but is relative to the current time and date. For example, the value **#-0001** corresponds to one day ago and the value **#-010001** corresponds to one month and one hour ago. Fields can be omitted starting from the right and are replaced by 0.

The audit records considered for display and matched against the selection string can be restricted to a specific subsystem by using the **-S** option. If this option is specified, the subsystem-specific field names can be used in the selection string in addition to the common field names.

The nodes from which audit log records are considered for display and matched against the selection string can be restricted to a set of specific nodes by using the **-n** option. If this option is specified, the search is limited to the set of nodes listed. Otherwise, the search is performed for all nodes defined within the current management scope, as determined by the CT_MANAGEMENT_SCOPE environment variable.

The audit records are displayed in a table. Field names specified as parameters control which fields are displayed and the order in which they appear on each line. By default, the columns displayed are: the date and time, the subsystem name that generated the record, the severity of the situation, and the subsystem-specific

message that describes the situation. If the management scope is not local, the node name is displayed in the first column.

## Parameters

*field_name1* **[***field_name2***...]**
Specifies one or more fields in the audit log records to be displayed. The order of the field names on the command line corresponds to the order in which they are displayed. If no field names are specified, **Time**, **Subsystem**, **Severity**, and **Message** are displayed by default. If the management scope is not local, **NodeName** is displayed as the first column by default. See the **Description** for information about these and other fields.

## Options

**-l** Indicates that long output should be produced. Long output includes subsystem-specific fields that are not included in the formatted message text.

**-a** Specifies that records from all nodes in the domain are to be displayed. If both the **-n** and the **-a** options are omitted, records from the local node only are displayed.

**-n** *node_name1***[,***node_name2***]...**
Specifies the list of nodes containing audit log records that will be examined and displayed if they meet the other criteria, such as matching the specified selection string. Node group names can also be specified, which are expanded into a list of node names. If both the **-n** and the **-a** options are omitted, records from the local node only are displayed.

**-S** *subsystem_name*
Specifies a subsystem name. If this option is present, only records identified by *subsystem_name* are considered for display. The records displayed can be further restricted by the **-s** option. If the subsystem name contains any spaces, it must be enclosed in single or double quotation marks.

For backward compatibility, the subsystem name can be specified using the **-n** option *only* if the **-a** and the **-S** options are *not* specified.

**-s** *selection_string*
Specifies a selection string. This string is evaluated against each record in the audit log. All records that match the selection string will be displayed. If the selection string contains any spaces, it must be enclosed in single or double quotation marks. For information on how to specify selection strings, see *RSCT: Administration Guide*.

The names of fields in the record can be used in the expression. If the **-S** option is not specified, only the names of common fields can be used. See the **Description** for a list of the common field names and their data types. If the **-S** option is specified, the name of any field for the specified subsystem as well as the common field names can be used.

If this option is omitted, the records that are displayed will depend on the **-S** option. If the **-S** option is omitted, all records from the audit log are displayed. Otherwise, all records for the subsystem identified by the **-S** option are displayed.

**-x** Excludes the header (suppresses header printing).

**-h** Writes the command's usage statement to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon is established. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that can be affected by this command.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines (in conjunction with the **-a** and **-n** options) the management scope that is used for the session with the RMC daemon. The management scope determines the set of possible target nodes where audit log records can be listed. If the **-a** and **-n** options are not specified, local scope is used. When either of these options is specified, CT_MANAGEMENT_SCOPE is used to determine the management scope directly. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

In order to list records from an audit log when the **-S** option is omitted, you must have read access to the target resource class on each node from which records are to be listed. When the **-S** option is specified, you must have read access to the audit log resource corresponding to the subsystem identified by the **-S** option on each node from which records are to be listed.

Authorization is controlled by the RMC access control list (ACL) file that exists on each node.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lsaudrec** Contains the **lsaudrec** command

## Examples

1. To list all records in the audit log on every node in the current management scope as determined by the CT_MANAGMENT_SCOPE environment variable, enter:

   ```
   lsaudrec
   ```

2. To list all records that were logged in the last hour on every node in the current management scope as determined by the CT_MANAGMENT_SCOPE environment variable, enter:

   ```
   lsaudrec -s "Time > #-000001"
   ```

3. To list the time and sequence number of every record in the audit log for the subsystem **abc** on nodes **mynode** and **yournode**, enter:

   ```
   lsaudrec -n mynode,yournode -S abc Time SequenceNumber
   ```

4. To list the records that are generated by the event-response resource manager (ERRM), enter:

   ```
   lsaudrec -SERRM
   ```

5. To list the records that are related to a condition called **Condition1**, enter:

   ```
   lsaudrec -SERRM -s"ConditionName=='Condition1'"
   ```

6. To list the records that are related to an event from **Condition1**, enter:

   ```
   lsaudrec -SERRM -s"ConditionName=='Condition1' && Etype==91"
   ```

7. To list the records that are related to a rearm event from **Condition1**, enter:

   ```
   lsaudrec -s"ConditionName=='Condition1' && Etype==92"
   ```

8. To list error records only, enter:

   ```
   lsaudrec -s"Category=1"
   ```

9. To list the sensor resource manager records in the audit log on the local node, enter:

   ```
   lsaudrec -SSSRM
   ```

   The output will look like this:

```
Time              Subsystem Category Description
11/10/05 21:52:32 SSRM      Error    The Command /SENSOR/sensor.ksh 1 in Sensor SENSOR_NOUSER_1 execution fails.
11/10/05 21:52:36 SSRM      Error    The Command /SENSOR/sensor.nocmd 1 in Sensor SENSOR_NOCMD_1 exits with error 127.
```

10. To list, in long format, the sensor resource manager records in the audit log on the local node, enter:

    ```
    lsaudrec -l -SSSRM
    ```

    The output will look like this:

```
Time        = 11/10/05 21:52:32 243097
Subsystem   = SSRM
Category    = Error
```

```
Description = The Command /SENSOR/sensor.ksh 1 in Sensor SENSOR_NOUSER_1 execution fails.
ErrorMsg    = 2645-202 The user name "guest" that was specified for running the command does not exist.

Time        = 11/10/05 21:52:36 361726
Subsystem   = SSRM
Category    = Error
Description = The Command /SENSOR/sensor.nocmd 1 in Sensor SENSOR_NOCMD_1 exits with error 127.
StandardOut =
StandardErr = ksh: /u/diane/drmc/scripts/SENSOR/sensor.nocmd:  not found
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- how to specify selection strings
- using constants in expressions

Commands: **rmaudrec**

# rmaudrec

## Name

**rmaudrec** – removes records from the audit log.

## Synopsis

**rmaudrec** [**–a** | **–n** *node_name1*[**,***node_name2*]...] [**–S** *subsystem_name*] **–s** *selection_string* [**–h**] [**–V**]

## Description

You can use the **rmaudrec** command to delete records in the audit log. The audit log is a facility for recording information about the system's operation. It can include information about the normal operation of the system as well as failures and other errors. It augments the syslog functionality by conveying the relationship of the error relative to other system activities. All detailed information about failures is still written to the Linux syslog.

Records are created in the audit log by subsystems that have been instrumented to do that. For example, the event response subsystem runs in the background to monitor administrator-defined conditions and then invokes one or more actions when a condition becomes true. Because this subsystem runs in the background, it is difficult for the operator or administrator to understand the total set of events that occurred and the results of any actions that were taken in response to an event. Because the event response subsystem records its activity in the audit log, the administrator can easily view its activity as well as that of other subsystems. In addition, records may sometimes need to be removed explicitly, which can be done using this command.

Each record in the audit log contains named fields. Each field contains a value that provides information about the situation corresponding to the record. For example, the field named **Time** indicates the time at which the situation occurred. Each record has a set of common fields and a set of subsystem-specific fields. The common fields are present in every record in the audit log. The subsystem-specific fields vary from record to record. Their names are only significant when used with a subsystem name because they may not be unique across all subsystems. Each record is derived from a template that defines which subsystem-specific fields are present in the record and defines a format string that is used to generate a message describing the situation. The format string may use record fields as inserts. A subsystem typically has many templates.

The field names can be used as variables in a *selection string* to choose which records are deleted. The selection string is matched against each record using the referenced fields of each record to perform the match. Any records that match will be removed. The selection string is specified with the **-s** option.

A selection string is an expression composed of field names, constants, and operators. The syntax of a selection string is very similar to an expression in the C programming language. For information on how to specify selection strings, see the *RSCT: Administration Guide*.

The common field names are:

| *Field* | *Description* |
|---|---|
| **Time** | Specifies the time when the situation occurred that the record corresponds to. The value is a 64-bit integer and represents the number of microseconds since Unix Epoch (00:00:00 GMT January 1, 1970). See the constants below for specifying the time in more user-friendly formats. |
| **Subsystem** | Specifies the subsystem that generated the record. This is a string. |
| **Category** | Indicates the importance of the situation corresponding to the audit record, as determined by the subsystem that generated the record. The valid values are: **0** (informational) and **1** (error). |
| **SequenceNumber** | Specifies the unique 64-bit integer that is assigned to the record. No other record in the audit log will have the same sequence number. |
| **TemplateId** | Specifies the subsystem-dependent identifier that is assigned to records that have the same content and format string. This value is a 32-bit unsigned integer. |
| **NodeName** | Specifies the name of the node from which the record was obtained. This field name cannot be used in a selection string. |

In addition to the constants in expressions that are described in the *RSCT: Administration Guide*, you can use the following syntax for dates and times with this command:

**#***mmddhhmmyyyy*
: This format consists of a sequence of decimal characters that are interpreted according to the pattern shown. The fields in the pattern are, from left to right: *mm* = month, *dd* = day, *hh* = hour, *mm* = minutes, *yyyy* = year. For example, **#010523042002** corresponds to January 5, 11:04 PM, 2002. The fields can be omitted from right to left. If not present, the following defaults are used: year = the current year, minutes = 0, hour = 0, day = 1, and month = the current month.

**#-***mmddhhmmyyyy*
: This format is similar to the previous one, but is relative to the current time and date. For example, the value **#-0001** corresponds to one day ago and the value **#-010001** corresponds to one month and one hour ago. Fields can be omitted starting from the right and are replaced by 0.

The audit records considered for deletion and matched against the selection string can be restricted to a specific subsystem by using the **-S** option. If this option is specified, the subsystem-specific field names can be used in the selection string in addition to the common field names.

The nodes from which audit log records are considered for deletion can be restricted to a set of specific nodes by using the **-n** option. If this option is specified, the search will be limited to the set of nodes listed. Otherwise, the search will be performed for all nodes defined within the current management scope as determined by the CT_MANAGEMENT_SCOPE environment variable.

It is advisable to first use the **lsaudrec** command with the same **-s** and **-n** option values to list the records that will be deleted. This minimizes the possibility of the selection string matching more records than intended.

## Options

**-a** Specifies that records from all nodes in the domain are to be removed. If both the **-n** and the **-a** options are omitted, records from the local node only are removed.

**-n** *node_name1***[,***node_name2***]...**
Specifies the list of nodes containing audit log records that will be examined and considered for deletion if they meet the other criteria, such as matching the specified selection string. Node group names can also be specified, which are expanded into a list of node names. If both the **-n** and the **-a** options are omitted, records from the local node only will be deleted.

**-S** *subsystem_name*
Specifies a subsystem name. If this option is present, only records identified by *subsystem_name* are considered for deletion. The records to be deleted can be further restricted by the **-s** option. If the subsystem name contains any spaces, it must be enclosed in single or double quotation marks.

For backward compatibility, the subsystem name can be specified using the **-n** option *only* if the **-a** and the **-S** options are *not* specified.

**-s** *selection string*
Specifies a selection string. This string is evaluated against each record in the audit log. If the evaluation results in a non-zero result (**TRUE**), the record is removed from the audit log. If the selection string contains any spaces, it must be enclosed within single or double quotation marks. For information on how to specify selection strings, see *RSCT: Administration Guide*.

The names of fields within the record can be used in the expression. If the **-S** option is not specified, only the names of common fields can be used. See the **Description** for a list of the common field names and their data types. If the **-S** option is specified, the name of any field for the specified subsystem as well as the common field names can be used.

If this option is not specified, no records will be removed from the audit log.

**-h** Writes the command's usage statement to standard output.

**-V** Writes the command's verbose messages to standard error.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon is established. When CT_CONTACT is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If CT_CONTACT is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that can be affected by this command.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT

environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines (in conjunction with the **-a** and **-n** options) the management scope that is used for the session with the RMC daemon. The management scope determines the set of possible target nodes where audit log records can be deleted. If the **-a** and **-n** options are not specified, local scope is used. When either of these options is specified, CT_MANAGEMENT_SCOPE is used to determine the management scope directly. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is *not* set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

If the **-V** option is specified and the command completes successfully, a message indicating the number of records that were deleted will be written to standard error.

## Exit status

**0** The command ran successfully.

**1** An error occurred with RMC.

**2** An error occurred with a command-line interface script.

**3** An incorrect option was entered on the command line.

**4** An incorrect parameter was entered on the command line.

**5** An error occurred that was based on incorrect command-line input.

## Security

In order to remove records from an audit log when the **-S** option is omitted, you must have write access to the target resource class on each node from which records are to be removed. When the **-S** option is specified, you must have write access to the audit log resource corresponding to the subsystem identified by the **-S** option on each node from which records are to be removed.

Authorization is controlled by the RMC access control list (ACL) file that exists on each node.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmaudrec** Contains the **rmaudrec** command

## Examples

1. To remove all records from the audit log on every node in the management scope defined by the CT_MANAGEMENT_SCOPE environment variable, enter:

   ```
   rmaudrec -s "Time > 0"
   ```

   or

   ```
   rmaudrec -s "SequenceNumber >= 0"
   ```

2. To remove all records more than a week old on every node in the management scope defined by the CT_MANAGEMENT_SCOPE environment variable, enter:

   ```
   rmaudrec -s "Time < #-0007"
   ```

3. To remove all records that are more than a day old and created by the **abc** subsystem on nodes **mynode** and **yournode**, enter:

   ```
   rmaudrec -S abc -s "Time < #-0001" -n mynode,yournode
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- how to specify selection strings
- using constants in expressions

Commands: **lsaudrec**

# Part 7. Cluster security

# Chapter 13. Cluster security services commands

# ctaclfck

## Name

**ctaclfck** – verifies the contents of a cluster security services ACL file.

## Synopsis

**ctaclfck -f** *acl_file_name* [**-s**] [**-c**] [**-u** *user_name*] [**-v**] [**-h**]

## Description

The **ctaclfck** command checks the contents of the cluster security services ACL file specified by the **-f** option. The check is limited to syntactical errors; a semantic check is not performed.

The command opens the ACL file, and reads and compiles one ACL entry at a time. If the command encounters an error, it will report the error to standard output. If the **-c** option is provided, the command will continue processing after encountering errors until it reaches the end of the file. Otherwise processing will stop after the first error is found and reported.

The **-u** option directs the command to verify the ACL file contents owned by the specified operating system user identity. The command user must have permission to change to the home directory of the user specified by the **-u** option, and must also have permission to read files in that directory. If the **-s** option is specified along with the **-u** option, the command user must also have permission to set its effective user identity to this identity (see the man page for the operating system command **su** for examples).

When the **-u** option is specified, the file name provided in the **-f** option is expected to be the base name of a file that resides in the home directory of the named user. In this case, the file name specified by the **-f** option must not contain any directory names, including the **./** and **../** directories.

If the **-s** option is specified, the command creates a file to contain the compiled contents of the ACL file. This permits applications to compile the ACL data buffer in advance to starting the application that uses it, saving the application this processing during its startup procedure or its ACL reading process. The compiled ACL file will have the same name as the ACL file with the extension **.cacl**. The ownership and file system permissions of the new ***.cacl** file will be set to the same ownership and permissions as the ACL file. If the ACL file is not currently owned by the command user, the command user must be capable of changing its effective user identity to the identity of the user that owns the ACL file. If the command is unable to do this, it will not create the ACL buffer file, but will complete verification of the ACL file.

The command checks for the correct ACL entry type, for the proper identity format, and for a valid permission. A valid permission is defined as one containing only operations that are defined by the permission template. The permission template set defined by cluster security services and used by this command follows.

| | | | |
|---|---|---|---|
| r | 0x1 | read | generic read operation |
| w | 0x2 | write | generic write operation |
| c | 0x4 | control | generic control operation / RMC refresh configuration operation |
| x | 0x8 | run | generic execute operation |
| C | 0x10 | cancel | generic cancel operation |
| q | 0x20 | query | RMC query resource operation |
| l | 0x40 | list | RMC enumerated resources operation |
| e | 0x80 | event | RMC event registration / unregistration / querying |
| d | 0x100 | define | RMC define / undefine resource operation |
| v | 0x200 | validate | RMC validate resource handle operation |
| s | 0x400 | set | RMC set attribute operation |

If the **-u** option is specified, the command searches for the ACL file in the home directory of the specified user. The user must own the file and the permission must be write-only by the user. When the **-u** option is specified, the ACL file name specified by the **-f** option must not contain a relative or full path to the file; it must specify the file name only.

## Options

**-f** *acl_file_name*
Specifies the cluster security services ACL file to be verified. The file name can be a full or relative path name, unless the **-u** option is specified.

**-s** Caches the ACL buffer (that resulted from the compilation of the ACL file) into a file. If the ACL file is not owned by the command user, the command user must be able to set its effective user identity to the owner of the ACL file.

**–c** Instructs the command to continue after encountering errors until the end of file is reached. All errors encountered will be reported regardless of whether or not the **-v** option is specified. If not specified, command processing will stop after the first error is encountered and reported.

**-u** *user_name*
Specifies the user name in whose home directory the ACL file resides. When this option is used, the file name specified by the **-f** option must be the base name of a file that resides in the named user's home directory; the file cannot contain any directory information, including the **./** and **../** directory names.

**-v** Writes the command's verbose messages to standard output.

**-h** Writes the command's usage statement to standard output.

## Exit status

**0** The command completed successfully.

**1** The command was able to verify the ACL file contents, but was unable to store the compiled ACL buffer into a file.

**4** The caller invoked this command incorrectly, omitting required options and parameters, or using mutually-exclusive options. This command terminated without processing the request.

**6** A memory allocation request failed during the operation of this command. The command was unable to complete the requested action.

**30** The command was unable to obtain exclusive use of the ACL file. Another instance of this command or another application may be running and accessing the ACL file. Retry the command at a later time.

**36** The command user does not have permission to access the ACL file, or to read the contents of the ACL file.

**105** The ACL file could not be located, or the contents of the file are corrupted.

## Security

The file system permission of the ACL file is determined by the end user or the application that owns the file. If the invoker does not have sufficient authority to read the file or to create the requested compiled ACL file with the same ownership, the command fails.

## Restrictions

The **ctaclfck** command works only on ACL files formatted for cluster security services.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctaclfck** Contains the **ctaclfck** command

## Examples

1. To verify the contents of the ACL file **/my_acl_file**:

   ```
   ctaclfck -f /my_acl_file
   ```

2. To verify the contents of the ACL file **../my_acl_file** (relative to the current directory) and provide detailed output:

   ```
   ctaclfck -f ../my_acl_file -v
   ```

3. To completely verify the contents of the ACL file **/u/fluffy/my_acl_file**, which is owned by the operating system user **fluffy**, and store the compiled ACL buffer into a file for later use:

   ```
   ctaclfck -c -u fluffy -f  my_acl_file  -v -s
   ```

## Author

cluster@us.ibm.com

## See also

Commands: **su**

# ctcasd

## Name

**ctcasd** – provides and authenticates RSCT host-based authentication (HBA) security mechanism credentials for the cluster security services.

## Synopsis

**ctcasd** [**-b**]

## Description

The **ctcasd** daemon is used by the cluster security services library when the RSCT HBA security mechanism is configured and active within the cluster environment. The cluster security services use **ctcasd** when service requesters and service providers try to create a secured execution environment through a network connection. **ctcasd** is not used when service requesters and providers establish a secured execution environment through a local operating system connection such as a UNIX domain socket.

When a service requester and a service provider have agreed to use RSCT host-based authentication through the cluster security services, the cluster security services library uses **ctcasd** to obtain and authenticate HBA credentials. Cluster security services does not provide a direct interface to the daemon that can be invoked by user applications.

The **ctcasd** daemon can be started or stopped using system resource controller (SRC) commands.

During startup, the daemon obtains its operational parameters from the **ctcasd.cfg** configuration file. The daemon expects to find this file in the **/var/ct/cfg/** directory. System administrators can modify the operational parameters in this file to suit their needs. If this file is not located, the daemon will use the default configuration stored in **/usr/sbin/rsct/cfg/ctcasd.cfg**.

HBA credentials are derived from the local node's private and public keys. These keys are located in files that are configured in **ctcasd.cfg**. These credentials are encrypted using the public key of the receiving node. Public keys for the nodes within the cluster are stored in a trusted host list file on each node. The location of this file is also defined in the **ctcasd.cfg** configuration file. The system administrator is responsible for creating and maintaining this trusted host list, as well as for synchronizing the lists throughout the cluster.

If the daemon detects that both the node's public and private key files are not present, **ctcasd** assumes that it is being started for the first time and creates these files. The daemon also creates the initial trusted host list file for this node. This file contains an entry for **localhost** and the host names and IP addresses associated with all AF_INET-configured and active adapters that the daemon can detect. Inadvertent authentication failures could occur if the public and private key files were accidentally or intentionally removed from the local system before the daemon was restarted. **ctcasd** creates new keys for the node that do not match the keys stored on the other cluster nodes. If RSCT host-based authentication suddenly fails after a system restart, this is a possible source of the failure.

Critical failures detected by the daemon that cause shutdown of the daemon are recorded to persistent storage. In Linux-based clusters, records are created in the system log.

## Options

**–b** Starts the daemon in bootstrap mode. The daemon runs as a foreground process and is not controlled by the system resource controller (SRC).

## Files

| | |
|---|---|
| **/usr/sbin/rsct/cfg/ctcasd.cfg** | Default configuration for the **ctcasd** daemon |
| **/var/ct/cfg/ctcasd.cfg** | Configuration for the **ctcasd** daemon, which can be modified by the system administrator |
| **/var/ct/cfg/ct_has.pkf** | Default location of the cluster security services public key file for the node |
| **/var/ct/cfg/ct_has.qkf** | Default location of the cluster security services private key file for the node |
| **/var/ct/cfg/ct_has.thl** | Default location of the cluster security services trusted host list for the node |

## Restrictions

- The **ctcasd** daemon does not encrypt the HBA identity credentials.
- Cluster security services supports its own file formats, private key formats, and public key formats only. Cluster security services does not support secured remote shell formats.

## Implementation specifics

This daemon is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

| | |
|---|---|
| **/usr/sbin/rsct/bin/ctcasd** | Contains the **ctcasd** daemon |

## Author

Robert Gensler- cluster@us.ibm.com

## See also

Commands: **ctskeygen**, **startsrc**, **ctsvhbac**, **ctsvhbal**, **ctsvhbar**, **ctsthl**

Files: **ctcasd.cfg**, **ct_has.pkf**, **ct_has.qkf**, **ct_has.thl**

# ctmsskf

## Name

**ctmsskf**– displays and manages the contents of a message security services (MSS) key file.

## Synopsis

**ctmsskf** {**-a** | **-d** | **-l** | **-h**} [**-f** *key_file*] [**-t** *key_type*] [**-v** *key_version*] [**-k** *key_value*]

## Description

The **ctmsskf** command displays and manages the contents of a message security services (MSS) typed key file. Use this command to add a key to, delete a key from, or list the contents of a key file.

**Adding a key:**

When you use this command to add a key entry to a key file, you must specify the following:

- the name of the key file where the key is to be added
- the type of the key to add
- optionally, the version of the key that is to be added to the key file
- the 16-digit value of the key

If the specified key file does not exist, it is created. If the specified key file *does* exist, the **ctmsskf** command verifies that the key type specified for the new key matches the type used by the keys already recorded within the file. Only keys of the same type can be added to an existing key file. When a key is successfully added to the file, that version of the key becomes the *active key version.* If a key version is specified using the **-v** *key_version* option, *key_version* is used as the new version number and is made the active version. If *key_version* is not specified, the key is added using a key version value that is one greater than the previous active key version number.

Existing versions of a key cannot be replaced. To replace an existing version of a key or to change the value of an existing version of a key, that key version must first be deleted using the **-d** option, and then added again using the **-a** option. The command returns an error if you try to add a key that uses a version number already in use by a key within an existing key file. In general, key replacements should only be performed on the value of the key that is currently active, as replacing the value of an older key version makes the older key version active.

Because key versions can be added to the key file in any order, the highest key version number may or may not be the key version that is currently active. Use the **-l** option to determine which key version is currently active for a file.

**Deleting a key:**

When you use this command to delete a key entry from a key file, you must specify the following:

- the name of the key file from where the key is to be deleted
- optionally, the type of key to delete
- optionally, the version of the key to delete

If the key specified is empty, does not exist, or does not have a proper header, the command returns an error. If the key type is specified and it does not match the key type in the header of the, the command returns an error. If the key version is specified, the command locates the record corresponding to the version provided and purges it from the file. If there is no such record, the command returns an error. If no key version is provided, the command purges only the records that are marked as inactive.

**Listing the contents of a key file:**

When you use this command to list the contents of a key file, the following information is displayed:

- the header of the key file.
- the list of keys in the key file.

  The following information is displayed for each key:
  - an indication of whether the record is inactive
  - the version of the key
  - the type of the key
  - the 16-digit value of the key

## Options

**–a** Adds a key to the key file. The **-f**, **-k**, and **-t** options must also be specified.

**–d** Deletes a key from the key file. The **-f** and **-v** options must also be specified. If the **-t** option is specified, the command checks to see if the type of the key file is the same as the key type provided.

**–l** Lists the contents of the key file. The **-f** option must also be specified. If the **-v** option is specified, the command lists only the key that matches the version number provided.

**–f** *key_file*
Specifies the name of the key file. The key file must be a valid key file created by MSS API or by this command.

**–t** *key_type*
Specifies the type of the key to add. If the specified key file is not empty, the command checks to see if the key type specified matches the key type in the header of the key file. The valid key type values are: **3des_md5**, **aes256_md5**, **des_cbc**, **des_md5**, **rsa512_sha**, and **rsa1024_sha**.

**–v** *key_version*
Specifies the version of the key.

**–k** *key_value*
Specifies the 16-digit value of the key.

**–h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-i** option is specified, the list of available key generation methods is displayed. When the **-l** option is specified, one or more keys from the key file are displayed.

## Standard error

Descriptive information for any detected failure condition is written to standard error.

## Exit status

**0** The command completed successfully.

**4** The caller invoked this command incorrectly, omitting required options and parameters, or using mutually-exclusive options. This command terminated without processing the request.

**6** A memory allocation request failed during the operation of this command. The command was unable to complete the requested action.

**9** If the **-a** option was specified, the command detected a key within the key file that used the same version number as the one specified by the **-v** option. If the **-d** option was specified, the command was unable to locate a key in the key file using the version number specified by the **-v** option. The key file was not modified.

**21** The key file could not be located. Verify that the path name for the key file specified by the **-f** option is correct.

**27** The key type specified by the **-t** option does not match the type for keys stored in the file specified by the **-f** option. The requested action was not performed.

**30** **ctmsskf** was unable to obtain exclusive use of the key file. Another instance of this command may be running and attempting to modify the same file, or the process that makes use of this key file may be examining the file. Retry the command at a later time.

**36** The command user does not have sufficient permission to modify the contents of the key file.

**37** The key file appears to be corrupted. Try to list the contents of the file using the **-l** option to verify if the file is corrupted. Follow the problem resolution advice listed in the error message for further recovery action.

## Security

The file system permission of the key files is determined by the application owning the file. If the invoker doesn't have sufficient authority to open the file, the command fails.

## Restrictions

This command works only on MSS-formatted key files.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctmsskf** Contains the **ctmsskf** command

## Examples

1. To view the keys contained in the key file **/my_key_file**, enter:

```
ctmsskf -l -f /my_key_file
```

2. To view the key with version 9 from the key file **/my_key_file**, enter:
   ```
   ctmsskf -l -v 9 -f /my_key_file
   ```
3. To add a key to the key file **/my_key_file**, enter:
   ```
   ctmsskf -a -t des_cbc -f /my_key_file -k 16_digit_value
   ```
4. To delete a key from the key file **/my_key_file**, enter:
   ```
   ctmsskf -d -f /my_key_file -v 10
   ```
5. To delete all inactive keys in the key file **/my_key_file**, enter:
   ```
   ctmsskf -d -f /my_key_file
   ```

## Author

cluster@us.ibm.com

# ctscachgen

## Name

**ctscachgen** – creates or replaces an on-disk version of a key cache.

## Synopsis

**ctscachgen -c** *file-name* [**-f**] [ **-i** | **-n** *enc-key-name* | **-k** *enc-key-value* **-t** *key-type* | **-q** ] [**-m** *key-gen-method*] [**-s** *cache-size*] [**-h**]

## Description

The **ctscachgen** command generates a key cache and stores the completed cache to an on-disk file named in *file-name*. This file can later be used and updated by applications through the **libct_skc** library interfaces.

Options allow you to specify the type of key to be generated, using the mnemonics that are used for symmetric key types by the **ctmsskf** command. You can also specify a key value to be used to encrypt the keys available in this cache. The keys are not encrypted by default. In addition, you can specify the number of keys to be stored in the file.

If the file specified in *file-name* exists, it is overwritten, even if the current contents do not match the options specified on the command line.

## Options

**-c** *file-name*
: Specifies the name of the key cache file. It can be either the full path or the relative path to the current directory.

**-f**
: Instructs the command to overwrite an existing key cache file with the same name without asking the invoker to confirm its overwriting.

**-i**
: Displays information about the key cache file specified with the **-c** option. The information displayed contains the version of the cache file, the read count, the number of keys in the cache, the type of keys in the cache, and whether they are encrypted with a pre-encryption key. This option cannot be used in conjunction with the **-n**, **-k**, **-t**, or **-q** option.

**-n** *enc-key-name*
: Provides the name of the file that contains the encryption typed key. This option cannot be used in conjunction with the **-i**, **-k**, **-t**, or **-q** option.

**-k** *enc-key-value*
: Specifies the key value, expressed in hexadecimal form (**6fe45d20a**, for example), to be used as the pre-encryption key. By default, no pre-encryption key value is used. This option must be used with the **-t** option. It cannot be used in conjunction with the **-i**, **-n**, or **-q** option.

**-t** *key-type*
: Provides the type of the encryption key specified by the **-k** option. The valid key types are: **3des_md5**, **aes256_md5**, **des_cbc**, **des_md5**, **rsa512_sha**, and **rsa1024_sha**. This option must be used with the **-k** option. It cannot be used in conjunction with the **-i**, **-n**, or **-q** option.

**–q**
: Instructs the command to use the host's HBA private key as encryption key used for pre-encrypting the session keys in the on-disk key cache file. This option cannot be used in conjunction with the **-i**, **-k**, **-t**, or **-n** option.

**-m** *key-gen-method*
Provides the session key generation method. Valid values are: **3des_md5**, **aes256_md5**, and **des_md5**. If you do not specify this option, the default method for generating the session keys is **des_md5**.

**-s** *cache-size*
Provides the size of the on-disk key cache file in terms of number of keys in the cache. If you do not specify this option, the default cache size is 128 keys.

**–h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-i** option is specified, information about the key cache file is written to standard output.

## Standard error

Descriptive information for any detected failure condition is written to standard error.

## Exit status

Upon successful completion, the command returns an exit status code of **0** and generates an on-disk key cache file. In the event of a failure, the routine returns the error code and may remove the existing key cache file that the invoker wants to overwrite.

**0** The command completed successfully.

**4** Options are mismatched or not valid. *file-name* remains unmodified.

**6** A memory allocation request failed during the operation of this command. The command was unable to complete the requested action.

**12** The command user cannot remove the existing key cache file (*file-name* remains unmodified) or access or write to the directory where *file-name* resides.

**21** There is not enough space to store *file-name* or the *file-name* contents appear corrupt.

**27** The key stored in the file specified by the **-c** option is not valid or is corrupted. *file-name* remains unmodified.

**36** The invoker cannot access the file specified by the **-c** option. *file-name* remains unmodified.

## Security

Permissions on the **ctscachgen** command permit only **root** to run the command.

## Restrictions

- On-disk key caches are intended to be used solely upon the system on which they were generated. They are not intended to be shared between systems or migrated to another system. If multiple systems access the same key cache file, the protections offered by these keys is lost, because multiple systems and applications have access to information that is supposed to remain secret to a specific application. Therefore, any files created by this command should not be stored in shared file systems or networked file systems.

- Files generated by this command are generated in a host-ordered binary format. This format makes it impossible for a key cache file generated on one architecture (such as a POWER™ platform) to be used on a different architecture (such as an Intel® platform).

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctscachgen**
Contains the **ctscachgen** command

## Author

cluster@us.ibm.com

## See also

Commands: **ctmsskf**

# ctsidmck

## Name

**ctsidmck** – verifies the cluster security library identity mapping.

## Synopsis

**ctsidmck -h** | **-i** | { [ **-dl** | **-dm** | **-dh** ] **-m** *security_mechanism network_ID* }

## Description

A system administrator can use the **ctsidmck** command to verify the mapping that would be obtained by the cluster security library (**libct_sec**) for a specific security network identifier.

The cluster security library establishes a security context through the exchange between a client of a trusted service and the trusted service server. During the creation of the security context, the cluster security library tries to map the client application's security network identity to an identity that may be present on the server node, called the *mapped identity.* The cluster security library uses the mapped identity later on the server in authorization functions such as access control verification. Whether the client application has a mapped identity on the server depends on whether the following identity mapping definition files are present on the server, and whether any of the entries within these files correspond to the security identity being used by the client application:

- **/usr/sbin/rsct/cfg/ctsec_map.global**
- **/var/ct/cfg/ctsec_map.local**
- **/var/ct/cfg/ctsec_map.global**

The location of definitions within these files is important; entries at the head of the file are processed before entries positioned towards the end of the file. The definition rules also allow for wildcarding of entry information and for expansion of certain reserved words. If a definition is incorrectly specified within one of these files, the mapping result may not be as intended. Also, if a definition is positioned after another definition that can successfully map a security network identifier, the mapping result may not be as intended.

ctsidmck allows an administrator to verify that the correct identity mapping definition is used by the cluster security library to map a security network identity. This command is to be executed on the system that would act as the server. By specifying a security network identifier to this command on the server, the administrator can determine what the mapped identity for that security network identity would be on that system, and what entry was used from the identity mapping definition files to obtain this mapping.

## Parameters

*network_ID*
: Specifies the security network identifier to be mapped. This should be an identity that can be assumed by a client application of a trusted service.

## Options

**–h** Writes the command's usage statement to standard output.

**–i** Displays a list of the supported security mechanisms on this system. The

command examines the cluster security library configuration on this node, obtains a list of supported security mechanisms, and displays this list. The mechanisms are listed by the mnemonic used by the cluster security library to refer to these mechanisms.

**–d** Specifies the level of detail in the command output. One of three levels of detail is permitted:

1. low (**l**): the command will only display the mapped identity for *network_ID*. This is the default detail level.
2. medium (**m**): the command will display the mapped identity for *network_ID*, as well as the entry from the identity mapping definition files that yielded the map.
3. high (**h**): the command will display every entry from the identity mapping definition files that is processed until a mapped identity for *network_ID* is found, or until all entries are processed.

**-m** *security_mechanism*

Specifies the security mechanism that was used to create the security network identifier provided by *network_ID*. *security_mechanism* is a mnemonic that would be used by the cluster security library to refer to this security mechanism. This option must be specified when the **-h** and the **-i** options are not provided.

Use the **-i** option to display a list of the security mechanisms that this system supports.

## Files

**/usr/sbin/rsct/cfg/ctsec_map.global**
The default identity mapping definition file. This file contains definitions required by the RSCT cluster trusted services in order for these systems to execute properly immediately after software installation. This file is ignored if the cluster-wide identity mapping definition file **/var/ct/cfg/ctsec_map.global** exists on the system. Therefore, any definitions within this file should also be included in the cluster-wide identity mapping definition file, if that file exists.

**/var/ct/cfg/ctsec_map.local** Local override to the cluster-wide identity mapping definitions. Definitions within this file are not expected to be shared between nodes within the cluster.

**/var/ct/cfg/ctsec_map.global** Cluster-wide identity mapping definitions. This file is expected to contain identity mapping definitions that are common throughout the cluster. If this file exists on the system, the default identity mapping definition file is ignored. Therefore, if this file exists, it should also contain any entries that would also be found in the default identity mapping definition file.

## Standard output

The **ctsidmck** command writes any mapped identity found for the security network identifier to standard output. If a medium or high level of detail is requested, any definitions displayed by this command are also written to standard output.

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

Descriptive information for any detected failure condition is written to standard error.

## Exit status

**0** This command successfully found a mapped identity for *network_ID*.

**3** This command detected a failure in the operation of the cluster security library mechanism pluggable module (MPM) corresponding to the security mechanism that was requested. **ctsidmck** was unable to search for a possible mapped identity for *network_ID* in this case. This failure may be accompanied by descriptive output indicating the nature of the MPM failure. Consult this output and perform any recommended actions.

**4** The caller invoked this command incorrectly, omitting required options and parameters, or using mutually-exclusive options. **ctsidmck** terminated without trying to find a mapped identity for *network_ID*.

**6** A memory allocation request failed during the operation of this command. **ctsidmck** was unable to search for a possible mapped identity for *network_ID* in this case.

**21** This command was unable to locate any of the identity mapping definition files on the local system. **ctsidmck** was unable to search for a possible mapped identity for *network_ID* in this case. Verify that at least one identity mapping definition file exists on the system.

**22** This command was unable to dynamically load the cluster security library mechanism pluggable module (MPM) corresponding to the security mechanism what was requested. The module may be missing, corrupted, or one of the shared libraries used by this module may be missing or corrupted. **ctsidmck** was unable to search for a possible mapped identity for *network_ID* in this case. This failure may be accompanied by descriptive output indicating the nature of the MPM failure. Consult this output and perform any recommended actions.

**37** At least one of the identity mapping definition files on the system appears to be corrupted. The command was unable to search for a possible mapped identity for *network_ID* in this case. Verify that none of the identity mapping files are corrupted, truncated, or contain syntax errors.

**38** ctsidmck could not locate a mapped identity for *network_ID*. No entry within any of the identity mapping definition files yielded a mapped identity for the specified security network identifier.

## Security

This command is executable only by the root system user and members of the system user group. It is intended for administrator use only, to verify the security configuration of the system. Because the output of the command could be used as a means for determining how to sabotage or circumvent system security, the permissions on this command should not be altered.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctsidmck** Contains the **ctsidmck** command

## Examples

1. To get a list of the security mechanisms that the local system supports, before verifying an identity map, enter:

   ```
   ctsidmck -i
   ```

2. To get only the mapped identity for the RSCT host-based authentication (HBA) mechanism security network identity **zathras@greatmachine.epsilon3.org**, enter:

   ```
   ctsidmck -m unix zathras@greatmachine.epsilon3.org
   ```

3. To see every identity mapping definition that the command checks while searching for a mapped identity for the HBA mechanism's security network identity **glorfindel@rivendell.elvin.net@endor**, enter:

   ```
   ctsidmck -d h -m unix glorfindel@rivendell.elvin.net@endor
   ```

## Author

cluster@us.ibm.com

## See also

Files: **ctsec_map.global**, **ctsec_map.global**

# ctskeygen

## Name

**ctskeygen** – generates cluster security services private and public keys for the local system and stores these keys in locally-mounted files.

## Synopsis

**ctskeygen -n** [**-f**] [ **-m** *method* ] [ **-p** *public-file* ] [ **-q** *private-file* ] | **-d** | **-i** | **-h**

## Description

The **ctskeygen** command generates host identifier keys — a private key and public key pair — to be used by the cluster security services library (**libct_sec**) in RSCT host-based authentication (HBA). The command creates a new private key for the node, derives a public key from the new private key, and stores these keys to files on the local node.

Whenever the node's private and public keys are modified, the node's new public key must be distributed to all nodes within the cluster and placed in the trusted host list files on these nodes, replacing the previous value stored there for this node. If this is not done, the node that has generated new private and public keys will be unable to authenticate with other nodes in the cluster using RSCT host-based authentication.

## Options

**–n** Generates host identifier keys (private and public keys).

*–f* Forces **ctskeygen** to record the keys it generates to the private and public key files if these files already exist. By default, the command will not overwrite these files if they exist, because the presence of the files indicates that the cluster security services service may be active. Removing or modifying these files without informing other nodes of the change in the public key value will cause failures in RSCT host-based authentications on this node. This option is not valid with the **-h** or the **-i** option.

**–m** *method*
Instructs the command to use the specified key generation method in creating the host identifier keys. Valid parameters for this option can be displayed using the **-i** option. This option is not valid with the **-h** and **-i** options.

**–p** *public-file*
Specified the fully-qualified path name of the file to be used to store the local host's public key. If this file exists, the command will not overwrite the contents of this file unless the **-f** option is also specified. If the **-p** option is not specified, the command records this key to the **/var/ct/cfg/ct_has.pkf** file. This option is not valid with the **-h** and **-i** options.

*–q private-file*
Specified the fully qualified path name of the file to be used to store the private key of the local host. If this file exists, the command will not overwrite the contents of this file unless the **-f** option is also specified. If the **-q** option is not specified, the command records this key to the file **/var/ct/cfg/ct_has.qkf**. This option is not valid with the **-h** and **-i** options.

**–d** Displays the current public key value for the local system.

**–i** Displays information about the key generation methods supported by this version of the command. **ctskeygen** displays messages to indicate which values are currently supported as arguments to the **-m** option, and what the command will use as a default setting for the **-m** option.

**–h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-d** option is specified, the public key value stored in the public key file is written to standard output.

## Standard error

Descriptive information for any detected failure condition is written to standard error.

## Exit status

**0** The command completed successfully.

**4** The caller invoked this command incorrectly, omitting required options and parameters, or using mutually-exclusive options. This command terminated without processing the request.

**6** A memory allocation request failed during the operation of this command. The command was unable to complete the requested action.

**12** The command user does not have sufficient permission to view or modify the contents of the key file.

**21** The key file could not be located or could not be created.

**30** **ctskeygen** was unable to obtain exclusive use of the public or private key file. Another instance of this command may be running and attempting to modify the keys, or the **ctcasd** daemon may be examining these files. Retry the command at a later time.

**37** The public or private key file appears to be corrupted. Try to view the public key value using the **-d** option to verify if the file is corrupted. Follow the problem resolution advice listed in the error message for further recovery action.

## Security

Permissions on the **ctskeygen** command permit only **root** to run the command.

## Restrictions

- Cluster security services supports its own file formats, private key formats, and public key formats only.
- Trusted host lists are modifiable using the **ctsthl** command only.
- Cluster security services does not provide an automated utility for creating, managing, and maintaining trusted host lists throughout the cluster. This is a procedure left to either the system administrator or the cluster management software.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

**ctskeygen**

## Location

**/usr/sbin/rsct/bin/ctskeygen** Contains the **ctskeygen** command

## Examples

1. To obtain the list of supported key generation methods:
   ```
   ctskeygen -i
   ```
2. To create new host identifier keys for the local system using the default settings:
   ```
   ctskeygen -n
   ```
3. To create new host identifier keys for the local system using 512-bit RSA private keys, storing these keys in locations other than the default location:
   ```
   ctskeygen -n -m rsa512 -p /mysec/public -q /mysec/private
   ```

## Author

Robert Gensler - cluster@us.ibm.com

## See also

Commands: **ctsthl**, **ctsvhbac**

Daemons: **ctcasd**

Files: **ct_has.pkf**, **ct_has.qkf**, **ct_has.thl**

# ctsthl

## Name

**ctsthl** – displays and modifies the contents of a cluster security services trusted host list file.

## Synopsis

**ctsthl** {**-a** | **-d** | **-h** | **-l** | **-s** } [ **-f** *trusted_host_list_file* ] [ **-n** *host_name* ] [ **-m** *method* ] [ **-p** *identifier_value* ]

## Description

This command displays and modifies the contents of a cluster security services trusted host list file. Unless the **-f** option is provided, the command performs its operations on the trusted host list file configured in the **ctcasd.cfg** file. **ctsthl** allows the command user to add, modify, or remove entries in the trusted host list for specific hosts. When a host is added or modified, the command user must provide the following information:

- The identity of the host (**zathras.ibm.com** or **129.34.128.54**, for example)
- The host identifier value to be used for this host, in a character string format representing the identifier's hexadecimal value (**b87c55e0**, for example)
- The method that was used to generate the host identifier (see the description of the **ctskeygen -i** command)

The command validates the generation method name, converts the character string representation to binary form, and creates a new entry within the trusted host list file for this host. Generally, the host identifier value is quite large. For instance, the character representation of a RSA 1024-bit generated identifier is over 256 characters in size.

When the contents of the trusted host list file are displayed, **ctsthl** provides the following information for each entry:

- The network identity of the host
- The host identifier value for that host, represented as a character string
- The method used to generate the host identifier

## Options

**–a** Adds to or replaces a host entry in the trusted host list. The **-n**, **-m**, and **-p** options also must be provided. If the host specified already exists in the trusted host list file, the entry for that host is modified to match the information provided to this command.

**–d** Removes a host's entry from the trusted host list file. The **-n** option also must be provided to indicate the host being removed.

**–h** Writes the command's usage statement to standard output.

**–l** Instructs the command to list the contents of the trusted host list file. If this option is combined with the **-a** or **-d** options, the contents are displayed after these options are processed. If this option is combined with the **-s** option, any new entries made by the command are displayed, as well as any public key mismatches detected for host names and IP addresses supported by the local system.

**–f** *trusted_host_list_file*
Specifies the fully-qualified path name of the trusted host list file. If this option is not provided, the trusted host list file configured in the **ctcasd.cfg** file is used.

**–n** *host_name*
Specifies the identity of the host to be used in this operation. The identity should be a host name or IP address specification by which the host is known to the cluster's network.

**–m** *method*
Instructs the command to use the specified key generation method in creating the host identifier keys. You can use the **ctskeygen -i** command to display valid values for *method*.

**–p** *identifier_value*
Specifies the host identifier value to be stored for the host. This is a character string that represents the hexadecimal value of the host identifier to be stored for this identifier. For example, if the host identifier value is **0xB87C55E0**, this option would be specified as **-p b87c55e0**.

**–s** Explores the local system for all known IP addresses and host names associated with AF_INET-configured and active adapters that the daemon can detect. For any host name or IP address on the local system that is not found in the local system's trusted host list file, an entry is added to associate that value with the local system's public key value.

## Files

| | |
|---|---|
| **/usr/sbin/rsct/cfg/ctcasd.cfg** | Default configuration for the **ctcasd** daemon |
| **/var/ct/cfg/ctcasd.cfg** | Configuration for the **ctcasd** daemon, which can be modified by the system administrator |

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-l** option is specified, the contents of the trusted host list file are written to standard output.

## Standard error

Descriptive information for any detected failure condition is written to standard error.

## Exit status

**0** The command completed successfully.

**4** The caller invoked this command incorrectly, omitting required options and parameters, or using mutually exclusive options. This command terminated without processing the request.

**6** A memory allocation request failed during the operation of this command. The command was unable to complete the requested action.

**10** The command was unable to locate any configured and active network (AF_INET) interfaces for the local system while processing the **-s** option. The local system's identities may not be properly recorded to the trusted host list. Verify that at least one AF_INET or AF_INET6 interface is defined and active on the local system and reissue the command.

**12** The command user does not have sufficient permission to view or modify the contents of the trusted host list file.

**21** The trusted host list file could not be located, or could not be extended to contain a new public key value.

**30** **ctsthl** was unable to obtain exclusive use of the trusted host list file. Another instance of this command may be running and attempting to modify the keys, or the **ctcasd** daemon may be examining these files. Retry the command at a later time.

**31** The public key value specified by the **-p** option does not end on a full byte boundary. Make sure the value contains an even number of digits.

**37** The key file appears to be corrupted. Try to view the public key value using the **-d** option to verify if the file is corrupted. Follow the problem resolution advice listed in the error message for further recovery action.

## Security

Permissions on the **ctsthl** command permit only **root** to run the command.

## Restrictions

- Cluster security services supports its own host identifier format and trusted host list file format only.
- Trusted host lists are modifiable using this command only.
- Cluster security services does not provide an automated utility for creating, managing, and maintaining trusted host lists throughout the cluster. This is a procedure left to either the system administrator or the cluster management software.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctsthl** Contains the **ctsthl** command

## Examples

1. To view the contents of the trusted host contained in the file **/mythl**, enter:

   ```
   ctsthl -l -f /mythl
   ```

2. To add an entry to the default trusted host list file for the system **zathras.ibm.com**, enter:

   ```
   ctsthl -a -n zathras.ibm.com -m rsa1024 -p 120400a9...
   ```

   Note that this example does not complete the entire identifier value.

3. To add an entry to the default trusted host list file for the system **129.23.128.76**, enter:

   ```
   ctsthl -a -n 129.23.128.76 -m rsa1024 -p 120400a9...
   ```

   Note that this example does not complete the entire identifier value.

4. To remove an entry for zathras.ibm.com from the default trusted host list, enter:

   ```
   ctsthl -d -n zathras.ibm.com
   ```

## Author

cluster@us.ibm.com

## See also

Commands: **ctskeygen**

Daemons: **ctcasd**

Files: **ctcasd.cfg**

Books: see the cluster security topics in *RSCT: Administration Guide*

# ctsvhbac

## Name

**ctsvhbac** – verifies the configuration for the RSCT host-based authentication (HBA) security mechanism on the local system.

## Synopsis

**ctsvhbac** [ [**-d** | **-h** | **-m** | **-s** ] | [ **-e** *msgnum*[,*msgnum*...] ] [ **-l** { **1** | **2** | **3** | **4** } | **-b** ] [**-p** *pubkeyfile*] [**-q** *pvtkeyfile*] [**-t** *thlfile*] ]

## Description

The **ctsvhbac** command is a verification utility for the RSCT host-based authentication (HBA) security mechanism. Use the **ctsvhbac** command to verify that the local system has configuration and credential files and information, such as private keys and a trusted host list, ready for the HBA security mechanism to use.

This command performs the following series of tests on the configuration of the HBA security mechanism:

- Verifies that the HBA mechanism configuration file is available and can be processed.
- Verifies that the HBA private key file exists and can be processed.
- Verifies that the HBA public key file exists and can be processed.
- Verifies that the private and public keys for the local system are in pair, which means that the public key is known to be derived from the private key.
- Verifies that the HBA trusted host list file exists and can be processed.
- Checks the contents of the HBA trusted host list for all of the host names and network addresses supported by the local node, determining whether entries exist in the trusted host list file for them. If a host name or network address is found, the command verifies that the same public key value that was used in earlier tests is listed for the name or address.

The command user may specify the private key file, public key file, and trusted host list file to use in the command. By default, this information is extracted from the configuration file for the HBA security mechanism.

For more detailed information about configuration requirements for authentication, see the cluster security topics in *RSCT: Administration Guide*.

## Parameters

None.

## Options

**-b** Produces brief output. When this option is used, the command displays only summary output of the tests and any errors detected. Further details of any errors can be determined by reissuing this command without this option. If the **-l** option is specified, this option is ignored.

**-d** Displays the list of probes required for successful execution of this command.

**-e** Specifies a list of error messages that are not to be displayed by

this command during its execution. One or more message numbers may be specified. Message numbers must be in the xxxx-yyy format. Multiple messages are to be separated by commas (,) with no white space characters.

**-h** Displays a help message for this command.

**-l** Allows the Cluster System Management (CSM) Probe Infrastructure to set the detail level of the output. Accepted levels are:

**1** Verbose mode. Displays the command purpose summary and status information for all tests.

**2** Displays the command purpose summary and any attention or error conditions detected in any tests.

**3** Displays any attention or error conditions detected in any tests.

**4** Silent mode. Displays errors detected during the tests.

**-m** Displays a detailed description of the command and its purpose.

**-p** Specifies the path name of the public key file that is to be used by the command. If this option is not specified, the command will use the public key file currently configured for the HBA security mechanism.

**-q** Specifies the path name of the private key file that is to be used by the command. If this option is not specified, the command will use the private key file currently configured for the HBA security mechanism.

**-s** Displays a summary of the purpose for the command.

**-t** Specifies the path name of the trusted host list file that is to be used by the command. If this option is not specified, the command will use the trusted host list file currently configured for the HBA security mechanism.

## Exit status

Exit status conforms to the CSM Probe Infrastructure conventions.

**0** No problems detected. Any messages displayed either are informational or indicate only minor alerts. No administration intervention is required.

**10** No problems were detected, but some items found warrant administrator attention. This exit status most commonly occurs if an IP address or host name supported by the local system is not listed in the trusted host list, or is listed with an incorrect public key value. For this exit status, the system administrator should examine the output to determine which conditions were detected, and whether they require corrective action.

To correct the most commonly reported conditions:

- Ensure that any IP addresses or host names that are not in the trusted host list were purposely omitted. If not, update the trusted host list on the local system.
- Repair any entries for local IP addresses and host names that use incorrect public keys.

**20** One or more problems were detected. This exit status occurs for the following conditions:

- The HBA security mechanism is configured incorrectly.
- Public and private keys might not be in pair.
- The trusted host list contains none of the IP address or host name values supported by the local system.

Unless these conditions are corrected, authentication requests using the HBA mechanism probably will not be successful on this system. For this exit status, the system administrator must examine the command output to identify and resolve reported problems. To correct reported problems, follow the problem-resolution advice listed in the command output.

**127** Unexpected failure in this command. For this exit status, the administrator should verify that at least one network interface is both configured and active on this system.

## Security

Permissions on the **ctsvhbac** command permit members of the **bin** user group to execute this command.

## Implementation specifics

This command is part of the RSCT cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctsvhbac** Contains the **ctsvhbac** command

## Examples

To verify the HBA security mechanism, enter:

```
ctsvhbac
```

The output would look like this:

```
-------------------------------------------------------------------------
Host Based Authentication Mechanism Verification Check

Private and Public Key Verifications

      Configuration file:  /usr/sbin/rsct/cfg/ctcasd.cfg
                  Status:  Available
                Key Type:  rsa512
                           RSA key generation method, 512-bit key

        Private Key file:  /var/ct/cfg/ct_has.qkf
                  Source:  Configuration file
                  Status:  Available
                Key Type:  rsa512
                           RSA key generation method, 512-bit key

         Public Key file:  /var/ct/cfg/ct_has.pkf
                  Source:  Configuration file
                  Status:  Available
                Key Type:  rsa512
                           RSA key generation method, 512-bit key

               Key Parity:  Public and private keys are in pair

Trusted Host List File Verifications

  Trusted Host List file:  /var/ct/cfg/ct_has.thl
                  Source:  Configuration file
```

```
                    Status:  Available

                  Identity:  avenger.pok.ibm.com
                    Status:  Trusted host

                  Identity:  9.117.10.4
                    Status:  Trusted host

                  Identity:  localhost
                    Status:  Trusted host

                  Identity:  127.0.0.1
                    Status:  Trusted host

Host Based Authentication Mechanism Verification Check completed
```

## See also

Commands: **ctskeygen**, **ctsthl**, **ctsvhbal**, **ctsvhbar**

Files: **ctcasd.cfg**, **ct_has.pkf**, **ct_has.qkf**, **ct_has.thl**

Books: See the cluster security topics in *RSCT: Administration Guide*

# ctsvhbal

## Name

**ctsvhbal** – displays the possible identities that the local system may use to identify itself in RSCT host-based authentication (HBA) security mechanism credentials.

## Synopsis

**ctsvhbal** [ [ **-d** | **-h** | **-m** | **-s** ] | [ **-e** *msgnum*[,*msgnum*...] ] [ **-l** { **1** | **2** | **3** | **4** } | **-b** ]

## Description

The **ctsvhbal** command is a verification utility for the RSCT host-based authentication (HBA) security mechanism. It displays the possible identities that the local system may use to identify itself in HBA credentials.

The HBA security mechanism might use either a host name or a network address value as part of the identification information within a credential, depending on the method chosen by the application. If the local system is to service requests from remote systems, at least one network address and host name for that remote system must appear in the trusted host list on the local system. To verify that the remote system can successfully authenticate the local system, system administrators use a combination of RSCT cluster security commands:

1. On both the local and remote system, issue the **ctsvhbac** command to verify that each system has a valid HBA security mechanism configuration.
2. On the local system, issue the **ctsvhbal** command to determine the values that the HBA security mechanism will use to identify this host to a remote system.
3. On the remote system, issue the **ctsvhbar** command, specifying the local system host name or IP address, to determine the value that the remote system will use to verify HBA credentials transmitted from the local system.
4. Compare the **ctsvhbal** and **ctsvhbar** command output to determine whether the two systems are using the same scheme for host-name resolution. If an exact host-name match does not appear in the output, repair the host-name resolution scheme, and repeat the steps above until both commands yield an exact match.

Completing these steps verifies successful authentication in one direction; in other words, the procedure verifies only that the remote system can authenticate requests from the local system. Because RSCT subsystems often use mutual authentication, system administrators also should verify that the local system can successfully authenticate the remote system. To complete the verification, the following additional steps are required:

- On the remote system, issue the **ctsvhbal** command to determine the values that the HBA security mechanism will use to identify that host to the local system.
- On the local system, issue the **ctsvhbar** command, specifying the remote system host name or IP address, to determine the value that the local system will use to verify HBA credentials transmitted from the remote system.
- Compare the **ctsvhbal** and **ctsvhbar** command output to determine whether the two systems are using the same scheme for host-name resolution. If an exact host-name match does not appear in the output, repair the host-name resolution scheme, and repeat the steps above until both commands yield an exact match.

Completing these additional steps verifies successful authentication when traffic flows in the opposite direction, from the remote system to the local system.

For more detailed instructions and examples, see the cluster security topics in *RSCT: Administration Guide*.

## Options

**-b** Produces brief output. When this option is used, the command displays only the host identities found for the local system and any errors detected. If the **-l** option is specified, this option is ignored.

**-d** Displays the list of probes required for successful execution of this command.

**-e** Specifies a list of error messages that are not to be displayed by this command during its execution. One or more message numbers may be specified. Message numbers must be in the *nnnnxxxx-yyy format. Multiple messages are to be separated by commas (,) with no white space characters.*

**-h** Displays a help message for this command.

**-l** Allows the Cluster System Management (CSM) Probe Infrastructure to set the detail level of the output. Accepted levels are:

- **1** Verbose mode. Displays the command purpose summary and status information for all tests.
- **2** Displays the command purpose summary and any attention or error conditions detected in any tests.
- **3** Displays any attention or error conditions detected in any tests.
- **4** Silent mode. Displays errors detected during the tests.

**-m** Displays a detailed description of the command and its purpose.

**-s** Displays a summary of the purpose for the command.

## Exit status

Exit status conforms to the CSM Probe Infrastructure conventions.

**0** No problems detected. Any messages displayed are informational. No administration intervention is required.

**10** No problems were detected, but the local system is unable to authenticate itself to any remote systems. The local system does not have any active network interfaces, which is a configuration that RSCT permits. For this exit status, however, the system administrator should verify that this configuration is appropriate.

**20** One or more problems were detected. Host-name resolution mechanisms that the local system uses are unable to obtain host names of network interfaces that the local system supports. Unless this condition is corrected, authentication requests using the HBA mechanism probably will not be successful on this system. For this exit status, the system administrator should follow the problem-resolution advice listed in the command output.

**127** Unexpected failure in this command.

## Security

Permissions on the **ctsvhbal** command permit members of the **bin** user group to execute this command.

## Implementation specifics

This command is part of the RSCT cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctsvhbal** Contains the **ctsvhbal** command

## Examples

To display the possible identities that the local system may use to identify itself in HBA credentials, enter:

```
ctsvhbal
```

Output would be similar to:

```
ctsvhbal: The Host Based Authentication (HBA) mechanism identities for
the local system are:

                  Identity:  zathras.pok.ibm.com

                  Identity:  9.127.100.101

ctsvhbal: At least one of the above identities must appear in the
trusted host list on the node where a service application resides in order
for client applications on the local system to authenticate successfully.
Ensure that at least one host name and one network address identity from the
above list appears in the trusted host list on the service systems used by
applications on this local system.
```

## See also

Commands: **ctskeygen**, **ctsthl**, **ctsvhbac**, **ctsvhbar**

Books: See the cluster security topics in *RSCT: Administration Guide*

# ctsvhbar

## Name

**ctsvhbar** – returns the host name that the RSCT host-based authentication (HBA) security mechanism uses on the local node to verify credentials from a specified host.

## Synopsis

**ctsvhbar** [ [ **-d** | **-h** | **-m** | **-s** ] | [ **-e** *msgnum*[,*msgnum*...] ] [ **-l** { **1** | **2** | **3** | **4** } | **-b** ] {*hostname* | *address*} [*hostname*... | *address*...]

## Description

The **ctsvhbar** command is a verification utility for the RSCT host-based authentication (HBA) security mechanism. Use this command when you need to determine which host name the HBA security mechanism uses to verify credentials from a remote system.

The HBA security mechanism might use either a host name or a network address value as part of the identification information within a credential, depending on the method chosen by the application. If the local system is to service requests from remote systems, at least one network address and host name for that remote system must appear in the trusted host list on the local system. To verify that the remote system can successfully authenticate the local system, system administrators use a combination of RSCT cluster security commands:

1. On both the local and remote system, issue the **ctsvhbac** command to verify that each system has a valid HBA security mechanism configuration.
2. On the local system, issue the **ctsvhbal** command to determine the values that the HBA security mechanism will use to identify this host to a remote system.
3. On the remote system, issue the **ctsvhbar** command, specifying the local system host name or IP address, to determine the value that the remote system will use to verify HBA credentials transmitted from the local system.
4. Compare the **ctsvhbal** and **ctsvhbar** command output to determine whether the two systems are using the same scheme for host-name resolution. If an exact host-name match does not appear in the output, repair the host-name resolution scheme, and repeat the steps above until both commands yield an exact match.

Completing these steps verifies successful authentication in one direction; in other words, the procedure verifies only that the remote system can authenticate requests from the local system. Because RSCT subsystems often use mutual authentication, system administrators also should verify that the local system can successfully authenticate the remote system. To complete the verification, the following additional steps are required:

- On the remote system, issue the **ctsvhbal** command to determine the values that the HBA security mechanism will use to identify that host to the local system.
- On the local system, issue the **ctsvhbar** command, specifying the remote system host name or IP address, to determine the value that the local system will use to verify HBA credentials transmitted from the remote system.
- Compare the **ctsvhbal** and **ctsvhbar** command output to determine whether the two systems are using the same scheme for host-name resolution. If an exact host-name match does not appear in the output, repair the host-name resolution scheme, and repeat the steps above until both commands yield an exact match.

Completing these additional steps verifies successful authentication when traffic flows in the opposite direction, from the remote system to the local system.

For more detailed instructions and examples, see the cluster security topics in *RSCT: Administration Guide*.

## Parameters

*hostname* The host name of a remote system.

*address* The network address of a remote system.

## Options

**-b** Produces brief output. When this option is used, the command displays the host identities provided by the command user, the fully qualified host identities obtained for them, and any errors. If the **-l** option is specified, this option is ignored.

**-d** Displays the list of probes required for successful execution of this command.

**-e** Specifies a list of error messages that are not to be displayed by this command during its execution. One or more message numbers may be specified. Message numbers must be in the xxxx-yyy format. Multiple messages are to be separated by commas (,) with no white space characters.

**-h** Displays a help message for this command.

**-l** Allows the Cluster System Management (CSM) Probe Infrastructure to set the detail level of the output. Accepted levels are:

- **1** Verbose mode. Displays the command purpose summary and status information for all tests.
- **2** Displays the command purpose summary and any attention or error conditions detected in any tests.
- **3** Displays any attention or error conditions detected in any tests.
- **4** Silent mode. Displays errors detected during the tests.

**-m** Displays a detailed description of the command and its purpose.

**-s** Displays a summary of the purpose for the command.

## Exit status

Exit status conforms to the CSM Probe Infrastructure conventions.

**0** No problems detected. Any messages displayed are informational. No administration intervention is required.

**10** No problems were detected. The command was unable to resolve the host name or IP address provided by the command user. The command user should verify that the correct host name or IP address was used. If the correct name or address was used, the system administrator should verify that the host-name resolution scheme used by the local system permits that name or address to be resolved.

**127** Unexpected failure in this command.

## Security

Permissions on the **ctsvhbar** command permit members of the **bin** user group to execute this command.

## Implementation specifics

This command is part of the RSCT cluster security services. It is shipped as part of the **rsct.core** Linux package.

## Location

**/usr/sbin/rsct/bin/ctsvhbar** Contains the **ctsvhbar** command

## Examples

To return the host name that the HBA security mechanism would use on the local node to verify credentials from the host identified by the host name **zathras**, you would enter:

```
ctsvhbar zathras
```

The output would look like this:

```
Host name or network address: zathras
Fully qualified host name
     used for authentication: zathras.ibm.com
```

To return the host name that the HBA security mechanism would use on the local node to verify credentials from the host identified by the network address **9.127.100.101**, you would enter:

```
ctsvhbar 9.127.100.101
```

The output would look like this:

```
Host name or network address: 9.127.100.101
Fully qualified host name
     used for authentication: epsilon3.pok.ibm.com
```

To return the host name that the HBA security mechanism would use on the local node to verify credentials from both the host identified by the host name **zathras**, and the host identified by the network address **9.127.100.101**, you would enter:

```
ctsvhbar zathras 9.127.100.101
```

The output would look like this:

```
Host name or network address: zathras
Fully qualified host name
     used for authentication: zathras.ibm.com
Host name or network address: 9.127.100.101
Fully qualified host name
     used for authentication: epsilon3.ibm.com
```

## See also

Commands: **ctskeygen**, **ctsthl**, **ctsvhbac**, **ctsvhbal**

Books: See the cluster security topics in *RSCT: Administration Guide*

# Part 8. Root command management

# Chapter 14. Least-privilege (LP) resource manager commands

# chlpcmd

## Name

**chlpcmd** – changes the attribute values of a least-privilege (LP) resource.

## Synopsis

To change the attribute values of an LP resource:

- On the local node:

  **chlpcmd** [ **–l 0** | **1** ] [ **–c 0** | **1** | **2** | **3** ] [**–h**] [**–TV**] *resource_name attr1*=*value1* [*attr2*=*value2*...]

  **chlpcmd –r** [**–h**] [**–TV**] *resource_name*

- On all nodes in a domain:

  **chlpcmd –a** [ **–l 0** | **1** ] [ **–c 0** | **1** | **2** | **3** ] [**–h**] [**–TV**] *resource_name attr1*=*value1* [*attr2*=*value2*...]

  **chlpcmd –a –r** [**–h**] [**–TV**] *resource_name*

- On a subset of nodes in a domain:

  **chlpcmd –n** *host1* [**,***host2***,**...] [ **–l 0** | **1** ] [ **–c 0** | **1** | **2** | **3** ] [**–h**] [**–TV**] *resource_name attr1*=*value1* [*attr2*=*value2*...]

  **chlpcmd –n** *host1* [**,***host2***,**...] **–r** [**–h**] [**–TV**] *resource_name*

## Description

Use the **chlpcmd** command to change any of the read/write attribute values of an LP resource. An *LP resource* is a **root** command or script to which users are granted access based on permissions in the LP access control lists (ACLs). Use the **-r** option to recalculate and assign the **CheckSum** attribute. Use the **-c** option to change the **ControlFlags** attribute. Use the **-l** option to change the **Lock** attribute. Use *attr*=*value* parameters to modify these attributes: **Name**, **CommandPath**, **RunCmdName**, **FilterScript**, **FilterArg**, and **Description**.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*resource_name*
: Specifies the name of the LP resource to change.

*attr1*=*value1* **[***attr2*=*value2***...]**
: Specifies one or more read/write attributes and their new values.

## Options

**–a** Changes attribute values for *resource_name* on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlpcmd** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **chlpcmd –a** runs in the management domain. To run **chlpcmd –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–n** *host1***[,***host2***,...]**
Specifies one or more nodes in the domain on which the LP resource is to be changed. By default, the LP resource is changed on the local node. This option is valid only in a management domain or a peer domain. If the **CT_MANAGEMENT_SCOPE** environment variable is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlpcmd** command runs once for the first valid scope that the LP resource manager finds.

**–r** Recalculates and assigns the **CheckSum** attribute value for this LP resource. Use the **-r** option when:
- You have modified the command or script that this LP resource represents.
- You want to change the **CheckSum** value from **0** to the correct value after the command or script becomes available on the system.

**–l 0 | 1**
Locks or unlocks the resource. You can use this option to protect the resource from being deleted by accident. The default value is **0**, which means no lock is set. To lock the resource, use **chlpcmd -l 1**.

**–c 0 | 1 | 2 | 3**
Sets the **ControlFlags** attribute, which is used to specify the control features for an LP command. If **ControlFlags** is not specified, it is set to **1** by default. Use this option to specify one of these values:

**0** Does not validate the **CheckSum** value.

**1** Does not validate the **CheckSum** value. This is the default.

**2** Validates the **CheckSum** value.

**3** Validates the **CheckSum** value.

When an attempt is made to run the LP resource using the **runlpcmd** command, the value of the **ControlFlags** attribute determines which checks are performed before running the command represented by the resource.

For RSCT version 2.4.2.0 and later, the **ControlFlags** attribute value specifies whether the **CheckSum** value is to be validated.

In previous versions of RSCT, the **ControlFlags** attribute value also specified whether the presence of certain characters in the input arguments to **runlpcmd** were to be disallowed. Checking for these characters is no longer necessary.

To maintain compatibility with LP resources that were defined in previous versions of RSCT, the **ControlFlags** attribute values, with respect to validating the **CheckSum** value, have remained the same. Consequently, values **0** and **1** indicate that the **CheckSum** value is not to be validated, and values **2** and **3** indicate that the **CheckSum** value is to be validated.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resources. The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If **CT_MANAGEMENT_SCOPE** is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **chlpcmd** command, you need:

- read permission in the Class ACL of the **IBM.LPCommands** resource class.
- write permission in the Resource ACL.

  As an alternative, the Resource ACL can direct the use of the Resource Shared ACL if this permission exists in the Resource Shared ACL.

Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chlpcmd** Contains the **chlpcmd** command

## Examples

1. To change the **Lock** attribute of LP resource **lpcommand1** before deleting a resource on a local node, enter:

   ```
   chlpcmd -l 0 lpcommand1
   ```

2. Suppose **nodeA** is in a management domain and **CT_MANAGEMENT_SCOPE** is set to **3**. To recalculate the **CheckSum** attribute value of LP resource **lpcommand2** on **nodeA**, enter:

   ```
   chlpcmd -r -n nodeA lpcommand2
   ```

## Author

cluster@us.ibm.com

## See also

- “lpacl ” on page 402, for general information about LP ACLs
- “rmccli ” on page 79, for general information about RMC commands and *attr*=*value* syntax

Books: *RSCT: Administration Guide* , for information about:
- modifying LP ACLs
- LP resource attributes and their definitions

Commands: **lphistory**, **lslpcmd**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

# lphistory

## Name

**lphistory** – lists or clears a certain number of least-privilege (LP) commands that were previously issued during the current resource monitoring and control (RMC) session.

## Synopsis

- To list a particular number of previously-issued commands:
  - On the local node:
    **lphistory** [**–h**] [**–TV**] [*number_of_commands*]
  - On all nodes in a domain:
    **lphistory –a** [**–h**] [**–TV**] [*number_of_commands*]
  - On a subset of nodes in a domain:
    **lphistory –n** *host1*[*,host2...*] [**–h**] [**–TV**] [*number_of_commands*]
- To clear the history list:
  - On the local node:
    **lphistory –c** [**–h**] [**–TV**]
  - On all nodes in a domain:
    **lphistory –c –a** [**–h**] [**–TV**]
  - On a subset of nodes in a domain:
    **lphistory –c –n** *host1*[**,***host2***,**...] [**–h**] [**–TV**]

## Description

The **lphistory** command either lists or clears a certain number of LP commands that were previously issued during the current RMC session, for all nodes or a subset of nodes within a cluster. By default, the **lphistory** command returns the 10 previous LP commands in their entirety, including all parameters and options. You can use the *number_of_commands* parameter to list up to 1000 commands.

The **lphistory –c** command clears the LP history list for all nodes or a subset of nodes within a cluster.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*number_of_commands*
Specifies the number of LP commands that you want to list, You can list a minimum of 1 command and a maximum of 1000 commands. The default value is **10**. You cannot specify this parameter with the **–c** option.

## Options

**–c** Clears the LP history list. You cannot specify this option with the *number_of_commands* parameter.

**–a** Displays previously-issued LP commands for all nodes in the domain. The

**CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lphistory** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lphistory –a** runs in the management domain. To run **lphistory –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–n** *host1***[,***host2***,...]**
Specifies the node or nodes in the domain on which the LP command history list is to be retrieved or cleared. By default, the LP history list for the local node is retrieved or cleared. The **–n** option is valid only in a management or peer domain. If the **CT_MANAGEMENT_SCOPE** environment variable is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lphistory** command runs once for the first valid scope that the LP resource manager finds.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resources. The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lphistory** command, you need write permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See "lpacl " on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lphistory** Contains the **lphistory** command

## Examples

1. To list 20 LP commands that were previously issued on the local node, enter:
   ```
   lphistory 20
   ```
2. Suppose **nodeA** is in a management domain and **CT_MANAGEMENT_SCOPE** is set to **3**. To list the LP command history on **nodeA**, enter:
   ```
   lphistory -c -n nodeA
   ```

## Author

cluster@us.ibm.com

## See also

“lpacl ” on page 402, for general information about LP ACLs

Books: *RSCT: Administration Guide*, for information about modifying LP ACLs

Commands: **chlpcmd**, **lslpcmd**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

# lslpcmd

## Name

**lslpcmd** – lists information about the least-privilege (LP) resources on one or more nodes in a domain.

## Synopsis

To display LP resource information:

- On the local node:

  **lslpcmd** [ **–A** | *resource_name1* [ **,** *resource_name2* **,** ... ] | **–R** *RunCmdName1* [ **,** *RunCmdName2* **,** ... ] ] [**–h**] [**–TV**]

- On all nodes in a domain:

  **lslpcmd –a** [ **–A** | *resource_name1* [ **,** *resource_name2* **,** ... ] | **–R** *RunCmdName1* [ **,** *RunCmdName2* **,** ... ] ] [**–h**] [**–TV**]

- On a subset of nodes in a domain:

  **lslpcmd –n** *host1* [**,***host2***,**...] [ **–A** | *resource_name1* [ **,** *resource_name2* **,** ... ] | **–R** *RunCmdName1* [ **,** *RunCmdName2* **,** ... ] ] [**–h**] [**–TV**]

## Description

The **lslpcmd** command displays information about LP resources on one or more nodes in a domain. LP resources are **root** commands or scripts to which users are granted access based on permissions in the LP access control lists (ACLs). Use this command to display the attributes of one or more LP commands by specifying the *resource_name1*,[*resource_name2*,...] parameter. If you omit this parameter, the **lslpcmd** command lists the names of all of the LP commands. Use the **–A** option to list all of the LP commands and all of their attributes and values. Use the **–R** option to list one or more LP resources that have a particular **RunCmdName** value.

The **lslpcmd** command lists the following information about defined LP resources:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the LP resource. |
| **CommandPath** | The fully-qualified path of the LP resource. |
| **Description** | A description of the LP resource. |
| **Lock** | The lock setting. Valid values are: **0** (the lock is not set) and **1** (the lock is set). |
| **CheckSum** | The **CheckSum** value of the LP resource to which **CommandPath** points. The LP resource manager assigns a value of **0** if the LP resource does not exist or if the user did not update the **CheckSum** value after the LP resource was made available. |
| **RunCmdName** | The LP resource name that is used as a parameter with the **runlpcmd** command. |
| **FilterScript** | The path to the filter script. |
| **FilterArg** | The list of arguments to pass to **FilterScript**. |

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*resource_name1***[,***resource_name2***,...]**
Specifies one or more LP resources for which you want to display information.

## Options

**–a** Displays information about one or more LP resources on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslpcmd** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lslpcmd –a** runs in the management domain. To run **lslpcmd –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–n** *host1***[,***host2***,...]**
Specifies the node or nodes in the domain on which the LP resource is to be listed. By default, the LP resource is changed on the local node. The **–n** option is valid only in a management or peer domain. If the CT_MANAGEMENT_SCOPE variable is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslpcmd** command runs once for the first valid scope that the LP resource manager finds.

**–A** Displays all of the LP resources with their attributes and values.

**–R** Display all attributes of the LP resources that have the same **RunCmdName** value.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where

the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resources. The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lslpcmd** command, you need:

- read permission in the Class ACL of the **IBM.LPCommands** resource class.
- read permission in the Resource ACL.

  As an alternative, the Resource ACL can direct the use of the Resource Shared ACL if this permission exists in the Resource Shared ACL.

Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lslpcmd** Contains the **lslpcmd** command

## Examples

1. To list the names of all LP resources on the local node, enter:

   ```
   lslpcmd
   ```

   The output will look like this:

   ```
   lpcommand1
   lpcommand2
   ⋮
   ```

2. To list the names and attributes of all LP resources on the local node, enter:

   ```
   lslpcmd -A
   ```

   The output will look like this:

   ```
   Name=lpcommand1
   CommandPath=/tmp/my_command
   Description=
   Lock=1
   CheckSum=112
   RunCmdName=lpcommand1
   FilterScript=
   FilterArg=
   ---------------------------------
   Name=lpcommand2
   CommandPath=/tmp/cmds/this_command
   Description=
   Lock=0
   CheckSum=0
   RunCmdName=lpcommand2
   FilterScript=
   FilterArg=
   ---------------------------------
   ⋮
   ```

3. To list the attributes of the LP resource **lpcommand1** on the local node, enter:

   ```
   lslpcmd lpcommand1
   ```

   The output will look like this:

   ```
   Name=lpcommand1
   CommandPath=/tmp/my_command
   Description=
   Lock=1
   CheckSum=100
   RunCmdName=lpcommand1
   FilterScript=
   FilterArg=
   ```

4. To list the attributes of LP resources that have a **RunCmdName** value of **rpower** on the local node, enter:

```
lslpcmd -R rpower
```

The output will look like this:

```
Name=lpcommand1
CommandPath=/opt/csm/bin/rpower
Description=
Lock=1
CheckSum=112
RunCmdName=rpower
FilterScript=/tmp/test1
FilterArg=node1,node2,node3
------------------------------
Name=lpcommand2
CommandPath=/opt/csm/bin/rpower
Description=
Lock=0
CheckSum=112
RunCmdName=rpower
FilterScript=/tmp/test1
FilterArg=node4,node5,node6
------------------------------
⋮
```

## Author

cluster@us.ibm.com

## See also

“lpacl ” on page 402, for general information about LP ACLs

Books: *RSCT: Administration Guide*, for information about modifying LP ACLs

Commands: **chlpcmd**, **lphistory**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

# mklpcmd

## Name

**mklpcmd** – defines a new least-privilege (LP) resource to the resource monitoring and control (RMC) subsystem and specifies user permissions.

## Synopsis

**mklpcmd** [**–n** *host*] [**–l**] [ **–c 0** | **1** | **2** | **3** ] [**–R** *RunCmdName*] [**–s** *FilterScript*] [**–A** *FilterArg*] [**–h**] [**–TV**] *resource_name command_path* [ *ID perm* ] ...

## Description

The **mklpcmd** command defines a new LP resource to the resource monitoring and control (RMC) subsystem subsystem. An LP resource is a **root** command or script to which users are granted access based on permissions in the LP access control lists (ACLs). Specify the LP resource using the *resource_name* parameter. The *command_path* parameter specifies the command or script that could be run with LP access. Specify the complete path name of the command or the script. If *command_path* exists when a resource is created, the LP resource manager calculates the **CheckSum** and assigns the **CheckSum** attribute value. If *command_path* does not exist, the LP resource manager assigns **0** as the **CheckSum** attribute value.

Use the **-l** option to lock the LP resource. The resource must be unlocked before it can be deleted. Use the **-c** option to specify the control settings of the resource.

You can also use the **mklpcmd** command to specify permissions for users when you are creating a resource. To do this, you need to have administrator permission on the resources. Administrator permission gives you the ability to set and edit permissions. You can specify multiple user IDs and permissions with this command. See the **Examples** section for more information.

This command runs on any node. In a management domain or a peer domain, use the **-n** option to define the LP resource on the node that is specified by *host*. Otherwise, this command runs on the local node.

## Parameters

*resource_name*
: Is the name or identifier of the LP resource that is to be defined to the RMC subsystem.

*command_path*
: Is the complete, fully-qualified path name of the command or script.

*ID perm* **...**
: Specifies permissions for users when you are creating a resource. This parameter is optional.

  *ID* Specifies the user identity for the ACL entry. See the **User identities** section of “lpacl ” on page 402 for the valid forms of this parameter.

  *perm* Specifies the user permissions for the ACL entry. This parameter can consist of a combination of any of the following values:

  **r** Read permission (consists of the **q**, **l**, **e**, and **v** permissions)

**w** Write permission (consists of the **d**, **c**, **s**, and **o** permissions)

**a** Administrator permission

**x** Execute permission

**q** Query permission

**l** Enumerate permission

**e** Event permission

**v** Validate permission

**d** Define and undefine permission

**c** Refresh permission

**s** Set permission

**o** Online, offline, and reset permission

**0** No permission

See the **User permissions** section of "lpacl " on page 402 for descriptions of these permissions.

## Options

**–n** *host*

Specifies the node in the domain on which the LP resource is to be defined. By default, the LP resource is defined on the local node. The **–n** option is valid only in a management or peer domain. If the CT_MANAGEMENT_SCOPE variable is not set, the LP resource manager uses scope settings in this order:

1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **mklpcmd** command runs once for the first valid scope that the LP resource manager finds.

**–l** Defines the new LP resource as locked so that it cannot be changed accidentally. The resource cannot be removed from the RMC subsystem until the **Lock** attribute is unset.

If you do not specify this option, the new resource is not locked. This is the default.

**–c 0 | 1 | 2 | 3**

Sets the **ControlFlags** attribute, which is used to specify the control features for an LP command. If **ControlFlags** is not specified, it is set to **1** by default. Use this option to specify one of these values:

**0** Does not validate the **CheckSum** value.

**1** Does not validate the **CheckSum** value. This is the default.

**2** Validates the **CheckSum** value.

**3** Validates the **CheckSum** value.

When an attempt is made to run the LP resource using the **runlpcmd** command, the value of the **ControlFlags** attribute determines which checks are performed before running the command represented by the resource.

In this release of RSCT, the **ControlFlags** attribute value specifies whether the **CheckSum** value is to be validated.

In previous releases of RSCT, the **ControlFlags** attribute value also specified whether the presence of certain characters in the input arguments to **runlpcmd** were to be disallowed. Checking for these characters is no longer necessary.

To maintain compatibility with LP resources that were defined in previous releases of RSCT, the **ControlFlags** attribute values, with respect to validating the **CheckSum** value, have remained the same. Consequently, values **0** and **1** indicate that the **CheckSum** value is not to be validated, and values **2** and **3** indicate that the **CheckSum** value is to be validated.

**–R** *RunCmdName*
Specifies the **RunCmdName** value for this resource, which will be used as a parameter of the **runlpcmd** command.

**–s** *script_path*
Specifies the fully-qualified path of the filter script.

**–A** *argument*
Specifies a string of arguments to be passed to the filter script.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resource. The management scope determines the set of possible target nodes where the resource can be processed. The valid values are:
**0** Specifies *local* scope.
**1** Specifies *local* scope.
**2** Specifies *peer domain* scope.
**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

- To run the **mklpcmd** command with one or more *ID*:*perm* parameters, you need:
  - read and write permission in the Class ACL of the **IBM.LPCommands** resource class.
  - read and administrator permission in the Resource Initial ACL.

    As an alternative, the Resource Initial ACL can direct the use of the Resource Shared ACL if these permissions exist in the Resource Shared ACL.
- To run the **mklpcmd** command with no *ID*:*perm* parameters, you need write permission in the Class ACL of the **IBM.LPCommands** resource class.

Permissions are specified in the LP ACLs on the contacted system. See "lpacl " on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/mklpcmd** Contains the **mklpcmd** command

## Examples

1. To create an LP resource called **LP1** that points to a command called **/tmp/user1/lpcmd1** on the local node, enter:

   ```
   mklpcmd LP1 /tmp/user1/lpcmd1
   ```
2. To create an LP resource called **LP2** that points to a command called **/tmp/my_command1** on **nodeB** in the management domain, enter:

   ```
   mklpcmd -n nodeB LP2 /tmp/my_command1
   ```

3. To create an LP resource called **lp3** with **ControlFlags** set to **3** (which means verify the **CheckSum** value), enter:

   ```
   mklpcmd -c 3 LP3 /tmp/cmd_lp3
   ```

4. To create an LP resource called **lp4** that points to **/tmp/testscript**, has a **RunCmdName** value of **test**, a **FilterScript** value of **/tmp/filterscr**, and filter arguments **node1** and **node2**, enter:

   ```
   mklpcmd -R test -f /tmp/filterscr -A "node1,node2" lp4 /tmp/testscript
   ```

5. To create an LP resource called **lp5** that points to **/usr/bin/mkrsrc** and gives users **user1@LOCALHOST** and **user2@LOCALHOST** read, write, and execute permission, enter:

   ```
   mklpcmd lp5 /usr/bin/mkrsrc user1@LOCALHOST rwx  user2@LOCALHOST rwx
   ```

## Author

cluster@us.ibm.com

## See also

“lpacl ” on page 402, for general information about LP ACLs

Books: *RSCT: Administration Guide*, for information about modifying LP ACLs

Commands: **chlpcmd**, **lphistory**, **lslpcmd**, **mkrsrc**, **rmlpcmd**, **runlpcmd**

# rmlpcmd

## Name

**rmlpcmd** – removes one or more least-privilege (LP) resources from the resource monitoring and control (RMC) subsystem.

## Synopsis

To remove one or more LP resources:

- From the local node:
  **rmlpcmd** [**–h**] [**–TV**] *resource_name1* [ **,** *resource_name2* **,** ... ]
- From all nodes in a domain:
  **rmlpcmd –a** [**–h**] [**–TV**] *resource_name1* [ **,** *resource_name2* **,** ... ]
- From a subset of nodes in a domain:
  **rmlpcmd –n** *host1* [**,***host2***,**...] [**–h**] [**–TV**] *resource_name1* [ **,** *resource_name2* **,** ... ]

## Description

The **rmlpcmd** command removes one or more LP resources from the RMC subsystem. An LP resource is a **root** command or script to which users are granted access based on permissions in the LP access control lists (ACLs). You can use the **rmlpcmd** command to remove LP resources from particular nodes or all nodes in a domain. If you want to remove locked LP resources, you must first use the **chlpcmd** command to unset the resource's **Lock** attribute.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*resource_name1***[,***resource_name2***,...]**
Specifies one or more LP resources to be removed.

## Options

**–a** Removes one or more LP resources from all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **rmlpcmd** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **rmlpcmd –a** runs in the management domain. To run **rmlpcmd –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–n** *host1***[,***host2***,...]**
Specifies one or more nodes in the domain from which the LP resource is to be removed. By default, the LP resource is removed from the local node.

The **–n** option is valid only in a management or peer domain. If the CT_MANAGEMENT_SCOPE variable is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **rmlpcmd** command runs once for the first valid scope that the LP resource manager finds.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resource. The management scope determines the set of possible target nodes where the resource can be processed. The valid values are:
**0** Specifies *local* scope.
**1** Specifies *local* scope.
**2** Specifies *peer domain* scope.
**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **rmlpcmd** command, you need read and write permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/rmlpcmd** Contains the **rmlpcmd** command

## Examples

1. To remove an LP resource named **LP1**, enter:
   ```
   rmlpcmd LP1
   ```
2. To remove LP resources **LP1** and **LP2**, enter:
   ```
   rmlpcmd LP1 LP2
   ```

## Author

cluster@us.ibm.com

## See also

“lpacl ” on page 402, for general information about LP ACLs

Books: *RSCT: Administration Guide*, for information modifying LP ACLs

Commands: **chlpcmd**, **lphistory**, **lslpcmd**, **mklpcmd**, **runlpcmd**

# runlpcmd

## Name

**runlpcmd** – runs a least-privilege (LP) resource.

## Synopsis

To run an LP resource:

- On the local node:

  **runlpcmd –N** *resource_name* | *RunCmdName* [**–h**] [**–TV**] [*"options_and_parms"*]

- On all nodes in a domain:

  **runlpcmd –a –N** *resource_name* | *RunCmdName* [**–h**] [**–TV**] [*"options_and_parms"*]

- On a subset of nodes in a domain:

  **runlpcmd –n** *host1* [**,***host2***,**...] **–N** *resource_name* | *RunCmdName* [**–h**] [**–TV**] [*"options_and_parms"*]

## Description

The **runlpcmd** command runs an LP resource, which is a **root** command or script to which users are granted access based on permissions in the LP access control lists (ACLs). You can use the **runlpcmd** command to call the LP command corresponding to a particular *RunCmdName* value with access permissions that match the permissions of the calling user. When **runlpcmd** is called with the **-N** option, the LP command that is specified by the *resource_name* parameter is run. Specify all parameters and option needed for command invocation using the *options_and_parms* parameter. If this parameter is not specified, an empty string is passed to the LP command. This is the default.

If the **CheckSum** attribute value is **0**, **runlpcmd** returns an error if the **ControlFlags** value is set to check for **CheckSum**; otherwise, no errors are returned. If the **ControlFlag** attribute of the LP command was set to validate the **CheckSum** before the LP command was run, **runlpcmd** performs such a check. The command is run only if the calculated **CheckSum** matches the value of the corresponding **CheckSum** attribute. If the two do not match, the command is rejected. If, however, the **ControlFlags** attribute is set to the default value, **CheckSum** validation is not performed.

You can specify the *RunCmdName* parameter along with with the **-N** *resource_name* option and parameter combination. However, one restriction applies when you use the *RunCmdName* parameter. If more than one resource matches the *RunCmdName* value and the permissions of the calling user, **runlpcmd** returns an error. If one match exists for the *RunCmdName* value and the the permissions of the calling user, **runlpcmd** *RunCmdName* returns successfully. In order to circumvent this restriction, **runlpcmd** also lets users run LP commands by specifying their unique names, using the **-N** *resource_name* option and parameter combination.

Before calling the LP command, **runlpcmd** checks to see if a **FilterScript** value exists. If so, it passes the **FilterArg** value and the *options_and_parms* parameter string specified on the command line to **FilterScript**. If **FilterScript** returns a **0**, **runlpcmd** calls the LP command. If **FilterScript** execution resulted in a non-zero

value, **runlpcmd** returns an error. If **FilterScript** was empty, **runlpcmd** performs some checks, as specified in **ControlFlags**, and then calls the LP command directly.

The output of this command may include *"***RC=***return_code"* as the last line.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*RunCmdName*
Specifies the name of the LP resource that you want to run on one or more nodes in the domain.

*"options_and_parms"*
Specifies the options and parameters that are required input for the LP command or script. If this parameter is not specified, an empty string is passed to the LP command. This is the default.

## Options

**–a** Changes one or more resources on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **runlpcmd** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **runlpcmd –a** runs in the management domain. To run **runlpcmd –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–n** *host1***[,***host2***,...]**
Specifies the node or nodes in the domain on which the LP resource is to be changed. By default, the LP resource is changed on the local node. The **–n** option is valid only in a management or peer domain. If the CT_MANAGEMENT_SCOPE variable is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **runlpcmd** command runs once for the first valid scope that the LP resource manager finds.

**–N** *resource_name*
Specifies the name of the LP resource that you want to run on one or more nodes in the domain.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system that is used for the session with the RMC daemon. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If the environment variable is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the LP resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon to process the LP resources. The management scope determines the set of possible target nodes where the resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **runlpcmd** command, you need:

- read permission in the Class ACL of the **IBM.LPCommands** resource class.
- execute permission in the Resource ACL.

  As an alternative, the Resource ACL can direct the use of the Resource Shared ACL if this permission exists in the Resource Shared ACL.

Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/runlpcmd** Contains the **runlpcmd** command

## Examples

To run the LP resource called **LP1**, which has required input options and parameters **-a -p User Group**, enter:

```
runlpcmd LP1 "-a -p User Group"
```

## Author

cluster@us.ibm.com

## See also

“lpacl ” on page 402, for general information about LP ACLs

Books: *RSCT: Administration Guide*, for information about modifying LP ACLs

Commands: **chlpcmd**, **lphistory**, **lslpcmd**, **mklpcmd**, **rmlpcmd**

# Chapter 15. LP access control list (ACL) commands

# chlpclacl

## Name

**chlpclacl** – changes the access controls for the least-privilege (LP) resource class (**IBM.LPCommands**).

## Synopsis

To add one or more accesses to the **IBM.LPCommands** Class ACL or to overwrite the **IBM.LPCommands** Class ACL with one or more accesses:

**chlpclacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [**-o**] [**-h**] [**-TV**] *ID_1 perm1* [*ID_2 perm2*] ...

To add one or more accesses to the **IBM.LPCommands** Class ACL or to overwrite the **IBM.LPCommands** Class ACL with one or more accesses all using the same permissions:

**chlpclacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-l** [**-o**] [**-h**] [**-TV**] *ID_1* [*ID_2*...] *perm*

To delete one or more accesses from the **IBM.LPCommands** Class ACL:

**chlpclacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-d** [**-h**] [**-TV**] *ID_1* [*ID_2*...]

To add accesses to (or remove accesses from) the **IBM.LPCommands** Class ACL or to overwrite the **IBM.LPCommands** Class ACL, with the accesses specified in a file:

**chlpclacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [ **-o** | **-d** ] **-f** *file_name* [**-h**] [**-TV**]

To set the **IBM.LPCommands** Class ACL to deny all accesses:

**chlpclacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-x** [**-h**] [**-TV**]

## Description

The **chlpclacl** command changes the access control list (ACL) that is associated with the least-privilege (LP) resource class (**IBM.LPCommands**). This command allows an access to be added to or removed from the **IBM.LPCommands** Class ACL. This ACL controls access to such class operations as creating LP resources and deleting LP resources. One Class ACL exists on each node for the **IBM.LPCommands** class.

To add accesses to the **IBM.LPCommands** Class ACL, specify the ID and the permission the ID is to have. More than one ID and permission pair can be specified. If you want to add multiple IDs and they will all have the same permission, use the **-l** option to indicate that the format of the command is a list of IDs followed by a single permission that applies to all of the IDs. If you use the **-o** option, the IDs and permissions specified with the command will overwrite the existing accesses. The previously-defined accesses in the Class ACL are deleted.

To delete accesses from the **IBM.LPCommands** Class ACL, use the **-d** option and specify the IDs to be deleted.

Use the **-f** option to indicate that the accesses are specified in a file. Each line of the file will be an ID and permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*ID* Specifies the network identity of the user. If the same *ID* is listed more than once, the last permission specified is used. For a description of how to specify the network identity, see the **User identities** section of “lpacl ” on page 402.

*perm* Specifies the permission allowed for *ID*. *perm* is specified as a string of one or more characters, where each character represents a particular permission. The valid values for *perm* are:

**r** Read permission (consists of the **q**, **l**, **e**, and **v** permissions)

**w** Write permission (consists of the **d**, **c**, **s**, and **o** permissions)

**a** Administrator permission

**x** Execute permission

**q** Query permission

**l** Enumerate permission

**e** Event permission

**v** Validate permission

**d** Define and undefine permission

**c** Refresh permission

**s** Set permission

**o** Online, offline, and reset permission

**0** No permission

See the **User permissions** section of “lpacl ” on page 402 for descriptions of these permissions.

## Options

**–a** Changes **IBM.LPCommands** Class ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable’s setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:

1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlpclacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment

variable is not set. In this case, **chlpclacl –a** runs in the management domain. To run **chlpclacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–d** Removes the ACL entry for the specified ID from the **IBM.LPCommands** Class ACL.

**–f** *file_name*
Indicates that the accesses are specified in *file_name*. Each line of this file consists of an ID and the permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

**–l** Indicates that there is a list of IDs followed by a single permission that is used for all of the IDs.

**–n** *host1***[,***host2***,...]**
Specifies the nodes in the domain on which the **IBM.LPCommands** Class ACL should be changed. By default, the **IBM.LPCommands** Class ACL is changed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–o** Indicates that the specified accesses overwrite any existing ACL entries for the **IBM.LPCommands** Class ACL. Any ACL entries in the **IBM.LPCommands** Class ACL are deleted.

**–x** Sets the **IBM.LPCommands** Class ACL to deny all accesses to the **IBM.LPCommands** class attributes and class operations. Any ACL entries in the **IBM.LPCommands** Class ACL are deleted.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP)

resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **chlpclacl** command, you need read and administrator permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See "lpacl " on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chlpclacl** Contains the **chlpclacl** command

## Examples

1. To give user **joe** on **nodeA** write permission to the **IBM.LPCommands** class so that he can create LP resources on **nodeA**, run one of these commands on **nodeA**:

```
chlpclacl joe@NODEID w

chlpclacl joe@LOCALHOST w
```

2. **nodeA** and **nodeB** are in a peer domain. To give user **joe** on **nodeB** write permission to the **IBM.LPCommands** class so that he can create LP resources on **nodeB**, run this command on **nodeA**:

   ```
   chlpclacl -n nodeB joe@LOCALHOST  w
   ```

   In this example, specifying **joe@NODEID** instead of **joe@LOCALHOST** gives **joe** on **nodeA** write permission to the **IBM.LPCommands** class on **nodeB**.
3. To give user **joe** on **nodeA** write permission to the **IBM.LPCommands** class and **bill** on **nodeA** administrator permission and write permission to the **IBM.LPCommands** class on **nodeA**, run this command on **nodeA**:

   ```
   chlpclacl joe@LOCALHOST w bill@LOCALHOST wa
   ```
4. To give user **joe** on **nodeA** administrator permission to the **IBM.LPCommands** class on **nodeA**, overwriting the current **IBM.LPCommands** Class ACL so that this is the only access allowed, run this command on **nodeA**:

   ```
   chlpclacl -o joe@LOCALHOST a
   ```
5. To give users **joe**, **bill**, and **jane** on **nodeA** read and write permissions to the **IBM.LPCommands** class on **nodeA**, run this command on **nodeA**:

   ```
   chlpclacl -l joe@LOCALHOST  bill@LOCALHOST  jane@LOCALHOST  rw
   ```
6. To delete access for **joe** on **nodeA** from the **IBM.LPCommands** class on **nodeA**, run this command on **nodeA**:

   ```
   chlpclacl -d  joe@LOCALHOST
   ```
7. To add a list of accesses that are in a file named **/mysecure/aclfile** on **nodeA** to the **IBM.LPCommands** class on **nodeA**, run this command on **nodeA**:

   ```
   chlpclacl -f /mysecure/aclfile
   ```

   The contents of **/mysecure/aclfile** on **nodeA** could be:

   ```
   joe@LOCALHOST     w
   bill@LOCALHOST    wa
   jane@LOCALHOST    rw
   ```
8. To deny all accesses to the **IBM.LPCommands** class on **nodeA**, run this command on **nodeA**:

   ```
   chlpclacl -x
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpracl**, **chlpriacl**, **chlprsacl**, **lslpclacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# chlpracl

## Name

**chlpracl** – changes the access controls for a least-privilege (LP) resource.

## Synopsis

To add one or more accesses to a Resource ACL or to overwrite a Resource ACL with one or more accesses:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [**-o**] [**-r**] [**-h**] [**-TV**] *resource ID_1 perm1* [*ID_2 perm2*] ...

To add one or more accesses to a Resource ACL or to overwrite an Resource ACL with one or more accesses all using the same permissions:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-l** [**-o**] [**-r**] [**-h**] [**-TV**] *resource ID_1* [*ID_2*...] *perm*

To delete one or more accesses from a Resource ACL:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-d** [**-r**] [**-h**] [**-TV**] *resource ID_1* [*ID_2*...]

To add accesses to (or remove accesses from) a Resource ACL or to overwrite a Resource ACL, with the accesses specified in a file:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [ **-o** | **-d** ] **-f** *file_name* [**-r**] [**-h**] [**-TV**] *resource*

To set a Resource ACL so that no permissions are allowed, or to use the Resource Shared ACL:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] { **-b** | **-x** } [**-r**] [**-h**] [**-TV**] *resource*

To set all of the Resource ACLs so that no permissions are allowed, or to use the Resource Shared ACL:

**chlpracl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] { **-B** | **-X** } [**-h**] [**-TV**]

## Description

The **chlpracl** command changes the access control list (ACL) that is associated with a least-privilege (LP) resource. This command allows an access to be added to or removed from the Resource ACL. This ACL controls access to such resource operations as listing attribute values and running LP commands. One Resource ACL exists for each LP resource.

For controlling access to the LP resource, three different types of Resource ACLs exist:

1. Resource ACL
2. Resource Initial ACL
3. Resource Shared ACL

The **chlpracl** command allows the Resource ACL to indicate that the Resource Shared ACL should be used in its stead to control access. For descriptions of these ACLs, see “lpacl ” on page 402.

To add an access to the Resource ACL, specify the name of the LP resource, the ID, and the permission the ID is to have. More than one ID and permission pair can be specified. If you want to add multiple IDs and they will all have the same permission, use the **-l** option to indicate that the format of the command is a list of IDs followed by a single permission that applies to all of the IDs. If you use the **-o** option, the IDs and permissions specified with the command will overwrite the existing accesses. The previously-defined accesses in the ACL are deleted.

To delete accesses from the Resource ACL, use the **-d** option and specify the name of the LP resource and the IDs to be deleted.

Use the **-f** option to indicate that the accesses are specified in a file. Each line of the file will be an ID and permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*resource*
Specifies the name of the LP resource for which the Resource ACL is changed.

*ID* Specifies the network identity of the user. If the same *ID* is listed more than once, the last permission specified is used. For a description of how to specify the network identity, see “lpacl ” on page 402.

*perm* Specifies the permission allowed for *ID*. *perm* is specified as a string of one or more characters, where each character represents a particular permission. The valid values for *perm* are:

**r** Read permission (consists of the **q**, **l**, **e**, and **v** permissions)

**w** Write permission (consists of the **d**, **c**, **s**, and **o** permissions)

**a** Administrator permission

**x** Execute permission

**q** Query permission

**l** Enumerate permission

**e** Event permission

**v** Validate permission

**d** Define and undefine permission

**c** Refresh permission

**s** Set permission

**o** Online, offline, and reset permission

**0** No permission

See “lpacl ” on page 402 for a description of each permission and how it applies.

## Options

**–a** Changes the Resource ACLs for *resource* on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlpracl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **chlpracl –a** runs in the management domain. To run **chlpracl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–b** Bypasses the ACL for the specified LP resource. The Resource Shared ACL is used for access control for this LP resource. Any ACL entries in the Resource ACL are deleted.

**–B** Bypasses the ACLs for all LP resources. The Resource Shared ACL is used for access control for all LP resources. Any ACL entries in the Resource ACLs are deleted. One Resource Shared ACL exists for each **IBM.LPCommands** class (or node).

**–d** Removes the ACL entry for the specified ID from the specified Resource ACL.

**–f** *file_name*
Indicates that the accesses are specified in *file_name*. Each line of this file consists of an ID and the permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

**–l** Indicates that there is a list of IDs followed by a single permission that is used for all of the IDs.

**–n** *host1***[,***host2***,...]**
Specifies the nodes in the domain on which the Resource ACL should be changed. By default, the Resource ACL is changed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–o** Indicates that the specified ACL accesses overwrite any existing ACL entries for the specified Resource ACL. Any ACL entries in the Resource ACL are deleted.

**–r** Indicates that *resource* is a ″typical″ RSCT resource handle. The resource handle must be enclosed in quotation marks. The Resource ACL of the resource handle is modified.

**–x** Sets the Resource ACL for the specified LP resource to deny all accesses to the LP resource. Any ACL entries in the Resource ACL are deleted.

**–X** Sets the Resource ACL of all LP resources to deny all accesses to the LP resource. Any ACL entries in the Resource ACLs are deleted.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **chlpracl** command, you need:

- read permission in the Class ACL of the **IBM.LPCommands** resource class.
- read and administrator permission in the Resource ACL.

  As an alternative, the Resource ACL can direct the use of the Resource Shared ACL if these permissions exist in the Resource Shared ACL.

Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chlpracl** Contains the **chlpracl** command

## Examples

1. To give user **joe** on **nodeA** the ability to run the LP command **lpcommand1** on **nodeA**, run one of these commands on **nodeA**:

   ```
   chlpracl lpcommand1 joe@NODEID  x

   chlpracl lpcommand1 joe@LOCALHOST  x
   ```

2. **nodeA** and **nodeB** are in a peer domain. To give user **joe** on **nodeB** the ability to run the LP command **lpcommand1** on **nodeB**, run this command on **nodeA**:

   ```
   chlpracl -n nodeB lpcommand1 joe@LOCALHOST  x
   ```

   In this example, specifying **joe@NODEID** instead of **joe@LOCALHOST** gives **joe** on **nodeA** the ability to run the LP command **lpcommand1** on **nodeB**.

3. To give user **joe** on **nodeA** execute permission to the LP command **lpcommand1** and **bill** on **nodeA** administrator permission and write permission to the same resource on **nodeA**, run this command on **nodeA**:

   ```
   chlpracl lpcommand1 joe@LOCALHOST  x  bill@LOCALHOST  wa
   ```

4. To give user **joe** on **nodeA** administrator permission to the LP command **lpcommand1** on **nodeA**, overwriting the current ACLs for **lpcommand1** so that this is the only access allowed, run this command on **nodeA**:

   ```
   chlpracl -o lpcommand1 joe@LOCALHOST x
   ```

5. To give users **joe**, **bill**, and **jane** on **nodeA** the ability to run the LP command **lpcommand1** on **nodeA**, run this command on **nodeA**:

   ```
   chlpracl lpcommand1 -l joe@LOCALHOST  bill@LOCALHOST  jane@LOCALHOST  x
   ```

6. To delete access for **joe** on **nodeA** from the ACLs for the LP command **lpcommand1** on **nodeA**, run this command on **nodeA**:

   ```
   chlpracl -d lpcommand1 joe@LOCALHOST
   ```

7. To add a list of accesses that are in a file named **/mysecure/aclfile** on **nodeA** to the LP command **lpcommand1** on **nodeA**, run this command on **nodeA**:

```
chlpracl -f /mysecure/aclfile lpcommand1
```

The contents of **/mysecure/aclfile** on **nodeA** could be:

```
joe@LOCALHOST     x
bill@LOCALHOST                  ax
jane@LOCALHOST    wx
```

8. To bypass the Resource ACL for the LP command **lpcommand1** on **nodeA**, and use the Resource Shared ACL to control access to it, run this command on **nodeA**:

   ```
   chlpracl -b lpcommand1
   ```

9. To bypass the Resource ACLs for all of the LP resources on **nodeA**, and use the Resource Shared ACL to control accesses, run this command on **nodeA**:

   ```
   chlpracl -B
   ```

10. To deny all accesses to the LP command **lpcommand1** on **nodeA**, run this command on **nodeA**:

    ```
    chlpracl -x lpcommand1
    ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpriacl**, **chlprsacl**, **lslpclacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# chlpriacl

## Name

**chlpriacl** – changes the access controls for the least-privilege (LP) Resource Initial ACL.

## Synopsis

To add one or more accesses to the Resource Initial ACL or to overwrite the Resource Initial ACL with one or more accesses:

**chlpriacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [**-o**] [**-h**] [**-TV**] *ID_1 perm1* [*ID_2 perm2*] ...

To add one or more accesses to the Resource Initial ACL or to overwrite the Resource Initial ACL with one or more accesses all using the same permissions:

**chlpriacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-l** [**-o**] [**-h**] [**-TV**] *ID_1* [*ID_2*...] *perm*

To delete one or more accesses from the Resource Initial ACL:

**chlpriacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-d** [**-h**] [**-TV**] *ID_1* [*ID_2*...]

To add accesses to (or remove accesses from) the Resource Initial ACL or to overwrite the Resource Initial ACL, with the accesses specified in a file:

**chlpriacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [ **-o** | **-d** ] **-f** *file_name* [**-h**] [**-TV**]

To set the Resource Initial ACL to use the Resource Shared ACL or so that no permissions are allowed:

**chlpriacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] { **-b** | **-x** } [**-h**] [**-TV**]

## Description

The **chlpriacl** command changes the access control list (ACL) that is associated with the least-privilege (LP) Resource Initial ACL. This command allows a user to be added to or removed from the Resource Initial ACL. This ACL is used to initialize a Resource ACL when the LP resource is created. The Resource Initial ACL can consist of ACL entries that define permissions to the LP resource or it can indicate that the Resource Shared ACL should be used to control access instead of the Resource ACL. One Resource Initial ACL exists on each node for the **IBM.LPCommands** class.

To add accesses to the Resource Initial ACL, specify the ID and the permission the ID is to have. More than one ID and permission pair can be specified. If you want to add multiple IDs and they will all have the same permission, use the **-l** option to indicate that the format of the command is a list of IDs followed by a single permission that applies to all of the IDs. If you use the **-o** option, the IDs and permissions specified with the command will overwrite the existing accesses. The previously-defined accesses in the ACL are deleted.

To delete accesses from the Resource Initial ACL, use the **-d** option and specify the IDs to be deleted.

Use the **-f** option to indicate that the accesses are specified in a file. Each line of the file will be an ID and permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*ID* Specifies the network identity of the user. If the same *ID* is listed more than once, the last permission specified is used. For a description of how to specify the network identity, see “lpacl ” on page 402.

*perm* Specifies the permission allowed for *ID*. *perm* is specified as a string of one or more characters, where each character represents a particular permission. The valid values for *perm* are:

**r** Read permission (consists of the **q**, **l**, **e**, and **v** permissions)

**w** Write permission (consists of the **d**, **c**, **s**, and **o** permissions)

**a** Administrator permission

**x** Execute permission

**q** Query permission

**l** Enumerate permission

**e** Event permission

**v** Validate permission

**d** Define and undefine permission

**c** Refresh permission

**s** Set permission

**o** Online, offline, and reset permission

**0** No permission

See “lpacl ” on page 402 for a description of each permission and how it applies.

## Options

**–a** Changes the Resource Initial ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable’s setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlpriacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment

variable is not set. In this case, **chlpriacl –a** runs in the management domain. To run **chlpriacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–b** Sets the Resource Initial ACL to indicate that the Resource ACL is bypassed and that the Resource Shared ACL is used for access control for the LP resource. Any ACL entries in the Resource Initial ACL are deleted. When a new LP resource is created, the Resource Shared ACL is used for it.

**–d** Removes the ACL entry for the specified ID from the Resource Initial ACL.

**–f** *file_name*
Indicates that the accesses are specified in *file_name*. Each line of this file consists of an ID and the permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

**–l** Indicates that there is a list of IDs followed by a single permission that is used for all of the IDs.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain on which the Resource Initial ACL should be changed. By default, the Resource Initial ACL is changed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–o** Indicates that the specified ACL entries overwrite any existing ACL entries for the Resource Initial ACL. Any ACL entries in the Resource Initial ACL are deleted.

**–x** Sets the Resource Initial ACL to deny all accesses to the LP resource. Any ACL entries in the Resource Initial ACL are deleted. When a new LP resource is created, all accesses will be denied to it.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **chlpriacl** command, you need read and administrator permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See "lpacl " on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chlpriacl** Contains the **chlpriacl** command

## Examples

1. To give user **joe** on **nodeA** execute permission in the Resource Initial ACL on **nodeA**, run one of these commands on **nodeA**:

   ```
   chlpriacl joe@NODEID  x

   chlpriacl joe@LOCALHOST  x
   ```

2. **nodeA** and **nodeB** are in a peer domain. To give user **joe** on **nodeB** execute permission to the Resource Initial ACL on **nodeB**, run this command on **nodeA**:

   ```
   chlpriacl -n nodeB joe@LOCALHOST  x
   ```

   In this example, specifying **joe@NODEID** instead of **joe@LOCALHOST** gives **joe** on **nodeA** execute permission to the Resource Initial ACL on **nodeB**.

3. To give user **joe** on **nodeA** execute permission and **bill** on **nodeA** administrator permission and read permission to the Resource Initial ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl joe@LOCALHOST  x  bill@LOCALHOST  ra
   ```

4. To give user **joe** on **nodeA** execute permission to the Resource Initial ACL on **nodeA**, overwriting the current ACLs so that this is the only access allowed, run this command on **nodeA**:

   ```
   chlpriacl -o joe@LOCALHOST x
   ```

5. To give users **joe**, **bill**, and **jane** on **nodeA** read permission and write permission to the Resource Initial ACL on **nodeA** on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl -l joe@LOCALHOST  bill@LOCALHOST jane@LOCALHOST  rw
   ```

6. To delete access for **joe** on **nodeA** from the Resource Initial ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl -d  joe@LOCALHOST
   ```

7. To add a list of accesses that are in a file named **/mysecure/aclfile** on **nodeA** to the Resource Initial ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl -f /mysecure/aclfile
   ```

   The contents of **/mysecure/aclfile** on **nodeA** could be:

   ```
   joe@LOCALHOST     x
   bill@LOCALHOST    rw
   jane@LOCALHOST    rwa
   ```

8. To set the Resource Initial ACL on **nodeA** so it indicates that the Resource Shared ACL on **nodeA** is used to control accesses for newly-created LP resources on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl -b
   ```

9. To set the Resource Initial ACL on **nodeA** so that it denies all accesses for newly-created LP resources on **nodeA**, run this command on **nodeA**:

   ```
   chlpriacl -x
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlprsacl**, **lslpclacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# chlprsacl

## Name

**chlprsacl** – changes the access controls for the least-privilege (LP) Resource Shared ACL.

## Synopsis

To add one or more accesses to the Resource Shared ACL or to overwrite the Resource Shared ACL with one or more accesses:

**chlprsacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [**-o**] [**-h**] [**-TV**] *ID_1 perm1* [*ID_2 perm2*] ...

To add one or more accesses to the Resource Shared ACL or to overwrite the Resource Shared ACL with one or more accesses all using the same permissions:

**chlprsacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-l** [**-o**] [**-h**] [**-TV**] *ID_1* [*ID_2*...] *perm*

To delete one or more accesses from the Resource Shared ACL:

**chlprsacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-d** [**-h**] [**-TV**] *ID_1* [*ID_2*...]

To add accesses to (or remove accesses from) the Resource Shared ACL or to overwrite the Resource Shared ACL, with the accesses specified in a file:

**chlprsacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] [ **-o** | **-d** ] **-f** *file_name* [**-h**] [**-TV**]

To set the Resource Shared ACL so that no permissions are allowed:

**chlprsacl** [ **-a** | **-n** *host1*[**,***host2*,... ] ] **-x** [**-h**] [**-TV**]

## Description

The **chlprsacl** command changes the access control list (ACL) that is associated with the Resource Shared ACL. This command allows a user to be added to or removed from the Resource Shared ACL. This ACL:

- is used to control accesses to LP resources when the Resource ACL indicates that it (the Resource Shared ACL) has control
- can control access to one or more LP resources
- can consist of ACL entries that define permissions to the LP resources

One Resource Shared ACL exists on each node for the **IBM.LPCommands** class.

The **chlpracl** command is used to indicate that the access to an LP resource is controlled by the Resource Shared ACL. The **chlpriacl** command is used to indicate that accesses to newly-created LP resources are controlled by the Resource Shared ACL, by modifying the Resource Initial ACL.

To add accesses to the Resource Shared ACL, specify the ID and the permission the ID is to have. More than one ID and permission pair can be specified. If you want to add multiple IDs and they will all have the same permission, use the **-l** option to indicate that the format of the command is a list of IDs followed by a single permission that applies to all of the IDs. If you use the **-o** option, the IDs and permissions specified with the command will overwrite the existing accesses. The previously-defined accesses in the ACL are deleted.

To delete accesses from the Resource Shared ACL, use the **-d** option and specify the IDs to be deleted.

Use the **-f** option to indicate that the accesses are specified in a file. Each line of the file will be an ID and permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*ID* Specifies the network identity of the user. If the same *ID* is listed more than once, the last permission specified is used. For a description of how to specify the network identity, see “lpacl ” on page 402.

*perm* Specifies the permission allowed for *ID*. *perm* is specified as a string of one or more characters, where each character represents a particular permission. The valid values for *perm* are:

**r** Read permission (consists of the **q**, **l**, **e**, and **v** permissions)

**w** Write permission (consists of the **d**, **c**, **s**, and **o** permissions)

**a** Administrator permission

**x** Execute permission

**q** Query permission

**l** Enumerate permission

**e** Event permission

**v** Validate permission

**d** Define and undefine permission

**c** Refresh permission

**s** Set permission

**o** Online, offline, and reset permission

**0** No permission

See “lpacl ” on page 402 for a description of each permission and how it applies.

## Options

**–a** Changes the Resource Shared ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable’s setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:

1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **chlprsacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and

a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **chlprsacl –a** runs in the management domain. To run **chlprsacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–d** Removes the ACL entry for the specified ID from the Resource Shared ACL.

**–f** *file_name*
Indicates that the accesses are specified in *file_name*. Each line of this file consists of an ID and the permission for that ID. If the **-d** option is used with the **-f** option, only the ID is needed on each line. Everything after the first space is ignored.

**–l** Indicates that there is a list of IDs followed by a single permission that is used for all of the IDs.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain on which the Resource Shared ACL should be changed. By default, the Resource Shared ACL is changed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–o** Indicates that the specified ACL entries overwrite any existing ACL entries for the Resource Shared ACL. Any ACL entries in the Resource Shared ACL are deleted.

**–x** Sets the Resource Shared ACL to deny all accesses to the LP resources that use the Resource Shared ACL. Any ACL entries in the Resource Shared ACL are deleted.

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP)

resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **chlprsacl** command, you need read and administrator permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See "lpacl " on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/chlprsacl** Contains the **chlprsacl** command

## Examples

1. To give user **joe** on **nodeA** execute permission in the Resource Shared ACL on **nodeA**, run one of these commands on **nodeA**:

```
chlprsacl joe@NODEID  x

chlprsacl joe@LOCALHOST  x
```

2. **nodeA** and **nodeB** are in a peer domain. To give user **joe** on **nodeB** execute permission to the Resource Shared ACL on **nodeB**, run this command on **nodeA**:

   ```
   chlprsacl -n nodeB joe@LOCALHOST  x
   ```

   In this example, specifying **joe@NODEID** instead of **joe@LOCALHOST** gives **joe** on **nodeA** execute permission to the Resource Shared ACL on **nodeB**.
3. To give user **joe** on **nodeA** execute permission and **bill** on **nodeA** administrator permission and read permission to the Resource Shared ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlprsacl joe@LOCALHOST  x  bill@LOCALHOST  ra
   ```
4. To give user **joe** on **nodeA** execute permission to the Resource Shared ACL on **nodeA**, overwriting the current ACLs so that this is the only access allowed, run this command on **nodeA**:

   ```
   chlprsacl -o joe@LOCALHOST x
   ```
5. To give users **joe**, **bill**, and **jane** on **nodeA** read permission and write permission to the Resource Shared ACL on **nodeA** on **nodeA**, run this command on **nodeA**:

   ```
   chlprsacl -l joe@LOCALHOST  bill@LOCALHOST jane@LOCALHOST  rw
   ```
6. To delete access for **joe** on **nodeA** from the Resource Shared ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlprsacl -d  joe@LOCALHOST
   ```
7. To add a list of accesses that are in a file named **/mysecure/aclfile** on **nodeA** to the Resource Shared ACL on **nodeA**, run this command on **nodeA**:

   ```
   chlprsacl -f /mysecure/aclfile
   ```

   The contents of **/mysecure/aclfile** on **nodeA** could be:

   ```
   joe@LOCALHOST     x
   bill@LOCALHOST    rw
   jane@LOCALHOST    rwa
   ```
8. To set the Resource Shared ACL on **nodeA** so that it denies all accesses for LP resources that use it on **nodeA**, run this command on **nodeA**:

   ```
   chlprsacl -x
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **lslpclacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# lslpclacl

## Name

**lslpclacl** – displays the access controls for the least-privilege (LP) resource class (**IBM.LPCommands**).

## Synopsis

To display the access controls for the **IBM.LPCommands** resource class:

- On the local node:
  **lslpclacl** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On all nodes in a domain:
  **lslpclacl -a** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On a subset of nodes in a domain:
  **lslpclacl** { **-n** *host1*[**,***host2*,... ] } [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]

## Description

The **lslpclacl** command displays the access control list (ACL) that is associated with the least-privilege (LP) resource class (**IBM.LPCommands**). The accesses contained in the ACL entries are displayed. The **IBM.LPCommands** Class ACL controls access to the **IBM.LPCommands** class operations. By default, this command displays information in table format (**-t**).

This command displays the following ACL information:

| ***Field*** | ***Description*** |
|---|---|
| **Identity** | The network identity of the user. See “lpacl ” on page 402 for a description of the network identity. |
| **Permissions** | The permissions allowed for **Identity**. The valid values are:<br>**a** Administrator permission<br>**r** Read permission (consists of the **e**, **l**, **q**, and **v** permissions)<br>**w** Write permission (consists of the **c**, **d**, **o**, and **s** permissions)<br>**x** Execute permission<br>**c** Refresh permission<br>**d** Define and undefine permission<br>**e** Event permission<br>**l** Enumerate permission<br>**o** Online, offline, and reset permission<br>**q** Query permission<br>**s** Set permission<br>**v** Validate permission<br>**0** No permission<br>See “lpacl ” on page 402 for a description of each permission. |

**NodeName** The location of the **IBM.LPCommands** resource class (for management domain scope or peer domain scope).

**PeerDomain** The name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined. This field is displayed when the **-p** option is specified.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Options

**–a** Displays the **IBM.LPCommands** Class ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslpclacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lslpclacl –a** runs in the management domain. To run **lslpclacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–i** Generates a template in a form that can be used, after appropriate editing, as file input to the **chlpclacl** command.

**–l** Displays the information on separate lines (long format).

**–t** Displays the information in separate columns (table format). This is the default.

**–d** Displays the information using delimiters. The default delimiter is a pipe symbol (**|**). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default pipe symbol (**|**) — when the information you want to display contains pipe symbols, for example. You can use this option to specify a delimiter of one or more characters.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain from which the **IBM.LPCommands** Class ACL is displayed. By default, the **IBM.LPCommands** Class ACL is displayed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–p** Displays the name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined.

**–E** Displays read permission as **elqv** instead of **r** and write permission as **cdos** instead of **w**.

**–x** Excludes the header (suppresses header printing).

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lslpclacl** command, you need read permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lslpclacl** Contains the **lslpclacl** command

## Examples

1. To list the **IBM.LPCommands** Class ACLs on **nodeA** in table format, run this command on **nodeA**:

   ```
   lslpclacl
   ```

   The output will look like this:

   ```
   Identity                        Permissions     NodeName
   joe@LOCALHOST                   ra              nodeA
   bill@0x374bdcbe384ed38a         rwa             nodeA
   jane@0x374bdcbe384ed38a         rwa             nodeA
   ```

2. To list the **IBM.LPCommands** Class ACLs on **nodeA** in long format, run this command on **nodeA**:

   ```
   lslpclacl -l
   ```

   The output will look like this:

   ```
   Class ACLs for LPRM
   NodeName nodeA
       Identity    =     joe@LOCALHOST
       Permissions =     ra

       Identity    =     bill@0x374bdcbe384ed38a
       Permissions =     rwa

       Identity    =     jane@0x374bdcbe384ed38a
       Permissions =     rwa
   ```

3. To list the **IBM.LPCommands** Class ACLs on **nodeA** in delimited format, run this command on **nodeA**:

   ```
   lslpclacl -d
   ```

   The output will look like this:

   ```
   Identity|Permissions|NodeName
   joe@LOCALHOST|ra|nodeA
   bill@0x374bdcbe384ed38a|rwa|nodeA
   jane@0x374bdcbe384ed38a|rwa|nodeA
   ```

4. To list the **IBM.LPCommands** Class ACLs on **nodeA** in the active domain, run this command:

```
lslpclacl -a
```

   The output will look like this:

```
Identity                        Permissions     NodeName
joe@LOCALHOST                   ra              node1.pok.ibm.com
bill@0x374bdcbe384ed38a         rwa             node1.pok.ibm.com
jane@0x374bdcbe384ed38a         rwa             node1.pok.ibm.com
joe@LOCALHOST                   ra              node2.pok.ibm.com
jane@0x374bdcbe384ed38a         rwa             node2.pok.ibm.com
```

5. To list the **IBM.LPCommands** Class ACLs on **nodeA** in the active domain and list the peer domain name, run this command:

```
lslpclacl -ap
```

   The output will look like this:

```
Identity                        Permissions     NodeName                PeerDomain
joe@LOCALHOST                   ra              node1.pok.ibm.com       PD1
bill@0x374bdcbe384ed38a         rwa             node1.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwa             node1.pok.ibm.com       PD1
joe@LOCALHOST                   ra              node2.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwa             node2.pok.ibm.com       PD1
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **chlprsacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# lslpracl

## Name

**lslpracl** – displays the access controls for a least-privilege (LP) resource.

## Synopsis

To display the access controls for an LP resource:

- On the local node:
  **lslpracl** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-L**] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**] [*name*]
- On all nodes in a domain:
  **lslpracl -a** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-L**] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**] [*name*]
- On a subset of nodes in a domain:
  **lslpracl** { **-n** *host1*[**,***host2*,... ] } [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-L**] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**] [*name*]

## Description

The **lslpracl** command displays the access control list (ACL) that is associated with a least-privilege (LP) resource. The accesses contained in the ACL entries are displayed. The Resource ACL controls access to the LP resources. If no LP resource name is specified, the Resource ACLs for all LP resources are listed. By default, this command displays information in table format (**-t**).

This command displays the following ACL information:

| ***Field*** | ***Description*** |
|---|---|
| **Name** | The name of the LP resource. See “lpacl ” on page 402 for a description of the network identity. |
| **Identity** | The network identity of the user. See “lpacl ” on page 402 for a description of the network identity. |
| **Permissions** | The permissions allowed for **Identity**. The valid values are:<br>**a** Administrator permission<br>**r** Read permission (consists of the **e**, **l**, **q**, and **v** permissions)<br>**w** Write permission (consists of the **c**, **d**, **o**, and **s** permissions)<br>**x** Execute permission<br>**c** Refresh permission<br>**d** Define and undefine permission<br>**e** Event permission<br>**l** Enumerate permission<br>**o** Online, offline, and reset permission<br>**q** Query permission<br>**s** Set permission<br>**v** Validate permission<br>**0** No permission |

See “lpacl ” on page 402 for a description of each permission.

**NodeName** The location of the LP resource (for management domain scope or peer domain scope).

**PeerDomain** The name of the RSCT peer domain in which the LP resource is defined. This field is displayed when the **-p** option is specified.

If the Resource ACL indicates that the Resource Shared ACL controls access to the LP resource, the ID is displayed as **Uses Resource Shared ACL** and there is no permission value. Use the **-L** option to display the Resource Shared ACL when it is used by the Resource ACLs that are being displayed.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Parameters

*name* Specifies the name of the LP resource.

## Options

**–a** Displays the Resource ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable’s setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:

1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslpracl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lslpracl –a** runs in the management domain. To run **lslpracl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–i** Generates a template in a form that can be used, after appropriate editing, as file input to the **chlpracl** command.

**–l** Displays the information on separate lines (long format).

**–t** Displays the information in separate columns (table format). This is the default.

**–d** Displays the information using delimiters. The default delimiter is a pipe symbol (|). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default pipe symbol (|) — when the information you want to display contains pipe symbols, for example. You can use this option to specify a delimiter of one or more characters.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain from which the Resource ACL is displayed. By default, the Resource ACL is displayed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain

scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–L** Displays the accesses of the Resource Shared ACL if the Resource ACL indicates that access is controlled by the Resource Shared ACL.

**–p** Displays the name of the RSCT peer domain in which the LP resource is defined.

**-E** Displays read permission as **elqv** instead of **r** and write permission as **cdos** instead of **w**.

**–x** Excludes the header (suppresses header printing).

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lslpracl** command, you need:

- read permission in the Class ACL of the **IBM.LPCommands** resource class.
- read permission in the Resource ACL.

  As an alternative, the Resource ACL can direct the use of the Resource Shared ACL if this permission exists in the Resource Shared ACL.

Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lslpracl** Contains the **lslpracl** command

## Examples

1. To list the Resource ACLs for the LP resource **lpcommand1** on **nodeA** in table format, run this command on **nodeA**:

   ```
   lslpracl lpcommand1
   ```

   The output will look like this:

   ```
   Resource ACLs for LPRM
   Name            Identity                Permissions     NodeName
   lpcommand1      joe@LOCALHOST           rx              nodeA
   lpcommand1      bill@0x374bdcbe384ed38a rx              nodeA
   lpcommand1      jane@0x374bdcbe384ed38a rwax            nodeA
   ```

2. To list the Resource ACLs for the LP resource **lpcommand1** on **nodeA** in long format, run this command on **nodeA**:

   ```
   lslpracl -l lpcommand1
   ```

   The output will look like this:

```
Resource ACLs for LPRM
Name lpcommand1, NodeName nodeA
    Identity    =     joe@LOCALHOST
    Permissions =     rx

    Identity    =     bill@0x374bdcbe384ed38a
    Permissions =     rx

    Identity    =     jane@0x374bdcbe384ed38a
    Permissions =     rwax
```

3. To list the Resource ACLs for the LP resource **lpcommand1** on **nodeA** in delimited format, run this command on **nodeA**:

   ```
   lslpracl -d lpcommand1
   ```

   The output will look like this:

   ```
   Resource ACLs for LPRM
   Name|Identity|Permissions|NodeName
   lpcommand1|joe@LOCALHOST|rx|nodeA
   lpcommand1|bill@0x374bdcbe384ed38a|rx|nodeA
   lpcommand1|jane@0x374bdcbe384ed38a|rwax|nodeA
   ```

4. To list the Resource ACLs for the LP resource **lpcommand1** in the active domain, run this command on **nodeA**:

   ```
   lslpracl -a lpcommand1
   ```

   The output will look like this:

   ```
   Resource ACLs for LPRM
   Name            Identity                Permissions     NodeName
   lpcommand1      joe@LOCALHOST           rx              nodeA.pok.ibm.com
   lpcommand1      bill@0x374bdcbe384ed38a rx              nodeA.pok.ibm.com
   lpcommand1      jane@0x374bdcbe384ed38a rwax            nodeA.pok.ibm.com
   lpcommand1      joe@LOCALHOST           rx              nodeB.pok.ibm.com
   lpcommand1      jane@0x374bdcbe384ed38a rwax            nodeB.pok.ibm.com
   ```

5. To list the Resource ACLs for all LP resources on **nodeA**, run this command on **nodeA**:

   ```
   lslpracl
   ```

   The output will look like this:

   ```
   Resource ACLs for LPRM
   Name            Identity                Permissions     NodeName
   lpcommand1      joe@LOCALHOST           rx              nodeA
   lpcommand1      bill@0x374bdcbe384ed38a rx              nodeA
   lpcommand1      jane@0x374bdcbe384ed38a rwax            nodeA
   lpcommand2      jim@LOCALHOST           rx              nodeA
   lpcommand2      jane@0x374bdcbe384ed38a rwax            nodeA
   lpcommand3      mary                    rwax            nodeA
   lpcommand4      bob@LOCALHOST           rx              nodeA
   lpcommand4      sam@0x374bdcbe384ed38a  rwax            nodeA
   ```

6. To list the Resource ACLs for the LP resource **lpcommand1** in the active domain and list the peer domain name, run this command on **nodeA**:

   ```
   lslpracl -ap lpcommand1
   ```

   The output will look like this:

   ```
   Resource ACLs for LPRM
   Name            Identity                Permission NodeName            PeerDomain
   lpcommand1      joe@LOCALHOST           rx         nodeA.pok.ibm.com   PD1
   lpcommand1      bill@0x374bdcbe384ed38a rx         nodeA.pok.ibm.com   PD1
   lpcommand1      jane@0x374bdcbe384ed38a rwax       nodeA.pok.ibm.com   PD1
   lpcommand1      joe@LOCALHOST           rx         nodeB.pok.ibm.com   PD1
   lpcommand1      jane@0x374bdcbe384ed38a rwax       nodeB.pok.ibm.com   PD1
   ```

7. To list the Resource ACLs for the LP resource **lpcommand2** on **nodeA**, run this command on **nodeA**:

```
lslpracl lpcommand2
```

   The output will look like this:

```
Resource ACLs for LPRM
Name            Identity                    Permissions   NodeName
lpcommand2      Uses Resource Shared ACL                  nodeA
```

8. To list the Resource ACLs for the LP resource **lpcommand2** on **nodeA**, and show the Resource Shared ACL if it is used, run this command on **nodeA**:

```
lslpracl -L lpcommand2
```

   The output will look like this:

```
Resource ACLs for LPRM
Name            Identity                Permissions     NodeName
lpcommand2      bill@0x374bdcbe384ed38a rx              nodeA
lpcommand2      jane@0x374bdcbe384ed38a rwax            nodeA
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **chlprsacl**, **lslpcmd**, **lslpclacl**, **lslpriacl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# lslpriacl

## Name

**lslpriacl** – displays the access controls for the least-privilege (LP) Resource Initial ACL.

## Synopsis

To display the access controls for the Resource Initial ACL:

- On the local node:
  **lslpriacl** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On all nodes in a domain:
  **lslpriacl -a** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On a subset of nodes in a domain:
  **lslpriacl** { **-n** *host1*[**,***host2*,... ] } [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]

## Description

The **lslpriacl** command displays the access control list (ACL) that is associated with the least-privilege (LP) Resource Initial ACL. The accesses contained in the ACL entries are displayed. The Resource Initial ACL is used as the Initial ACL that gets copied to the Resource ACL when an LP resource is created. By default, this command displays information in table format (**-t**).

This command displays the following ACL information:

| ***Field*** | ***Description*** |
|---|---|
| **Identity** | The network identity of the user. See “lpacl ” on page 402 for a description of the network identity. |
| **Permissions** | The permissions allowed for **Identity**. The valid values are:<br>**a** Administrator permission<br>**r** Read permission (consists of the **e**, **l**, **q**, and **v** permissions)<br>**w** Write permission (consists of the **c**, **d**, **o**, and **s** permissions)<br>**x** Execute permission<br>**c** Refresh permission<br>**d** Define and undefine permission<br>**e** Event permission<br>**l** Enumerate permission<br>**o** Online, offline, and reset permission<br>**q** Query permission<br>**s** Set permission<br>**v** Validate permission<br>**0** No permission<br>See “lpacl ” on page 402 for a description of each permission. |

**NodeName** The location of the **IBM.LPCommands** resource class (for management domain scope or peer domain scope).

**PeerDomain** The name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined. This field is displayed when the **-p** option is specified.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Options

**–a** Displays the Resource Initial ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslpriacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lslpriacl –a** runs in the management domain. To run **lslpriacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–i** Generates a template in a form that can be used, after appropriate editing, as file input to the **chlpriacl** command.

**–l** Displays the information on separate lines (long format).

**–t** Displays the information in separate columns (table format). This is the default.

**–d** Displays the information using delimiters. The default delimiter is a pipe symbol (|). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default pipe symbol (|) — when the information you want to display contains pipe symbols, for example. You can use this option to specify a delimiter of one or more characters.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain from which the Resource Initial ACL is displayed. By default, the Resource Initial ACL is displayed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–p** Displays the name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined.

**-E** Displays read permission as **elqv** instead of **r** and write permission as **cdos** instead of **w**.

**–x** Excludes the header (suppresses header printing).

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lslpriacl** command, you need read permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lslpriacl** Contains the **lslpriacl** command

## Examples

1. To list the Resource Initial ACLs on **nodeA** in table format, run this command on **nodeA**:

   ```
   lslpriacl
   ```

   The output will look like this:

   ```
   Resource Initial ACLs for LPRM
   Identity                        Permissions     NodeName
   joe@LOCALHOST                   rx              nodeA
   bill@0x374bdcbe384ed38a         rwx             nodeA
   jane@0x374bdcbe384ed38a         rwax            nodeA
   ```

2. To list the Resource Initial ACLs on **nodeA** in long format, run this command on **nodeA**:

   ```
   lslpriacl -l
   ```

   The output will look like this:

   ```
   Resource Initial ACLs for LPRM
   NodeName c175n06.ppd.pok.ibm.com
      Identity    =     joe@LOCALHOST
      Permissions =     rx

      Identity    =     bill@0x374bdcbe384ed38a
      Permission  =     rwx

      Identity    =     jane@0x374bdcbe384ed38a
      Permissions =     rwax
   ```

3. To list the Resource Initial ACLs on **nodeA** in delimited format, run this command on **nodeA**:

   ```
   lslpriacl -d
   ```

   The output will look like this:

   ```
   Resource Initial ACLs for LPRM
   Identity|Permissions|NodeName
   joe@LOCALHOST|rx|nodeA
   bill@0x374bdcbe384ed38a|rwx|nodeA
   jane@0x374bdcbe384ed38a|rwax|nodeA
   ```

4. To list the Resource Initial ACLs in the active domain, run this command:

```
lslpriacl -a
```

The output will look like this:

```
Resource Initial ACLs for LPRM
Identity                        Permissions     NodeName
joe@LOCALHOST                   rx              nodeA.pok.ibm.com
bill@0x374bdcbe384ed38a         rwx             nodeA.pok.ibm.com
jane@0x374bdcbe384ed38a         rwax            nodeA.pok.ibm.com
joe@LOCALHOST                   rx              nodeB.pok.ibm.com
jane@0x374bdcbe384ed38a         rwax            nodeB.pok.ibm.com
```

5. To list the Resource Initial ACLs in the active domain and list the peer domain name, run this command:

```
lslpriacl -ap
```

The output will look like this:

```
Resource Initial ACLs for LPRM
Identity                        Permissions     NodeName                PeerDomain
joe@LOCALHOST                   rx              nodeA.pok.ibm.com       PD1
bill@0x374bdcbe384ed38a         rwx             nodeA.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwax            nodeA.pok.ibm.com       PD1
joe@LOCALHOST                   rx              nodeB.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwax            nodeB.pok.ibm.com       PD1
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **chlprsacl**, **lslpcmd**, **lslpclacl**, **lslpracl**, **lslprsacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# lslprsacl

## Name

**lslprsacl** – displays the access controls for the least-privilege (LP) Resource Shared ACL.

## Synopsis

To display the access controls for the Resource Shared ACL:

- On the local node:
  **lslprsacl** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On all nodes in a domain:
  **lslprsacl -a** [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]
- On a subset of nodes in a domain:
  **lslprsacl** { **-n** *host1*[**,***host2*,... ] } [ **-l** | **-i** | **-t** | **-d** | **-D** *delimiter* ] [**-p**] [**-E**] [**-x**] [**-h**] [**-TV**]

## Description

The **lslprsacl** command displays the access control list (ACL) that is associated with the least-privilege (LP) Resource Shared ACL. The accesses contained in the ACL entries are displayed. The Resource Shared ACL controls access to LP resources in which the Resource ACL indicates that the Resource Shared ACL is used. By default, this command displays information in table format (**-t**).

This command displays the following ACL information:

| ***Field*** | ***Description*** |
|---|---|
| **Identity** | The network identity of the user. See “lpacl ” on page 402 for a description of the network identity. |
| **Permissions** | The permissions allowed for **Identity**. The valid values are:<br>**a** Administrator permission<br>**r** Read permission (consists of the **e**, **l**, **q**, and **v** permissions)<br>**w** Write permission (consists of the **c**, **d**, **o**, and **s** permissions)<br>**x** Execute permission<br>**c** Refresh permission<br>**d** Define and undefine permission<br>**e** Event permission<br>**l** Enumerate permission<br>**o** Online, offline, and reset permission<br>**q** Query permission<br>**s** Set permission<br>**v** Validate permission<br>**0** No permission<br>See “lpacl ” on page 402 for a description of each permission. |

**NodeName** The location of the **IBM.LPCommands** resource class (for management domain scope or peer domain scope).

**PeerDomain** The name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined. This field is displayed when the **-p** option is specified.

This command runs on any node. If you want this command to run on all of the nodes in a domain, use the **-a** option. If you want this command to run on a subset of nodes in a domain, use the **-n** option. Otherwise, this command runs on the local node.

## Options

**–a** Displays Resource Shared ACLs on all nodes in the domain. The **CT_MANAGEMENT_SCOPE** environment variable's setting determines the cluster scope. If **CT_MANAGEMENT_SCOPE** is not set, the LP resource manager uses scope settings in this order:
1. The management domain, if it exists
2. The peer domain, if it exists
3. Local scope

The **lslprsacl** command runs once for the first valid scope that the LP resource manager finds. For example, suppose a management domain and a peer domain exist and the **CT_MANAGEMENT_SCOPE** environment variable is not set. In this case, **lslprsacl –a** runs in the management domain. To run **lslprsacl –a** in the peer domain, you must set **CT_MANAGEMENT_SCOPE** to **2**.

**–i** Generates a template in a form that can be used, after appropriate editing, as file input to the **chlprsacl** command.

**–l** Displays the information on separate lines (long format).

**–t** Displays the information in separate columns (table format). This is the default.

**–d** Displays the information using delimiters. The default delimiter is a pipe symbol (**|**). Use the **-D** option if you want to change the default delimiter.

**–D** *delimiter*
Displays the information using the specified delimiter. Use this option to specify a delimiter other than the default pipe symbol (**|**) — when the information you want to display contains pipe symbols, for example. You can use this option to specify a delimiter of one or more characters.

**–n** *host1***[,***host2***,...]**
Specifies the node in the domain from which the Resource Shared ACL is displayed. By default, the Resource Shared ACL is displayed on the local node. This option is valid only in a management domain or a peer domain. If **CT_MANAGEMENT_SCOPE** is not set, first the management domain scope is chosen if it exists, then the peer domain scope is chosen if it exists, and then local scope is chosen, until the scope is valid for the command. The command will run once for the first valid scope found.

**–p** Displays the name of the RSCT peer domain in which the **IBM.LPCommands** resource class is defined.

**-E** Displays read permission as **elqv** instead of **r** and write permission as **cdos** instead of **w**.

**–x** Excludes the header (suppresses header printing).

**–h** Writes the command's usage statement to standard output.

**–T** Writes the command's trace messages to standard error.

**–V** Writes the command's verbose messages to standard output.

## Environment

**CT_CONTACT**
Determines the system where the session with the resource monitoring and control (RMC) daemon occurs. When **CT_CONTACT** is set to a host name or IP address, the command contacts the RMC daemon on the specified host. If **CT_CONTACT** is not set, the command contacts the RMC daemon on the local system where the command is being run. The target of the RMC daemon session and the management scope determine the resource classes or resources that are processed.

**CT_IP_AUTHENT**
When the CT_IP_AUTHENT environment variable exists, the RMC daemon uses IP-based network authentication to contact the RMC daemon on the system that is specified by the IP address to which the CT_CONTACT environment variable is set. CT_IP_AUTHENT only has meaning if CT_CONTACT is set to an IP address; it does not rely on the domain name system (DNS) service.

**CT_MANAGEMENT_SCOPE**
Determines the management scope that is used for the session with the RMC daemon in processing the resources of the least-privilege (LP) resource manager. The management scope determines the set of possible target nodes where resources can be processed. The valid values are:

**0** Specifies *local* scope.

**1** Specifies *local* scope.

**2** Specifies *peer domain* scope.

**3** Specifies *management domain* scope.

If this environment variable is not set, *local* scope is used, unless the **-a** option or the **-n** option is specified.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output. When the **-V** option is specified, this command's verbose messages are written to standard output.

## Standard error

All trace messages are written to standard error.

## Exit status

**0** The command has run successfully.

**1** An error occurred with RMC.

**2** An error occurred with the command-line interface (CLI) script.

**3** An incorrect option was specified on the command line.

**4** An incorrect parameter was specified on the command line.

**5** An error occurred with RMC that was based on incorrect command-line input.

**6** The resource was not found.

## Security

To run the **lslprsacl** command, you need read permission in the Class ACL of the **IBM.LPCommands** resource class. Permissions are specified in the LP ACLs on the contacted system. See “lpacl ” on page 402 for general information about LP ACLs and the *RSCT: Administration Guide* for information about modifying them.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/lslprsacl** Contains the **lslprsacl** command

## Examples

1. To list the Resource Shared ACLs on **nodeA** in table format, run this command on **nodeA**:

   ```
   lslprsacl
   ```

   The output will look like this:

   ```
   Resource Shared ACLs for LPRM
   Identity                        Permissions     NodeName
   joe@LOCALHOST                   rx              nodeA
   bill@0x374bdcbe384ed38a         rwx             nodeA
   jane@0x374bdcbe384ed38a         rwax            nodeA
   ```

2. To list the Resource Shared ACLs on **nodeA** in long format, run this command on **nodeA**:

   ```
   lslprsacl -l
   ```

   The output will look like this:

   ```
   Resource Shared ACLs for LPRM
   NodeName c175n06.ppd.pok.ibm.com
      Identity    =     joe@LOCALHOST
      Permissions =     rx

      Identity    =     bill@0x374bdcbe384ed38a
      Permissions =     rwx

      Identity    =     jane@0x374bdcbe384ed38a
      Permissions =     rwax
   ```

3. To list the Resource Shared ACLs on **nodeA** in delimited format, run this command on **nodeA**:

   ```
   lslprsacl -d
   ```

   The output will look like this:

   ```
   Resource Shared ACLs for LPRM
   Identity|Permissions|NodeName
   joe@LOCALHOST|rx|nodeA
   bill@0x374bdcbe384ed38a|rwx|nodeA
   jane@0x374bdcbe384ed38a|rwax|nodeA
   ```

4. To list the Resource Shared ACLs in the active domain, run this command:

```
lslprsacl -a
```

The output will look like this:

```
Identity                        Permissions     NodeName
joe@LOCALHOST                   rx              nodeA.pok.ibm.com
bill@0x374bdcbe384ed38a         rwx             nodeA.pok.ibm.com
jane@0x374bdcbe384ed38a         rwax            nodeA.pok.ibm.com
joe@LOCALHOST                   rx              nodeB.pok.ibm.com
jane@0x374bdcbe384ed38a         rwax            nodeB.pok.ibm.com
```

5. To list the Resource Shared ACLs in the active domain and list the peer domain name, run this command:

```
lslprsacl -ap
```

The output will look like this:

```
Resource Shared ACLs for LPRM
Identity                        Permissions     NodeName                PeerDomain
joe@LOCALHOST                   rx              nodeA.pok.ibm.com       PD1
bill@0x374bdcbe384ed38a         rwx             nodeA.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwax            nodeA.pok.ibm.com       PD1
joe@LOCALHOST                   rx              nodeB.pok.ibm.com       PD1
jane@0x374bdcbe384ed38a         rwax            nodeB.pok.ibm.com       PD1
```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:

- the least-privilege (LP) resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **chlprsacl**, **lslpcmd**, **lslpclacl**, **lslpracl**, **lslpriacl**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

“lpacl ” on page 402, for general information about LP ACLs

# Chapter 16. LP man pages

# lpacl

## Name

**lpacl** – provides general information about protecting the least-privilege (LP) commands resource class and its resources using access controls that are provided by the resource monitoring and control (RMC) subsystem.

## Description

RMC controls access to all of its resources and resource classes through access control lists (ACLs), using two different ACL implementations. The implementation that RMC uses depends on which class is involved. The two major differences between the implementations are in: 1) the mechanisms with which ACLs are viewed and modified and 2) whether ACLs are associated with individual resources.

RMC implements access controls for its resources and resource classes in the following ways:

1. Through ACLs that are defined by resource class stanzas in the **ctrmc.acls** file.

   You can view these ACLs by examining the **ctrmc.acls** file. You can modify these ACLs using the **chrmcacl** command. Use a stanza to define an ACL that applies to a class or to all of the resources in a class.

   RMC uses this method for all of its resources and resource classes, except for the **IBM.LPCommands** resource class and its resources.

   For more information about the **ctrmc.acls** file and the ACLs it defines, see “ctrmc.acls ” on page 160 and the *RSCT: Administration Guide*.
2. Through ACLs that are associated with resources and a resource class within the RMC subsystem.

   You can view and modify these ACLs using LP commands. You can define an ACL that applies to a class or an ACL that applies to an individual resource of a class.

   RMC uses this method for the **IBM.LPCommands** resource class and its resources.

   This man page provides information about ACLs that are specific to the **IBM.LPCommands** resource class and its resources.

The LP resource manager uses the **IBM.LPCommands** resource class to define LP resources. These resources represent commands or scripts that require **root** authority to run, but typically the users who need to run these commands do not have **root** authority. By using the LP resource manager commands, users can run commands that require **root** authority. The LP resource manager commands are:

| | |
|---|---|
| **chlpcmd** | Changes the read/write attribute values of an LP resource |
| **lphistory** | Lists or clears a certain number of LP commands that were previously issued during the current RMC session |
| **lslpcmd** | Lists information about the LP resources on one or more nodes in a domain |
| **mklpcmd** | Defines a new LP resource to RMC and specifies user permissions |
| **rmlpcmd** | Removes one or more LP resources from the RMC subsystem |
| **runlpcmd** | Runs an LP resource |

For descriptions of these commands, see Chapter 14, “Least-privilege (LP) resource manager commands,” on page 331. For information about how to use these commands, see the *RSCT: Administration Guide*.

Because each LP resource can define a unique command, RMC implements ACLs for the **IBM.LPCommands** class that allow access to be controlled at the individual resource level and at the class level. RSCT provides a set of commands that you can use to list and modify the ACLs for the **IBM.LPCommands** class and its resources. The LP ACL commands are:

**chlpclacl** Changes the Class ACL

**chlpracl** Changes the Resource ACL

**chlpriacl** Changes the Resource Initial ACL

**chlprsacl** Changes the Resource Shared ACL

**lslpclacl** Lists the Class ACL

**lslpracl** Lists the Resource ACL

**lslpriacl** Lists the Resource Initial ACL

**lslprsacl** Lists the Resource Shared ACL

**mklpcmd** Defines a new LP resource to RMC and specifies user permissions

For descriptions of these commands, see Chapter 15, “LP access control list (ACL) commands,” on page 357 and “mklpcmd ” on page 345. For information about how to use these commands, see the *RSCT: Administration Guide*.

## Basic ACL structure

Typically, an ACL is composed of a list of ACL entries. Each ACL entry specifies an identity and a set of permissions granted to that identity. The complete list of ACL entries determines how the ACL controls access to the associated class or resource.

A resource-associated ACL can refer to another ACL instead of containing a list of ACL entries itself. When a resource-associated ACL refers to another ACL, the set of ACL entries in the referenced ACL controls access to the resource.

## Types of ACLs

Four types of ACLs control access to the **IBM.LPCommands** class and its resources, as follows:

**Class ACL**

A *Class ACL* controls access to class operations on one node. You need to have been granted specific permissions to perform class operations, such as listing class attributes, creating class resources, and deleting class resources.

A Class ACL is composed of a list of ACL entries. The list of ACL entries controls access to class operations on the node. If the list is empty, no identity is permitted to perform class operations on the node.

When you try to perform a class operation on the **IBM.LPCommands** class on a node — creating a new resource, for example — RMC checks the Class ACL on that node to verify that you have the required permission to perform the operation. If you do not have the required permission, the operation is rejected.

One Class ACL exists on each node for the **IBM.LPCommands** class. Each node's Class ACL controls access to all **IBM.LPCommands** class operations on that node.

**Resource ACL**

A *Resource ACL* controls access to resource operations for one LP resource. You need to have been granted specific permissions to perform resource operations, such as listing resource attributes, modifying resource attributes, and running resource commands.

A Resource ACL can be composed of a list of ACL entries. In this case, the list of ACL entries controls access to resource operations for that resource. If the list is empty, no identity is permitted to perform resource operations for the resource.

A Resource ACL can refer to the Resource Shared ACL instead of containing a list of ACL entries itself. In this case, the list of ACL entries in the Resource Shared ACL controls access to resource operations for the resource. If the list is empty, no identity is permitted to perform resource operations for the resource.

When you try to perform a resource operation on an LP resource — running an LP command, for example — RMC first checks the Resource ACL for the selected resource to determine whether the Resource ACL contains a list of ACL entries or whether it refers to the Resource Shared ACL. If the Resource ACL has a list of ACL entries, RMC checks that list to verify that you have the required permission to perform the operation. If you do not have the required permission, the operation is rejected.

If the Resource ACL refers to the Resource Shared ACL, RMC checks the Resource Shared ACL to verify that you have the required permission to perform the operation. If you do not have the required permission, the operation is rejected.

One Resource ACL exists for each LP resource. When a Resource ACL refers to the Resource Shared ACL, the Resource Shared ACL that is being referenced is the one on the same node as the resource.

**Resource Initial ACL**

A *Resource Initial ACL* defines the initial contents of a Resource ACL created on a node.

Because a Resource Initial ACL is used to initialize Resource ACLs, a Resource Initial ACL can contain a list of ACL entries or a reference to the Resource Shared ACL.

When a new LP resource is created, its Resource ACL is initialized as specified by the Resource Initial ACL on the node.

One Resource Initial ACL exists on each node for the **IBM.LPCommands** class.

**Resource Shared ACL**

A *Resource Shared ACL* can control access to resource operations for multiple resources on one node.

A Resource Shared ACL is composed of a list of ACL entries. The list of ACL entries controls access to resource operations for all of the resources on the node that refer to the Resource Shared ACL. As with the other ACL types, the list of ACL entries can be empty.

To use this ACL, place ACL entries in it as you would in a Resource ACL. Then, modify the Resource ACLs on the same node to refer to the Resource Shared ACL. Using the Resource Shared ACL, you can use one list of ACL entries to control access to multiple resources on the same node.

One Resource Shared ACL exists on each node for the **IBM.LPCommands** class.

## ACL entries

An RMC ACL for LP commands specifies a list of ACL entries. Each ACL entry defines a user identity and that identity's user permissions. A *user identity* is an authenticated network identity. The *user permissions* specify the access that a user has to the class or to the resources.

***User identities:*** In an RMC ACL entry, the user identity can be in one of the following three forms:

1. [**host:**]*host_user_identifier*

   Specifies a host user identifier. The optional **host:** keyword specifies that the user identifier can be matched against a network identifier that is provided by the host-based authentication (HBA) security mechanism. If the **host:** keyword is omitted and the entry does not take one of the other forms described, the entry is assumed to be a host user identifier. The host user identifier can be in one of the following three forms:

   a. *user_name*@*host_identifier*

      Specifies a particular authenticated user. You can specify *host_identifier* in several different formats. These formats, which are the same as when the host user identifier format is specified as a host identifier alone, are described as follows.

   b. *host_identifier*

      Specifies any authenticated user on the host identified. The host identifier can be:

      - a fully-qualified host name.
      - a short host name.
      - an IP address.
      - the RSCT node ID. This is the 16-digit hexadecimal number, for example: **0xaf58d41372c47686**.
      - the keyword **LOCALHOST**. This keyword is a convenient shorthand notation for the RSCT node ID of the node where the ACL exists. The **LOCALHOST** keyword is stored in the ACL.
      - the keyword **NODEID**. This keyword is a convenient shorthand notation for the RSCT node ID of the node where an ACL editing command is running. The **NODEID** keyword is not stored in the ACL; the node ID that the keyword represents is actually stored in the ACL..

   c. *"******"*

      Specifies any authenticated user on any host. The asterisk (*) must be enclosed in double quotation marks when it is specified as command input.

2. **none:***mapped_user_identifier*

   Specifies a mapped name, as defined in the **ctsec_map.global** file or the **ctsec_map.local** file. For more information, see "ctsec_map.global, ctsec_map.local" on page 161. For information about mapped user identifiers, see the *RSCT: Administration Guide*.

3. **UNAUTHENT**
   Specifies any unauthenticated user.

Some typical forms of a user identity are:

*user@full_host_name*
*user@short_host_name*
*user@ip_address*
*user@node_ID*
*user*@**LOCALHOST**
*full_host_name*
*short_host_name*
*IP_address*
*node_ID*
**LOCALHOST**
*

When you are running LP commands, the *host_identifier* parameter is often expected to be the RSCT node ID. You can use the **NODEID** keyword to represent the node ID of the node on which the command runs. To determine the node ID otherwise, enter:

```
lsrsrc IBM.Host NodeIDs
```

To determine all of the node IDs in a management domain or a peer domain, enter:

```
lsrsrc -ta IBM.Host NodeIDs NodeNameList
```

The node ID is displayed in decimal format. Use the hexadecimal equivalent for the *host_identifier*, preceded by **0x**. If the nodes are in a peer domain, enter:

```
lsrpnode -i
```

The node ID is displayed in hexadecimal. To use this value in the commands, you need to precede this value with **0x**. If the **CT_CONTACT** environment variable is used to specify where the RMC session occurs, the host_identifier is expected to be a fully-qualified host name, a short host name, or an IP address.

***User permissions:*** The user permissions are expressed as a string of one or more characters, each representing a particular permission.

To compensate for the fine granularity of the permission set, RSCT provides two composite permissions. The **r** permission consists of individual permissions that allow ″read″ types of operations. The **w** permission consists of individual permissions that allow ″write″ types of operations. Most ACL entries will probably use these convenient composite permissions.

*The permission set:* The next two sections show two different views of the defined permission set. The first section describes the permission set using the composite permissions. The second section describes the permission set using the individual permissions.

**Using composite permissions**

**r** Read permission.
- To view the resource attribute values for an LP resource, you need this permission for the LP resource.
- To view the **IBM.LPCommands** class attribute values, you need this permission for the **IBM.LPCommands** class.

- You need this permission to list the LP ACLs.

Therefore, this permission is meaningful for any LP ACL. Read permission consists of the **q**, **l**, **e**, and **v** permissions.

**w** Write permission.

- To change the resource attribute values for an LP resource, you need this permission for the LP resource.
- To change the class attribute values for the **IBM.LPCommands** class, you need this permission for the **IBM.LPCommands** class.
- To create or delete LP resources, you need this permission for the **IBM.LPCommands** class.

Therefore, this permission is meaningful for any LP ACL. Write permission consists of the **d**, **s**, **c**, and **o** permissions.

**a** Administrator permission.

- To change the Resource ACL for an LP resource, you need this permission for the LP resource.
- To change the Class ACL, the Resource Initial ACL, or the Resource Shared ACL, you need this permission for the **IBM.LPCommands** class.

Therefore, this permission is meaningful for any LP ACL.

**x** Execute permission. To run an LP command that is defined in an LP resource, you need this permission for the LP resource. Therefore, this permission is meaningful for the LP Resource ACL, the Resource Initial ACL, and the Resource Shared ACL.

**0** No permission. This permission denies you access to an LP resource or to the **IBM.LPCommands** class. Therefore, this permission is meaningful for any LP ACL.

**Using individual permissions**

**q** Query permission.

- To query the resource attribute values for an LP resource, you need this permission for the LP resource.
- To query the class attribute values, you need this permission for the **IBM.LPCommands** class.
- You need this permission to list the LP ACLs.

Therefore, this permission is meaningful for any LP ACL.

**l** Enumerate permission. To list the LP resources, you need this permission for the **IBM.LPCommands** class. Therefore, this permission is meaningful for the Class ACL.

**e** Event permission. To register, unregister, or query events, you need this permission for an LP resource or for the **IBM.LPCommands** class. Therefore, this permission is meaningful for any LP ACL.

**v** Validate permission. You need this permission to validate that an LP resource handle still exists. Therefore, this permission is meaningful for the Resource ACL, the Resource Initial ACL, and the Resource Shared ACL.

**d** Define and undefine permission. To create or delete LP resources, you need this permission for the **IBM.LPCommands** class. Therefore, this permission is meaningful for the Class ACL.

**c** Refresh permission. To refresh the **IBM.LPCommands** class configuration,

you need this permission for the **IBM.LPCommands** class. Therefore, this permission is meaningful for the Class ACL.

**s** Set permission.

- To set resource attribute values for an LP resource, you need this permission for the LP resource.
- To set class attribute values, you need this permission for the **IBM.LPCommands** class.

Therefore, this permission is meaningful for any LP ACL.

**o** Online, offline, and reset permission. Because LP resources do not support the online, offline, and reset operations, this permission has no meaning in LP ACLs.

**a** Administrator permission.

- To change the Resource ACL for an LP resource, you need this permission for the LP resource.
- To change the Class ACL, the Resource Initial ACL, or the Resource Shared ACL, you need this permission for the **IBM.LPCommands** class.

Therefore, this permission is meaningful for any LP ACL.

**x** Execute permission. To run an LP command that is defined in an LP resource, you need this permission for the LP resource. Therefore, this permission is meaningful for the LP Resource ACL, the Resource Initial ACL, and the Resource Shared ACL.

**0** No permission. This permission denies you access to an LP resource or to the **IBM.LPCommands** class. Therefore, this permission is meaningful for any LP ACL.

Some permission characters have no meaning in certain types of ACLs. For example, the **l** permission has no meaning in a Resource ACL. A permission character that has no meaning in a certain type of ACL can be present in the ACL with no ill effect. For example, the **l** permission can be specified in an ACL entry of a Resource ACL. The presence of meaningless permissions in ACL entries is inevitable when the composite permissions are used.

In addition to the permissions that are granted explicitly by ACL entries, the **root** mapped identity always has query and administrator permission for ACL operations. If an ACL is set so that all access is denied, the **root** mapped identity can still be used to change the ACL, due to its implicit authority.

The system administrator needs to determine how ACLs should be defined for the **IBM.LPCommands** class and its resources. This depends on which operations users are required to perform.

## Security

- To use the LP commands that change the Class ACL, the Resource Initial ACL, and the Resource Shared ACL, you must have query and administrator permission for the **IBM.LPCommands** class.
- To use the LP command that changes a Resource ACL for an LP resource, you must have query and administrator permission for the LP resource.
- To use the LP commands that list the Class ACL, the Resource Initial ACL, and the Resource Shared ACL, you must have query permission for the **IBM.LPCommands** class.

- To use the LP command that lists a Resource ACL for an LP resource, you must have query permission for the LP resource.

The **Security** section of each LP command description indicates which permissions are required for the command to run properly.

## Implementation specifics

This man page is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/man/lpacl.7** Contains the **lpacl** man page

## Examples

Some examples of how to modify the LP ACLs follow. In these examples, the commands are run on a management server for a group of nodes in a management domain. The management server is named **ms_node** and the managed nodes are called **mc_node1**, **mc_node2**, and so forth. In a management domain, it is most likely that the LP resources will be defined on the management server and the LP commands themselves will be targeted to the managed nodes. In these examples, the Resource Shared ACL is not used because separate permissions are desired for the individual LP resources. These examples assume that the LP resources have not yet been defined using the **mklpcmd** command.

1. You want to define the **lpadmin** ID to be the administrator for the LP commands. This ID will have the authority to modify the LP ACLs. You also want to give this ID read and write permission to be able to create, delete, and modify the LP resources. To set this up, use the **root** mapped identity to run these commands on the management server:

   ```
   chlpclacl lpadmin@LOCALHOST rwa
   chlpriacl lpadmin@LOCALHOST rwa
   ```

   These commands define the **lpadmin** ID on the management server as having administrator, read, and write permission for the **IBM.LPCommands** class and for the Resource Initial ACL. The Resource Initial ACL is used to initialize a Resource ACL when an LP resource is created. Therefore, when an LP resource is created, the **lpadmin** ID will have administrator, read, and write permission to it.
2. The **lpadmin** ID can now create LP resources that define the LP commands that are needed. See “mklpcmd ” on page 345 for a description on how to create the LP resources. Access to the LP resources can be defined using the **mklpcmd** command or the **chlpracl** command. When the resource is created, the Resource Initial ACL is copied to the Resource ACL. To modify the Resource ACL using the **chlpracl** command so that **joe** will be able to use the **runlpcmd** command for the resource named **SysCmd1**, the **lpadmin** ID runs this command on the management server:

   ```
   chlpracl SysCmd1 joe@LOCALHOST x
   ```

   This gives **joe** on the management server execute permission to the **SysCmd1** resource so he can use the **runlpcmd** command.
3. In this example, only the **lpadmin** ID has permission to create, delete, and modify LP resources. Use the **chlpclacl** command to let other users create and delete LP resources. In this case, they need to have write access to the class. To be able to list the resources in the **IBM.LPCommands** class, read permission is required. Read permission on a Resource ACL allows a user to

view that LP resource. Write permission on a Resource ACL allows a user to modify that LP resource. To allow **joe** to view the LP resource named **SysCmd1**, the **lpadmin** ID runs this command on the management server:

```
chlpracl SysCmd1 joe@LOCALHOST r
```

4. There are several nodes in a peer domain. There is an LP resource called **SysCmdB1** on **nodeB** for which **joe** needs execute permission. In addition, **joe** needs to have execute permission from nodes **nodeA**, **nodeB**, and **nodeD**. If you run the **chlpracl** command on **nodeB**, you can use **joe@LOCALHOST** for **nodeB**, but you need to determine the node IDs for **nodeA** and **nodeD**. To obtain the node IDs, enter:

   ```
   lsrpnode -i
   ```

   The output will look like this:

   ```
   Name    OpState RSCTVersion NodeNum NodeID
   nodeA   Online  2.4.2.0     2       48ce221932ae0062
   nodeB   Online  2.4.2.0     1       7283cb8de374d123
   nodeC   Online  2.4.2.0     4       b3eda8374bc839de
   nodeD   Online  2.4.2.0     5       374bdcbe384ed38a
   nodeE   Online  2.4.2.0     2       ba74503cea374110
   nodeF   Online  2.4.2.0     1       4859dfbd44023e13
   nodeG   Online  2.4.2.0     4       68463748bcc7e773
   ```

   Then, to give **joe** the permissions as stated above, run on nodeB:

   ```
   chlpracl SysCmd1 -l joe@LOCALHOST joe@0x48ce221932ae0062 \
   joe@0x374bdcbe384ed38a x
   ```

## Author

cluster@us.ibm.com

## See also

Books: *RSCT: Administration Guide*, for information about:
- the LP resource manager
- how to use ACLs

Commands: **chlpclacl**, **chlpracl**, **chlpriacl**, **chlprsacl**, **chlpcmd**, **chrmcacl**, **lphistory**, **lslpclacl**, **lslpcmd**, **lslpracl**, **lslpriacl**, **lslprsacl**, **lsrpnode**, **lsrsrc**, **mklpcmd**, **rmlpcmd**, **runlpcmd**

Files: **ctrmc.acls**, **ctsec_map.global**, **ctsec_map.local**

# Part 9. Topology services and group services

# Chapter 17. Commands for subsystem control and status

# cthactrl

## Name

**cthactrl** – controls subsystems within a cluster.

## Synopsis

**cthactrl -i** *init_opt* | **-s** | **-k** | **-b** | **-r** | **-d** | **-z** | **-h**

## Description

The **cthactrl** command establishes and controls cluster subsystem information and manages topology services and group services.

## Options

**-i** *init_opt*
: Initializes the group services and topology services subsystems, where *init_opt* can be specified as:

  **-c** *cluster_name*
  : Specifies the cluster name.

  **-n** *nodenum*
  : Specifies the node number.

  **-e** *environ*
  : Specifies the subdirectory that contains the cluster access modules.

  **-p** *portspec*
  : Specifies the UDP port numbers for group services and topology services.

**-s**
: Starts the group services and topology services subsystems.

**-k**
: Stops the group services and topology services subsystems.

**-b**
: Rebuilds the group services and topology services subsystems' configurations (**machines.lst**, for example).

**-r**
: Refreshes the group services and topology services subsystems.

**-d**
: Deletes the group services and topology services subsystems.

**-z**
: Deinstalls the group services and topology services subsystems.

**-h**
: Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Exit status

**0**
: Successful completion.

*a non-zero value*
: A failure has occurred.

## Security

You must have **root** authority to run this command.

## Restrictions

This command applies to the **cthags** and **cthats** subsystems only.

## Location

**/usr/sbin/rsct/bin/cthactrl** Contains the **cthactrl** command

## Examples

1. To initialize the local node as a part of the cluster of **filesys1** and designate **12347** as the UDP port number for **cthags** and **12348** as the UDP port number for **cthags**, enter:

   ```
   cthactrl -i -c filesys1 -n 1 -p "cthats=12347,cthags=12348" -e filesys1
   ```

2. To start the group services and topology services subsystems (**cthags** and **cthats**), enter:

   ```
   cthactrl -s
   ```

3. To stop the group services and topology services subsystems (**cthags** and **cthats**), enter:

   ```
   cthactrl -k
   ```

## Author

cluster@us.ibm.com

## See also

Commands: **cthagsctrl**, **cthagstune**, **cthatsctrl**, **cthatstune**, **lssrc**, **nlssrc**

# nlssrc

## Name

**nlssrc** – displays the status of a subsystem or a group of subsystems in canonical form.

## Synopsis

To display all status:

**nlssrc** [**–h** *host*] **–a**

To display group status:

**nlssrc** [**–h** *host*] **–g** *group_name*

To display subsystem status in canonical form:

**nlssrc** [**–h** *host*] [**–l**] [**–c**] **–s** *subsystem_name*

To display status by PID in canonical form:

**nlssrc** [**–h** *host*] [**–l**] [**–c**] **–p** *subsystem_pid*

## Description

Use the **nlssrc** command to display the status of a subsystem or a group of subsystems in canonical form.

## Options

**–a** Displays the current status of all defined subsystems.

**–c** Requests the canonical **lssrc** output of the supported subsystems.

**–g** *group_name*
Specifies a group of subsystems for which to get status. The command will fail if the subsystem object class does not contain *group-name*.

**–h** *host*
Specifies the foreign host on which this status action is requested. The local user must be running as root. The remote system must be configured to accept remote system resource controller (SRC) requests. That is, the **srcmstr** daemon (see **/etc/inittab**) must be started with the **–r** option and the **/etc/hosts.equiv** file or the **.rhosts** file must be configured to allow remote requests.

**–l** Requests that a subsystem send its current status in long form. Long status requires that a status request be sent to the subsystem; it is the responsibility of the subsystem to return the status.

**–p** *subsystem_pid*
Specifies a particular instance of the *subsystem_pid* parameter to get status for, or a particular instance of the subsystem to which the status subserver request is to be taken.

**–s** *subsystem_name*
Specifies a subsystem for which to get status. The *subsystem_name*

parameter can be the actual subsystem name or the synonym name for the subsystem. The command will fail if the subsystem object class does not contain *subsystem*.

## Security

You do *not* need **root** authority to run this command.

## Restrictions

This command applies to the **cthags** and **cthats** subsystems only.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/nlssrc** Contains the **nlssrc** command

## Examples

1. To get **nlssrc** output in English from a subsystem called **ctsubsys**, enter:

   ```
   nlssrc -c -ls ctsubsys
   ```

2. The following example shows the same information in different formats:

   **Local-dependent format:**

   ```
   nlssrc -ls ctsubsys

   Subsystem  Group     PID   Status
   ctsubsys   ctsubsys  6334  active
   2 locally-connected clients.  Their PIDs:
   15614 23248
   HA Subsystem domain information:
   Domain established by node 5
   Number of groups known locally: 1
                       Number of          Number of local
   Group Name          providers          providers/subscribers
   ha_filesys             7                   1        0
   ```

   **Canonical format:**

   ```
   nlssrc -ls ctsubsys -c

   Number of local clients: 2
   PIDs: 15614 23248
   HA Subsystem domain information:
   Domain established by node 5.
   Number of known local groups: 1
   Group Name: ha_filesys
        Providers: 7
        Local Providers: 1
        Local Subscribers: 0
   ```

## See also

Commands: **lssrc**

## Author

Myung Bae -- cluster@us.ibm.com

# Chapter 18. Topology services commands

Topology services is a distributed subsystem that provides information to other subsystems about the state of the nodes and adapters in the cluster.

# cthatsctrl

## Name

**cthatsctrl** – controls the topology services subsystem.

## Synopsis

**cthatsctrl** { **–a** [ **-p** *port-number* ] | **-s** | **-k** | **-d** | **-b** | **-t** | **-o** | **-r** | **-h** }

## Description

The **cthatsctrl** control command controls the operation of the topology services subsystem. The subsystem is under the control of the system resource controller (SRC) and belongs to a subsystem group called **cthats**. Associated with each subsystem is a daemon and a command that configures and starts the daemon.

An instance of the topology services subsystem runs on every node of a cluster.

### Adding the subsystem

When the **–a** option is specified, the control command adds the topology services subsystem to the SRC. The control command:

1. Makes sure the **cthats** subsystem is stopped.
2. Gets the port number from the cluster data makes sure the port number is set in the **/etc/services** file.

   The service name that is entered in the **/etc/services** file is **cthats**.
3. Removes the **cthats** subsystem from the SRC (in case it is still there).
4. Adds the **cthats** subsystem to the SRC.

### Starting the subsystem

When the **–s** option is specified, the control command starts to start the topology services subsystem, **cthats**.

### Stopping the subsystem

When the **–k** option is specified, the control command stops the topology services subsystem, **cthats**.

### Deleting the subsystem

When the **–d** option is specified, the control command removes the topology services subsystem from the SRC. The control command:

1. Makes sure the **cthats** subsystem is stopped
2. Removes the **cthats** subsystem from the SRC
3. Removes the **cthats** port number from the **/etc/services** file

### Rebuilding the configuration

When the **-b** option is specified, the control command reads the configuration information from the cluster data and builds a configuration file, **machines.lst**, for the topology services daemon.

### Turning tracing on

When the **–t** option is specified, the control command turns tracing on for the topology services daemon .

**Turning tracing off**

When the **–o** option is specified, the control command turns tracing off (returns it to its default level) for the topology services daemon .

**Refreshing the subsystem**

When the **–r** option is specified, the control command refreshes the subsystem . The **-r** option signals the daemon to read the rebuilt information.

## Options

**–a [–p** *port-number*]
: Adds the subsystem.

**-s** Starts the subsystem.

**-k** Stops the subsystem.

**-d** Deletes the subsystem.

**-t** Turns tracing on for the subsystem.

**-o** Turns tracing off for the subsystem.

**-b** Rebuilds the topology services configuration file from the configuration information in the cluster data.

**-r** Refreshes the subsystem.

**-h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

This command writes any error messages to standard error.

## Exit status

**0** Indicates that the command completed successfully.

*a non-zero value*
: Indicates that an error occurred.

## Security

You must have **root** authority to run this command.

## Restrictions

This command is valid in a peer domain only.

Use this command *only* under the direction of the IBM Support Center.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/cthatsctrl** Contains the **cthatsctrl** command

## Examples

1. To add the topology services subsystem to the SRC, enter:
   ```
   cthatsctrl -a
   ```
2. To start the topology services subsystem, enter:
   ```
   cthatsctrl -s
   ```
3. To stop the topology services subsystem, enter:
   ```
   cthatsctrl -k
   ```
4. To delete the topology services subsystem from the SRC, enter:
   ```
   cthatsctrl -d
   ```
5. To turn tracing on for the topology services daemon, enter:
   ```
   cthatsctrl -t
   ```
6. To turn tracing off for the topology services daemon, enter:
   ```
   cthatsctrl -o
   ```
7. To rebuild the topology services configuration file from the configuration information in the cluster data, enter:
   ```
   cthatsctrl -b
   ```
8. To signal all the topology services daemons in the cluster to read the new configuration file, enter:
   ```
   cthatsctrl -r
   ```
9. To write usage information to standard output, enter:
   ```
   cthatsctrl -h
   ```

## Author

Felipe Knop - cluster@us.ibm.com

## See also

Commands: **cthactrl**, **cthagsctrl**, **cthatstune**, **lssrc**

# cthatstune

## Name

**cthatstune** – views and changes the topology services subsystem's tunable parameters at run time.

## Synopsis

**cthatstune** [ **-f** [*network1*]**:***frequency1*[**,**[*network2*]**:***frequency2*...] ] [ **-s** [*network1*]**:***sensitivity1*[**,**[*network2*]**:***sensitivity2*...] ] [**-p** *priority*] [**-l** *log_length*] [**-m** *pin_object*] [**-r**] [**-v**] [**-h**]

## Description

The **cthatstune** command changes the topology services subsystem's tunable parameters at run time. The topology services subsystem has two types of tunable parameters:

**subsystem-wide**
Affects the behavior of the topology services subsystem. This type includes the fixed priority level, the maximum length of the log file, and the object to be pinned in main memory.

**per-network** Affects the behavior of each network. This type includes the heartbeat frequency and sensitivity.

The **cthatstune** command changes the parameters in the cluster data. The new values will not take effect until the topology services daemon reads in the new values from the cluster data. You can use a refresh operation to instruct the topology services daemon to read the new values from the cluster data. You can start a refresh operation by issuing the **cthatsctrl -r** command or the **cthatstune -r** command on one of the nodes in the cluster.

In addition to the real values, two special values: **VIEW** and **DEFAULT**, can be used to display the current setting and to use the default value of the tunable parameter, respectively.

For per-network tunable parameters, in addition to the network name, an empty network name or the special network name **ALL** can be used to specify that the value following the network name applies to all networks.

## Options

**-f [***network1***]:***frequency1***[,[***network2***]:***frequency2***...]**
Specifies the *heartbeat frequency*, which is the interval in seconds between heartbeats, for one or more networks.

The value of *frequency* can be an integer from **1** to **30**. The default value is **1**.

**-s [***network1***]:***sensitivity1***[,[***network2***]:***sensitivity2***...]**
Specifies the maximum number of missing heartbeats for one or more networks. If this maximum is exceeded, the topology services daemon considers the peer to be inactive.

The value of *sensitivity* can be any integer from **4** to **40**. The default value is **4**.

**–p** *priority*
Specifies the fixed priority level. The value of *priority* can be **0**, which means “do not run in fixed priority level,” or an integer from **1** to **80**. The default value is **30**.

**-l** *log_length*
Specifies the maximum log file length (in number of lines). The value of *log_length* can be any integer from **2000** to **1 000 000**. The default value is **5000**.

**–m** *pin_object* **[,***pin_object***...]**
Specifies the object to be pinned in main memory. Valid values are:

| | |
|---|---|
| **NONE** | Does not pin any object in main memory. |
| **TEXT** | Specifies the TEXT object to be pinned in main memory. |
| **DATA** | Specifies the DATA object to be pinned in main memory. |
| **STACK** | Specifies the STACK object to be pinned in main memory. |
| **PROC** | Specifies that all pinnable objects should be pinned in main memory. This is the default value. |

**–r** Applies the new tunables and refreshes the topology services subsystem.

**–v** Provides verbose output.

**-h** Writes the command’s usage statement to standard output.

## Standard output

When the **-h** option is specified, this command’s usage statement is written to standard output. All verbose messages are written to standard output.

## Standard error

This command writes any error messages to standard error.

## Exit status

**0** Indicates that the command completed successfully.

*a non-zero value*
Indicates that an error occurred.

## Security

You must have **root** authority to run this command.

## Restrictions

This command is valid in a peer domain only.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/cthatstune** Contains the **cthatstune** command

## Examples

1. To change the fixed priority level to 40, view the current setting of the maximum log file length, and pin default objects in main memory, without making the new setting take effect immediately, enter:

   ```
   cthatstune -p 40 -l VIEW -m DEFAULT
   ```

2. To make the new setting (previously changed by **cthatstune**) take effect, enter:

   ```
   cthatstune -r
   ```

3. To change the fixed priority level to normal, pin program and data segments in main memory, and make the new settings take effect immediately, enter:

   ```
   cthatstune -p 0 -m TEXT,DATA -r
   ```

4. To change the heartbeat frequency of **filesys_net** to 2 and all other networks to 4, change the sensitivity of all other networks to the default value, and make the new settings take effect immediately, enter:

   ```
   cthatstune -f filesys_net:2,:4 -s :DEFAULT -r
   ```

5. To change the heartbeat frequency of **filesys_net** to the default value and **service_net** to 3, change the sensitivity of all networks to 8, pin the entire topology services subsystem in main memory, and make the new settings take effect immediately, enter:

   ```
   cthatstune -f filesys_net:DEFAULT,service_net:3 -s :8 -m PROC -r
   ```

   You can also do this using the following method:

   ```
   cthatstune -f filesys_net:DEFAULT,service_net:3
   cthatstune -s :8
   cthatstune -m PROC
   cthatstune -r
   ```

## Author

Felipe Knop - cluster@us.ibm.com

## See also

Commands: **cthatsctrl**, **lssrc**

# hatsoptions

## Name

**hatsoptions** – controls topology services options on a node or a control workstation.

## Synopsis

**hatsoptions** [**-s**] [**-d**]

## Options

**–s** Instructs the topology services daemon to reject messages that are apparently delayed.

**–d** Instructs the topology services daemon not to reject messages that are apparently delayed (this is the default).

## Description

Before this command can be executed, environment variable HB_SERVER_SOCKET must be set to the location of the UNIX-domain socket used by the topology services subsystem. The statement below can be used:

```
export HB_SERVER_SOCKET=/var/ha/soc/hats/server_socket.partition name
```

Alternatively, variable HA_SYSPAR_NAME can be set to the partition name.

The topology services daemon must be running in order for this command to be successful.

**hatsoptions** can be used to control a number of options in topology services. Option **-s** instructs the topology services daemon to reject messages that are apparently delayed. This can be used in very large system configurations, where messages are sometimes delayed in the network or in the sender and receiver nodes. Use this option only if the Time-Of-Day clocks are synchronized across all the nodes and the control workstation. Otherwise messages may be incorrectly discarded when the sender's Time-Of-Day clock is behind the receiver's.

Option **-d** instructs the topology services daemon not to reject messages that are apparently delayed. This is the default.

## Environment

**HB_SERVER_SOCKET**
This environment variable should be set before this command can be executed. It must be set to the location of the UNIX-domain socket used by topology services clients to connect to the topology services daemon. This environment variable must be set to **/var/ha/soc/hats/server_socket.***partition name*.

**HA_SYSPAR_NAME**
If HB_SERVER_SOCKET is not set, then HA_SYSPAR_NAME must be set to the partition name.

## Files

**/var/ha/soc/hats/server_socket.***partition name*

## Exit status

**0** Indicates the successful completion of the command.

**1** Indicates the command was unsuccessful.

## Security

You must have **root** privilege to run this command.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/hatsoptions**
Contains the **hatsoptions** command

## Examples

To instruct the topology services daemon on the local node to start discarding apparently delayed messages, enter:

```
export HA_SYSPAR_NAME=partition1

/usr/sbin/rsct/bin/hatsoptions -s
```

## See also

Commands: **hatsctrl**, **hats**, **lssrc**, **startsrc**, **stopsrc**, **syspar_ctrl**

# Chapter 19. Group services commands

Group services provides distributed coordination and synchronization services for other distributed subsystems running on a set of nodes in a cluster.

# cthagsctrl

## Name

**cthagsctrl** – controls the group services subsystem.

## Synopsis

**cthagsctrl** { **-a** [ **-p** *port-number* ] | **-d** | **-s** | **-k** | **-t** | **-o** | **-r** | **-z** | **-h** }

## Description

The **cthagsctrl** control command controls the operation of the group services subsystem (**cthags**) under the control of the system resource controller (SRC).

An instance of the group services subsystem runs on every node of a cluster.

From an operational point of view, the group services subsystem group is organized as follows:

| | |
|---|---|
| **Subsystem** | group services |
| **Subsystem group** | **cthags** |
| **SRC subsystem** | **cthags** — Associated with the **hagsd** daemon. The subsystem name on the nodes is **cthags**. There is one subsystem per node and each of these subsystems is associated with the cluster to which the node belongs. |
| **Daemon** | **hagsd** — Provides the group services functions. |

In general, the **cthagsctrl** command is not issued from the command line. It is normally called by the **cthactrl** command during the creation of the cluster.

The **cthagsctrl** command provides a variety of controls for operating the group services subsystem:

- Adding, deleting, starting, and stopping the subsystem
- Deleting the subsystem from the cluster
- Turning tracing on and off
- Refreshing the subsystem configuration within the cluster

### Adding the subsystem

When the **-a** option is specified, the **cthagsctrl** command adds the group services subsystems to the SRC. This command:

1. Makes sure the **cthags** subsystem is stopped.
2. Gets the port number for the **cthags** subsystem from the cluster data.
3. Removes the **cthags** subsystem from the SRC (in case it is still there).
4. Adds the **cthags** subsystem to the SRC.
5. Does not currently add an entry for the **cthags** group to the **/etc/inittab** file. As a result, **cthags** is required to be started by another subsystem when it is needed.

### Deleting the subsystem

When the **–d** option is specified, this command removes the group services subsystems from the SRC. The control command:

1. Makes sure the **cthags** subsystem is stopped.
2. Removes the **cthags** subsystem from the SRC .
3. Removes the port number from the **/etc/services** file.

**Starting the subsystem**

When the **–s** option is specified, this command starts the group services subsystem, **cthags**.

**Stopping the subsystem**

When the **–k** option is specified, this command stops the group services subsystem, **cthags**.

**Turning tracing on**

When the **–t** option is specified, this command turns tracing on for the **hagsd** daemon.

**Turning tracing off**

When the **–o** option is specified, this command turns tracing off (returns it to its default level) for the **hagsd** daemon.

**Refreshing the subsystem**

The **–r** option refreshes the **cthags** subsystem.

**Logging**

While they are running, the group services daemons provide information about their operation and errors by writing entries in three log files in the **/var/ct/***cluster_name***/log/cthags** directory. The log files are:

- **/var/ct/***cluster_name***/log/cthags**_*nodenum_instnum***.***cluster_name*
- **/var/ct/***cluster_name***/log/cthags**_*nodenum_instnum.cluster_name***.long**
- **/var/ct/***cluster_name***/log/cthags.default.***nodenum_instnum*

The log files contain the log of the **hagsd** daemons on the nodes.

The log file names include these variables:

- *nodenum* is the node number on which the daemon is running.
- *instnum* is the instance number of the daemon.
- *cluster_name* is the name of the cluster in which the daemon is running.

Each daemon limits the log size to a pre-established number of lines. The default is 5000 lines. When the limit is reached, the daemon appends the string **.bak** to the name of the current log file and begins a new log. If a **.bak** version already exists, it is removed before the current log is renamed.

## Options

**–a [ –p** *port number* **]**
Adds the subsystem.

**-d** Deletes the subsystem.

**-s** Starts the subsystem.

**-k** Stops the subsystem.

**-t** Turns tracing on for the subsystem.

**-o** Turns tracing off for the subsystem.

**-r** Refreshes the subsystem.

**-z** Uninstalls the **cthags** subsystem.

**-h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

This command writes error messages, as necessary, to standard error.

## Exit status

**0** Indicates that the command completed successfully.

*a non-zero value*
Indicates that an error occurred.

## Security

You must have **root** authority to run this command.

## Restrictions

This command is valid in a peer domain only.

Use this command *only* under the direction of the IBM Support Center.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/cthagsctrl** Contains the **cthagsctrl** command

## Examples

1. To add the group services subsystems to the SRC in the current cluster, enter:
   ```
   cthagsctrl -a
   ```
2. To add the group services subsystems with a port number of 12347, enter:
   ```
   cthagsctrl -a -p 12347
   ```

3. To delete the group services subsystems from the SRC in the current cluster, enter:
   ```
   cthagsctrl -d
   ```
4. To start the group services subsystems in the current cluster, enter:
   ```
   cthagsctrl -s
   ```
5. To stop the group servicess subsystems in the current cluster, enter:
   ```
   cthagsctrl -k
   ```
6. To turn tracing on for the group services daemon in the current cluster, enter:
   ```
   cthagsctrl -t
   ```
7. To turn tracing off for the group services daemon in the current cluster, enter:
   ```
   cthagsctrl -o
   ```

## See also

Commands: **cthactrl**, **cthagstune**, **lssrc**, **nlssrc**

## Author

cluster@us.ibm.com

# cthagstune

## Name

**cthagstune** – changes the group services subsystem's tunable parameters at run time.

## Synopsis

**cthagstune** { [**-l** *log_length*] | [**-d** *log_dirsize*] | [**-h**] }

## Description

The **cthagstune** command changes the group services subsystem's tunable parameters at run time.

## Options

**-l** Specifies the maximum log file length. If the value is **0** or a negative number, a default log file length is used.

**-d** Specifies the maximum log directory size in kilobytes. If the value is **0** or a negative number, a default log directory size is used.

**-h** Writes the command's usage statement to standard output.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

This command writes error messages, as necessary, to standard error.

## Exit status

**0** Indicates that the command completed successfully.

*a non-zero value*
Indicates that an error occurred.

## Security

You must have **root** authority to run this command.

## Restrictions

This command is valid in a peer domain only.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/cthagstune** Contains the **cthagstune** command

## Examples

To change the log file length to 6000 lines and to set the log directory size to approximately 7 megabytes, enter:

```
cthagstune -l 6000 -d 7000
```

## See also

Commands: **cthactrl**, **cthagsctrl**, **lssrc**, **nlssrc**

## Author

cluster@us.ibm.com

# hagsns

## Name

**hagsns** – gets group services name server information.

## Synopsis

**hagsns** [**–h** *host*] [**–c**] **–s** *subsystem_name*

**hagsns** [**–h** *host*] [**–c**] **–p** *subsystem_pid*

## Description

Use the **hagsns** command to query the status of the group services nameserver.

## Options

**–c** Forces the output as ″English_only.″ If the **–c** option is not specified, the daemon's locale will be used for the output.

**–h** *host*
Specifies the host to obtain name server status for.

**–p** *subsystem_pid*
Specifies a particular instance of the *subsystem_pid* to obtain name server status for.

**–s** *subsystem_name*
Specifies a subsystem to get status for. The *subsystem_name* variable can be the actual subsystem name or the synonym name for the subsystem. The command is unsuccessful if the *subsystem_name* variable is not contained in the subsystem object class.

## Standard error

This command writes error messages, as necessary, to standard error.

## Exit status

**0** Indicates that the command completed successfully.

*a non-zero value*
Indicates that an error occurred.

## Security

You must have **root** authority to run this command.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/hagsns** Contains the **hagsns** command

## Examples

To get domain information from the group services subsystem, enter:

```
hagsns -c -s cthags
```

or

```
hagsns -s cthags
```

The output will look like this:

```
HA GS NameServer Status
NodeID=1.16, pid=14460, domainID=6.14, NS established,CodeLevel=GSLevel(DRL=8)
NS state=kCertain, protocolInProgress=kNoProtocol,outstandingBroadcast=KNoBcast
Process started on Jun 19 18:34:20, (10d 20:19:22) ago, HB connection took (19:14:9).
Initial NS certainty on Jun 20 13:48:45, (10d 1:4:57) ago, taking (0:0:15).
Our current epoch of Jun 23 13:05:19 started on (7d 1:48:23), ago.
Number of UP nodes: 12
List of UP nodes: 0 1 5 6 7 8 9 11 17 19 23 26
```

In this example, **domainID=6.14** means that node 6 is the name server (NS) node. The domain ID consists of a node number and an incarnation number. The incarnation number is an integer, incremented whenever the group services daemon is started. **NS established** means that the name server was established.

## See also

Commands: **hagsvote**, **lssrc**, **nlssrc**

## Author

cluster@us.ibm.com

# hagsvote

## Name

**hagsvote** – gets vote information for group services groups.

## Synopsis

**hagsvote** [**–h** *host*] [**–l**] [**–a** *argument*] [**–c**] **–s** *subsystem_name*

**hagsvote** [**–h** *host*] [**–l**] [**–a** *argument*] [**–c**] **–p** *subsystem_pid*

## Description

Use the **hagsvote** command to query the status of voting protocols for group services.

## Options

**–a** *argument*
Specifies the name of a group services group that was created from the client's first call to join the protocol.

**–c** Requests the canonical output of the group services voting information. The output is displayed in English regardless of the installed language locale. If **–c** is not specified, the daemon's locale will be used for the output.

**–h** *host*
Specifies the host name which is getting status.

**–l** Requests detailed output in "long" form.

**–p** *subsystem_pid*
Specifies a particular instance of the *subsystem_pid* variable to get the vote for.

**–s** *subsystem_name*
Specifies a subsystem to vote on. The *subsystem_name* variable can be the actual subsystem name or the synonym name for the subsystem. The command is unsuccessful if the *subsystem_name* variable is not contained in the subsystem object class.

## Standard output

This command writes error messages (as necessary) to standard error.

## Exit status

**0** Indicates the successful completion of the command.

*a non-zero value*
Indicates that an error occurred.

## Security

You must have **root** privilege to run this command.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/hagsvote** Contains the **hagsvote** command

## Examples

1. To see information about the status of the voting protocol for the group **theSourceGroup** in long form, enter:

   ```
   hagsvote -ls cthags -a theSourceGroup (locale-dependent)
   ```

   The output will look like this:

   ```
   Number of groups: 4
   Group name [theSourceGroup] GL node [26] voting data:
   GL in phase [1] of n-phase protocol of type [Join].
   Local voting data:
   Number of providers: 1
   Number of providers not yet voted: 1 (vote not submitted).
   Given vote: [No vote value] Default vote: [No vote value]
   ProviderID Voted? Failed? Conditional?
   [101/26] No No Yes
   Global voting data:
   Number providers not yet voted: 1
   Given vote: [No vote value] Default vote: [No vote value]
   Nodes that have voted: []
   Nodes that have not voted: [26]
   ```

   The first line of the output means that the total number of groups is 4. The second line provides the group name and the group leader node (in this case 26). The remaining lines give the voting data:

   - The group leader is in phase 1 of an *n*-phase protocol.
   - The protocol is the **Join** protocol.
   - For the local node, it has one provider. One provider has not voted yet.
   - No default vote value is given and no vote value is given.
   - Under the line ″ProviderID Voted? Failed? Conditional?,″ ″[101/16] No No Yes,″ means that the provider ID is 101/26, not voted yet, not failed, but wait for the vote (so it is conditional).

   The output then shows the global voting status:

   - One provider has not voted yet.
   - No vote value given yet, no default vote value.
   - The nodes that have voted is none.
   - The nodes that have not voted is node 26.

2. In the following example, the meaning of each line of output is the same as in the first example except that node 26 is the group leader node.

   ```
   hagsvote -ls cthags -a theSourceGroup -c (canonical form)
   ```

   The output will look like this:

   ```
   Number of groups: 4
   Group Name: theSourceGroup
   GL Node: 26 (I am GL)
   Current phase number of an n-phase protocol: 1
   Protocol name: [Join]
   Local voting data:
   Number of local providers: 1
   Number of local providers not yet voted: 1 (vote not submitted)
   Given vote: [No vote value] Default vote: [No vote value]Global voting data:
   Number of nodes in group: 1
   Number of global providers not yet voted: 1
   Given vote: [No vote value] Default vote: [No vote value]
   Nodes that have voted: []
   Nodes that have not voted: [26]
   ```

## See also

Commands: **hagsns**, **lssrc**, **nlssrc**

## Author

cluster@us.ibm.com

# Part 10. Problem determination

# Chapter 20. Commands for data collection

# ctsnap

## Name

**ctsnap** – gathers configuration, log, and trace information about the Reliable Scalable Cluster Technology (RSCT) components.

## Synopsis

**ctsnap** [**-d** *output_directory*] [**-h**]

## Description

The **ctsnap** command gathers configuration, log, and trace information about the RSCT components that are installed with CSM or System Automation. The **ctsnap** command collects data only on the local node on which it (**ctsnap**) is running. Depending on the programs that are installed, the following components may be included:

- Audit log resource manager (**IBM.AuditRM**)
- Cluster security services (**ctsec**)
- Common information model resource manager (**IBM.CIMRM**)
- Configuration resource manager (**IBM.ConfigRM**)
- Domain management server resource manager (**IBM.DMSRM**)
- Event response resource manager (**IBM.ERRM**)
- File system resource manager (**IBM.FSRM**)
- First failure data capture (**ct_ffdc**)
- Group services (**cthags**)
- Host resource manager (**IBM.HostRM**)
- Least-privilege resource manager (**IBM.LPRM**)
- Resource monitoring and control (**ctrmc**)
- Sensor resource manager (**IBM.SensorRM**)
- Storage resource manager (**IBM.StorageRM**)
- Topology services (**cthats**)

This command is typically run when a problem is encountered with any of these components in order to provide information to your software service organization.

The output of **ctsnap** is a compressed tar file (**ctsnap.***host_name***.***nnnnnnnn***.tar.Z**) and a log file (**ctsnap.***host_name***.***nnnnnnnn***.log**, where *nnnnnnnn* is the timestamp when the **ctsnap** command was run and *host_name* is the name of the host on which the command is running. Both files should be provided to the software service organization. By default, these files are placed in the **/tmp/ctsupt** directory.

## Options

**–d** *output_directory*
: Identifies the output directory. The default directory is **/tmp/ctsupt**.

**–h**
: Writes the command's usage statement to standard output.

## Files

| | |
|---|---|
| **/tmp/ctsupt** | Location of the default directory that contains the output files. |

**/tmp/ctsupt/ctsnap.***host_name***.***nnnnnnnn***.log**
Location of the log file of the command execution, where *nnnnnnnn* is a timestamp and *host_name* is the name of the host on which the command is running.

**tmp/ctsupt/ctsnap.***host_name***.***nnnnnnnn***.tar.Z**
Location of the compressed tar file that contains the collected data, where *nnnnnnnn* is a timestamp and *host_name* is the name of the host on which the command is running.

## Exit status

**0** Command has run successfully.

**1** Command was not successful.

## Security

Only **root** users can run this command.

## Standard output

When the **-h** option is specified, this command's usage statement is written to standard output.

## Standard error

Error messages are written to standard error (and to the **ctsnap.***host_name***.***nnnnnnnn***.log** file).

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) package for Linux.

## Location

**/usr/sbin/rsct/bin/ctsnap** Contains the **ctsnap** command

## Examples

1. To gather RSCT support information, enter:
   ```
   ctsnap
   ```
2. To gather RSCT support information and place it in the **/tmp/mydir** directory, enter:
   ```
   ctsnap -d /tmp/mydir
   ```

## Author

Michael Schmidt - cluster@us.ibm.com

## See also

Commands: **lssrc**

# Chapter 21. First failure data capture (FFDC) commands

# fccheck

## Name

**fccheck** – performs basic problem determination on the first failure data capture (FFDC) utilities.

## Synopsis

```
/usr/sbin/rsct/bin/fccheck [-q] | [-h]
```

## Options

**-h**

Displays help and usage information to standard output. No other processing is performed.

**-q** Specifies ″quiet″ mode. The command does not display the results of each test to standard output. The exit status of the command must be used to determine the results of the tests. If more than one condition was detected, the exit status will reflect the most severe condition detected by **fccheck**.

## Description

The **fccheck** command performs basic problem determination for the first failure data capture utilities. The command checks for the following conditions and information on the local node:

- Checks if FFDC error stack usage has been disabled in the current process environment.
- Obtains the IP address that would be currently used by FFDC to identify the local node.
- Checks if **/var/adm/ffdc/stacks** is available, and if so, how much space is available in the file system where the directory resides. Checks to see if there is insufficient space to create FFDC error stacks.
- Checks if **/var/adm/ffdc/dumps** is available, and if so, how much space is available in the file system where the directory resides.

Results of these tests are displayed to standard output unless the ″quiet″ option has been specified. **fccheck** sets an exist status value to indicate the most severe condition it detected during the execution of its tests.

## Exit status

**0** All conditions tested by **fccheck** were found to be in normal operational parameters.

**2** Help information successfully displayed. No further processing is performed.

**12** No checking performed. Invalid option specified to this command.

**19** The directory **/var/adm/ffdc/stacks** is not mounted or does not exist.

**20** Cannot access or examine one or more directories in the path **/var/adm/ffdc/stacks**. Permissions may have been changed on one or more of the directories in this path to prevent access.

**24** Cannot access or examine one or more directories in the path

**/var/adm/ffdc/dumps**. Permissions may have been changed on one or more of the directories in this path to prevent access.

**32** The directory **/var/adm/ffdc/dumps** is not mounted or does not exist.

**40** Insufficient space is available in the **/var/adm/ffdc/stacks** directory to create FFDC error stacks on the local node.

**41** Unable to obtain file system information from the operating system. This indicates a potential problem with the operating system itself.

**42** FFDC error stack creation and usage has been disabled in this process environment.

## Examples

To check for possible problems with the FFDC utilities on the local node:

```
fccheck
fccheck Status: All tests completed
```

If the local node had disabled the creation of FFDC error stacks, **fccheck** would indicate this as a problem:

```
fccheck

fccheck Status: Creation and use of FFDC Error Stacks has been expressly
disabled in the current execution environment. Any processes created in
the current execution environment cannot create their own FFDC Error Stacks
or inherit use of existing FFDC Error Stacks.

fccheck Status: All checks completed. Examine the previous status output for
possible FFDC problem conditions and take the recommended actions listed in
these messages.
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcclear**, **fcinit**

# fcclear

## Name

**fcclear** – removes first failure data capture (FFDC) error stacks and detail data files from the local node.

## Synopsis

```
/usr/sbin/rsct/bin/fcclear -h |
    {    [-d filename[,filename,...]]
         [-D filename[,filename,...]]
         [-f FFDC_failure_ID[,FFDC_failure_ID,...]
         [-F FFDC_failure_ID[,FFDC_failure_ID,...]
         [-s file_name[,filename,...]
         [-S file_name[,filename,...]
         [-t days]
    }
```

## Options

**-d** Removes detail data files by specifying a list of one or more detail data file names. These file names may be absolute path names, or relative to the **/var/adm/ffdc/dumps** directory. These files are removed if they exist on the local node. Files on remote nodes cannot be removed through this command. If more than one file name is provided, they must be separated by a comma (,) without any intervening white space.

**-D**

Preserves detail data files by specifying a list of one or more detail data file names. These file names may be absolute path names, or relative to the **/var/adm/ffdc/dumps** directory. These files are retained if they exist on the local node. Files on remote nodes cannot be retained through this command. If more than one file name is provided, they must be separated by a comma (,) without any intervening white space.

**-f**

Removes FFDC error stack files by specifying a list of one or more FFDC failure identifiers. The FFDC error stacks associated with these FFDC error identifiers are located and removed if they are present on the local node. FFDC error stacks on remote nodes will not be removed. If more than one FFDC failure identifier is supplied, they must be separated by a comma (,) with no intervening white space.

**-F**

Preserves FFDC error stack files by specifying a list of one or more FFDC failure identifiers. The FFDC error stacks associated with these FFDC error identifiers are located and retained if they are present on the local node. FFDC error stacks on remote nodes will not be retained. If more than one FFDC failure identifier is supplied, they must be separated by a comma (,) with no intervening white space.

**-h**

Displays help and usage information to the standard output device. No other processing is performed.

**-s**

Removes FFDC error stack files by specifying a list of one or more FFDC error stack file names. These file names can be absolute path names or file names relative to the **/var/adm/ffdc/stacks** directory. These files are removed if they exist on the local node. FFDC error stacks on remote nodes cannot be removed through this command. If more than one file name is provided, each must be separated by a comma (,) without any intervening white space.

**-S**

Removes FFDC error stack files by specifying a list of one or more FFDC error stack file names. These file names can be absolute path names or file names relative to the **/var/adm/ffdc/stacks** directory. These files are removed if they exist on the local node. FFDC error stacks on remote nodes cannot be removed through this command. If more than one file name is provided, each must be separated by a comma (,) without any intervening white space.

**-t**

Indicates that FFDC error stacks and detail data files that are older than a specific number of days should be removed from the local node. This selection criteria is independent of the other selection criteria.

## Description

**fcclear** is used to remove FFDC error stack files that are no longer needed for problem determination efforts from the local node. Specific FFDC error stack files can be removed, as well as FFDC error stack files containing the records of specific FFDC failure identifiers. Individual entries within an FFDC error stack cannot be removed.

Using the **-t** option, **fcclear** can be used to remove FFDC error stack files older than a specific number of days. To use **fcclear** in an automatic fashion to clean out unneeded FFDC error stacks, see the **cron** command for automating the execution of commands.

To remove all FFDC error stacks from the local node, specify a value of zero (0) for the number of days option argument.

## Exit status

**fcclear** generates the following exit status values upon completion:

**0**

Successful completion of the command. The command may complete successfully if no FFDC error stack files or detail data files match the selection criteria.

**2**

Help information successfully displayed. No further processing is performed.

**10**

No files are removed from the local system. A required option was not specified to this command.

**11**

No files are removed from the local system. The argument of the -t option is not numeric.

**12**

No files are removed from the local system. Unknown option specified by the caller.

**19**

The directory **/var/adm/ffdc/stacks** does not exist or is not mounted.

**26**

No files are removed from the local system. The same option was specified more than once.

**28**

No files were removed from the system. The caller provided options that instruct the command to both remove and retain the same file. This condition can occur when the command user specified an FFDC failure identifier that is recorded in an FFDC error stack file specified by name to this command.

## Examples

To remove any FFDC error stack and detail data files older than seven days from the local node:

```
fcclear -t 7
```

To remove all FFDC error stack and detail data files older than seven days, but retain the FFDC error stack that contains information for the FFDC failure identifier **/3Iv04ZVVfvp.wtY0xRXQ7.....**, issue the command:

```
fcclear -t 7 -F /3Iv04ZVVfvp.wtY0xRXQ7...................
```

To remove the FFDC error stack file that contains the record for the FFDC failure identifier **/3Iv04ZVVfvp.wtY0xRXQ7.....**, issue the command:

```
fcclear -f /3Iv04ZVVfvp.wtY0xRXQ7...................
```

To remove the FFDC error stack files **myprog.14528.19990204134809** and **a.out.5134.19990130093256** from the system, plus the detail data file **myprog.14528.19990204135227**:

```
fcclear -s myprog.14528.19990204134809,a.out.5134.19990130093256
    -d myprog.14528.19990204135227
```

To extend the previous command to remove the named files plus any FFDC error stack and detail data files older that 14 days:

```
fcclear -s myprog.14528.19990204134809,a.out.5134.19990130093256
    -d myprog.14528.19990204135227 -t 14
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fccheck**, **fcreport**, **fcstkrpt**

# fcdecode

## Name

**fcdecode** – translates a first failure data capture (FFDC) failure identifier from its standard form into its component parts and displays this information to standard output.

## Synopsis

```
/usr/sbin/rsct/bin/fcdecode FFDC_failure_ID[,FFDC_failure_ID,...] | -h
```

## Options

**-h** Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

## Parameters

*FFDC_failure_ID*

An FFDC failure identifier, returned from previous calls to the **fcpushstk** and **fclogerr** commands, or returned from previous calls to the **fc_push_stack** or **fc_log_error** subroutines. This identifier indicates an entry made to report a failure or other noteworthy incident. More than one FFDC failure identifier can be provided as an argument to this command, however, each identifier must be separated by a comma (,) with no intervening white space between the identifiers.

## Description

**fcdecode** decodes the 42-character FFDC failure identifier into its component parts, and displays these parts in human readable format. The output of this command displays the following information, extracted from the FFDC failure identifier:

- The network address (in ASCII format) of the node where this report resides
- The time when this recording was made, expressed using the currently active time zone settings
- One of the following, depending on where the information is recorded:
- The Linux system log template ID used to make this recording, if the record was filed in the Linux system log on that node, or
- The name of the FFDC error stack file containing this recording, if the record was file in the FFDC error stack and the FFDC error stack resides on this node
- A suggested command that can be used to obtain the specific report associated with this FFDC failure identifier.

## Exit status

**fcdecode** returns one of the following integer status codes upon completion:

**0**

FFDC failure identifier successfully decoded.

**2**

Help information displayed and processing ended.

**10**

An FFDC failure identifier was not provided as an argument to this command.

**12**

Invalid or unsupported option provided to this command.

**27**

No information written to the standard output device. The FFDC failure identifier argument was not valid.

## Examples

The FFDC failure identifier is represented by a base-64 value, read from right to left. Each dot represents a leading zero. To decode the FFDC failure identifier **.3Iv04ZVVfvp.wtY0xRXQ7.**.....into its component parts:

```
fcdecode .3Iv04ZVVfvp.wtY0xRXQ7...................

Information for First Failure Data Capture identifier
        .3Iv04ZVVfvp.wtY0xRXQ7...................
        Generated by the local system
        Generated Thu Sep 3 11:40:17 2003 EDT
        Recorded to the Linux system log using template 460bb505
        To obtain the Linux system log information for this entry, issue
        the following command on the local system:
        TZ=EST5EDT errpt -a -j 460bb505 -s 0903114098 | more
        Search this output for an Linux system log entry that contains
        the following ERROR ID code:
         .3Iv04ZVVfvp.wtY0xRXQ7...................
```

The same command run on a different node has the following results:

```
fcdecode .3Iv04ZVVfvp.wtY0xRXQ7...................

Information for First Failure Data Capture identifier
        .3Iv04ZVVfvp.wtY0xRXQ7...................
        Generated on a remote system with the following Internet address:
          9.114.55.125
        Generated Thu Sep 3 11:40:17 2003 EDT
        Recorded to the Linux system log using template 460bb505
        TZ=EST5EDT errpt -a -j 460bb505 -s 0903114098 | more
        Search this output for an Linux system log entry that contains
        the following ERROR ID code:
         .3Iv04ZVVfvp.wtY0xRXQ7...................
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcdispfid**, **fcreport**, **fcstkrpt**

# fcdispfid

## Name

**fcdispfid** – displays the first failure data capture (FFDC) failure identifier to standard error.

## Synopsis

```
/usr/sbin/rsct/bin/fcdispfid [-q] FFDC_failure_ID | -h
```

## Options

**-h** Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

**-q**

Suppresses warning messages from this command. If this option is not provided, this command will display messages when an invalid FFDC failure identifier is detected.

## Parameters

*FFDC_failure_ID*

Specifies an FFDC failure identifier. This is an identifier returned from a previous call to **fcpushstk** or **fclogerr**, and indicates an entry made to report a failure encountered by the script. This identifier is written to the standard error device using FFDC message **2615-000**.

## Description

This command is used by scripts to display an FFDC failure identifier value to the standard error device. This interface is provided because script programs do not have a mechanism for passing data back to its client except through exit status codes, signals, standard output, and standard error. To accomplish the task of ″passing back″ an FFDC failure identifier to a client in such an environment, **fcdispfid** uses XPG/4 cataloged message number **2615-000** to display this information to the standard error device. Clients of the script can capture the standard error information, search for the specific message number, and obtain the FFDC failure identifier from the script.

The script must indicate that any FFDC failure identifiers generated by the script will be directed to the standard error device in the script's user documentation. The client cannot be expected to know this behavior by default.

## Exit status

**0**

FFDC failure identifier displayed to standard error.

**2**

Help information displayed and processing ended.

**12**

No information written to the standard error device. An invalid option was specified.

**27**

No information written to the standard error device. The *FFDC_failure_ID* argument does not appear to be in a valid format.

## Examples

To display an FFDC failure identifier to the client through the standard output device:

```
FID=$(fclogerr -e FFDC_ERROR -t ERRID_SP_FFDCEXMPL_ER -i /usr/lpp/ssp/inc/
myprog.h -r myprog -s myprog.ksh -p $LINEPOS -v "1.1" -l PSSP -d $MINUSDOPTS -x
$MINUSXOPTS -y $MINUSYOPTS -b "myprog Configuration Failure - Exiting")
    RC=$?
    if ((RC == 0))
    then
         fcdispfid $FID
         return 1
    else
         :
    fi
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcdecode**, **fcfilter**, **fclogerr**, **fcpushstk**, **fcreport**, **fcstkrpt**

Subroutines: **fc_display_fid** in the *RSCT First Failure Data Capture Programming Guide and Reference*

# fcfilter

## Name

**fcfilter** – locates and displays any first failure data capture (FFDC) failure identifiers in one or more files or in standard input.

## Synopsis

```
/usr/sbin/rsct/bin/fcfilter [ file_name ] [ . . . ]
```

## Parameters

*file_name*

The name of the file to be searched for an FFDC failure identifier. More than one file may be provided. If a file name is not provided, **fcfilter** reads from standard input.

## Description

This commands scans any files listed as arguments for FFDC failure identifiers. If a file name is not provided as an argument, this command examines standard input for FFDC failure identifiers. If an FFDC failure identifier is detected, **fcfilter** displays the identifier to standard output on its own line.

**fcfilter** can be used by scripts to extract FFDC failure identifiers returned by child processes via the standard error device.

If **fcfilter** detects more than one FFDC failure identifier in the input, the command will display all FFDC failure identifiers found, each one on a separate output line.

## Exit status

**fcfilter** returns the following integer status codes upon completion:

**0**

**fcfilter** completed its execution. This exit status does not necessarily mean that any FFDC failure identifiers were detected.

**> 0**

**fcfilter** was interrupted or stopped by a signal. The exit status is the integer value of the signal that stopped the command.

## Examples

The FFDC failure identifier is represented by a base-64 value, read from right to left. Each dot represents a leading zero. To obtain the list of all FFDC failure identifiers generated by a run of the command *mycmd*:

```
 mycmd 2> /tmp/errout
 fcfilter /tmp/errout
/.00...JMr4r.p9E.xRXQ7.....................
/.00...JMr4r.pMx.xRXQ7.....................
```

To obtain the FFDC failure identifier from a child process in a parent script, the script can use the **fcfilter** command as follows:

```
RESULTS=$(mychild 2> /tmp/errout)
if (($? != 0))              # mychild ended in failure, get FFDC ID
then
    cat /tmp/errout | fcfilter | read FIRST_FFDCID
else
    rm -f /tmp/errout
fi
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcdispfid**, **fclogerr**, **fcpushstk**, **fcreport**, **fcstkrpt**

Subroutines: **fc_display_fid**, **fc_log_error**, **fc_push_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fcinit

## Name

**fcinit** – establishes or inherits a first failure data capture execution environment.

## Synopsis

For Bourne and Korn shells:

```
. /usr/sbin/rsct/bin/fcinit.sh [ [-l] [-s{c|i}] ] | [-h]
```

For C shells:

```
source /usr/sbin/rsct/bin/fcinit.csh [ [-l] [-s{c|i}] ] | [-h]
```

## Options

**-h** Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

**-l** Indicates that the process will use the Linux system log only. This option is not necessary when the **-s** option is specified, since use of the Linux system log is permitted within an FFDC error stack environment.

**-s** Indicates that an FFDC error stack environment is to be established. Applications wishing to use the **fcpushstk** interface must specify this flag. Upon successful completion of this command, an FFDC error stack file is reserved for the script in the **/var/adm/ffdc/stacks** directory. This flag must be specified with one of two possible options:

- **c** Requests that the FFDC error stack environment be *created*. If an FFDC error stack environment was not created by an ancestor process, it will be created. If such an environment was previously created by an ancestor process, this process will *inherit* the FFDC error stack environment as if the **i** option had been specified.
- **i** Specifies that an FFDC error stack environment is to be *inherited* if it was previously established by an ancestor process. If an FFDC error stack environment was not previously established by an ancestor process, an FFDC error stack environment is not established for this process, and this process cannot make use of an FFDC error stack (although it may make use of the Linux system log and the BSD system log).

## Description

This interface must be used by a script program that will use the FFDC interfaces for recording information to the Linux system log, the BSD system log, or the FFDC error stack.

Applications may wish to establish an FFDC environment for one of the following reasons:

- The script may wish to record information to the Linux system log. Scripts can use **fcinit** to establish a basic FFDC environment
- The script wants to have itself and any descendant processes created by itself or its children to record failure information to the FFDC error stack. In this case, the script considers itself a ″top-level″ application that will cause multiple

″lower-level″ applications to be created, and the success of the ″top-level″ application depends upon the success of these ″lower-level″ applications. When using **fcinit** in this fashion, the process is said to *establish* or *create* the FFDC error stack environment.

- The script uses the FFDC error stack or the FFDC Trace only in those cases when the script is invoked by an ancestor process that wants failure information or trace information recorded to these devices. In all other cases, the script does not wish to use these devices. When using **fcinit** in this fashion, the process is said to *inherit* the FFDC error stack environment.

Any process wishing to record information to the Linux system log or the BSD system log through the FFDC interfaces must establish an FFDC environment. If the process does not wish to make use of an FFDC error stack, the process can establish a basic FFDC environment that does not make use of an FFDC error stack. An FFDC error stack environment, which contains an FFDC error stack, is established by a process when that process wants to have failure information from itself, any threads it may create, and any descendant processes it may create to be recorded in an FFDC error stack. An *FFDC error stack environment*, which contains an FFDC error stack, is inherited by a process when that process wants to record failure information to an FFDC error stack file only when one of its ancestors has requested for processes to do so; in all other cases, the process will not record failure information to the FFDC error stack.

The FFDC error stack environment, which contains an FFDC error stack, reserves an FFDC error stack file, so that failure information is recorded to a file in the **/var/adm/ffdc/stacks** directory. These files use the naming format ***script_name.PID.date_and_time***, where *script_name* is the name of the script itself, *PID* is the process identifier of the script, and *date_and_time* is the date and time when the script was executed. Whenever this script or children processes of this script record failure information to the FFDC error stack, it will be recorded in this file.

In order for information to be recorded in the FFDC error stack by a process, the process must use the **fcpushstk** FFDC interface, and the process has to be operating within an established FFDC error stack environment. If an FFDC error stack environment does not exist, or if the **fcpushstk** interface is not used when an FFDC error stack environment exists, no information is recorded by that process in the FFDC error stack. This function permits processes to run in a normal or ″silent″ mode when failure debugging information is not wanted or needed, but also permits this information to be available when the process is invoked within a special environment for debugging.

**fcinit** must be executed within the FFDC client's process environment (″sourced″) in order for the command to properly set the FFDC environment for the script. Script-based FFDC clients using this command must ″source″ the command in order for **fcinit** to execute within the client's process image. If this is not done. the FFDC interface is executed within its own process image; any settings of the FFDC environment are lost after the FFDC interface completes. To demonstrate how a script-based application would ″source″ the **fcinit** command, a Korn Shell program would issue the following instruction:

```
. fcinit.sh <options and arguments>
```

A C Shell script would do the following:

```
source fcinit.csh <options and arguments>
```

Processes that use the **fclogerr** FFDC interface must establish an *FFDC environment*. If the process only wishes to use the **fclogerr** interface, the *FFDC environment* can be established without an FFDC error stack.

If an FFDC environment already exists when a script attempts to create one, the script inherits the existing FFDC environment instead of creating its own.

## Exit status

**fcinit** returns the following exit status codes upon completion:

**0** FFDC environment successfully established.

**1** FFDC environment successfully inherited.

**2** Help information displayed and processing ended.

**fcinit** returns the following exit status codes upon detection of a failure:

**12**

FFDC environment not established or inherited - Unknown function parameter provided.

**13**

FFDC error stack environment not established or inherited - caller indicated that the FFDC environment should be both created and inherited.

**14**

FFDC environment not established in this call - the caller already has an FFDC environment established for itself - this routine may have been executed multiple times.

**15**

FFDC error stack environment not established or inherited - an FFDC error stack environment did not exist, and the FC_INHERIT option was specified.

**16**

FFDC environment not established or inherited - the client's process environment could not be modified by this routine.

**17**

FFDC environment not established or inherited - the FFDC environment appears to be corrupted and should be considered unusable.

**18**

FFDC environment not established or inherited - the routine could not allocate the memory required to modify the client's process environment.

**19**

FFDC error stack environment not established or inherited - Unable to reserve the FFDC error stack file for the calling process - the FFDC error stack directory does not exist or cannot be used.

**21**

FFDC error stack environment not established or inherited - Unable to reserve the FFDC error stack file for the calling process - the file already exists

**42**

FFDC error stack environment not established or inherited - creation and use of FFDC error stacks has been disabled by the system administrator. Scripts can establish only a basic FFDC environment that makes use of the Linux system log and the BSD system log.

**99**

FFDC environment not established or inherited - an unexpected internal failure occurred within **fcinit**. This condition may require the attention of customer and application-support services.

## Examples

For a Korn Shell script to establish a basic FFDC environment for using the Linux system log and the BSD system log only (an FFDC error stack is not to be used or reserved):

```
# Set up an FFDC environment to use the Linux system log only. An FFDC error
# Stack is not needed for this script.
. fcinit.sh -1
rc=$?
if ((rc != 0))
    then
         print "fcinit failed with exit code of $rc"
         exit 1
fi
# Normal processing starts
```

For a Korn Shell script to establish an FFDC error stack environment that causes the script and any descendant process to record failure information to the FFDC error stack:

```
# Set up FFDC environment to record failure information to the FFDC error
# stack
. fcinit.sh -sc
rc=$?
if ((rc != 0))
then
    print "fcinit failed with a code of $rc"
    exit 1
fi
# Normal processing starts
```

**Note:** The FFDC client may receive an indication that an FFDC error stack environment was inherited, instead of created by the **fcinit** call. This occurs when an FFDC error stack environment was already established by one of the process's ancestors.

To inherit an FFDC error stack environment from the process's parent process:

```
# Inherit an FFDC environment from parent process if it exists - otherwise,
# operate in a normal "silent" mode
. fcinit.sh -si
rc=$?
if ((rc != 0))
```

```
then
    print "fcinit failed with a code of $rc"
    exit 1
fi
# Normal processing starts
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fccheck**, **fclogerr**, **fcpushstk**, **fcteststk**

Subroutines: **fc_init** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fclogerr

## Name

**fclogerr** – records information about failure or noteworthy conditions to the Linux system log and the BSD system log.

## Synopsis

```
/usr/sbin/rsct/bin/fclogerr {-e event -t error_template_label
        -i error_template_headerfile -r resource -s source_filename
        -p line_of_code_pos -v sidlevel -l lpp_name -a assoc_fid
        { [ -d detail_data_item[,detail_data_item,...]
        -x detail_data_type[,detail_data_type,...]
        -y detail_data_len[,detail_data_len,...] ] |
        [-f detail_data_file] } -b BSD_system_log_message_text } | -h
```

## Options

**-a** Contains the FFDC failure identifier for a failure condition reported by software used by this application which causes or influenced the condition being recorded at this time. This identifier should have been returned to this application as part of the software's result indication. The caller provides this identifier here so that the FFDC error stack can associate the failure report it is making at this time with the previously recorded failure report. This permits problem investigators to trace the cause of a failure from its various symptoms in this application and others to the root cause in the other software. If no other software failure is responsible for this condition, or if the other software did not return an FFDC failure identifier as part of its result information, this option should be omitted.

**-b** Specifies the text message to be written to the BSD system log.

**-d** Specifies one or more data items that provide detailed information about the condition, used to provide the detail data in the Linux system log entry. If details of the information are too lengthy, these details can be written to a file, and the name of that file provided as the *detail_data_file* parameter. If a detail data file name is provided, this option should be omitted. If neither the *detail_data* or the *detail_data_file* parameters are provided or appear valid, null information will be recorded for the detail data in the Linux system log.

More than one data item may be provided with this option. Each data item must be separated by commas ( **,** ) with no intervening white-space characters. If a data item has imbedded whitespace characters, the data item must be enclosed in double quotation marks (″ ″). The data items themselves must not contain commas ( **,** ), because the command interprets commands a field separators.

This option *must* be accompanied by the **-x** and **-y** options.

**-e** Specifies the FFDC log event type. Valid values are: **FFDC_EMERG**, **FFDC_ERROR**, **FFDC_STATE**, **FFDC_TRACE**, **FFDC_RECOV**, and **FFDC_DEBUG**. This code gives a general description of the type of event being logged (emergency condition, permanent condition, informational notification, debugging information, etc.) and the severity of the condition. If this option is not specified, the event type FFDC_DEBUG is assigned to this incident record.

**-f** Specifies the name of a file containing details about the condition being

reported. This option is used when the details are too lengthy to record within the remaining 100 bytes of detail data information left to the application by **fclogerr**, or when a utility exists that can analyze the detail information. The contents of this file is copied to the **/var/adm/ffdc/dumps** directory, and the file's new location is recorded as the detail data in the Linux system log entry.

**-h** Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

**-i** Specifies the absolute path name of the header file (**.h**) that contains the Linux system log template identification number that corresponds to the *error_template_label* specified in the **-l** option. This template must also be found in the node's Linux system log template repository (**/var/adm/ras/errtmplt**). This header file was generated by the **errupdate** command as part of the source code's building procedures, and should have been included in the licensed program's packaging to be installed on the node with the software. If this option is not specified or the header file cannot be found when the script is executed, **fclogerr** will record the failure information using its own default error template (label FFDC_DEF_TPLT_TR, identifier code 2B4F5CAB).

**-l** Specifies an abbreviation of the name of the licensed program in which this software was shipped. This value should be recognizable to customer and application-support services as an acceptable name for the licensed program (**AIX** or **CSM**, for example). If this option is not provided or does not appear to be valid, the character string **PPS_PRODUCT** is used.

**-p** Specifies the line of code location within the source code module where the condition is being reported. The value provided must be a valid integer value. To allow for proper identification and location of the condition, this value should be as close to the line of code that detected the condition as possible. Korn Shell scripts can use the value of **$LINENO**. Script languages that do not provide a special line count variable can provide a symbolic value here that a developer can use to locate the spot in the source code where **fclogerr** is being used. If this option is not valid or not provided, the value of **0** is used.

**-q** Suppresses the generation of warning messages from the command. Warning are generated when the command must substitute default information for missing information, or when the command is unable to copy the *detail_data_file* to the **/var/adm/ffdc/dumps** directory.

**-r** Specifies the software component name. This is a symbolic name for the software making the report and should be a name recognizable to both customer and application-support services. The character string is limited to 16 characters.

**-s** Specifies the name of the source file containing the line of code that encountered the condition being reported. For Korn and Borne Shell scripts, the argument to this option should be set to **$0**; C Shell scripts would set this argument to **${0}**. If this option is not provided or not valid, the character string **unknown_file** is used.

**-t** Indicates the symbolic label given to the Linux system log template in the error log repository. The **errupdate** command that builds Linux system log templates creates a macro that maps this label to an integer code. This label begins with the characters **ERRID_** and is a maximum of 19 characters. If this option is not specified or the header file cannot be found

when the script is executed, **fclogerr** will invoke the **errlogger** to create a message in the Linux system log using the OPMSG template.

**-v** Indicates the SCCS version number of the source code module that detected the condition being recorded. For source code built under SCCS control, this should be set to ″**1.1**″ (the double-quotes are necessary). If this option is not provided or is not valid, the character string **unknown** is used.

**-x** Indicates how the data items specified by the **-d** option are to be interpreted when recording this information to the Linux system log. These types must agree with the corresponding fields of the Linux system log template specified in the **-t** option. Each type indicates how the corresponding data item in the **-d** list is interpreted. Acceptable values for this option are ALPHA, HEX, and DEC. There must be a matching type listed in the **-x** argument for each argument in the **-d** list.

This option *must* be supplied if the **-d** option is provided.

**-y** Indicates the length of the data items (in bytes) specified by the **-d** option. These lengths must agree with the corresponding fields of the Linux system log template specified in the **-t** option. There must be a matching type listed in the **-y** argument for each argument in the **-d** list.

This option *must* be supplied if the **-d** option is provided.

## Description

This interface is used by any script program that wishes to record information to the Linux system log and the BSD system log. The information written to this device is intended for use by the system administrator or operator to determine what failure conditions or other noteworthy conditions have occurred on the system that require attention. The purpose of the Linux system log and the BSD system log is to record enough information about a condition so that the nature, impact, and response to the condition can be determined from the report, without requiring a recreation of the condition to detect what condition occurred and where. Any software that encounters permanent failure conditions that will persist until some type of direct intervention occurs, or encounters a condition that should be brought to the attention of the system administrator, should use **fclogerr** to record this information in the Linux system log and the BSD system log.

Scripts should establish a basic FFDC environment or an FFDC error stack environment before using **fclogerr**, either by creating or inheriting the environment. **fclogerr** records information to the Linux system log and the BSD system log even if these environments are not established, but the interface will not be capable of generating an FFDC failure identifier unless one of these environments exists.

Processes designed to use the FFDC error stack can also make use of the **fclogerr** interface, and should make use of it if they encounter conditions that require administrator attention or intervention to resolve.

To ensure proper identification of the condition and the location at which it was encountered, the FFDC policy recommends that **fclogerr** should be called in-line in the script's source code module and invoked as soon as the condition is detected. **fclogerr** will record source code file name and line of code information to assist in identifying and locating the source code that encountered the condition. **fclogerr** can be invoked by a subroutine or autoloaded routine to record this information if this is necessary, provided that all location information and necessary failure detail information is made available to this external routine. The external recording routine must record the true location where incident was detected.

Although **fclogerr** reports information to both the Linux system log and the BSD system log, different options must be provided to this interface for each recording device. The detail data information recorded to the Linux system log is not recorded to the BSD system log. BSD system log information is provided through different command options. This may require the **fclogerr** user to duplicate some information in this call.

## Exit status

**fclogerr** returns the following exit status codes upon successful completion:

**0**

Information successfully queued to be written to the Linux system log and the BSD system log. An FFDC failure identifier for the record is displayed to standard output. The caller should capture standard output to obtain this value.

**2**

Help information displayed and processing ended.

**12**

No information recorded to the Linux system log, and no FFDC failure identifier is provided by the command. The command user provided an non-valid option to this command.

On UNIX platforms other than AIX, **fclogerr** returns the following exit status codes when a failure occurs:

**38** A record could not be made in the BSD system log for this incident. The system log is experiencing a failure condition. On AIX systems, a report was recorded to the AIX error log; on other systems, this should be considered a failure.

When **fclogerr** is provided with incomplete information, it substitutes default information for the missing information and attempts to make a record in the FFDC error stack. Warnings are generated in these cases, and warning messages are generated unless the **-q** option is specified. In cases where more than one warning condition was detected, the command returns an exit status code for the condition it considered the most severe. The following exit status codes are returned by **fclogerr** when warning conditions are detected:

**10**

The command user failed to provide the **-i** option to this command, or the header file named as the argument to the -i option could not be located. The command will record generic information to the Linux system log in this case, using the first failure data capture default template (label FFDC_DEF_TPLT_TR, identifier code 2B4F5CAB).

**26**

Both a detailed data string and a detail data file were provided to this routine. The routine chose the detail data string and ignored the detail data file.

**28**

The name of the resource detecting the incident was not provided. The default resource name **ffdc** was substituted for the missing resource name.

**29**

At least one component of the detecting application information—source code file name, source code file version, licensed program name, line of code position—was not provided. Default information was substituted for the missing information.

**32**

The file named in the *detail_data_file* parameter could not be copied to the **/var/adm/ffdc/dumps** directory. The FFDC error stack entry cites the original version of this file. Do not discard the original copy of this file.

**33**

The **-e** option was not specified, or did not specify a valid FFDC event type. The event type FFDC_DEBUG has been assigned to this incident record.

**34**

A message was not supplied in the *format* parameter. As a result, a generic message was recorded to the BSD system log for this incident.

**35**

No detailed information was provided for this incident. Later problem analysis may be difficult without these details to indicate specifics on the incident.

**36**

The length of the detail data string was greater than the capacity of the Linux system log entry limit. Detail data was truncated to fit in the available space. Some information on the incident may have been lost in this truncation.

**37**

An FFDC error identifier could not be constructed for the report created by this routine. An FFDC failure identifier is not written to standard output, but information on the incident was recorded to the Linux system log and the BSD system log.

**38** A record could not be made in the BSD system log for this incident. The system log is experiencing a failure condition. On AIX systems, a report was recorded to the AIX error log; on other systems, this should be considered a failure.

## Examples

For this example, a Korn Shell script attempts to access configuration information from a file. If this attempt fails, the code will record a failure to the Linux system log using the following template source code:

```
*! mymesgcat.cat
+ SP_FFDCEXMPL_ER:
    Comment        = "Configuration Failed - Exiting"
    Class          = S
    Log       = true
    Report         = true
    Alert          = false
    Err_Type  = PERM
    Err_Desc  = {3, 10, "CONFIGURATION FAILURE - EXITING"}
    Prob_Causes    = E89B
    User_Causes    = E811
```

```
    User_Actions   = 1056
    Fail_Causes    = E906, E915, F072, 108E
    Fail_Actions   = {5, 14, "VERIFY USER HAS CORRECT PERMISSIONS TO ACCESS FILE"},
              {5, 15, "VERIFY CONFIGURATION FILE"}
    Detail_Data    = 46, 00A2, ALPHA
    Detail_Data    = 42, EB2B, ALPHA
    Detail_Data    = 42, 0030, ALPHA
    Detail_Data    = 16, EB00, ALPHA
    Detail_Data    = 16, 0027, ALPHA
    Detail_Data    = 4, 8183, DEC
    Detail_Data    = 4, 8015, DEC
    Detail_Data    = 60, 8172, ALPHA
```

This definition yields the following Linux system log template:

```
LABEL:            ERRID_SP_FFDCEXMPL_ER
IDENTIFIER:        <calculated by errupdate during source code build>

Date/Time:         <filled in by Linux system log subsystem>
Sequence Number:   <filled in by Linux system log subsystem>
Machine Id:        <filled in by Linux system log subsystem>
Node Id:           <filled in by Linux system log subsystem>
Class:             S
Type:              PERM
Resource Name:     <filled in by -r option to fclogerr>

Description
CONFIGURATION FAILURE - EXITING

Probable Causes
COULD NOT ACCESS CONFIGURATION FILE

User Causes
USER CORRUPTED THE CONFIGRATION DATABASE OR METHOD

    Recommended Actions
    RE-CREATE FILE

Failure Causes
COULD NOT ACCESS CONFIGURATION FILE
PERMISSIONS ERROR ACCESSING CONFIGURATION DATABASE
FILE READ ERROR
FILE IS CORRUPT

    Recommended Actions
    VERIFY USER HAS CORRECT PERMISSIONS TO ACCESS FILE
    VERIFY CONFIGURATION FILE

Detail Data
DETECTING MODULE
<filled in by fclogerr options>
ERROR ID
<The FFDC Failure Identifier created by fclogerr>
REFERENCE CODE
<The -a option value to fclogerr>
FILE NAME
<Must be supplied as part of -d option list to fclogerr>
FUNCTION
<Must be supplied as part of -d option list to fclogerr>
RETURN CODE<Must be supplied as part of -d option list to fclogerr>
ERROR CODE AS DEFINED IN sys/errno.h
<Must be supplied as part of -d option list to fclogerr>
USER ID<Must be supplied as part of -d option list to fclogerr>
```

The first three **Detail_Data** fields are constructed by the **fclogerr** routine from information passed in the parameters. The remaining detail data must be supplied with the **-d** option, and the type of data supplied must be indicated by the **-x** option. The following sample source code segment demonstrates how this is done, and how **fclogerr** is invoked to record the information in the Linux system log and the BSD system log.

```
typeset CONFIG_FNAME
typeset INBUF
typeset MINUSDOPTS
typeset MINUSXOPTS
typeset MINUSYOPTS
typeset FID
integer MYCLIENT
integer RC
    :
MYCLIENT=$$
CONFIG_FNAME="/configfile.bin"
exec 3< $CONFIG_FNAME
    :
read -u3 INBUF
RC=$?
if ((RC != 0))
then
    # Create detail data memory block for Linux system log template
    # Need to know the exact structure of the template to do this correctly.
    #    Field 1 - filled in by fc_log_error
    #    Field 2 - filled in by fc_log_error
    #    Field 3 - filled in by fc_log_error
    #    Field 4 - name of configuration file being used - 16 bytes
    #    Field 5 - name of function call that failed - 16 bytes
    #    Field 6 - return code from failing function - 4-byte integer
    #    Field 7 - errno from failing function call (unused) - 4-byte integer
    #    Field 8 - user ID using this software - remaining space (62 bytes)
    # This source code supplied fields 4 through 8 in the -d option, and
    # describes the data types for each in the -x option.
    MINUSDOPTS=$CONFIG_FNAME
    MINUSXOPTS="ALPHA"
    MINUSYOPTS="16"
    MINUSDOPTS="$MINUSDOPTS,read"
    MINUSXOPTS="$MINUSXOPTS,ALPHA"
    MINUSYOPTS="$MINUSYOPTS,16"
    MINUSDOPTS="$MINUSDOPTS,$RC"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,4"
    MINUSDOPTS="$MINUSDOPTS,0"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,4"
    MINUSDOPTS="$MINUSDOPTS,$MYCLIENT"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,60"
    FID=$(fclogerr -e FFDC_ERROR -t ERRID_SP_FFDCEXMPL_ER -i /usr/lpp/ssp/inc/
myprog.h -r myprog -s myprog.ksh -p $LINEPOS -v "1.1" -l PSSP -d $MINUSDOPTS -x
$MINUSXOPTS -y $MINUSYOPTS -b "myprog Configuration Failure - Exiting")
    RC=$?
    if ((RC == 0))
    then
         fcdispfid $FID
         return 1
    else
         :
    fi
fi
```

Now consider a slight variation on the above example, using the same Linux system log template, but this time using an external command to obtain the configuration data from a file that this source code supplies. The command exits with a non-zero exit status and prints an FFDC failure identifier to standard output if it encounters any failure conditions. Also, to demonstrate the use of double quotation marks in the **-d** list, the configuration file will have an embedded space in the name:

```
typeset CONFIG_FNAME
typeset INBUF
typeset MINUSDOPTS
typeset MINUSXOPTS
typeset MINUSYOPTS
typeset FID
typeset OUTPUT
integer MYCLIENT
integer RC
    :
MYCLIENT=$$
CONFIG_FNAME="This is a test"
OUTPUT=$(configdabeast $CONFIG_FNAME)
RC=$?
if ((RC != 0))
then
    # Create detail data memory block for Linux system log template
    # Need to know the exact structure of the template to do this correctly.
    #    Field 1 - filled in by fc_log_error
    #    Field 2 - filled in by fc_log_error
    #    Field 3 - filled in by fc_log_error
    #    Field 4 - name of configuration file being used - 16 bytes
    #    Field 5 - name of function call that failed - 16 bytes
    #    Field 6 - return code from failing function - 4-byte integer
    #    Field 7 - errno from failing function call (unused) - 4-byte integer
    #    Field 8 - user ID using this software - remaining space (62 bytes)
    # This source code supplied fields 4 through 8 in the -d option, and
    # describes the data types for each in the -x option.
    MINUSDOPTS="\""$CONFIG_FNAME"\""
    MINUSXOPTS="ALPHA"
    MINUSYOPTS="16"
    MINUSDOPTS="$MINUSDOPTS,configdabeast"
    MINUSXOPTS="$MINUSXOPTS,ALPHA"
    MINUSYOPTS="$MINUSYOPTS,16"
    MINUSDOPTS="$MINUSDOPTS,$RC"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,4"
    MINUSDOPTS="$MINUSDOPTS,0"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,4"
    MINUSDOPTS="$MINUSDOPTS,$MYCLIENT"
    MINUSXOPTS="$MINUSXOPTS,DEC"
    MINUSYOPTS="$MINUSYOPTS,60"
    FID=$(fclogerr -e FFDC_ERROR -t ERRID_SP_FFDCEXMPL_ER -i /usr/lpp/ssp/inc/
myprog.h -r myprog -s myprog.ksh -p $LINEPOS -v "1.1" -l PSSP -d $MINUSDOPTS -x
$MINUSXOPTS -y $MINUSYOPTS -a $OUTPUT -b "myprog Configuration Failure - Exiting")
    RC=$?
    if ((RC == 0))
    then
         fcdispfid $FID
         return 1
    else
         :
    fi
fi
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **errpt**, **fcdecode**, **fcdispfid**, **fcinit**, **fcpushstk**, **fcreport**

Files: **ct_ffdc.h**

Subroutines: **fc_log_error** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fcpushstk

## Name

**fcpushstk** – records information about failure or noteworthy conditions to the first failure data capture (FFDC) error stack.

## Synopsis

```
/usr/sbin/rsct/bin/fcpushstk { [-aassoc_fid] -cmessage_catalog_name
    -mmessage_set -nmessage_number [-omessage_param[,message_param,...]]
    -llpp_name -pline_of_code_pos -rresource -ssource_filename -vsidlevel
    {[-ddetail_data] | [-fdetail_data_file]} } default_message | -h
```

## Options

**-a** Specifies an FFDC failure identifier for a failure condition reported by software used by this application which causes or influenced the condition being recorded at this time. This identifier should have been returned to this application as part of the software's result indication. The caller provides this identifier here so that the FFDC error stack can associate the failure report it is making at this time with the previously recorded failure report. This permits problem investigators to trace the cause of a failure from its various symptoms in this application and others to the root cause in the other software. If no other software failure is responsible for this condition, or if the other software did not return an FFDC failure identifier as part of its result information, the **-a** option should not be provided.

**-c** Indicates the name of the XPG/4-compliant message catalog that contains a description of the failure being recorded. This name is relative to the **/usr/lib/nls/msg/$LANG** directory. If the message catalog cannot be found, the *default_message* will be displayed to describe the failure. Note that the *default_message* will not be translated between locales.

**-d** A character string that provides detailed information on the condition, similar to the detail data concept used by the Linux system log. If details of the information are too lengthy, these details can be written to a file, and the name of that file provided as an argument to the **-f** option. The **-d** and **-f** options cannot be specified at the same time. If neither the **-d** or the **-f** options are provided or appear valid, the character string **no detail data** is recorded.

**-f** Specifies the name of a file containing details about the condition being reported, similar to the detail data concept used by the Linux system log. This option is used when the details are too lengthy to record within the FFDC error stack itself, or when a utility exists that can analyze the detail information. The contents of this file is copied to the **/var/adm/ffdc/dumps** directory, and the file's new location is recorded as the detail data in the FFDC error stack. If a file containing details of the condition does not exist, do not specify this option. The **-d** and **-f** options cannot be specified at the same time.

**-h** Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

**-l** Specifies an abbreviation of the name of the licensed program in which this software was shipped. This value should be recognizable to customer and application-support services as an acceptable name for the licensed

program (**AIX** or **CSM**, for example). If this option is not provided or does not appear to be valid, the character string **PPS_PRODUCT** is used.

**-m** Specifies the message set containing the message describing the failure in the message catalog file. If this message set cannot be located, the *default_message* will be displayed to describe the failure. Note that **default_message** will not be translated to the user's locale.

**-n** Specifies the message number that describes the failure being recorded. If this message cannot be located, the *default_message* will be displayed to describe the failure. Note that *default_message* will not be translated to the user's locale.

**-o** Specifies a list of substitution parameters within the message indicated by the **-n** option. **fcpushstk** only supports character strings as substitutional parameters (%s) due to the shell operating environment. If multiple substitutional parameters are provided, each one must be separated by a comma (,). If any of these substitution parameters contain imbedded white space, they must be enclosed in double quotes (″″).

**-q** Suppresses the generation of warning messages from the command. Warning are generated when the command must substitute default information for missing information, or when the command is unable to copy the *detail_data_file* to the **/var/adm/ffdc/dumps** directory.

**-r** Specifies the software component name. This is a symbolic name for the software making the report, and should be a name recognizable to both customer and application-support services.

**-p** Specifies the line of code location within the source code module where the condition is being reported. The value provided must be a valid integer value. To allow for proper identification and location of the condition, this value should be as close to the line of code that detected the condition as possible. Korn Shell scripts can use the value of **$LINENO**. Script languages that do not provide a special line count variable can provide a symbolic value here that a developer can use to locate the spot in the source code where **fcpushstk** is being used. If this option is not valid or not provided, the value of **0** is used.

**-s** Specifies the name of the source file containing the line of code that encountered the condition being reported. For Korn and Borne Shell scripts, the argument to this option should be set to **$0**; C Shell scripts would set this argument to ${0}. If this option is not provided or not valid, the character string **unknown_file** is used.

**-v** Indicates the SCCS version number of the source code module that detected the condition being recorded. For source code under SCCS control, this should be set to ″**1.1**″ (the double-quotes are necessary). If this option is not provided or is not valid, the character string **unknown** is used.

## Parameters

*default_message*

Indicates a default message to be used as a description of the failure, when the information cannot be retrieved from the message catalog information supplied through the **-c**, **-m**, and **-n** options. If this string contains positional parameters, all positional parameters must be specified to be character strings (%s). The message should be enclosed in double quotes (″″) if it contains any embedded white space. **fcpushstk** limits the overall length of this string to 72 characters.

## Description

**fcpushstk** is used by scripts to record failure information to the FFDC error stack. Scripts record descriptive information and debugging data to the FFDC error stack for use in later problem determination efforts.

The FFDC error stack is used to help understand failure conditions that occur when multiple related processes or threads are executing together on a node to perform a common task. This device is best applied to an application that creates one or more threads or subprocesses, which in turn, may also create threads or subprocesses themselves. To use the FFDC error stack, the script establishes an *FFDC error stack environment* using the **fcinit** interface. After this environment is established, the application and any of its descendants can make use of the FFDC error stack.

Not all software applications will establish an FFDC error stack environment. However, these applications may be invoked by other applications or scripts that establish FFDC error stack environments. In these cases, the scripts or applications invoking this software may wish to capture the failure information from this software, to analyze it along with other failure information from other software it invokes to discover any relationships or patterns in the failures. For this reason, software that ordinarily would not make use of the FFDC error stack under normal operational conditions should at least support the use of the FFDC error stack when it is used by any client invoking the software. This is accomplished by *inheriting* the FFDC error stack environment from the parent process through the **fcinit** interface.

**fcpushstk** records descriptions and details about noteworthy conditions to the FFDC error stack. If an *FFDC error stack environment* has not been established by the script, either by creation or inheritance, **fcpushstk** does not record any information and returns control back to the caller. This action permits the script to run in a normal ″silent″ mode when debugging information is not requested, but also permits the script to support the use of the FFDC error stack when debugging information is requested.

Scripts must make explicit calls to **fcpushstk** to record information to the FFDC error stack when an FFDC error stack environment is established. Merely establishing the environment is not enough to result in failure data being recorded. The **fclogerr** command will not make any records to the FFDC error stack.

To ensure proper identification of the condition and the location at which it was encountered, **fcpushstk** should be called in-line in the script's source code module, invoked as soon as the condition is detected. **fcpushstk** will record source code file name and line of code information to assist in identifying and locating the source code that encountered the condition. **fcpushstk** can be invoked by a subroutine or autoloaded routine to record this information if this is necessary, provided that all location information and necessary failure detail information is made available to this external routine. The external recording routine must record the true location where the incident was detected.

The maximum size of an FFDC error stack entry is given by the FC_STACK_MAX definition in the **<rsct/ct_ffdc.h>** header file. FC_STACK_MAX defines a length in bytes. This value should be used only as a rough guide, since this length includes data that will be used by **fcpushstk** to record the detecting file information, description information, and FFDC failure identifier information. Any records longer than FC_STACK_MAX bytes will be truncated to fit within the FC_STACK_MAX limit.

## Exit status

**fcpushstk** returns the following exit status codes upon successful completion:

**0**

FFDC error stack environment exists, and failure information successfully recorded in the FFDC error stack. An FFDC failure identifier for the record is displayed to standard output. The caller should capture standard output to obtain this value.

**2**

Help information displayed and processing ended.

**fcpushstk** returns the following exit status codes when a failure occurs:

**11**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. The client requested to use an option not supported in this release of the FFDC software

**12**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. Unknown function parameter provided to the interface.

**15**

FFDC error stack environment does not exist. No information recorded to the FFDC error stack. No FFDC failure identifier is generated by this command. This is the normal return code to the FFDC client when an FFDC error stack environment did not exist to be inherited via **fcinit**.

**17**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. The FFDC error stack environment appears to be corrupted and should be considered unusable.

**19**

No information recorded to the FFDC error stack - the FFDC error stack directory does not exist or cannot be used. No FFDC failure identifier is provided by this command.

**20**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. Unable to access the FFDC error stack file. The file may have been removed, or permissions on the file or its directory have been changed to prohibit access to the FFDC error stack.

**22**

No information recorded to the FFDC error stack - the FFDC error stack file could not be locked for exclusive use by this interface. Repeated attempts had been made to lock this file, and all attempts failed. Another process may have locked the file and failed to release it, or the other process may be hung and is preventing other processes from using the FFDC error stack. No FFDC failure identifier is provided by this command.

**24**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. The FFDC error stack file appears to be corrupted. The client should consider the FFDC error stack environment unusable.

**25**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. The FFDC error stack file name is set to a directory name. The FFDC error stack environment should be considered corrupted and unusable.

**32**

A dump file could not be copied to the **/var/adm/ffdc/dumps** directory. There is insufficient space in the file system containing the **/var/adm/ffdc** directory. The **fcclear** command should be used to remove unneeded FFDC error stacks and dump files, or the system administrator needs to add more space to the file system. No FFDC failure identifier is provided by this command.

**40**

No information recorded to the FFDC error stack. Information could not be recorded in the FFDC error stack because there is not enough space in the file system that contains the **/var/adm/ffdc** directory. Use the **fcclear** command to remove unneeded FFDC error stacks and dump files. Otherwise, the system administrator needs to add more space to the file system. No FFDC failure identifier is provided by this command.

**41**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. A failure occurred when reading control information from the FFDC error stack or writing incident information to the FFDC error stack. The client should conclude that the entry was not recorded for this incident.

**99**

No information recorded to the FFDC error stack, and no FFDC failure identifier is provided by this command. An unexpected internal failure occurred in the **fc_push_stack** routine.This problem may require the attention of application-support services.

When **fcpushstk** is provided with incomplete information, it substitutes default information for the missing information and attempts to make a record in the FFDC error stack. Warnings are generated in these cases, and warning messages are displayed to the standard error device unless the **-q** option has been specified. In cases where more than one warning condition was detected, the command generates an exit status code corresponding to the most severe warning condition it detected. The following exit status codes are returned by **fcpushstk** when warning conditions are detected:

**26**

Both a detailed data string and a detail data file were provided to this routine. The routine chose the detail data string and ignored the detail data file.

**28**

The name of the resource detecting the incident was not provided. The default resource name was substituted for the missing resource name.

**29**

At least one component of the detecting application information—source code file name, source code file version, licensed program name, line of code position—was not provided. Default information was substituted for the missing information.

**30**

No default message was provided to describe the nature of the incident. If the XPG/4 message catalog containing the description message cannot be found, no description for this condition will be displayed by the **fcstkrpt** command.

**31**

No message was provided to describe the nature of the incident, or a component of the XPG/4 information—catalog file name, message set number, message number—was not provided. No description for this condition can be displayed by the **fcstkrpt** command.

**32**

The file named in the *detail_data_file* parameter could not be copied to the **/var/adm/ffdc/dumps** directory. The FFDC error stack entry cites the original version of this file. Do not discard the original copy of this file.

**35**

No detailed information was provided for this incident. Later problem analysis may be difficult without these details to indicate specifics on the incident.

**37**

An FFDC failure identifier could not be constructed for the report created by this routine. No FFDC failure identifier is provided by this command, but information on the incident was recorded to the FFDC error stack.

**44**

The information provided to this command would have caused an FFDC error stack record to exceed the FC_STACK_MAX limit. The record was truncated to allow it to be recorded within the system limits. Important information about the failure may have been lost during the truncation process. Modify the script to provide less information, or to record the information to a detail data file and submit the detail data file name to this command instead.

## Examples

To record information about a failure to the FFDC error stack when the FFDC environment is established or inherited by the process:

```
#!/bin/ksh
    :
    :
cp /tmp/workfile $FILENAME
RC=$?
if ((RC != 0))
then
```

```
    FFDCID=$(fcpushstk -c mymsg.cat -m2 -n10 -o$FILENAME -r myprog
         -d"cp exit status $RC - file being copied /tmp/workfile" -s$0
         -p$LINENO -v"1.1" -lPSSP "Cannot update configuration file %1$s")
    if (($? == 0))
    then
         fcdispfid $FFDCID
         return 1
    fi
fi
    :
    :
```

To make the same recording from a script language that does not have a line of code variable available:

```
#!/bin/bsh
    :
    :
CODESCTN=14             # Used to identify where in the script code we are
cp /tmp/workfile $FILENAME
RC=$?
if test $RC -ne 0
then
    FFDCID=`fcpushstk -c mymsg.cat -m2 -n10 -o$FILENAME -r myprog
         -d"cp exit status $RC - file being copied /tmp/workfile" -s$0
         -p$CODESCTN -v"1.1" -lPSSP "Cannot update configuration file %1$s"`
    if test $? -eq 0
    then
         fcdispfid $FFDCID
         return 1
    fi
fi
CODESECTION=15               # New code section begins - a different task starts
    :
    :
```

To record information about a failure condition that is related to another failure condition previously recorded to the FFDC error stack by an application exploiting FFDC:

```
#!/bin/ksh
    :
    :
ASSOC_FID=$(/usr/lpp/ssp/bin/somecmd -a -b)
RC=$?if ((RC != 0))
then
    FFDCID=$(fcpushstk -a$ASSOC_FID -c mymsg.cat -m2 -n10 -o$FILENAME -r myprog
         -d"cp exit status $RC - file being copied /tmp/workfile" -s$0
         -p$LINENO -v"1.1" -lPSSP "Cannot update configuration file %1$s")
    if (($? == 0))
    then
         fcdispfid $FFDCID
         return 1
    fi
fi
    :
    :
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcdecode**, **fcdispfid**, **fcinit**, **fcreport**, **fcstkrpt**, **fcteststk**

Subroutines: **fc_push_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fcreport

## Name

**fcreport** – locates and displays the report of a failure and any failures associated with the failure.

## Synopsis

```
/usr/sbin/rsct/bin/fcreport { [-a] FFDC_failure_ID } | -h
```

## Options

**-a**

Displays all information contained in a report for a failure. The default is to display the network address of the node where the failure report was generated, the time stamp on the failure report, and the description of the incident recorded in the failure report.

**-h**

Displays a help message to standard output and exits. No other processing is performed, regardless of the options specified.

## Parameters

*FFDC_failure_ID*

Specifies the FFDC failure identifier of the failure to begin the report. **fcreport** will attempt to obtain the failure information for this failure, as well as any failures that this report lists as an associated failure. Only one FFDC failure identifier may be provided to this command.

## Description

**fcreport** decodes an FFDC failure identifier, and obtains reports on the failure identified by it. The command also detects if any failure was associated with the FFDC failure identifier, and if so, obtains the report on that failure. The command continues to examine the report of each failure it locates for associated failures and to obtain reports on the associated failures until one of the following conditions is met:

- No further associated failures are detected.
- The report for an associated failure cannot be found. This may occur when the associated failure report resides on a remote node that cannot be reached at the moment, or the record of the failure has been removed from the node where it resided.

Using this command, the user can obtain a report for the entire list of failures that caused a specific failure. **fcreport** is not capable of locating reports for any failures that may have been caused by the initial failure provided to the command; it can only obtain reports of failures that caused this failure.

## Exit status

**fcreport** generates one of the following exit status codes upon completion:

**0**

Failure report located and displayed for the FFDC failure identifier provided. Zero or more related failure reports may have been located and displayed as well.

**2**

Help information displayed and processing ended.

**10**

Required options or arguments are not provided.

**11**

The FFDC failure identifier provided to this command was generated by a later release of the FFDC software. The command is not capable of correctly interpreting this identifier.

**12**

Unknown option specified to this command.

**20**

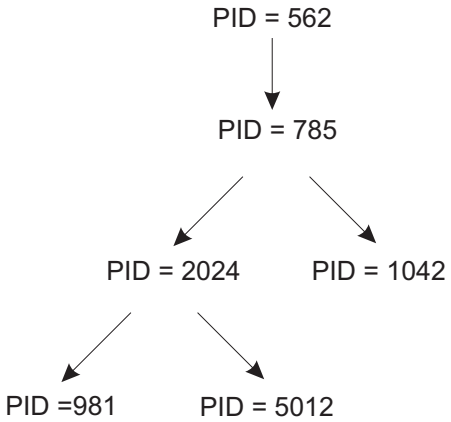
The FFDC failure identifier refers to an entry made in an FFDC error stack on this system, but the FFDC error stack file cannot be accessed. The file may have been removed, or permissions may have been altered on the file to prevent access to it.

**27**

The FFDC failure identifier provided to this command is not a valid identifier.

## Examples

Consider the case where several processes were created in the following parent-child order:




In this example, process 785 generated the FFDC failure identifier **.3Iv04ZVVfvp.wtY0xRXQ7.....** and passed it back to Process 562. To obtain a detailed report for FFDC failure identifier **.3Iv04ZVVfvp.wtY0xRXQ7.....** and any previous failures that led to this specific failure:

```
$ fcreport -a .3Iv04ZVVfvp.wtY0xRXQ7...................
```

This report will contain the details of the specified FFDC failure identifier, as well as any failures in processes 2024, 1042, 981, and 5012 that may have caused it. The report will not contain any failures in process 562 that may have been caused as a result of process 785's failure.

## Security

**fcreport** uses **rsh** to obtain failure reports that may reside on remote nodes. The user must have sufficient privilege to execute **rsh** commands to these remote nodes. If the user does not have this permission, **fcreport** can only trace the list of related failures so long as they exist on the local node.

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcclear**, **fcdecode**, **fcdispfid**, **fcfilter**, **fclogerr**, **fcpushstk**, **fcstkrpt**

Subroutines: **fc_log_error**, **fc_push_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fcstkrpt

## Name

**fcstkrpt** – displays the contents of an FFDC error stack file.

## Synopsis

```
/usr/sbin/rsct/bin/fcstkrpt { [-a] [-p | -r]
                            {
                                 -fFFDC_failure_ID [-i] |
                                 -sFFDC_error_stack_file_name
                            }
                      } | [-h]
```

## Options

**-a**

Indicates that all information be displayed for entries in the FFDC error stack. The default action is to display the time stamp for the record and the description of the incident.

**-f**

Specifies the FFDC failure identifier to use in locating the FFDC error stack. **fcstkrpt** decodes the FFDC failure identifier, locates the FFDC error stack associated with that FFDC failure identifier, and processes the FFDC error stack. Only one FFDC failure identifier can be specified by this flag.

**-h**

Displays a help message to standard output and exits. No other processing is performed regardless of the options specified.

**-i**

Displays only the information associated with the specific failure report identified by the **-f** flag. By default, all records in the FFDC error stack are displayed.

**-p**

Displays information from the FFDC error stack by process orientation. The output is ordered so that it reflects the order in which the processes were created (parent-child process relationship). Child process information is shown first, followed by parent process information. This view is used to understand which incidents occurred first, and which incidents occurred later because of them.

**-r**

Displays information from the FFDC error stack by incident relationships. Incidents are presented along with those incidents that are related to them. This view is used to understand which incidents occurred because of the occurrence of other incidents. This is the default.

**-s**

Specifies the name of the FFDC error stack to be examined. This name may be either the absolute or relative path name of the FFDC error stack. Only one FFDC error stack file name can be specified by this flag. If a

relative file name is used, the file is assumed to be located in the **/var/adm/ffdc/stacks** directory of the node where the file resides.

## Description

**fcstkrpt** reads an existing FFDC error stack file and displays its contents to the standard output device. The FFDC error stack file is indicated either through the name of the file itself, or by using an FFDC failure identifier that references a specific record within that file.

Information from the FFDC error stack can be displayed in one of two formats: by *related failure conditions* (the default) or by *software layer*.

## Exit status

**fcstkrpt** issues the following integer exit status codes upon completion:

**0**

FFDC error stack file successfully located, and contents displayed to the standard output device.

**2**

Help information displayed and processing ended.

**12**

An invalid option was specified.

**14**

No information written to the standard output device. The **-f** option was used and the *FFDC error identifier* argument was not valid.

**20**

No information written to the standard output device. The **-s** option was used and the *FFDC error stack File* argument was not found.

**27**

No information written to the standard output device. The caller provided a valid *FFDC failure identifier*, but the file referenced by the FFDC failure identifier was not recorded on this node. Use the **fcdecode** command to locate the node where this FFDC error stack resides.

**81**

No information written to the standard output device. A failure occurred while writing information to standard output. The application should conclude that standard output cannot accept output.

**85**

No information written to the standard output device. The caller provided a valid FFDC failure identifier, but the file referenced by the FFDC failure identifier does not exist.

## Examples

To obtain a brief report of the information stored in the FFDC error stack file **/var/adm/ffdc/stacks/myprog.562.20031001143052**:

```
$ fcstkrpt -r -s myprog.562.20031001143052
```

To obtain a detailed report of the information contained in the FFDC error stack where the FFDC failure identifier **.3Iv04ZVVfvp.wtY0xRXQ7.....** was recorded, and present this information in parent-child ordering:

```
$ fcstkrpt -p -f .3Iv04ZVVfvp.wtY0xRXQ7...................
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcclear**, **fcdecode**, **fcdispfid**, **fcfilter**, **fcpushstk**, **fcreport**

Subroutines: **fc_push_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# fcteststk

## Name

**fcteststk** – tests for the presence of a first failure data capture error stack environment.

## Synopsis

```
/usr/sbin/rsct/bin/fcteststk [-q] | [-h]
```

## Options

**-q**

Suppresses output from this command that explains whether or not an FFDC environment was established. The command user will be required to test the exit status from the command to determine whether an FFDC environment is established for this process.

**-h** Writes this command's usage statement to standard output.

## Description

**fcteststk** can be called by any application program that wishes to use the FFDC error stack to test if these facilities have been activated . By performing this test, applications can avoid the performance burden of collecting failure information in cases where an *FFDC environment* has not been established. This interface is provided primarily for use by library routines, which would not have any knowledge of whether their client application established or inherited an *FFDC environment*.

An *FFDC error stack environment* is established by a process when that process wants to have failure information from itself, any threads it may create, and any descendant processes it may create to be recorded in an FFDC error stack. An *FFDC error stack environment* is inherited by a process when that process wants to record failure information to an FFDC error stack file only when one of its ancestors has requested for processes to do so; in all other cases, the process will not record failure information to the FFDC error stack. Processes use **fcinit** to either establish or inherit the FFDC error stack environment.

The FFDC error stack environment reserves an FFDC error stack file, so that failure information is recorded to a file in the **/var/adm/ffdc/stacks** directory. These files use the naming format ***script_name.PID.date_and_time***, where *script_name* is the name of the script itself, *PID* is the process identifier of the script, and *date_and_time* is the date and time when the script was executed. Whenever this script or children processes of this script record failure information to the FFDC error stack, it will be recorded in this file.

Applications use the **fcpushstk** interface to record failure information to the FFDC error stack. However, the application may need to collect this information from various locations before recording the information, and obtaining this information can impact the application's overall performance. The application should not need to collect this information if the *FFDC error stack environment* was not established or inherited. To avoid this performance impact, the application can issue **fcteststk** to determine if an *FFDC error stack environment* is available, and if so, begin collecting the failure information. If the *FFDC error stack environment* does not exist, the application can avoid collecting this information.

Processes that use the **fclogerr** FFDC interface can use **fclogerr** when an *FFDC environment* exists, whether or not an FFDC error stack is in use by the *FFDC environment*. Whenever **fclogerr** is used, failure information is recorded to the Linux system log and the BSD system log, regardless of whether an FFDC error stack was reserved. Any application that records information using the **fclogerr** interface must *always* collect the failure information and record it, regardless of whether an FFDC error stack is in use.

## Exit status

**0** An FFDC error stack environment exists.

**2** Help information displayed and processing ended.

**12** No processing performed. An invalid option was specified.

**15** FFDC error stack environment has not been established or inherited by the client at this point in time.

**17** FFDC error stack environment appears to be corrupted and should be considered unusable.

## Examples

To test whether an FFDC error stack environment exists for an application:

```
fcteststk -q
if (($? == 0))
then
    # Collect failure information
         :
         :
    # Use fcpushstk to record failure info
         :
         :
fi
```

## Implementation specifics

This command is part of the Reliable Scalable Cluster Technology (RSCT) fileset.

## See also

Commands: **fcinit**, **fcpushstk**

Subroutines: **fc_test_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

# Chapter 22. FFDC files

# ct_ffdc.h

## Name

**ct_ffdc.h** – provides data types, definitions, and interface prototypes for the first failure data capture (FFDC) C language library interfaces.

## Description

Any C and C++ language source code files that use the FFDC C language interfaces must include this header file. This file contains the C language prototypes for the FFDC interfaces, the symbolic constants used as return codes from these interfaces, and data type definitions needed by FFDC C and C++ language clients.

### C language interface selection control

This file provides the compiler definition **FC_VERSION**. This definition controls which version of the FFDC interfaces should be used during compilation of the source code. One version of the FFDC interfaces is available; the value of **FC_VERSION** is set to a default value of **1**. If this variable is not set during compilation, the value for **FC_VERSION** reverts to the default value of **1** and the initial version of the FFDC interfaces is used.

### Data types

The **fc_eid_t** data type defined by this module is used to store an FFDC failure identifier. This identifier is created by the **fc_push_stack** and **fc_log_error** interfaces whenever these interfaces are successful in recording failure information. This identifier contains information in an encoded form to indicate the system on which the record was made, the time when the record was made, and the location of the record. FFDC commands such as **fcreport** and **fcstkrpt** can be used at a later time to obtain the exact failure report for problem determination efforts.

### FFDC environment establishment codes

An FFDC client application uses the **fc_init** interface to specify how the FFDC environment should be established. The following selections are supported:

**FC_LOG**
: Establishes a basic FFDC environment, which permits the application to record failure information to the Linux syslog and the BSD system log. An FFDC error stack is not established for use by the application in this case, unless this value is combined with the FC_STACK_CREAT option or the FC_STACK_INHERIT option. This selection would be used by applications making use of the **fc_log_error** interface only.

**FC_STACK_CREAT**
: Creates an FFDC error stack environment if one was not previously created by an ancestor of this process, or inherits the FFDC error stack environment if an ancestor previously established one. The FFDC error stack environment permits the application to record information to the Linux syslog, the BSD system log, and the FFDC error stack. This selection is used by applications that would use the **fc_push_stack** interface as well as the **fc_log_error** interface. Do not use FC_STACK_CREAT in conjunction with FC_STACK_INHERIT.

**FC_STACK_INHERIT**
: Inherits an FFDC error stack environment only if an ancestor process previously established an FFDC error stack environment. If an ancestor did not establish such an environment, the application does not make use of an

FFDC error stack, but may still make use of the Linux syslog and the BSD system log. Do not use FC_STACK_INHERIT in conjunction with FC_STACK_CREAT.

### Record type definitions

Seven FFDC event types are specified in this file. These event types are used to instruct the **fc_log_error** interface as to the severity of the condition being logged:

**FFDC_EMERG**
A severe failure has occurred, and the system is in danger of coming offline. This information is required by the system administrator to bring the system back online. The BSD system log priority equivalent is LOG_EMERG.

**FFDC_ERROR**
A permanent failure has occurred, and the condition will persist until it is repaired. The system is not in danger of coming offline. The BSD system log priority equivalent is LOG_ERR.

**FFDC_STATE**
An event of some significance has occurred, but the event does not constitute a failure condition. The BSD system log priority equivalent is LOG_NOTICE.

**FFDC_PERF**
A condition has been noticed which can or will degrade the system's performance below acceptable levels. The system is not in danger of coming offline, but performance may be unacceptably slow, which can result in random failures in system applications, such as timeout conditions. The BSD system log priority equivalent is LOG_WARNING.

**FFDC_TRACE**
This entry identifies the name and location of a trace file generated by an application or system component. Such an entry would be made when a trace has been enabled in an application or a component, to indicate where the trace file resides. The BSD system log priority equivalent is LOG_INFO.

**FFDC_RECOV**
A recovery action has been successfully completed by the system in response to an FFDC_EMERG, FFDC_ERROR, or FFDC_PERF condition. Such an entry would be created only after an FFDC_EMERG, FFDC_ERROR, or FFDC_PERF condition was detected, and a recovery action started in response to that condition completed successfully. The BSD system log priority equivalent is LOG_DEBUG.

**FFDC_DEBUG**
A failure condition was detected. Unlike the FFDC_ERROR case, the failure is not a permanent condition, or the system can continue successfully with the condition present. The BSD system log priority equivalent is LOG_DEBUG.

## Location

**/usr/sbin/rsct/include/ct_ffdc.h**

**/usr/include/rsct/ct_ffdc.h**

## See also

Commands: **fcdecode**, **fcdispfid**, **fcreport**, **fcstkrpt**

Subroutines: **fc_display_fid**, **fc_eid_init**, **fc_eid_is_set**, **fc_init**, **fc_log_error**, **fc_push_stack** (see the *RSCT First Failure Data Capture Programming Guide and Reference*)

## Examples

To use this file in a C or C++ language program, add the following line near the beginning of the source code module:

```
#include <rsct/ct_ffcd.h>
```

# Part 11. Appendixes

# Appendix. Product-related information

Reliable Scalable Cluster Technology (RSCT) is a component of the following licensed programs:

- Cluster Systems Management (CSM) for Linux
- System Automation for Multiplatforms

## RSCT version

This edition applies to RSCT version 2.4.5.0 for Linux. To find out which version of RSCT is running on a particular Linux node, enter:

```
rpm -qa | grep rsct.basic
```

## Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

## Using assistive technologies

Assistive technology products, such as screen readers, function with user interfaces. Consult the assistive technology documentation for specific information when using such products to access interfaces.

## ISO 9000

ISO 9000 registered quality systems were used in the development and manufacturing of this product.

## Product-related feedback

To contact the IBM cluster development organization, send your comments by e-mail to:

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# Glossary

**access control.** The process of limiting access to system objects and resources to authorized principals.

**access control list.** A list of principals and the type of access allowed to each.

**ACL.** See *access control list.*

**action.** The part of the event response resource that contains a command and other information about the command.

**attribute.** Attributes are either persistent or dynamic. A resource class is defined by a set of persistent and dynamic attributes. A resource is also defined by a set of persistent and dynamic attributes. Persistent attributes define the configuration of the resource class and resource. Dynamic attributes define a state or a performance-related aspect of the resource class and resource. In the same resource class or resource, a given attribute name can be specified as either persistent or dynamic, but not both.

**AIX.** Advanced Interactive Executive. See *AIX operating system.*

**AIX operating system.** IBM's implementation of the UNIX operating system.

**authentication.** The process of validating the identity of an entity, generally based on user name and password. However, it does not address the access rights of that entity. Thus, it simply makes sure a user is who he or she claims to be.

**authorization.** The process of granting or denying access to an entity to system objects or resources, based on the entity's identity.

**checksum.** A count of the number of bits in a transmission unit that is included with the unit so that the receiver can check to see whether the same number of bits arrived. If the counts match, it's assumed that the complete transmission was received. TCP and UDP communication layers provide a checksum count and verification as one of their services.

**client.** Client applications are the ordinary user interface programs that are invoked by users or routines provided by trusted services for other components to use. The client has no network identity of its own: it assumes the identity of the invoking user or of the process where it is called, who must have previously obtained network credentials.

**cluster.** A group of servers and other resources that act like a single system and enable high availability and, in some cases, load balancing and parallel processing.

**clustering.** The use of multiple computers (such as UNIX workstations, for example), multiple storage devices, and redundant interconnections to form what appears to users as a single highly-available system. Clustering can be used for load balancing, for high availability, and as a relatively low-cost form of parallel processing for scientific and other applications that lend themselves to parallel operations.

**cluster security services.** A component of RSCT that is used by RSCT applications and other RSCT components to perform authentication within both management domains and peer domains.

**condition.** A state of a resource as defined by the event response resource manager (ERRM) that is of interest to a client. It is defined by means of a logical expression called an event expression. Conditions apply to resource classes unless a specific resource is designated.

**condition/response association.** A link between a condition and a response.

**CSM.** Clusters Systems Management.

**datagram.** Synonymous with *UDP packet.*

**DNS.** See *domain name system.*

**domain.** (1) A set of network resources (such as applications and printers, for example) for a group of users. A user logs in to the domain to gain access to the resources, which could be located on a number of different servers in the network. (2) A group of server and client machines that exist in the same security structure. (3) A group of computers and devices on a network that are administered as a unit with common rules and procedures. Within the Internet, a domain is defined by its IP address. All devices that share a common part of the IP address are said to be in the same domain.

**domain name.** A meaningful and easy-to-remember ″handle″ for an Internet address.

**domain name system.** The service through which domain names are located and translated into IP addresses.

**event.** Occurs when the event expression of a condition evaluates to True. An evaluation occurs each time an instance of a dynamic attribute is observed.

**event expression.** A definition of the specific state when an event is true.

**event response.** One or more actions as defined by the event response resource manager (ERRM) that take place in response to an event or a rearm event.

**failover.** A backup operation that automatically switches to another adapter if one adapter fails. Failover is an important fault-tolerance function of mission-critical systems that rely on constant accessibility. Automatically and transparently to the user, failover redirects requests from the failed adapter to another adapter that mimics the operations of the failed adapter.

**FFDC.** See *first failure data capture.*

**first failure data capture.** Provides a way to track problems back to their origin even though the source problem may have occurred in other layers or subsystems than the layer or subsystem with which the end user is interacting. FFDC provides a correlator called an **ffdc_id** for any error that it writes to the AIX error log. This correlator can be used to link related events together to form a chain.

**FIFO.** First in first out, usually referring to buffers.

**High Performance Switch.** The switch that works in conjunction with a specific family of IBM pSystem servers.

**HPS.** See *High Performance Switch.*

**Internet Protocol.** The method by which data is sent from one computer to another on the Internet.

**IP.** See *Internet Protocol.*

**IP address.** A 32-bit (in IP Version 4) or 128-bit (in IP Version 6) number identifying each sender or receiver of information that is sent in packets across the Internet.

**LAPI.** See *low-level application programming interface.*

**Linux.** A freeware clone of UNIX for 386-based personal computers (PCs). Linux consists of the **linux** kernel (core operating system), originally written by Linus Torvalds, along with utility programs developed by the Free Software Foundation and by others.

**LoadLeveler®.** The IBM LoadLeveler licensed program is a job management system that works with POE to let users run jobs and match processing needs with system resources, in order to make better use of the system.

**low-level application programming interface.** A low-overhead message-passing protocol that uses a one-sided communication model and active message paradigm to transfer data among tasks. See also *RSCT LAPI.* Contrast with *PSSP LAPI.*

**logical unit number.** A unique identifier used on a SCSI bus that enables it to differentiate between up to eight separate devices (each of which is a logical unit). Each LUN is a unique number that identifies a specific logical unit, which may be an end user, a file, or an application program.

**LUN.** See *logical unit number.*

**management domain.** A set of nodes configured for manageability by the Clusters Systems Management (CSM) licensed program. Such a domain has a management server that is used to administer a number of managed nodes. Only management servers have knowledge of the whole domain. Managed nodes only know about the servers managing them; they know nothing of each other. Contrast with *peer domain.*

**Message Passing Interface.** A standardized API for implementing the message-passing model.

**MPI.** See *Message Passing Interface.*

**mutex.** See *mutual exclusion object.*

**mutual exclusion object.** A program object that allows multiple program threads to share the same resource, such as file access, but not simultaneously. When a program is started, a mutual exclusion object is created with a unique name. After this stage, any thread that needs the resource must lock the mutual exclusion object from other threads while it is using the resource. The mutual exclusion object is set to unlock when the data is no longer needed or the routine is finished.

**network credentials.** These represent the data specific to each underlying security mechanism.

**OSI.** Operating system image.

**PAC.** See *privileged attribute certificate.*

**packet.** The unit of data that is routed between an origin and a destination on the Internet or any other packet-switched network.

**Parallel Environment.** The IBM Parallel Environment for AIX 5L licensed program is an execution and development environment for parallel C, C++, and FORTRAN programs. It also includes tools for debugging, profiling, and tuning parallel programs.

**parallel operating environment.** An execution environment that smooths the differences between serial and parallel execution. It lets you submit and manage parallel jobs.

**Parallel System Support Programs.** The IBM Parallel System Support Programs for AIX 5L licensed program is system administration software for the IBM RS/6000® SP™ system.

**PE.** See *Parallel Environment.*

**peer domain.** A set of nodes configured for high availability by the configuration resource manager. Such a domain has no distinguished or master node. All nodes are aware of all other nodes, and administrative commands can be issued from any node in the domain. All nodes also have a consistent view of the domain membership. Contrast with *management domain.*

**POE.** See *parallel operating environment.*

**port.** A ″logical connection place″. Using TCP/IP, the way a client program specifies a particular server program on a computer in a network.

**principal.** A user, an instance of the server, or an instance of a trusted client whose identity is to be authenticated.

**privileged attribute certificate.** Contains such information as the client's name and the groups to which it belongs. Its format is dependent on the underlying security mechanism.

**protocol.** The set of rules that endpoints in a telecommunication connection use when they communicate.

**PSSP.** See *Parallel System Support Programs.*

**PSSP LAPI.** The version of LAPI that supports the SP Switch2.

**rearm event.** Occurs when the rearm expression for a condition evaluates to True.

**rearm expression.** An expression that generates an event which alternates with an original event in the following way: the event expression is used until it is true; then, the rearm expression is used until it is true; then, the event expression is used. The rearm expression is commonly the inverse of the event expression. It can also be used with the event expression to define an upper and lower boundary for a condition of interest.

**Reliable Scalable Cluster Technology.** A set of software components that together provide a comprehensive clustering environment for AIX and Linux. RSCT is the infrastructure used by a variety of IBM products to provide clusters with improved system availability, scalability, and ease of use.

**resource.** An entity in the system that provides a set of services. Examples of hardware entities are processors, disk drives, memory, and adapters. Examples of software entities are database applications, processes, and file systems. Each resource in the system has one or more attributes that define the state of the resource.

**resource class.** A broad category of system resource, for example: node, file system, adapter. Each resource class has a container that holds the functions, information, dynamic attributes, and conditions that apply to that resource class. For example, the **/tmp space used** condition applies to a file system resource class.

**resource manager.** A process that maps resource and resource-class abstractions into calls and commands for one or more specific types of resources. A resource manager can be a standalone daemon, or it can be integrated into an application or a subsystem directly.

**RSCT.** See *Reliable Scalable Cluster Technology.*

**RSCT LAPI.** The version of LAPI that supports the IBM @server High Performance Switch (HPS). See also *low-level application programming interface.*

**RSCT peer domain.** See *peer domain.*

**SCSI.** See *Small System Computer Interface.*

**Small System Computer Interface.** A parallel interface that can have up to eight devices all attached through a single cable; the cable and the host (computer) adapter make up the SCSI bus. The bus allows the interchange of information between devices independently of the host. In the SCSI program, each device is assigned a unique number, which is either a number between 0 and 7 for an 8-bit (narrow) bus, or between 8 and 16 for a 16-bit (wide) bus. The devices that request input/output (I/O) operations are initiators and the devices that perform these operations are targets. Each target has the capacity to connect up to eight additional devices through its own controller; these devices are the logical units, each of which is assigned a unique number for identification to the SCSI controller for command processing.

**SD.** Structured data.

**security context token.** A pointer to an opaque data structure called the context token descriptor. The context token is associated with a connection between a client and the server.

**security services token.** A pointer to an opaque descriptor called the security token descriptor. It keeps track of the mechanism-independent information and state.

**servers.** Server programs are usually daemons or other applications running in the background without a user's inherited credentials. A server must acquire its own network identity to get to access other trusted services.

**SP Switch2.** The switch that works in conjunction with IBM RS/6000 SP systems.

**standalone system.** A system on which you are using LAPI that is not running IBM's Parallel Environment for AIX 5L licensed program.

**striping.** The distribution of message data across multiple communication adapters in order to increase bandwidth.

**TCP.** See *Transmission Control Protocol.*

**Transmission Control Protocol.** One of the core Internet protocols. TCP ports are 16-bit entities, so a maximum of 65535 different endpoints are possible within a single IP address.

**UDP.** See *User Datagram Protocol.*

**User Datagram Protocol.** One of the core Internet protocols. UDP is a layer 4 protocol (Transport layer of the OSI model) within the Internet protocol suite. It provides a mechanism to identify different endpoints on a single host by using ports. UDP deals with single-packet delivery that is provided by the underlying IP. As a stateless protocol, it is often used in applications where data must arrive quickly. This smaller feature set provides quicker data transmittal and lower total overhead. UDP packets (or *datagrams*) contain, in addition to the lower-level headers, a UDP header, which consists of the packet length, source and destination ports, and a checksum. UDP ports are 16-bit entities, so a maximum of 65535 different endpoints are possible within a single IP address.

# Index

## A



## B



## C

# D



# E

## S



## T



## U



## V



## W



## X

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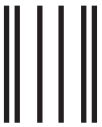

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