IBM VisualAge TeamConnection Enterprise Server

Administrator’s Guide

Version 3.0

SC34-4551-01

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SC34-4551-01

September 1999

Note

Before using this document, read the general information under “Notices” on page ix.

This edition applies to fixpack 3.0.3, hotfix 1 of the licensed program IBM TeamConnection and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

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About this book

This book is part of the documentation library supporting the IBM VisualAge TeamConnection Enterprise Server licensed programs. It is written for persons who need to perform the following tasks:

- Use the TeamConnection Familiy Administrator (tcadmin) to perform the following tasks:
  - Create and set up TeamConnection families.
  - Create and modify authority and interest groups.
  - Create and modify release and component processes.
  - Create and administer configurable fields and user exits.
- Use the TeamConnection client to perform the following administrative tasks:
  - Create user IDs and authorize users to access the TeamConnection family database.
  - Set up and use programs that shadow TeamConnection parts to a file system.
- Use other TeamConnection and DB2 tools to maintain your TeamConnection family database, including:
  - Manage TeamConnection defects, features, and logs.
  - Collect statistics about and tune your database.
  - Use the server daemon and license monitors to keep track of server activity and use.

This book contains the following sections:

"Part 1. Introducing IBM VisualAge TeamConnection Enterprise Server" on page 1 presents an overview of the IBM VisualAge TeamConnection Enterprise Server product. The information in this section should be read and understood by everyone who is going to work with TeamConnection.

"Part 2. Setting up a TeamConnection server" on page 15 is intended for the family administrator who needs to plan how the IBM VisualAge TeamConnection Enterprise Server product is going to be used in the company's development environment. After the planning stage, the family administrator will use this section to learn how to do TeamConnection administrative tasks. Before reading this section, you should be familiar with the TeamConnection terminology and concepts presented in "Part 1. Introducing IBM VisualAge TeamConnection Enterprise Server" on page 1.

"Part 4. Maintaining your TeamConnection server" on page 151 contains information on maintaining your TeamConnection database and monitoring family use.

This book also contains several appendixes providing more information for performing TeamConnection administrative tasks and worksheets that can help you plan your TeamConnection families.

Information on customer service, a bibliography, and a glossary are included at the back of this book.

This book is available in PDF format. Because production time for printed manuals is longer than production time for PDF files, the PDF files may contain more up-to-date information. The PDF files are located in directory path nls\doc\enu (Intel) or softpubs/en_US (UNIX). To view these files, you need a PDF reader such as Acrobat.

Who should read this book

This book is for TeamConnection family administrators. It assumes familiarity with the objects, actions, and processes involved in using a TeamConnection database. You should read the *TeamConnection User's Guide*, SC34-4499, before you use the TeamConnection product. It introduces the fundamentals of the *configuration management*, *version control*, *change control*, and *problem tracking* features in the TeamConnection licensed programs. It also defines the concepts that are the foundation of TeamConnection *actions* and establishes their interrelationships. You should be familiar with your operating system because you access the TeamConnection licensed programs through that environment.

TeamConnection administrators need to be skilled in operating system and database administration. It is also highly recommended that administrators be skilled in DB2 tuning and performance.

Conventions and terminology used in this book

This book uses the following highlighting conventions:

- *Italics* are used to indicate the first occurrence of a word or phrase that is defined in the glossary. They are also used for information that you must replace.
- **Bold** is used to indicate items on the GUI.
- `Monospace` font is used to indicate exactly how you type the information.
- File names follow Intel conventions: **mydir\myfile.txt.** AIX, HP-UX, and Solaris users should render this file name **mydir/myfile.txt.**

Tips or platform specific information is marked in this book as follows:

Shortcut techniques and other tips

IBM VisualAge TeamConnection Enterprise Server for OS/2

IBM VisualAge TeamConnection Enterprise Server for Windows/NT

IBM VisualAge TeamConnection Enterprise Server for Windows 95

IBM VisualAge TeamConnection Enterprise Server for AIX

IBM VisualAge TeamConnection Enterprise Server for HP-UX

IBM VisualAge TeamConnection Enterprise Server for Solaris

The tasks explained in this book can be performed from three different interfaces. For some tasks you need to use the TeamConnection family administrator interface. Others require the TeamConnection client interface. Each of these tasks can also be performed from the TeamConnection command-line interface. Whenever instructions require a specific interface to be used, they are flagged as follows:

Tasks to be performed from the TeamConnection client interface.

Tasks to be performed from the TeamConnection family administrator.

Tasks to be performed from the TeamConnection command-line interface.

Prerequisite and related information

Before using this book, refer to the *TeamConnection Installation Guide*, available in softcopy format on the installation CD. The *Installation Guide* contains instructions for installing a TeamConnection server.

This book assumes familiarity with the DB2 Universal Database, version 5, which TeamConnection uses as its data repository. Refer to the bibliography at the back of this book for a list of publications you can use to install and administer your DB2 database system.

Note: It is not recommended that you make changes to your database by issuing INSERT, UPDATE, or DELETE statements or by changing or deleting database tables or the columns defined in TeamConnection database tables. Changing your database in these ways, through the DB2 administrator tools, the DB2 command line processor, the TeamConnection migration tools, or the tcupdb tool can corrupt your TeamConnection database. Any such changes are made at your own risk. Please contact your IBM representative for information on the terms of IBM customer support.

How to send your comments

Your feedback is important in helping to provide the most accurate and highest quality information. If you have any comments about this book or any other IBM VisualAge TeamConnection Enterprise Server documentation 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. Introducing IBM VisualAge TeamConnection Enterprise Server

Chapter 1. An introduction to TeamConnection

TeamConnection is a team programming environment that helps you manage and control your development projects, increase team productivity, and increase software quality. You can use TeamConnection to communicate with and share information among team members to keep up with the many tasks in the development life cycle, from planning through maintenance.

TeamConnection helps you streamline the following tasks:

- *Configuration management*: the process of identifying, organizing, managing, and controlling software modules as they change over time. This includes controlling access to your software modules and providing notification to team members as software modules change.
- *Release management*: the logical organization of objects that are related to an application. The release provides a logical view of objects that must be built, tested, and distributed together. Releases are versioned, built, and packaged.
- *Version control*: the tracking of relationships among the versions of the various parts that make up an application. Version control enables you to build your product using stable levels of code, even if the code is constantly changing. It provides control over which changes are available to everyone and, optionally, allows more than one developer at a time to update a part.
- *Change control*: the controlling of changes to parts that are stored in TeamConnection. TeamConnection keeps track of any part changes you make and the reasons you make them. Your development team can build releases with accuracy and efficiency, even as the parts evolve. The product ensures that the change process is followed and that the changes are authorized. After changes are made, it allows you to integrate the changes and build the application. TeamConnection tracks all changes to the parts across multiple products and environments.

  The *change control process* is configurable. Your team can decide how strict the change control should be, from loose to very tight. You can also adjust the level of control as you move through a development cycle.
- *Build support*: the function that enables you to define the structure of your application and then to create it within TeamConnection from your input parts. Independent steps in a build can run in parallel on different servers, thus reducing your build time. You can build applications for platforms in addition to the one TeamConnection runs on—currently, you can use TeamConnection to build applications on AIX, HP-UX, OS/2, Windows NT, Windows 95, Solaris, MVS, and MVS OpenEdition.

- *Packaging support*: the preparation of your application for electronic distribution to other users.

TeamConnection definitions

The following sections define TeamConnection concepts and objects that relate to family administration. For more information on TeamConnection concepts and objects that relate to end-user tasks, refer to the *User's Guide.*

TeamConnection's client/server architecture

Figure 1 is an example of a network of TeamConnection clients and servers.

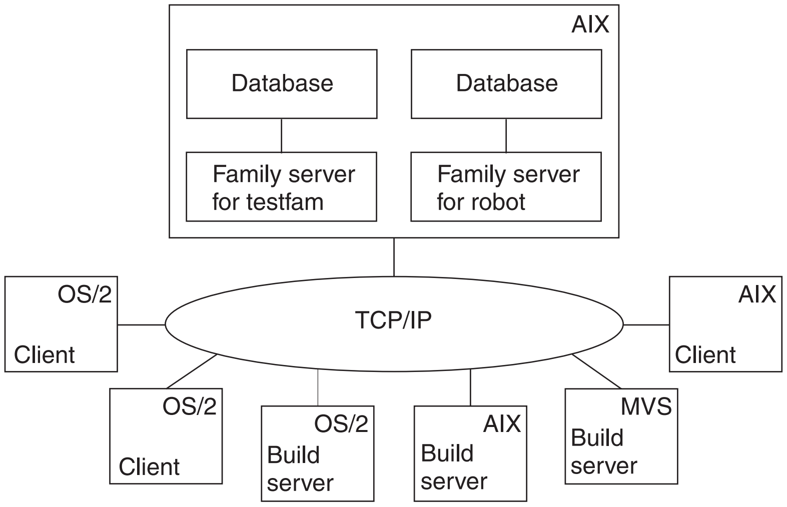


Figure 1. A sample TeamConnection client/server network

The TeamConnection *server* consists of the underlying database software, the server administration tools, and the communication software required to connect to the clients.

A TeamConnection *client* gives team members access to the development information and parts stored on the server.

TeamConnection database

TeamConnection is built on the IBM DB2 Universal Database. DB2 is shipped with the TeamConnection server, and you can install DB2 when you install the TeamConnection server. Please refer to the DB2 documentation listedc in this document's "Bibliography" on page 353 for detailed information on DB2 database configuration, administration, and utilities.

Families

The TeamConnection database controls all information within the TeamConnection environment. An individual TeamConnection database is called a *family.* The TeamConnection documentation refers to the database variously as the family, the family database, the server, the family server, or the database.

A family represents a complete and self-contained collection of TeamConnection users and development information. A TeamConnection family corresponds to a DB2 database instance. Information within a family is completely isolated from information in all other families. One family cannot share information with another. Information stored in a family includes the following:

- Text parts, such as source code and product documentation
- Binary parts, such as compiled code
- Modeled parts that are stored in the information model by tools such as VisualAge Generator
- Defects and features that record problems or suggested enhancements to your applications or products
- Components, releases, drivers, and workareas, which help you to organize, manage, and work with parts, defects, and features
- Users, logins, host lists, access lists, and notification lists, which help you to control user access to information stored in the family
- Other TeamConnection objects that manage and describe the other objects

See "Chapter 8. Setting up your family structure" on page 71 for more information about families.

User access to families

Users are given access to the TeamConnection family through their *user IDs*. Each family has at least one *superuser*, who has privileged access to the family.The superuser gives other users the *authority* to perform some set of *actions* on particular objects. This book assumes that the TeamConnection family administrator has superuser status.

Depending on the authority granted to a user, that user might in turn be able to grant some equal or lesser level of authority to other users. However, the ability to grant authority for some actions is reserved to the superuser. There are no actions which the superuser cannot perform.

TeamConnection can use two types of security to ensure that only authorized users access the TeamConnection family. For host-based authentication, each user ID is associated with a *host list*, which is a list of client machine addresses from which the user can access TeamConnection when using that ID. A single user can access TeamConnection from multiple systems or login

IDs. Likewise, a single system login ID can act on behalf of multiple users. The set of authorized login IDs for a TeamConnection user ID makes up the user's host list.

For password-based authentication, users must login to the TeamConnection family and specify the correct password. This type of security provides users the flexibility of accessing TeamConnection from any workstation, provided that they login with the proper password.

See "Chapter 9. Setting up user access to a family" on page 89 for more information about authorizing TeamConnection user IDs.

Components

Within each family, development information is organized into groups called *components*. The component hierarchy of each family includes a single top component, called *root*, and *descendants* of that root. Each *child component* has at least one parent component; a child can have multiple parents.

The following figure depicts a component hierarchy.

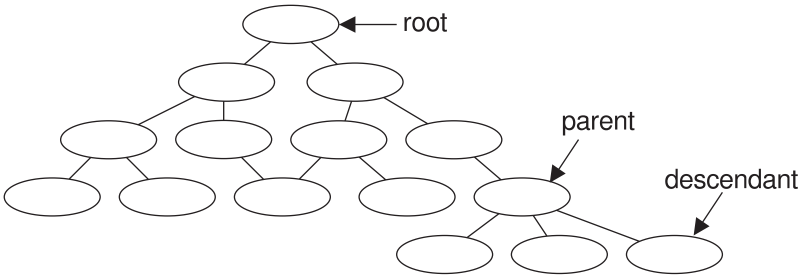


Figure 2. Sample of a component hierarchy

TeamConnection uses components to organize development information, control access to the information, and notify users when certain actions occur. Descendant components inherit access and notification information from ancestor components. Information about the components is stored in the database, including:

- The component's position in its family hierarchy.
- The user who owns the component. The component *owner* is responsible for managing information related to it, including defects or features.
- The users who have access to the component and the level of access each user has. This information makes up the component's *access list*.
- The users who are to be notified about changes to the component. This set of users is called the *notification list*.
- The *process* by which the component handles defects and features.

See “Planning your components” on page 71 for more information about components.

Releases

An application is likely to contain parts from more than one component. Because you probably want to use some of the same parts in more than one application, or in more than one version of an application, TeamConnection also groups parts into *releases*. A release is a logical organization of all parts that are related to an application; that is, all parts that must be built, tested, and distributed together. Each time a release is changed, a new version of the release is created. Each version of the release points to the correct version of each part in the release.

Each part in TeamConnection is managed by at least one component and contained in at least one release. One release can contain parts from many components; a component can span several releases.Figure 3 shows the relationships between parts, the releases that contain them, and the components that manage them.

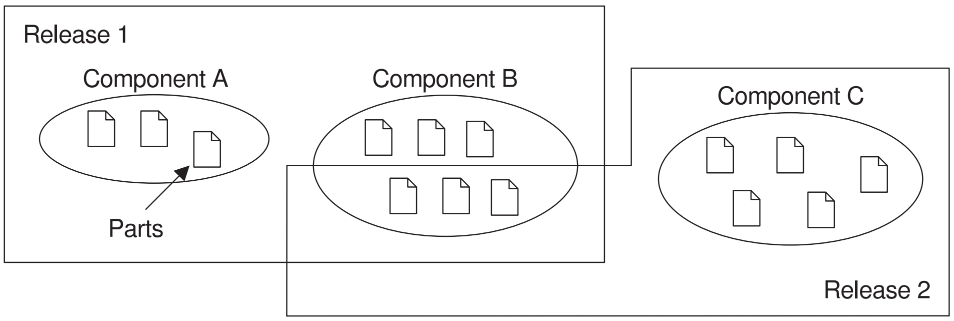


Figure 3. Parts, releases, and components

Each time a new development cycle begins, you can define a separate release. Each subsequent release of an application can share many of the same parts as its predecessor. Thus maintenance of an older release can progress at the same time as development of a newer one. Each release follows a process by which defects and features are handled.

See “Planning your releases” on page 75 for more information about releases.

Processes

An application changes over time as developers add features or correct defects. TeamConnection controls these changes according to the *processes* you choose for your application’s components and releases. A process enforces a specific level of control to part changes and ensures that actions occur in a specific order.

Two separate types of processes are defined: component processes, which can be different for each component within a family, and release processes, which apply to all activities associated with a given release. Component or release processes are built from a number of lower-level processes, or *subprocesses*, that are included with the TeamConnection product.

TeamConnection is shipped with several predefined processes. If these do not apply to your organization, you can configure your own processes by defining different combinations of subprocesses.

See “Planning your processes” on page 79 for a description of TeamConnection processes and instructions for setting and changing them.

Hardware and software requirements

For a current list of hardware and software requirements for VisualAge TeamConnection enterprise Server, open your Web browser on the following Web address:

http://www.software.ibm.com/ad/teamcon/about/

Select either **Software Requirements** or **Hardware Requirements**.

Interfaces

TeamConnection provides a number of interfaces that you can use to access information:

- A web-client interface that gives you access to the server through a web browser.
- A command-line client that lets you type TeamConnection commands from an operating system prompt.
- A family administrator graphical user interface that you use to create and customize a TeamConnection family.
- A server command-line interface that lets you type TeamConnection family administrator commands from an operating system prompt or automate family administrator functions.

The client interfaces are available from a server or client machine, but the server interfaces are available only on machines on which you have installed the TeamConnection server code.

You perform some administrator functions, such as creating and authorizing user IDs and creating components and releases, from the client interfaces. Most administrator functions, however, require you to use the family administrator GUI or the server line commands. In this book, the interface you should use for each task is identified by one ofhte following flags:

Tasks to be performed from the TeamConnection client interface.

Tasks to be performed from the TeamConnection family administrator.

Tasks to be performed from the TeamConnection command-line interface.

You may find that some administrator activities are best performed from the family administrator GUI and others from the sever command line interface. If you want to create a family, modify its properties, and customize the family (such as modifying authorization groups, adding a configurable field, or adding a user exit), you can use the family administrator GUI. You can also manually start and stop the family and notification daemons using the family administrator GUI.

If you want to automate certain routine administrator tasks, such as nightly family backups (which require you to stop the family, backup the database, and restart the family), you should use the server line commands. Otherwise, you will need somebody to be at the console to click the appropriate buttons in the family administrator GUI. The server line commands are explained in "Chapter 5. Starting and stopping the servers" on page 39 and "Part 5. Using the server command-line interface" on page 197.

"Chapter 2. Administrator Tasks" on page 11 explains the various TeamConnection administrative tasks, the interfaces you use to perform them, and where to find instructions for performing them.

Chapter 2. Administrator Tasks

This chapter briefly describes the tasks that a TeamConnection administrator performs. Administrators' responsibilities vary widely according to the needs of your development environment and the size and complexity of your network. TeamConnection administrators need to be skilled in operating system and database administration. It is also highly recommended that administrators be skilled in DB2 tuning and performance.

The tasks explained in this book can be performed by a single system administrator or by two or more administrators. One way to distinguish administrators' roles is by function, as follows:

System administrator
Has *superuser* access to the family server and database administration access to the database management system. This administrator is responsible for the following:

- Installing and maintaining the TeamConnection server
- Maintaining and backing up the database used by TeamConnection

Note: On UNIX systems, the system administrator must also have root access to the TeamConnection server.

Family administrator
Has superuser access to the family server and database administration access to the database management system. This administrator is responsible for the following:

- Planning and configuring TeamConnection for one or more families
- Managing user access to one or more families
- Creating and updating configurable fields
- Configuring release and component processes for a family
- Creating and updating user exits
- Monitoring the user activity of a family
- Maintaining one or more families

Build administrator
This administrator is responsible for the following:

- Setting up and maintaining build servers
- Planning for builds
- Creating builders and parsers
- Starting and stopping build servers

- Defining *pools*
- Monitoring build performance
- Creating driver members
- Committing and completing drivers
- Extracting releases
- Packaging and distributing applications

System Administrators

System administrators are responsible for installing the TeamConnection server software, creating user accounts for TeamConnection families, updating network and services configuration files for TCP/IP and socket addresses used by families and build servers, preparing the TeamConnection client software for LAN installation (if your installation plans to make the client software available over a LAN), starting and stopping the servers, maintaining the TeamConnection databases, and performing database backups.

These responsibilities span the boundaries between TeamConnection, the operating system, and the DB2 Universal Database manager. The following table will help you determine where to find instructions for performing these tasks.

Tasks	**Environment**	**For instructions, refer to:**
Installing TeamConnection	Operating system	*TeamConnectionInstallation Guide*
Preparing the TeamConnection client software for LAN installation	Operating system	*TeamConnectionInstallation Guide*
Configuring TeamConnection families	Family administrator GUI	“Chapter 4. Creating your TeamConnection family” on page 29
Starting and stopping the TeamConnection servers	Family administrator GUI or server line commands	“Chapter 5. Starting and stopping the servers” on page 39

Tasks	Environment	For instructions, refer to:
Operating system tasks: • Creating user accounts for TeamConnection families (for multiuser operating systems) • Updating network and services configuration files for TCP/IP address and socket port numbers used by families and build servers • Enabling the syslog to capture system and database messages	Operating system	Your operating system user's or administrator's guide.
Database manager tasks: • Installing the DB2 Universal Database • Starting and stopping the database manager • Maintaining the database • Database backup and recovery	DB2 Universal Database manager	For installation instructions, refer to the *IBM DB2 Universal Database Quick Beginnings* manual appropriate to your platform. For database administration, refer to the *IBM DB2 Universal Database Administration Guide*.

One particularly important function of a system administrator is maintaining the TeamConnection databases. Your TeamConnection database needs to be backed up regularly using the DB2 backup utilities available from the DB2 Control Center or the command line processor. See "Backing up the TeamConnection database" on page 168 for instructions.

Note: It is not recommended that you make changes to your database by issuing INSERT, UPDATE, or DELETE statements or by changing or deleting database tables or the columns defined in TeamConnection database tables. Changing your database in these ways, through the DB2 administrator tools, the DB2 command line processor, the TeamConnection migration tools, or the tcupdb tool can corrupt your TeamConnection database. Any such changes are made at your own risk. Please contact your IBM representative for information on the terms of IBM customer support.

Family Administrators

If your TeamConnection environment includes more than one family, you might consider assigning one family administrator to each family. Family administrators are responsible for planning and creating the component structure and releases to be used in your family, configuring the processes to be used for the components and releases, creating user IDs and managing their access to the family, and creating configurable fields and user exits.

Tasks	Environment	For instructions, refer to:
Planning for and creating families	Family administrator GUI	"Chapter 4. Creating your TeamConnection family" on page 29
Preparing for users	Client GUI, client command line interface, or Web client GUI	"Chapter 9. Setting up user access to a family" on page 89
Configuring fields	Family administrator GUI	"Chapter 10. Setting up and implementing configurable fields" on page 115
Configuring processes	Family administrator GUI	"Chapter 11. Configuring component and release processes" on page 131
Providing user exits	Family administrator GUI	"Chapter 12. Providing user exits" on page 135
Setting up the mail facility	Family Administrator GUI	"Chapter 4. Creating your TeamConnection family" on page 29
Changing the age of defects and features	Server command line interface	"Changing the age of defects and features" on page 154
Resolving TeamConnection errors	Operating system and TeamConnection files	"Resolving TeamConnection errors" on page 156
Maintaining the database	DB2 Universal Database manager	"Chapter 15. Maintaining your TeamConnection DB2 database" on page 167

Build Administrators

TeamConnection provides build environments for most of its platforms. If you have a large and complex project, or your development efforts require you to build on multiple platforms, it may be beneficial for you to assign a build administrator for TeamConnection or for each TeamConnection family. Build administrators are responsible for installing and maintaining the build servers, configuring your build environment, creating build scripts and parsers, monitoring build performance, and customizing packaging and distribution scripts.

The *TeamConnection User's Guide* explains how to create and maintain a build environment.

Part 2. Setting up a TeamConnection server

This section is intended for the family administrator who needs to plan for how the TeamConnection product is going to be used in the company's development environment. After the planning stage, the family administrator will use this section to learn how to create a family, set up various TeamConnection services, start and stop the family, and set up the TeamConnection home page.

Before reading this section, you should be familiar with the TeamConnection terminology and concepts presented in "Part 1. Introducing IBM VisualAge TeamConnection Enterprise Server" on page 1.

Chapter 3. Planning your families

Careful planning of the families that your organization will use is an important first step in preparing to use TeamConnection. First, decide how many families you will need. The following will help you decide:

- Data cannot be shared between families, so group all development projects that share source data within the same family.

  For example, you have several applications under maintenance or development, and these applications share some source code, such as a utility subroutine library. If you create a family for each application, each family must maintain a copy of the source code for the library. If you create one family for all the applications, they can share a single copy of the source code.

  When looking at the data your projects share, consider not just the data they share today, but what they might be sharing in the future. If your development projects are going to remain separate, create individual families.
- You can create new families as your needs evolve over time.
- The more families you have, the more administrative work you will have.

Keep in mind that these are merely guidelines. If it is not clear whether you need one or more than one family, consider starting with one. You can always create another family later.

You must also decide on a name for the family. You want the name to uniquely identify the purpose of the family. For example, you might use your product name or an abbreviation of your product name. Another consideration is what case to use—lower, upper, or mixed. Mixed case is not recommended because it is more difficult to remember. You might want to ask your users what case they prefer. See “Database naming conventions” on page 23 for more information about database names.

Updating TCP/IP files

OS/2

NT

95

If you use wizards to install TeamConnection, then your TCP/IP services and hosts files are set up for you and you can skip this section.

Before you install the TeamConnection code, you must have the correct version of TCP/IP installed on your workstation. See “Hardware and software requirements” on page 8 for the communications software requirements for your operating system.

After TCP/IP is installed, update your TCP/IP services and hosts files.

You can update these files using smit. In many installations, a name server is used instead of /etc/hosts. Also, many installations distribute /etc/services. smit can be used to make the necessary updates.

You can update these files using sam. In many installations, a name server is used instead of /etc/hosts. Also, many installations distribute /etc/services. You can use the sam tool to make the necessary updates.

Do the following steps.

1. Update the services file, which is located in \etc\services in the directory where TCP/IP is installed.

   To determine the directory name, type `echo %etc%` at a prompt.

   If you have a services file, it is located in the system32/drivers/etc subdirectory of the Windows NT installation directory. If the services file does not exist, you must configure it through TCP/IP.

   Include the family name and port address of the TeamConnectionserver. The port address can be any 4-digit number, as long as it does not already exist in your services file. You might want to ask your TCP/IP administrator to assign you a number.

   Type the following entry in your services file. Replace *ffff* with an appropriate port address. Follow the line with a carriage return.

   ```
   #  TeamConnection servers
   testfam    ffff/tcp    # port address for the TeamConnection test family
   ```
2. Update the TCP/IP hosts file, which is located in \etc\hosts.

   To determine the directory name, type `echo %etc%` at a prompt. If the hosts file does not exist, you must configure it through TCP/IP.

If you have a hosts file, it is located in the system32/drivers/etc subdirectory or the Windows NT installation directory. If the hosts file does not exist, you must configure it through TCP/IP.

Add the following:
- IP address.
- Server name.
- Alias name of the TeamConnection family server, which is your family name. For the initial installation of TeamConnection, the family name is *testfam*.
- Alias name for the *build socket*. For the initial installation of TeamConnection, use *bldsock*.

The following is an example of the entry you would type in your hosts file. Follow the line with a carriage return. You can use the hostname command to get the name of the server.

```
9.12.345.67   teamserv.company.com   testfam    bldsock
```

3. Do the following to verify that the hosts file is specified correctly:
   - Type `host` *`family_name`*, where *family_name* is the name of your TeamConnection family.

The tchostw.exe utility is available from the samples directory on the TeamConnection CD-ROM.

Type `tchostw` *`family_name`*, where *family_name* is the name of your TeamConnection family.

The tchost.hp utility is available from the misc directory on the TeamConnection CD-ROM.

Type `tchost.hp` *`family_name`*, where *family_name* is the name of your TeamConnection family.

The tchost.sol utility is available from the misc directory in the CD-ROM for TeamConnection for UNIX.

Type `tchost.sol` *`family_name`*, where *family_name* is the name of your TeamConnection family.

The information returned should match the number and name specified in your hosts file entry. For example, using the entry given in the previous step, the system response would be as follows:

```
teamserv.company.com = 9.12.345.67
```

   - Type `host` *`ip_address`*, where *ip_address* is the IP address of your machine.

Type `tchostw` *ip_address*, where *ip_address* is the IP address of your machine.

Type `tchost.hp` *ip_address*, where *ip_address* is the IP address of your machine.

Type `tchost.sol` *ip_address*, where *ip_address* is the IP address of your machine.

The information returned should match the number and name specified in your hosts file entry. For example, again using the entry given in the previous step, the system response would be as follows:

```
9.12.345.67 = teamserv.company.com
```

If you do not receive the expected response, contact your TCP/IP administrator to solve the problem.

If the servers are defined in the domain name server, then you can use the UNIX utility ″nslookup″ instead.

4. Do the following to verify that you can connect to your TeamConnection family:
   a. At a prompt, type `ping testfam`.
   b. Press Ctrl+C to end the command.

   a. At a prompt, type `ping -s testfam`.
   b. Press Ctrl+C to end the command.

If you receive information that is similar to the following, you can successfully connect to your TeamConnection family:

```
PING teamserv.company.com: 56 data bytes
64 bytes from 1.23.457.78: icmp_seg:0. time=0. ms
64 bytes from 1.23.456.78: icmp_seg:1. time=0. ms
64 bytes from 1.23.456.78: icmp_seg:2. time=0. ms
```

If you receive information that is similar to the following, you can successfully connect to your TeamConnection family:

```
PINGING teamserv.company.com (9.12.345.67): with 32 bytes of data:
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
```

The PING command will send four requests and then it will stop.

If you receive the message `unknown host testfam`, you cannot connect to the family. Verify that the data you entered in the hosts and services files is correct, and then try the command again. If you still do not get the correct response, contact your TCP/IP administrator to solve the problem.

5. Do the following to verify that you can connect to your TeamConnection build server:
   a. At a prompt, type `ping bldsock`.
   b. Press Ctrl+C to end the command.

   a. At a prompt, type `ping -s bldsock`.
   b. Press Ctrl+C to end the command.

If you receive information that is similar to the following, you can successfully connect to your TeamConnection family:

```
PING teamserv.company.com: 56 data bytes
64 bytes from 1.23.457.78: icmp_seg:0. time=0. ms
64 bytes from 1.23.456.78: icmp_seg:1. time=0. ms
64 bytes from 1.23.456.78: icmp_seg:2. time=0. ms
```

If you receive information that is similar to the following, you can successfully connect to your TeamConnection family:

```
PINGING teamserv.company.com (9.12.345.67): with 32 bytes of data:
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
Reply from 9.12.345.67: bytes=32 time=10ms TTL=255
```

The PING command will send four requests and then it will stop.

If you receive the message `unknown host bldsock`, you cannot connect to the build server. Verify that the data you entered in the hosts and services files is correct, and then try the command again. If you still do not get the correct response, contact your TCP/IP administrator to solve the problem.

Note: Do not install the TeamConnection components until the ping commands successfully complete.

Setting up login IDs

Certain login IDs required for your TeamConnection family need to be coordinated. You need to create a system login, and a TeamConnection initial superuser login that are the same as your family name. In addition, the DB2 user with administrator authority needs to be the same as the TeamConnection superuser ID. If you create a family called testfam, for example, then you also need to create a system login called testfam, an initial TeamConnection superuser ID (created when you create your family) called testfam, and a DB2 user called testfam with administrator authority.

For TeamConnection to function properly, you need to login to your system and start your TeamConnection family using these coordinated login IDs. For example, for a family called testfam on a Windows NT server, you would do the following:

1. Login to Windows NT using the login ID **testfam**.
2. Grant that user ID DB2 administrator authority.
3. Create a TeamConnection family called **testfam** with an initial superuser ID called **testfam**.
4. Start the family while logged into Windows NT as user **testfam**.

On UNIX platforms, the primary group ID for the VisualAge TeamConnection family user ID must be the same as the primary group ID (the default is db2iadm1) for the DB2 instance (the default is testfam) to be used for the family. If this is not properly done, then the family user ID will lack authority to create the database for the family. Use only lowercase names for user accounts.

DB2 considerations

Before you create a TeamConnection family, you need to be aware of certain DB2 considerations concerning DB2 instances, database naming conventions, and database configuration parameters

DB2 instances

Each family has its own unique database. If you create more than one family on a single machine, they use the same database manager to access the database. If you want to install families on separate machines, you need a TeamConnection and DB2 server on each machine.

It is recommended that the databases for each TeamConnection family be placed in a separate DB2 instance. By following this recommendation, you can assure that if an instance is stopped, only one TeamConnection family is affected. It also enables you to tune the performance for one instance while affecting only one TeamConnection family.

You need to have at least 100 MB of free disk space in the file system where the family database is to be created.

On Intel platforms, it is recommended that you create only one DB2 instance per (physical) server. Because it is recommended that you have only one family per instance, you should have only one family per (physical) server.

On UNIX platforms, use the sample .profile for each family that you create. This .profile contains DB2 environment variables that you need to customize before you create a family. One of these variables, DB2INSTANCE, defines the DB2 instance in which the family is to be created. DB2INSTANCE must be set in the profile for the new family and should point to the new DB2 instance. The sample profile is located in `$TC_HOME/install/$LANG/profile.family`.

If you already have a family running on an existing DB2 instance, it is necessary to create another DB2 instance for a new family. Refer to *DB2 Quick Beginnings* for information on how to create a new DB2 instance.

Database naming conventions

DB2 places certain restrictions on database names. Because the TeamConnection family name corresponds to the name of the DB2 database, these DB2 restrictions apply to TeamConnection families as well.

The name you specify:

- Can contain 1 to 8 characters
- Cannot be any of the following:
  - USERS
  - ADMINS
  - GUESTS
  - PUBLIC
  - LOCAL
- Cannot begin with the following:
  - IBM
  - SQL
  - SYS
- Cannot include accented characters.
- To avoid potential problems, do not use the special characters @, #, and $ in a database name if you intend to have a client remotely connect to a host database. Also, because these characters are not common to all keyboards, do not use them if you plan to use the database in another country.
- Be aware of case-sensitivity on your platform:
  - On OS/2, use uppercase names.
  - On Windows NT, use any case.
  - On UNIX, use lowercase names.

| The family name, the user ID name, and the DB2 database name should be
| the same. If you have a family named testfam (TC_FAMILY=testfam), for

| example, then you should have a user ID named testfam for that family, and
| there should be a directory with that name, such as /home/testfam
| (TC_DBPATH=/home/testfam). Some TeamConnection tools, such as tcstop,
| are designed to work according to these recommendations.

Database configuration parameters

When you create a new family, TeamConnection creates a DB2 database and sets the following values for certain database configuration parameters. Use caution when modifying the values to which TeamConnection sets these parameters.

APPLHEAPSZ = 1280
This parameter defines the number of private memory pages available to be used by the database manager on behalf of a specific agent or subagent.

DBHEAP=2400
This parameter indicates the maximum amount of space that the catalog cache can use from the database heap (dbheap). The catalog cache is used to store table descriptor information that is used when a table, view or alias is referenced during the compilation of an SQL statement.

DLCHKTIME = 1000
This parameter defines the frequency at which the database manager checks for deadlocks among all the applications connected to a database.

LOGFILSIZ = 4000
This parameter determines the number of pages for each of the configured logs. A page is 4KB in size.

LOGPRIMARY = 5
This parameter specifies the number of primary logs that will be created.

LOGSECOND = 30
This parameter specifies the number of secondary log files that are created and used for recovery log files (only as needed).

STMTHEAP=4096
This parameter sets the statement heap size. It is used to optimize complex SQL statements. If the STMTHEAP parameter is not set large enough, you may receive an SQL warning indicating that there is not enough memory available to process the statement.

On Intel platforms, the following additional database parameters are set when you create a family.

APP_CTL_HEAP_SZ=128
: This parameter determines the maximum size, in 4 KB pages, for the application control shared memory. Application control heaps are allocated from this shared memory.

CATALOGCACHE_SZ=32
: This parameter sets the catalog cache size. The catalog cache is used to store table descriptor information that is used when a table, view or alias is referenced during the compilation of an SQL statement.

DBHEAP=600
: This parameter indicates the maximum amount of space that the catalog cache can use from the database heap (dbheap).

LOCKLIST=50
: This parameter indicates the amount of storage that is allocated to the lock list. There is one lock list per database and it contains the locks held by all applications concurrently connected to the database.

MAXAPPLS=40
: This parameter specifies the maximum number of concurrent applications that can be connected (both local and remote) to a database.

TeamConnection leaves all other DB2 database configuration parameters at their DB2 default values.

DB2 kernel changes for UNIX platforms

Note: These changes are not required for AIX.

Depending on your workstation's operating system and its kernel configuration, you may have to update the kernel configuration parameters. Because changing the kernel in UNIX is a delicate operation, it is recommended that you make a backup of your UNIX system before attempting the kernel changes needed by DB2.

Recommended Values for HP-UX

The values in the following table are recommended for the HP-UX kernel configuration parameters, based on the available Physical Memory. To maintain the interdependency among kernel parameters, change parameters in the same sequence in which they appear in the following table.

Kernel Parameter	64MB - 128MB	128MB - 256MB	256MB+
nproc	512	768	1024
maxfiles	256	256	256
maxuprc	256	384	512
nflocks	2048	4096	8192
ninode	512	1024	2048
nfile	(4 * NINODE)	(4 * NINODE)	(4 * NINODE)
msgseg	8192	16384	32768
msgmnb	65535 (1)	65535 (1)	65535 (1)
msgmax	65535 (1)	65535 (1)	65535 (1)
msgtql	256	512	1024
msgmap	130	258	258
msgmni	128	256	256
msgssz	16	16	16
semmns	256	512	1024
semmni	128	256	512
semmap	(2 + SEMMNI)	(2 + SEMMNI)	(2 + SEMMNI)
semmnu	256	512	1024
shmmax	67108864 (2)	134217728 (2)	268435456 (2)
shmseg	16	16	16
shmmni	300	300	300

Notes:

1. Parameters msgmnb and msgmax must be set to 65535.
2. Parameter shmmax should be set to 134217728 or 90% of the physical memory (in bytes), whichever is higher. For example, if you have 196 MB of physical memory in your system, set shmmax to 184968806 (176*1024*1024). When using the sam tool, these values are actually represented in hexadecimal:
   - 67108864 = 0X40000000 (0X4 followed by 7 zeros)
   - 134217728 = 0X80000000 (0X8 followed by 7 zeros)
   - 268435456 = 0X100000000 (0X1 followed by 8 zeros)

Important!: Ensure that your system has the HP-UX 10 Transitional Links for HP-UX 9, otherwise the rebuilding of the kernel will fail. The following commands in HP-UX 10 handle the transitional links, which are installed by default:

```
 /opt/upgrade/bin/tllist      -> lists the transitional links, if available
/opt/upgrade/bin/tlremove   -> removes the transitional links
 /opt/upgrade/bin/tlinstall -> establishes the transitional links
```

To change the values, do the following:

1. Login as root.
2. Invoke the SAM tool: **/usr/sbin/sam &**.
3. Select Kernel Configuration.
4. Select Configurable Parameters.
5. Highlight the parameter to be changed.
6. Select Modify Configurable Parameter from the Actions menu and make the appropriate changes. In some cases, the recommended value to be used with DB2 for a parameter will replace an existing formula.
7. Repeat the previous two steps for every kernel parameter which needs to be updated.
8. Create a new kernel by selecting Create a New Kernel from the Actions menu.
9. Reboot the system so that the changes can take effect. Accept the defaults from the Reboot the system window.

Recommended Values for Solaris

The values in the following table are recommended for Solaris kernel configuration parameters, based on the available Physical Memory.

Kernel Parameter	**64MB - 128MB**	**128MB - 256MB**	**256MB — 512MB**	**512MB+**
msgsys:msginfo_msgmax	65535 (1)	65535 (1)	65535 (1)	65535 (1)
msgsys:msginfo_msgmnb	65535 (1)	65535 (1)	65535 (1)	65535 (1)
msgsys:msginfo_msgmap	130	258	258	258
msgsys:msginfo_msgmni	128	256	256	256
msgsys:msginfo_msgssz	16	16	16	16
msgsys:msginfo_msgtql	256	512	1024	1024
msgsys:msginfo_msgseg	8192	16384	32768	32768
shmsys:shminfo_shmmax	67108864	134217728 (2)	26843545 (2)	53687091 (2)
shmsys:shminfo_shmseg	16	16	16	16
shmsys:shminfo_shmmni	300	300	300	300
semsys:seminfo_semmni	128	256	512	1024
semsys:seminfo_semmap	130	258	514	1026

Kernel Parameter	64MB - 128MB	128MB - 256MB	256MB — 512MB	512MB+
semsys:seminfo_semmns	256	512	1024	2048
semsys:seminfo_semmnu	256	512	1024	2048

Notes:

1. Parameters msgsys:msginfo_msgmnb and msgsys:msginfo_msgmax must be set to 65535.
2. Parameters shmsys:shminfo_shmmax should be set to the suggested value in the above table or 90% of the physical memory (in bytes), whichever is higher. For example, if you have 196 MB of physical memory in your system, set the shmsys:shminfo_shmmax 184968806 (176*1024*1024).

To change the values, do the following:

1. Login as root.
2. Just in case you have an existing /etc/system file, make a backup of it.
3. Edit the file /etc/system as follows:

   To set a kernel parameter, add a line at the end of the file:

   ```
    set parameter-name = value
   ```

   For example, to set the value of the parameter msgsys:msginfo_msgmax, add the following line:

   ```
   set msgsys:msginfo_msgmax = 65535
   ```
4. Depending upon the amount of physical memory in your system, append the appropriate kernel configuration parameter file to the /etc/system file. If necessary, change the value of shmsys:shminfo_shmmax as described in note 2.
5. After updating the /etc/system file, reboot the system:

   ```
   shutdown -i6 -y -g0
   ```

Chapter 4. Creating your TeamConnection family

This chapter explains how to set up the TeamConection family administrator interface and use it to create a TeamConnection family. The family administrator is a graphical user interface that helps you perform the following tasks:

- Create, delete, or copy a family
- Add an existing family to the family administrator so that you can manage it through the family administrator interface
- Define and implement configurable fields
- Configure release and component processes
- Define user exits and determine which TeamConnection actions can trigger them
- Set up authority and interest groups
- Start and stop your family

This chapter focuses on the first two tasks: creating a family and adding an existing family to the family administrator. For instructions on performing the remaining tasks, refer to the following sections of this book:

For information about this task,	**Go to this page.**
Defining and implementing configurable fields	115
Configuring release and component processes	131
Providing user exits	136
Setting up authority and interest groups	97
Starting or stopping a family	39

Some of these tasks can be done from the TeamConnection server command-line interface. “Part 5. Using the server command-line interface” on page 197explains how to use server commands.

Setting up the family administrator

TeamConnection provides a family administrator for creating families and for performing other administrative tasks. You can access this interface only from a family server machine. The family administrator is capable of working with one or more families at a time. When you first install TeamConnection, however, it is recommended that you work with only one family in the family administrator. Later on, you can create a separate user ID just to manage the family administrator to control multiple families.

Before you use the family administrator interface for the first time, you need to do the following:

1. On Intel platforms, add the bin directory of your Java installation to your PATH statement and classes.zip to your CLASSPATH statement.
2. Open the family administrator and set the locations for your internet browser, your Adobe Acrobat reader, and your TeamConnection softcopy documentation:
   a. Do one of the following to display the TeamConnection family administrator window:
      - In OS/2, from the TeamConnection Group folder on the desktop, double-click on the **Family Administrator** icon.
      - In Windows NT 4.0, select **TeamConnection Family Administrator** from the **Start** menu.
      - Type `tcadmin` from a command prompt.

   b. From the Help menu, select **Help Settings.**

   c. In the Help Settings window, type the locations of your internet browser, your Adobe Acrobat reader, and your TeamConnection softcopy documentation. You can use the **Browse** buttons to help you locate these files. The default installation path for the TeamConnection softcopy documentation is teamc\nls\doc\enu.

Creating a family

An initial family, called testfam, is configured during the installation of the TeamConnection server. This family usually serves as a test family so that you can verify that TeamConnection is working properly. You can use this family to explore and learn about TeamConnection. Eventually, you will want to create another family for use during application development.

If you create more than one family, TeamConnection places each in a separate directory. Each family requires its own audit log, user exit directory, mail queue directory, and security and configurable field information, and therefore cannot share a directory with another family.

At a minimum, you will provide the following information when you create your family:

- The name of the family
- The fully qualified path name of the directory where you want the family configuration information stored
- The port address of the family server
- The level of security to use for the family
- The login and client host information for the first superuser of the family

To create a TeamConnection family using the family administrator, follow these steps. Before you begin, define your family name in the TCP/IP hosts file and the port number for your database in the TCP/IP services file. See the *Installation Guide* for information on setting up TCP/IP files.

1. Do one of the following to display the TeamConnection Family Administrator window:
   - In OS/2, from the TeamConnection Group folder on the desktop, double-click on the **Family Administrator** icon.
   - In Windows NT 4.0, Select **TeamConnection Family Administrator** from the **Start** menu.
   - Type `tcadmin` from a command prompt.

     This command has several optional parameters:

     -hide Starts tcadmin, but does not open the Family Administrator. You can use this parameter in conjunction with the -start parameter to start a family without opening the Family Administrator.

     -start *family*
     Causes the family specified to be started automatically when the Family Administrator is started.

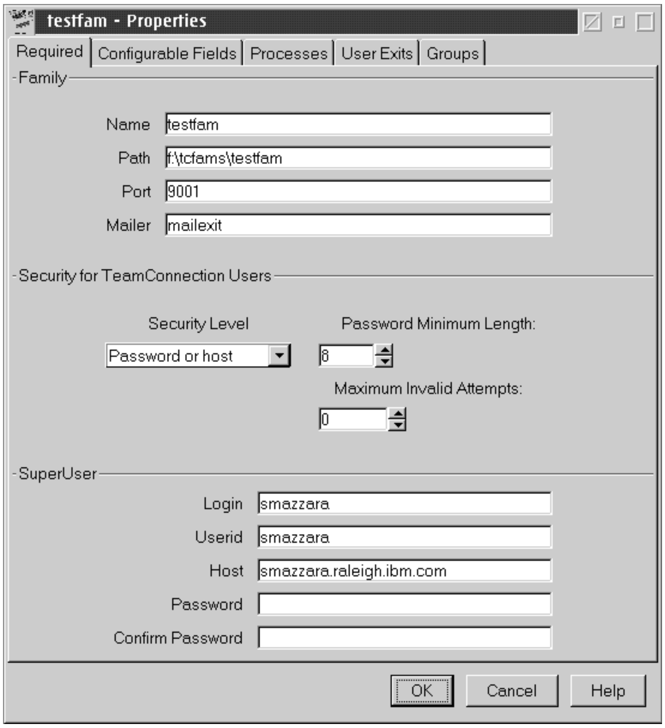
     -f *directory*
     Specifies the location of the configuration files needed to create a new family. The default location of these files is \nls\cfg\$LANG from the directory where TeamConnection is installed. If you have configured the files differently and placed them in a different directory structure, you can use this parameter to point to the files you want to use to create a new family.

     -log [*logfilename***]**
     When -log is specified, a log file will be generated that will contain information on which commands are run, the output from those commands, and error messages and stack traces for debugging purposes. If no log file name is specified, then the file tcadmin.log will be created. If a log file name is specified, the error log will be written to that log file. The log file is overwritten if the same file name is specified again.
2. Select **Create Family** from the Family pull-down menu.
3. When the family properties notebook appears, complete the required information about the family. See “Required” on page 32 for instructions. After you have set the required properties, select the **OK** push button.

Note: After your family is created, you can access other pages in this notebook by selecting the family and then selecting **Family → Properties**.

Using the family properties notebook

The following sections introduce each page of the family properties notebook. Many of these settings are discussed in greater detail in later chapters of this book.



Family

Name testfam
Path f:\tcfams\testfam
Port 9001
Mailer mailexit

Security for TeamConnection Users

Security Level Password or host
Password Minimum Length: 8
Maximum Invalid Attempts: 0

SuperUser

Login smazzara
Userid smazzara
Host smazzara.raleigh.ibm.com
Password
Confirm Password

Figure 4. Family Properties notebook

Required

Complete the fields on the **Required** page of the properties notebook as follows.

Name Type a name for your family. The name must follow the conventions outlines in "Database naming conventions" on page 23.

Path Specify the fully-qualified path name of the directory where you want the database configuration information stored. TeamConnection places this information in a subdirectory of the path you specify. This subdirectory has the same name as the family. If you specify **c:\proddev** (for Intel) or **/proddev** (for UNIX) as the path name, for example, TeamConnection places all files related to the family in the directory path c:\proddev\yourDBName (Intel) or /proddev/yourDBName (UNIX).

As you fill out the Name and Path fields, the **TC_DBPATH Set to** field shows you the directory path of your family database. This is a protected field. The TC_DBPATH environment variable will be set to the value shown in this field.

Note: If a directory for the database name you specify already exists, you will need to delete it before you proceed. This procedure will fail if the directory already exists.

Port Specify the TCP/IP port address that you set in your TCP/IP services file.

Mailer
Specify the name of the mail routine you want to use to notify users of actions they need to be informed of. See “Setting up the mail facility” on page 40 for information on setting up the mail routine for notification.

Security level
Select a level of security from the list box. Choose one of the following:

Host-only
A valid combination of the system login ID, TeamConnection user ID, and host name must be used to obtain access to the family. This is the default level of security.

Password-only
A user must log in to and log off of TeamConnection and supply a password in one of the following ways:
- Select **Login** from the **File** menu of the Tasks window.
- Issue the command `teamc tclogin` from a command prompt.

When the user logs in to the family, the family will send back a token associated with that user from that client. The server will check the attached token and, if valid, will proceed to perform the requested action.

If you specify the password-only option, you will need to specify a password for each TeamConnection user. See “Chapter 9. Setting up user access to a family” on page 89 for information on creating users.

Password-or-host
The user can use either the password-only function if he or she has a password or the host-only function if he or she has a valid host list entry. This level of security is useful for teams in which particular team members may be remote or mobile

and have changing IP addresses. If the user supplies a valid password, then TeamConnection uses the password to admit access to the family. If the user either does not supply a password or supplies an incorrect password, then TeamConnection checks the user's host list entry to admit access.

None Any user can access TeamConnection. Neither a password nor a valid host list entry is required.

See "Planning for user authentication" on page 89 for information on how to set up user IDs for the security level you select. See "Login managers" on page 94 for information on starting and stopping login managers for password-only and password-or-host security.

Minimum password length
Use this field to set the minimum number of characters to be used for passwords. The default password length is 8, the minimum is 1, and the maximum length is 32.

Maximum invalid attempts
Use this field to set the number of times users can attempt to log in before TeamConnection deactivates the user's ID. If this happens, a superuser must reactivate the ID before the user can attempt to log in again.

Login Specify a user ID for the superuser for the family. For Intel platforms, use the value set for the TC_USER environment variable. To see this value, type the following from a command prompt and look for the TC_USER variable:

```
set | more
```

For UNIX and Windows NT platforms, set this field to the login ID for the user.

Userid
Specify the TeamConnection user ID for the superuser. If you omit this parameter, it defaults to the value specified in the **Login** field. It is a good idea to give the superuser an ID that is readily identifiable as a superuser. A good way to do this is to preface the user ID with su_, such as su_john.

Host Specify the TCP/IP host name for the family server machine, which was set in your TCP/IP hosts file.

To see this value, type the following from a command prompt:

```
hostname
```

Note: You do not need to use the fully-qualified host name. You can, for example, specify *myServer* instead of *myServer.myCompany.com*.

Password
If you want to use password security, you must specify the password to be used to verify the superuser's access to the TeamConnection server. If you do not specify the password for superuser access, then no one will be able to access the database. To use password security, you need to set the **Security Level** field on the **Required** page of the family properties notebook to **password-only** or **password-or-host**.

The password must be a minimum of 1 character long and only include characters from the syntactic ASCII character set.

If you anticipate the need for security past the basic level of authentication (host-only) at any time in the future, it is recommended that you supply a user ID and password for the initial superuser when creating the family. Avoid modifying any fields in this portion of the **Required** Properties page after you have created the family. If you want to change the security level of a family to ″Password or Host″, you can use this page to make this change, but do not enter a password in the **Password** field. Use the TeamConnection client **Modify Password** menu item or the TeamConnection **Login** window to set a password for the superuser.

Confirm password
Type your password again.

Use the SuperUser fields to set the login ID, user ID, host name, and password for the initial superuser. After you have set these values and created the family, you cannot use this window to change them. To change any of these values after the family is created, use the TeamConnection client interface. "Chapter 9. Setting up user access to a family" on page 89 explains how to change the properties of user IDs.

Configurable fields

Use the **Configurable fields** page of the properties notebook to define special fields for defects, features, parts, releases, users, and workareas. See "Chapter 10. Setting up and implementing configurable fields" on page 115 for more information on using this section of the properties notebook.

Processes

This page of the family properties notebook provides access to two windows: one for defining release processes and one for defining component processes. To open one of these windows, select one of the **Settings** push buttons.

Use the **Release Process Settings** window and the **Component Process Settings** window to define processes and subprocesses for releases and components defined in your family. Complete the fields on these windows as follows. For more information about defining and using release processes, see "Chapter 11. Configuring component and release processes" on page 131.

- To see the default subprocesses defined for each release process, select a process name from the **Release Process** or **Component Process** list. The subprocesses included will appear highlighted in the **Subprocesses** list.
- To add or delete subprocesses for an existing process, follow these steps:
  1. Select a process from the **Release Process** or **Component Process** list.
  2. To add or delete a subprocess, select it from the **Subprocesses** list.
  3. To save your changes, select the **Apply** button.
- To create a new process, follow these steps:
  1. Select the **New** push button, type the name of the new process in the New Release Process or New Component Process window, and then select the **OK** push button.
  2. From the **Subprocesses** list, select the subprocesses you want to include in the new process.
  3. To save the new process, select the **Apply** push button.
- To delete a process, select it from the **Release Process** or **Component Process** list and then select the **Delete** push button. When the confirm delete window appears, select **Yes**.
- To rename a process, follow these steps:
  1. Select a process from the **Release Process** or **Component Process** list.
  2. Select the **Rename** push button.
  3. Type a new name in the **New name** field of the Rename Release Process or Rename Component Process window, and then select the **Apply** push button.

User exits

Use the **User Exits** page of the properties notebook to define processes to be called at certain exit points for TeamConnection actions. See "Chapter 12. Providing user exits" on page 135 for more information on using this section of the properties notebook.

Groups

This page of the family properties notebook provides access to two windows: one for defining authority groups and one for defining interest groups. To open one of these windows, select one of the **Settings** push buttons.

Use the **Authority Group Settings** window and the **Interest Group Settings** window to define authority and interest groups and actions for your family.

Complete the fields on these windows as follows. For more information about defining and using authority and interest groups, see “Chapter 9. Setting up user access to a family” on page 89.

- To see the default actions defined for each authority or interest group, select a group name from the **Authority Group** or **Interest Group** list. The actions included will appear highlighted in the **Actions** list.
- To add or delete actions for an existing group, follow these steps:
  1. Select a group from the **Authority Group** or **Interest Group** list.
  2. To add or delete an action, select it from the **Actions** list.
  3. To save your changes, select the **Apply** push button.
- To create a new group, follow these steps:
  1. Select the **New** push button, type the name of the new group in New Authority Group or New Interest Group window, and then select the **OK** push button.
  2. From the **Actions** list, select the actions you want to include in the new group.
  3. To save the new group, select the **Apply** push button.
- To delete a group, select it from the **Authority Group** or **Interest Group** list and then select the **Delete** push button. When the confirm delete window appears, select **Yes**.
- To rename a group, follow these steps:
  1. Select a group from the **Authority Group** or **Interest Group** list.
  2. Select the **Rename** push button.
  3. Type a new name in the **New name** field of the Rename Authority Group or Rename Interest Group window, and then select the **Apply** push button.

Adding an existing family to the Family Administrator window

You can add an icon to the Family Administrator window for an existing TeamConnectionfamily that was defined outside the GUI. To do this, follow these steps:

1. Select **Attach icon** from the Family pull-down menu. The Attach Icon to Family window appears.
2. Complete the fields on this window as follows:

   Name Type the name of your family.

   Path Specify the directory path where the family was created.

   As you fill out the Name and Path fields, the **TC_DBPATH Set to** field shows you the directory path of your family database. This is a protected field. The TC_DBPATH environment variable will be set to the value shown in this field.

   Port Specify the TCP/IP port address that you set in your TCP/IP services file.

   Mailer Specify the name of the mail routine you want to use to notify users of actions they need to be informed of.
3. Select **OK**. An icon for that family appears.
4. After you see your family icon in the Family Administrator window, you can:
   - Start and stop the family and notification servers. See 41 for instructions.
   - Change the default values in the database to better suit your needs. To change the default values, select the family icon and then select **Family → Properties**.

Chapter 5. Starting and stopping the servers

This chapter explains how to start and stop TeamConnection servers using the family administrator. TeamConnection also provides a line command called teamcd, which enables you to start and stop the family server, notification server, and build server. See “Starting your family” on page 201 for instructions on using teamcd.

NT

For information on setting up the TeamConnection family server to run as a Windows NT service that can be started automatically when you start Windows NT, see “Starting teamcd as a Windows NT service” on page 204.

TeamConnection also provides a teamcbld command for starting and stopping build servers. For more information about this command, refer to the *TeamConnection User’s Guide*.

Specifying the number of daemons to start

When you start the family server, you specify the number of daemons, one or more, that are to be started. A *daemon* is a process that runs as a background task and provides access to the TeamConnection database. Because one daemon processes only one request at a time, the number of daemons you have running determines how quickly requests are processed. A daemon is not available until a request completes.

To determine the number of daemons to start, you need to understand the types of requests your users generally issue. For example, if many of the requests are for reports, which require longer processing, you will need more daemons than if most of the requests process quickly, such as checking files in and out.

Requests are queued and processed by the next available daemon. If the queue fills up, requests are not queued and the server refuses the connection. This is a signal that more daemons are needed.

If you do not explicitly specify the number of daemons when you start the family server, only one daemon is started. It is recommended that you start with five daemons. You can then use the server daemon monitor to gauge whether you have too many or too few daemons running. If you see, from looking at the server daemon monitor, that there is significant contention between the daemons (the monitor shows the same set of requests for long periods of time), restart the family server with fewer daemons. If you see that client requests are often being queued (the monitor shows all the daemons are in use and clients are waiting for a daemon to become available), restart the family server with more daemons. "Using the server daemon monitor" on page 181 explains how to use the server daemon monitor.

To change the number of daemons to start, you need to stop and restart the family. You specify the number of daemons to start on the Family Servers window of the family administrator. See 41 for instructions.

Setting up the mail facility

TeamConnection users can receive notification when certain events occur within TeamConnection. A user's mail address is specified when a TeamConnection user ID is created. TeamConnection uses this mail address to notify users when certain actions occur.

In order for users to receive notification, the notification server must be running. When you start the notification server, you specify an executable or command file that specifies the mail exit routine that processes mail requests.

The following mail exit routine samples are shipped with TeamConnection:

- mailexit.cmd (Intel platforms)
- mailexit.exe (Intel platforms)
- mailexit.ksh (UNIX platforms)

These samples are located in the directory where TeamConnection is installed. These samples use the sendmail command. You can either use one of these sample mail exits or you can use a different mail facility and write your own routine.

The sendmail command is part of TCP/IP, and is installed when TCP/IP is installed. If you use the sendmail function to send notification messages, you must configure it on your network in order for TeamConnection client workstations to receive notification messages from the server. Refer to your TCP/IP documentation for more information.

If you use a different mail facility, refer to the shipped mail exit routine sample, mailexit.c, to see how you can tailor TeamConnection to support your mail facility.

In order not to lose messages when the mail exit routine fails, you can have the exit routine return a code of 1041. This causes the notification daemon to exit and the mail that was being processed is not deleted. If the exit routine returns any other code, the mail that is being processed is deleted.

You set the mail facility on the Required page of the family Properties notebook. See "Required" on page 32 for instructions.

Starting the servers

This section explains how to start the TeamConnection family server and notification server. These processes can be started together when you start the family server or individually.

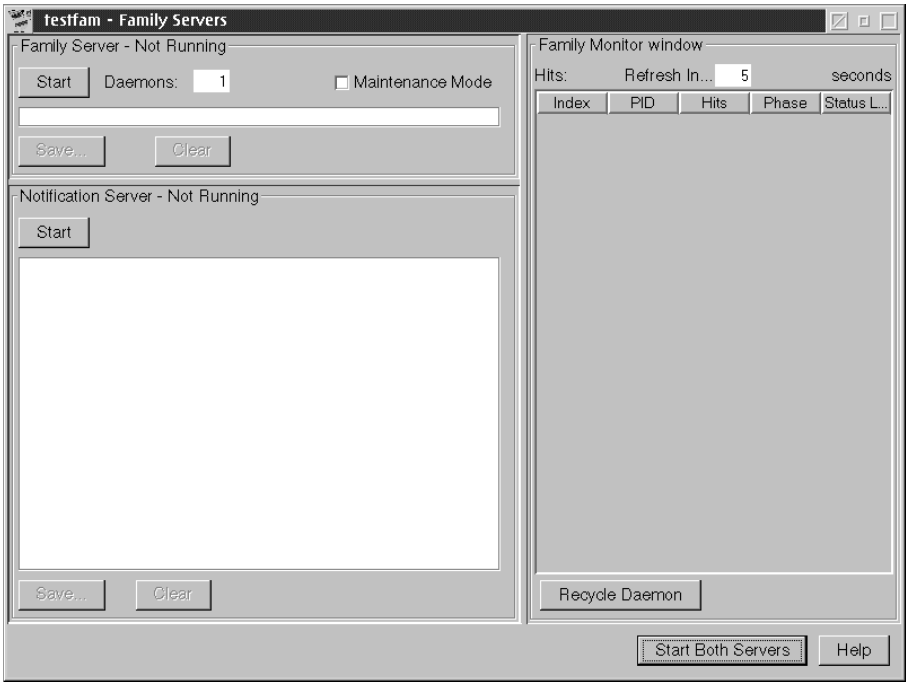
On Windows NT, an MS/DOS window with the teamcd daemon running in the foreground may display when the TeamConnection family is started. You can minimize this window.

NT

On Windows NT it is important to start your family while logged in to the same user account under which the family was created. Otherwise you will receive an SQL error -727. The login ID under which the family was created is used as the table schema name when the various tables TeamConnection uses are built. All queries against the family expect to see this login ID.

You can follow these steps to start both the family and notification servers from the family administrator:

1. Do one of the following to display the TeamConnection Family Administrator window:
   - From the TeamConnection Group folder on the desktop, double-click on the **Family Administrator** icon.
   - Type `tcadmin` from a prompt.
2. Double-click the family icon for the family you want to start. The Family Servers window appears.



3. When starting the family server, specify in the **Daemons** field the number of daemons you want started.
4. To start only one server, select the appropriate **Start** push button. To start both the family and notification servers, select the **Start Both Servers** push-button.

   When a server starts successfully, the message ″Press CTRL-C to stop″ appears in the list box and the **Start** push button changes to **Stop**.
5. Minimize the Family Servers window.
   Note: Do not close the Family Servers window. Closing the Family Servers window stops the family server.

Note: If a family is started outside of the family administrator (or by another copy of the family administrator), the GUI will not allow you to modify or delete it and a message will appear in the Family Servers window stating: ″The family is already running outside of tcadmin.″ There may also be a message in the Notification Server window stating: ″If the Notification Server was started outside of tcadmin, the output is not available.″

Stopping the servers

If you started the family or notification servers from the family administrator, follow these steps to stop them:

1. From the Family Servers window, select the **Stop** push button for the appropriate server to stop only one server. To stop both the family and notification servers, select the **Stop Both Servers** push button.
2. Close the Family Servers window.

Chapter 6. Setting up the client interface

The TeamConnection Web-based client interface provides access to your TeamConnection family from a Web browser such as Netscape or Internet Explorer. Once you have set up the interface, your users need only connect to the family's Web address, and then they can perform all TeamConnection tasks from their Web browser.

To use the TeamConection Web-based client interface, you need one of the following HTTP servers installed on your TeamConnection server. This software is available on CD 3 of the TeamConnection FullPak.

- IBM HTTP Server powered by Apache (for Windows NT, AIX, or Solaris)
- Apache HTTP Server (for any platform supported by TeamConnection)

You need to install and configure your HTTP server as described in its product documentation.

After you have created your family and installed and configured your HTTP server, do the following.

For UNIX platforms, TeamConnection ships with a sample script called ${TC_HOME}/samples/ksh/update_jgui_v303. This script automates the tasks explained in this section.

1. **Define your TeamConnection family to the HTTP server:**
   a. Edit the Web server's httpd.conf file and add the following lines immediately below the line that defines the /icons/ alias. These two lines must be added in the order shown here.

      Note: It is recommended that you use the version of the web servers shipped on the TeamConnection single-box CD. If you use an older web server, you may need to update Alias in access.conf.

      ```
      Alias /icons/ "e:/httpsrv/icons/"
      Alias /teamc/lib/ "<tc_home>/lib/"
      Alias /teamc/ "<tc_home>/www/"
      ```

      Replace `<tc_home>` with the directory path where TeamConnection is installed (the value of the TC_HOME environment variable), for example ″e:/teamc/lib″.

b. Add the following lines after the line #AddType application/x-httpd-php3-source .phps:

```
#AddType application/x-httpd-php3-source .phps
AddType  application/java-archive .jar
AddType application/octet-stream .obj
```

c. For Intel platforms only, add the following entry (in bold) to the DirectoryIndex:

```
DirectoryIndex index.html index.htm
```

The index file shipped on Intel is called index.htm, not index.html. Adding this entry to the DirectoryIndex allows your browser to recognize index.htm as the TeamConnection home page.

d. Stop and restart the HTTP server.

2. **Set up a family directory in your <tc_home>/www/ directory:**

a. In the <tc_home>/www/ directory, create a subdirectory named after your family. If your family is **testfam**, for example, then you should create the following directory:

```
<tc_home>/www/testfam
```

b. Copy the folowing files from <tc_home>/www/template/ to <tc_home>/www/<family>/:

```
index.html (or index.htm)
family.xml
```

c. Edit index.html (or index.htm) and make the following changes:

- Replace the port number 7654 with the port number or your family (in four places)
- Change testfam in the <title> tag to the name of your family.

d.

3. **Test access to your family:**

a. Start your TeamConnection family according to the instructions in "Chapter 5. Starting and stopping the servers" on page 39.

b. From a supported Web browser, open the following Web address, where *<server>* is the host name or IP address of the system where the family is running, and *<family>* is the name of your family:

```
http://<server>/teamc/<family>/
```

c. Download the Java plugin.

The first time you and your users connect to your family, you will need to download the Java plugin. You can do so by selecting the graphic at the bottom of the TeamConnection welcome page. Follow the instructions provided on the Java plugin download site.

d. Copy identitydb.obj to your home directory.

TeamConnection ships with a Java signature file called identitydb.obj located in the lib subdirectory of the TeamConnection installation path.

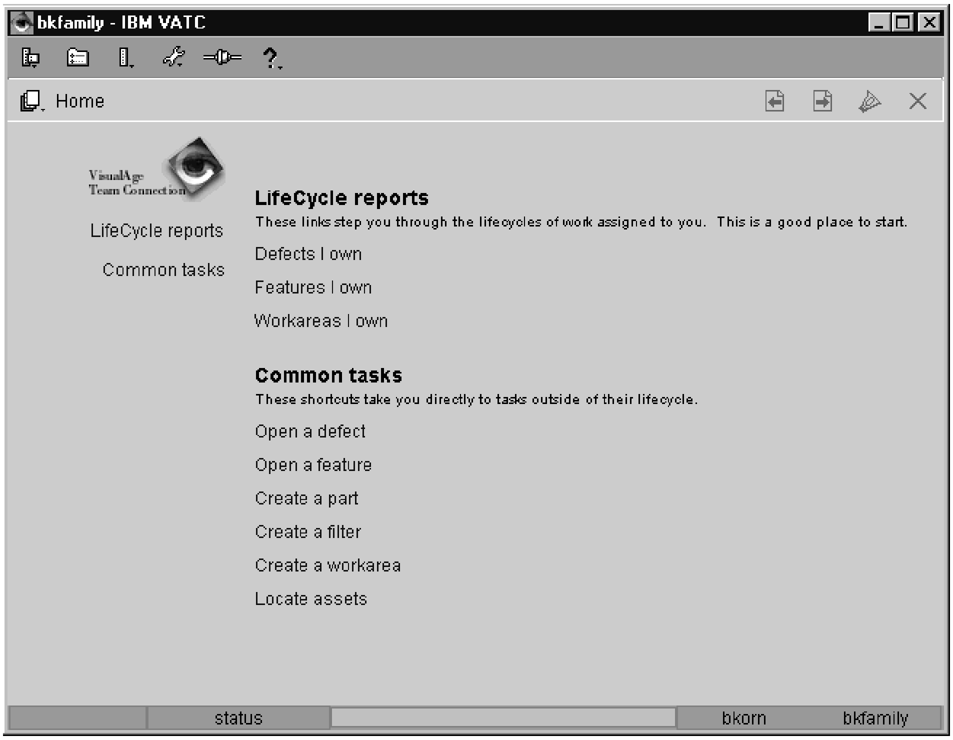
This file certifies TeamConnection to the Web server. You and your users need to download this file and copy it to your home directory. Follow the instructions provided on the TeamConnection welcome page.

Note: On AIX, HP and OS/2, first-time users will see a series of seven Java security dialogs when they bring up TeamConnection from their web browsers. These dialogs will prompt them to 'Grant' or 'Deny' privileges to perform certain tasks on their computers. Selecting 'Grant' will enable the users to get the full function of the Java Web Client. Selecting 'Deny' will make the applet unusable. Users can select the 'Remember this decision' checkbox to avoid seeing the security dialogs each time they connect to the family server.

e. Reload the TeamConnction welcome page.

   After you have set up the web client and reloaded the TeamConnection welcome page, you will be prompted to login to TeamConnection. Type your TeamConnection login ID and password into the login window. The TeamConnection home page opens in an applet window.

The following is an example of the TeamConnection home page. This is the point from which you will perform TeamConnection tasks:



LifeCycle reports

Common tasks

LifeCycle reports

These links step you through the lifecycles of work assigned to you. This is a good place to start.

Defects I own

Features I own

Workareas I own

Common tasks

These shortcuts take you directly to tasks outside of their lifecycle.

Open a defect

Open a feature

Create a part

Create a filter

Create a workarea

Locate assets

Figure 5. TeamConnection home page

Customizing TeamConnection home pages

TeamConnection ships with a default home page. This section explains how to change the contents of the shipped home page. Customizing a home page involves defining TeamConnection tasks for your users to select. Before you change any of the shipped home pages, therefore, you need to understand the content of the *TeamConnection User's Guide*.

| You customize the TeamConnection home pages by altering the index.html (or index.htm) and family.xml files, which you copied to your <tc_home>/www/<family>/ directory when you set up the client interface. If you want different groups of users to see different home pages when they connect to the family, you can create several different versions of index.html (each with a unique name) and tell your users to open their Web browsers to these pages. If you want separate home pages for developers and testers, for example, you can do the following:

1. Copy index.html to developers.html and make changes appropriate for your development group. when you give your development group the URL for the family, have them connect to
`http://<server>/teamc/<family>/developers.html`

2. Copy index.html to testers.html and make changes appropriate for your test group. When you give your test group the URL for the family, have them connect to `http://<server>/teamc/<family>/testers.html`

After you have altered these pages to suit your needs, it is a good idea to load them into your TeamConnection family as a backup and recovery measure.

Changing index.html

The file index.html (or index.htm) is the TeamConnection home page. It contains a section called ″Project Links.″ You can add to this section any links to Web pages containing information about your development projects. The section called ″News″ is a good place to put any information that you want your users to see when they start TeamConnection.

If you use the Integrated Notes Database, then one addition you might want to make to your Project Links section is a link for your Notes Database. Use the following format:

```
//http:domino_server:<port>/directory/database.nsf?OpenDatabase
```

Where:

domino_server is the name of the Domino server on which your otes database is located.

port is the TCP/IP port number of the Domino server. This is optional.

database is the name of your database file.

Changing the actions, menus, and views

The TeamConnection actions, menus, and views are defined in family.xml, located in your family subdirectory of the teamc/www directory. You can modify this file to change the actions on the home page, to prefill values for some fields, such as release, component, or workarea, and to add or remove columns that display for TeamConnection views. After you change this file and the first user logs in, the changes are saved with other TeamConnection preferences.

The changes you make to family.xml establish family defaults for the actions, menus, and views that appear on the TeamConnection home page. Your TeamConnection users can override the defalt values for views. If, for example, you set up a default view for DefectView, a TeamConnection user can add or remove columns and rearrange the columns in the views. Whatever columns and column order a view has when the user shuts down his or her browser is the new default for that user.

Changing an action on the home page

The following is a sample action from the home page. It shows the ″Defects I Own″ action.

```
<:menuitem>:
          <:text mnemonic="D">:Defects I own<:/text>:
          <:URL>:/report/DefectView?where=ownerLogin+in+(''{0}'')+and+state+in+(''open'',
        <:/menuitem>:
```

The text shown in italics defines the TeamConnection action to be performed (/report/DefectView?) and the SQL string to be passed to the database with the report request:

```
where=ownerLogin+in+(''{0}'')+and+state+in+(''open'',''design'',''size'',''review'',''wor
```

You can add a target field to this query, for example, by adding the following (shown in bold):

```
where=ownerLogin+in+(''{0}'')+and+state+in+(''open'',''design'',''size'',''review'',''wor
```

The remaining parts of the action, shown below, define the menu item for the action (enclosed in `<:menuitem>: <:/menuitem>:`tags) and the text users select from the home page to perform the action (enclosed in `<:text>:<:/text>:` tags). Since actions are passed to the server in the form of a URL, the action string itself is enclosed in `<:URL>:<:/URL>:` tags.

```
<:menuitem>:
          <:text mnemonic="D">:Defects I own<:/text>:
          <:URL>:action string goes here<:/URL>:
        <:/menuitem>:
```

One of the easiest ways to add actions to a home page is to generate a query using the TeamConnection filter window and copy the action string into the HTML tags shown above. TeamConnection displays the action strings at the bottom of the applet window as shown below:

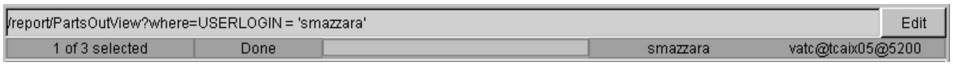

/report/PartsOutView?where=USERLOGIN = 'smazzara'

Figure 6. Action string in a TeamConnection home page

You can add the action string to the family.xml file by tagging it as shown in the following example. Note that when you include an action string in a URL definition, you need to replace spaces with plus (+) and enclose values in two sets of single quotes.

```
<:menuitem>:
          <:text>:Parts checked out by smazzara<:/text>:
          <:URL>:/report/PartsOutView?where=USERLOGIN+=+''smazzara''<:/URL>:
        <:/menuitem>:
```

Prefiling values

The family.xml file contains an attribute section that lets you specify attribute values to appear on TeamConnection windows. The following is a sample from this section. It shows a list of values for the **target** attribute:

```
<attr>
      <name>TARGET</name>
      <value>v303</value>
      <value>v302</value>
      <value>v400</value>
    </attr>
```

Changing a view

The following is the default view definition for defects. It shows the columns to be displayed, the width of each column, and the position of each column (starting with 0). You can add or replace the columns that appear in the default view, change the order of columns, or change the width allowed for each column. Refer to the *TeamConnection Commands Reference* for a complete list of TeamConnection view and column names

```
<view>
      <name>DefectView</name>
        <cols>
          <col>
            <name>ABSTRACT</name>
            <width>162</width>
            <pos>0</pos>
          </col>
          <col>
            <name>NAME</name>
            <width>110</width>
            <pos>1</pos>
          </col>
          <col>
            <name>STATE</name>
            <width>75</width>
            <pos>2</pos>
          </col>
          <col>
            <name>SEVERITY</name>
            <width>75</width>
            <pos>3</pos>
          </col>
          <col>
            <name>COMPNAME</name>
            <width>109</width>
            <pos>4</pos>
          </col>
          <col>
            <name>RELEASENAME</name>
            <width>101</width>
            <pos>5</pos>
          </col>
          <col>
        <name>OWNERLOGIN</name>
        <width>75</width>
        <pos>6</pos>
      </col>
      <col>
        <name>ANSWER</name>
        <width>75</width>
        <pos>7</pos>
      </col>
    </cols>
</view>
```

Chapter 7. Setting up Asset Locator

Asset Locator is a search engine that allows users to perform free text queries against a release. The search engine is referred to as the *crawler,* and the activity of searching through the release extract is referred to as a *crawl.* Asset Locator provides different *analyzers* for different file types in your release. An analyzer is a module of the crawler that understands the structure and contents of certain file types. The Java analyzer, for example, analyzes .java files, and the HTML analyzer analyzes .html files. When you search an extracted release, Asset Locator places the results in a DB2 database on the same file system to which the release was extracted. This section explains the requirements for Asset Locator and how to configure Asset Locator. Read this section in its entirety before you begin.

The following software is required for using Asset Locator. These are installed when you install TeamConnection FullPak 3.0.3. If you have not already installed these requirements, refer to the file install.txt on the root directory of CD 1 of the TeamConnection FullPak CDs.

- DB2 UDB 5.2 Text Extender
- WebSphere Application Server 2.0.2+ (specifically the servlet engine)
- HTTP Web Server 1.3.3+ (installed when you install WebSphere Application Server)

Asset Locator has been tested on Windows NT, AIX, and Solaris platforms.

Before you can use Asset Locator, you need to configure it. Configuring Asset Locator involves creating a DB2 instance and database that Asset Locator will use to search a release, setting up the DB2 text extender, setting up WebSphere Application Server, creating a TeamConnection user login with release extract authority to perform crawls, and setting up the Asset Locator configuration files. On UNIX platforms, many of these steps have been automated through a series of shell scripts that prompt you for the information needed to set up Asset Locator. Use the following table to help you find the information you need:

For information on:	**Refer to page:**
Setting up Asset Locator on UNIX platforms using automated shell scripts. If you follow the instructions in this section, you can skip the instructions for manually setting up Asset Locator.	54
Setting up Asset Locator on Windows NT platforms. This section explains how to set up Asset Locator manually.	55

For information on:	Refer to page:
Setting options in the Asset Locator configuration files. These steps are required for Windows NT platforms.	58
Starting the Asset Locator Administrator to extract a release and start the crawler.	64
Solving problems with the Asset Locator crawler or runtime.	64

Setting up Asset Locator on UNIX platforms

Asset Locator ships with a set of shell scripts and a sample profile that you can use to configure its components. These shell scripts automate much of the configuration. They prompt you to enter information about your TeamConnection family and the location of release extracts for crawls. You can obtain these shell scripts and the sample profile from the samples/ksh directory of your TeamConnection installation path:

update_websphere_v303	Creates a DB2 instance for your Asset Locator database, creates text extender instances, and configures WebSphere Application Server.
profile.assetloc	Updates your TeamConnection .profile with information needed for Asset Locator.
update_assetloc_v303	Updates the Asset Locator configuration files and starts the text extender service.

Before you begin, make sure you have done the following:

1. Installed the auxiliary software required by Asset Locator. See install.txt from the root directory of CD 1 of the TeamConnection FullPak.
2. Created a TeamConnection family according to the instructions in “Chapter 3. Planning your families” on page 17 and “Chapter 4. Creating your TeamConnection family” on page 29. Be sure to follow the database naming conventions. It is especially helpful to give your TeamConnection family, your DB2 database, and your DB2 login the same name. These instructions will use testfam. The primary group for the DB2 login is sys and the secondary group is DBGROUP.
3. Created a DB2 login for the crawler. In these instructions the login is crawler, the primary group is sys, and the secondary group is DBGROUP. Note that the primary and secondary groups are the same for the logins testfam and crawler.
4. In your TeamConnection family, create a user ID for the crawler with ReleaseExtract authority. These instructions will use the user ID, crawler. Add a host list entry for the crawler ID.

5. Ensure you have enough disk space for the release extract and the crawler database. It is recommended that you use 200MB for the database plus the amount of space you determine necessary for the release extract. You might want to run a test extract to determine how much space the release needs.
6. Create a DB2 group called smadmin. This is used by the DB2 text extender.

To run the Asset Locator setup scripts, do the following.

1. Login as user crawler and issue the following command to update your TeamConnection .profile:
   ```
   cp ${TC_HOME}/install/en_US/profile.assetloc .profile
   ```
2. Login as user root and execute the following script:
   ```
   ${TC_HOME}/samples/ksh/update_websphere_v303
   ```
3. Answer the prompts to create a DB2 instance, text extender instances, and to configure the WebSphere Application Server.
4. Login as user crawler and execute the following script:
   ```
   ${TC_HOME}/samples/ksh/update_assetloc_v303
   ```
5. Answer the prompts to specify your TeamConnection family, host, and port name and the location for your release extract.

Setting up Asset Locator on Windows NT

To set up Asset Locator on Windows NT, you need to configure the following auxiliary software required by Asset Locator:

- DB2 Text Extender
- WebSphere Application Server

You also need to set options in the Asset Locator configuration files as described in "Setting up Asset Locator configuration files" on page 58

Before you start, make sure you have done the following:

1. Installed the auxiliary software required by Asset Locator. See install.txt from the root directory of CD 1 of the TeamConnection FullPak.
2. Created a TeamConnection family according to the instructions in "Chapter 3. Planning your families" on page 17 and "Chapter 4. Creating your TeamConnection family" on page 29. Be sure to follow the database naming conventions. It is especially helpful to give your TeamConnection family, your DB2 database, and your DB2 login the same name. These instructions will use testfam. The primary group for the DB2 login is sys and the secondary group is DBGROUP.

3. Created a DB2 login for the crawler. In these instructions the login is crawler, the primary group is sys, and the secondary group is DBGROUP. Note that the primary and secondary groups are the same for the logins testfam and crawler.
4. In your TeamConnection family, create a user ID for the crawler with ReleaseExtract authority. These instructions will use the user ID, crawler. Add a host list entry for the crawler ID.
5. Ensure you have enough disk space for the release extract and the crawler database. It is recommended that you use 200MB for the database plus the amount of space you determine necessary for the release extract. You might want to run a test extract to determine how much space the release needs.

DB2 Text Extender

To set up the DB2 text extender on Windows NT, do the following:

1. Configure DB2 to run the DB2 instance. (If you have already created a TeamConnection family, this will have been done already.)
2. Set environment variable DB2DBDFT=assetloc as a System environment variable.
3. Start DB2 using the **db2start** command, if not started automatically.
4. Start the text extender server using the **txstart.exe** command.

   You can set this up to start automatically when you start Windows NT by creating a shortcut for txstart.exe and placing it in your startup folder.
5. Create the Asset Locator database using the following command:
   ```
   db2 create database assetloc
   ```
6. Update the following DB2 configuration parameters. These parameter settings will improve DB2 performance with Asset Locator:

   UDF_MEM_SZ = 1024
   APPLHEAPSZ = 512

WebSphere Application Server

Do the following to set up WebSphere application Server for Asset Locator:

1. Configure the WebSphere Application Server to load the Asset Locator servlet (EColabraQueryServlet) used to perform the queries against the assetloc database. The EColabraQueryServlet will be invoked by the TeamConnection Web client when using the Asset Locator dialog to perform queries against crawled data. There are two different ways to perform this servlet configuration:
   - Using the WebSphere Administrator. For instructions see “Using the WebSphere Administrator” on page 57.
   - Directly edit the Websphere Application Server properties files. For instructions see “Editing the WebSphere properties files” on page 58.

You only need to follow the instructions in one of these sections. After you have configured WebSphere to load the Asset Locator servlet, contine wth the next step.

2. Modify WebSphere Servlet Service to run as the NT User where the assetloc database will exist. This is necessary for the Servlet engine to have the proper database privileges:
   a. Select WebSphere Servlet Service from the list of NT Services.
   b. Select the **Startup** button.
   c. Change **Log On As** information to log on as the appropriate NT user.

You must stop the Servlet Engine to pick up any changes made to the Servlet configuration. You should also stop the WebServer as well and then restart it. Using the NT Services window from the NT Control Panel, stop the WebSphere Servlet Service. You do not have to restart the servlet service, the WebServer will restart the servlet engine on first request. Using the NT Services window from the Control Panel, stop and restart the IBM HTTP Server.

Using the WebSphere Administrator

To configure the WebSphere Application Server to load the Asset Locator servlet using the WebSphere Administrator, do the following:

| 1. Open a Web browser on the following Web address:
| `http://`*`hostname`*`:9527`, where *hostname* is the TCP/IP host name for the
| machine where WebSphere is installed.

2. Login to the WebSphere Administrator. The default user ID and password are **admin/admin**.
3. Set the Application Server classpath to include Asset Locator classes:
   a. Select Java Engine
   b. Modify Application Server classpath to include Asset Locator jar file, for example, d:\teamc\lib\assetloc.jar.
   c. Ensure that db2java.zip is also in Application Server classpath, for example, d:\db2\java\db2java.zip.
4. Add Asset Locator servlet (EColabraQueryServlet) to Servlet engine:
   a. Select Servlet Configuration
   b. Add EColabraQueryServlet with the following settings and select **OK**:

      ```
      Servlet Name = EColabraQueryServlet
      Servlet Class = com.ibm.ecolabra.runtime.EColabraQueryServlet
      Bean Servlet = no
      ```

   c. Set Load at startup to **yes**.
   d. Add the following servlet properties:

Name	**Value**

AssetLocatorConfig	\configDirectory\\AssetLocator.cfg (e.g, d:\\teamc\\config\\AssetLocator.cfg)
RunTimeConfig	\configDirectory\\runtime.cfg (e.g, d:\\teamc\\config\\runtime.cfg)

e. Save servlet add.

Editing the WebSphere properties files

To configure the WebSphere Application Server to load the Asset Locator servlet by editing the properties files directly, do the following:

1. Change to the drive WebSphere is installed on.
2. Edit \WebSphere\AppServer\properties\bootstrap.properties and modify java.classpath to include assetloc.jar and db2java.zip (if it does not already include these).
3. Edit \WebSphere\AppServer\properties\server\servlet\servletservice\servlets.properties as follows:
   a. Add **servlets.startup=EColabraQueryServlet** to the section # servlets to be loaded at startup.
   b. Add the following to the section # Servlets added by the user. (These three entries are shown wrapped, but your entries need to be on one line):

```
servlet.EColabraQueryServlet.code=
   com.ibm.ecolabra.runtime.EColabraQueryServlet
servlet.EColabraQueryServlet.description=
servlet.EColabraQueryServlet.initArgs=
   RunTimeConfig=\configDirectory\runtime.cfg,
   AssetLocatorConfig=\configDirectory\AssetLocator.cfg
```

Setting up Asset Locator configuration files

To set up the Asset Locator configuration files, you need to edit the following files located in the /config directory. On Windows NT, this directory is located in the teamc directory, for example d:\teamc\config. On UNIX platforms, this directory is located in the home directory of the crawler user ID, for example home/crawler/config. It is strongly recommend that you create a backup copy of these files before editing them. You can refer to the comments in the files themselves or to this section for configuration information.

File name	Contents and purpose
admin.cfg	The primary file for the Asset Locator crawler, in which you will configure the appropriate crawl roots, scheduling of the crawl, the location for the release extract, and the location of log files. The file is divided into

	sections, designated by a section title in open and closed brackets ([ ]), for example, [FileSystemRoots].
AssetLocator.cfg	Contains login information for both DB2 and TeamConnection. It also contains the database schema for each of the DB2 tables that are created by the crawler. There is a separate database table for each analyzer (for example, JAVA_TABLE, CPP_TABLE.) The only need for an administrator to update the schema portion of this file would be to identify the columns (and ordering of the columns) displayed in the result or AssetView (that is, if you want to change the default columns).
runtime.cfg	The configuration file for the servlet (or the runtime). The servlet is executed when you perform a query using Asset Locator from the TeamConnection Web-based client interface.

Configuring admin.cfg

The file admin.cfg is the main configuration file. The following sections explain the purpose of each section of admin.cfg, the options you can set in each section, and examples for each option.

[ResourceMapping]: Use this section to specify the file extensions that each analyzer is to search. The currently-supported analyzers are Java, C/C++, COBOL, HTML, and XML.

The following entries specify that file types .java and .jav are to be searched by the Java analyzer:

```
java = Java
jav = Java
```

[LogFiles]: Use this section to specify the name and location of log files and a test wrap option for the files. The log files display information about the crawl. You can specify the following options:

EventLogFile	Contains information about tasks performed by the Asset Locator crawler.
ErrorLogFile	Contains error messages that occurred during the crawl.
CrawlerStateLogFile	Contains a detailed description of the crawler's progress.

wrapLongLines	Specifies that each line in the log files should be wrapped after 80 characters. Specify true or false.

The log file paths you specify must exist. The following are examples of these options:

```
EventLogFile = d:\assetloc\log\event.log
ErrorLogFile = d:\assetloc\log\error.log
CrawlerStateLogFile = .\log\crawler.log
wrapLongLines = true
```

[Crawler]: Use this section to set options that control how the crawler functions.

GUIMode	Indicates whether to use the crawler from the GUI or the command line. Specify true or false.
MaxLocalDepth	Sets the maximum number of directories to crawl.
ShouldUseTimer	Indicates whether or not to use scheduled crawls. Specify true or false. This option works in conjunction with the TimeToCrawl option. If you set this option to true, the crawler operates on the schedule set in the TimeToCrawl option. If you set this option to false, the crawler operates immediately. If you are working with a large family, you may want to specify a time when there are fewer users logged in to TeamConnection.
TimeToCrawl	Sets the time to crawl. specify three values separated by spaces to indicate the minute (0-59), hour (0-23), and day of the week (0-6, where 0 is Sunday and 6 is Saturday). Each value can be given in the form of a number (9), a list of numbers (1,3,6), a range of numbers 0-3,4,7-9 or an asterisk to indicate that all discrete values are set. If you specify a list or a range of numbers, do not include spaces in the list or range. The following are examples: TimeToCrawl=0 12 * crawls every day at noon TimeToCrawl=0 0 0,6 crawls Sunday and Saturday at TimeToCrawl=0,30 * 1-5 crawls weekdays every half h

[FileSystemRoots]: Use this section to specify the file system root directories to be crawled. Specify a name and the directory path, for example, mySrc = c:\myProject\mySource.

[WebDAVRoots]: Use this section to specify a list of WebDAV roots to be crawled. Specify a name and the Web address, for example, myComponent = http://root/mainComponent/subComponent.

[TCRoots]: Use this section to specify a list of TeamConnection families and releases to crawl. Specify a name and the TeamConnection family, host, port, and release, for example, testfam = testfam@hostname@5000@rel1.

[TCGeneral]: Use this section to specify general attributes for a crawl

ReleaseExtractDirectory	The name of the directory where you want the release extracted to.

Configuring AssetLocator.cfg

The configuration file AssetLocator.cfg contains login information for both DB2 and TeamConnection. It also contains the database schema for each of the DB2 tables that are created by the crawler. There is a separate database table for each analyzer (for example, JAVA_TABLE, CPP_TABLE, and so on.).

At most installations you will want to modify only the login portions of this file. It is recommended that you leave the schema portions as shipped. The only need for an administrator to update the schema portion of this file would be to identify the columns (and ordering of the columns) displayed in the result or AssetView. The schema portions of the file are identified as [table1], [table2], [table3], and so on. The file contains one table definition for each file type that Asset Locator supports (Java, C++, HTML, XML, Cobol). You should modify these table schemas only if you are well-versed in DB2. Table 6 defines the schema for a table that stores information about your TeamConnection family. Do not modify table 6.

To change the columns that display in an AssetView, modify the Visual field of the table and field sections. To hide a column, set the Visual field to 0. To reorder the columns, specify a number corresponding to the order in which you want the column to appear, Visual=1 for the first column, Visual=2 for the second, and so on. The following is a brief example. It shows the FREE_TEXT and TIME fields of table 1 hidden, the Date field as the first column, and the PROJECT_NAME field as the second column:

```
[table1_field17]
Name = FREE_TEXT
Type = CLOB (1 M)
Key = false
AllowNull = true
Visual = 0
```

```
[table1_field18]
Name = DATE
Type = DATE
Key = false
AllowNull = true
Visual = 1

[table1_field19]
Name = TIME
Type = TIME
Key = false
AllowNull = true
Visual = 0

[table1_field20]
Name = PROJECT_NAME
Type = VARCHAR(100)
Key = false
AllowNull = true
Visual = 2
```

The following sections describe the TeamConnection and DB2 options that you can modify in AssetLocator.cfg.

[AnalyzerLimits]: Use this section to set limits on how the analyzer functions. The analyzers in Asset Locator are capable of analyzing parts that are not complete or that have syntax errors in them. You can set the maximum number of errors the analyzer encounters before stopping the analysis of the current part. You can also limit the number of seconds the analyzer can spend crawling each kilobyte of file data. The following are examples of these options:

```
MaxErrorsAllowed = 50
MaxTimePerKB = 2
```

[TeamConnection]: Use this section to specify TeamConnection options:

useLogin	Should always be set to true, even if your family's security level is host-only.
user	Specifies the TeamConnection login ID required to login. This option is always required. The ID you specify must have release extract authority for the TeamConnection family.
password	Specifies the password for the TeamConnection login ID specified in user. If the TeamConnection security level is Host-only, this option is not required.
connectionTimeout	Specifies the maximum number of seconds

	allowed to connect to the TeamConnection server. The crawler skips the current TCRoot if a connection is not made within this time limit.
pingInterval	During the release extract, the analyzer pings the TeamConnection server periodically to ensure the connection is still active. This option specifies the number of seconds between pings.

[Database]: Use this section to specify the DB2 database name and login ID for the search results table:

name	Defines the DB2 system, driver name, and database name for the search result table. The format for the name is system:driver name:database. The following is an example: `name = jdbc:db2:assetloc`
useLogin	Specifies whether or not DB2 login is required. Specify true or false. When you run the crawler on the same machine as the DB2 database manager, no login is required.
user	The user ID to login. This option is required only when useLogin=true.
password	The password for the user specified in the user option.

Configuring runtime.cfg

The runtime.cfg configuration file contains a pointer to the log file created by the Asset Locator servlet and a list of error messages passed to the servlet engine.

ErrorLogFile	Specifies the pointer to the log file. The following is an example: `ErrorLogFile = d:\assetloc\log\runtime.log`
MaxResultsInReply	Specifies the maximum number of results that will be returned by a query. The default value is -1, which indicates that there is no limit to the results.

Starting the Asset Locator Administrator

The Asset Locator Administrator is a graphical user interface that you use to perform the release extract and start the crawler. Before your users can search a release using Asset Locator, you need to start the release extract and the crawler using the Administrator.

To start and use the Asset Locator Administrator, do the following:

1. Start DB2 using the **db2start** command.
2. Start the DB2 text extender using the **txstart** command.
3. Start your Web server, if it has not already been started.

   On UNIX platforms, you need to ensure the root ID has the correct DB2 environment set before starting the WebServer. Do the following.

   a. Login as the root user and type **ksh** to ensure you are in a korn shell environment.
   b. ″Source in″ the profile environment for the crawler user into root's environment. For example, if user crawler's home directory is /home/crawler, type the following command as user root:

   ```
   . /home/crawler/.profile
   ```

   c. Check the environment by typing **env | grep DB2**. If you see several DB2 environment variables you have successfully ″sourced in″ the crawler's profile into root.
   d. Start the WebServer using one of the following commands from the HTTP Server installation directory:

      On AIX
      /usr/lpp/HTTPServer/sbin/apachectl start

      On Solaris 2.6
      | /opt/HTTPServer/sbin/apachectl start
4. Start the Asset Locator Administrator using the **assetadm** command.
5. Press **start** to begin the Crawl. Crawler logging will display both in the GUI and in the log files stored in the log file paths you set in admin.cfg.

   When completed, the assetloc database will contain information gathered by the crawler. At this point, users can perform queries against crawled data by selecting **Locate Assets** from the TeamConnection Web-based client.

Solving problems with Asset Locator

This section addresses some of the problems that can arise during Asset Locator configuration, particularly if you are required to deviate from the

Asset Locator configuration instructions documented in the previous sections. There are two primary components to be configured for Asset Locator, the crawler and the runtime.

Addressing crawler problems

When attempting to diagnose problems that occur during Asset Locator crawling, always check the error and event log files to see more specific detail of the problem. The following is a list of symptoms and steps you can take to address them:

Symptom	**Possible Solution(s)**
Unable to create log files	Verify the following: • admin.cfg contains valid information for location of the event, error, and crawler state log files • The directory path identified to hold the log files exists and , in UNIX, has the necessary permissions for the Asset Locator crawler to create the log files • Log file settings include both directory and the log file name. (e.g., d:\log\event.log or /tmp/log/event.log)
Unable to connect to TeamConnection server	Verify the following: • AssetLocator.cfg contains valid information in [TeamConnection]: useLogin=true, User = • There is a valid TeamConnection Host List entry for the current family for the User identified above • admin.cfg contains a valid TCRoot entry pointing to the family: family@host@port@release

Symptom	Possible Solution(s)
Unable to perform TeamConnection release extract	In addition to the potential solutions for connectivity problems, verify that you can perform the following release extract independent of the Crawler. Execute the following command from a command-line prompt with the same permissions from which you were attempting the Asset Locator Crawl. If you can perform this command successfully, then the crawler should function as well. `teamc release -extract releaseName -family family@host@port -root extract-dir -become user  -scan -erase` Substitute the following values in this command: *releaseName* — The release specified in the TCRoots option of admin.cfg. *family@host@port* — The family, host, and port specified in the TCRoots option of admin.cfg. *extract-dir* — The directory path specified in the ReleaseExtractDirectory option of admin.cfg. *user* — The TeamConnection user ID specified in the user option of the {TeamConnection} section of AssetLocator.cfg.
A Java OutOfMemoryError exception occurs during a crawl	Modify the command used to launch the Asset Locator Administrator GUI in assetadm.cmd to increase the heap and stack size used by the JVM. Note that AssetLocator already increases the default values for these, but they should be increased even more if you continually encounter this error. Asset Locator initially sets these values to mx50m, ms20m, oss20m, for max heap size, initial heap size, and max java stack size, respectively.
Unable to perform update index	Verify that the DB2 Text Extender is running. Issue the command **txstart.exe** to restart the Text Extender service.

Addressing runtime problems

Runtime is the portion of Asset Locator executed when users perform queries using the Asset Locator function invoked from the TeamConnection Web—based client interface. The Runtime is implemented by a servlet that is invoked by the WebSphere Application Server's servlet engine.

Note: It is important that you stop the WebSphere Servlet Service after every change that is made during any troubleshooting activity to ensure that the Asset Locator servlet is reloaded and picks up any configuration changes you have made. On UNIX, it is important that you kill the servlet engine process that will continue to run even after WebServer is stopped. Issue the following command to find and then stop the Java Servlet process:

```
ps -ef | grep java
```

Symptom	**Possible Solution(s)**
User reports that Asset Locator query fails	• Look at the runtime log file (location/filename specified in runtime.cfg). The runtime log file should contain any problems that were encountered by the Asset Locator servlet (EColabraQueryServlet). • Verify that the log file directories and log files of the HTTP Server and Application Server have the permissions necessary for the crawl account to update.
No runtime log file generated	Verify the following: • runtime.cfg contains valid information for location of the runtime log file, for example, d:\log\runtime.log for NT or /tmp/log/runtime.log for UNIX. • Directory path identified to hold the log file exists and has the necessary permissions for Asset Locator servlet to create the log file. If trouble persists, specify /tmp/runtime.log for log file location (UNIX only). • EColabraQueryServlet is properly configured in the WebSphere Application Server according to instructions in previous sections of this chapter. • The initialization parameters properly point to the Asset Locator configuration files
Database exceptions logged in runtime log file	Verify the following: • The database manager has been started (using the db2start command) • The Text Extender service is started (using the txstart command) • db2java.zip is configured in the Application Server classpath in *Websphere_install_dir*/properties/bootstrap.properties • WebSphere Application Server is started with necessary database environment set. Ensure that root id has the DB2 environment set before starting the WebServer (e.g., /usr/lpp/HTTPServer/sbin/apachectl start). One way to do this is to su root from the Asset Locator crawler account as described in the configuration documentation. This will allow root to inherit the necessary environment (UNIX only).

Symptom	Possible Solution(s)
Results empty or inaccurate for attribute specific queries	Verify that the database configuration parameters have been configured for the Asset Locator database instance and assetloc database as described in the Administration Guide. Specifically, if the udf_mem_sz instance parameter is not set to at least 1024, you can receive exceptions in the runtime log file attempting to perform Asset Locator queries against attributes with a database schema of type LONG VARCHAR.
General Asset Locator query failure	If problems still persist after attempting above solutions, look at the log files generated by the IBM HTTP Server and/or the WebSphere Application Server to see if there is some error occurring independent of the Asset Locator.

Part 3. Putting your TeamConnection server to work

This section provides information you need to plan how you will set up your TeamConnection family and which TeamConnection functions you will use. It explains how to define users to TeamConnection, how to create and use configurable fields, how to configure TeamConnection processes, how to implement user exits, and how to set up and enable shadowing..

Chapter 8. Setting up your family structure

Before you begin to use your family, it is important that you think about the following:

- How to arrange your component structure
- How to organize your releases
- What processes you want to use

This chapter helps you determine how you want to organize your family and then explains how to do it.

You need to understand what families, components, releases, and processes are and what their purpose is within TeamConnection. If you have not already done so, read “Chapter 1. An introduction to TeamConnection” on page 3, before continuing.

The following table directs you to the task you need:

For information about this task,	**Go to this page.**
Planning your component structure	71
Planning your releases	75
Planning your processes	79
Creating your components and releases	84

Planning your components

This section discusses how you can organize your component hierarchy to support your configuration management needs.

Organizing the component hierarchy

You can organize your component hierarchy several ways. For example, one component hierarchy might mirror the application development organization hierarchy, such as department, section, team, or unit of development. Another hierarchy might reflect the software architecture of the applications under development, such as application, GUI, database.

When you set up your component hierarchy, consider that all defects and features are recorded by component, and the owner of a component becomes the default owner of the defects and features for that component. This is important because defect and feature owners automatically receive a considerable amount of authority over the defects and features they own. To see the actions that defect and feature owners can perform, refer to the authority and notification table in the *TeamConnection User's Guide*.

If you create your component hierarchy to store software or documentation source files, it is best to reflect the product organization at the top level. You can then create descendant components to reflect the development or maintenance responsibilities. Figure 7 gives an example of this type of structure.

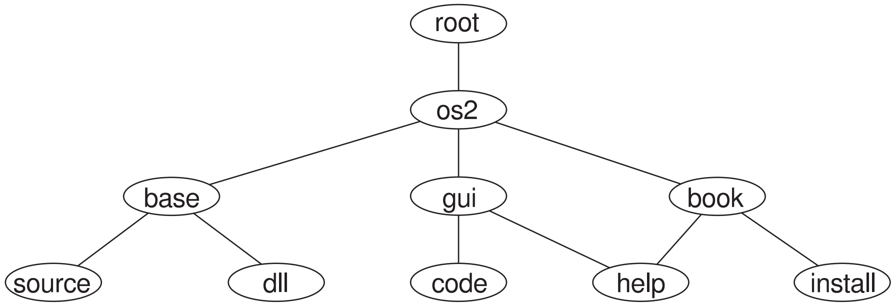


Figure 7. A hierarchy representing product organization

Your component hierarchy can consist of several parallel hierarchies so that you can easily restrict access to certain related components. For example, if you have vendors working on your development team, you might want to restrict their access to certain information. You can create a parallel hierarchy that contains only the information that they require. Figure 8 represents this type of structure.

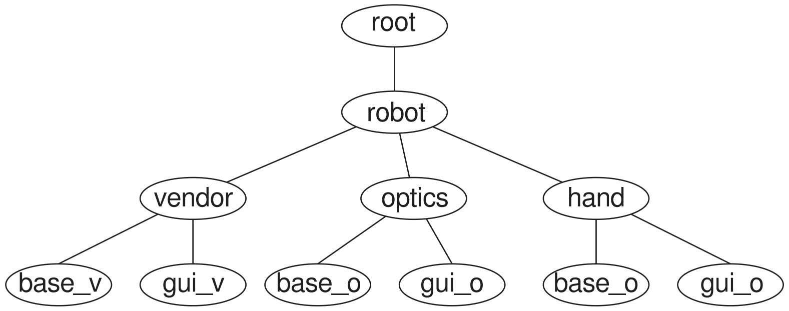


Figure 8. A hierarchy showing parallel components

Components can have more than one parent. A component that has more than one parent inherits authority and notification from both. In Figure 9 on page 73, the component optics groups both the optics_v and optics_d components for the development project, giving the optics_v components two parents. The optics component manages notification for the entire optics team. Access control is managed separately for the vendors and the internal users through the lower-level components, optics_v and optics_d.

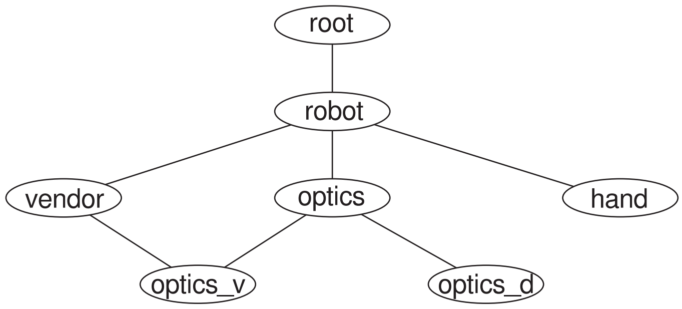


Figure 9. Components with more than one parent

Your initial component hierarchy is not necessarily going to be the same as your hierarchy a year from now. It will change as your organization grows and as your needs change. Remember that you can change the parents of a component as well as delete or rename the component.

When you plan your component hierarchy, you might find it helpful to first sketch it on paper. You can then use this sketch to help you make a table in which you note information about each component, such as the type of parts you want to control with the component, what releases a component will manage, and which processes each component and release will initially follow.

Determining component ownership

Each component in the hierarchy has an owner. Initially that owner is the person who creates the component. After the component is created, the owner can, at any time, transfer ownership to another person.

Ownership of a component is critical. A component owner has authority to perform a wide variety of actions on that component and the parts contained in that component, as well as on all its descendant components and their parts. For example, the owner has authority to give other users access to the component and its parts and to delete the component.

You might create many of the initial components for your development organization, but you probably will not want to remain the owner of them all. As you are planning your component hierarchy, determine whom you want to own each component. The owner of the root component, the component at the top of the hierarchy, should be the person with overall responsibility for the project. If several other people have responsibility for various pieces of the development project, you might want those people to own the descendant components that relate to their piece of the project.

The owner of a parent component has the same level of authority for all of its descendant components.

Figure 10 shows a portion of a component hierarchy that Sam, a family administrator, created. Sam transferred ownership of many of the components to other members of the team. However, he kept ownership of the root component because he has overall responsibility for the project.

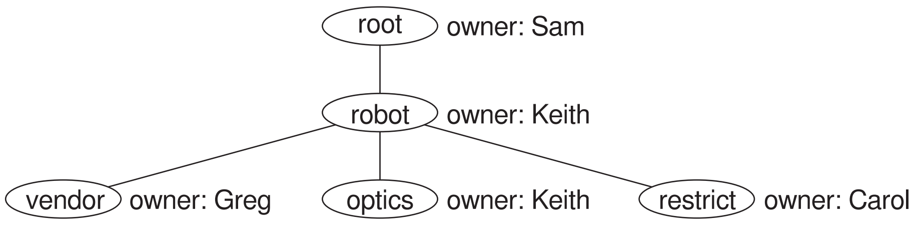


Figure 10. A hierarchy showing component ownership

Naming the components

During the planning stage, it is helpful to decide on a component naming convention. Do you want each component name to reflect the type of data it is managing? If so, you need to understand the content, function, execution platform, or other characteristics of the parts the component will manage. For example, the name for a component that manages data for the graphical user interface of your application might begin with the characters *gui*. Do you want component names to be in all lowercase characters, all uppercase characters, or in mixed case? The database is case sensitive. Therefore, when you are consistent with how your components are named, your users will have less difficulty finding objects in the database. The names you use must be unique within the family.

Other TeamConnection users will be able to create components, so you will want to publicize your naming convention so that everyone can adhere to it. TeamConnectionusers need to access TeamConnection data, and that data can be difficult to find if they do not understand and follow your naming convention.

Determining access to components

Each component has an access list that controls access to development data. Access authority is inherited for all descendant components, but can be explicitly restricted in the descendant components. See “Setting up authority groups" on page 97 for instructions. If you need to restrict access to several components for most users, you might need to redesign your component hierarchy.

Planning your releases

After you decide how you are going to organize your components, determine the releases that you will initially create.

Basically, a release is a logical grouping of parts. This group of parts makes up a single version of a product, or part of a product, that is built separately, such as documentation or test cases. One release can group parts that are managed by many components.

Relating releases with components

Every release is associated with a component that manages which users can access the parts in the release and which users are notified when certain actions occur. Before you can create a release, you need to create a component to manage the release. The only relationship between a release and the component from which it was created is to use the access list of that component. You can create parts in the release that belong to another component.

For example, Figure 11 shows the component hierarchy for a development project. Keith owns the component robot. He creates the release robot_control to contain all the parts that pertain to the first version of the application they are developing. When Keith created the release, he specified robot as the managing component, but he did not specify an owner. Therefore, Keith is the release owner by default.

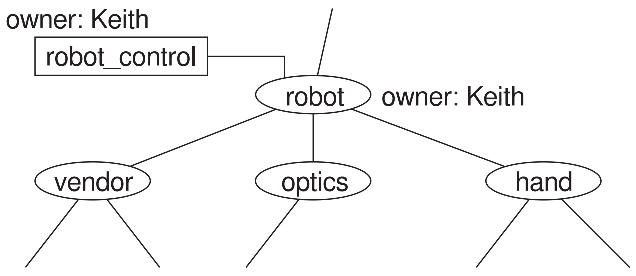


Figure 11. The release-component relationship

Keith decides that Doug should own release robot_control. As owner of the release, Doug has authority to perform most actions against the release. However, access and notification for the release are managed by component robot and are controlled by Keith, the owner of robot. In this way, Keith can maintain access and notification control of the release, even though he has delegated the management responsibilities to Doug.

If Keith wants to give Doug the ability to control the access to release robot_control, he can add Doug's user ID to the component's access list and specify an authority group, such as componentlead, that contains the authority to add users to access lists. Both Doug and Keith would then have the authority to add entries to the access list of component robot.

You can learn more about access lists and authority groups in "Setting up authority groups" on page 97.

Selecting serial or concurrent development

The release can be set up for developing in serial development or in concurrent development mode. In *serial development*, a part is locked when a user checks it out, and no one else can update the part as long as it is checked out. In *concurrent development*, more than one user can simultaneously have the same part checked out. When TeamConnection detects that someone else has made changes to a part that another is checking in, it notifies the user that a collision has occurred. The user can reconcile the changes using the TeamConnection merge program.

You specify the mode in which your users will work when you create the release. Be aware, however, that after the mode is set to concurrent, you can change it to serial mode only if all workareas and drivers in the release are committed. You can change the development mode from serial to concurrent at any time.

Release options that control database growth

To optimize TeamConnection performance, you can control the size of your database in the following ways:
- Automatically by setting options when you create a release
- Manually by pruning a release

The following sections explain these methods of controlling database growth. The *IBM DB2 Universal Database Administration Guide* contains more information about managing the size and growth of your database.

Controlling database size automatically

You can help control the size of your family database by requesting the following options when creating a release:
- Automatic pruning of workareas
- Maximum number of build output versions

These options let you reclaim database space without extra work.

Automatic pruning of workareas: To understand automatic pruning of workareas, it helps to understand the basics of workarea versioning. Every time you freeze a workarea, TeamConnection saves a revision level of the workarea. When you freeze workarea 123, for example, a version called 123:2 is created. This version contains information about each part in the workarea and its current version at the time the workarea was frozen. It may contain version 1 of part optics.c, for example. If you freeze the workarea again later, a new version called 123:3 is created with information about the versions of the parts in the workarea when it was frozen. This version may contain version 2 of part optics.c. Each of these workarea versions is saved in the database and you can retrieve the versions of the parts they contain before you integrate the workarea into the release.

Automatic pruning enables you to delete all versions of workareas after you have integrated the most current version of the workarea into a release. You can indicate whether you want automatic pruning of workareas by doing one of the following:

Select **Automatic version pruning** on the Create Releases window when you create the release.

C:\> Use the `+autopruning` flag with the release command.

These options tell TeamConnection to destroy workarea versions when a user integrates a workarea or commits a driver to the release. Be aware that when workareas are destroyed, most of their change tracking information is also destroyed and it will be more difficult for you to go back to previous versions.

Maximum committed output versions: You can also indicate the maximum number of committed build output versions you want kept. When that number is reached, TeamConnection discards the oldest one. Otherwise, all build outputs are saved. You can set the maximum committed build output versions by doing one of the following:

Specify the number you want kept in the **Maximum number of output versions** field on the Create Releases window.

C:\> Use the `-outputVersions` flag in the release command.

Controlling database size manually

If you choose not to use autopruning to control database size, you can still prune your releases manually as follows:

1. From the Actions menu, select **Release→Prune**.
2. In the **Name** field of the Prune Release window, type the name of the Release you want to prune.
3. In the **Branch point** field of the Prune Release window, type the name of the first version of the workarea you want to prune and then select **OK.** This version and all versions created from it will be deleted.

Sharing parts between releases

TeamConnection has a coupling mechanism that enables two releases to share the exact same parts. You can enable this mechanism by linking the parts in one release to another release. Once a part is shared, then any changes that you make to it in one release must also be made in the other release.

When you create a release, you can control how tightly it is coupled to other releases with which it shares parts. You do so by selecting one of the following coupling options:

Default
When a release shares a part in common with another release, it must be checked in and checked out (or changed in any other way, such as renamed, deleted, or recreated) in both releases at the same time. To break the common link and allow the part to be changed in only one release, you have to use a force option.

With this option, you must always deliberately break links using the force option.

Loose Loose coupling allows you to break the common link between parts without using the force option. Any time you change the part in the release without specifying the common releases, TeamConnection breaks the link to the other releases. TeamConnection provides a common option that allows you to override the loose coupling and maintain links to the release.

With this option, you must always deliberately maintain links using the common option.

LooseRestr
LooseRestr coupling allows you to break the common link without using the force option and prevents you from maintaining the common link using the common option.

With this option, links are always broken and cannot be deliberately maintained.

Naming your releases

Next, decide how you are going to name the releases you create. You might want to name your releases according to the product or object you are building. For example, *prod1r1* for release 1.1 of your application, or *using1r1* for the book files for release 1.1 of your application. To make it easier on your users, continue using the basic naming convention that you are using for your components. The names you use must be unique within the family.

Planning your processes

Before you create your family's components and releases, decide what processes you are going to use during initial development.

A TeamConnection process is used to enforce a specific level of control of components and releases. TeamConnection is shipped with a set of predefined processes for both components and releases, so you provide different processes for each to follow. You can use these processes, or you can configure your own processes using some of the predefined subprocesses. "Chapter 11. Configuring component and release processes" on page 131 explains how you configure TeamConnection processes.

You probably already have a process for tracking problems as well as a process for tracking suggested improvements to your applications. If you want to continue to use those processes, determine how you can best group the TeamConnectionsubprocesses to reflect your current process. If you do not have an existing method, decide how tightly you want to control part changes and track defects and features.

The poster, *Staying on Track with TeamConnection Processes*, explains the various states that different TeamConnection objects can go through depending on the process that is being followed. You might want to study this information before you determine how you want to use TeamConnection processes.

Component processes

A component's process determines how much planning and designing is required before work on a defect or feature begins and whether the originator is required to verify that the work was done correctly.

When choosing a process for a component to follow, think about the type of data within the component. For example, the parts within one component might contain complex code that is time-consuming to fix. Before any defects or features are accepted, the work needs to be designed and sized, so the *preship* process is followed. Parts within another component contain code that is relatively easy to fix and test. The defects and features for this component do not need to be designed and sized, so the *prototype* process, which contains no subprocesses, is followed.

For components, you can require users to follow any, all, or none of the following predefined subprocesses:

dsrDefect
Design, size and review fixes to be made for defects

verifyDefect
Verify that the fixes work

dsrFeature
Design, size, and review changes to be made for features

verifyFeature
Verify that the features have been implemented correctly

The following table lists the component processes that are supplied by IBM. Each process combines a set of TeamConnection subprocesses. An `X` under the TeamConnection subprocess indicates that the corresponding process includes it.

Table 1. Shipped component processes

	TeamConnectionsubprocesses			
Shipped TeamConnectioncomponent process	**dsrDefect**	**dsrFeature**	**verifyDefect**	**verifyFeature**
default		x	x	x
development		x		
emergency_fix				
maintenance			x	x
preship	x	x	x	x
prototype				
test		x	x	x

Release processes

A release's process determines to what extent part changes are tracked and the procedure for integrating changed parts into a build. Release processes control the day-to-day work that is involved in producing the product-fixing defects and implementing features, as well as building the product. The type of process control you want to enforce on a release is likely to change over time.

For releases, you can require any, all, or none of the following predefined subprocesses:

track This subprocess is TeamConnection's way of relating all part changes to a specific defect or feature and a specific release. Each workarea gathers all the parts modified for the specified defect or feature in one release and records the status of the defect or feature. The workarea moves through successive states during its life cycle. The TeamConnection actions that you can perform against a workarea depend on its current state.

You must use the track subprocess if you want to use any of the other release subprocesses.

approval
This subprocess ensures that a designated approver agrees with the decision to incorporate changes into a particular release and electronically signs a record. As soon as approval is given, the changes can be made.

fix This subprocess ensures that as users check in parts associated with a workarea, an action is taken to indicate that they have completed their portion. When everyone finishes, the owner of the fix record (usually the component owner) can change the fix record to complete. The parts are then ready for integration.

driver A driver is a collection of all the workareas that are to be integrated with each other and with the unchanged parts in the release at a particular time. The driver subprocess allows you to include these changes incrementally so that their impact can be evaluated and verified before additional changes are incorporated. Each workarea that is included in a driver is called a driver member.

test The test subprocess guarantees that testing occurs prior to verifying that the fix is correct within the release.

Another level of control is to use release process attributes, which alter the automatic state changes applied to a workarea.

trackfixhold
With the trackfixhold attribute and the fix subprocess a workarea will remain in the fix state rather than moving to the integrate state when the final `Fix -complete` command has been issued. To move the workarea to integrate state, issue a `Workarea -integrate` command.

trackcommithold
With the trackcommithold attribute a workarea will remain in the commit state when

- a `Driver -complete` command is issued for a release with a driver subprocess.
- the final `Fix -complete` command is issued for a release without a driver subprocess and with the fix subprocess.
- the `WorkArea -integrate` command is issued for a release without a driver subprocess and without the fix subprocess.

To move the workarea to test state, issue a `Workarea -test` command.

tracktesthold
With the tracktesthold attribute and the test subprocess a workarea will remain in the test state rather than move to the complete state when the final test is marked. To move the workarea to complete state, issue a `Workarea -complete` command.

To add these attributes to your release process, add the following to your relproc.ld file and then reload it.

```
track_test|trackfixhold
track_test|trackcommithold
track_test|tracktesthold
```

See "Chapter 21. Configuring component or release processes" on page 219 for instructions on editing and reloading relproc.ld.

The following table lists the release processes that are supplied by IBM. Each process combines different sets of TeamConnection subprocesses. An `X` under the TeamConnection subprocess indicates that the corresponding process includes it.

Table 2. Shipped release processes

	TeamConnectionsubprocesses				
Shipped TeamConnectionrelease processes	**track**	**approval**	**fix**	**driver**	**test**
prototype					
development	x		x		x
test	x		x	x	x
preship	x	x	x	x	x
maintenance	x		x	x	x
emergency_fix	x			x	
track_only	x				
track_driver	x		x	x	
track_approval	x	x	x	x	
track_test	x		x	x	x
track_full	x	x	x	x	x
no_track					

It is important that your users understand the meaning of each process and the type of control it enforces. For example, if a stringent release process such as track_full is selected, actions have to occur in a precise order. Compare this to the no_track process where users can freely check parts in and out of TeamConnection.

How processes might change during development

TeamConnection provides different processes for components and releases. The processes you choose depend on how tightly you want to control changes and how you want to handle defects and features. Your choices, of course, will vary depending on where you are in your current development cycle. You can change your processes during a development effort to reflect different phases. For example, you might do the following:

- During the requirements gathering phase, you create a component that manages the requirements documentation. You want minimal defect or feature processing against the parts managed by this component, so you select a process, such as *prototype*, that is not strict. The release would also follow a relaxed process, such as *prototype*.
- After the requirements are settled and design work begins, you want to control changes to the requirements data but not to the rapidly evolving design data. For the requirements component, you change to a process that includes review and verification, such as the *default* process. You also create a new component to manage the design documentation and you select a process that is not strict. You continue to use the *prototype* process for the release.
- When coding begins, you change the process for the design component to one that includes review and verification, such as *development*. You also create a new component to manage the code files. Because you will be loading files into TeamConnection rapidly, you select a process that is not strict, such as *prototype*.

  You also change to a release process, such as *development*, that tracks the resolution of defects and features.
- After all the code files that are managed by a given component pass unit test, you change that component's process to one that includes review and verification, such as *default*. You also change the release process to one with tight control, such as *track_full*, so that you can carefully manage code changes.
- Ninety days before your delivery date, you change all the components to a very stringent process, such as *preship*, to ensure that all new features or defects are reviewed for impact to the delivery schedule.

Using the driver subprocess

The driver subprocess is a way to better control the building and testing of your application code. As you develop your application program, you will probably have many drivers within a release, and you can have multiple overlapping releases during a development cycle.

For example, let’s say you are developing a robot application and you send monthly updates to customers for their feedback. You do regular driver builds of your application. You use the driver subprocess to help you control the integration of changes that occur between builds. At some point during the month you cut off changes to the current release r9504 for system testing. You are then ready to create a new release called r9505. Using TeamConnection, you can link the parts in r9504 to the new release r9505. During the follow-on development work, release r9504 is still there. At the end of the month you send your final build and tested driver of release r9504 to your customers.

The following figure depicts this process graphically. In this illustration, releases are labeled r*yymm*, where *yy* represents the year (such as 95 for 1995) and *mm* represents the month (such as 04 for April). Drivers are labeled d*mdd*, where *m* represents the month (such as 4 for April) and *dd* represents the day of the month.

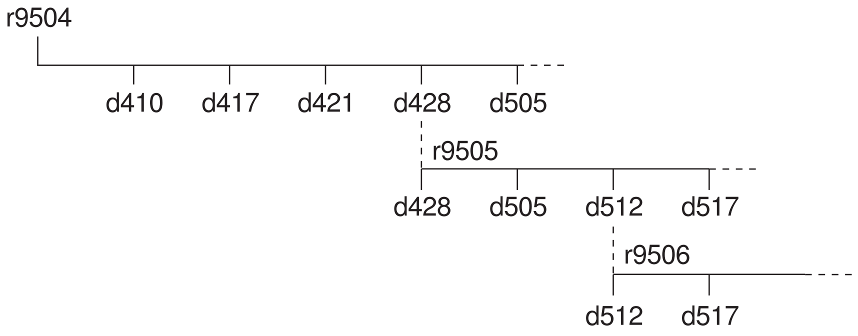


Figure 12. Using the driver subprocess

Creating components and releases

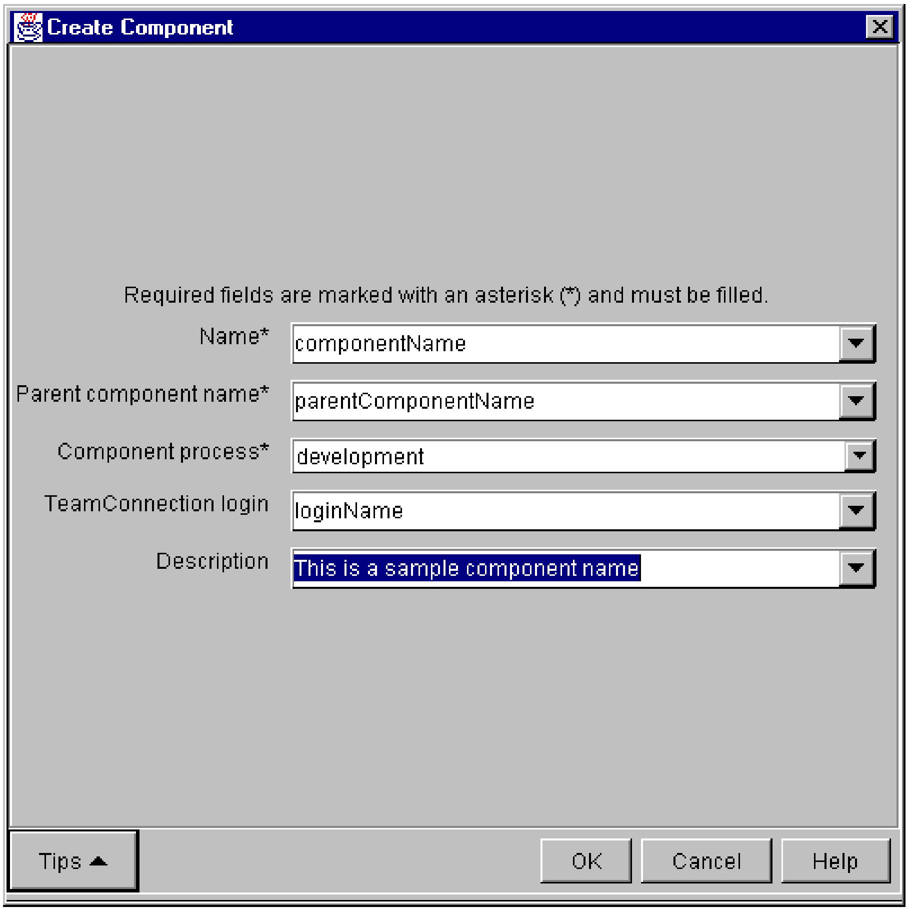
Now that you have gone through the planning phase and have your structure on paper, you are ready to create the components and releases that your organization will use.

Creating components

For each family you create, TeamConnection creates the top component called root. Therefore, at least the first component you create has root as the parent. Do not change the name of the root component.

To create a component, do one of the following:

1. From the Actions menu, select **Component → Create**. The Create Components window appears.



Required fields are marked with an asterisk (*) and must be filled.

Name* componentName

Parent component name* parentComponentName

Component process* development

TeamConnection login loginName

Description This is a sample component name

2. Type the component name, the name of the parent component, and the name of the process you want the component to follow. Other information on this window is optional.
3. Select **OK** to create the component.

From a command line, type:

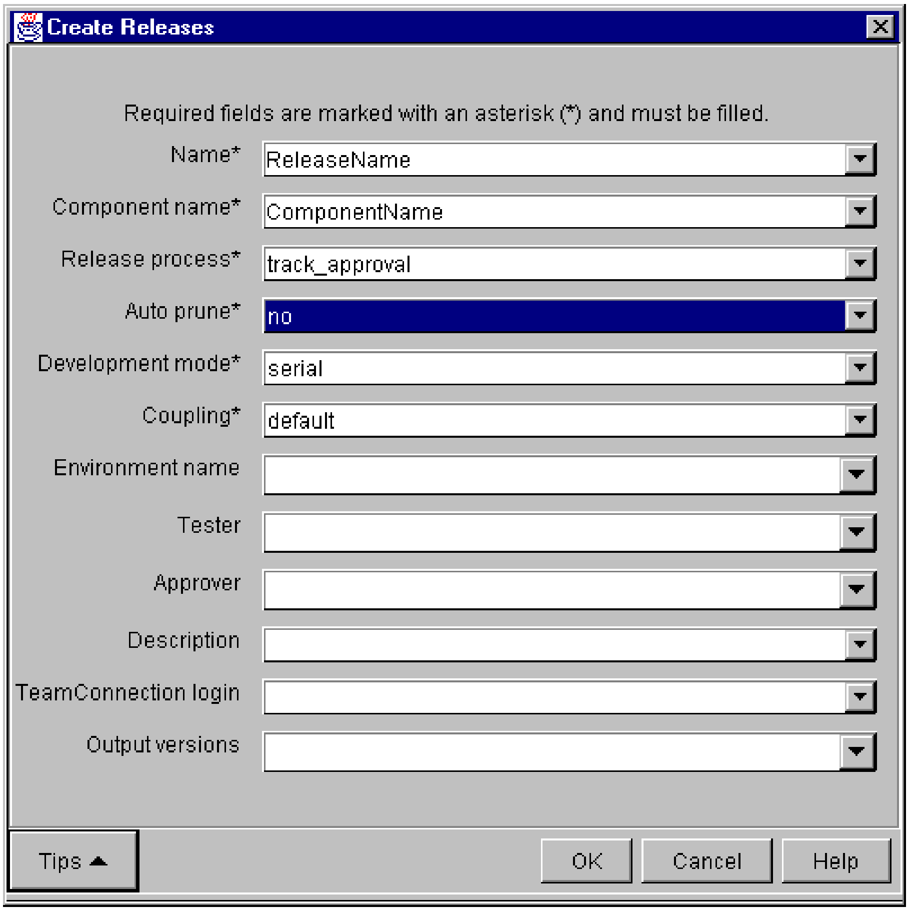
```
teamc component -create componentName -parent parentName
  -process processName
```

For more information about the component command, refer to the *Commands Reference*.

Creating releases

Before creating a release, you need to create a component to manage access to the release. See “Planning your releases” on page 75 for more information. To create a release, do one of the following.

1. From the Actions menu, select **Releases** → **Create**. The Create Releases window appears.



Create Releases

Required fields are marked with an asterisk (*) and must be filled.

Name*	ReleaseName
Component name*	ComponentName
Release process*	track_approval
Auto prune*	no
Development mode*	serial
Coupling*	default
Environment name	
Tester	
Approver	
Description	
TeamConnection login	
Output versions	

2. Type the release name and the name of the managing component, and select the process you want the release to follow. See “Release processes” on page 80 for more information about release processes.
3. To enable automatic pruning of workarea versions, select **yes** in the **Auto prune** field. See “Automatic pruning of workareas” on page 77 for more infomration about automatic pruning.
4. Select either **serial** or **concurrent** in the **Development mode** field. See “Selecting serial or concurrent development” on page 76 for more information about the development mode of a release.

   After the mode is set to concurrent, you can change it to serial mode only if all workareas and drivers in the release are committed. You can change the development mode from serial to concurrent at any time.
5. Select **default, loose,** or **looseRestr** in the **Coupling** field. See “Sharing parts between releases” on page 78 for more information about release coupling options.

   All other fields are optional and many of them are related to the release process you have selected.
6. Select **OK** to create the release.

C:\>

From a command line, type:

```
teamc release -create releaseName -component componentName
  -process processName [-concurrent] [+autopruning]
  [-outputVersions number] [-coupling default|loose|looseRestr]
```

For more information about the release command, refer to the *Commands Reference*.

Creating a new release from an old release

A TeamConnection family contains the work of many individuals for one product or project. Within that family, several releases can be created.

For example, currently, a team is working in the release robot_control. After this team finishes with the current edition of the robot project, the next team might work on a follow-on release of the robot product. That team could create a new release called robot_v2 in which to work. Another possibility is a team that wants to implement the robot_control program on a different type of robot (similar to developing the same application for a different operating system). The team could create a release called robot_mk5 in which to work. These various releases in a family are used to isolate changes to a similar code base.

These examples illustrate that the various releases in a family will often share a code base from another release. Administrators can link releases in order to share code between the linked releases.

For example, to create a new release called robot_v2 that links to release robot_control, do the following using either the GUI or command line interface:

1. Create the new release robot_v2.
2. Create a workarea.
3. Link the existing robot_control release to the new release robot_v2 using the workarea that was just created.
4. Integrate the workarea with the new release.

Changing the development mode of a release

You can change the development mode from serial to concurrent at any time. You can change it from concurrent to serial mode only if all workareas and drivers in the release are committed.

C:\> To change the development mode of a release, you can issue the teamc release -modify command with the -serial or -concurrent attribute.

The following command changes the development mode of a release from serial to concurrent:

```
teamc release -modify myRelease -concurrent
```

The following command changes the development mode of a release from concurrent to serial:

```
teamc release -modify myRelease -serial
```

Chapter 9. Setting up user access to a family

This chapter helps you determine how to set up user authentication for the security level in use by your family, how to identify your users to TeamConnection, and how to set up authority groups and interest groups.

Before you start defining users, make sure you have read “Chapter 4. Creating your TeamConnection family” on page 29 and understand how your TeamConnection installation implements security for families.

Planning for user authentication

Each user must have a TeamConnection login that uniquely identifies the user to TeamConnection and gives the user access to TeamConnection objects. TeamConnection uses the following terms and objects to identify users and control their access to TeamConnection information:

TeamConnection login
The name by which TeamConnection knows you and assigns access authority to you, and the name under which you issue TeamConnection commands. This name is the one specified by the TC_BECOME environment variable or on the **Become user** field of the TeamConnection settings notebook.

System login
This term is most meaningful in a multiuser environment, such as AIX, HP-UX, Solaris, or Windows NT. The system login is the ID that you use to log in to your workstation and is specified on the **System login** field of the TeamConnection settings notebook. In single-user environments, such as OS/2, the system login is the one specified by the TC_USER environment variable. In Windows 95, the system login is used if one is specified, otherwise, the TC_USER environment variable is used.

Security levels and logins

Other information that TeamConnection uses to authenticate users varies according to the security level in use by your family.

Host only

If your family uses host-only security, then each user requires a valid combination of the system login, TeamConnection login, and host name to access the family. This is the default level of security. To set up user authentication for host only security, you need to do the following

1. Create a login for each user as described in “Creating logins” on page 91

2. Create a host-list entry for each login as described in “Planning for host-list security” on page 94

Host lists associate logins and host names. If you are using host-list security, each TeamConnection user has a host list that controls which logins and host names he or she can use to access TeamConnection.

If the hosts in your site use IP addresses that are assigned dynamically, then the host-only authentication level will not work. In this case, you can use the password-only authentication level.

Password only

Password-only security requires a user to log in to and log off of TeamConnection and supply a password in one of the following ways:

Select the login icon from the main toolbar.

Issue the command `teamc tclogin` from a command prompt.

When the user logs in to the family, the family sends back a token associated with that user from that client. The server checks the attached token and, if valid, performs the requested action.

Use password-only security if the hosts in your site use IP addresses that are assigned dynamically.

To set up user authentication for password-only security, you need to do the following:

1. Create logins for each user according to the instructions in “Creating logins” on page 91.
2. Create a password for each user according to the instructions in “Adding and modifying passwords” on page 93.

For information on how TeamConnection’s login manager works, see “Login managers” on page 94.

Password or host

If your family uses password-or-host security, users can either login to the family with a password or access the family with a valid host list entry. This level of security is useful for teams in which particular team members may be remote or mobile and have changing IP addresses. If the user supplies a valid password, then TeamConnection uses the password to admit access to the family. If the user either does not supply a password or supplies an incorrect password, then TeamConnection checks the user’s host list entry to admit access.

For information on how TeamConnection's login manager works, see "Login managers" on page 94.

None

If your family does not use any level of security (if you specified **None** for the security-level option), users can access TeamConnection from any client without entering a password. Though all TeamConnection users need a login to access the family, when the security level is None, TeamConnection does not require the login to have a password or a host list entry.

Use this authentication level with caution and only when absolutely necessary. For example, if the superuser forgets his or her password and the authentication level is password only, then the superuser can stop the family, change the authentication level to None, restart the family, modify the password, stop the family, change the authentication level back to password only, and restart the family. Do not use this authentication level for normal operations.

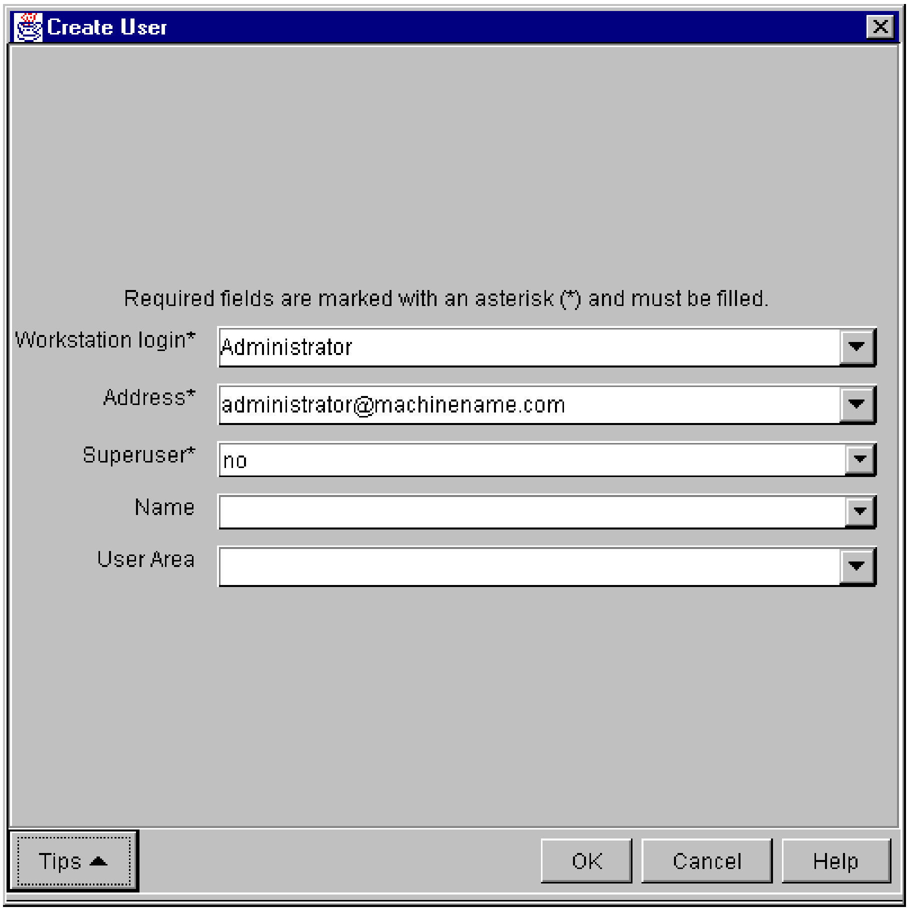
Creating logins

You can use a number of methods to assign logins to your users. For instance, you can have each user's TeamConnection login match the user's system login. This is easy to do because each user already has a system login. This method can be ideal if your users use the same login across their different systems, but it's confusing if they do not. For example, if Chris Wright has access to two workstations and logs in to one as *chris* and the other as *wright*, then identifying all the objects that belong to Chris Wright is more complicated. If you use this method, when a user moves on to another project, you will have to transfer the ownership of objects from that user to another user. Using this method can make additional work for you on a project where people move around a lot.

Another method is to assign logins according to the roles that people have, such as proj_lead, writer1, tester_mvs, and manager. When you use this method, ownership remains the same when people leave the project. However, it can be more difficult to identify the person who owns a particular login. For example, it is easier to identify Chris Wright as the user of the login *cwright* than it is to identify him as the owner of the login *writer1*.

You must have superuser or admin authority to create logins. To create a new login in TeamConnection, do one of the following:

1. Select **User → Create** from the Actions menu. The Create User window appears.



Required fields are marked with an asterisk (*) and must be filled.

Workstation login* Administrator

Address* administrator@machinename.com

Superuser* no

Name

User Area

2. Type the user's login and electronic mailing address. Other information on this window is optional.

   If the mail address you enter in this window is unreachable from the server, you will receive an error message.For more information, select **Help** from the Create User window.
3. Select **OK**.

From a command line, type:

```
teamc user -create -login login -name name -address mailAddress
```

For more information about the user command, refer to the *Commands Reference* book.

Superuser privilege is granted to one login when a TeamConnection family is created. This privilege is required so that at least one person has privileged access to the family to perform special tasks, such as creating and deleting other logins. The person with superuser privilege can perform all possible actions in your TeamConnection family. This is an authority level that you definitely want to limit to only a very few individuals. In fact, individuals who have a superuser login should also have another login that has less authority, which is the login they will use when doing their normal work. The user can switch between the two logins by setting the **Become user** option in their TeamConnection settings (or by changing the TC_BECOME environment variable).

To give a user superuser privilege, include the `+super` flag with the user command, or set the **Superuser** field to **yes** when creating a user. When creating superuser logins, you might want to begin the login with `su_`. This prefix provides an easily identifiable flag for logins with superuser privilege. You must have superuser privilege yourself in order to give this authority to someone else.

Note: If you are using password security, you must add a password to the user's login. "Adding and modifying passwords" provides more information. If you are using host-list security, you must add at least one host address entry to the user's host list to enable TeamConnection to recognize a new user. "Planning for host-list security" on page 94 provides more information.

Planning for password security

If your family uses password-only or password-or-host security, then you need to create a password for each TeamConnection login.

Adding and modifying passwords

If you are using password-only or password-or-host security, you will need to modify the logins you have created to add passwords to them. To add or modify a user's password, follow these steps:

1. Select **User → Modify → Password** from the Actions menu. The Modify Password window appears.
2. Type the login in the **Login** field.
3. Type the password in the **New password** and **Verify password** fields.
   Note: The default minimum password length is 8 character. To determine if the minimum password length for a family is something other than the default, check the **Required** page of the properties notebook for the family.
4. If you are modifying an existing password, type the old password in the **Old password** field.
5. Select the **OK** push button.

From a command line, type:

```
teamc user -modify -login login -password password
```

For more information about the user command, refer to the *Commands Reference*.

Login managers

To enable users to execute as many commands as possible without authenticating before each command, they must log into the family server under one of the following conditions:

- The server is running in password-only mode.
- The server is running in password-or-host mode, and the user is attempting to access the server from a host that is not defined in a host list for that user.

When the user logs in, the server generates a token for that user, and each TeamConnection command authenticates itself to the server by passing that token to the server. When the user logs out, the server discards the token and will no longer accept it. In order to ″remember″ the token for each client command issued, the client automatically starts a login manager to perform the login operation and to remember the token.

When the user issues a TeamConnection command, the command requests the token from the login manager and then forwards the token to the server. When the user logs out of the family server, the login manager exits normally.

On single-user operating systems, only one login manager will ever be running, but on multiuser systems, such as AIX, HP-UX, Solaris, and Windows NT, by default, one login manager will run for each user logged into a family. Running multiple login managers can strain resources. To avoid this situation, the superuser can start a global login manager that will act as the login manager for every user.

The global login manager must be started by root (UNIX platforms) or someone with system administrator authority (Windows NT) and with TeamConnection superuser authority. To start the global login manager, execute the following command:

```
teamc tclogin -START_TCLOGINMGR
```

To stop the global login manager, execute the following command:

```
teamc tclogin -KILL_TCLOGINMGR
```

Planning for host-list security

When host-list security is in effect, each login is associated with a host list, which is a list of client machine addresses from which the user can access TeamConnection when using that login. Users must have at least one entry on their host lists so that TeamConnection will recognize them as valid users.

A user named Chris Wright has the following TeamConnection responsibilities:

- Develops code for a product
- Performs superuser tasks for the family in which the product is developed
- Supervises builds of the product

Chris has a workstation with the TCP/IP host name *cwright.company.com.* This workstation is used for Chris's daily programming activities and for superuser activities. For day-to-day programming work, Chris uses the TeamConnection login *cwright* from host name *cwright.company.com.* For superuser activities, Chris uses the TeamConnection login *su_cwright* from host name *cwright.company.com.* For build activities, Chris has access to a workstation with the TCP/IP host name *build.company.com.* Chris logs into build.company.com as *cwright* and extracts files from TeamConnection as user *build.* To enable Chris to perform each of these activities with the proper TeamConnection authority, Chris needs the following TeamConnection host list entries:

Table 3. Host list entries for a sample user

System login	**Host name**	**TeamConnection login**
cwright	cwright.company.com	cwright
cwright	cwright.company.com	su_cwright
cwright	build.company.com	build

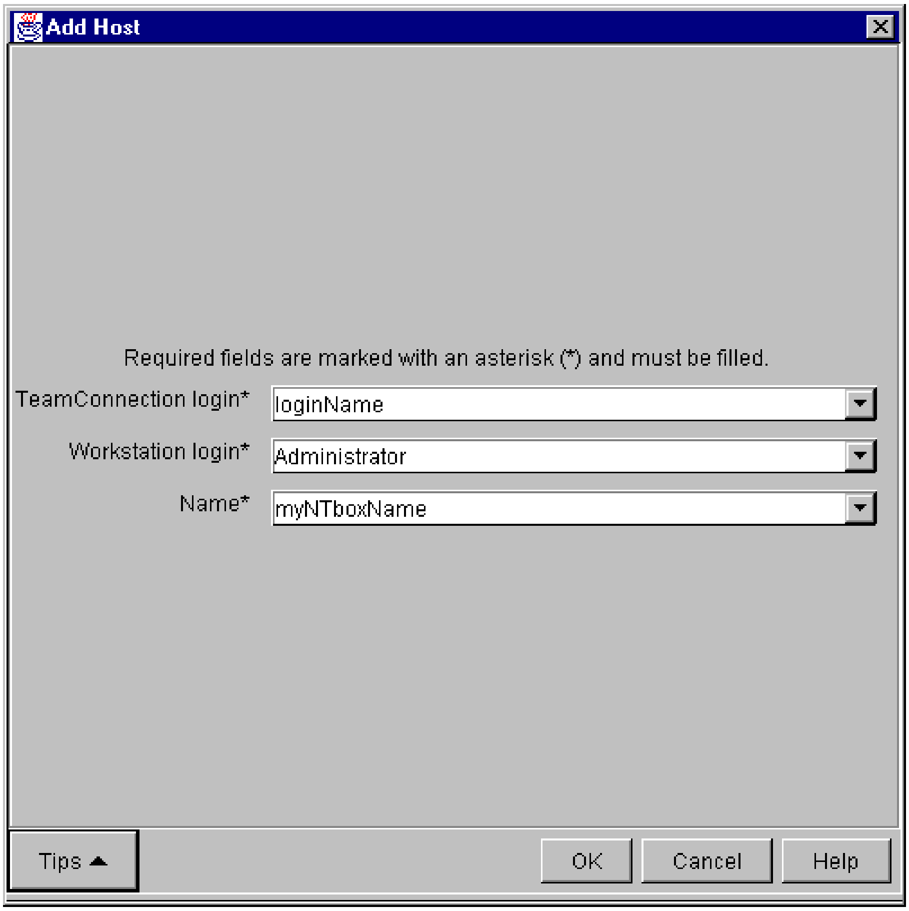
With these host list entries, Chris can do the following:
- Access TeamConnection as login cwright to perform daily programming tasks from workstation cwright.company.com.
- Access TeamConnection as login su_cwright to perform superuser tasks from workstation cwright.company.com.
- Access TeamConnection as login build to perform build activities from workstation build.company.com.

A superuser or someone with admin authority must create the initial host entry for a user. After the initial entry is created, users can add host list entries for themselves. Additional entries in a host list let a user access TeamConnection from other client machines.

Creating host list entries

The initial host list entry for each user must be created by someone with superuser or admin authority. To create a host list entry in TeamConnection, do one of the following:

1. Select **User → Host → Add host** from the Actions menu. The Add Host window appears.


Add Host

Required fields are marked with an asterisk (*) and must be filled.

TeamConnection login* loginName

Workstation login* Administrator

Name* myNTboxName

2. Type the TeamConnection login, the system login, and the name of the client machine from which the user will access TeamConnection.
3. Select **OK**.

From a command line, type:

```
teamc host -create login@hostName -login login
```

The login value following -create is the system login (TC_USER) with the host name appended to it, while the -login attribute flag is the TeamConnection login (TC_BECOME). The value of the user's login is case sensitive, so type it exactly as it was typed when the user was created.

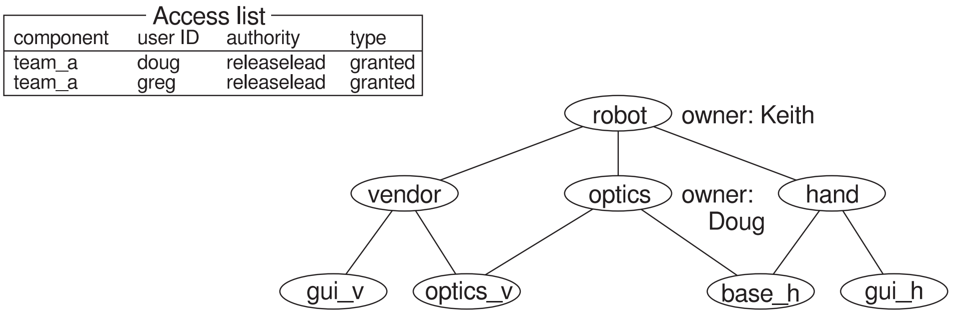
For more information about the host command, refer to the *Commands Reference*.

Setting up authority groups

As soon as a TeamConnection login and a password (for password security) or host list entry (for host-list security) are created for a user, that user automatically has the authority to perform certain basic actions within the family. This authority is referred to as *base authority.* Beyond base authority, authority to access TeamConnection data is managed by the components that you create. Each component has an *access list* that controls access to development data. Authority granted in an access list is called *explicit authority.* Explicit authority is inherited by descendant components. So when a user has authority to perform actions within one component, that authority is inherited for all its descendant components. Explicit authority and how it is inherited is discussed in "Granting authority to users" on page 101.

TeamConnection users also get authority to perform additional actions when they own TeamConnection objects. Authority granted by ownership is called *implicit authority.* Because this authority is inherited, you need to be careful when assigning component ownership and when granting access authority to your users.

Figure 13 shows Doug as the owner of the optics component. As owner, Doug has the implicit authority to perform most TeamConnection actions against the objects that are managed by the optics component. Doug wants Greg to be able to perform many of the same actions, so he gives him explicit releaselead authority through the component's access list. Because authority is inherited by descendant components, Doug and Greg have releaselead authority in the optics_v and base_h components.



Access list

component	user ID	authority	type
team_a	doug	releaselead	granted
team_a	greg	releaselead	granted

Figure 13. Granting authority to other users

Look at your component hierarchy before granting access authority. Do you want that user to have the authority to perform the same set of actions in all of the descendant components? If the answer is no for only one or two of the components, you can restrict the user from inheriting authority for those components. See "Granting or restricting access" on page 103 for instructions on restricting access to a component. If the answer is no for many of the descendant components, you might not want to give the user that level of authority.

What are the TeamConnection authority levels?

The authority to perform various TeamConnection actions is based on four types of authority levels: base authority, implicit authority, explicit authority, and superuser privilege. These types of authority are described as follows. For a summary of the authority required for performing TeamConnection actions, refer to "Appendix A. Authority and notification for TeamConnection actions" on page 235.

Base authority
All users defined to TeamConnection have authority to perform the following actions:
- Open defects and features
- Modify the information for their login
- Display information about any login
- Add notes to existing defects and features
- Search for information within TeamConnection to create reports (some information may be filtered out if you are not authorized to see it)

Implicit authority
Many TeamConnection objects, such as a component, part, or defect, have an owner. The object owner automatically receives authority to perform certain actions. For example, when a defect is opened, the owner has the authority to accept the defect or reassign ownership of the defect. Similarly, the owner of a component, a release, or a feature has authority related specifically to those objects. Sometimes authority is given based on an action the user takes. For example, when someone checks a part out of TeamConnection, that person is given the authority to check it back in.

Explicit authority
Some users need additional authority to perform actions against objects that they do not own. For example, users other than the component owner will need to check parts out of TeamConnection. The component owners give additional authority to users by adding their names to the component's access list.

When a user is assigned to be the owner of a component it is a good idea to give explicit componentlead authority to that user. In that way, the user can grant the componentlead authority to other users. Otherwise, the owner of a component cannot grant the componentlead authority to others.

See "Granting authority to users" on page 101 for more information about access lists.

Superuser privilege

A user with TeamConnection superuser privilege can perform any TeamConnection action. Only an individual with superuser privilege can add, delete, or recreate a login, as well as grant superuser privilege to another user. Only a few users in your organization should have this privilege.

See page 92 for information about granting this privilege.

What are authority groups?

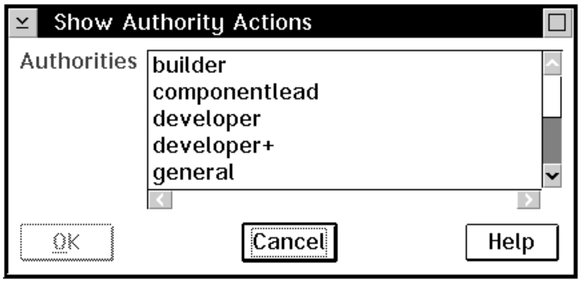
There are many actions that users can perform against TeamConnection objects. It would be tedious to grant one action at a time to each of your users. Instead, you can grant a user the authority to perform a group of actions, called an *authority group*. For example, the managers of a project might want to view only the status of certain TeamConnection objects, while the developers need to view objects and also check in, check out, and extract parts. You can grant access to an authority group for either of these jobs.

The family administrator is responsible for the authority groups that your organization uses. TeamConnection ships with a set of default authority groups. Determine whether these meet your needs or whether you need to change them. As your organization grows and as your needs change, you will probably want to revise your authority groups.

Displaying authority groups

If you do not know what authority groups your organization uses, you can either display the groups on the Show Authority Actions window:

1. Select **Lists → Access → Show Authority Actions** from the Actions menu. The Show Authority Actions window appears.



2. To see a list of the actions that are contained in a group, highlight one or more group names, and then select **OK**.

Creating or modifying authority groups

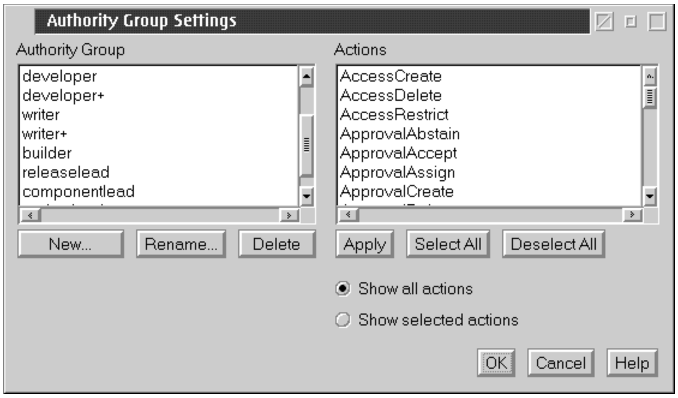
When a family is first created, the authority table contains default values for authority groups. If the default authority groups are not adequate for your development organization, you can create new authority groups or modify existing groups. Authority groups can be created or modified at any time during your development cycle.

First, decide what group of actions the intended users are required to perform. If there is a shipped authority group that closely matches your needs, you might want to modify that group or use it to prime a new group with actions. To help you keep track of the authority groups that the family uses, add the name of each authority group you create to the worksheet provided in “Appendix B. Worksheets” on page 253.

We recommend you use the family administrator to create or modify authority groups; however, if you prefer to do this manually, see page 227.

Before you do this task, we recommend that you stop the family server (see page “Stopping the servers” on page 43 for instructions).

1. From the **Family** menu, select **Properties**. The properties notebook appears.
2. Select the **Groups** page and then select the **Settings** push button under Authority to display the authority group settings.



3. Do one of the following:
   - To change an existing group, highlight the group from the **Authority Group** list, and then select or deselect the appropriate actions from the **Actions** list.
   - To create a new group, follow these steps:
     a. Select the **New** push button and type the name of the new group in **New Authority Group** field.
     b. To prime the new authority group with actions from an existing group, select a group from the **Prime with Actions from** list.

        This step initializes your new authority group with the same actions in the group you select. After the new group is created, you can use the Authority Group Settings window to change the actions or add actions to the group.
     c. Select the **OK** push button to save your new group.
   - To delete a group, select it from the **Authority Group** list and then select the **Delete** push button. When the conform delete window appears, select **Yes**.
   - To rename a group, follow these steps:
     a. Select a group from the **Authority Group** list.
     b. Select the **Rename** push button.
     c. Type a new name in the **New name** field of the Rename Authority Group window, and then select the **Apply** push button.
4. When you finish making changes to your notebook pages, select **OK** to save your changes and exit from the notebook.

   The changes will not take effect until you start the family server.

Granting authority to users

Each component has an access list that controls access to development data. Each entry in an access list contains a login, the name of an authority group, and whether the authority is granted or restricted for that access group. A user whose login appears in the component's access list either has authority to perform any action or is restricted from performing any action listed in the specified authority group. A login can appear in a component's access list more than once.

There are three actions you can perform on the entries on a component's access list:
- Add a new granted entry to the access list. This action grants a user a certain level of authority to access the component.
- Add a new restricted entry to the access list. This action blocks a user from a certain level of authority to access the component.
- Remove an entry from the access list. This action removes a user's granted or restricted authority to access the component. This action can have one of the following effects:
  – If the user has only one entry in the component's access list and has no inherited access to the component, then all access is rescinded.
  – If the user has another entry in the access list or has inherited access to the component, then that user's access is controlled by the other entries or by entries in the parent component's list.

Restricting a user from an authority group is useful when a user has inherited access that you want to rescind. If login doug, for example, has releaselead access to component optics, and if component base_h is a child of component optics, then doug also has inherited releaselead access to component base_h. TeamConnection allows you to restrict doug's releaselead access to base_h, so that doug no longer has that level of access to the component. You can also create another access list entry for doug to grant him a lower level of access, developer, for example, to base_h. Such actions would result in an access list as follows:

Component	**Login**	**Authority**	**Type**
base_h	doug	releaselead	restricted
base_h	doug	developer	granted

Before you grant access authority to users, you should understand the following:
- Each component has only one access list.
- The authority groups in the access list must exist in the family.
- Each entry on an access list grants or restricts one user's authority to perform the actions in the specified authority group for the development data managed by that component.
- The authority granted on an access list also grants the specified authority to the user for any descendant components unless the authority has been explicitly restricted from any of those components.

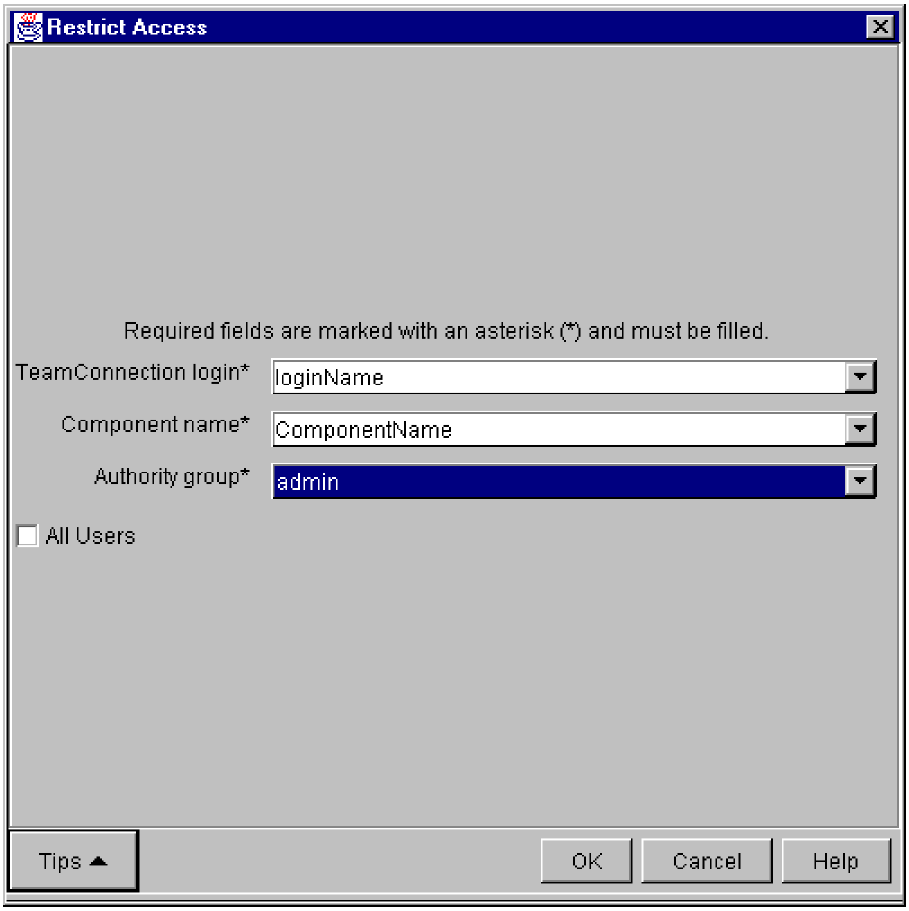
- The total authority a user has is based on the combination of the different authority groups that are associated with the user. For example, a user that has been granted developer+ and writer authority can perform all the actions listed in those groups.

  You can create new authority groups that will build on existing groups. For example, you might create a group called creator that contains two actions: compCreate and releaseCreate. You could then grant certain users creator authority that would give them this additional authority without duplicating actions that are in their other groups.
- Only the following users can grant or restrict access authority:
  - A superuser
  - The component owner
  - Users with accessCreate or accessRestrict authority
- You cannot grant authority greater than the authority that you have for a component. For example, if you have releaselead authority for the component optics, you cannot grant componentlead authority to another user. However, if you had componentlead authority, you could grant that same authority to another user.
- A user with superuser authority can grant any authority to any user on any access list.

Granting or restricting access

To grant or restrict access, do one of the following:

1. Select **Lists** → **Access** from the Actions menu, and then select either **Add** or **Restrict**. The Add Access or Restrict Access window appears.



Required fields are marked with an asterisk (*) and must be filled.

TeamConnection login* loginName

Component name* ComponentName

Authority group* admin

All Users

2. Type the name of the component and the logins of the users, and then select the authority group that you want to add them to or restrict them from.
3. Select **OK**.

From the command line:
- Use the access -create command to grant authority.
- Use the access -restrict command to restrict authority.

For example, to give writer authority to a user with a login of bruce for component robot_dev, type the following command:

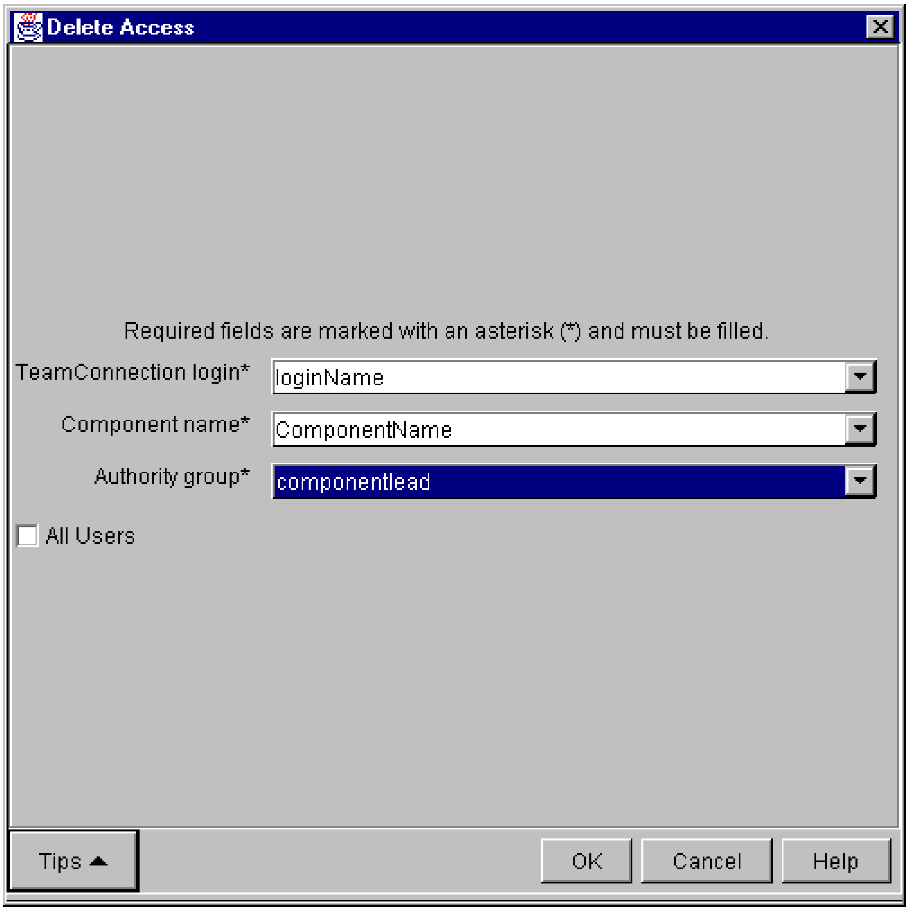
```
teamc access -create -login bruce -authority writer -component robot_dev
```

For more information about the access command, refer to the *Commands Reference* book.

Removing an entry from an access list

To remove an entry from an access list, do one of the following:

1. Select **Lists** → **Access** → **Remove** from the Actions menu. The Remove Access window appears.



Required fields are marked with an asterisk (*) and must be filled.

TeamConnection login* loginName

Component name* ComponentName

Authority group* componentlead

All Users

2. Type the name of the component, the logins of the users, and then select the authority group that you want to remove from the access list.
3. To remove all users from the component's access list, select the **All Users** checkbox.
4. Select **OK**.

Use the access -delete command to remove an entry from an access list. For example, to remove the entry that grants writer authority to a user with a login of bruce for component robot_dev, type the following command:

```
teamc access -delete -login bruce -authority writer -component robot_dev
```

Setting up report security

You can restrict users' access to certain TeamConnection reports by enabling report access checking. With this option, TeamConnection checks a component's access list before allowing a user to view a component, defect, feature, or part. Only users who are granted authority in an authority group that includes the CompView, DefectView, FeatureView, and PartView actions can view reports for the component.

Report access checking is available for the following views. For more information about these views, refer to the *Commands Reference.*

View name	Menu access	Command-line access
CompView	Objects→Components→Components	teamc report -view CompView
DefectView	Objects→Defects→Defects	teamc report -view DefectView
FeatureView	Objects→Features→Features	teamc report -view FeatureView
PartView	Objects→Parts→Parts	teamc report -view PartView
PartFullView	Objects→Parts→PartFull	teamc report -view PartFullView
PartsOutView	Objects→Parts→PartsOut	teamc report -view PartsOutView
BPartView	(not available from GUI)	teamc report -raw -view BPartView

To set up report access checking, do the following:

1. Set the environment variable TC_REPORT_CHECKACCESS=1.

   You can turn off report access checking by setting this environment variable to 0.
2. To give report access to a user, open the component's access list and add an entry for that user in an authority group with CompView, DefectView, FeatureView, or PartView authority.
3. To restrict report access for a user, either remove the user's entry from the access list, add a restricted entry for an authority group with CompView, DefectView, FeatureView, or PartView authority, or change the authority group to one without CompView, DefectView, FeatureView, or PartView authority.

See "Granting or restricting access" on page 103 and "Removing an entry from an access list" on page 104 for instructions on adding and removing entries from access lists.

Setting up interest groups

TeamConnection notifies users when certain actions are performed on certain objects. Notification messages are sent to an electronic mailing address that is specified when the user's login is created. (See "Setting up the mail facility" on page 40 for more information.)

Some notification is automatic. For example, a user receives notification when someone adds the user's login to an access list.

Users can receive additional notification. For example, a manager might want to be notified whenever a defect is opened against a component. The component owner can explicitly request that TeamConnection send the manager notification.

Each component has a *notification list* that controls who is notified of what actions. Notification is inherited by descendant components. When a user is to be notified that a specific action occurred within one component, that user will also be notified when that action occurs in any of the descendant components. Unlike authority, notification cannot be restricted for a specific component.

What are the TeamConnection interest levels?

Notification for TeamConnection actions is based on two types of interest levels: implicit notification and explicit notification. These types of interest are described as follows. For a summary of the interest levels for specific TeamConnection actions, see "Appendix A. Authority and notification for TeamConnection actions" on page 235.

Implicit notification
: Many TeamConnection objects, such as a component, defect, or feature, have an owner. Other objects are treated as though they have owners under certain circumstances. For example, when a user locks a part, that user is treated as the part's owner for notification purposes. The object owner automatically receives notification when actions are performed against it. For example, when a defect is opened, the owner of the component against which it is opened is notified. Similarly, if a user locks a part and someone else with superuser authority unlocks it, the user who locked it is notified.

Explicit notification
: Some users need additional notification for objects that they do not own. For example, project managers might want to know when defects are closed for all components even when they do not own all components. The component owners give additional notification to users by adding their names to the component's notification list.

See "Working with notification lists" on page 110 for more information about notification lists.

What are interest groups?

There are many actions that users can be notified of. It would be tedious to request one action notification at a time for each of your users. Instead, you can request that a user receive notification for a group of actions, called an *interest group*. Each interest group is a group of actions that a certain type of user might want to be notified of.

For example, a developer might want to be notified when defects are opened or closed, while the lead developer needs to be notified not only when defects are opened, modified, or closed, but also when defects are sized or verified.

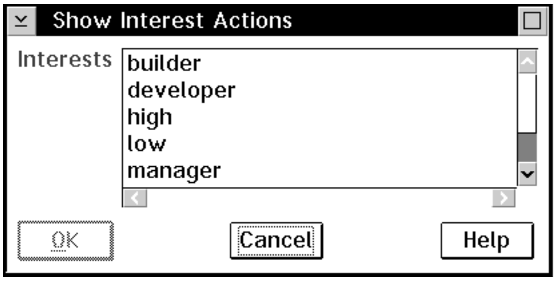
When planning for notification, you need to be familiar with what type of user is automatically notified when specific actions occur. This information is listed in "Appendix A. Authority and notification for TeamConnection actions" on page 235. Interest groups are composed of a subset of these TeamConnection actions.

The family administrator is responsible for the interest groups that your organization uses. TeamConnection ships with a set of default interest groups. Determine whether these meet your needs or whether you need to change them. As your organization grows and as your needs change, you will probably want to revise your interest groups.

Displaying interest groups

If you do not know what interest groups your organization uses, you can display the groups on the Show Interest Actions window:

1. Select **Lists → Notify → Show interest actions** from the Actions menu. The Show Interest Actions window appears.



2. To see a list of the actions that are contained in a group, select one or more group names, and then select **OK**.

Creating or modifying interest groups

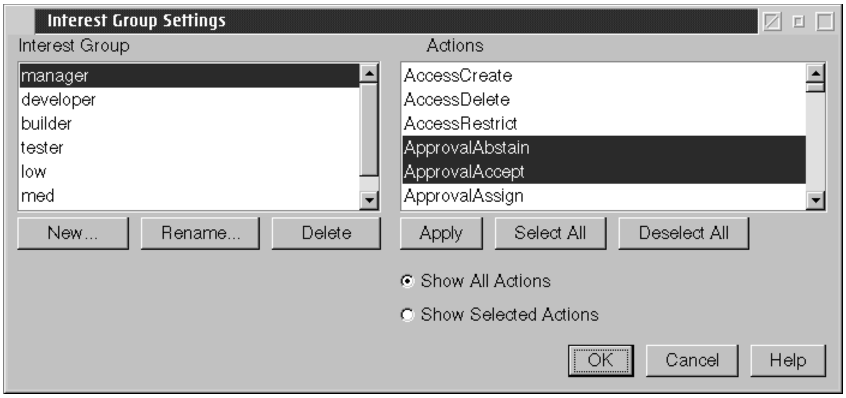
When the family is first created, the interest table contains the default values for the interest groups. If you find that the default interest groups are not adequate, you can create new interest groups or modify existing groups. Interest groups can be created or modified at any time during your development cycle.

First, decide what group of actions the intended users want to be notified of. See if there is a shipped interest group that closely matches your needs. If there is, you might want to modify that group or create a new group and prime it with actions from an existing group. To help you keep track of the interest groups that the family uses, add the name of each interest group you create to the worksheet provided in “Appendix B. Worksheets” on page 253.

We recommend you use the family administrator to create or modify interest groups; however, if you prefer to do this manually, see page 229.

Follow these steps to create or modify interest groups from the family administrator. Before you do this task, we recommend that you stop the family server (see page “Stopping the servers” on page 43 for instructions).

1. From the **Family** menu, select **Properties**. The properties notebook appears.
2. Select the **Groups** page and then select the **Settings** push button under Interest to display the interest group settings.



3. Do one of the following:
   - To change an existing group, highlight the group from the **Interest Group** list, and then select or deselect the appropriate actions from the **Actions** list.
   - To create a new group, follow these steps:
     a. Select the **New** push button and type the name of the new group in **New Interest Group** field.
     b. To prime the new interest group with actions from an existing group, select a group from the **Prime with Actions from** list.

        This step initializes your new interest group with the same actions in the group you select. After the new group is created, you can use the Interest Group Settings window to change the actions or add actions to the group.
     c. Select the **OK** push button to save your new group.
   - To delete a group, select it from the **Interest Group** list and then select the **Delete** push button. When the confirm delete window appears, select **Yes**.
   - To rename a group, follow these steps:
     a. Select a group from the **Interest Group** list.
     b. Select the **Rename** push button.
     c. Type a new name in the **New name** field of the Rename Interest Group window, and then select the **Apply** push button.
4. When you finish making changes to your notebook pages, select **OK** to save your changes and exit from the notebook.

   The changes will not take effect until you start the family server.

Working with notification lists

Each component has a notification list that controls who gets notified of what actions. Each entry in a notification list contains a login and the name of an interest group. An interest group defines the actions that each user in the group is to be notified of.

Before working with notification lists, you should understand the following:

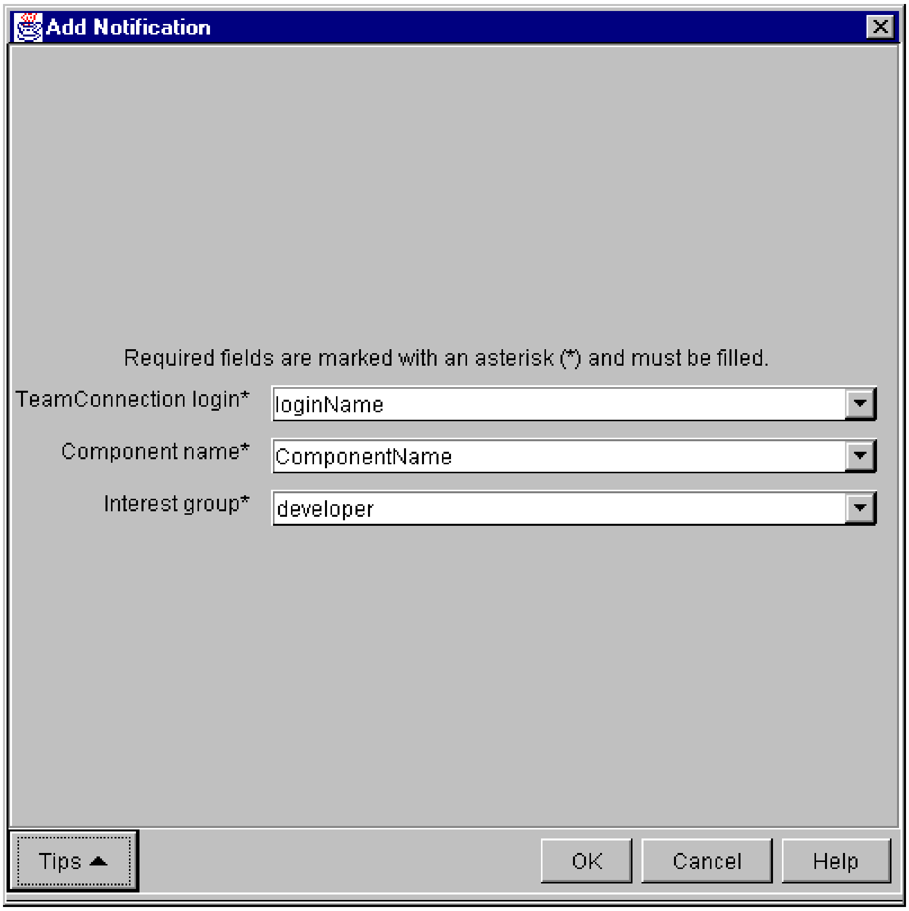
- Each component has only one notification list.
- The interest groups listed in the notification list must exist in the family.
- The total notification a user has is based on the combination of the different interest groups that are associated with the user. For example, a user that has been granted med and builder notification will receive notification on actions listed only in those groups.

  You can create new interest groups that build on existing groups. For example, you might create a group called size that contains two actions: defectSize and featureSize. You could then add certain users to the `size` group for a component to give them this additional notification without duplicating actions that are in their other groups.
- Each entry on a notification list ensures that the user will be notified when those actions in the specified interest group occur.
- The user receives notification when actions in the specified interest group occur in any descendant components.
- You cannot restrict notification as you can access authority.

Adding an entry to a notification list

To add an entry to a component's notification list, do one of the following:

1. Select **Lists → Notify → Add** from the Actions menu. The Add Notification window appears.



Required fields are marked with an asterisk (*) and must be filled.

TeamConnection login* loginName

Component name* ComponentName

Interest group* developer

2. Type the name of the component and the logins of the users, and then select the interest group that you want to add them to.
3. Select **OK**.

C:\>

From a command line, use the notify -create command. For example, to add notification to the developer interest group in the robot_dev component for the owners of logins korn and kotora, type the following:

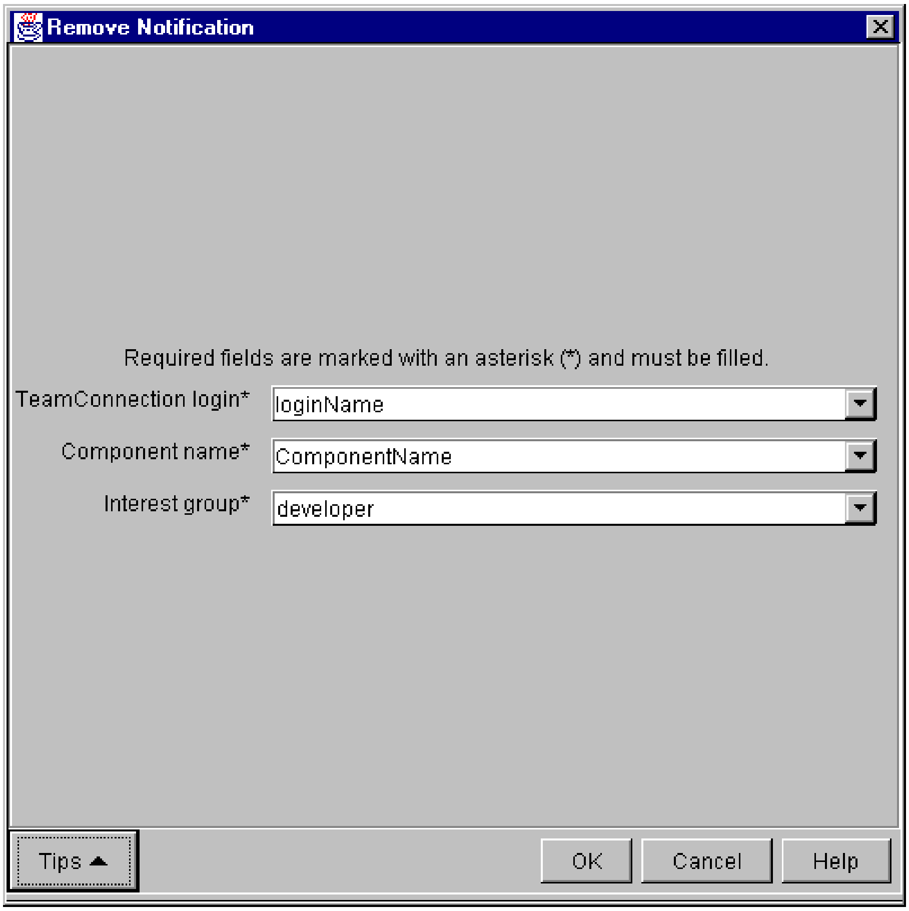
```
teamc notify -create -login korn kotora -interest developer
  -component robot_dev
```

For more information about the notify command, refer to the *Commands Reference* book.

Removing an entry from a notification list

To remove an entry from a component's notification list, do one of the following:

1. Select **Lists** → **Notify** → **Remove** from the Actions menu. The Remove Notification window appears.



Required fields are marked with an asterisk (*) and must be filled.

TeamConnection login*: loginName

Component name*: ComponentName

Interest group*: developer

2. Type the name of the component and the logins of the users, and then select the interest group that you want to remove them from.
3. To remove all users from the component's notification list, select the **All Users** checkbox.
4. Select **OK**.

From a command line, use the notify -delete command. For example, to remove notification from the developer interest group in the robot_dev component for the owners of logins korn and kotora, type the following:

```
teamc notify -delete -login korn kotora -interest developer
  -component robot_dev
```

Chapter 10. Setting up and implementing configurable fields

Many of the attributes for defects and features are configurable. TeamConnectionallows you to customize them so that they more closely match the needs of your development environment. Some examples of attributes that you can customize include the following:

Defects
prefix, phaseFound, phase inject, priority, symptom, target

Features
prefix, priority, target

“Appendix D. Configurable field types” on page 277 contains complete lists of attributes that you can customize. These are referred to as configurable fields.

You can also create and add your own configurable fields to defects, features, parts, releases, workareas,and users. For example, you might want to add a field called PubImpact to defects and features. Programmers can then use this field to notify the writing team as to whether or not a defect or feature affects the accuracy of the product documentation.

TeamConnection uses two types of objects to make configurable fields work: configurable field types and configurable fields.

A *configurable field type* defines possible values for a field, the default value, and a description of each value. Configurable field types are required only when you want to specify a list of possible values for a configurable field or a default value. They are not required if you want to create a configurable field for text entry. The configurable field type, priority, for example, which is shipped with TeamConnection, is defined as follows. This configurable field type is used to define the values for the priority field for features and defects.

Table 4. Definition of configurable field type priority

Possible values	**Description**
mustfix	Defect or feature must be resolved in this release
candidate	Defect or feature is a candidate if time permits
deferred	Defect or feature deferred to next release
easy	Defect or feature is easy to solve or implement

Table 4. Definition of configurable field type priority (continued)

Possible values	Description
moderate	Defect or feature is moderately difficult to resolve
difficult	Defect or feature is difficult to solve or implement
n/a	Priority does not apply to this defect or feature

A *configurable field* defines how the configurable field type is to be used by the object for which it is defined. A configurable field definition includes the following information:

- Whether or not the field is active
- Whether it is required or optional
- Whether you can set its value on Create or Open windows, or just modify it on Modify Property windows
- The configurable field type that defines the possible values for the field, if a field can have one value from multiple choices
- The attribute name to be used for the field on TeamConnection commands
- The label to be used for the field on Create, Open, and Modify Property windows
- The title to be used for the field in reports and in Features, Defects, Parts, Releases, Users, and Workareas windows
- Whether the owner or originator of defects, features, parts, and users can modify the field
- Whether the field is included on Defect Accept or Feature Accept windows
- Dependent relationships between configurable fields

Features and defects use the priority field type differently, for example, and the difference between the two is determined by how the configurable field is defined. The following table shows how options set for priority differ for features and defects.

Table 5. Definition of priority field in features and defects

Option	Features	Defects
Active	Yes	Yes
Required	No	No
Allow on Create/Open	No	Yes
Field Type	priority	priority
Attribute	priority	priority
Field Label	Priority	Priority
Title	Priority	Priority

If you want to create a text-entry configurable field that does not require a list of possible values or a default value, then you can create a configurable field without specifying a configurable field type. If you do want to specify a list of possible values or a default value, then you must specify a configurable field type when you create the field. If you do not want to use an existing field type, you must create the type before you create the field.

For example, if you create a PubImpact field, you might want to create a new configurable field type called `PubImpact` (the configurable field type can have the same name as the field). If you assign the attributes of `yes`, `no`, and `maybe` to this field, writers can use the GUI interface or issue a TeamConnection command to see a list of all defects or features that affect the publications. If you also add a value of `done`, the writers can indicate when they have finished updating the documentation. The following is an example of a TeamConnection command to query such a field.

C:\>

```
teamc report -view DefectView -where "PubImpact in ('done')"
```

Defining configurable field types

For the defect and feature tables, TeamConnection ships configurable field types that have defined values. You can use the default field types as is or change their attributes. For example, TeamConnection defines a field named `Severity`. This field has valid values of `1, 2, 3,` and `4` (see the table on page 277). You could add an additional value of `5`, or you could change the description of what the value `2` represents.

Note: The maximum size for the value of a configurable field type when entering single-byte characters is 15 with a maximum of 7 characters when entering double-byte characters.

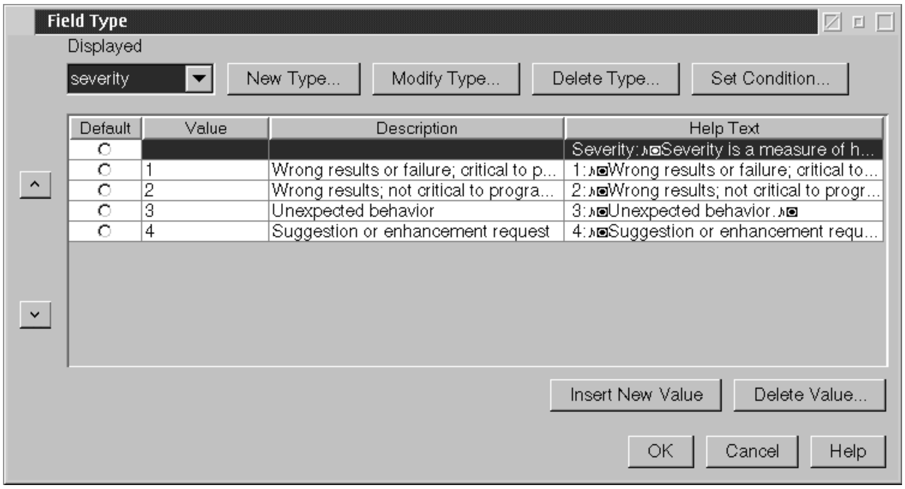
You can also create new configurable field types for the defect, feature, part, release, workarea,and user tables. This allows you to structure problem tracking information for your development environment. You can create new types or change the attributes of the existing types at any time during your development cycle. TeamConnection stores configurable field types in a file called config.ld. “Defining configurable field types” on page 207 describes the config.ld file.

It is recommended that you use the family administrator to create or modify configurable field types; however, if you prefer to do this manually, see page 207. Always backup your database before adding or changing configurable fields or configurable field types.

Note: The family administrator does not support configurable fields for TargetView and ConfigPartView. To add configurable fields to these views, follow the instructions in "Updating TargetView and ConfigPartView" on page 214.

Follow these steps to create or modify configurable field types from the family administrator. Before you do this task, stop the family server (refer to page "Stopping the servers" on page 43 for instructions).

1. Display the family icon's pop-up menu; then select **Properties**. The properties notebook appears.
2. Select the **Configurable Fields** page.
3. Under the section labeled **Configurable Field Types**, select the **Settings** push button to open the Field Type window. The following figure shows the Field Type window.



Default	Value	Description	Help Text
○			Severity:♪◙Severity is a measure of h...
○	1	Wrong results or failure; critical to p...	1:♪◙Wrong results or failure; critical to...
○	2	Wrong results; not critical to progra...	2:♪◙Wrong results; not critical to progr...
○	3	Unexpected behavior	3:♪◙Unexpected behavior.♪◙
○	4	Suggestion or enhancement request	4:♪◙Suggestion or enhancement requ...

4. From this window, you can do the following:
   - To create a new field type, follow these steps:
     a. Select the **New Type** push button beside the **Displayed** list to open the New Field Type window. Type a name for the new field type.

        The name cannot exceed 15 characters (7 for DBCS) and cannot contain spaces.

        The name that you specify becomes a column name for the DB2 database table for any object (defect, feature, part, release, user, or workarea) that you add the field type to as a configurable field. DB2 requires that all column names be unique. You cannot, therefore, use any name that is already defined as a column for the table. The DefectView table, for example, has a column named ″state.″ This column records the current state of a defect (open, working, closed, canceled, and so on). You cannot add another configurable field called ″state″ to the DefectView table.

        Refer to the appendix of the *Commands Reference* for a list of column names defined for defects, features, parts, releases, users, and workareas.

     b. Use the **Resolve by Matching** radio buttons to determine the rules for specifying values for the field type. Select one of the following:

        A unique name value
        Only one value can be specified for the field.

        Multiple name values
        One or more values can be specified for the field.

        An Expression
        The value specified must match specific rules (6–digit numeric value, for example) defined for the configurable field type. This option is available only on UNIX platforms. See "Defining regular expressions" on page 120 for an example of how to specify a UNIX regular expression.

your changes and close the window.

Defining regular expressions

This section applies to UNIX platforms only.

Instead of setting specific values for configurable field types, you can set rules for the format of values that can be entered for configurable fields. You do this by specifying a UNIX regular expression for the value of the configurable field type.

A UNIX regular expression sets limits on the type of characters (letters or numbers, for example), the length, and any required special characters for the value of a configurable field. The following gives examples of shipped configurable field types that are regular expressions and explains how to interpret them:

Configurable field type	Regular expression	Meaning
serial	ˆ[0-9]\{6\}$	The value entered for the configurable field must contain six numerals: • The characters ˆ and $ enforce the field length of the value that users can enter for the configurable field. • [0-9] indicates that valid characters for the value are 0 through 9. • \{6\} indicates that the value contains six digits.

Configurable field type	Regular expression	Meaning
phone	ˆTL-[0-9]\{3\}-[0-9]\{4\}$	The value entered for the configurable field must be a phone number with the format TL-PPP-NNNN, where P and N are numerals: • The characters ˆ and $ enforce the field length of the value that users can enter for the configurable field. • TL- indicates that the phone number must begin with the characters ″TL-″. • [0-9]\{3\}- indicates that the first three digits must be numerals between 0 and 9 followed by -. • [0-9]\{4\} indicates that the last four digits must be numerals between 0 and 9.

Refer to your UNIX operating system reference for information on specifying UNIX regular expressions.

Defining dependent relationships between configurable field types

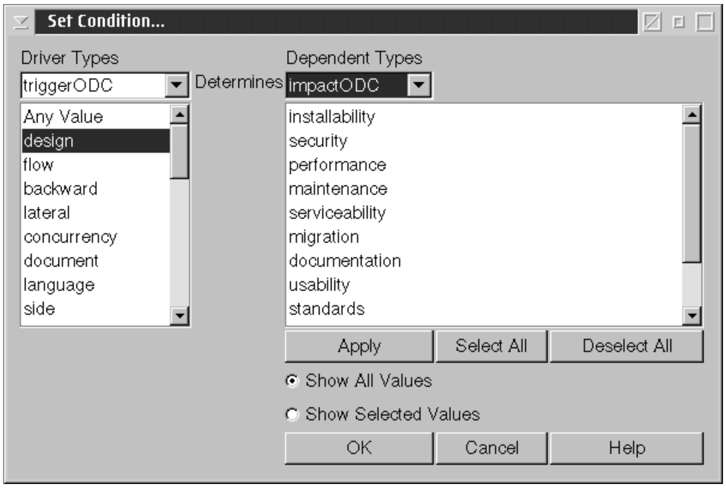
You can set up dependencies between configurable field types. A dependency relationship between configurable field types enables you to use one configurable field type to constrain the values that can be set for another configurable field type. In this type of relationship, one configurable field type is the driver and the others are its dependents.

One example of using dependent configurable field types is for setting values for a company's division and department numbers. You can define a configurable field type called *division* as a driver. The range of values that can be set for its dependent field type, *department* is constrained to departments that are part of the division number to which the field *division* has been set.

Note: You can define dependent relationships between any shipped configurable field type except the defect configurable fields, prefix and severity and the feature configurable field, prefix. These can be defined as driver types only.

To define a dependent relationship between two configurable field types, follow these steps:

1. Display the family icon's pop-up menu; then select **Properties**. The properties notebook appears.
2. Select the **Configurable Fields** page.
3. Under the section labeled **Configurable Field Types**, select the **Settings** push button to open the Field Type window.
4. On the Field Type window, select the **Set Condition** push button. The following figure shows the Set Condition window.



5. From the Driver Types field, select a configurable field type to be the driver; then, in the list box below the Driver Types field, select the specific value of the field that will control the values of the dependent type.
6. From the Dependent Types field, select the dependent configurable field type; then, in the list box below the Dependent Types field, select the values that are valid for the driver value you selected. Select the **Apply** button to save your changes.
7. Repeat these last two steps until you have set up all the dependent relationships you need, then select the **OK** push button to save your changes.

Defining configurable fields

Default configurable fields are shipped by IBM and are installed when the TeamConnectionserver is configured. If you do not want to use these defaults, you can change them at any time after the family database is created.

The following conditions apply to the use of configurable fields:

- Defect, feature, part, release, workarea, and user objects can have up to 20 configurable fields each.
- Fields for defect and feature objects are effective on open, accept, and modify actions. Fields for part, release, workarea and user objects are effective on create and modify actions.

- You can use the data from configurable fields to search the database and display information in reports, but TeamConnection does not use the data. For example, if you have a field called PubImpact, TeamConnection cannot change the state of a defect based on the value of this field, but users can sort all defects and features by whether or not they impact the publications.
- When you add fields, TeamConnection displays them on the GUI like any predefined field. However, the help information for configurable fields for the GUI and the commands do not reflect your new or changed fields.
- Whenever you create or modify a configurable field, your client users need to do one of the following to make the new field appear on the GUI:
  - Close the GUI and reopen it
  - Use the settings notebook to change the family and then change it back

  Refreshing the GUI in this way is particularly important if the new field is required. Otherwise, your users will receive errors, but will have no way to enter information in the required fields.
- The data type for all configurable fields is character.

Creating and modifying configurable fields

We recommend you use the family administrator to create or modify configurable fields; however, if you prefer to do this manually, see "Part 5. Using the server command-line interface" on page 197.

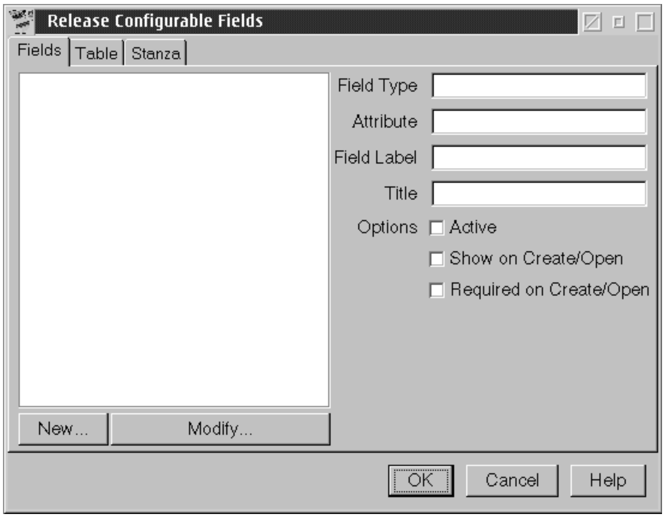
Follow these steps to create or modify configurable fields from the family administrator. Before you do this task, stop the family server (refer to page "Stopping the servers" on page 43 for instructions).

1. Display the family icon's pop-up menu; then select **Properties**. The properties notebook appears.
2. Select the **Configurable Fields** page.

   The Configurable Fields section of this page has a list box from which you can select the following objects: Defect, Feature, Part, Release, Workarea,and User.
3. Select one of these objects and then select the **Settings** push button to open the configurable field settings for that object.

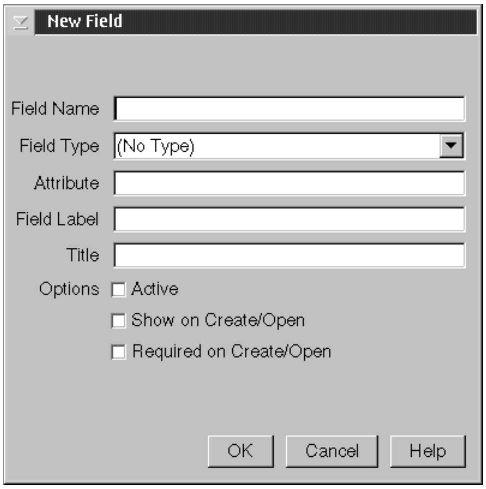
   This window has three notebook pages that you can use to do the following:

Fields	Define configurable fields to be used for the object.
Table	Define the table report for the object.
Stanza	Define the stanza report for the object.

4. Select the **Fields** page of the configurable fields window.

   From this page, you can do the following:
   - To create a new configurable field, follow these steps:
     a. Select the **New** push button under the list of configurable fields to open the New Field window.

The changes do not take effect until you start the family server.

Displaying configurable field properties

To display the properties of the active configurable fields for an object, type one of the following commands from a prompt:

C:\>

- `teamc defect -configInfo -family` *familyName* `[-raw]`
- `teamc feature -configInfo -family` *familyName* `[-raw]`
- `teamc part -configInfo -family` *familyName* `[-raw]`
- `teamc release -configInfo -family` *familyName* `[-raw]`
- `teamc user -configInfo -family` *familyName* `[-raw]`
- `teamc workarea -configInfo -family` *familyName* `[-raw]`

These commands show you exactly what has been defined and let you verify that the fields were loaded correctly.

If the -raw flag is used, the information is organized in a fixed ASCII table format as follows:

```
Field Label|Title|Attribute|DB Column Name|Create|Required|Field Type|
OwnerMod|OrigMod|ShowOnAccept|ReqOnAccept|Driver
```

Note: The properties of both the `Prefix` and `Severity` configurable fields are displayed for defects, whereas only the `Prefix` field is displayed for features.

Changing report formats

TeamConnection users can view or print reports about an object. When you create a field, TeamConnection adds the new field to the report. You can choose the field information that you want to present to the user and the place on the report where the information appears.

Reports are displayed in two formats: stanza and table. The following sections describe these formats and explain how you can change them using the Family Administrator GUI.

Note: The family administrator does not support modifying reports for TargetView and ConfigPartView. To modify these reports, follow the instructions in “Updating TargetView and ConfigPartView Reports” on page 218.

The stanza report

Figure 14 on page 126 shows an example of a stanza report. Each line in the report represents one or more attributes of the object.

From the client interface, select **Defects → View** from the Actions pull-down menu. When the View Defect Information window appears, type the defect name.

To display the report from a command prompt, type the following command. This example displays information about defect 3168.

```
teamc report -view DefectView -where "name='3168'" -stanza
```

The following is an example of a stanza report:

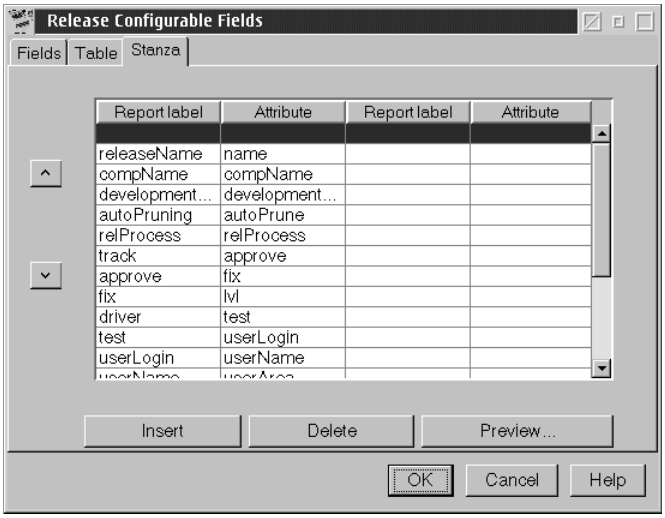
```
prefix        d
name          3168
reference     testcase_099
abstract      Compilation error occurred.
duplicate

state         open                       priority
severity      2                          target        driver_020
age           9

compName      demoComponent              answer
release       demoRelease                symptom       compile_failed
envName                                  phaseFound    prototyping
level         level_019                  phaseInject

addDate       93/04/01 11:32:47          assignDate    93/04/04 18:45:41
lastUpdate    93/04/13 11:54:15          responseDate  93/04/03 11:29:59
endDate
ownerLogin    annHar                     originLogin   martin
ownerName     Ann Harrison               originName    Martin Karland
ownerArea     Development                originArea    Testing

developer     johnDoe
```

Figure 14. Sample stanza report displayed after adding configurable fields

We recommend you use the family administrator to change the stanza report formats; however, if you prefer to do this manually, see page 214.

Follow these steps to change the position of the field, or to change or delete the format specification from the family administrator. Before you do this task, stop the family server (refer to page “Stopping the servers” on page 43 for instructions).

1. Display the family icon's pop-up menu; then select **Properties**. The properties notebook appears.
2. Select the Configurable Fields page.
3. Select the object whose report format you want to change and then select the **Settings** push button.
4. Select the **Stanza** page of the configurable fields window.



Report label	Attribute	Report label	Attribute
releaseName	name		
compName	compName		
development...	development...		
autoPruning	autoPrune		
relProcess	relProcess		
track	approve		
approve	fix		
fix	lvl		
driver	test		
test	userLogin		
userLogin	userName		
userName	userArea		

5. Do one of the following:
   - The columns labeled **Report label** are input fields. You can either type into these fields to change the report labels, or select a configurable field type to display in these fields.
   - The columns labeled **Attribute** specify the configurable field types you want displayed. You can either type into these fields, or select a configurable field type to display in these fields. To select a configurable field type, do the following:
     a. Select the field.
     b. Select the drop-down button to display a list of configurable field types.
     c. Select the type you want to use.

     The number of characters that are displayed in the **Report label** and **Attribute** columns of the stanza report varies according to how you use them:
     – If you select a configurable field type for the first column and leave all remaining columns blank, there is no limit to the number of characters that will display in the stanza report.
     – If you select a configurable field type to display in both columns, the first column is limited to 25 characters and the second column to 20.
     – If you select a configurable field type to display in the second column and leave the first column blank, the second column is limited to 20 characters.
   - Use the **Insert** push button to add blank lines into which you can insert new fields.
   - Use the **Delete** push button to remove a field from the report. This button removes all fields on the selected line. If the line defines fields in columns one and three, then both fields are deleted.
6. Use the up and down arrow buttons to change the position of a line.

changes and exit from the notebook.

Note: When changing the Part stanza format, only the partView table is changed, not the partFullView table. To manually change the partFullView table, see page 214.

Refer to Appendix A in the *Commands Reference* if you are not familiar with the differences between these two views.

The changes do not take effect until you start the family server.

The table report

Figure 15 is an example of a table report. Each row of the table represents a different object, and the value of each attribute for that object is displayed in columns.

The following is an example of the command to display the report.

```
teamc report -view DefectView -where "name='3168'" -table
```

The following is an example of the table format for defects. This example shows a table report to which a `developer` field has been added.

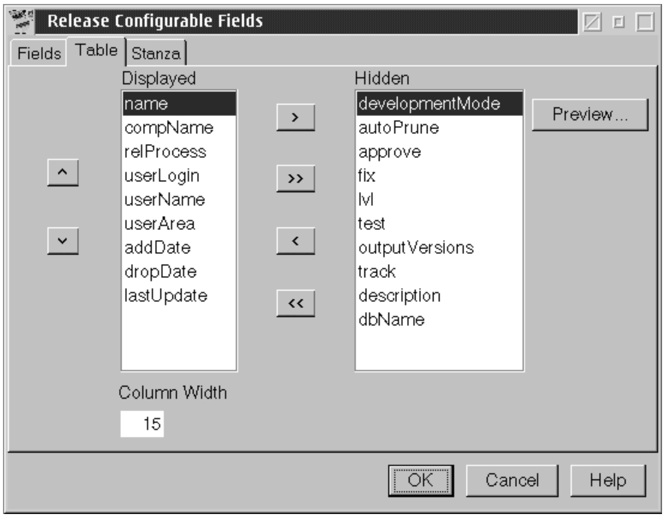
```
pref name     compName       state    originLo ownerLog sev age prio abstract          developer
---- -------- -------------- -------  -------- -------- --- --- ---- ----------------- ---------
d    3168     demoComponent  open     martin   annHar   2   009      Compilation error johnDoe
```

Figure 15. Sample table report displayed after adding configurable fields

It is recommended that you use the family administrator to change the table formats; however, if you prefer to do this manually, see page 214.

Follow these steps to change the columns you want displayed, their position in the table, or the width of the columns. Before you do this task, stop the family server (refer to page “Stopping the servers” on page 43 for instructions).

1. Do one of the following from a server machine to display the TeamConnection Family Administrator window:
   - From the TeamConnection Group folder on the desktop, double-click on the **Family Administrator** icon.
   - Type `tcadmin` from a prompt.
2. Display the family icon's pop-up menu; then select **Properties**. The properties notebook appears.
3. Select the Configurable Fields page.
4. Select the object whose report format you want to change and then select the **Settings** push button.
5. Select the **Table** page of the configurable fields window.



6. Do one of the following:
   - To change the position of a column, select it and then select the up or down arrow repeatedly until the column name is in the correct position.
   - To remove a column from the table, select the column label from the **Displayed** list box and then select the right arrow button to move the column to the **Hidden** list box.
   - To add a column to the table, select the column label from the **Hidden** list box and then select the left arrow button to move the column to the **Displayed** list box. The label is placed at the bottom of the list; you can change its position.
   - To move all columns between the **Displayed** and **Hidden** list boxes, use the double-left and double-right arrow buttons.
   - To change the width of a column, select the column label and then select the up or down arrow in the **Column width** field.
7. When you finish making changes to your notebook pages, select **OK** to save your changes and exit from the notebook.

Note: When changing the Part table format, only the partView table is changed, not the partFullView table. To manually change the partFullView table, see page 214.

Refer to Appendix A in the *Commands Reference* if you are not familiar with the differences between these two views.

The changes do not take effect until you start the family server.

Chapter 11. Configuring component and release processes

TeamConnection is shipped with several predefined processes for both components and releases. If these processes do not meet the needs of your development organization, you can create your own processes. You do this by combining some of the predefined subprocesses that IBM provides.

This chapter explains how you configure new processes or change existing processes. If you are not familiar with TeamConnection processes and how they are used, read “Planning your processes” on page 79.

Planning your changes

Consider the following before configuring your processes:

- To avoid confusion for end users, do not modify processes after they are in use. If you must add or delete subprocesses in an existing process, consider instead creating a new process.
- Do not delete a process that is being used by any component or release in your family.
- Changes to processes do not take effect until one of the following occurs:
  - A component or release is modified using the process name
  - A component or release is created using the process name

The processes shipped by IBM are explained to your users in on-line help. Any processes you configure are not explained in on-line help. Therefore, you will need to provide this type of information to your users.

Tables are provided in “Configurable processes worksheets” on page 264 for you to record the processes you configure.

Modifying or creating configurable processes

Your first step in configuring a process is to give the process a name. The name you choose can be up to 15 characters in length with no blanks, tabs, or vertical separators. To help you keep track of the processes that you configure for your family, add the name of each process you create to the worksheet provided in “Configurable processes worksheets” on page 264.

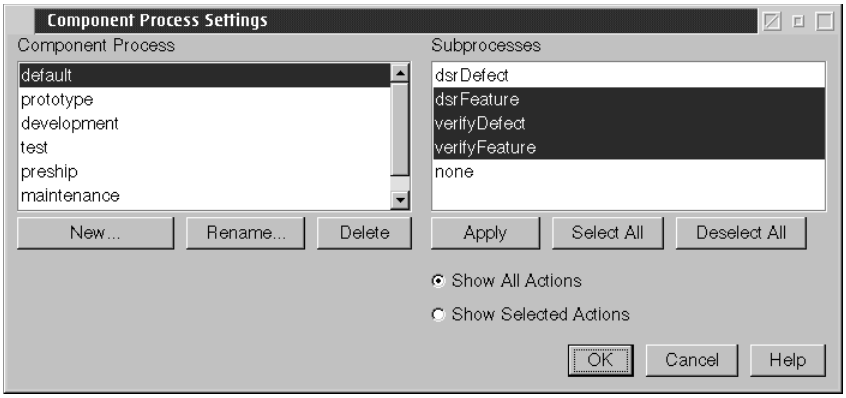
We recommend you use the family administrator to modify or create configurable processes; however, if you prefer to do this manually, see page 219.

Follow these steps from a server machine to configure component or release processes from the family administrator. Before you do this task, we recommend that you stop the family server (refer to page “Stopping the servers” on page 43 for instructions). The changes you make do not take effect until you restart your family.

1. Do one of the following to display the TeamConnection Family Administrator window:
   - From the TeamConnection Group folder or the **Start** menu on the desktop, double-click on the **Family Administrator** icon.
   - Type `tcadmin` from a command prompt.
2. Display the family icon's pop-up menu, then select **Properties**. The properties notebook appears.
3. Select **Processes**.

   This page of the family properties notebook provides access to two windows: one for defining release processes and one for defining component processes. To open one of these windows, select one of the **Settings** push buttons.

   Use the **Release Process Settings** window and the **Component Process Settings** window to define processes and subprocesses for releases and components defined in your family. Complete the fields on these windows as follows.


Component Process Settings

Component Process: default (selected), prototype, development, test, preship, maintenance

Subprocesses: dsrDefect, dsrFeature (selected), verifyDefect (selected), verifyFeature (selected), none

[✓ Show All Actions] Show Selected Actions

   - To see the default subprocesses defined for each release or component process, select a process name from the **Release Process** or **Component Process** list. The subprocesses included will appear highlighted in the **Subprocesses** list.
   - To add or delete subprocesses for an existing process, follow these steps:
     a. Select a process from the **Release Process** or **Component Process** list.
     b. To add or delete a subprocess, select it from the **Subprocesses** list.
     c. To save your changes, select the **Apply** button.
   - To create a new process, follow these steps:
     a. Select the **New** push button, type the name of the new process in New Release Process or New Component Process window, and then select the **OK** push button.
     b. From the **Subprocesses** list, select the subprocesses you want to include in the new process.
     c. To save the new process, select the **Apply** push button.
   - To delete a process, select it from the **Release Process** or **Component Process** list and then select the **Delete** push button. When the confirm delete window appears, select **Yes**.
   - To rename a process, follow these steps:
     a. Select a process from the **Release Process** or **Component Process** list.
     b. Select the **Rename** push button.
     c. Type a new name in this **New name** field of the Rename Release Process or

changes and exit from the notebook.

Chapter 12. Providing user exits

TeamConnection provides a highly configurable set of processes so that you can adapt the tool to your specific needs. However, there are many cases where you might want to make further process adjustments or add automated steps. User exits allow you to enhance the TeamConnection processes to perform tasks like the following:
- Ensuring that code files meet formatting requirements, such as the including keywords that identify the name and version of the file
- Creating a new defect when a verification record is rejected on a current defect
- Analyzing a build failure and removing any workareas from a driver that include changes to files that failed to compile (if the build fails the driver remains in restrict state, however if it succeeds the driver can be committed)
- Ensuring that the right information is in a sizing record before it is accepted
- Automatically generating management reports when a driver is committed

This chapter describes user exits, how to use them, and how to implement them for each TeamConnection family. User exits are not necessary for the operation of TeamConnection; they are optional and can be configured for each family.

With user exits, you can specify additional actions that you want performed before completing or proceeding with a specific TeamConnection command action. A user exit enables the TeamConnection server to call a user-defined program during the processing of TeamConnection actions. The program can be an executable file or a command file. Thus, you can use TeamConnection as a trigger to start non-TeamConnection processing. You can also use user exits to restrict certain TeamConnection actions based on external considerations. For example, you might have a user exit scan C source files to ensure that the source code conforms to the standards defined by your development process.

TeamConnection provides two ways to register user exits. You can use the **User Exits** page of the family administrator to specify the following:
- The action you want to add a user exit to
- The point at which the user exit is to be triggered (before, during, or after the action or if the action fails)
- The name of the user exit program
- The name of an environment file containing parameters to be passed to the user exit program

This information is stored in a file called userExit. You can also edit the userExit file directly to provide this information. For instructions on editing the userExit file directly, see "Chapter 22. Setting up user exits" on page 223. The recommended way to register user exits, however, is through the family administrator.

User exits are provided for most TeamConnection actions. The actions that support user exits are listed in "Appendix E. User exit parameters" on page 289.

Registering user exit programs

When you register a user exit program with TeamConnection, you provide the following information:

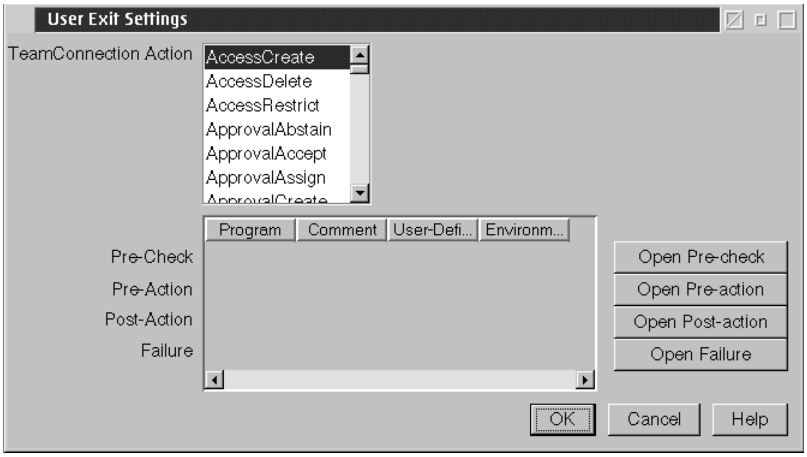
- The action you want to add a user exit to
- The point at which the user exit is to be triggered (before, during, or after the action or if the action fails)
- The name of the user exit program
- The name of an environment file containing parameters to be passed to the user exit program

You can provide this information to TeamConnection using the **User Exits** page of the family administrator.

When you want TeamConnection to start a user exit, you must associate the user exit program with TeamConnection actions. We recommend you use the family administrator to associate the actions with the program; however, if you prefer to do this manually, see 223.

Before you do this task, we recommend that you stop the family server (refer to page "Stopping the servers" on page 43 for instructions). The changes you make to the user exit settings do not take effect until you restart the family server.

1. Select the family and then select **Properties** from the Family menu. The properties notebook appears.
2. Select the **User Exits** page and then select the **Settings** push button to open the User Exit Settings window.



3. Select the action that you want to associate the user exit with, then select one of the following push buttons at the bottom of the settings window to specify when you want the user exit to start.

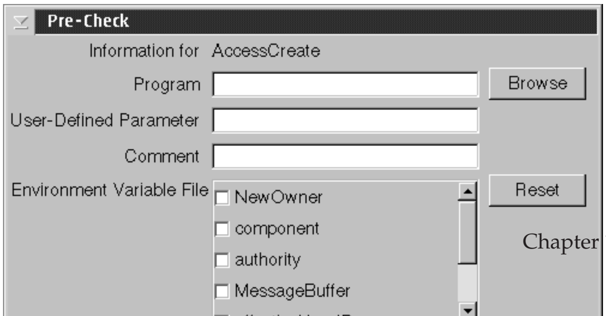
   Open Pre-check
   To execute the user exit before any initialization or access checking takes place

   Open Pre-action
   To execute the user exit after all checks are made and TeamConnection is ready to process the action

   Open Post-action
   To execute the user exit after the action is completed and all database or library updates have been committed

   Open Failure
   To execute the user exit when a previous user exit with an exit ID of 0 or 1 is not successful, or when the action is not successful. The user exit program executed after a failure can clean up what the other user exit programs started

   Selecting one of these push buttons opens a window that you can use to specify the program and parameters to use for the user exit. The following is an example of the Pre-Check window. The Pre-action, Post-action, and Failure windows have the same fields.



changes and close the windows.

Environment file

The environment file is a temporary binary file containing the name and value for all parameters to be passed to a user exit from a TeamConnection. It is created when the user exit is started. The parameters to be passed are selected from one of the following user exit windows:

- Pre-check
- Pre-action
- Post-action
- Failure

Each time a user exit is started, a temporary environment file is generated and the name of the file is passed to the user exit as the second positional parameter. Therefore, the user exit program has direct access to the data in the environment file. The name of each parameter is now known to TeamConnection. This allows the administrator to specify each parameter to be passed in the environment file by name.

One of the parameters that is of particular interest to administrators is something called ″configurable fields″. There are a predetermined number of configurable fields in TeamConnection. An administrator can turn these fields on or off, as well as change their names. TeamConnection allows the administrator to get the value of any configurable field by name (just like any other parameter). When the administrator checks for the value of a specific configurable field in the environment file, he or she gets a zero length value if the user did not specify that configurable field when the TeamConnection action was invoked.

The following is what happens when a TeamConnection user issues a command for which a user exit has been written:

1. The TeamConnection server gathers the information required by the user exit, including the parameters selected for the environment file and their values, into a newly created temporary environment file.
2. The user exit program is called and is passed the user-defined parameter string, the name of the environment file, and all of the parameters defined for the user exit.
3. The user exit program opens the environment file, searches for a parameter by name, reads the length of the parameter value, then reads the value.

You need to include in your user exit program the code for searching and reading the environment file. TeamConnection is packaged with sample user exits viewexit.c, viewexit.ksh, viewexit.cmd and teamcenv.c that demonstrate how to access the environment file. Specifically, teamcenv.c is a tool that searches the environment file for a specific parameter name and returns the value of that parameter. “Appendix E. User exit parameters” on page 289 contains a list of parameter names used for the environment file.

The userExit file

TeamConnection stores the values you enter into the user exit windows in a file called userExit in the config directory of TC_DBPATH. The following is the format of the userExit file:

```
ActionName WhenInvoked UserExitName UserDefinedParameters EnvironmentFileParameters Comm
```

ActionName
The TeamConnection with which the user exit is associated (corresponds to **TeamConnection Action** on the User Exit Settings window.

WhenInvoked
The point in processing the action when the user exit program is called. The userExit file identifies when the user exit is to be invoked by the numerals 0, 1, 2, 3, as follows:

In userExit file	Corresponds to
0	Pre-check
1	Pre-action
2	Post-action
3	Failure

UserExitName
The full path name of the user exit program (corresponds to **Program** on the Pre-check, Pre-action, Post-action, or Failure windows).

UserDefinedParameters
The user defined parameter string passed as the first parameter to the user exit program (corresponds to **User-Defined Parameter** on the Pre-check, Pre-action, Post-action, or Failure windows). TeamConnection adds quotation marks to the parameter when it writes it to the userExit file. If your user exit is written in REXX, you need to strip these quotation marks. The sample program samples\viewexit.cmd performs this process. You can use viewexit.cmd as a model.

EnvironmentFileParameters
The list of parameters, specified by name, to be included in the environment file when it is passed to the user exit program (corresponds to **Environment Variable File** listbox on the Pre-check, Pre-action, Post-action, or Failure windows). When a user does not

enter a value in an optional GUI field or command line parameter, the user exit puts ″″ in its place. If your user exit is written in REXX, you need to strip these quotation marks. The sample program samples\viewexit.cmd performs this process. You can use viewexit.cmd as a model.

Comment
A comment describing the user exit (corresponds to **Comment** on the Pre-check, Pre-action, Post-action, or Failure windows).

The following shows two sample lines from a userExit file:

```
PartAdd 0 copyrightCheck "1991 1992" # sample 1
PartAdd 0 copyrightCheck "1991 1992" ENV=(component,release) # sample 2
```

The first entry (sample 1) invokes the user exit ″copyrightCheck″ before TeamConnection performs any verification checks (0) for the part creation command (PartAdd). It is passed the user-defined parameter ″1991 1992″. The second entry (sample 2) includes a list of parameters to be selected from an environment file and passed to the user exit program.

Writing user exit programs

When you write user exit programs, you need to account for the following:

- When a user does not enter a value in an optional GUI field or command line parameter, the user exit puts "" in its place. This is also true for user-defined parameters. This is According to the calling conventions of most high-level languages like C and DOS batch, TeamConnection adds quotation marks to parameters before passing them to the user exit program. If your user exit is written in REXX, you must strip these quotation marks. The sample program samples\viewexit.cmd provides a model for doing this.
- Positional parameters that pass true or false values, such as **Break common link** (force flag), return the following:

True	1
False	0

- A nonzero return code from a user exit program for Pre-check and Pre-action (exit ID 0 or 1) terminates the TeamConnection command. Nonzero return codes do not affect TeamConnection commands for Post-action or Failure (exit ID 2 or 3).

Follow these guidelines when you write user exit programs:

- Not all TeamConnection commands can be used in a user exit. Some may cause a database deadlock to occur.
- User exit programs do not permit user interaction (for example, from a user exit program, you cannot prompt a user with a read command).

- Define only one user exit program for each TeamConnection action and exit ID combination. If you define more than one program, TeamConnection uses the last one you define.
- You are limited to a total of 40,000 bytes of total output from all user exits, plus warnings, for each TeamConnection action (except teamc report and -view actions).
- Limit the length of time that the user exit program runs.

Sample user exit programs

TeamConnection is shipped with the following sample user exit programs:

samples/teamcenv.c
A program that lets you read the entire environment file and display the contents of each variable stored, or extract the value of a specific variable based on the name. It can be called from viewexit.c or any user exit programs written in C.

samples/viewexit.c, samples/viewexit.ksh, and samples/viewexit.cmd.
A program that displays the output of a user exit, identifying the user exit command, the environment file, the user-defined parameter, and each of the positional parameters. Also, parameters that are null or were truncated because they would make the command string too long are identified. There is also a function that was derived from teamcenv (above) to display the contents of the environment file (if one was specified). Each of these samples shows the following information:
- Parameter 0: Executable name
- Parameter 1: User defined parameters
- Parameter 2: Environment variable file name (generated by TeamConnection and deleted automatically after the daemons are brought down)

The samples are provided in C, Korn shell, and REXX.

The list of available user exits and their parameters can be viewed by a superuser issuing the following command:

```
teamc report -userExitInfo
```

Adding the -long flag will also display the user exits currently configured and the environment variables to be written to the environment file.

Chapter 13. TeamConnection shadows

C:\> TeamConnection currently provides no support for working with shadows from its graphical user interfaces. To work with shadows, you need to use TeamConnection's command-line interface.

A shadow is a collection of parts in a file system that reflects the contents of a workarea, driver, or release. The shadow could be a simple directory structure on a network server, or a file system on a completely different computer platform. You can use shadows to build your product, or they can simply be a place where developers can go to search through code. Shadowing is similar to extracting in that the purpose of each is to provide a set of files that reflect the version of a TeamConnection object.

TeamConnection does not do shadowing all by itself. It implements a framework that requires you to provide the ″shadowing program″ to perform the actual file system updates. This shadowing program can be one you create yourself, or a sample that is shipped with TeamConnection. When commands are issued that change the contents or properties of a part, TeamConnection determines what needs to be updated in the shadows. TeamConnection then extracts the parts and calls the ″shadowing program″ to update the file system.

TeamConnection stores information about the shadowed parts in the TeamConnection database. Subsequent shadowing actions ″remember″ what is already in the shadow to avoid doing unnecessary updates. For example, assume a driver exists with many driver members. When a new workarea is added to the driver, only those files that have been changed on the new workarea are extracted and placed in the shadow.

This chapter describes shadows and how to implement them for your families. Shadow properties and shadow actions are described. The requirements and interfaces that shadowing programs must implement are also defined.

Note: Shadows are not necessary for the operation of TeamConnection; they are optional and can be configured for each family.

Shadow types

A shadow type is an association between a name you define and a shadowing program. A shadow type has the following properties:

name The name you choose for the type. The name must be unique within the family.

description
The description of the shadow type.

program name
The program that TeamConnection will call to perform the shadowing actions. This name should be a fully qualified path to the program. The TeamConnection server must be able to access and run this program. This program can be a sample shipped with TeamConnection, or one that you write yourself.

Shadow properties

Shadows have the following properties.

name The name of the shadow. The name must be unique within the release.

type A type that has been defined for the family.

release
The release for the shadow.

mode The mode of the shadow. The mode can have two possible values:

- **manual** - Shadows are updated only when explicitly requested by authorized users with the shadow **-synchronize** command.
- **synchronous** - Shadows are updated as the contents of workareas, drivers, and releases are changed.

state A shadow has two possible states:

- **disabled** - The shadow is not able to perform shadowing actions. A shadow can be disabled if, for example, the file system has run out of space. After the problem with the shadow has been corrected, the shadow can be enabled.
- **enabled** - The shadow is able to perform shadowing actions.

location

The location of the shadow. This is text that defines where each part should be placed in the shadow. The location text supports the following substitution variables.

Note: On UNIX platforms, to bypass the UNIX shell, use the escape character \ with the $ macros.

- $N - the name of the workarea, driver, or release that is being shadowed.

- $P - the path name of the part being shadowed.
- $B - the base name of the part being shadowed.
- $F - the family name.
- $R - the release name of the part being shadowed.
- $C - the component name of the part being shadowed.
- $S - the name of the shadow.
- $V - the version SID of the part being shadowed.
- $$ - used to define the literal ″$″.

This property can contain any text. This information is passed to the shadowing program after the values for any variables are substituted. The contents of this property are defined, validated, and implemented by the shadowing program.

For example, the location could be specified as some directory that the TeamConnection family server can access, such as:

```
/home/tcparts/$R/$N/$P
```

or it could be a combination of machine name, port, and directory:

```
hostname.ibm.com 1300 /home/tcparts/$R/$N/$P
```

The location property should be defined so that parts from workarea, driver, and release versions do not resolve to the same location. For example, if the location was specified as /tcparts/$R/$P, the same part in two different workareas would resolve to the same location. You should always include the name of the object ($N) and the path ($P) in the location to avoid this situation.

drivers
Indicates whether the specified shadow contains drivers. Valid values are **yes** and **no**.

workareas
Indicates whether the specified shadow contains workareas. Valid values are **yes** and **no**.

release
Indicates whether the specified shadow contains release versions. Valid values are **yes** and **no**.

crlf
Indicates whether a crlf (carriage return / line feed) conversion should be performed. Valid values are **yes** and **no**. When this value is yes, both a ″cr″ and a ″lf″ character are used to indicate the end of a line in a file. Generally, a crlf value of yes means that the shadow is primarily used by Intel-based clients, and a value of no indicates AIX/UNIX users. This property only applies to text parts.

keys Indicates whether TeamConnection keywords embedded in parts will be expanded. Valid values are **yes** and **no**. This property only applies to text parts.

timestamp
Indicates which timestamp should be used on files extracted from TeamConnection. This property can have the following values:

- **preserve** - The timestamp of the part will be set to the timestamp maintained by TeamConnection as set when the part was checked in. This is the same timestamp that you would see if you extracted the part.
- **current** - The timestamp of the part will be the current time. That is, the time when the part is shadowed.

priority
A positive integer number that indicates the shadow's priority within the release. Shadows are processed from the highest priority shadow to the lowest. This property applies only to synchronous shadows. For manual shadows, this is set to zero (0).

parameters
Additional parameters to pass to the shadowing program. These are parameters that the shadowing program defines and knows how to implement. The format is any text. This property supports the same substitution variables that are supported by the location property. For example:

```
-component $C -version $V  -language English
```

Shadow actions

The following actions can be performed with the TeamConnection shadow command.

- **define** - Define a shadow type.
- **redefine** - Update the properties of an existing shadow type.
- **undefine** - Delete a shadow type.
- **create** - Create a shadow of a specific type for a release.
- **modify** - Modify the properties of a shadow.
- **disable** - Disable a shadow. This will temporarily turn a shadow off.
- **enable** - Enable a previously disabled shadow.
- **delete** - Delete a shadow. This action only affects the shadowing information in the TeamConnection database. It does not delete the files in the shadow.
- **view** - View the shadow properties.

- **synchronize** - Synchronize a shadow to the state of the TeamConnection database. A shadow is out of sync with TeamConnection when the contents of the parts in the shadow are not the same as the contents of the parts in TeamConnection. The shadow could be out of sync if a prior attempt at shadowing failed. Synchronizing the shadow will attempt to update the shadow to reflect the current state of the TeamConnection objects (release, drivers, workareas). The synchronize action has a report option that will only report the parts that are out of sync.
- **verify** - Verifying a shadow will synchronize a shadow. Additionally, TeamConnection will verify that the timestamps of the parts in the shadow match the timestamps that TeamConnection stored when the parts were placed in the shadow. This action is typically required when your shadow has been damaged from unexpected problems. For example, in the case of a disk crash, the shadow could be restored from backup. Then the verify action could be used to update any parts that have changed since the backup.

See the Command Reference for more details on each of these actions.

When does shadowing happen

For **manual** mode shadows, shadowing occurs only when the shadows are explicitly synchronized with the shadow **-synchronize** command. This action will update the shadows to reflect the current state of the TeamConnection release, driver, or workarea that you are synchronizing.

For **synchronous** mode shadows, shadowing occurs as the contents of releases, drivers, and workareas change. The following actions will trigger shadowing for each of the objects.

- Releases

  Driver -commit

  Workarea -integrate (if the driver subprocess is not included in the release process.)
- Drivers

  DriverMember -create/-delete
- WorkAreas

  Workarea -refresh/-undo/-cancel

  Part -checkin/-create/-rename/-undo/-build/-delete/-link/-modify/-recreate/-refresh/-rename

The Driver -commit and WorkArea -integrate commands will trigger shadowing for all of the parts on the specified driver or workarea. The DriverMember commands will trigger shadowing for all of the parts on the specified driver that are not current. The workarea -refresh, -undo, and -cancel commands will trigger shadowing for all of the parts on the specified workarea that are not current. A part command will only trigger shadowing for the specified parts in the specified workareas.

Writing shadowing programs

When TeamConnection determines that a shadow needs to be updated, it will call a shadowing program to perform the actual updates to the file system. The shadowing program is called once for each file in the shadow that needs to be updated. For example, on a Part **-create** action, the shadowing program will be called once for the part. For a DriverMember **-create** action, the shadowing program will be called once for each part in the workarea that was added to the driver.

Shadowing program interface

The shadowing program must implement the following interface to copy, delete, and verify parts in the shadow:

```
-chmod -family Name -release Name -shadow Name -path Name -location Text
         -fmode Name  -parameters Text

-copy -family Name -release Name -shadow Name -path Name
         -location Text -type [ text | binary ] -fmode Name
         -sourcefile Name -parameters Text

-delete -family Name -release Name -shadow Name -path Name
         -location Text  -parameters Text

-verify -family Name -release Name -shadow Name -path Name
           -location Text -timestamp Timestamp -parameters Text
```

Attributes:

Attribute	**Description**
-family Name	The family for which this program is being called.
-release Name	The release for which this program is being called.
-shadow Name	The name of the shadow.
-path Name	The full pathname of the part being shadowed.
-location Text	The location as defined for the shadow with all variables replaced by their actual value.
-type [text | binary]	The type of the file.
-fmode Name	The filemode of the file.
-timestamp TimeStamp	The timestamp of the file in the form YYYY/MM/DD HH:MM:SS
-sourcefile Name	The full pathname of a file that contains the contents of the part. This is a temporary copy of the part that TeamConnection extracts. After the shadowing has finished, this file will be removed.

Attribute	Description
-parameters Text	The parameters defined for the shadow with all variables replaced by their actual value. This is always passed as the last parameter to the program.

Your shadowing program must also implement a validate function. Every time a shadow is created or modified, this function is called with the properties of the shadow. When a shadow is created, the shadow properties are determined by overriding the default property values with those explicitly specified on the command. When a shadow definition is modified, the shadow properties are determined by overriding the current property values with those specified on the command. The syntax for the validate action is:

```
-validate -shadow Name -type Name -release Name -location Text
             -contents  [drivers] [workareas] [release]
             -mode { synchronous | manual }  -crlf { yes | no }
              -keys { yes | no }  -timestamp { preserve | current }
              -priority Number -parameters Parameters
```

The shadowing program should validate the values specified. In particular, the **-location** and **-parameters** value should be checked to see if they have been specified properly (since these parameters are implemented by the shadowing program, TeamConnection does not perform any validation on them). If the parameters are valid, this function should return a zero, and TeamConnection will store the updates. If the parameters are not valid, display an error message and return a nonzero return code. The updates will not be stored.

Shadowing program requirements

This section defines the minimal requirements that each of the shadowing actions should implement. Your shadowing program may perform more than what is required here. It all depends on the needs and characteristics of your installation. Since shadowing programs will be run frequently on the TeamConnection family server, you should keep performance in mind when writing shadowing programs. Try to keep the time required to perform shadowing as short as possible. Use compiled programs rather than interpretive languages (command files, shells, or scripts).

The **-chmod** function of the program should modify the file mode of *location* to the *fmode value*. Note that when you create your shadowing program, you should only change the mode when you are shadowing to file systems that support file modes (AIX, HP-UX, and Solaris). If the function is successful, return zero, otherwise return a nonzero return code.

The **-copy** function of the program should copy the contents of the *sourcefile* to the *location*. The timestamp of the part in the shadow must be the same as the timestamp on the *sourcefile*. This enables the shadow to be verified at a later time. If the function is successful, return zero, otherwise return a nonzero return code.

The **-delete** function should delete the part from the *location*. If the function is successful, return zero, otherwise return a nonzero return code.

The **-verify** function should validate that the *timestamp* of the file in the *location* is the same as the timestamp parameter. If the timestamp is the same, a return code of zero should be returned. If the timestamp is not the same and you want the timestamp to be refreshed, return a one. For other errors, return any other nonzero return code.

Note: For the **-chmod**, **-copy**, and **-delete** functions, a shadowing failure does not cause the TeamConnection command to fail. For example, if on a part **-checkin**, the shadowing fails, the part is still checked in to TeamConnection and unlocked from your user ID. This results in the shadow being out of sync with TeamConnection. The shadow can be synchronized after the problem with the shadow has been corrected.

Shadowing program output

Any error messages that are displayed from within the shadowing program are returned to the user as part of the command output. TeamConnection will display a warning message stating that the command was successful, but shadowing errors occurred.

Sample shadowing program

A sample shadowing program named TCshadow.c is shipped with TeamConnection. It implements a simple shadow on a file system that the TeamConnection server can access directly. Included in the sample are routines for parsing and validating the parameters passed to the shadow program. You can compile this and use it as is, or use it as the basis for creating your own shadow programs.

Part 4. Maintaining your TeamConnection server

This section contains information on maintaining your TeamConnection database, tuning database performance, and monitoring family use.

Chapter 14. Maintaining your TeamConnection family

This chapter tells you how to use several TeamConnection tools for the following:

- Displaying the current version of TeamConnection code
- Changing the age of defects and features
- Taking care of returned mail
- Resolving TeamConnection errors

As the family or database administrator for a TeamConnection family, you will also need to perform maintenance and tuning operations on the DB2 database that stores your TeamConnection family. For information on administering a DB2 database, refer to the following DB2 Universal Database administration manuals:

- *Administration Getting Started* (S10J-8154–00)

  An introductory guide to basic administration tasks and the DB2 administration tools.
- *SQL Getting Started* (S10J-8156–00)

  Discusses basic concepts of DB2 SQL.
- *Administration Guide* (S10J-8157–00)

  A complete guide to administration tasks and the DB2 administration tools.
- *SQL Reference* (S10J-8165–00)

  A reference to DB2 SQL for programmers and database administrators.
- *Troubleshooting Guide* (S10J-8169–00)

  A guide to identifying and solving problems with DB2 servers and clients and to using the DB2 diagnostic tools.
- *Messages Reference* (S10J-8168–00)

  Provides detailed information about DB2 messages.
- *Command Reference* (S10J-8166–00)

  Provides information about DB2 system commands and the command line processor.
- *Replication Guide* (S10J-0999–00)

  Describes how to plan, configure, administer, and operate IBM replication tools available with DB2.
- *System Monitor Guide and Reference* (S10J-8164–00)

  Describes how to monitor DB2 database activity and analyze system performance.

- *Glossary*

  A comprehensive glossary of DB2 terms.

More information on administering a TeamConnection DB2 family database may be available in technical reports on the IBM VisualAge TeamConnection Enterprise Server Library home page. To access this home page, select Library from the IBM VisualAge TeamConnection home page at Web address http://www.software.ibm.com/ad/teamcon.

Displaying the current version of TeamConnection code

TeamConnection provides a tool called tclevel that displays the current version of TeamConnection installed on your computer. If you have problems using TeamConnection, the TeamConnection service or support personnel may ask you to use this tool to determine the level of code you are running. To use this tool, do the following:

C:\> From a command prompt, issue the following command:

```
tclevel
```

TeamConnection displays information like the following:

```
(C) Copyright IBM Corp.,1996,1999
Platform: AIX tcaix02 2 4 000044289000
Release: v302
Driver: N1999-06-30
HotFix: 3
```

This information includes a copyright statement, the platform on which you are running TeamConnection, and the current TeamConnection release number, driver date, and hotfix applied.

Changing the age of defects and features

TeamConnection provides two aging utilities: age and resetAge. Use these utilities to update the age value of defects and features while work is in progress. If you do not use these utilities, the age value for each defect and feature remains at zero.

Before you use the age utilities, make sure you have set the TC_DBPATH and TC_FAMILY environment variables in your config.sys file as follows:

- Set TC_DBPATH to the directory where the family database is. Make sure that you do not include a semicolon (;) or backslash (\ ) at the end of this path.
- Set TC_FAMILY to the family name.

The following is an example for a family database named testfam:

```
SET TC_DBPATH=c:\teamc\testfam
SET TC_FAMILY=testfam
```

With these environment variables, the age utilities will change the defect and feature ages of the TeamConnection family database testfam in the directory c:\teamc\testfam.

The age utility

Use the age utility to increment the age value by 1 for each defect or feature that is in a specified state.

The age utility is shipped in one of the following files:

UNIX platforms
age

OS/2 age.cmd

Windows
age.bat

The file is located in bin subdirectory of the directory where the TeamConnection server is installed. Initially, the file is set up to update the age of defects that are in one of the following states:

- open
- working
- design
- size
- review

You can edit the file to delete one or more of these states or to add any of the following states:

- canceled
- returned
- closed
- verify

Run the age utility from a server machine using the following command:

```
age
```

The resetAge utility

Use the resetAge utility to reset the age of defects and features based on their state (open, working, design, size, and review), the date they were opened, and the selected aging increment.

Run the resetAge utility from a server machine using the following command.

```
resetage ageIncr
```

Where *ageIncr* is one of the following:

fullweek
: Ages the defects and features according to a 7-day schedule.

workweek
: Ages the defects and features according to a 5-day work week schedule.

Resolving TeamConnection errors

The TeamConnection error log and audit log can help you resolve TeamConnection error messages. This section explains how to use these two logs and briefly explains the trace facility.

Using the system error log (syslog.log)

Severe errors that are encountered by the family server are recorded in the syslog.log file. Use this file to help you better understand and resolve the error. This log usually provides more information than what is found in the initial message. There is only one syslog.log file, so if you have multiple families, error information for each family is recorded in the same file.

Because the syslog facility is not a native application for OS/2 and Windows NT, TeamConnection provides an application specific syslog. The syslog file resides in the same location where the TeamConnection Family Server (teamcd.exe) resides, and it is called syslog.log.

Refer to the *Installation Guide* for instructions on activating the syslog (on UNIX platforms).

Using the audit log (audit.log)

For each family, TeamConnection provides an audit log that contains an entry for every action performed since the family was created. The audit.log file is located in the directory where your family database is installed (your TC_DBPATH).

The audit log file contains information about both successful and unsuccessful transactions, making it useful for determining the source of a problem. It also includes an entry whenever an unauthorized attempt is made to access the TeamConnection server. This can help you audit your system's security.

The following information is recorded in the audit log for each transaction:

- For authorized transactions:
  - Process ID number of the family server
  - TeamConnection action
  - Whether the transaction was successful or not
  - Date of the transaction
  - Time the transaction started
  - Time the transaction ended
  - For failure transactions, status phase information showing the C++ method being executed by the TeamConnection action name
  - User ID of the person who requested the action
  - The name of the host system from which the user is accessing TeamConnection
  - Additional information for successful transactions, or error messages for unsuccessful transactions. See page 158 for the additional information about each TeamConnection action.
- For unauthorized transactions:
  - Process ID number of the family server
  - User ID of the person who requested the action
  - The name of the host system from which the user is accessing TeamConnection
  - Notification that the request was unauthorized
  - Date and time of the transaction request
  - For failure transactions, status phase information showing the C++ method being executed by the TeamConnection action name
  - Error message

The following is an example of information as it appears in the audit.log file.

```
31436,ReleaseCreate,SUCCESS,1998/03/17,11:32:50,11:33:00,tcserv,tcserv,
      alexm.ral.ibm.com,robot_v2
31449,PartLink,SUCCESS,1998/03/17,11:33:41,11:33:42,tcserv,tcserv,
      alexm.ral.ibm.com,FILEH1.bin,relH1,robot_v2,1.2
31249,PartCheckOut,SUCCESS,1998/03/17,11:35:08,11:35:08,tcserv,tcserv,
      alexm.ral.ibm.com,FILEH1.bin,robot_v2,1.3
31259,PartCheckIn,SUCCESS,1998/03/17,11:35:18,11:35:18,tcserv,tcserv,5
      alexm.ral.ibm.com,FILEH1.bin,relI1,1.4
24942,Transaction from joe/tcserv@tcserv.ral.ibm.com was UNAUTHORIZED,03/18/95,09:43:11,
      0010-100 User joe was not found.
68256,PartExtract,FAILURE,1998/02/06,10:35:45,10:35:46,beville,beville,ausaix18.austin.ibm.com,
   statusphase = getListByBaseName
   6021-140 There is no committed version of part junk.c visible to release r2.
            To view the part, specify a workarea that has a visible version of the part.
     Recovery:
       - Verify that the correct release name and part name were specified.
       - Specify a valid workarea which has a visible version of the part.
```

Figure 16. Sample of an audit log file

The following table lists the additional information that is provided for each TeamConnection action.

TeamConnection Action	Additional information
AccessCreate	TeamConnection user ID, component name, authority group name
AccessDelete	TeamConnection user ID, component name
AccessRestrict	TeamConnection user ID, component name, authority group name
ApprovalAbstain	Release name, defect or feature name, approver’s name
ApprovalAccept	Release name, defect or feature name, approver’s name
ApprovalAssign	Release name, defect or feature name, new approver’s name
ApprovalCreate	Defect or feature name, release name, approver’s name
ApprovalDelete	Defect or feature name, release name, approver’s name
ApprovalReject	Release name, defect or feature name, approver’s name
ApproverCreate	TeamConnection user ID, release name
ApproverDelete	TeamConnection user ID, release name
CompCreate	New component name
CompDelete	Component name
CompLink	Component name, new parent component name
CompModify	Component name

TeamConnection Action	Additional information
CompRecreate	Component name
CompUnlink	Component name, parent component name
CompView	Component name
CoreqCreate	Release name, first defect or feature name, second defect or feature name
CoreqDelete	Release name, defect or feature name
DefectAccept	Defect name
DefectAssign	Defect name
DefectCancel	Defect name
DefectClose	**This action is not audited**
DefectComment	Defect name
DefectDesign	Defect name
DefectModify	Defect name
DefectOpen	Defect name
DefectReopen	Defect name
DefectReturn	Defect name
DefectReview	Defect name
DefectSize	Defect name
DefectVerify	Defect name
DefectView	Defect name
DriverAssign	Driver name, release name, new driver owner’s TeamConnection user ID
DriverCheck	Driver name, release name
DriverCommit	Driver name, release name
DriverComplete	Driver name, release name
DriverCreate	Driver name, release name
DriverDelete	Driver name, release name
DriverExtract	Driver name, release name
DriverModify	Driver name, release name
DriverView	Driver name, release name
EnvCreate	Tester’s TeamConnection user ID, release name, environment name
EnvDelete	Environment name, release name

TeamConnection Action	Additional information
EnvModify	Tester's TeamConnection user ID, release name, environment name
FeatureAccept	Feature name
FeatureAssign	Feature name
FeatureCancel	Feature name
FeatureClose	**This action is not audited**
FeatureComment	Feature name
FeatureDesign	Feature name
FeatureModify	Feature name
FeatureOpen	Feature name
FeatureReopen	Feature name
FeatureReturn	Feature name
FeatureReview	Feature name
FeatureSize	Feature name
FeatureVerify	Feature name
FeatureView	Feature name
FixActive	Defect or feature name, release name, component name
FixAssign	Defect or feature name, release name, component name
FixComplete	Defect or feature name, release name, component name
FixCreate	Defect or feature name, release name, component name
FixDelete	Defect or feature name, release name, component name
HostCreate	TeamConnection user ID, host name, user login on host
HostDelete	TeamConnection user ID, user login on host, host name
MemberCreate	Driver name, defect or feature name, release name
MemberDelete	Driver name, defect or feature name, release name
NotifyCreate	TeamConnection user ID, component name, interest group
NotifyDelete	TeamConnection user ID, component name
PartAdd	Path name, release name, SID
PartCheckIn	Path name, release name, SID
PartCheckOut	Path name, release name, SID
PartDelete	Path name, release name
PartExtract	Path name, release name, SID
PartForceIn	**Audited via PartCheckIn**

TeamConnection Action	Additional information
PartForceOut	**Audited via PartCheckOut**
PartLink	Path name, release name, new release name, SID
PartLock	Path name, release name, SID
PartLockForce	**Audited via PartLock**
PartMark	Path name, release name, SID
PartMerge	Path name, release name, workarea name, source release name, **Also audited via underlying PartCheckOut, PartCheckIn, and PartExtract actions**
PartModify	Path name, release name
PartOverrideR	Path name, release name, cancel flag, workarea name, User ID
PartReconcile	Path name, release name, workarea name, **Also audited via underlying PartCheckOut, PartCheckIn, and PartExtract actions**
PartRecreate	Path name, release name
PartRecreaForce	**Audited via PartRecreate**
PartRename	Path name, new path name, release name
PartRenameForce	**Audited via PartRename**
PartResolve	Base name, release name
PartRestrict	Path name, release name, cancel flag
PartUndo	Path name, release name, undo type, SID
PartUndoForce	**Audited via PartUndo**
PartUnlock	Path name, release name
PartView	Path name, release name
ReleaseCreate	New release name
ReleaseDelete	Release name, new release name
ReleaseExtract	Release name, new release name
ReleaseLink	Release name, new release name
ReleaseMerge	Release name, workarea name, source release name, **Also audited via underlying PartCheckOut, PartCheckIn, and PartExtract actions**
ReleaseModify	Release name, new release name
ReleaseRecreate	Release name, new release name
ReleaseView	Release name, new release name

TeamConnection Action	Additional information
Report	**With -where flag: view name, criteria **With -help flag: help, none **With -testClient flag: test, none **With -testServer flag: test, none
ShadowCreate	Shadow name, release name
ShadowDefine	Type name
ShadowDelete	Shadow name, release name
ShadowDisable	Shadow name, release name
ShadowEnable	Shadow name, release name
ShadowModify	Shadow name, release name
ShadowRedefine	Type name
ShadowSync	Shadow name, release name, workarea or driver name
ShadowUndefine	Type name
ShadowVerify	Shadow name, release name, workarea or driver name
ShadowView	Shadow name, release name
SizeAssign	Defect or feature name, component name, release name
SizeAccept	Defect or feature name, component name, release name
SizeCreate	Defect or feature name, component name, release name
SizeDelete	Defect or feature name, component name, release name
SizeReject	Defect or feature name, component name, release name
TestAbstain	Defect name, release name, environment name, tester's TeamConnectionuser ID
TestAccept	Defect name, release name, environment name, tester's TeamConnectionuser ID
TestAssign	Defect name, environment name, new tester's TeamConnection user ID
TestCreate	Defect name, environment name, release name, tester's TeamConnectionuser ID
TestDelete	Defect name, environment name, release name
TestReject	Defect name, release name, environment name, tester's TeamConnectionuser ID
WorkareaAssign	Defect or feature name, release name, new workarea owner's TeamConnectionuser ID
WorkareaCancel	Defect or feature name, release name
WorkareaCheck	Defect or feature name, release name, driver name
WorkareaCommit	Defect or feature name, release name

TeamConnection Action	Additional information
WorkareaComplet	Defect or feature name, release name
WorkareaCreate	Defect or feature name, release name
WorkareaExtract	workarea name, release name
WorkareaFix	Defect or feature name, release name
WorkareaIntegra	Defect or feature name, release name
WorkareaModify	Defect or feature name, release name, target
WorkareaReconcile	Release name, workarea name, **Also audited via underlying PartCheckOut, PartCheckIn, and PartExtract actions**
WorkareaTest	Defect or feature name, release name
WorkareaView	Defect or feature name, release name
UserCreate	New user ID
UserDelete	User ID
UserRecreate	User ID
UserModify	User ID
UserView	**No additional information is audited**
VerifyAbstain	Defect or feature name, TeamConnection user ID
VerifyAccept	Defect or feature name, TeamConnection user ID
VerifyAssign	Defect or feature name, TeamConnection user ID of the new verification record owner
VerifyReject	Defect or feature name, TeamConnection user ID

Cleaning up the audit log

NT The tccleanu utility is not available on Windows NT.

C:\> TeamConnection continually appends information to the end of the audit log. To keep this file from growing too large, type the following from a command line in the directory containing your TeamConnection audit log. If you need to maintain the audit.log for more than one TeamConnection family, then type this command from the directory where each audit log is located. Before issuing this command, stop the family server (refer to page "Stopping the servers" on page 43).

```
tccleanu fileSize
```

Where *fileSize* is the size of the specified file in bytes. If you do not specify the size, the default is 256000.

TeamConnection creates a backup file called audit1.log. It places this file in the directory where the audit log is located and from which you issue the tccleanu command. You can rename this file to any name you want for archive purposes. If you do not rename the file, TeamConnection keeps three backup logs in addition to the current log: audit2.log, audit3.log, and audit4.log. Each time you run the tccleanu program, TeamConnection moves the contents of each log file as follows:

1. audit3.log information is moved to audit4.log.
2. audit2.log information is moved to audit3.log.
3. audit1.log information is moved to audit2.log.
4. audit.log information is moved to audit1.log.

After this command is issued, the audit.log file is empty and ready to log new information.

Using the trace facility

TeamConnection provides environment variables for trace. Modify the trace environment variables *only* when directed to do so by an IBM service representative.

The names of the TeamConnection trace environment variables, the purpose they serve, and the TeamConnection component that uses the environment variable are listed in the following table:

Environment variable	**Purpose**	**Used by**

TC_TRACE	Specifies the variable that lets the user designate which parts should be traced. Files names are separated from each other using commas or spaces and wild cards (both * and ?) are supported. Also supported is the ! operator which indicates files not to be traced. You should modify this environment variable only when directed to do so by an IBM service representative. Otherwise it is set to null. The following are examples of the TC_TRACE environment variable:
	`TC_TRACE=fhg*.C, !fhgtrace.C  - trace everything meeting the s`
	`TC_TRACE=*  - trace everything`
	`TC_TRACE=src\foo\* - trace everything in the src\foo directory`
		Client and family and build servers

Environment variable	Purpose	Used by
TC_TRACEATTEMPTS	Specifies the maximum number of failed trace attempts accepted before giving up, for example, TC_TRACEATTEMPTS=20. If the trace gives up, a line is written to another file, named tcover.err, saying that an overflow occured. The default setting is 10. You should modify this only when directed to do so by an IBM service representative.	Client and family and build servers
TC_TRACEDELAY	Specifies the amount of time in seconds that TeamConnection waits, when a trace attempt fails, before attempting another trace, for example, TC_TRACEDELAY=2. The default is 1 second. You should modify this only when directed to do so by an IBM service representative.	Client and family and build servers
TC_TRACEFILE	Specifies the the file you want the trace result written to, for example, TC_TRACEFILE=mytrace.txt. The default is tctrace. You can also point to stdout and stderr, for example, TC_TRACEFILE=stdout.	Client and family and build servers
TC_TRACEOPTS	Instructs the trace facility to write its output to another machine, for example, TC_TRACEOPTS=/hgtm9@8888.	Client and family and build servers
TC_TRACEPEEK	Inbstructs the trace facility to print the source file name and line number to stderr immediately before attempting a full trace. This environment variable helps to track down trace statements that cause the program to trap (as in TRACE(″this breaks %s″, 123);). To turn on trace peek set TC_TRACEPEEK=1.	Client and family and build servers

Environment variable	Purpose	Used by
TC_TRACEQUICK	Instructs the trace facility to print the source file name and line number to the log. This speeds up the trace and helps you find out quicky what area of code is causing a problem. To turn on quick tracing set TC_TRACEQUICK=1.	Client and family and build servers
TC_TRACESAFE	Set this variable to 1 (for example, TC_TRACESAFE=1) for the highest level of concurrency control using semaphores. This slows down the trace facility considerably, so only use it when absolutely necessary. The default setting is <null>.	Client and family and build servers
TC_TRACESIZE	Specifies the maximum size of the trace file in bytes. If this size is reached, wrapping occurs. The default is one million bytes. You can set this to a different number, for example, TC_TRACESIZE=20000000.	Client and family and build servers

Chapter 15. Maintaining your TeamConnection DB2 database

This chapter tells you how to use several TeamConnection and DB2 tools for the following:

- Backing up the TeamConnection database
- Updating TeamConnection tables and views
- Reorganizing your database tables and views
- Rebinding your database

Note: It is not recommended that you make changes to your database by issuing INSERT, UPDATE, or DELETE statements or by changing or deleting database tables or the columns defined in TeamConnection database tables. Changing your database in these ways, through the DB2 administrator tools, the DB2 command line processor, the TeamConnection migration tools, or the tcupdb tool can corrupt your TeamConnection database. Any such changes are made at your own risk. Please contact your IBM representative for information on the terms of IBM customer support.

As the family or database administrator for a TeamConnection family, you will need to perform maintenance and tuning operations on the DB2 database that stores your TeamConnection family. For information on administering a DB2 database, refer to the following DB2 Universal Database administration manuals:

- *Administration Getting Started* (S10J-8154–00)

  An introductory guide to basic administration tasks and the DB2 administration tools.
- *SQL Getting Started* (S10J-8156–00)

  Discusses basic concepts of DB2 SQL.
- *Administration Guide* (S10J-8157–00)

  A complete guide to administration tasks and the DB2 administration tools.
- *SQL Reference* (S10J-8165–00)

  A reference to DB2 SQL for programmers and database administrators.
- *Troubleshooting Guide* (S10J-8169–00)

  A guide to identifying and solving problems with DB2 servers and clients and to using the DB2 diagnostic tools.
- *Messages Reference* (S10J-8168–00)

Provides detailed information about DB2 messages.

- *Command Reference* (S10J-8166–00)

  Provides information about DB2 system commands and the command line processor.
- *Replication Guide* (S10J-0999–00)

  Describes how to plan, configure, administer, and operate IBM replication tools available with DB2.
- *System Monitor Guide and Reference* (S10J-8164–00)

  Describes how to monitor DB2 database activity and analyze system performance.
- *Glossary*

  A comprehensive glossary of DB2 terms.

More information on administering a TeamConnection DB2 family database may be available in technical reports on the IBM VisualAge TeamConnection Enterprise Server Library home page. To access this home page, select Library from the IBM VisualAge TeamConnection home page at Web address http://www.software.ibm.com/ad/teamcon.

Backing up the TeamConnection database

Your TeamConnection database needs to be backed up regularly using the DB2 backup utilities available from the DB2 Control Center or the following command from the command line processor:

```
db2 backup database family_name to backup_directory
```

Substitute your family name for *family_name* and a directory path for your backed up database for *backup_directory*. The DB2 backup utility will place a compressed version of the database in the backup directory path. Be sure to set file permissions for the backup directory such that the compressed backup file is accessible. It is recommended that you copy this backup file to an external backup media (i.e. tape) to protect against file system failures. Refer to the *IBM DB2 Universal Database Administration Guide* for details on this process.

TeamConnection provides a backup utility in the samples directory that you can use to backup your database. This utility, called tcbackup and available on all platforms, stops your TeamConnection family, creates a directory called db2backup, and runs the DB2 backup command. To use this utility, type the following at a command prompt. Replace *familyName* with the name of your TeamConnection family.

```
tcbackup familyName
```

Updating your database tables and views

TeamConnection includes a utility that you can use to integrate database schema changes (changes to the tables and views that define TeamConnection objects such as users, parts, defects, and so on). It may be necessary to run this utility when you install a TeamConnection fixpack. The utility, called fhcirt, adds new tables, adds new columns to existing tables, and populates the tables where necessary. "Creating a family database" on page 199 explains the syntax of the fhcirt command. The following sections show examples of using fhcirt to update tables and views on Intel and UNIX platforms.

For Intel

On Intel platforms, to update the testfam database on drive f:, set TC_FAMILY=testfam, set TC_DBPATH=f:\testfam, and issue the following command:

```
fhcirt f:\teamc\nls\cfg\*.dd* f:\teamc\nls\cfg\*.bnd
```

Note: If you have added indexes to the TeamConnection tables, you will also need to include the full path name of your .ddx files. See "Preserving table indexes" on page 200 for more information.
Note: The directory path \teamc\nls\cfg is the default installation path on Intel for the TeamConnection DB2 files needed to create tables and views and bind the family database. If you specify an installation path other than the default, make sure the path you specify for the loadfiles parameter contains the TeamConnection DB2 files.

For UNIX

On UNIX platforms, to update the testfam database, set the TC_FAMILY environment variable to your family name (using export TC_FAMILY=), set the TC_DBPATH environment variable to your database path name (using export TC_DBPATH=), and then issue the following command:

```
fhcirt $TC_HOME/nls/cfg/*.dd* $TC_HOME/nls/cfg/*.bnd
```

Where $TC_HOME is the directory name where TeamConnection is installed.
Note: If you have added indexes to the TeamConnection tables, you will also need to include the full path name of your .ddx files. See "Preserving table indexes" on page 200 for more information.

Reorganizing your database tables and views

TeamConnection ships with a database reorganizing script, called tcrstats in the samples directory, that you should use after making significant changes to a family. Significant changes include loading the family, adding many new parts, or making numerous part changes. You should also run the reorganizing script after running the fhcirt command described in "Updating your database tables and views".

This process should produce the optimal statistics and performance. Sometimes, rather than running the reorganizing script, it is sufficient just to do a runstat and rebind the database. In any event, the reorganizing script will reorganize any tables or indexes that were flagged by DB2 as needing reorganization.

Rebinding the family database

After doing certain administrative tasks with the family database, such as installing patches for TeamConnection or for DB2 and after performing the DB2 REORG action, you wil need to rebind the DB2 plans to the family database in order to resynchronize the consistency token and avoid a runtime error SQLCODE -818. You can rebind the DB2 plans to the family database using the tcrebind script found in the samples directory

Chapter 16. Enhancing SQL performance

The performance of SQL applications can be impaired after many updates, deletes, or inserts have been made. Generally, newly inserted rows cannot be placed in a physical sequence that is the same as the logical sequence defined by the index. This means that the database manager must perform additional physical reads to access the data, because logically sequential data may be on different data pages.

In general, reorganizing a table takes more time than running statistics. Performance may be improved sufficiently by obtaining the current statistics for your data and rebinding your applications, so try this first. If this does not improve performance, the data in the tables and indexes may not be arranged efficiently, so reorganization may help.

For more details on using RUNSTATS and reorganizing table data, see the DB2 Universal Database *Administration Guide* and *Command Reference*.

Updating catalog statistics using the RUNSTATS utility

The RUNSTATS utility updates statistics in the system catalog tables to help with the query optimization process. Without these statistics, the database manager could make a decision that would adversely affect the performance of an SQL statement. The RUNSTATS utility allows you to collect statistics on the data contained in the tables, indexes, or both tables and indexes.

Use the RUNSTATS utility to collect statistics based on both the table and the index data to provide accurate information to the access plan selection process in the following situations:

- When a table has been loaded with data, and the appropriate indexes have been created.
- When a table has been reorganized with the REORG utility.
- When there have been extensive updates, deletions, and insertions that affect a table and its indexes. (Extensive in this case may mean that 10 to 20 percent of the table and index data has been affected.)
- Before binding application programs whose performance is critical
- When comparison with previous statistics is desired. Running statistics on a periodic basis permits the discovery of performance problems at an early stage, as described below.
- When the prefetch quantity is changed.
- When you have used the REDISTRIBUTE NODEGROUP utility.

TeamConnection provides a sample script, called tcrstats in the samples directory, that will update the catalog statistics for all TeamConnection tables and their indexes. TeamConnection also provides a sample script, called tcrebind in the samples directory, that will rebind all of the TeamConnection packages.

Analyzing statistics

Analyzing the statistics can indicate when reorganization is necessary. Some of these indications are:

- Clustering of indexes

  Index scans that are **not** index-only accesses might perform better with higher cluster ratios. A low cluster ratio leads to more I/O for this type of scan, since after the first access of each data page, it is less likely that the page is still in the buffer pool the next time it is accessed. Increasing the buffer size can improve the performance of an unclustered index. (See for information about how the database manager can improve index scan performance for indexes with low cluster ratios and the optimizer uses index statistics.)

  If the table data was initially clustered with respect to a certain index, and the above clustering information indicates that the data is now poorly clustered for that same index, you may wish to reorganize the table to re-cluster the data with respect to that index.

- Overflow of rows

  The overflow number indicates the number of rows that do not fit on their original pages. This can occur when VARCHAR columns are updated with longer values. In such cases, a pointer is kept at the row's original location. This can hurt performance, because the database manager must follow the pointer to find the row's contents, which increases the processing time and may also increase the number of I/Os.

  As the number of overflow rows grows higher, the potential benefit of reorganizing your table data also increases. Reorganizing the table data will eliminate the overflowing of rows.

- Comparison of file pages

  The number of pages with rows can be compared with the total number of pages that a table contains. Empty pages will be read for a table scan. Empty pages can occur when entire ranges of rows are deleted.

  As the number of empty pages grows higher, so does the need for a table reorganization. Reorganizing the table can compress the amount of space used by a table, by reclaiming these empty pages. In addition to more efficient use of disk space, reclaiming unused pages can also improve the performance of table scan, since fewer pages will be read into the buffer pool.

- Number of leaf pages

  The number of leaf pages predicts how many index page I/Os are needed for a complete scan of an index.

  Random update activity can cause page splits to occur that increase the size of the index beyond the minimum amount of space required. When indexes are rebuilt during the reorganization of a table, it is possible to build each index with the minimum amount of space possible.

  Note: A default of ten percent free space is left on each index page when the indexes are rebuilt. The environment variable `DB2_INDEX_FREE` can be used to establish a value other than the default for the amount of free space for each index page. The maximum amount of free space for each index page is sixty percent.

RUNSTATS can also help you determine how performance is related to changes in your database. The statistics show the data distribution within a table. When used routinely, RUNSTATS provides data about tables and indexes over a period of time, thereby allowing performance trends to be identified for your data model as it evolves over time.

Ideally, you should rebind application programs after running statistics, because the query optimizer may choose a different access plan given the new statistics. See “Rebinding the family database” on page 170 for instructions on rebinding the TeamConnection database.

If you do not have enough time available to collect all of the statistics at one time, you may choose to periodically run RUNSTATS to update only a portion of the statistics that could be gathered.

However, you should periodically use RUNSTATS to gather both table and index statistics at once, to ensure that the index statistics are synchronized with the table statistics. Index statistics retain most of the table and column statistics collected from the last run of RUNSTATS. If the table has been modified extensively since the last time its table statistics were gathered, gathering only the index statistics for that table will leave the two sets of statistics out of synchronization.

You may wish to collect statistics based only on index data in the following situations:

- A new index has been created since the utility was performed and you do not want to re-collect statistics on the table data.
- There have been a lot of changes to the data that affect the first column of an index.

The RUNSTATS utility allows you to collect varying levels of statistics. For tables, you can collect basic level statistics or you can also collect distribution statistics for the column values within a table. For indexes, you can collect basic level statistics or you can also collect detailed statistics which can help the optimizer better estimate the I/O cost of an index scan.

Note: Statistics are not collected for LONG or large object (LOB) columns.

Reorganizing table data

The REORGCHK command returns information about the physical characteristics of a table, and whether or not it would be beneficial to reorganize that table. This command can be used through the command line processor. See the *Command Reference* for more information, including how to interpret the command output.

The REORG utility optionally rearranges data into a physical sequence according to a specified index. REORG has an option to specify the order of rows in a table with an index, thereby clustering the table data according to the index and improving the CLUSTERRATIO or CLUSTERFACTOR statistics collected by the RUNSTATS utility. As a result, SQL statements requiring rows in the indexed order can be processed more efficiently. REORG also stores the tables more compactly by removing unused, empty space.

You may wish to consider the following factors to determine when to reorganize your table data:

- The volume of insert, update, and delete activity
- Any significant change to the performance of queries which use an index with a high cluster ratio
- Running statistics (RUNSTATS) does not improve the performance of queries
- The REORGCHK command indicates a need to reorganize your table
- The cost of reorganizing your table, including the CPU time, the elapsed time, and the reduced concurrency resulting from the REORG utility locking the table until the reorganization is complete.

To execute the REORG utility, you must have SYSADM, SYSMAINT, SYSCTRL or DBADM authority, or CONTROL privilege on the table.

Applying these techniques to TeamConnection

TeamConnection is a diverse SQL application whose performance characteristics can be very sensitive to the statistics available to DB2 at the time the access plan for a given SQL statement is built. TeamConnection uses both dynamic SQL (as in a report) and static SQL, which means that some access plans are built dynamically when queries are encountered, while others are statically bound at bind time.

When you encounter a TeamConnection performance problem, the first approach should be to determine how recently RUNSTATS was performed against your family, and whether TeamConnection was then re-bound to refresh the access plans. If the performance problems persists after refreshing the statistics and access plans, use REORGCHK to determine which tables would benefit from reorganization, and then reorganize (using the REORG utility) those tables.

TeamConnection is designed such that the primary key index is the preferred index to organize a table. Primary key indexes are those with an index name that begins with PK. Refer to the product softcopy documentation and readme.txt file for any exceptions to this guideline.

When REORG, RUNSTATS, and REBIND do not improve performance

If a performance problem persists, DB2 provides numerous tuning parameters that an administrator can update. Caution should be used in modifying any of these parameters. It is recommended that you modify a single parameter (or a small, related set of parameters) at time, and then run a representative workload to determine the impact of the modification. Many of these changes are not applied immediately, so it is advisable to stop and restart the DB2 instance after changing the DB2 configuration. It is also recommended to rebind the eamConnection packages (SQL access plans) after any configuration change. you can use the sample script tcrebind to rebind the TeamConnection packages.

See the DB2 Universal Database *Administration Guide*, particularly the sections that discuss getting and updating the database manager and database configurations, for details about configuration and tuning opportunities.

Table spaces and buffer pools

The Data Definition Language (DDL) used to define the TeamConnection database schema describes a number of table spaces for the tables that contain your TeamConnection family’s data. If you assign those tables to separate I/O devices and separate I/O cards, you can improve the degree of I/O parallelism that DB2 provides TeamConnection.

By assigning these tablespaces to separate buffer pools and tuning the buffer pools for your system configuration, you can also improve the overall performance of your TeamConnection family.

Configuration and tuning

The optimal values for the DB2 configuration and tuning parameters will be unique to each TeamConnection family and system.

When you create a new family, TeamConnection creates a DB2 database and sets the following values for certain database configuration parameters. Use caution when modifying the values to which TeamConnection sets these parameters.

APPLHEAPSZ = 1280
This parameter defines the number of private memory pages available to be used by the database manager on behalf of a specific agent or subagent.

DBHEAP=2400
This parameter indicates the maximum amount of space that the catalog cache can use from the database heap (dbheap). The catalog cache is used to store table descriptor information that is used when a table, view or alias is referenced during the compilation of an SQL statement.

DLCHKTIME = 1000
This parameter defines the frequency at which the database manager checks for deadlocks among all the applications connected to a database.

LOGFILSIZ = 4000
This parameter determines the number of pages for each of the configured logs. A page is 4KB in size.

LOGPRIMARY = 5
This parameter specifies the number of primary logs that will be created.

LOGSECOND = 30
This parameter specifies the number of secondary log files that are created and used for recovery log files (only as needed).

STMTHEAP=4096
This parameter sets the statement heap size. It is used to optimize complex SQL statements. If the STMTHEAP parameter is not set large enough, you may receive an SQL warning indicating that there is not enough memory available to process the statement.

On Intel platforms, the following additional database parameters are set when you create a family.

APP_CTL_HEAP_SZ=128
: This parameter determines the maximum size, in 4 KB pages, for the application control shared memory. Application control heaps are allocated from this shared memory.

CATALOGCACHE_SZ=32
: This parameter sets the catalog cache size. The catalog cache is used to store table descriptor information that is used when a table, view or alias is referenced during the compilation of an SQL statement.

DBHEAP=600
: This parameter indicates the maximum amount of space that the catalog cache can use from the database heap (dbheap).

LOCKLIST=50
: This parameter indicates the amount of storage that is allocated to the lock list. There is one lock list per database and it contains the locks held by all applications concurrently connected to the database.

MAXAPPLS=40
: This parameter specifies the maximum number of concurrent applications that can be connected (both local and remote) to a database.

TeamConnection leaves all other DB2 database configuration parameters at their DB2 default values.

Techniques for optimizing queries

Another way to increase performance of the family database is to ensure that queries issued by users are as efficient as possible. The following sections suggest two ways to accomplish this:

- By carefully considering how queries are constructed
- By introducing indexes for common predicates specifies often on queries
-

Constructing efficient queries

TeamConnection users can optimize performance of the family database by carefully considering how they construct queries. The following examples show techniques for constructing queries that can increase performance:

Limiting the result set

One of the best ways to increase efficiency is to limit the result set to only the objects you are interested in. PartView, for example, has attributes that you can combine to find only the file names you want. The following example shows a PartView query that limits the result set to file names that begin with ″tx″ and end with the extensions ″cpp″ or ″hpp″:

```
teamc report -view partView -where "baseName like 'tx%' and
      extension in ('cpp','hpp')" -raw -release v303
      -workarea 12345
```

It also improves performance to use the table and view attributes that best suit your intent. The following query, for example, uses the baseName attribute to return all parts with the extension ″exe″:

```
 teamc report -view partView -raw -where "baseName like '%.exe'"
       -release v303"
```

You can improve the performance of this query by using the extension attribute of PartView:

```
teamc report -view partView -raw -where "extension='exe'" -release v303
```

The best optimizations can be done by users expressing focused queries. There is a direct correspondence in response time with the size of the result set. So providing a predicate that limits the result set to just those objects which are of interest is beneficial. For example, if the query for the cpp and hpp files were really just interested in files in a particular directory then it could be expressed as:

```
teamc report -view partView -where "nuPathName like 'src/server/tx%' and
      extension in ('cpp','hpp')" -raw -release v303 -workarea 12345
```

Reducing columns selected from views

Another optimization technique is to reduce the attributes (columns) selected from a particular view. For example, if a user querying a PartFullView were interested only in the pathName, releaseName, currentVersion, committedVersion, revisionName, versionID, changeType, addDate, dropDate, and lastUpdate of parts, then he or she can issue the following command:

```
teamc report -general partFullView -select "pathName, releaseName,
      currentVersion, committedVersion, revisionName, versionID,
      changeType, addDate, dropDate, lastUpdate" -where "extension='exe'
      and releaseName='v303' and workareaID is null"
```

This command allows DB2 to recognize that some of the joins (the table containing configurable fields, for example) do not need to be performed to compute the result set.

Introducing indexes

Another technique for improving the performance of queries is to introduce indexes for commonly and frequently used predicates. If administrators notice common predicates being specified on queries which do not appear to be performing well, then an index can be introduced to aid in the evaluation of those queries. For example, if you see a lot of predicates which specify the target attribute, as follows:

```
teamc report -view defectView -raw -where "state='open' and (target='v303' or
      target is NULL) and addDate>'1999/07/01' order by severity, ownerLogin"
```

and which produces an audit.log entry like the following:

```
0197472,Report,SUCCESS,1999/07/15,19:27:02,19:27:04,aUser,aUser,aHost.raleigh.ibm.com,
defectView,state='open' and (target='v303' or target is NULL) and addDate>'1999/07/01'
order by severity, ownerLogin,performance,,
```

You might choose to create one of the following indexes. In this example target is a configurable field which is an alias for the 5th configurable column in fhcConfFieldDefect.

```
db2 "create index dfctCfgTrgt on fhcConfFieldDefect( c5, oid )"
db2 "runstats on table .fhcConfFieldDefect for index .dfctCfgTrgt"

db2 "create index dfctCfg on fhcDefect( addDate, state, osrelConfFieldDid )"
db2 "runstats on table .fhcDefect for index .dfctCfg"
```

Note: If you choose to create your own indexes into TeamConnection tables and views, be sure to store them in a .ddx file. The TeamConnection fhcirt command, which you use to update your TeamConnection tables and views, can drop indexes. If you have stored your indexes in .ddx files, then you can reload them when you issue the fhcirt command. See “Preserving table indexes” on page 200 for more information.

Chapter 17. Monitoring family use

TeamConnection provides monitoring tools that enable you to keep track of how family servers are being used:

- A daemon monitor accessible from the family administrator GUI or a line command (monitor) for monitoring the activity of the TeamConnection server daemons in real time.
- A license monitor command (tclicmon) for gathering information from the audit log concerning the number of users who have contacted a TeamConnection family in a given time interval.

Using the server daemon monitor

The TeamConnection server daemon monitor permits you to monitor the activity of the TeamConnection server daemons. It makes use of the server's shared memory space. Each TeamConnection daemon, as well as the monitor itself, attaches to the same shared memory segment. Each time a TeamConnection server daemon services a request, the shared memory segment for that particular server daemon is updated with information regarding the user who has requested the work and the nature of the request.

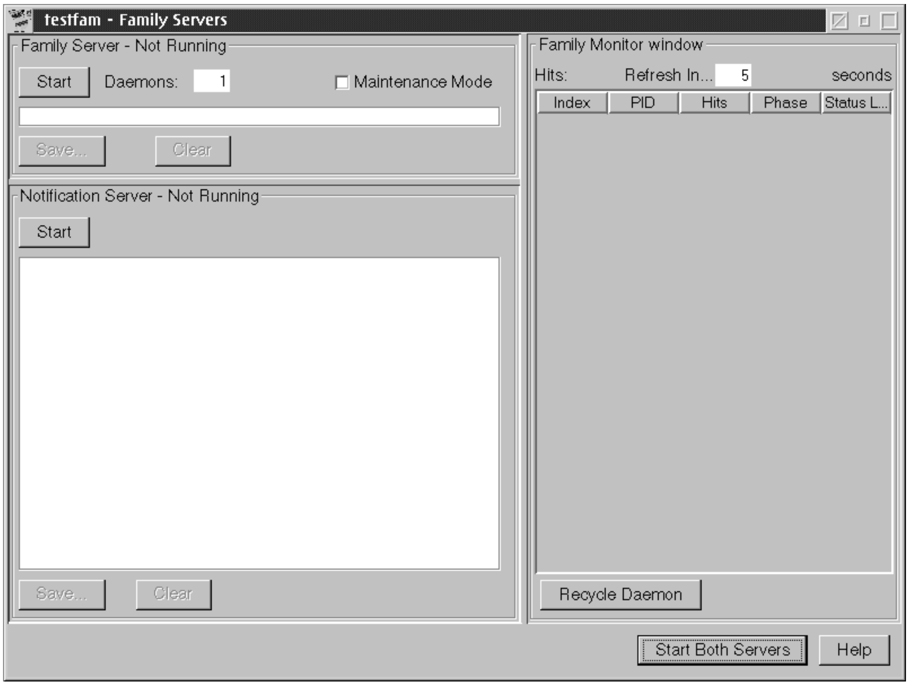
You can use the server daemon monitor in a number of ways:

- To determine the activity of the server
- To determine which users issue time-consuming requests
- To determine the total number of requests serviced by the TeamConnection server and the number serviced by each server daemon since it was started
- To determine if there is a problem with one or more of the server daemons

Using the monitor on the Family Servers window

The Family Servers window provides a family monitor area that you can use to monitor the TeamConnection family daemons. To open this window, follow these steps. To start the server daemon monitor, you must start the family you want to monitor on the TeamConnection server machine.

1. Double-click the family icon for the family you want to start. The Family Servers window appears.



The monitor section of this window has the following fields:

Hits This text area displays the total number of requests processed by all family daemons.

Refresh Interval
This text box displays the interval in seconds at which the information in the Family Monitor window is updated. Use the up and down buttons to increase or decrease the refresh interval.

For best results, decrease the refresh interval down to 1 second. If you do not intend to use the monitor information, increase the refresh interval to a large number.

Daemon information

This table displays the following status information for each family daemon.

Hits The number of requests processed by the daemon.

Index The position of the daemon. If you have five daemons running, for example, each one is numbered 01 through 05.

PID The operating system process ID for the daemon.

Status Line
The current command being executed by the daemon.

Using the monitor command

To start the server daemon monitor, you must start the family you want to monitor on the TeamConnection server machine. The server daemon monitor program is located in the `*teamcInstallPath*\bin` directory.

C:\> To start the server daemon monitor, issue the following command:

```
monitor refreshInterval [width] [-raw]
```

Where:

- **refreshInterval** indicates the time in seconds between successive screen updates. If you start the monitor with a refresh interval of 2, for example, then the activity monitor screen is updated with new information every 2 seconds. A refresh interval of 0 displays the monitor information once and then terminates.

  Set the refresh interval to a number low enough to capture requests as they are issued and processed. If you set the refresh interval too high, you may never see any activity occurring because the server daemon would have received and processed the request before the screen is updated. A refresh interval of 1 or 2 seconds is usually sufficient.
- **width** indicates the number of characters of status information to display for each TeamConnection server daemon. The default is 132 characters. The maximum is also 132 characters.
- **-raw** causes the monitor to display information in a raw format. The -raw option also causes the width parameter to be ignored. The raw format is separated by | characters, as in the following example:

  ```
  *|25|1|1|
  01|01234|00025|                              |                                    |
  .....................................................................
  ```

  The asterisk in the first column marks the start of information for the family. The next three columns represent the total hits that the family has received, the daemon count, and the number of active daemons. The subsequent lines show information for each daemon: the index, process ID, hits for each daemon, phase (60 characters), and status line (256 characters). The final line of output for each family is a line of periods. This output will be displayed every refresh interval.

After you issue this command, an activity monitor screen displays, showing which server daemons are running and which are servicing requests. To exit the server daemon monitor, press any key.

The following is an example of a TeamConnection server daemon monitor screen showing 3 TeamConnection server daemons running. Two of these daemons are servicing requests. This example shows formatted output. See the description of the **-raw** parameter, above, for an example of raw output.

```
3 of 3 teamcd daemons running.  Shared mem size is 1088.
Press any key to quit.
Total hits = 441

01,16504,00143,

02,15454,00152,statusphase = getListByBaseName,1998/02/26,08:56:54,
          Report,ksloop,ksloop,ksloop1.raleigh,DefectVi
          ew,state not in ('returned','canceled','verify','cl

03,12364,00146,
```

- The first line shows that all three of the TeamConnection server daemons are running and that the monitor and the server daemons are using 1088 bytes of shared memory.
- The second line indicates the total number of requests serviced by the server daemons since it was last started.
- The remaining lines show one status line for each server daemon. The status lines consist of comma-separated columns showing the following information for each daemon. If a daemon is not currently servicing requests, then only the first three columns of information are displayed. The amount of information displayed is also controlled by the *width* option specified with the `monitor` command. If you issue the `monitor` command without the *width* option, 132 characters of information are shown.

  Column number
  Information displayed

  1 Daemon index. The index number of the TeamConnection server daemon in the shared memory segment. If a server daemon is stopped normally while the server daemon monitor is running, then **--** appears in this column instead of a process ID. If a server daemon is stopped abruptly or abnormally while the server daemon monitor is running, then >> appears in this column. In either case, the information about hte request that was being processed when the daemon was stopped remains on the screen. After a daemon is started again, its process ID appears in this column.

  2 Daemon process ID. The process ID of the TeamConnection server daemon.

  3 The number of requests serviced by the daemon since it was started.

  4 Status phase information, indicating the C++ method being executed.

5	The date the last request to the server daemon was issued. The format is mm/dd/yy.
6	The time the last request to the server daemon was issued. The format is hh:mm:ss.
7	The TeamConnection request that is being serviced.
8	The TeamConnection user ID that issued the request.
9	The login ID of the TeamConnection user who issued the request.
10	The hostname of the machine from which the request was issued.
11	Additional information about the request being serviced. This can include, for example, details about a TeamConnection query.

Monitoring the activity of the server daemons

You can use the TeamConnection server daemon monitor to determine if you have enough server daemons running for a family:

- If you find that all daemons are constantly in use, then you may need to increase the number of daemons you start when you start the family server. Each TeamConnection family server daemon can process only one request at a time. If all daemons are busy processing requests, new requests are rejected. Users whose requests are rejected receive a message like the following:

```
0010-250 A connection cannot be established with family or port testfam at
         node testfam on port 9001.

         An error occurred while processing the connect system function on the
         TeamConnection server. The connection request has been rejected by
         the TeamConnection server.

  Recovery:

    - Verify that the connection information displayed in the
      message is correct and that the TeamConnection server
      is running.

    - If the error occurs frequently, the TeamConnection server
      daemons may be overloaded by incoming requests.
      Increase the number of TeamConnection server daemons
      to alleviate this problem.

    - If the problem persists, contact the system administrator or
      the family administrator.
```

  Usually a request can be processed very quickly, but some requests can take several seconds to complete if the information being requested is lengthy or the action is complex, as in a `driver -commit` request. If your server is having trouble processing requests, you may want to stop the server and then restart it with more deamons, provided your license agreement permits you to do so.

- If you find that one or more daemons are rarely used, then you may need to decrease the number of daemons you start when you start the family server.

Detecting time-consuming requests

If you notice that a specific request of a server daemon takes a long time to complete, then you can cancel the request by recycling the daemon.

To recycle a server daemon, issue one of the following commands, replacing *pid* with the process ID of the daemon.

OS/2	`kill pid`
NT	Refer to your Windows NT documentation.
	`kill -1 pid`
hp	`kill -1 pid`
	`kill -1 pid`

See "Stopping the servers" on page 43 for more information on recycling server daemons.

Monitoring server daemon problems

Column 3 of the server daemon monitor screen displays the number of requests serviced by each server daemon. Requests should be nearly evenly distributed among the daemons. If one or more daemons shows an unusually low number of requests processed, then there may be a problem with that daemon. There can be one or more reasons for a low processing rate for a daemon:

- A request can take a long time to process. Actions such as `driver -commit`, `driver -check -long`, `driver -extract`, `release -extract`, and `report` can be time consuming.
- A request may be held pending the release of a lock on a database table. Certain actions, such as `driver -commit`, need to lock some of the database tables so that other users do not damage the data integrity before the request completes. If a database table is locked and an update request for that table is received, then the request will be held until the database table is unlocked. An update request is any request that alters the contents of the

information in a database table. Requests that query the contents of a locked database table can still be completed.

Using the license monitor

Use the TeamConnection license monitor to obtain a snapshot of the number of users who have contacted a TeamConnection family in a given time interval. The license monitor obtains family use information from the audit log. By default, only the audit.log for the current family is processed, but you can request information for another family on the same server.

Note: The license monitor needs to use an audit log file that is not currently in use by a family server. If the audit log is in use, stop the family server before running the license monitor.

The license monitor is a command that allows TeamConnection family administrators to monitor compliance with the terms of your license agreement by showing the number of concurrent uses of TeamConnection for a given time period. It is assumed that the family administrators know how many licenses the company obtained for TeamConnection.

The number of concurrent users is defined as the number of users who have contacted a TeamConnection family in a given amount of time. The default is 15 minutes. If, for example, you have 30 licenses and a total pool of 100 users, then up to 30 users can work with a TeamConnection family for any given period of 15 minutes.

The license monitor command does not enforce the limit of the number of licenses. Even if the number of actual users exceeds the number of licenses for TeamConnection, no attempt is made to limit access to a TeamConnection family. It is the responsibility of the family administrator to monitor the license usage and if the number of concurrent users exceeds the number of licenses for TeamConnection, then the family administrator should contact IBM to obtain more licenses. The number of licenses and the highest actual number of concurrent users should match.

The license monitor command is invoked from the directory of the family you want to monitor. It uses the contents of the audit.log to determine how many users (defined by each unique combination of user ID, login ID, and host name) have contacted the TeamConnection family in a given date and time interval, according to periods of a given duration (also called histograms). If, for example, use is to be monitored for two hours from 08:00 to 10:00, then the license monitor checks the audit log for users each 15 minutes (the default): four times per hour or eight times in the two-hour interval.

The following is an example of how family use might be reported for this two-hour period:

```
From 08:00:01 to 08:15:00, actual users:  1
From 08:15:01 to 08:30:00, actual users:  5
From 08:30:01 to 08:45:00, actual users:  5
From 08:45:01 to 09:00:00, actual users: 10
From 09:00:01 to 08:15:00, actual users:  8
From 09:15:01 to 09:30:00, actual users:  5
From 09:30:01 to 09:45:00, actual users:  3
From 09:45:01 to 10:00:00, actual users:  4
```

The highest amount of users in a given period is ten.

How the license monitor counts users

A user is any unique combination of user ID, login ID, and host name. If, a user accesses the family using two user IDs from a single host name, for example, then that is counted as two separate users.

If more than one period in the interval being monitored has the same highest number of users, then only the first occurrence of that number is reported. If, for example, you monitor family use for three hours and the highest number of uses reaches twenty for two separate fifteen-minute periods, only the first occurrence is reported.

Because most TeamConnection transactions have a short duration, only the starting time for the transaction is considered by the license monitor command. When a long transaction starts in one time period and ends in another time period, the license monitor counts that use only once. It ignores the user’s transaction for the second time period. A transaction in the audit log is processed only for those entries with a status of SUCCESS.

Using the tclicmon command

C:\>

You can issue the license monitor command any time, but it is recommended that you issue it at least once a day, especially before or after the daily backup of the family.

When you issue the command, you specify values for the dates and times that mark the interval you want to monitor. Use the following format for dates and times in the license monitor command:

```
yyyy/mm/dd,hh:mm:ss
```

The comma between the date and the time is required. The default value for the begin date and time is today at 00:00:01, and the default value for the end date and time is today at the current time.

The license monitor command has three action flags:

tclicmon -highest
: Displays only a summary of the report of concurrent users. The main element of the report is the time period that had the maximum use.

tclicmon -report
: Displays a full report of use for all time periods between the -begin date and the -end date for the duration specified in the -timePeriod attribute. You can request the report in several different formats.

tclicmon -help
: Displays a summary of the command, showing some examples and the defaults. To see help for the syntax, enter the command without any arguments.

Note: The order of the arguments for the tclicmon command needs to follow the sequence described in the syntax. For example, if you want to use a long report format with a begin date, then the order is:

```
-report -long -begin
```

If you change the order of the command arguments as follows:

```
-report -begin -long
```

the command will not be executed and a usage message will appear.

Reporting highest uses

To display the highest use for an interval, issue the following command from the directory containing the family you want to monitor:

```
tclicmon -highest
        [-begin yyyy/mm/dd,hh:mm:ss]
        [-end   yyyy/mm/dd,hh:mm:ss]
        [-timePeriod minutes]
        [-input fileName]
```

Where:

- `-begin` *yyyy/mm/dd,hh:mm:mm* is the date and time of the beginning of the interval. The default is today at 00:00:01.
- `-end` *yyyy/mm/dd,hh:mm:ss* is the date and time of the end of the interval. The default is today at the current time.
- `-timePeriod` *minutes* is the duration of each time period, in minutes. The minimum value is five minutes. The default is 15 minutes.
- `-input` *fileName* is the full path name of the file that contains the audit log. The default is the file name ″$TC_DBPATH/audit.log″ (for AIX, HP-UX, and Solaris) or ″*d:\%TC_DBPATH%*\\audit.log″ (for OS/2 or Windows NT), where *TC_DBPATH:* is the top directory for the family.

To obtain the default report of only the highest use, type the following,

```
tclicmon -highest
```

If the current date and time when the command is issued is July 31, 1998, 08:15:59 and the current directory for the family is k:\testfam, then the result shown in the standard output might be as follows:

```
*** TeamConnection License Monitor ***

Begin date:
   1998/07/31,00:00:01
End date:
   1998/07/31,08:15:59
Length of each time period, in minutes:
   15
Audit file:
   K:\testfam\audit.log


The period that has the highest number of concurrent users is:
beginDate           endDate             concurrentUsers
------------------- ------------------- ---------------
1998/07/31,07:00:00 1998/07/31,07:15:00 3
```

Displaying a full use report

To display a full use report for an interval, issue the following command from the directory containing the family you want to monitor:

C:\>

```
tclicmon -report [-outputFormat]
         [-begin yyyy/mm/dd,hh:mm:ss]
         [-end   yyyy/mm/dd,hh:mm:ss]
         [-timePeriod minutes]
         [-input fileName]
```

Where:

- *-outputFormat* is one of the following:

  -csv Produces an output in comma-separated-values (CSV) format. This format can be used to prepare charts with software that can import data in CSV format.
  - Each row corresponds to one time period.
  - The fields are separated by a comma, and the dates are enclosed between quotes, for example:

    ```
    "1998/10/01,00:00:01","1998/10/01,14:30:15",10
    ```

  -long This is the default format for the -report action. Produces an output with a header and a footer, and the time periods are shown in the following table format.
  - Each field is displayed as a column heading.
  - Field values appear under respective column heading.
  - Each row corresponds to one time period.

  -raw Produces an output in raw format:
  - Each row corresponds to one time period.
  - The fields are separated by a vertical bar, for example:

    ```
    1998/10/01,00:00:01|1998/10/01,14:30:15|10
    ```

  -stanza Produces an output that is equivalent to the long format.

  -table Produces an output without a header or a footer, and the time periods are shown in the following table format:
  - Each field is displayed as a column heading.
  - Field values appear under respective column heading.
  - Each row corresponds to one time period.
- `-begin` *yyyy/mm/dd,hh:mm:mm* is the date and time of the beginning of the interval. The default is today at 00:00:01.
- `-end` *yyyy/mm/dd,hh:mm:ss* is the date and time of the end of the interval. The default is today at the current time.
- `-timePeriod` *minutes* is the duration of each time period, in minutes. The minimum value is five minutes. The default is 15 minutes.
- `-input` *fileName* is the full path name of the file that contains the audit log. The default is the file name ″$TC_DBPATH/audit.log″ (for AIX, HP-UX, and Solaris) or ″*d:\%TC_DBPATH%*\\audit.log″ (for OS/2 or Windows NT), where *TC_DBPATH:* is the top directory for the family.

Examples:

- To obtain a default detailed report (-long) on family use, type the following command:

```
tclicmon -report -begin 1998/07/31,04:00:01
```

If the current date and time is July 31, 1998, 08:15:59, the starting time is 04:00 and the current directory for the family is k:\testfam, the result shown in the standard output might be as follows:

```
*** TeamConnection License Monitor ***

Begin date:
   1998/07/31,04:00:01
End date:
   1998/07/31,08:15:59
Length of each time period, in minutes:
   15
Audit file:
   K:\testfam\audit.log


beginDate           endDate             concurrentUsers
------------------- ------------------- ---------------
1998/07/31,04:00:01 1998/07/31,04:15:00 2
1998/07/31,04:15:00 1998/07/31,04:30:00 1
1998/07/31,04:30:00 1998/07/31,04:45:00 0
1998/07/31,04:45:00 1998/07/31,05:00:00 0
1998/07/31,05:00:00 1998/07/31,05:15:00 0
1998/07/31,05:15:00 1998/07/31,05:30:00 0
1998/07/31,05:30:00 1998/07/31,05:45:00 0
1998/07/31,05:45:00 1998/07/31,06:00:00 0
1998/07/31,06:00:00 1998/07/31,06:15:00 2
1998/07/31,06:15:00 1998/07/31,06:30:00 1
1998/07/31,06:30:00 1998/07/31,06:45:00 0
1998/07/31,06:45:00 1998/07/31,07:00:00 0
1998/07/31,07:00:00 1998/07/31,07:15:00 3
1998/07/31,07:15:00 1998/07/31,07:30:00 0
1998/07/31,07:30:00 1998/07/31,07:45:00 0
1998/07/31,07:45:00 1998/07/31,08:00:00 1
1998/07/31,08:00:00 1998/07/31,08:15:00 0

The period that has the highest number of concurrent users is:
beginDate           endDate             concurrentUsers
------------------- ------------------- ---------------
1998/07/31,07:00:00 1998/07/31,07:15:00 3
```

- To obtain a detailed report on family use in table format (without the header and footer), type the following command:

  ```
  tclicmon -report -table -begin 1998/07/31,04:00:01
  ```

  If the current date and time is July 31, 1998, 08:15:59, the starting time is 04:00, and the current directory for the family is k:\testfam, the result shown in the standard output might be as follows:

  ```
  beginDate           endDate             concurrentUsers
  ------------------- ------------------- ---------------
  1998/07/31,04:00:01 1998/07/31,04:15:00 2
  1998/07/31,04:15:00 1998/07/31,04:30:00 1
  ```

```
1998/07/31,04:30:00 1998/07/31,04:45:00 0
1998/07/31,04:45:00 1998/07/31,05:00:00 0
1998/07/31,05:00:00 1998/07/31,05:15:00 0
1998/07/31,05:15:00 1998/07/31,05:30:00 0
1998/07/31,05:30:00 1998/07/31,05:45:00 0
1998/07/31,05:45:00 1998/07/31,06:00:00 0
1998/07/31,06:00:00 1998/07/31,06:15:00 2
1998/07/31,06:15:00 1998/07/31,06:30:00 1
1998/07/31,06:30:00 1998/07/31,06:45:00 0
1998/07/31,06:45:00 1998/07/31,07:00:00 0
1998/07/31,07:00:00 1998/07/31,07:15:00 3
1998/07/31,07:15:00 1998/07/31,07:30:00 0
1998/07/31,07:30:00 1998/07/31,07:45:00 0
1998/07/31,07:45:00 1998/07/31,08:00:00 1
1998/07/31,08:00:00 1998/07/31,08:15:00 0
```

- To obtain a detailed report on family use in raw format (without the header and footer), type the following command:

  ```
  tclicmon -report -raw -begin 1998/07/31,04:00:01
  ```

  If the current date and time is July 31, 1998, 08:15:59, the starting time is 04:00, and the current directory for the family is k:\testfam, the result shown in the standard output might be as follows:

  ```
  1998/07/31,04:00:01|1998/07/31,04:15:00|2
  1998/07/31,04:15:00|1998/07/31,04:30:00|1
  1998/07/31,04:30:00|1998/07/31,04:45:00|0
  1998/07/31,04:45:00|1998/07/31,05:00:00|0
  1998/07/31,05:00:00|1998/07/31,05:15:00|0
  1998/07/31,05:15:00|1998/07/31,05:30:00|0
  1998/07/31,05:30:00|1998/07/31,05:45:00|0
  1998/07/31,05:45:00|1998/07/31,06:00:00|0
  1998/07/31,06:00:00|1998/07/31,06:15:00|2
  1998/07/31,06:15:00|1998/07/31,06:30:00|1
  1998/07/31,06:30:00|1998/07/31,06:45:00|0
  1998/07/31,06:45:00|1998/07/31,07:00:00|0
  1998/07/31,07:00:00|1998/07/31,07:15:00|3
  1998/07/31,07:15:00|1998/07/31,07:30:00|0
  1998/07/31,07:30:00|1998/07/31,07:45:00|0
  1998/07/31,07:45:00|1998/07/31,08:00:00|1
  1998/07/31,08:00:00|1998/07/31,08:15:00|0
  ```

- To obtain a detailed report on family use in comma-separated-values format (without the header and footer), type the following command:

  ```
  tclicmon -report -csv -begin 1998/07/31,04:00:01
  ```

  If the current date and time is July 31, 1998, 08:15:59, the starting time is 04:00, and the current directory for the family is k:\testfam, the result shown in the standard output might be as follows:

  ```
  "1998/07/31,04:00:01","1998/07/31,04:15:00",2
  "1998/07/31,04:15:00","1998/07/31,04:30:00",1
  "1998/07/31,04:30:00","1998/07/31,04:45:00",0
  "1998/07/31,04:45:00","1998/07/31,05:00:00",0
  "1998/07/31,05:00:00","1998/07/31,05:15:00",0
  ```

```
"1998/07/31,05:15:00","1998/07/31,05:30:00",0
"1998/07/31,05:30:00","1998/07/31,05:45:00",0
"1998/07/31,05:45:00","1998/07/31,06:00:00",0
"1998/07/31,06:00:00","1998/07/31,06:15:00",2
"1998/07/31,06:15:00","1998/07/31,06:30:00",1
"1998/07/31,06:30:00","1998/07/31,06:45:00",0
"1998/07/31,06:45:00","1998/07/31,07:00:00",0
"1998/07/31,07:00:00","1998/07/31,07:15:00",3
"1998/07/31,07:15:00","1998/07/31,07:30:00",0
"1998/07/31,07:30:00","1998/07/31,07:45:00",0
"1998/07/31,07:45:00","1998/07/31,08:00:00",1
"1998/07/31,08:00:00","1998/07/31,08:15:00",0
```

Chapter 18. Server tools

The following tools are provided on the TeamConnection server. Generally, they are run from the family directory and expect that all environment variables needed to run the family server are set. The PATH environment variable should include the path containing the tools since some tools will use another.

Note: It is not recommended that you make changes to your database by issuing INSERT, UPDATE, or DELETE statements or by changing or deleting database tables or the columns defined in TeamConnection database tables. Changing your database in these ways, through the DB2 administrator tools, the DB2 command line processor, the TeamConnection migration tools, or the tcupdb tool can corrupt your TeamConnection database. Any such changes are made at your own risk. Please contact your IBM representative for information on the terms of IBM customer support.

tcqry A standalone version of the teamc report command.

tcupdb
A standalone routine to update a non-TeamConnection table in the TeamConnection database.

Using tcqry

The tcqry tool is a standalone routine that issues a TeamConnection database query. It is essentially the `teamc report -general` command, but bypasses the client/server interface. The following is the syntax for the tcqry command:

```
tcqry -g tabspec [-s selspec] [-w whereClause] [-c colspec]
```

Where:

- **-g** *tabspec* is the table specification.
- **-s** *selspec* specifies the columns to select. If omitted, ″select *″ is assumed.
- **-w** *whereClause* is the where clause criteria.
- **-c** *colspec* is a series of numbers giving the minimum column widths for displaying the selected columns in a tabular format. The last number will be propagated if there are more columns than numbers. If omitted, a ″raw″ format is used with the ″|″ character separating the data columns.

The following example lists the user id, login and name of users defined to be superusers in TeamConnection.

```
tcqry-g users -s id,login,name -w "superuser='yes'" -c 5,12
```

Using tcupdb

The tcupdb is a standalone routine that issues a database command to modify a non-TeamConnection table in the TeamConnection database. The following are options for the syntax of the tcupdb command:

C:\>

```
tcupdb -g tabspec -s setClause [-w whereClause]

tcupdb -g tabspec -d [-w whereClause]

tcupdb -g tabspec -i insertClause
```

Where:

- **-g** *tabspec* is the table specification.
- **-s** *setClause* modifies the table with the given criteria.
- **-w** *whereClause* is the where clause criteria.
- **-d [w** *whereClause***]** deletes the selected rows from the table.
- **-i** *insertClause* inserts rows into the table.

The following example deletes all rows of table mytab where the column col1 has a value less than 1.

```
tcupdb  -g mytab -d -w "col1<1"
```

The following example inserts a new row into table mytab with col1 = 5 and col2 = 7.

```
tcupdb  -g mytab -i "(col1, col2) values (5, 7)"
```

The following example adds one to col2 of table mytab for rows with col1 = 5.

```
tcupdb  -g mytab -s "col2 = col2 + 1" -w "col1 = 5"
```

Part 5. Using the server command-line interface

This section explains how to perform administrative functions using the TeamConnection server command-line interface. Doing these tasks from the command line sometimes requires extra steps and is more prone to error. For these reasons, it is recommended that you perform most functions using the family administrator graphical user interface. The commands in this section, however, can help you to automate TeamConnection tasks.

Chapter 19. Creating, starting and stopping a family

Creating a family database

You can create a family database from a command line prompt using the fhcirt command, as follows:

```
C:\>

fhcirt [-family familyName] [-c [-f]] [-d databaseLocation]  [loadfiles] [-v]
```

Where:

- **-family** *familyName* specifies the name of the family to create or update. If you do not include this parameter, fhcirt uses the family name set in the TC_FAMILY environment variable.
- **-c [-f]** causes the DB2 database to be dropped (if it already exists) and created. If you also include the -f parameter, the database is dropped without prompting you for confirmation.
- **-d** *databaseLocation* specifies the location where the database should be created. On Intel platforms, specify a drive, such as **e:**. On UNIX platforms, specify a directory path, such as **/disk2/database**. If you omit this parameter, the database will be created where DB2 is installed.
- *loadfiles* are the DB2 files to be loaded into the database. On Intel platforms, specify the drive and directory path where the TeamConnection DB2 table definitions, view definitions, and bind files are installed. The default directory path is \teamc\nls\cfg. On UNIX platforms, specify the directory path where the TeamConnection DB2 table definitions, view definitions, and bind files are installed. The default directory path is $TC_HOME/nls/cfg. For both platforms, the files you need are *.ddl (table definitions), *.ddv (view definitions), and *.bnd (bind files).

  Note: If you have added indexes to the TeamConnection tables, you will also need to include the full path name of your .ddx files. See "Preserving table indexes" on page 200 for more information.
- **-v** displays detailed information about the updates made to your tables and views. This parameter is optional.

To create a family database named family1 on drive d:, issue the following command:

```
fhcirt -family family1 -c -d d: f:\teamc\nls\cfg\*.ddl f:\teamc\nls\cfg\*.ddv
                f:\teamc\nls\cfg\*.bnd
```

Note: The directory path \teamc\nls\cfg is the default installation path on Intel for the TeamConnection DB2 files needed to create tables and views and bind the family database. If you specify an installation path other than the default, make sure the path you specify for the *loadfiles* parameter contains the TeamConnection DB2 files.

Preserving table indexes

During an upgrade fhcirt might drop indexes on some of the tables in a TeamConnection family. If some of the TeamConnection tables have been reorganized and you are upgrading to a new level of TeamConnection code, this function eliminates unnecessary indexes. If you have added your own indexes to TeamConnection tables, however, fhcirt drops these indexes as well. You need to preserve your indexes before updating your tables using fhcirt.

To preserve your indexes, add them to a .ddx file and include this file name with the list of *loadfiles* that you pass to the fhcirt command.

The fhcirt command displays all of the dropped indexes with the following warning message

Note: The following indexes were dropped. If any of these were created by the family administrator please make sure they are re-created. In the future non-standard TeamConnection indexes should be placed in a ’ddx’ file, and that filename passed to the fhcirt command during the upgrade process.

Creating an initial superuser for a family

Before you can define users, components, and releases for a family, you need to create a user ID with superuser access to the family. From a command line, you can do this using the fhchdf command. Before you can use this command, you need to create the family database and make sure the environment variable TC_DBPATH is set. You can issue this command only once for each family. After the initial superuser ID has been created, use the TeamConnection GUI or line commands to modify or create additional users. If the family database has a component called ″root,″ then the fhchdf command will not execute.

C:\>

```
fhchdf  -create
-user Name
-login Name
-address Name
-family Name
[-name Text]
[-area Name]
[-password Name]
```

Where:

- -user *Name* is the TeamConnection user ID for the superuser. If you omit this parameter, it defaults to the value specified for the -login parameter. It is a good idea to give the superuser an ID that is readily identifiable as a superuser. A good way to do this is to preface the user ID with su_, such as -user su_john.

  Note: This parameter is used only in single-user environments, such as OS/2.
- -login *Name* is the login ID for the superuser. This parameter is used in multiuser environments, such as AIX, HP-UX, Solaris, and Windows NT, to identify the user account to which the TeamConnection superuser ID is assigned. It is a good idea to give the superuser an ID that is readily identifiable as a superuser. A good way to do this is to preface the ID with su_, such as -login su_john. Single-user environments, such as OS/2, do not define a separate login ID. If you omit the -user parameter, it defaults to the value specified for the -login parameter.
- -address *Name* is the hostname of the family server from which the superuser will be authorized to access the family, such as -address tcserver.
- -family *Name* is the name of the family for which you are defining the superuser. The family must have already been created. An example is -family testfam.
- -name *Text* is the real name of the superuser, such as -name ″John Smith″. This attribute is optional.
- -area *Name* is the development area in which the superuser works, such as -area ″User interface″. This attribute is optional.
- -password *Name* is the password that must be used by the initial superuser. A password is required only if you created the family with the password-only or password-or-host level of security. Under these security levels, if a password is not created, then no one will have access to the database.

The following example creates a superuser ID for John Smith on the family server tcserver for the family named robot:

```
fhchdf -create -user su_john -login jsmith -address tcserver
        -family robot -name "John Smith" -area "User interface"
        -password f5asdfjk
```

Starting your family

You can use the teamcd command to start the family server, notification server, and build servers together or to start any one of these by itself.

Family server and, optionally, all servers

To start the family server from the command line, type the following from a prompt:

C:\>

```
teamcd [-b bldsrvr -n mailexit -m] family n
```

Where:

- **-b** *bldsrvr* starts a build server and specifies the name of a file that describes the build servers that you want to start. Refer to the *TeamConnection User's Guide* for information about creating this file. You can also use the TC_BUILD_RSSBUILDS_FILE environment variable to set this value.
- **-n** *mailexit* starts a notification server and specifies the executable or command file to process mail requests. You can also use the TC_NOTIFY_DAEMON environment variable to set this value.
- **-m** starts the family in maintenance mode. While in maintenance mode, the family is locked into read-only mode and prevents users from updating the database while maintenance is being performed.

  You can issue report queries and extract parts when the TeamConnection server is running in maintenance mode, but you cannot issue any commands that update the database. If you attempt a command that updates the database while the server is running in maintenance mode, you will receive an error message. You can supplement the text of this standard error message. In the server's /config directory, create a text file named **maintMsg** and place in it any appropriate text, such as "This TeamConnection family is down for backups from 2am to 4am daily."
- *family* is the name of the family you are starting.
- *n* is the number of daemons that you want to start. When starting the family server, if this value is not typed, the default is 1. When starting only build servers or the notification server, specify 0 for this parameter.

It is recommended that you use this command to start your build servers. However, you can start the build server separately as described in the *TeamConnection User's Guide*.

Build server only

TeamConnection provides build servers on the following platforms: AIX, HP-UX, Solaris, OS/2, Windows NT, Windows 95, MVS, and MVS/OpenEdition.

Other than MVS and MVS/OE build servers, you can start build servers using either the teamcd or teamcbld command. We recommend you use the teamcd command as it provides better process and memory management of the build servers.

To use the teamcd command to start a build server apart from starting the family server (on the same machine), type the following from a prompt:

```
teamcd -b bldsrvr family 0
```

Where:

- *bldsrvr* is the name of a file that describes the build servers that you want to start. Refer to the *TeamConnection User's Guide* for information about creating this file. You can also use the TC_BUILD_RSSBUILDS_FILE environment variable to set this value.
- *family* is the name of the family for which you are starting the build server.
- 0 indicates that only the build server, and not the family server, is to be started. When you want to start only a build server, you must specify 0 as the number of daemons, otherwise TeamConnection will start one family daemon.

Note:

For information on starting the build sever using the teamcbld command, refer to the *TeamConnection User's Guide*.

An MVS or MVS/OE build server cannot be started using the teamcd command. Refer to the *TeamConnection User's Guide* for instructions on starting an MVS build server.

Notification server only

You can use the teamcd command to start the notification server apart from starting the family server by typing one of the following commands from a prompt:

```
notifyd family mailexit

teamcd -n mailexit family 0
```

Where:

- *family* is the name of your family.
- *mailexit* is the executable or command file that specifies the exit routine to process mail requests. You can also use the TC_NOTIFY_DAEMON environment variable to set this value.
- 0 on the teamcd command indicates that only the notification server, and not the family server, is to be started. When you want to start only a notification server, you must specify 0 as the number of daemons on the teamcd command, otherwise TeamConnection will start one family daemon.

Starting teamcd as a Windows NT service

You can set up teamcd to run as a Windows NT service as follows. Before you follow the instructions below, take note of the following limitations:

- If the user account used to log on the service is logged off of NT, SRVANY will continue to run, but the teamcd daemons will be killed when DB2 detects the user logoff. When another user (or even the same user) logs onto NT, SRVANY will still be running, but the teamcd daemons will not be regenerated.
- Stopping the teamcd service does not stop the family. To stop the family, issue the following command from the command prompt:

  ```
  kill teamcd
  ```
- Since TeamConnection is not currently designed to run specifically as an NT service, some of the standard NT service benefits (such as system service logging) will not be performed

To set up and run teamcd as an NT service, do the following:

1. Install the NT Resource Kit, either Workstation or Server. This kit contains the SRVANY application, which allows other applications to run as an NT service.
2. Install SRVANY to run the TeamConnection service. From a command prompt, type the following command. Replace *TC_Service* with the name you want to assign to the service and *d:\dirpath\* with the full path to SERVANY.EXE.

   ```
   instsrv TC_Service d:\dirpath\srvany.exe
   ```
3. In the Control Panel, double-click the Services icon to open the Services dialog box.
4. Select *TC_Service* and click the **Startup** button to open the Service window. Complete the fields on this window as follows:

   For this field:
   Select or specify:

   Startup Type
   Automatic

   Log On As
   This Account

   In the text entry field next to it, specify the user account the service will use to log on. This account should have NT Administrator authority as well as the authority to start the TeamConnection family server and logon to DB2.

   Note: Do not set **Log On As** to the System Account. When the service is started with this specified, NT will pass 'SYSTEM' as the login ID to TeamConnection and TeamConnection will attempt to logon to DB2 with this ID. The DB2 logon will fail and the service will not be started.

5. Create a command file called StartTC.cmd with the following three lines:

```
set tc_dbpath=familypath
db2start
start " TeamC -family" /min teamcd family daemons
```

   Replace the values shown in this example as follows:

   Command:
   Function:

   set tc_dbpath=*familypath*
   Sets the TC_DBPATH environment variable. Replace *familypath* with the location and name of the family database.

   db2start
   Starts the DB2 database manager. If DB2 is already running, DB2 will return with a message indicating this and the processing of the command file will not be affected.

   start *"TeamC -family"* **/min teamcd** *family daemons*
   Starts the teamcd process under the name you provide. This command has the following parts:

   "TeamC - family"
   The name of the process you wish to use.

   /min Starts the teamcd process minimized.

   family The name of your family. (The family name, TCP/IP host name, and port number must be properly defined in the TCP/IP hosts and services files. See "Updating TCP/IP files" on page 17 for instructions.)

   daemons
   The number of teamcd family server daemons to start. (See "Specifying the number of daemons to start" on page 39 for guidelines on the number of daemons to start.)

6. To start the Registry Editor, type the following command at a command prompt:

```
regedt32
```

7. Make the following changes in the Registry Editor:

8. Under HKEY_LOCAL_MACHINE, open the following folders:

```
SYSTEM
CurrentControlSet
Services
TC_Service
```

9. In the *TC_Service* folder, select **Edit** → **Add Key** to create a key named **Parameters** with a class of **REG_SZ**.
10. Open the Parameters key folder and select **Edit** → **Add Value** to create a value with the name **Application** and data type **REG_SZ**.
11. In the String Editor, type the full path name of your StartTC command file, as in the following example:

    ```
    C:\StartTC.cmd
    ```

After you have followed these steps, *TC_Service* is configured to start when NT boots. Your TeamConnection family will start automatically whenever you start your NT system.

Stopping your family

If you started the family server from a command line, type the following at a prompt. Substitute the name of the family you want to stop for *familyName*.

C:\>

```
tcstop familyName
```

NT

If more than one TeamConnection family has been created on an NT server, tcstop will only stop the first family created. You may have to use the NT Task Manager to stop the second family (or enter CTRL-C).

Chapter 20. Configurable field commands

Defining configurable field types

This section provides instructions for manually editing the config.ld file to define configurable field types. When you change the config.ld file, you must also reload the contents of the config table.

Instructions for using the family administrator to define field types are on page 117.

Before you define field types, you should be familiar with the information in "Defining configurable field types" on page 117.

It is recommended that you keep the config.ld file in the family directory. If you want to maintain common configurable field definitions for more than one family, however, you can store this file in a common directory; but you will need to specify the fully-qualified path name for it when you load it using the fhclcnfg command.

Note: Be careful not to include duplicate entries in this file. If you attempt to load this file with duplicate entries, you will receive an SQL error from DB2 with a message similar to the following:

```
SQLMessage: One or more values in the INSERT statement,
UPDATE statement or foreign key update caused by a DELETE
statement are not valid because they would produce duplicate
rows for a table with a primary key, unique constraint or
unique index.
```

When adding entries to the file, follow the existing format of the file:

```
fieldType|value|default|kind|driver|driverSeq|dependent|dependSeq|choiceOrder|
description|helpText
```

Information about configurable field types is stored in the config table. After you modify the config table, you must reload it (see "Reloading the config table" on page 210).

The config table consists of the following information:

fieldType
Identifies the types of configurable fields that are defined for your family. You specify one of these types when you configure a new field. You can create new types, and you can configure the acceptable

values for each type. You must have at least one value for each type. The type field can have up to 15 characters (7 for DBCS), but it cannot contain blank spaces or tabs.

The name that you specify becomes a column name for the DB2 database table for any object (defect, feature, part, release, user, or workarea) that you add the field type to as a configurable field. DB2 requires that all column names be unique. You cannot, therefore, use any name that is already defined as a column for the table. The DefectView table, for example, has a column named ″state.″ This column records the current state of a defect (open, working, closed, canceled, and so on). You cannot add another configurable field called ″state″ to the DefectView table.

Refer to the appendix of the *Commands Reference* for a list of column names defined for defects, features, parts, releases, users, and workareas.

"Appendix D. Configurable field types" on page 277 describes the configurable field types that are shipped by TeamConnection.

value This field represents the choices the user has for the configurable field. You can add choices to the default fields shipped by TeamConnection and to the fields created specifically for your family. The value can have up to 85 single-byte characters or 65 double-byte characters; but it cannot contain spaces or tabs. If you want to enable users to set this configurable field type to the value null, include the value null among the possible values.

Note: Because a user can abbreviate these values from the command line, you cannot define a value that can be an abbreviation of another value of the same type. For example, you cannot add a value of `build` to the phase type, because a value of `building` already exists. Also, if a value of 1 exists for the severity type, you cannot add a severity value of `12`.

default This field indicates whether the defined name is used as the default when the user does not enter a value for the configuration type. Valid values are either `yes` or `no`, and only one name for each configuration type can have the default field set to `yes`.

kind This field defines the method of resolving the configured value. A kind of **0** is resolved by matching the (abbreviated) input value to a unique name value for the type. For a kind of **1**, the input may contain a list of any of the values in the *value* field separated by blanks. No abbreviations may be used. For a kind of **2**, the input must match specific rules (6-digit numeric value, for example) defined in the **value** field. This kind enables you to define a UNIX regular expression for the configurable field type instead of a specific value. It is available on UNIX platforms only. See "Defining regular expressions" on page 120 for examples of UNIX regular expressions.

The next four fields are used to define dependencies between different parameters. One parameter for a configurable object (Defect, Feature, etc.) can be defined to be a ″driver.″ Other parameters may be defined to be dependent on the driver.

One example of using dependent configurable field types is for setting values for a company's division and department numbers. You can define a configurable field type called *division* as a driver. The range of values that can be set for its dependent field type, *department* is constrained to departments that are part of the division number to which the field *division* has been set.

This dependency is set up by using non-zero values in the driver and dependent fields. The values that can be selected for the dependent field are restricted by the value selected for the driver. The values for the driver and dependent fields must be the same for all rows of a given *fieldType*. The type with a given non-zero value in the dependent field is dependent on the parameter that has that same value in its driver field. The *value* that is selected for a driver field has some number in its *driverSeq* field. If the *driverSeq* is zero, any name values of a dependent field can be selected. If the *driverSeq* is not zero, then values that can be selected for the dependent parameter must have a *dependSeq* value that is the same as the *driverSeq* value or zero.

driver The driver field for a dependent field.

driverSeq
The driver sequence number that associates a driver field with its dependent fields.

dependent
The dependent field.

dependSeq
The dependent sequence number that associates a dependent field with its driver field.

choiceOrder
The order in which the *value* is shown in the GUI.

description
This field contains the description of each value. The description field cannot contain more than 63 characters, but it can be set to blank. The description with the defined values appears on the GUI window when the field is displayed.

helpText

A long description of the *value.* This description is displayed if the user requests help for the value requested. A row in the config table with a null value for the name may supply general help text for the config type. The help text cannot contain newline characters if the field is enclosed in quotes. The preferred (by the GUI) format of help text is:

```
"xyz: This is help for the value xyz."
```

The default configuration field types, along with their attributes, that IBM ships are listed starting on page 277.

Reloading the config table

When you edit the config.ld file and change any values, you must reload the contents of the config table so that TeamConnection recognizes the changes.

You can reload the config table as often as necessary. It is recommended that you stop the family server before you reload the table (see page "Stopping the servers" on page 43 for instructions).

To reload the config table, issue the following command from the server machine. Before issuing this command, ensure that the TC_FAMILY environment variable is set to the correct family name and TC_DBPATH is set to the correct database path name.

```
C:\>  fhclcnfg path\config.ld
```

Where:
- *path*\config.ld is the path name of the configurable fields definition file. If you specify a fully-qualified path name, TeamConnectionlooks for the file in the path you specify. If you specify only the file name with no directory path, TeamConnection looks for the file in the directory specified by the TC_DBPATH environment variable.

Changing values in the config table does not change any values that are already in the database for existing records.

To verify that the command successfully modified the config table, use the report command to generate a report. To do this, type the following from an OS/2 or TeamConnection command line:

```
C:\>  teamc report -view config
```

If the config table did not load correctly, make the necessary changes to the config.ld file and run the command again.

For more information, about the report -view command, refer to the *Commands Reference*.

Updating .tbl files

To add a configurable field type to a TeamConnection object, you need to update the .tbl file for that object. The following objects support configurable fields and can have a .tbl file associated with them. These files are located in the cfgField directory of your family directory (TC_DBPATH). As shipped, only the Defect.tbl and Feature.tbl files have contents because only defects and features have configurable fields.

Object	**Associated .tbl file**
Defects	Defect.tbl
Features	Feature.tbl
Parts	Part.tbl
Releases	Release.tbl
Users	User.tbl
Workareas	Workarea.tbl

A .tbl file consists of one or more records containing up to 10 fields separated by vertical bars (|). Each field represents a configurable field setting (such as the field type or whether or not it is required). The fields are positional; that is, the field's position in the record determines which setting its value applies to. If no value is defined for a field (the field is null), its place is held by two vertical bars side-by-side (||).

The following is an example of a configurable field record in a .tbl file:

```
yes|priority|priority|Priority|Priority|no|no|priority|no|no
```

The following table explains each field, its corresponding field on the configurable fields settings window in the family administrator, acceptable values, and a description of its function.

Field	**Configurable Field Setting**	**Values**	**Function**
Field 1	Active	yes no	Whether or not the field is available to users.

Field	Configurable Field Setting	Values	Function
Field 2	Field Name	Any text string containing up to 15 characters (7 for DBCS). The string cannot contain spaces. This field is required.	How the field is identified in the family administrator.
Field 3	Attribute	Any text string containing up to 15 characters (7 for DBCS). The string cannot contain spaces.	The command-line attribute for the field. If you do not specify a value for this field, the field is not available from the command-line interface.
Field 4	Field Label	Any text string containing up to 15 characters (7 for DBCS). The string cannot contain spaces.	The field label that appears in the user interface, such as on filter windows.
Field 5	Title	Any text string containing up to 15 characters (7 for DBCS). The string cannot contain spaces.	The field label that appears on column headings for reports.
Field 6	Show on Create/Open	yes no	Whether or not the field appears on Create or Open windows.
Field 7	• Required on Create/Open • Required on Accept	yes acc || (null)	Whether or not the field is required to create, open, or accept the object. The values for his field have the following meaning: **yes** Required on Create/Open **acc** Required on Accept (valid for defects and features only) **|| (null)** Not required
Field 8	Field Type	Either a configurable field type defined in config.ld or || (null).	Determines whether the user selects a value defined by the field type or enters text for the field.

Field	Configurable Field Setting	Values	Function
Field 9	Owner Modifiable	yes no	Whether or not the owner of the object can modify the field.
Field 10	Originator Modifiable	yes no	Whether or not the originator of the object can modify the field. The value ″yes″ is valid only for defects and features. For all other objects, the value must be ″no.″

The following is the Defect.tbl file shipped with TeamConnection. This file defines five configurable fields for defects:

```
yes|symptom|symptom|Symptom||yes|yes|symptom|yes|yes
yes|phaseFound|phaseFound|Phase found||yes|yes|phase|yes|yes
yes|phaseInject|phaseInject|Phase injected||no|no|phase|yes|yes
yes|priority|priority|Priority|Priority|no|no|priority|no|no
yes|target|target|Target|Target|no|no||yes|no
```

Notice the following about these configurable fields:

- Records 1 through 3, the ″symptom,″ ″phaseFound,″ and ″phaseInject″ fields, have no labels for report column headings. These columns will not appear in defect reports.
- Record 5, the ″target″ field, is a text field. It has no associated configurable field type, so users enter text for this field.

Updating database views with new configurable field information

After you reload the contents of the config table (update the .tbl files), you must also update the database views so that the new configurable fields appear in the GUI.

It is recommended that you stop the family server before you update the database views (see “Stopping the servers” on page 43 for instructions).

To update the database views, issue the following command from the server machine. Before issuing this command, ensure that the TC_FAMILY environment variable is set to the correct family name and TC_DBPATH is set to the correct database path name.

C:\>

```
fhcfupdv configFile view
```

Where:

- *configFile* is the name of the configurable field table (.tbl file) with which the view is to be updated. TeamConnection looks for the file in the directory specified by the TC_DBPATH environment variable.
- *view* is the database view to be updated. The following are the views you can specify with this command. Refer to the *TeamConnection Commands Reference* for a full description of each of these views.
  - DefectView
  - Feature View
  - DefectDownView
  - FeatureDownView
  - Users
  - PartView
  - PartFullView
  - WorkAreaView
  - ReleaseView

Updating TargetView and ConfigPartView

The TeamConnection Family Administrator GUI does not support adding configurable fields to TargetView and ConfigPartView. To add configurable fields to these views, follow these steps. You can perform this procedure any time after the database is created.

1. Copy tcsource.tbl from the samples directory to the cfgField directory.
2. Edit tcsource.tbl for any new fields to be added. By default, these fields contain definitions for only one configurable field: externalVersion.
3. To update TargetView with the configurable field information, issue the following command from a command line prompt:

```
fhcfupdv tcsource.tbl TargetView
```

4. To update ConfigPartView with the configurable field information, issue the following command from a command line prompt:

```
fhcfupdv tcsource.tbl ConfigPartView
```

Changing report formats

This section explains how you can manually change the position of report fields on the reports TeamConnection generates for the user, defect, feature, partFullView, and partView objects.

Instructions for using the family administrator to change the reports are on page 125.

You can use the system editor to edit the following files. Before you change the report formats, you might want to make backup copies of these files.

- cfgfield\Defect.fmt
- cfgfield\Feature.fmt
- cfgfield\Part.fmt
- chgfield\Partview.fmt
- cfgfield\Release.fmt
- cfgfield\User.fmt
- cfgfield\Workarea.fmt

Each .fmt file is divided into five sections, separated by colons. The sections are:

- StanzaViewFormat
- StanzaViewColumn
- TableViewFormat
- TableViewColumn
- TableViewHeader

The column sections describe the column name of each of the labels specified in the format sections. The header section specifies how the columns appear in the table format.

The format sections specify the layout of the report. For example, a format specification of %3$-25.25s indicates the following:

% Start of format specification.

3 The sequence number of the field that is generated by TeamConnection. The dollar sign must appear after the sequence number.

Note: If you add a new field to the report, you must adjust all sequence numbers for fields that appear after the new field. If you create a new configurable field and place it in position 3, for example, then you must increase the sequence number of the field that was previously defined in position 3 to 4 and increase the sequence number for all remaining fields.

- The output is left-justified. If you do not include this character, the output is right-justified.

25 The minimum number of characters (bytes) of output.

.25 The maximum number of characters (bytes) printed for all or part of the output field, or minimum number of digits printed for integer values.

If you do not want the field displayed, type `0.0`. For example, you have three sequence fields: 1, 2, and 3. If you do not want sequence 2 displayed, you type:

```
%1$-4.4s %2$-0.0s %3$-15.15s
```

s Type of data:
`s` for strings
`ld` for integers

You can specify only a data type of `s` for configurable fields. Use `ld` to display existing values, such as defect age.

You can also change or delete the format specification. Before you change a format specification, be aware of the following:

- A format specification in the stanza view does not have to match the format specification for the same field in the table view.
- Information in a stanza report appears in columns. When you specify the identical minimum and maximum number of characters for all fields appearing in a column, the report columns are left-justified. For example, Figure 17 on page 217 shows all the fields in the first column defined as 25.25.
- When you change a format specification in the table view, adjust the matching heading length in the table view header section. Otherwise, information will not appear correctly under the headings when users display the table.

Figure 17 on page 217 shows a sample report format for the defect table after configurable fields have been added. The changes are noted in bold font and are described following the figure.

```
# StanzaViewFormat

prefix        %01$s
name          %02$s
reference     %03$s
abstract      %04$s
duplicate     %05$s

state         %06$-25.25s   priority      %07$-20.20s
severity      %08$-25.25s   target        %09$-20.20s
age           %10$s

compName      %11$-25.25s   answer        %12$-20.20s
release       %13$-25.25s   symptom       %14$-20.20s
envName       %15$-25.25s   phaseFound    %16$-20.20s
driver        %17$-25.25s   phaseInject   %18$-20.20s

addDate       %19$-25.25s   assignDate    %20$-20.20s
lastUpdate    %21$-25.25s   responseDate  %22$-20.20s
endDate       %23$-25.25s

ownerLogin    %24$-25.25s   originLogin   %25$-20.20s
ownerName     %26$-25.25s   originName    %27$-20.20s
ownerArea     %28$-25.25s   originArea    %29$-20.20s

developer    %30$-25.25s

:
# StanzaViewColumn
# NOTE: please leave this section in English
prefix,name,reference,abstract,duplicate,state,priority,severity,
target,age,compName,answer,releaseName,symptom,envName,phaseFound,
driverName,phaseInject,addDate,assignDate,lastUpdate,responseDate,
endDate,ownerLogin,originLogin,ownerName,originName,ownerArea,
originArea,developer
:
# TableViewFormat
%-4.4s %-15.15s %-15.15s %-8.8s %-8.8s %-8.8s %-3.3s %-3.3s %-4.4s %-55.55s %30$-9.
9s
:
# TableViewColumn
# NOTE: please leave this section in English
prefix,name,compName,state,originLogin,ownerLogin,severity,age,
priority,abstract,developer
:
# TableViewHeader
pref name            compName        state    originLo ownerLog sev age prio abstract  developer
:
```

Figure 17. Sample report format after adding configurable fields

In Figure 17, the format of the shipped defect report was modified as follows:

- Added a new label, `developer`, at the end of the StanzaViewFormat section, and the format specification %30$-25.25s
- Added the column name, `developer`, as the last entry in the StanzaViewColumn section

Note: When you edit the StanzaViewColumn, you must maintain a continuous line of text. Control characters are ignored and appear as output in the report.

- Added `%30$-9.9s` in the corresponding position for the `developer` entry in the TableViewFormat section
- Added the column name `developer` in the TableViewColumn section
- Added a new label, `developer`, in the TableViewHeader section and added the corresponding dashes in the next line

If the developer field had been added to the middle of the reports instead of to the end, its sequence number and the sequence number of all remaining fields would need to be adjusted.

Updating TargetView and ConfigPartView Reports

The TeamConnection Family Administrator GUI does not support modifying reports for TargetView and ConfigPartView. To modify the reports for these views, follow these steps. You can perform this procedure any time after the database is created.

1. Copy target.fmt from the samples directory to the cfgField directory.
2. Edit target.fmt for any new fields to be added. By default, these fields contain definitions for only one configurable field: externalVersion.

Chapter 21. Configuring component or release processes

This section provides instructions for manually editing the comproc.ld and relproc.ld files to configure processes. When you change the .ld files, you must also reload the contents of the configurable process tables.

Instructions for using the family administrator to configure processes are on page 131.

Before you configure processes, you should be familiar with the information in “Chapter 11. Configuring component and release processes” on page 131.

Editing the comproc.ld and relproc.ld files

Information about configurable processes for components is stored in the comproc.ld file. Information about configurable processes for releases is stored in the relproc.ld file. When the family is created, the configurable process tables are created, based on the settings in the comproc.ld and relproc.ld files. If you modify the configurable process tables after the family is created, edit the .ld files and then run the fhclproc command.

To add new processes or change existing processes, edit the comproc.ld file for component processes or the relproc.ld file for release processes. It is recommended that you keep the comproc.ld and relproc.ld files in the family directory. If you want to maintain common process definitions for more than one family, however, you can store these files in a common directory; but you will need to specify the fully-qualified path name for them when you load them using the fhclproc command.

Note: Be careful not to include duplicate entries in this file. If you attempt to load this file with duplicate entries, you will receive an SQL error from DB2 with a message similar to the following:

```
SQLMessage: One or more values in the INSERT statement,
UPDATE statement or foreign key update caused by a DELETE
statement are not valid because they would produce duplicate
rows for a table with a primary key, unique constraint or
unique index.
```

Add entries to the file using the following format:

```
ProcessName|SubprocessName
```

ProcessName

The name of the process you are creating. The name can be up to 15 characters in length; it cannot contain blanks, tabs, or vertical separators.

SubprocessName

The name of a TeamConnection subprocess. You can specify only one of the following subprocesses for each entry. If you want to include more than one subprocess, you must have an entry for each subprocess. Type the name exactly as it appears in the database.

The following are the subprocesses for components:

- none
- dsrDefect
- dsrFeature
- verifyDefect
- verifyFeature

The following are the subprocesses for releases:

- none
- approval
- fix
- driver
- test
- track
- trackfixhold
- tracktesthold
- trackcommithold

See "Release processes" on page 80 for an explanation of these subprocesses.

Reloading the configurable process tables

After you edit an .ld file, use the fhclproc command to reload the contents of the configurable component or release process tables with the changed values. Before issuing this command, ensure that the TC_FAMILY environment variable is set to the correct family name and TC_DBPATH is set to the correct database path name. The format of the fhclproc command when reloading the component process table is:

C:\>

```
fhclproc path\comproc.ld c
```

The format of the fhclproc command when reloading the release process table is:

```
fhclproc path\relproc.ld  r
```

Where:
- *path*\comproc.ld or *path*\relproc.ld is the path name of the process definition file. If you specify a fully-qualified path name, TeamConnection looks for the .ld file in the path you specify. If you specify only the file name with no directory path, TeamConnection looks for the file in the directory specified by the TC_DBPATH environment variable.
- c indicates that you are reloading the component process table.
- r indicates that you are reloading the release process table.

To verify that the command successfully modified the tables, use the report command to generate a report. To do this, type one of the following commands:

```
teamc report -view Cfgcomproc
teamc report -view Cfgrelproc
```

If the table did not load correctly, make the necessary changes to the comproc.ld or relproc.ld file and run the command again.

For more information about the report -view command, refer to the *Commands Reference*.

Chapter 22. Setting up user exits

This section provides instructions for manually updating the userExit file to add entries that call user-defined programs during the processing of TeamConnection actions.

Instructions for using the family administrator to set up user exits are on page 136.

Before you edit the userExit file, you should be familiar with the information in “Chapter 12. Providing user exits” on page 135.

Note: The userExit file is copied to your family database directory from a file located in the language subdirectory of the nls\cfg directory path in the TeamConnection installation directory, for example, teamc\nls\cfg\enu. The version of the userExit file in this location contains comments that are not copied when the family is created using the family administrator.

Editing the userExit file

The userExit file has no defined actions until you add entries for the user exits that your organization will use. The entries you add specify the programs that you want started for specific TeamConnection actions. For each user exit, add an entry using the following format:

```
Action  ExitID  UEprogram  UEparameter  ENV=( ) #Comments
```

Use one or more blank spaces to separate each field in the entry. A line that begins with a # sign is a comment. You can have blank lines in the file.

The userExit file is located in the config subdirectory of the directory where your family’s database is installed.

A description of each field in the entry follows:

Action
: The name of the TeamConnection action that causes the user exit to start. You must type the name exactly as it appears in the database. See the list of actions in “Appendix B. Worksheets” on page 253 for the correct spelling and capitalization. For a list of actions that support user exits, see the User Exits page of the Settings notebook for your family.

ExitID Identifies when the user exit program is started during the course of the TeamConnection action. Valid values are 0, 1, 2, and 3. The value indicates that the user exit program does one of the following:

0	Starts at the beginning of the TeamConnection action, before any initialization or access checking takes place.
1	Starts after all TeamConnection checks are made and TeamConnection is ready to process the command.
2	Starts after the TeamConnection action is completed. At this point, the action has been submitted to TeamConnection, and all database or library updates have been committed.
3	Starts when a previous user exit with an exit ID of 0 or 1 is not successful, or when the TeamConnection action is not successful. This exit ID allows the user exit program to clean up what the other user exit programs started.

UEprogram
The name of the user exit program. The program must exist in a directory defined in the PATH statement of your config.sys file (for OS/2 or Windows platforms).

UEparameter
A variable-length list of character string parameters provided to the user exit program.

ENV=( )
The customized parameter list for the user exit. See “Creating customized parameter lists” for more information on passing a customized parameter list to a user exit program.

#Comments
A comment about the user exit program. This field is optional.

TeamConnection does not recognize the updates to the userExit file until you stop and restart the TeamConnection server.

Creating customized parameter lists

To create a customized parameter list for a user exit program, include the ENV=( ) field in the definition for the user exit in the userExit file. The ENV=( ) field consists of a comma-separated list of the parameters or configurable fields to be passed to the user exit program. To pass the component and release parameters of a PartAdd action to a user exit, for example, include the ENV=( ) field as follows:

```
ENV=(component,release)
```

See “Appendix E. User exit parameters” on page 289 for a list of parameters that can be passed to a user exit program for each action’s exit IDs.

To include a configurable field in a customized parameter list, identify it by its attribute name.

Chapter 23. Creating and modifying authority and interest groups

Creating or modifying authority groups

When a TeamConnection family is created, the authority table is primed with default information contained in the authorit.ld file. This section provides instructions for manually editing the authorit.ld file to create new authority groups or change information about existing authority groups. When you change the authorit.ld file, you must also reload the contents of the authority table in the TeamConnection database.

Instructions for using the family administrator to create or modify authority groups are on page 99.

Before you create or modify authority groups, you should be familiar with the information in "Setting up authority groups" on page 97.

Editing the authorit.ld file

To add new authority groups or to add actions to an existing authority group, edit the authorit.ld file. It is recommended that you keep the authorit.ld file in the family directory. If you want to maintain common authority group definitions for more than one family, however, you can store this file in a common directory; but you will need to specify the fully-qualified path name for the authorit.ld file when you load it using the fhclauth command.

Note: Be careful not to include duplicate entries in this file. If you attempt to load this file with duplicate entries, you will receive an SQL error from DB2 with a message similar to the following:

```
SQLMessage: One or more values in the INSERT statement,
UPDATE statement or foreign key update caused by a DELETE
statement are not valid because they would produce duplicate
rows for a table with a primary key, unique constraint or
unique index.
```

Add entries to the file using the following format:

```
AuthorityGroup|ActionName
```

AuthorityGroup
This is the name of an existing authority group or the name of a group that you are creating. The name can be 15 characters long; it cannot contain blanks, tabs, or vertical separators. For an existing

authority group, type the name exactly as it appears in the database table. The default names provided by IBM use all lowercase characters.

ActionName
This is the name of an existing TeamConnection action. Specify only one action per entry. You must type the name exactly as it appears in the database table. Refer to the list of actions in the *TeamConnection User's Guide* for the correct spelling and capitalization. Certain actions cannot be included in an authority group. These actions are noted in the table found in "Appendix B. Worksheets" on page 253.

As shipped, the sample authorit.ld file provided with TeamConnection does not include the PartExec action. To add this action to your authority groups, edit and reload authorit.ld.

Reloading the authority table

Whenever you change the authorit.ld file, you must reload the contents of the authority table before your users can use the new and changed authority groups.

You can reload the authority table as often as necessary. We recommend that you stop the family server before you reload the authority table (see page "Stopping the servers" on page 43 for instructions).

To reload the authority table, issue the following command from the server machine. Before issuing this command, ensure that the TC_FAMILY environment variable is set to the correct family name and TC_DBPATH is set to the correct database path name.

C:\>

```
fhclauth path\authorit.ld
```

Where:
- *path*\authorit.ld is the path name of the authorit.ld file. If you specify a fully-qualified path name, TeamConnection looks for the authorit.ld file in the path you specify. If you specify only **authorit.ld** with no directory path, TeamConnection looks for the file in the directory specified by the TC_DBPATH environment variable.

To verify that the authority table loaded correctly, use the report command to generate a report on the authority table. For example, to verify that a new authority group named `general` was added to the table, issue the following command:

```
C:\>            teamc report -view authority -where "name='general'"
```

If the table loaded correctly, information about the general authority group appears. If the authority table did not load correctly, make the necessary changes to the authorit.ld file and run the fhclauth command again.

For more information about the report -view command, refer to the *Commands Reference*.

Creating or modifying interest groups

This section provides instructions for manually editing the interest.ld file to create or modify interest groups. When you change the interest.ld file, you must also reload the contents of the interest table.

Instructions for using the family administrator to create or modify interest groups are on page 108.

Before you create or modify interest groups, you should be familiar with the information in "Setting up interest groups" on page 106.

Editing the interest.ld file

To add new interest groups or to add actions to an existing interest group, edit the interest.ld file. It is recommended that you keep the interest.ld file in the family directory. If you want to maintain common interest group definitions for more than one family, however, you can store this file in a common directory; but you will need to specify the fully-qualified path name for the interest.ld file when you load it using the fhclintr command.

Note: Be careful not to include duplicate entries in this file. If you attempt to load this file with duplicate entries, you will receive an SQL error from DB2 with a message similar to the following:

```
SQLMessage: One or more values in the INSERT statement,
UPDATE statement or foreign key update caused by a DELETE
statement are not valid because they would produce duplicate
rows for a table with a primary key, unique constraint or
unique index.
```

Add entries to the file using the following format:

```
InterestGroup|ActionName
```

InterestGroup
This is the name of an existing interest group or the name of a group that you are creating. The name can be up to 15 characters; it cannot

contain blanks, tabs, or vertical separators. For an existing interest group, type the name exactly as it appears in the database table. The default names provided by IBM use all lowercase characters.

ActionName
This is the name of an existing TeamConnection action. Specify only one action per entry. You must type the name exactly as it appears in the database table. Refer to the list of actions in the *TeamConnection User's Guide* for the correct spelling and capitalization. Certain actions cannot be included in an interest group. These actions are noted in the table found in "Appendix B. Worksheets" on page 253.

Reloading the interest table

Whenever you change the interest.ld file, you must reload the contents of the interest table before your users can use the new and changed interest groups.

You can reload the interest table as often as necessary. We recommend that you stop the family server before you reload the interest table (see page "Stopping the servers" on page 43 for instructions).

To reload the interest table, issue the following command from the server machine in the directory where the interest.ld file is stored. Before issuing this command, ensure that the TC_FAMILY environment variable is set to the correct family name and TC_DBPATH is set to the correct database path name.

C:\>
```
fhclintr path\interest.ld
```

Where:
- *path*\interest.ld is the path name of the interest.ld file. If you specify a fully-qualified path name, TeamConnection looks for the interest.ld file in the path you specify. If you specify only **interest.ld** with no directory path, TeamConnection looks for the file in the directory specified by the TC_DBPATH environment variable.

To verify that the interest table loaded correctly, use the report command to generate a report on the interest table. For example, to verify that a new interest group named `general` was added to the table, issue the following command:

C:\>
```
teamc report -view interest -where "name='general'"
```

If the interest table loaded correctly, information about the general interest group appears. If the interest table did not load correctly, make the necessary changes to the interest.ld file and run the command again.

For more information about the report -view command, refer to the *Commands Reference*.

Authorizing teamc part -exec commands

You can authorize the commands that can be passed to the server by the teamc part -exec action by placing the them in a file called %TC_DBPATH%/execcmds.ld. This file is automatically loaded by the server whenever the teamc part -exec command is issued. Only the commands that appear in this file can be issued using teamc part -exec. The following is an example of the contents of the execcmds.ld file for a UNIX platform:

```
/usr/bin/grep
/usr/bin/wc
```

The format of this file is a simple list of executable file names, one file per line. The path for each executable should be specified for security, but the server does search for the command in its path. Users must specify the name of the executable exactly as it appears in execcmds.ld. If the full path is in execcmds.ld, the user must specify the full path. If a relative path is specified, the user must specify a relative path. If no path is specified (the executable can be found in the server's path or current working directory), then the user must specify the file without the path. Lines preceded by # are comments and are ignored by the server. Each command line is limited to 260 bytes.

This list should not contain commands that can execute a user-specified command supplied as an argument (such as ksh, csh, sh, find, rexec, and command.com). These commands allow the user to execute commands not listed in this file and, therefore, bypass this security mechanism.

On OS/2 the executable must be in the server's current working directory or in its path. You cannot specify a directory path on the teamc part -exec command itself (for example, you cannot specify teamc part -exec ″d:\usr\bin\grep . . . ″. The OS/2 implementation of the teamc part -exec action does not support batch and command files.

You cannot specify multiple commands in the -exec command string. The teamc part -exec action accepts only one command. If you want to allow multiple commands to be executed, you must write a shell script that performs the commands you want to issue and add the name of the shell script to the list of allowed commands in execcmds.ld.

Note: Servers running Windows NT should not have batch or command files (.bat or .cmd) listed in the execcmds.ld file. In this situation, the user supplied command line, in its entirety, is interpreted by the command interpreter. Therefore, pipes (|), redirection (>), multiple commands (following &), and so on, are all evaluated and acted on by the interpreter, allowing this security mechanism to by subverted. For example, the following action will execute mybatfile and the format command and will perform the IO redirection:

```
teamc part -exec "mybatfile.bat { } d:\lotus\notes\data\*.id  & format c:>d:\tmp\a"
```

The following action, in contrast, will execute the grep and pass the remainder of the arguments directly to grep, uninterpreted because grep can be executed without involving the command interpreter:

```
teamc part -exec "grep a {} &  format c:>d:\tmp\a & format e:"
```

To grant users access to the teamc part -exec action itself, you need to add the PartExec action to any authority group in the authority table, authorit.ld and update the table in your TeamConnection database as described in “Creating or modifying authority groups” on page 227. As shipped, the sample authorit.ld file provided with TeamConnection does not include the PartExec action.

Part 6. Appendixes

Appendix A. Authority and notification for TeamConnection actions

TeamConnection ships with IBM-supplied authority groups, interest groups, component processes, and release processes. Your family administrator can modify these preconfigured authority groups, interest groups, and processes to fit the needs of your organization.

Each authority group consists of actions normally performed by a particular type of user. Your family administrator can modify these groups or create new ones to reflect the needs of your organization.

Authority groups provide explicit authority to perform the actions included in each group. You might also have implicit authority to perform certain actions according to the objects that you own. Authority groups are defined in a file called authorit.ld.

To determine your authority groups, from the Actions pull-down menu, select Lists → Access lists → Show authority actions. On the Show authority actions window select an action.

Each notification group consists of actions normally of interest to a particular type of user. Your family administrator can modify these groups or create new ones to reflect the needs of your organization. Interest groups are defined in a file called interest.ld.

To determine your interest notification groups, from the Actions pull-down menu, select Lists → Notification lists → Show interest actions. On the Show authority actions window select an action.

Notification for TeamConnection actions can be implicit or explicit. For example, the owner of an object receives implicit notification if an action is performed on an object, while users on a notification list receive explicit notification. (See the Administrator's Guide for more information.)

The following table lists all of the TeamConnection actions, the required level of implicit and explicit authority to perform the action, and the users who are notified when an action is performed. To explicitly assign authority to a user, add the user's ID to a component's access list.

Note: The user who performs the action is excluded from the notification that is sent out after the action is successfully completed.

For this action	These users have authority	These users are notified
AccessCreate	• Component owner • Explicitly defined for the component where access is being added	User being given new access, subscribers
AccessDelete	• Component owner • Explicitly defined for the component where access is being altered	User whose access was deleted, subscribers
AccessRestrict	• Component owner • Explicitly defined for the component where access is being restricted	User whose access is being restricted, subscribers
ApprovalAbstain	• Approval record owner • Explicitly defined for the component that manages the associated release	Approval record owner, subscribers
ApprovalAccept	• Approval record owner that manages the associated release	Approval record owner, subscribers
ApprovalAssign	• Approval record owner • Explicitly defined for the component that manages the associated release	New and original approval record owners, subscribers
ApprovalCreate	• Workarea owner • Explicitly defined for the component that manages the associated release	New approval record owner, subscribers
ApprovalDelete	• Explicitly defined for the component that manages the associated release	Approval record owner, subscribers
ApprovalReject	• Approval record owner • Explicitly defined for the component that manages the associated release	Approval record owner, subscribers
ApproverCreate	• Release owner • Explicitly defined for the component that manages the associated release	New approver, subscribers
ApproverDelete	• Release owner • Explicitly defined for the component that manages the associated release	Deleted approver, subscribers
BuilderCreate	• Explicitly defined for the component that manages the associated release	Subscribers
BuilderDelete	• Explicitly defined for the component that manages the associated release	Subscribers

For this action	These users have authority	These users are notified
BuilderExtract	• Explicitly defined for the component that manages the associated release	Not applicable
BuilderModify	• Explicitly defined for the component that manages the associated release	Subscribers
BuilderView	• Explicitly defined for the component that manages the associated release	Not applicable
CollisionAccept	• Component owner • Explicitly defined for the component that manages the associated release	Release owner, subscribers
CollisionReconc	• Component owner • Explicitly defined for the component that manages the associated release	Release owner, subscribers
CollisionReject	• Component owner • Explicitly defined for the component that manages the associated release	Release owner, subscribers
CompCreate	• Parent component owner • Explicitly defined for the parent component	New component owner
CompDelete	• Component owner • Explicitly defined for the component being removed	Component owner, subscribers
CompLink	• Component owner of the component being linked • Explicitly defined for the component being linked	Owners of both components, subscribers
CompModify	• Component owner • Explicitly defined for the component being modified	New component owner if applicable, subscribers
CompRecreate	• Parent component owner • Explicitly defined for the parent component	Owners of both components, subscribers
CompUnlink	• Component owner of the component being unlinked • Explicitly defined for the component being unlinked	Owners of both components, subscribers
CompView	• Component owner • Explicitly defined for the component being viewed	Not applicable

For this action	These users have authority	These users are notified
CoreqCreate	• Workarea owner of all specified workareas • Explicitly defined for the component managing the associated workarea and release	Not applicable
CoreqDelete	• Workarea owner of all specified workareas • Explicitly defined for the component associated with the release	Not applicable
DefectAccept	• Defect owner for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectAssign	• Defect owner, defect originator • Explicitly defined for the component associated with the defect **Note:** Originators who do not have DefectAssign authority can reassign the defect only when it is in the open state.	New owner, defect originator, duplicate defect originators, subscribers
DefectCancel	• Defect originator • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectClose	Automatic action; no authority is required	Defect owner, defect originator, duplicate defect originators, subscribers
DefectConfiginfo	Not applicable; this is a base authority that can be performed by all users in the family	Defect owner, defect originator, duplicate defect originators, subscribers
DefectDesign	• Defect owner • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers

For this action	These users have authority	These users are notified
DefectModify	• Defect owner can modify: – answer, abstract, environment, driver, prefix, reference, release, and all configurable fields • Defect originator can modify: – originator, severity, name, abstract, environment, driver, prefix, reference, release, and all configurable fields • Explicitly defined for the component associated with the defect, these users can modify: – abstract, answer, name, environment, driver, originator, prefix, reference, release, severity, phaseFound*, phaseInject*, priority*, symptom*, and target* *If these fields have been configured by the family administrator, the field names might differ from those shown.	Defect owner, defect originator, duplicate defect originators, subscribers
DefectOpen	Not applicable; this is a base authority that can be performed by all users in the family	Component owner, subscribers
DefectReopen	• Defect originator • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectReturn	• Defect owner • Explicitly defined for the component associated with the defect	Defect originator, duplicate defect originators, subscribers
DefectReview	• Defect owner • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectSize	• Defect owner • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectVerify	• Defect owner • Explicitly defined for the component associated with the defect	Defect owner, defect originator, duplicate defect originators, subscribers
DefectView	• Defect owner, defect originator • Explicitly defined for the component associated with the defect	Not applicable

For this action	These users have authority	These users are notified
DriverAssign	• Driver owner • Explicitly defined for the component associated with the release	New owner, subscribers
DriverCheck	• Driver owner • Explicitly defined for the component associated with the release	Not applicable
DriverCommit	• Explicitly defined for the component associated with the release	Subscribers
DriverComplete	• Explicitly defined for the component associated with the release	Subscribers
DriverCreate	• Release owner • Explicitly defined for the component associated with the release	Subscribers
DriverDelete	• Driver owner • Explicitly defined for the component associated with the release	Subscribers
DriverExtract	• Driver owner • Explicitly defined for the component associated with the release	Not applicable
DriverFreeze	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
DriverModify	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
DriverRefresh	• Explicitly defined for the component associated with the release	Component owner, subscribers
DriverRestrict	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
DriverView	• Driver owner • Explicitly defined for the component associated with the release	Not applicable
EnvCreate	• Release owner • Explicitly defined for the component associated with the release	Tester, subscribers

For this action	These users have authority	These users are notified
EnvDelete	• Release owner • Explicitly defined for the component associated with the release	Subscribers
EnvModify	• Release owner • Explicitly defined for the component associated with the release	Tester, subscribers
FeatureAccept	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureAssign	• Feature owner • Explicitly defined for the component associated with the feature	New owner, feature originator, duplicate feature originators, subscribers
FeatureCancel	• Feature originator • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureClose	Occurs automatically; no authority is required	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureComment	Not applicable; this is a base authority that can be performed by all users in the family	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureDesign	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers

For this action	These users have authority	These users are notified
FeatureModify	• Feature owner can modify: – abstract, prefix, reference, and all configurable fields • Feature originator can modify: – abstract, name, prefix, reference, and all configurable fields • Explicitly defined for the component associated with the feature, these users can modify: – abstract, name, originator, prefix, reference, priority*, and target* *If these fields have been configured by the family administrator, the field names might differ from those shown.	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureOpen	Not applicable; this is a base authority that can be performed by all users in the family	Component owner, subscribers
FeatureReopen	• Feature originator • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureReturn	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureReview	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureSize	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureVerify	• Feature owner • Explicitly defined for the component associated with the feature	Feature owner, feature originator, duplicate feature originators, subscribers
FeatureView	• Feature owner • Explicitly defined for the component associated with the feature	Not applicable

For this action	These users have authority	These users are notified
FixActive	• Fix record owner, component owner, workarea owner • Explicitly defined for the component associated with the fix record	Subscribers
FixAssign	• Fix record owner, component owner, workarea owner • Explicitly defined for the component associated with the fix record	New fix record owner, subscribers
FixComplete	• Fix record owner, component owner, workarea owner • Explicitly defined for the component associated with the fix record	Subscribers
FixCreate	• Defect or feature owner, workarea owner • Explicitly defined for the component associated with the defect or feature	Subscribers
FixDelete	• Defect or feature owner, workarea owner • Explicitly defined for the component associated with the defect or feature	Subscribers
HostCreate	• Owner of the user ID for which a host list entry is being created or deleted • Superuser	Not applicable
HostDelete	• Owner of the user ID for which a host list entry is being deleted • Superuser	Not applicable
MemberCreate	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
MemberCreateR	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
MemberDelete	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers
MemberDeleteR	• Driver owner • Explicitly defined for the component associated with the release	Driver owner, subscribers

For this action	These users have authority	These users are notified
NotifyCreate	• Component owner • Explicitly defined for the component associated with the notification list	Not applicable
NotifyDelete	• Component owner • Owner of user ID • Explicitly defined for the component associated with the notification list **Note:** Users can delete themselves from a notification list without requiring any authority	Not applicable
ParserCreate	• Explicitly defined for the component associated with the release	Subscribers
ParserDelete	• Explicitly defined for the component associated with the release	Subscribers
ParserModify	• Explicitly defined for the component associated with the release	Subscribers
ParserView	• Explicitly defined for the component associated with the release	Not applicable
PartAdd	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartBuild	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartCheckIn	• User who checked out or locked the part originally, component owner • Explicitly defined for the component associated with the part **Note:** The user who is explicitly given this authority can check in a part that is checked out by someone else.	Subscribers
PartCheckOut	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartChildInfo	• Component owner • Explicitly defined for the component associated with the part	Not applicable

For this action	These users have authority	These users are notified
PartConnect	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartDelete	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartDeleteForce	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartExtract	• Component owner • Explicitly defined for the component associated with the part	Not applicable
PartForceIn	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartForceOut	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartLink	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartLock	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartLockForce	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartMark	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartMerge	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartModify	• Component owner • Explicitly defined for the component associated with the part	Subscribers

For this action	These users have authority	These users are notified
PartOverrideR	Explicitly defined for the component associated with the release	Subscribers, user granted the override (if a user specified)
PartReconcile	• Component owner • Explicitly defined for the component that manages the associated release	Subscribers
PartRecreateForce	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartRecreate	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartRefresh	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartRename	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartRenameForce	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartResolve	Not applicable; this is a base authority that can be performed by all users in the family	Not applicable
PartRestrict	Explicitly defined for the component associated with the release	Subscribers
PartTouch	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartUndo	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartUndoForce	• Component owner • Explicitly defined for the component associated with the part	Subscribers
PartUnlock	• User who checked out or locked the part originally, component owner • Explicitly defined for the component associated with the part	Subscribers

For this action	These users have authority	These users are notified
PartView	• Component owner • Explicitly defined for the component associated with the part	Not applicable
PartViewMsg	• Component owner • Explicitly defined for the component associated with the part	Not applicable
PrereqCreate	• Workarea owner of all specified workareas • Explicitly defined for the component managing the associated workarea and release	Not applicable
PrereqDelete	• Workarea owner of all specified workareas • Explicitly defined for the component managing the associated workarea and release	Not applicable
ReleaseCreate	• Explicitly defined for the component associated with the new release	New release owner, component owner, subscribers
ReleaseDelete	• Release owner • Explicitly defined for the component associated with the release	Release owner, component owner, subscribers
ReleaseExtract	• Release owner • Explicitly defined for the component associated with the release	Not applicable
ReleaseLink	• Release owner • Explicitly defined for the component associated with the release	Release owner, subscribers
ReleaseMerge	• Release owner • Explicitly defined for the component associated with the release	Release owner, subscribers
ReleaseModify	• Release owner • Explicitly defined for the component associated with the release **Note:** To identify a new component to manage the release, you must have ReleaseCreate in an authority group in the component that you are modifying	Release owner, subscribers, new owner (if applicable)

For this action	These users have authority	These users are notified
ReleasePrune	• Release owner • Explicitly defined for the component associated with the release	Subscribers
ReleaseRecreate	• Release owner • Explicitly defined for the component associated with the release	Release owner, component owner, subscribers
ReleaseView	• Release owner • Explicitly defined for the component associated with the release	Not applicable
Report	Not applicable; this is a base authority that can be performed by all users in the family	Not applicable
ShadowCreate	Explicitly defined for the component associated with the release	Not applicable
ShadowDefine	Superuser	Not applicable
ShadowDelete	Explicitly defined for the component associated with the release	Not applicable
ShadowDisable	Explicitly defined for the component associated with the release	Not applicable
ShadowEnable	Explicitly defined for the component associated with the release	Not applicable
ShadowModify	Explicitly defined for the component associated with the release	Not applicable
ShadowRedefine	Superuser	Not applicable
ShadowSync	Explicitly defined for the component associated with the release	Not applicable
ShadowUndefine	Superuser	Not applicable
ShadowVerify	Explicitly defined for the component associated with the release	Not applicable
ShadowView	Explicitly defined for the component associated with the release	Not applicable
SizeAccept	• Sizing record owner • Explicitly defined for the component associated with the sizing record	Subscribers
SizeAssign	• Sizing record owner • Explicitly defined for the component associated with the sizing record	New sizing record owner, defect/feature owner, subscribers

For this action	These users have authority	These users are notified
SizeCreate	• Defect/feature owner • Explicitly defined for the component associated with the defect/feature	Component owner, defect/feature owner, subscribers
SizeDelete	• Defect/feature owner • Explicitly defined for the component associated with the defect/feature	Subscribers, sizing record owner, defect/feature owner
SizeReject	• Sizing record owner • Explicitly defined for the component associated with the sizing record	Subscribers
TestAbstain	• Test record owner • Explicitly defined for the component associated with the test record's release	Subscribers
TestAccept	• Test record owner • Explicitly defined for the component associated with the test record's release	Subscribers
TestAssign	• Test record owner • Explicitly defined for the component associated with the test record's release	New test record owner, subscribers
TestReady	• Test record owner • Explicitly defined for the component associated with the test record's release	Subscribers
TestReject	• Test record owner • Explicitly defined for the component associated with the test record's release	Subscribers
UserCreate	Superuser	New user
UserDelete	Superuser	Not applicable
UserModify	• Owner of the user object can modify all characteristics except the superuser privilege • Must be a superuser to grant the superuser privilege	Not applicable
UserRecreate	Superuser	Not applicable
UserView	Not applicable; this is a base authority that can be performed by all users in the family	Not applicable
VerifyAbstain	• Verification record owner • Explicitly defined for the component associated with the verification record's defect or feature	Subscribers

For this action	These users have authority	These users are notified
VerifyAccept	• Verification record owner • Explicitly defined for the component associated with the verification record's defect or feature	Subscribers
VerifyAssign	• Verification record owner • Explicitly defined for the component associated with the verification record's defect or feature	New verification record owner, subscribers
VerifyReady	Takes place automatically; no authority is required	Verification record owners
VerifyReject	• Verification record owner • Explicitly defined for the component associated with the verification record's defect or feature	Subscribers
WorkAreaAssign	• Workarea owner • Explicitly defined for the component associated with the release	New workarea owner, subscribers
WorkAreaCancel	• Defect or feature owner (if either exists), otherwise workarea owner • Explicitly defined for the component associated with the defect or feature	Subscribers, owners of approval records for workarea being canceled
WorkAreaCheck	• Workarea owner • Explicitly defined for the component associated with the release	Not applicable
WorkAreaCommit	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaComplet	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaCreate	• Defect or feature owner • Explicitly defined for the component associated with the defect or feature	Workarea owner, subscribers
WorkAreaFix	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers

For this action	These users have authority	These users are notified
WorkAreaFreeze	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaIntegra	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaModify	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaReconcile	• Workarea owner • Explicitly defined for the component associated with the release	Workarea owner, subscribers
WorkAreaRefresh	• Workarea owner • Explicitly defined for the component associated with the release	Workarea owner, subscribers
WorkAreaTest	• Workarea owner • Explicitly defined for the component associated with the release	Subscribers
WorkAreaUndo	• Defect or feature owner (if either exists), otherwise workarea owner • Explicitly defined for the component associated with the release	
WorkAreaView	• Workarea owner • Explicitly defined for the component associated with the release	Not applicable

Appendix B. Worksheets

Authority groups worksheet

The following table lists TeamConnection actions. Use this table to record the authority groups for your family if you are using groups other than those supplied by IBM. Those TeamConnection actions that cannot be included in an authority group are marked with information about how they can be performed.

TeamConnection action	**Authority groups for family:________________**									
AccessCreate										
AccessDelete										
AccessRestrict										
ApprovalAbstain										
ApprovalAccept										
ApprovalAssign										
ApprovalCreate										
ApprovalDelete										
ApprovalReject										
ApproverCreate										
ApproverDelete										
BuilderCreate										
BuilderDelete										
BuilderExtract										
BuilderModify										
BuilderView										
CollisionAccept										
CollisionReconc										
CollisionReject										
CompCreate										
CompDelete										
CompLink										

TeamConnection action	**Authority groups for family:________________**									
CompModify										
CompRecreate										
CompUnlink										
CompView										
CoreqCreate										
CoreqDelete										
DefectAccept										
DefectAssign										
DefectCancel										
DefectClose	Automatic action									
DefectComment	Base authority									
DefectDesign										
DefectModify										
DefectOpen	Base authority									
DefectReopen										
DefectReturn										
DefectReview										
DefectSize										
DefectVerify										
DefectView										
DriverAssign										
DriverCheck										
DriverCommit										
DriverComplete										
DriverCreate										
DriverDelete										
DriverExtract										
DriverFreeze										
DriverModify										
DriverRefresh										
DriverRestrict										
DriverView										

TeamConnection action	Authority groups for family:________________									
EnvCreate										
EnvDelete										
EnvModify										
FeatureAccept										
FeatureAssign										
FeatureCancel										
FeatureClose	Automatic action									
FeatureComment	Base authority									
FeatureDesign										
FeatureModify										
FeatureOpen	Base authority									
FeatureReopen										
FeatureReturn										
FeatureReview										
FeatureSize										
FeatureVerify										
FeatureView										
FixActive										
FixAssign										
FixComplete										
FixCreate										
FixDelete										
HostCreate	Superuser, admin, or owner implicit authority									
HostDelete	Superuser, admin, or owner implicit authority									
MemberCreate										
MemberCreateR										
MemberDelete										
MemberDeleteR										
NotifyCreate										
NotifyDelete										
ParserCreate										
ParserDelete										

TeamConnection action	Authority groups for family:________________									
ParserModify										
ParserView										
PartAdd										
PartBuild										
PartCheckIn										
PartCheckOut										
PartChildInfo										
PartConnect										
PartDelete										
PartDeleteForce										
PartDisconnect										
PartExtract										
PartForceIn										
PartForceOut										
PartLink										
PartLock										
PartLockForce										
PartMark										
PartModify										
PartOverrideR										
PartRecreate										
PartRecreaForce										
PartRename										
PartRenameForce										
PartResolve	Base authority									
PartRestrict										
PartTouch										
PartUndo										
PartUndoForce										
PartUnlock										
PartView										
PartViewmsg										

TeamConnection action	Authority groups for family:_________________									
PrereqCreate										
PrereqDelete										
ReleaseCreate										
ReleaseDelete										
ReleaseExtract										
ReleaseLink										
ReleaseModify										
ReleasePrune										
ReleaseRecreate										
ReleaseView										
Report	Base authority									
ShadowCreate										
ShadowDefine	Superuser									
ShadowDelete										
ShadowDisable										
ShadowEnable										
ShadowModify										
ShadowRedefine	Superuser									
ShadowSync										
ShadowUndefine	Superuser									
ShadowVerify										
ShadowView										
SizeAccept										
SizeAssign										
SizeCreate										
SizeDelete										
SizeReject										
TestAbstain										
TestAccept										
TestAssign										
TestReady	Automatic action									
TestReject										

TeamConnection action	Authority groups for family:________________									
UserCreate	Superuser implicit or admin authority									
UserDelete	Superuser implicit or admin authority									
UserModify	Superuser, admin, or owner implicit authority									
UserRecreate	Superuser implicit or admin authority									
UserView										
VerifyAbstain										
VerifyAccept										
VerifyAssign										
VerifyReady	Automatic action									
VerifyReject										
WorkAreaAssign										
WorkAreaCancel										
WorkAreaCheck										
WorkAreaCommit										
WorkAreaComplet										
WorkAreaCreate										
WorkAreaFix										
WorkAreaFreeze										
WorkAreaIntegra										
WorkAreaModify										
WorkAreaRefresh										
WorkAreaTest										
WorkAreaView										

Interest groups worksheet

The following table lists the TeamConnection actions. Use this table to record the interest groups for your family if you are using groups other than those supplied by IBM. Those TeamConnection actions that cannot be included in an interest group are marked with information about how users are notified.

TeamConnection actions	Interest groups for family: _________						
AccessCreate							.

TeamConnection actions	**Interest groups for family: _________**						
AccessDelete							
AccessRestrict							.
ApprovalAbstain							
ApprovalAccept							
ApprovalAssign							
ApprovalCreate							
ApprovalDelete							
ApprovalReject							
ApproverCreate							
ApproverDelete							
BuilderCreate							
BuilderDelete							
BuilderExtract	No notification						
BuilderModify							
BuilderView	No notification						
CollisionAccept							
CollisionReconc							
CollisionReject							
CompCreate	New owner implicit notification						
CompDelete							
CompLink							
CompModify							
CompRecreate							
CompUnlink							
CompView	No notification						
CoreqCreate	No notification						
CoreqDelete	No notification						
DefectAccept							
DefectAssign							
DefectCancel							
DefectClose							
DefectComment							

TeamConnection actions	**Interest groups for family: _________**						
DefectDesign							
DefectModify							
DefectOpen							
DefectReopen							
DefectReturn							
DefectReview							
DefectSize							
DefectVerify							
DefectView	No notification						
DriverAssign							
DriverCheck	No notification						
DriverCommit							
DriverComplete							
DriverCreate							
DriverDelete							
DriverExtract	No notification						
DriverFreeze							
DriverModify							
DriverRefresh	No notification						
DriverRestrict	Owner implicit notification						
DriverView	No notification						
EnvCreate							
EnvDelete							
EnvModify							
FeatureAccept							
FeatureAssign							
FeatureCancel							
FeatureClose							
FeatureComment							
FeatureDesign							
FeatureModify							
FeatureOpen							

TeamConnection actions	Interest groups for family: _________						
FeatureReopen							
FeatureReturn							
FeatureReview							
FeatureSize							
FeatureVerify							
FeatureView	No notification						
FixActive							
FixAssign							
FixComplete							
FixCreate							
FixDelete							
HostCreate	No notification						
HostDelete	No notification						
MemberCreate							
MemberCreateR	New owner implicit notification						
MemberDelete							
MemberDeleteR	Owner implicit notification						
NotifyCreate	No notification						
NotifyDelete	No notification						
ParserCreate							
ParserDelete							
ParserModify							
ParserView	No notification						
PartAdd							
PartBuild	owner implicit notification						
PartCheckIn							
PartCheckOut							
PartConnect							
PartDelete							
PartDisconnect							
PartExtract	No notification						
PartForceIn							

TeamConnection actions	Interest groups for family: _________						
PartForceOut							
PartLink							
PartLock							
PartLockForce	PartLock subscribers						
PartMark							
PartModify							
PartOverrideR							
PartRecreaForce	PartRecreate subscribers						
PartRecreate							
PartRename							
PartRenameForce	PartRename subscribers						
PartResolve	No notification						
PartRestrict							
PartTouch	No notification						
PartUndo							
PartUndoForce	PartUndo subscribers						
PartUnlock							
PartView	No notification						
PartViewmsg	No notification						
PrereqCreate	New owner implicit notification						
PrereqDelete	Owner implicit notification						
ReleaseCreate							
ReleaseDelete							
ReleaseExtract	No notification						
ReleaseLink							
ReleaseModify							
ReleaseRecreate							
ReleaseView	No notification						
Report	No notification						
ShadowCreate	No notification						
ShadowDefine	No notification						
ShadowDelete	No notification						

TeamConnection actions	Interest groups for family: _________						
ShadowDisable	No notification						
ShadowEnable	No notification						
ShadowModify	No notification						
ShadowRedefine	No notification						
ShadowSync	No notification						
ShadowUndefine	No notification						
ShadowVerify	No notification						
ShadowView	No notification						
SizeAccept							
SizeAssign							
SizeCreate							
SizeDelete							
SizeReject							
TestAbstain							
TestAccept							
TestAssign							
TestCreate							
TestDelete							
TestReady	Owner implicit notification						
TestReject							
UserCreate	New user implicit notification						
UserDelete	No notification						
UserModify	No notification						
UserUnDelete	No notification						
UserView	No notification						
VerifyAbstain							
VerifyAccept							
VerifyAssign							
VerifyReady	Owner implicit notification						
VerifyReject							
WorkAreaAssign							
WorkAreaCancel							

TeamConnection actions	Interest groups for family: _________						
WorkAreaCheck	No notification						
WorkAreaCommit							
WorkAreaComplet							
WorkAreaCreate							
WorkAreaExtract							
WorkAreaFix							
WorkAreaFreeze	Owner implicit notification						
WorkAreaIntegra							
WorkAreaModify							
WorkAreaRefresh							
WorkAreaTest							
WorkAreaView	No notification						

Configurable processes worksheets

The following worksheets list the TeamConnection subprocesses. Use these worksheets to record the processes that you have created for your family. Separate worksheets are provided for component and release processes. For more information on configuring processes, see "Chapter 11. Configuring component and release processes" on page 131.

TeamConnection component subprocesses	Component processes for _____________					
dsrDefect						
dsrFeature						
verifyDefect						
verifyFeature						
none						

TeamConnection release subprocesses	Release processes for _____________					
track						
approval						

TeamConnection release subprocesses	**Release processes for ____________**					
fix						
driver						
test						
trackfixhold						
trackcommithold						
tracktesthold						
none						

Appendix C. Environment Variables

You can set environment variables to describe the TeamConnection environment in which you are working. Environment variables provide default settings and behaviors for many TeamConnection actions and processes. You can override the value you set for many of these variables by using the corresponding flag in a TeamConnection command or field on the TeamConnection GUI.

Some environment variables can be set either by your operating system (such as in your config.sys file or .profile) or by the TeamConnection Settings notebook. When an environment variable has a Settings notebook equivalent, TeamConnectionuses the two as follows:

- The environment variable controls the command line interface.
- The Settings notebook controls the graphical user interface.

If there is no Settings notebook equivalent for the environment variable, then the environment variable takes effect regardless of the interface you are using. See “Setting environment variables” on page 276 for more information about setting environment variables.

You are not required to set your TC_FAMILY environment variable for the TeamConnectionclient command line interface. However, if the TC_FAMILY environment variable is not set, the `-family` must be specified for every client command.

The following table lists the names of the TeamConnection environment variables, the purpose they serve, the equivalent TeamConnection command-line flag, the equivalent Settings notebook field, and the TeamConnection component that uses each environment variable.

Table 6. TeamConnection environment variables

Environment variable	Purpose	Flag	Setting	Used by
LANG	Specifies the language-specific message catalog.			Client, family server
NLSPATH	Specifies the search path for locating message files.		NLS path	Client, family server
PATH	Specifies where tcadmin is to search for the family create utilities.			Client, build server, family server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_BACKUP	Controls whether or not the following commands create backup files when a read-only copy of the file already exists on your workstation. If this environment variable is set to off or OFF, the commands do not create backup files. • builder -extract • part -checkout • part -extract • part -merge • part -reconcile			Family server
TC_BACKUPCHAR	Specifies the character to be interted in the file name extension when TeamConnection creates a backup copy of a file during checkout and extract actions. The default backup characters are $ on Intel platforms and _ on UNIX platforms. If you check out or extract a file called myfile.ext, for example, and a read-only copy of this file already exists on your workstation, TeamConnection creates a backup copy called myfile.$ext or myfile._ext. On file systems requiring 8.3 file names (such as FAT file systems), the file extension is truncated to three characters (myfile.$ex or myfile._ex).			Family server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_BECOME	Identifies the user ID you want to issue TeamConnectioncommands from, if the user ID differs from your login. You assume the access authority of the user ID you specify.	-become	Become user	Client, build server (except mvs)
TC_BUILDENVIRONMENT	Specifies the build environment name, such as OS/2 or MVS. The value you specify here can be anything you like, but it must exactly match the environment specified for a builder in order for the builder to use this build agent. This value is case-sensitive.	-e		Build server
TC_BUILDMINWAIT	Minimum amount of time to wait (in seconds) between queries for new jobs. Default setting is 5, minimum setting is 3.			Build server
TC_BUILDMAXWAIT	Maximum amount of time to wait (in seconds) between queries for new jobs. Default setting is 15, maximum setting is 300.			Build server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_BUILDOPTS	Specifies build options for sending build log file messages to the screen, and setting the logging level. If you do not specify any of these options, then the build server writes build messages to the build log file (teamcbld.log), and writes a minimum level of messages to the log file. Some possible values are: • TOSCREEN (-s) sends the **teamcbld.log** file to the screen in addition to sending it to a file. • USEENVFILE (-n) – writes the changed environment variables to a file called **tcbldenv.lst** instead of setting them in program's environment. The format of the file is `variable=value`. – writes the list of input files to a file called **tcbldin.lst**. One file per line, format is `pathName type`. – writes the list of output files to a file called **tcbldout.lst**. One file per line, format is `pathName type`.	-s, -n		Build server
TC_BUILDPOOL	Specifies the build pool name.	-p	Pool	Build server
TC_BUILD_RSSBUILDS_FILE	Specifies the name of startup files to be used to provide information about build servers to the build process.			Build server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_CASESENSE	Changes the case of the arguments in commands, not in queries.		Case	Client
TC_CATALOG	Specifies a specific file for the TeamConnectionmessage catalog. Sometimes, depending upon the operating system environment, the catalog open command will only look in a particular directory for the catalog. If the host is running multiple versions of TeamConnection, this variable may be used. To set this environment variable, specify the file path name of the message catalog as in the following example: `TC_CATALOG= "/`*`family`*`/msgcat/teamc.cat"`			Family server, oe build server
TC_COMPONENT	Specifies the default component.	-component	Component	Client, make import tool
TC_DBPATH	Specifies the database directory path. Family specific database files reside here.			Family server
TC_FAMILY	Identifies the TeamConnection family you work with.	-family	Family	Build server, client, family server, make import tool

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_MAKEIMPORTRULES	Specifies the name of the rules file that TeamConnection uses when importing the makefile data into TeamConnection. If you set this environment variable, then you do not have to use the /u option with the fhomigmk command (Intel only). Specify the full path name of the rules file. If neither this environment variable nor the /u option is used, TeamConnection uses default rules.			Make import tool
TC_MAKEIMPORTTOP	Strips off the leading part of the directory name when importing parts into TeamConnection. For example, you have parts with the following directory structure: g:\octo\src\inc\. To create these parts without the g:\octo structure, you can set TC_MAKEIMPORTTOP=g:\octo before you invoke the make import tool. The parts created in TeamConnection have the directory structure of src\inc\.			Make import tool
TC_MAKEIMPORTVERBOSE	Causes the -verbose flag to be added to part commands created by fhomigmk.			Make import tool
TC_MIGRATERULES	Specifies the name of a file containing the rules to be applied for migration of makefiles if the name is not supplied on the fhomigmk command (Intel only) line as a parameter.			Client

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_MODELS	Specifies which models to load beyond the base TeamConnection models. Use thisd environment variable to enable tools that extend the TeamConnection model. The following list shows the values to set for TC_MODELS for other tools supported by TeamConection: **DataAtlas** TC_MODELS=″_ewswsdd _ewswhll _ewswims″ This environment variable is also used to specify which models to load in the TeamConnection Breditor (a tool offered by the ToolBuilder's Development Kit). The following are appropriate Breditor settings for each TeamConnection platform: **OS/2** fhcbred **Windows NT** fhmbred **AIX** fhcbred **Solaris** fhcbred **HP-UX** fhcbred			Sever

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_MODPERM	Controls whether or not the read-only attribute is set after a part is created, checked in or unlocked in TeamConnection. To cause the read-only attribute to be set, specify TC_MODPERM=ON. To prevent the read-only attribute from being set, specify TC_MODPERM=OFF. The default is TC_MODPERM=ON.			Client
TC_NOTIFY_DAEMON	An alternate way of starting notifyd with the teamcd command. If you set this environment variable, then you do not have to use the -n option with the teamcd command. Specify the full path name of the mail exit to use with notifyd.			Family server
TC_RELEASE	Specifies a release.	-release	Release	Client, make import tool
TC_REPORT_CHECKACCESS	Enables report access checking. With this option, TeamConnection checks a component's access list before allowing a user to view a component, defect, feature, or part. Only users who are granted authority in an authority group that includes the CompView, DefectView, FeatureView, and PartView actions can view reports for the component.Set TC_REPORT_CHECKACCESS=1 to enable or TC_REPORT_CHECKACCESS=0 to disable this function.			Family server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_TOP	Specifies the source directory.	-top	Top	Client
TC_TRACE	Specifies the variable that lets the user designate which parts should be traced. You should modify this only when directed to do so by an IBM service person. Otherwise it is set to null. To trace all parts, specify TC_TRACE=*.			Client, family server, build server
TC_TRACEFILE	Specifies the output (part path and name) of the trace that the user designates using TC_TRACE. The default trace file name is tctrace. For the MVS build server, the default trace file is stdout.			Client, family server, build server
TC_TRACESIZE	Specifies the maximum size of the trace file in bytes. If the maximum is reached, wrapping occurs. The default is one million bytes.			Client, family server, build server
TC_USER	Specifies the user login ID for single-user environments OS/2 and Windows 95 (if not using the login facility). This environment variable is not used in multiuser environments AIX, HP-UX, Solaris, MVS, MVS/OE, and Windows NT. If a user is using the Windows 95 login facility, this environment variable is not used.		User ID	Client, build server
TC_WORKAREA	Specifies the default workarea name.	-workarea	Workarea	Client, make import tool
TC_WWWPATH	Specifies the path for the HTML helps and image files for Web client.			Client, family server

Table 6. TeamConnection environment variables (continued)

Environment variable	Purpose	Flag	Setting	Used by
TC_WWWDISABLED	Disables the Web client.			Family server

The following environment variables are dynamically set by the `teamcbld` processor before the build script is invoked:

Table 7. TeamConnection dynamically set build environment variables

Environment variable	Purpose	Flag	Setting	Used by
TC_BUILD_USER	Login of user who initiated the `part -build` command.			Build server
TC_INPUT	List of input files (separated by spaces).			Build server
TC_INPUTTYPE	List of input file types (such as `TCPart`).			Build server
TC_OUTPUT	List of output files.			Build server
TC_OUTPUTTYPE	List of output file types.			Build server
TC_LOCATION	Directory where build script is invoked.			Build server (except MVS build server)

Setting environment variables

For methods of setting your environment variables, refer to your operating system documentation. For example, you can use the following command to set the TC_FAMILY environment variable:

- OS/2 - `SET TC_FAMILY=familyName@hostname@portnumber`
- UNIX - `export TC_FAMILY=familyName@hostName@portNumber`

Appendix D. Configurable field types

This appendix describes the configurable field types shipped with TeamConnection. It also contains information that may help you determine how options that define configurable field types and configurable fields in the TeamConnection GUI, command line interface, and SQL interface correspond.

Configurable field types

The following tables show the configuration table values under the following column headings:

Field type
Configuration field types that are supported by TeamConnection.

Value Values for the various configuration field types that are shipped with TeamConnection.

Note: Your TeamConnection family administrator can add names for each configuration field type.

Description
A description of each value shipped with TeamConnection.

Note: Your TeamConnection family administrator can add descriptions for fields.

There are no default values specified for most of the field types that IBM ships. However, your TeamConnection family administrator can set defaults for your family. For information on setting defaults, see “Defining configurable field types” on page 117.

Priority levels for defects and features

Field Type	Value	Description
priority	mustfix	Defect or feature must be resolved in this release
priority	candidate	Defect or feature is a candidate if time permits
priority	deferred	Defect or feature deferred to next release
priority	easy	Defect or feature is easy to solve or implement

Field Type	Value	Description
priority	moderate	Defect or feature is moderately difficult to resolve
priority	difficult	Defect or feature is difficult to solve or implement
priority	n/a	Priority does not apply to this defect or feature

The type of driver

Field Type	Value	Description
drivertype	development	Development driver
drivertype	production	Production driver
drivertype	integration	Integration driver
drivertype	prototype	Prototype driver
drivertype	other	Other type of driver

The severity of the problem that a defect was opened to resolve

Field Type	Value	Description
severity	1	Wrong results or failure; critical to program execution
severity	2	Wrong results; not critical to program execution
severity	3	Unexpected behavior
severity	4	Suggestion or enhancement request

The type of defect or feature

Field Type	Value	Description
defectPrefix	c	Defect reported by a customer
defectPrefix	d	Defect reported by internal users
featurePrefix	s	Suggestion made by customer
featurePrefix	f	Feature requested by internal users

The symptom of the problem a defect was opened to resolve

Field Type	Value	Description
symptom	incorrect_i/o	Incorrect or unexpected input or output
symptom	program_defect	Program defect

Field Type	Value	Description
symptom	design_wrong	Original design is incorrect; redesign required
symptom	function_needed	Additional function is required
symptom	plans_incorrect	Plans need to be changed or enhanced
symptom	docs_incorrect	Documentation is incorrect
symptom	prog_suspended	Program suspended during normal operation
symptom	core_dump	Core dump occurred during normal operation
symptom	lost_data	Data loss occurred during normal operation
symptom	usability	Program or application is not usable as is
symptom	test_failed	Test failed
symptom	build_failed	Build, compile, or module integration failed
symptom	install_failed	Installation failed
symptom	obsolete_code	Remove obsolete code
symptom	intgr_problem	Integration problems with other applications
symptom	performance	Performance problems; code needs to be optimized
symptom	reliability	Reliability problems; code needs more work
symptom	non-standard	Coding practices or program execution is non-standard
symptom	not_to_spec	Program or application does not function as specified

The development phase in progress when a defect was found or injected

Field Type	Value	Description
phase	design	Design Phase
phase	planning	Planning Phase
phase	strategy	Strategic Planning Phase
phase	prototyping	Prototyping Phase
phase	development	Development Phase
phase	documenting	Documentation or Publication Phase

Field Type	Value	Description
phase	inspections	Inspection Phase
phase	maintenance	Maintenance Phase
phase	building	Building, Compiling or Module Integration Phase
phase	unit_test	Unit Test
phase	functional_test	Functional Test
phase	regression_test	Regression Test
phase	install_test	Installation Test
phase	config_test	Configuration Test
phase	integrate_test	Integration Test
phase	quality_test	Quality Assurance Test
phase	usability_test	Usability Test
phase	ship_test	Ship Test
phase	beta_test	Beta Test
phase	n/a	Not applicable to any particular phase

The reason a defect or feature is being accepted

Field Type	Value	Description
answerAccept	program_defect	The problem was due to a program error
answerAccept	docs_defect	Documentation needs to be changed
answerAccept	docs_change	Documentation needs to address new features
answerAccept	plans_change	Plans or schedules need to be changed
answerAccept	new_function	New function will be added
answerAccept	redesign	Current function needs to be redesigned
answerAccept	fix_testcase	Testcase needs to be fixed
answerAccept	remove_code	Obsolete code needs to be removed
answerAccept	remove_support	Nonsupported functions need to be removed
answerAccept	comply_with	Coding practices and operation needs to comply with standards

The reason a defect or feature is being returned

Field Type	Value	Description
answerReturn	fixed	The problem is already fixed

Field Type	Value	Description
answerReturn	future	Future releases or versions will address the defect or feature
answerReturn	duplicate	This is a duplicate of an existing defect or feature
answerReturn	usage_error	The problem is caused by incorrect usage
answerReturn	hardware_error	The problem is caused by a hardware error
answerReturn	info_needed	More information is required
answerReturn	limitation	This problem is a current limitation
answerReturn	suggestion	This problem is a suggestion, not an error
answerReturn	unrecreatable	The problem cannot be re-created
answerReturn	as_designed	The program works as designed
answerReturn	deviation	Code or documentation will deviate from the standards

The relationship of a part to the translation process

Field Type	Value	Description
translation	no	Part is not involved in translation
translation	yes	Part is translated into other languages
translation	related	Part is not translated but is related to translation process

Reasons for returning a feature

Field Type	Value	Description
featureReturn	fixed	The feature is already implemented
featureReturn	future	Future releases or versions will address the feature
featureReturn	duplicate	This is a duplicate of an existing feature
featureReturn	info_needed	More information is required
featureReturn	deviation	Code or documentation will deviate from the standards
featureReturn	null	Null

Reasons for accepting a feature

Field Type	Value	Description
featureAccept	docs_change	Documentation needs to address new features
featureAccept	new_function	New function will be added
featureAccept	redesign	Current function needs to be redesigned
featureAccept	null	Null

Fields for specifying expressions

NT

Configurable field types for specifying expressions, such as serial and phone, are not supported on Windows NT servers.

Field Type	Value	Description
serial	^NULL$	Null value
serial	^[0-9]\{6\}$	Six-numeral serial number

Phone numbers

Field Type	Value	Description
phone	^NULL$	Null value
phone	^TL-[0-9]\{3\}-[0-9]\{4\}$	Phone format TL-PPP-NNNN, P and N are numerals

A list from which more than one item can be selected

Field Type	Value	Description
list	item1	Item to be selected from a list
list	item2	Item to be selected from a list
list	item3	Item to be selected from a list
list	item4	Item to be selected from a list
list	item5	Item to be selected from a list

Field for noting code development iterations

Field Type	Value	Description
iteration	base_code	Base Code/Prior Release
iteration	01	First iteration
iteration	02	Second iteration
iteration	03	Third iteration

Field Type	Value	Description
iteration	04	Fourth iteration
iteration	05	Fifth iteration
iteration	06	Sixth iteration
iteration	07	Seventh iteration
iteration	08	Eighth iteration
iteration	09	Ninth iteration
iteration	10	Tenth iteration
iteration	11	Eleventh iteration
iteration	12	Twelfth iteration
iteration	13	Thirteenth iteration
iteration	14	Fourteenth iteration
iteration	15	Fifteenth iteration

Describes the activity in progress when a defect was discovered

Field Type	Value	Description
activityODC	review	Review or inspection
activityODC	ut/ft	Unit Test or Functional Test
activityODC	st	System Test
activityODC	id	Information Development
activityODC	customer	Customer use

Identify specific intents or purposes for which an activity that triggered a defect was being performed

Field Type	Value	Description
triggerODC	design	Design Nonconformance
triggerODC	flow	Understanding Flow
triggerODC	backward	Backward Compatibility
triggerODC	lateral	Lateral Compatibility
triggerODC	concurrency	Concurrency
triggerODC	document	Internal Document Consistency/Completeness
triggerODC	language	Language Dependencies
triggerODC	side	Side Effects
triggerODC	rare	Rare Situation

Field Type	Value	Description
triggerODC	simple	Simple Path
triggerODC	complex	Complex Path
triggerODC	coverage	Test Coverage
triggerODC	variation	Test Variation
triggerODC	sequencing	Test Sequencing
triggerODC	interaction	Test Interaction
triggerODC	workload	Workload Volume/Stress
triggerODC	recover	Recovery/Exception
triggerODC	startup	Startup/Restart
triggerODC	hw	Hardware Configuration
triggerODC	sw	Software Configuration
triggerODC	normal	Normal Mode
triggerODC	accuracy	The information does not describe the product correctly
triggerODC	clarity	The information is confusing or difficult to understand
triggerODC	completeness	Necessary information is missing
triggerODC	organization	The relationship between parts or between a part and the whole is not conveyed
triggerODC	retrievability	The information is difficult to find
triggerODC	style	The manner of expression is inappropriate or difficult to understand
triggerODC	task	The presentation of why and how to perform a task is inappropriate
triggerODC	aesthetics	The appearance and layout of the information is inappropriate

The impact a defect might have on customers if not fixed

Field Type	Value	Description
impactODC	installability	The ability of the customer to prepare and place the software in position for use
impactODC	security	The protection of systems, programs, and data from inadvertent or malicious destruction, alteration, or disclosure

Field Type	Value	Description
impactODC	performance	The speed of the software as perceived by the customer and the customer's end users, in terms of their ability to perform their tasks
impactODC	maintenance	The ease of applying preventive or corrective fixes to the software
impactODC	serviceability	The ability to diagnose failures easily and quickly, with minimal impact to the customer
impactODC	migration	The ease of upgrading to a current release
impactODC	documentation	The degree to which the publication aids provided for understanding the structure and intended uses of the software are correct and complete
impactODC	usability	The degree to which the software and publication aids enable the product to be easily understood and conveniently employed by its end user
impactODC	standards	The degree to which the software complies with established pertinent standards
impactODC	reliability	The ability of the software to consistently perform its intended function without unplanned interruption
impactODC	requirements	A customer expectation, with regard to capability, which was not known, understood, or prioritized as a requirement for the current product or release
impactODC	capability	The ability of the software to perform its intended functions, and satisfy known requirements

The aspect of the product that a defect is intended to address

Field Type	Value	Description
targetODC	requirements	Customer, market, or technical requirements
targetODC	design	Product design
targetODC	code	Product code

Field Type	Value	Description
targetODC	build	Problems encountered during the driver build process, in library systems, or with management of change or version control
targetODC	information	Information/User Documentation
targetODC	ui	User Interface
targetODC	nls	National Language Support

Represents the actual correction that was made

Field Type	Value	Description
defTypeODC	assignment	Value(s) assigned incorrectly or not assigned at all
defTypeODC	checking	Errors caused by missing or incorrect validation of parameters or data in conditional statements
defTypeODC	algorithm	Efficiency or correctness problems that affect the task and can be fixed by (re)implementing an algorithm or local data structure without the need for requesting a design change
defTypeODC	function	The error should require a formal design change
defTypeODC	timing	Necessary serialization of shared resource was missing
defTypeODC	interface	Communication problem between product components
defTypeODC	relationship	Problems related to associations among procedures, data structures and objects
defTypeODC	editorial	Defects relates to grammar, spelling, punctuation, organization, etc.
defTypeODC	technical	Defects related to the description of a product and its interfaces
defTypeODC	navigational	Defects that prevent users from finding needed information about a product
defTypeODC	GUI	Graphical User Interface
defTypeODC	cmdline	Command Line Interface
defTypeODC	panels	Panels
defTypeODC	na	Not Available

Indication of whether the defect was an omission, a commission, or extraneous

Field Type	Value	Description
qualifierODC	missing	The defect was to due to an error of omission
qualifierODC	incorrect	The defect was to due to an error of commission
qualifierODC	extraneous	The defect was to due to something not relevant or pertinent to the document or code

The source of the code or information that was fixed

Field Type	Value	Description
sourceODC	here	A defect is in code which was developed in house
sourceODC	reused	A defect is encountered using a part of a standard reuse library
sourceODC	outsourced	A defect is in a part provided by a vendor
sourceODC	reference	Defect contained in detailed descriptive information
sourceODC	tasks	Defect contained in guidance information
sourceODC	presentation	Defect contained in graphical and other elements used to present the information
sourceODC	concepts	Defect contained in high level overview and conceptual information
sourceODC	examples	Examples
sourceODC	na	Not available or not applicable

The history of the code or information that was fixed

Field Type	Value	Description
srcHistoryODC	base	The defect is in part of the product which has not been modified by the current project and is not part of a standard reuse library
srcHistoryODC	new	The defect is in a function which was created by and for the current project and which introduces new function

Field Type	Value	Description
srcHistoryODC	rewritten	The defect was introduced as a direct result of redesign and/or rewrite of old function in an attempt to improve its design or quality
srcHistoryODC	refixed	The defect was introduced by the solution provided to fix a previous defect

Appendix E. User exit parameters

The following table shows the parameters passed to each user exit program defined for a specific TeamConnection action and ExitID. A description of the parameters follows the table on page 317.

Note: Parameters are not shown for exit ID 3. The parameters for exit ID 3 are the same as those passed to exit ID 0, with an additional parameter at the end to indicate the last user exit ID that has been executed successfully, for example, 0 or 1.The msgBuff parameter will always be null for exit ID 0, but will probably not be null for exit ID 3.

A parameter name followed by *not used* indicates that TeamConnection passes an empty string.

See "Chapter 12. Providing user exits" on page 135 for more information on user exits.

Parameters passed to user exit programs

The figure that follows shows the parameters passed to each user exit program defined for a specific TeamConnection action and exit ID.

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
AccessCreate	0	NewOwner, component, authority, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	NewOwner, component, authority, effectiveUserID, VerboseFlag
	2	NewOwner, component, authority, effectiveUserID, VerboseFlag
AccessDelete	0	OldOwner, component, authority, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	OldOwner, component, authority, effectiveUserID, VerboseFlag
	2	OldOwner, component, authority, effectiveUserID, VerboseFlag
AccessRestrict	0	NewOwner, component, authority, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	NewOwner, component, authority, effectiveUserID, VerboseFlag
	2	NewOwner, component, authority, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
ApprovalAbstain	0	release, WorkAreaName, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
ApprovalAccept	0	release, WorkAreaName, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
ApprovalAssign	0	release, WorkAreaName, OldOwner, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, OldOwner, NewOwner, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, DefectOrFeatureName, OldOwner, NewOwner, workareaType, effectiveUserID, VerboseFlag
ApprovalCreate	0	release, WorkAreaName, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
ApprovalDelete	0	release, WorkAreaName, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
ApprovalReject	0	release, WorkAreaName, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	release, WorkAreaName, DefectOrFeatureName, ApproverName, workareaType, effectiveUserID, VerboseFlag
ApproverCreate	0	NewOwner, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	NewOwner, release, effectiveUserID, VerboseFlag
	2	NewOwner, release, effectiveUserID, VerboseFlag
ApproverDelete	0	OldOwner, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	OldOwner, release, effectiveUserID, VerboseFlag
	2	OldOwner, release, effectiveUserID, VerboseFlag
BecomeCreate	0	login, becomeLogin, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, becomeLogin, effectiveUserID, VerboseFlag
	2	login, becomeLogin, effectiveUserID, VerboseFlag
BecomeDelete	0	login, becomeLogin, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, becomeLogin, effectiveUserID, VerboseFlag
	2	login, becomeLogin, effectiveUserID, VerboseFlag
BuilderCreate	0	name, transmitFlag, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	name, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, effectiveUserID, VerboseFlag
	2	name, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, effectiveUserID, VerboseFlag
BuilderDelete	0	name, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	name, release, effectiveUserID, VerboseFlag
	2	name, release, effectiveUserID, VerboseFlag
BuilderExtract	0	name, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	name, release, effectiveUserID, VerboseFlag
	2	name, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, effectiveUserID, VerboseFlag
BuilderModify	0	name, transmitFlag, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	name, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, effectiveUserID, VerboseFlag
	2	name, temporaryfileonserver, release, condition, value, script, filetype, buildparameters, targetenvironment, timeout, processoroptions, effectiveUserID, VerboseFlag
BuilderView	0	name, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	name, release, effectiveUserID, VerboseFlag
	2	name, release, effectiveUserID, VerboseFlag
CollisionAccept	0	pathName, WorkAreaName, release, state, alternateversion, workareaType, typename, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag
	2	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag
CollisionReconc	0	pathName, WorkAreaName, release, state, alternateversion, workareaType, typename, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag
	2	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag
CollisionReject	0	pathName, WorkAreaName, release, state, alternateversion, workareaType, typename, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag
	2	pathName, WorkAreaName, release, typename, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
CompCreate	0	component, parentcomponent, owner, componentprocess, description, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	newcomponent, parentcomponent, owner, newcomponentprocess, description, effectiveUserID, VerboseFlag
	2	newcomponent, parentcomponent, owner, newcomponentprocess, description, effectiveUserID, VerboseFlag
CompDelete	0	component, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, effectiveUserID, VerboseFlag
	2	component, effectiveUserID, VerboseFlag
CompLink	0	component, parentcomponent, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, parentcomponent, effectiveUserID, VerboseFlag
	2	component, parentcomponent, effectiveUserID, VerboseFlag
CompModify	0	component, newcomponent, NewOwner, newdescription, newcomponentprocess, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, newcomponent, OldOwner, NewOwner, olddescription, newdescription, oldcomponentprocess, newcomponentprocess, dateoflastupdate, effectiveUserID, VerboseFlag
	2	name, newcomponent, NewOwner, description, process, effectiveUserID, VerboseFlag
CompRecreate	0	component, parentcomponent, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, parentcomponent, olddropDate, effectiveUserID, VerboseFlag
	2	component, parentcomponent, olddropDate, effectiveUserID, VerboseFlag
CompUnlink	0	component, parentcomponent, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, parentcomponent, effectiveUserID, VerboseFlag
	2	component, parentcomponent, effectiveUserID, VerboseFlag
CompView	0	component, displaytype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, displaytype, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	component, displaytype, effectiveUserID, VerboseFlag
CoreqCreate	0	release, primeworkareaname, secondworkareaname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag
	2	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag
CoreqDelete	0	release, WorkAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, workareaType, effectiveUserID, VerboseFlag
DefectAccept	0	defectname, originaldefectname, answer, remarks, StdStr, ConfStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, answer, remarks, configFields, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectAssign	0	defectname, newcomponent, NewOwner, remarks, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, newcomponent, NewOwner, remarks, effectiveUserID, VerboseFlag
	2	defectname, newcomponent, NewOwner, remarks, effectiveUserID, VerboseFlag
DefectCancel	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectComment	0	defectname, remarks, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, remarks, effectiveUserID, VerboseFlag
DefectDesign	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectModify	0	defectname, newdefectname, severity, environmentname, prefix, reference, drivername, abstract, originator, answer, remarks, release, configFields, notesDB, notesID, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, newdefectname, severity, environmentname, prefix, reference, drivername, abstract, originator, answer, remarks, release, configFields, dateoflastupdate, notesDB, notesID, effectiveUserID, VerboseFlag
	2	defectname, newdefectname, severity, environmentname, prefix, reference, drivername, abstract, originator, answer, remarks, release, configFields, notesDB, notesID, effectiveUserID, VerboseFlag
DefectOpen	0	component, prefix, severity, reference, environmentname, remarks, drivername, abstract, release, configFields, defectname, MessageBuffer, notesDB, notesID, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, prefix, severity, reference, environmentname, remarks, drivername, abstract, release, configFields, defectname, effectiveuserarea, notesDB, notesID, effectiveUserID, VerboseFlag
	2	component, prefix, severity, reference, environmentname, remarks, drivername, abstract, release, configFields, defectname, effectiveuserarea, notesDB, notesID, effectiveUserID, VerboseFlag
DefectReopen	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectReturn	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectReview	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectSize	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectVerify	0	defectname, originaldefectname, answer, remarks, stdStr, confStr, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, remarks, effectiveUserID, VerboseFlag
	2	defectname, originaldefectname, answer, remarks, effectiveUserID, VerboseFlag
DefectView	0	defectname, displaytype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, displaytype, effectiveUserID, VerboseFlag
	2	defectname, displaytype, effectiveUserID, VerboseFlag
DriverAssign	0	drivername, release, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, NewOwner, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, NewOwner, driverstate, drivertype, effectiveUserID, VerboseFlag
DriverCheck	0	drivername, release, longFlag, dupFlag, basename, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, longFlag, driverstate, drivertype, basename, effectiveUserID, VerboseFlag
	2	drivername, release, longFlag, driverstate, drivertype, basename, effectiveUserID, VerboseFlag
DriverCommit	0	drivername, release, forceFlag, ignoreFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, drivertype, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
DriverComplete	0	drivername, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, drivertype, effectiveUserID, VerboseFlag
DriverCreate	0	drivername, release, drivertype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, drivertype, effectiveUserID, VerboseFlag
DriverDelete	0	drivername, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
DriverExtract	0	drivername, release, root, nokeysFlag, ExtractType, fmask, dmask, crlfFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, root, nokeysFlag, ExtractType, fmask, dmask, crlfFlag, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, root, nokeysFlag, ExtractType, fmask, dmask, crlfFlag, driverstate, drivertype, effectiveUserID, VerboseFlag
DriverFreeze	0	drivername, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
DriverMerge	0	drivername, release, workareaname, fromDriver, fromRelease, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, workareaname, fromDriver, fromRelease, effectiveUserID, VerboseFlag
	2	drivername, release, workareaname, fromDriver, fromRelease, effectiveUserID, VerboseFlag
DriverModify	0	drivername, newdrivername, release, newdrivertype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, newdrivername, release, oldtype, newtype, driverstate, dateoflastupdate, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	drivername, newdrivername, release, oldtype, newtype, driverstate, effectiveUserID, VerboseFlag
DriverRefresh	0	drivername, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, driverstate, drivertype, effectiveUserID, VerboseFlag
DriverRestrict	0	drivername, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, drivertype, effectiveUserID, VerboseFlag
DriverView	0	drivername, release, displaytype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, displaytype, driverstate, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, displaytype, driverstate, drivertype, effectiveUserID, VerboseFlag
MemberCreate	0	drivername, release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, WorkAreaName, DefectOrFeatureName, workareastate, workareaType, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, WorkAreaName, DefectOrFeatureName, workareastate, workareaType, drivertype, effectiveUserID, VerboseFlag
MemberDelete	0	drivername, release, numberofworkareas, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	drivername, release, drivertype, effectiveUserID, VerboseFlag
	2	drivername, release, drivertype, effectiveUserID, VerboseFlag
EnvCreate	0	environmentname, release, testersname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	environmentname, release, testersname, effectiveUserID, VerboseFlag
	2	environmentname, release, testersname, effectiveUserID, VerboseFlag
EnvDelete	0	environmentname, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	environmentname, release, effectiveUserID, VerboseFlag
	2	environmentname, release, effectiveUserID, VerboseFlag
EnvModify	0	environmentname, release, newtestersname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	environmentname, release, newtestersname, effectiveUserID, VerboseFlag
	2	environmentname, release, newtestersname, effectiveUserID, VerboseFlag
FeatureAccept	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, configFields, answer, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureAssign	0	featurename, newcomponent, NewOwner, remarks, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, newcomponent, NewOwner, remarks, effectiveUserID, VerboseFlag
	2	featurename, newcomponent, NewOwner, remarks, effectiveUserID, VerboseFlag
FeatureCancel	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureComment	0	featurename, remarks, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, remarks, effectiveUserID, VerboseFlag
FeatureDesign	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
FeatureModify	0	featurename, newfeaturename, prefix, reference, abstract, originator, remarks, configFields, MessageBuffer, answer, release, notesDB, notesID, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, newfeaturename, prefix, reference, abstract, originator, remarks, configFields, dateoflastupdate, answer, release, notesDB, notesID, effectiveUserID, VerboseFlag
	2	featurename, newfeaturename, prefix, reference, abstract, originator, remarks, configFields, answer, release, notesDB, notesID, effectiveUserID, VerboseFlag
FeatureOpen	0	component, prefix, reference, remarks, abstract, configFields, featurename, release, notesDB, notesID, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	component, prefix, reference, remarks, abstract, configFields, featurename, release, notesDB, notesID, effectiveUserID, VerboseFlag
	2	component, prefix, reference, remarks, abstract, configFields, featurename, release, notesDB, notesID, effectiveUserID, VerboseFlag
FeatureReopen	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureReturn	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureReview	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureSize	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureVerify	0	featurename, originalfeaturename, remarks, StandardFields, configFields, answer, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, remarks, effectiveUserID, VerboseFlag
	2	featurename, originalfeaturename, remarks, answer, effectiveUserID, VerboseFlag
FeatureView	0	featurename, displaytype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	featurename, displaytype, effectiveUserID, VerboseFlag
	2	featurename, displaytype, effectiveUserID, VerboseFlag
FixActive	0	WorkAreaName, release, component, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, release, component, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, release, component, type, effectiveUserID, VerboseFlag
FixAssign	0	WorkAreaName, release, component, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, release, component, NewOwner, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, release, component, NewOwner, type, effectiveUserID, VerboseFlag
FixComplete	0	WorkAreaName, release, component, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, release, component, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, release, component, type, effectiveUserID, VerboseFlag
FixCreate	0	WorkAreaName, release, component, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, release, component, NewOwner, type, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	WorkAreaName, DefectOrFeatureName, release, component, NewOwner, type, effectiveUserID, VerboseFlag
FixDelete	0	WorkAreaName, release, component, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, component, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, component, type, effectiveUserID, VerboseFlag
HostCreate	0	NewOwner, login@hostname, loginType, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	NewOwner, login@hostname, effectiveUserID, VerboseFlag
	2	NewOwner, login@hostname, effectiveUserID, VerboseFlag
HostDelete	0	OldOwner, login@hostname, loginType, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	OldOwner, login@hostname, effectiveUserID, VerboseFlag
	2	OldOwner, login@hostname, effectiveUserID, VerboseFlag
NotifyCreate	0	NewOwner, component, interestgroupname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	NewOwner, component, interestgroupname, effectiveUserID, VerboseFlag
	2	NewOwner, component, interestgroupname, effectiveUserID, VerboseFlag
NotifyDelete	0	OldOwner, component, interestgroupname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	OldOwner, component, interestgroupname, effectiveUserID, VerboseFlag
	2	OldOwner, component, interestgroupname, effectiveUserID, VerboseFlag
ParserCreate	0	description, release, parsercommand, paths, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	description, release, parsercommand, paths, effectiveUserID, VerboseFlag
	2	description, release, parsercommand, paths, effectiveUserID, VerboseFlag
ParserDelete	0	description, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	description, release, effectiveUserID, VerboseFlag
	2	description, release, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
ParserModify	0	description, release, parsercommand, paths, workAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	description, release, parsercommand, paths, effectiveUserID, VerboseFlag
	2	description, release, parsercommand, paths, effectiveUserID, VerboseFlag
ParserView	0	description, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	description, release, effectiveUserID, VerboseFlag
	2	description, release, effectiveUserID, VerboseFlag
PartAdd	0	partpathName, transmitFlag, filenameonclient, temporaryfileonserver, release, component, filetype, textBuff, WorkAreaName, fMode, parentname, parsername, buildername, relationtoparent, buildparameters, parttype, parenttype, temporaryFlag, StandardFields, configFields, translation, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, temporaryfileonserver, release, component, filetype, WorkAreaName, remarks, fMode, parentname, parsername, buildername, relationtoparent, buildparameters, parttype, parenttype, temporaryFlag, configFields, translation, effectiveUserID, VerboseFlag
	2	partpathName, temporaryfileonserver, release, component, filetype, WorkAreaName, remarks, fMode, parentname, parsername, buildername, relationtoparent, buildparameters, parttype, parenttype, temporaryFlag, configFields, translation, effectiveUserID, VerboseFlag
PartBuild	0	partpathName, release, WorkAreaName, buildmode, poolname, buildparameters, cancelFlag, detailfilename, clientportname, parttype, buildResourceName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, WorkAreaName, release, component, buildmode, poolname, buildparameters, cancelFlag, detailfilename, clienthostname, clientportname, parttype, effectiveUserID, VerboseFlag
	2	partpathName, WorkAreaName, release, component, buildmode, poolname, buildparameters, cancelFlag, detailfilename, clienthostname, clientportname, parttype, effectiveUserID, VerboseFlag
PartCheckIn	0	partpathName, transmitFlag, filenameonclient, temporaryfileonserver, release, forceFlag, textBuff, WorkAreaName, commonFlag, filetype, parttype, retainlockFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	partpathName, temporaryfileonserver, release, component, forceFlag, WorkAreaName, remarks, commonreleases, filetype, parttype, retainlockFlag, configFields, effectiveUserID, VerboseFlag
	2	partpathName, temporaryfileonserver, release, component, versionname, forceFlag, WorkAreaName, remarks, commonreleases, filetype, parttype, retainlockFlag, configFields, effectiveUserID, VerboseFlag
PartCheckOut	0	partpathName, release, forceFlag, WorkAreaName, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, temporaryfileonserver, release, filetype, component, versionname, forceFlag, workareaname, parttype, configFields, effectiveUserID, VerboseFlag
	2	partpathName, temporaryfileonserver, release, filetype, component, versionname, forceFlag, workareaname, parttype, configFields, effectiveUserID, VerboseFlag
PartChildInfo	0	partpathName, release, versionname, WorkAreaName, displaytype, relationtoparent, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, versionname, WorkAreaName, displaytype, relationtoparent, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, versionname, WorkAreaName, displaytype, relationtoparent, parttype, effectiveUserID, VerboseFlag
PartConnect	0	partpathName, release, WorkAreaName, parentname, relationtoparent, parttype, parenttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, WorkAreaName, component, parentname, relationtoparent, parttype, parenttype, effectiveUserID, VerboseFlag
	2	partpathName, release, WorkAreaName, component, parentname, relationtoparent, parttype, parenttype, effectiveUserID, VerboseFlag
PartDelete	0	partpathName, release, forceFlag, WorkAreaName, commonFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
	2	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
PartDisconnect	0	partpathName, release, WorkAreaName, parentname, parttype, parenttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	partpathName, release, WorkAreaName, component, parentname, parttype, parenttype, effectiveUserID, VerboseFlag
	2	partpathName, release, WorkAreaName, component, parentname, parttype, parenttype, effectiveUserID, VerboseFlag
PartExec	0	execCmd, criteria, parent, parentType, release, WorkAreaName, versionname, numVersions, MessageBuffer, effectiveUserId, TeamcUserID, VerboseFlag
	1	execCmd, criteria, release, WorkAreaName, versionname, numVersions, configFields, effectiveUserId
	2	execCmd, criteria, release, WorkAreaName, versionname, numVersions, configFields, effectiveUserId
PartExtract	0	partpathName, release, nokeysFlag, WorkAreaName, versionname, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, temporaryfileonserver, release, nokeysFlag, WorkAreaName, versionname, component, parttype, configFields, effectiveUserID, VerboseFlag
	2	partpathName, temporaryfileonserver, release, nokeysFlag, WorkAreaName, versionname, component, parttype, configFields, effectiveUserID, VerboseFlag
PartLink	0	partpathName, sourcerelease, release, sourceworkareaname, sourceversion, parttype, targetworkareaname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, sourceworkareaname, sourcerelease, targetrelease, sourceversion, component, parttype, targetworkareaname, effectiveUserID, VerboseFlag
	2	partpathName, sourceworkareaname, sourcerelease, targetrelease, sourceversion, component, parttype, targetworkareaname, effectiveUserID, VerboseFlag
PartLock	0	partpathName, release, forceFlag, WorkAreaName, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, forceFlag, WorkAreaName, filetype, component, versionname, parttype, configFields, effectiveUserID, VerboseFlag
	2	partpathName, release, forceFlag, WorkAreaName, filetype, component, versionname, parttype, configFields, effectiveUserID, VerboseFlag
PartMark	0	partpathName, release, versionname, WorkAreaName, translationstate, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	partpathName, release, versionname, WorkAreaName, translationstate, component, parttype, configFields, effectiveUserID, VerboseFlag
	2	partpathName, release, versionname, WorkAreaName, translationstate, component, parttype, configFields, effectiveUserID, VerboseFlag
PartMerge	0	partpathName, driver, release, WorkAreaName, fromDriver, FromRelease, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, driver, release, WorkAreaName, fromDriver, FromRelease, effectiveUserID, VerboseFlag
	2	partpathName, driver, release, WorkAreaName, fromDriver, FromRelease, effectiveUserID, VerboseFlag
PartModify	0	partpathName, release, newcomponent, newfMode, configFields, WorkAreaName, filetype, parsername, buildername, buildparameters, parttype, temporaryfilename, translation, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, oldcomponent, newcomponent, oldfMode, newfMode, configFields, WorkAreaName, dateoflastupdate, filetype, parsername, buildername, buildparameters, parttype, temporaryFlag, translation, effectiveUserID, VerboseFlag
	2	partpathName, release, oldcomponent, newcomponent, oldfMode, newfMode, configFields, WorkAreaName, dateoflastupdate, filetype, parsername, buildername, buildparameters, parttype, temporaryFlag, translation, effectiveUserID, VerboseFlag
PartReconcile	0	partpathName, release, WorkAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, WorkAreaName, effectiveUserID, VerboseFlag
	2	partpathName, release, WorkAreaName, effectiveUserID, VerboseFlag
PartRecreate	0	partpathName, release, forceFlag, WorkAreaName, commonFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, olddropDate, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
	2	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, olddropDate, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
PartRefresh	0	partpathName, sourcerelease, release, sourceworkareaname, sourceversion, parttype, targetworkareanum, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	partpathName, sourceworkareaname, sourcerelease, targetrelease, sourceversion, component, parttype, targetworkareaname, effectiveUserID, VerboseFlag
	2	partpathName, sourceworkareaname, sourcerelease, targetrelease, sourceversion, component, parttype, targetworkareaname, effectiveUserID, VerboseFlag
PartRename	0	partpathName, release, nuPartPathName, forceFlag, WorkAreaName, commonFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, nuPartPathName, forceFlag, WorkAreaName, commonFlag, component, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
	2	partpathName, release, nuPartPathName, forceFlag, WorkAreaName, commonFlag, component, parttype, commonRelBuffer, effectiveUserID, VerboseFlag
PartTouch	0	partpathName, release, forceFlag, WorkAreaName, commonFlag, parttype, creatChangeFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, parttype, effectiveUserID, VerboseFlag
PartUndo	0	partpathName, release, forceFlag, WorkAreaName, commonFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, versionname, parttype, commonRelBuffer, timeNow, effectiveUserID, VerboseFlag
	2	partpathName, release, forceFlag, WorkAreaName, commonFlag, component, versionname, parttype, commonRelBuffer, timeNow, effectiveUserID, VerboseFlag
PartUnlock	0	partpathName, WorkAreaName, release, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, WorkAreaName, release, component, parttype, configFields, effectiveUserID, VerboseFlag
	2	partpathName, WorkAreaName, release, component, parttype, configFields, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
PartView	0	partpathName, release, versionname, WorkAreaName, displaytype, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, versionname, WorkAreaName, displaytype, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, versionname, WorkAreaName, displaytype, parttype, effectiveUserID, VerboseFlag
PartViewmsg	0	partpathName, release, versionname, WorkAreaName, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, component, versionname, WorkAreaName, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, component, versionname, WorkAreaName, parttype, effectiveUserID, VerboseFlag
PartRestrict	0	partpathName, release, cancelFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, cancelFlag, component, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, cancelFlag, component, parttype, effectiveUserID, VerboseFlag
PartOverrideR	0	partpathName, release, WorkAreaName, login, cancelFlag, parttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	partpathName, release, WorkAreaName, login, cancelFlag, component, parttype, effectiveUserID, VerboseFlag
	2	partpathName, release, WorkAreaName, login, cancelFlag, component, parttype, effectiveUserID, VerboseFlag
PrereqCreate	0	release, primeworkareaname, secondworkareaname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag
	2	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag
PrereqDelete	0	release, primeworkareaname, secondworkareaname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	release, primeworkareaname, secondworkareaname, primeworkareatype, secondworkareatype, effectiveUserID, VerboseFlag
ReleaseCreate	0	release, component, newreleaseprocess, environmentname, testersname, ApproverName, description, releaseowner, autoprune, developmentmode, releasedatabasename, outputversions, StandardFields, configFields, coupling, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, component, newreleaseprocess, environmentname, testersname, ApproverName, description, releaseowner, coupling, effectiveUserID, VerboseFlag
	2	release, component, newreleaseprocess, environmentname, testersname, ApproverName, description, releaseowner, coupling, effectiveUserID, VerboseFlag
ReleaseDelete	0	release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, effectiveUserID, VerboseFlag
	2	release, effectiveUserID, VerboseFlag
ReleaseExtract	0	release, root, nokeysFlag, committedFlag, date, fmask, dmask, complist, crlfFlag, versionname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, root, nokeysFlag, committedFlag, date, fmask, dmask, crlfFlag, complist, effectiveUserID, VerboseFlag
	2	release, root, nokeysFlag, committedFlag, date, fmask, dmask, crlfFlag, complist, effectiveUserID, VerboseFlag
ReleaseLink	0	release, FromRelease, WorkAreaName, newworkareaname, fromversionname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, FromRelease, WorkAreaName, fromworkareaname, fromversionname, effectiveUserID, VerboseFlag
	2	release, FromRelease, WorkAreaName, fromworkareaname, fromversionname, effectiveUserID, VerboseFlag
ReleaseMerge	0	release, WorkAreaName, FromRelease, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, FromRelease, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, FromRelease, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
ReleaseModify	0	release, newrelease, component, description, newreleaseprocess, environmentname, testersname, ApproverName, NewOwner, autoprune, outputversions, StandardFields, configFields, coupling, developmentMode, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, newrelease, oldcomponent, newcomponent, olddescription, newdescription, oldreleaseprocess, newreleaseprocess, environmentname, testersname, ApproverName, OldOwnerName, NewOwner, dateoflastupdate, coupling, effectiveUserID, VerboseFlag
	2	release, newrelease, component, description, newreleaseprocess, environmentname, testersname, ApproverName, NewOwner, coupling, effectiveUserID, VerboseFlag
ReleasePrune	0	release, versionname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, versionname, effectiveUserID, VerboseFlag
	2	release, versionname, effectiveUserID, VerboseFlag
ReleaseRecreate	0	release, environmentname, testersname, ApproverName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, lastdropdate, environment, testersname, ApproverName, effectiveUserID, VerboseFlag
	2	release, lastdropdate, environment, testersname, ApproverName, effectiveUserID, VerboseFlag
ReleaseView	0	release, reporttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, reporttype, effectiveUserID, VerboseFlag
	2	release, reporttype, effectiveUserID, VerboseFlag
Report	0	viewname, reportcriteria, parent, release, WorkAreaName, versionname, reporttype, parenttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	viewname, reportcriteria, parent, effectiveUserID, VerboseFlag
	2	viewname, reportcriteria, parent, effectiveUserID, VerboseFlag
ReportGeneral	0	dbobjnames, selspec, reportcriteria, colspec, queryopt, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	viewname, reportcriteria, selspec, colspec, queryChar, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	viewname, reportcriteria, selspec, colspec, queryChar, effectiveUserID, VerboseFlag
SizeAccept	0	WorkAreaName, component, release, sizetext, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, component, release, sizetext, sizetype, effectiveUserID, VerboseFlag
	2	WorkAreaName, component, release, sizetext, sizetype, effectiveUserID, VerboseFlag
SizeAssign	0	WorkAreaName, component, release, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, component, release, NewOwner, sizetype, effectiveUserID, VerboseFlag
	2	WorkAreaName, component, release, NewOwner, sizetype, effectiveUserID, VerboseFlag
SizeCreate	0	WorkAreaName, component, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
	2	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
SizeDelete	0	WorkAreaName, component, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
	2	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
SizeReject	0	WorkAreaName, component, release, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
	2	WorkAreaName, component, release, sizetype, effectiveUserID, VerboseFlag
TargetCreate	0	targetName, status, targetDate, active, criteria, configFields, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	targetName, status, targetDate, active, criteria, configFields, effectiveUserID, VerboseFlag
	2	targetName, status, targetDate, active, criteria, configFields, effectiveUserID, VerboseFlag
TargetDelete	0	criteria, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	criteria, MessageBuffer, effectiveUserID, VerboseFlag
	2	criteria, MessageBuffer, effectiveUserID, VerboseFlag
TargetModify	0	status, targetDate, active, criteria, configFields, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	status, targetDate, active, criteria, configFields, MessageBuffer, effectiveUserID, VerboseFlag
	2	status, targetDate, active, criteria, configFields, MessageBuffer, effectiveUserID, VerboseFlag
TargetView	0	criteria, type, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	criteria, type, MessageBuffer, effectiveUserID, VerboseFlag
	2	criteria, type, MessageBuffer, effectiveUserID, VerboseFlag
TestAbstain	0	WorkAreaName, TesterName, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
TestAccept	0	WorkAreaName, TesterName, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
TestAssign	0	WorkAreaName, OldOwner, NewOwner, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, OldOwner, NewOwner, release, environmentname, workareaType, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	WorkAreaName, DefectOrFeatureName, OldOwner, NewOwner, release, environmentname, workareaType, effectiveUserID, VerboseFlag
TestCreate	0	WorkAreaName, TesterName, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
TestDelete	0	DefectOrFeatureName, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	DefectOrFeatureName, release, environmentname, type, effectiveUserID, VerboseFlag
	2	DefectOrFeatureName, release, environmentname, type, effectiveUserID, VerboseFlag
TestReject	0	WorkAreaName, TesterName, release, environmentname, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, DefectOrFeatureName, TesterName, release, environmentname, type, effectiveUserID, VerboseFlag
UserCreate	0	login, usersfullname, area, sendmailaddress, superuserprivilegeFlag, configFields, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, usersfullname, area, sendmailaddress, superuserprivilegeFlag, configFields, effectiveUserID, VerboseFlag
	2	login, usersfullname, area, sendmailaddress, superuserprivilegeFlag, configFields, effectiveUserID, VerboseFlag
UserDelete	0	login, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, usersfullname, effectiveUserID, VerboseFlag
	2	login, usersfullname, effectiveUserID, VerboseFlag
UserModify	0	login, newlogin, newusersfullname, newarea, newuserssendmailaddress, newsuperuserprivilegeFlag, configFields, passwordlength, oldpassword, newpassword, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	1	login, newlogin, oldusersfullname, newusersfullname, oldarea, newarea, oldsendmailaddress, newsendmailaddress, oldsuperuserprivilegeFlag, newsuperuserprivilegeFlag, configFields, dateoflastupdate, effectiveUserID, VerboseFlag
	2	login, newlogin, newusersfullname, newarea, newuserssendmailaddress, newsuperuserprivilegeFlag, configFields, effectiveUserID, VerboseFlag
UserRecreate	0	login, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, usersfullname, olddropDate, effectiveUserID, VerboseFlag
	2	login, usersfullname, olddropDate, effectiveUserID, VerboseFlag
UserView	0	login, displaytype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	login, displaytype, effectiveUserID, VerboseFlag
	2	login, displaytype, effectiveUserID, VerboseFlag
VerifyAbstain	0	defectname, login, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	defectname, login, type, effectiveUserID, VerboseFlag
	2	defectname, login, type, effectiveUserID, VerboseFlag
VerifyAccept	0	WorkAreaName, login, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, login, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, login, type, effectiveUserID, VerboseFlag
VerifyAssign	0	WorkAreaName, OldOwner, NewOwner, MessageBuffer, effectiveUserID, TesterName, VerboseFlag
	1	WorkAreaName, OldOwner, NewOwner, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, OldOwner, NewOwner, type, effectiveUserID, VerboseFlag
VerifyReject	0	WorkAreaName, login, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, login, type, effectiveUserID, VerboseFlag
	2	WorkAreaName, login, type, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
WorkAreaAssign	0	release, WorkAreaName, NewOwner, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, NewOwner, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, NewOwner, workareaType, effectiveUserID, VerboseFlag
WorkAreaCancel	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaCheck	0	release, WorkAreaName, driver, nodupFlagChar, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, drivername, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, drivername, workareaType, effectiveUserID, VerboseFlag
WorkAreaCommit	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaComplet	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaCreate	0	release, WorkAreaName, DefectOrFeatureName, target, workareaOwner, StandardFields, configFields, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, target, workareaOwner, workareaType, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	WorkAreaName, release, DefectOrFeatureName, target, workareaOwner, workareaType, effectiveUserID, VerboseFlag
WorkAreaExtract	0	WorkAreaName, release, root, nokeysFlag, type, fmask, dmask, crlfFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, root, nokeysFlag, fmask, dmask, crlfFlag, effectiveUserID, TeamcUserID, VerboseFlag
	2	WorkAreaName, release, root, nokeysFlag, fmask, dmask, crlfFlag, effectiveUserID, TeamcUserID, VerboseFlag
WorkAreaFix	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaFreeze	0	release, WorkAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, workareatarget, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, workareatarget, workareaType, effectiveUserID, VerboseFlag
WorkAreaIntegra	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaModify	0	release, WorkAreaName, newtarget, StandardFields, configFields, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, oldtarget, newtarget, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, oldtarget, newtarget, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaReconci	0	release, WorkAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, effectiveUserID, VerboseFlag

TeamConnection action	Exit ID	Parameters passed to the user exit program (see page 317 for definitions)
	2	release, WorkAreaName, effectiveUserID, VerboseFlag
WorkAreaRefresh	0	release, WorkAreaName, source, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, source, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, source, workareaType, effectiveUserID, VerboseFlag
WorkAreaTest	0	release, WorkAreaName, forceFlag, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
	2	WorkAreaName, release, DefectOrFeatureName, workareaType, effectiveUserID, VerboseFlag
WorkAreaUndo	0	release, WorkAreaName, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, target, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, target, workareaType, effectiveUserID, VerboseFlag
WorkAreaView	0	release, WorkAreaName, reporttype, MessageBuffer, effectiveUserID, TeamcUserID, VerboseFlag
	1	release, WorkAreaName, reporttype, workareaType, effectiveUserID, VerboseFlag
	2	release, WorkAreaName, reporttype, workareaType, effectiveUserID, VerboseFlag

User exit parameter definitions

The following list provides definitions for most of the parameters passed to user exit programs. Parameters are listed in alphabetical order. Parameter names are in lowercase, except where they are the name of a field in a TeamConnection database table. For more information on these and other parameters, refer to the *Commands Reference*.

abstract
Defect or feature abstract.

alternateversion
Specifies the name of a version of a driver, release, or workarea where the conflicting version of a part is visible.

answer
Specifies the reason for an action taken on a defect.

ApproverName
Approver's TeamConnection user ID.

area Department or area in which the user works.

authority
Specifies a user's authority group.

autoprune
Whether or not to automatically prune workareas that have not been integrated with the release. Valid values are `yes` and `no`.

buildername
The name of the builder used to create an output part.

buildmode
The mode in which the build runs. The following values are valid:

1	force
2	normal
3	unconditional
4	report

buildparameters
Specifies the parameters passed to the build script.

cancelFlag
This flag is used with PartBuild actions to cancel a build request.

clienthostname
The name of the system where the client command originated.

clientportname
The port number used for the build pool.

committedFlag
This flag is used with ReleaseExtract and ReleaseLink actions to specify whether the user wants the last committed (as opposed to the current) versions of parts in the release. A value of 0 means to use the current version; 1 means to use the last committed version.

commonFlag
Indicates whether the part is common with other releases or not. A value of 0 indicates no, 1 indicates yes.

commonreleases
For a common part, this parameter specifies the other releases the part is common with (on the partCheckIn action). Release names are separated by blanks.

component
Specifies the name of a component.

componentprocess
Specifies the process to be used for a component in CompCreate actions.

condition
This parameter is used with the value parameter to determine if a build event was successful.

configFields
This parameter has the format:

```
attribute name    content
attribute name    content

⋮

           null string
```

For exit ID 0, the attribute name can appear in abbreviated form, as it is not processed by TeamConnection.

creatChangeFlag
This flag is used by PartTouch to specify the write permissions of the part: 0200 permits write by the owner; 0000 does not allow write. This parameter is defined numerically, in octal notation. The fMode code is constructed by combing the logical OR of the following values:

4000	setuid
2000	setgid
0400	Permits read by owner
0200	Permits write by owner
0100	Permits execute or search by owner
0040	Permits read by group
0020	Permits write by group
0010	Permits execute or search by group
0004	Permits read by all others
0002	Permits write by all others
0001	Permits execute or search by all others

For example, `0755` would permit read, write, and execute for the owner and read and execute for all others.

crlfFlag
This flag is used by DriverExtract and ReleaseExtract to handle crlf conversions when extracting Intel-based files to a UNIX-based platform.

date Enables you to extract only files from a release that are older than the specified date.

dateoflastupdate
Specifies the date in modify actions.

defectname
Indicates the name of the defect.

DefectOrFeatureName
Indicates the name of the defect or feature for approval record, fix record, test record, driver member, or workarea actions.

description
Specifies a description of an object.

detailfilename
Specifies the file in which all build messages for a part are collected.

developmentmode
Valid values are `serial` and `concurrent`.

displaytype
This parameter is used on all view actions. The type of view format requested, where:

0	stanza
1	raw
2	table
3	long
4	process

dmask
Specifies the read, write, and execute directory permissions for the extracted parts in octal notation.

driver, drivername
Specifies the name of the driver for defect, driver, driver member, and workarea actions.

driverstate
Values can be working, integrate, commit, or complete.

drivertype
Specified by the user when a driver is created, for example, development, production, or prototype.

effectiveUserID
The TeamConnection user ID that initiated the transaction. This is the value of the TC_BECOME environment variable or the -become attribute flag. In OS/2, Windows 3.1, and Windows 95 environments, if this variable is not set and the -become attribute is not specified, it is the value of the TC_USER environment variable.

environment, environmentname
Specifies the environment in which the testing is to be done if the test subprocess is included in the release process. (The tester/environment name combination becomes an entry on the environment list for the release.)

ExtractType
Indicates whether this is a full or delta driver extract. 0 indicates delta; 1 indicates full.

featurename
Specifies the name of the feature for feature actions.

filenameonclient
The name of the source file from which a TeamConnection part is created using the PartAdd or PartCheckin action.

filetype
Specifies one of the following file types with the PartAdd action:

0	none
1	text
2	binary

Part type for the other part actions is text for text parts, and binary for binary parts.

fmask Specifies the read, write, and execute file permissions for the extracted parts in octal notation. Refer to the *Commands Reference* for details.

fMode
Specifies the write permissions of the part: 0200 permits write by the owner; 0000 does not allow write. This parameter is defined numerically, in octal notation. The fMode code is constructed by combing the logical OR of the following values:

4000	setuid
2000	setgid
0400	Permits read by owner
0200	Permits write by owner
0100	Permits execute or search by owner
0040	Permits read by group
0020	Permits write by group

0010	Permits execute or search by group
0004	Permits read by all others
0002	Permits write by all others
0001	Permits execute or search by all others

For example, `0755` would permit read, write, and execute for the owner and read and execute for all others.

forceFlag
Indicates whether the force option was chosen on part actions (0 indicates no and 1 indicates yes). The force option is used to force a break between common parts when using PartLock, PartCheckOut, PartCheckIn, PartDelete, PartRecreate, PartRename, and PartUndo actions.

FromRelease
Specifies the name of the release to be linked from in ReleaseLink actions.

fromversionname
Specifies the version of the release to be linked from in ReleaseLink actions.

fromworkareaname
Specifies the name of the workarea to be linked from in ReleaseLink actions.

gid Specifies ownership of extracted parts by identifying the internal number that uniquely identifies the group to the system.

interestgroupname
Specifies the name of an interest group in a NotifyCreate or NotifyDelete action.

lastdropdate
Specifies the date on which a release to be recreated using the ReleaseRecreate action was deleted.

login The system login ID for a user. In single-user environments, such as OS/2, Windows 3.1 and Windows 95, this parameter is the TC_USER environment variable.

login@hostname
Specifies a host list entry in HostCreate and HostDelete actions.

longFlag
Indicates whether the -long flag is specified or not specified. A value of 0 indicates not specified; 1 indicates specified. The -long flag is available on some of the view actions and is used to display more

detailed information of the object being viewed. The -long flag on the driverCheck action displays details about prerequisites and corequisites.

name Specifies the name of a builder in Builder actions. In the CompModify action, this parameter specifies the current component name.

newarea
Specifies a new area or department in which a user works.

newcomponent
Specifies a new name for a component.

newcomponentprocess
Specifies a new process to be used for a component.

newdefectname
Specifies a new name for a defect in a DefectModify action.

newdescription
Specifies a new description for an object.

newdrivername
Specifies a new name for a driver in a DriverModify action.

newdrivertype
Specifies a new type for the driver in DriverModify actions. Valid types include development, production, or prototype.

newfeaturename
Specifies a new name for a feature in a FeatureModify action.

newfMode
Specifies a new write permission for a PartModify action. See **fmode** for a list of values.

newlogin
Specifies a new login ID for a user.

NewOwner
Specifies the new owner of an object in actions that create, modify, or assign owners to objects.

newrelease
Specifies a new release name for ReleaseModify actions.

newreleaseprocess
Specifies the release process to be used for ReleaseCreate or ReleaseModify actions.

newsendmailaddress
Specifies a new email address for a user's notification messages.

newsuperuserprivilegeflag
Specifies the user's superuser status for UserModify actions. Specify 0 to deny superuser status or 1 to grant superuser status.

newtarget
Specifies a new target for workareas.

newtestersname
Specifies the full name of a new tester in an EnvModify action.

newtype
Specifies a new driver type for DriverModify actions. Valid types include development, production, or prototype.

newusersfullname
Specifies the new full name for a user in UserModify actions.

newuserssendmailaddress
Specifies the new mail address for a user in UserModify actions.

newworkareaname
Specifies the workarea to be linked to in ReleaseLink actions.

node Specifies a remote host on which to place the extracted part tree.

nokeysFlag
For extract actions, indicates whether you want to substitute assigned values in place of keywords imbedded in the extracted parts. 0 means not to substitute assigned values; 1 means to substitute assigned values.

numberofworkareas
Specifies the number of workareas to be deleted in a MemberDelete action.

nuPartPathName
Specifies the new path name for PartRename actions.

oldcomponentprocess
Specifies the process of a component to be modified.

olddescription
Specifies the description of an object to be modified.

olddropDate
Specifies the date on which a component, part, or user to be recreated using the CompRecreate, PartRecreate, or UserRecreate action was deleted.

oldfMode
Specifies the old write permission for a PartModify action. See **fmode** for a list of values.

OldOwner
Specifies the old owner of an object in actions that modify or assign owners to objects.

oldreleaseprocess
Specifies the old release process to be changed by a ReleaseModify action.

oldsendmailaddress
Specifies an email address to be changed for a user's notification messages.

oldsuperuserprivilegeflag
Specifies the user's superuser status to be changed by a UserModify action. Specify 0 if the user currently does not have superuser status or 1 if he or she currently does have superuser status.

oldtarget
Specifies a target to be changed for workareas.

oldtype
Specifies the driver type to be changed by a DriverModify action. Valid types include development, production, or prototype.

oldusersfullname
Specifies the full name for the user to be changed by a UserModify action.

originaldefectname
The name of a defect for which the current defect is a duplicate.

originalfeaturename
The name of a feature for which the current feature is a duplicate.

originator
The TeamConnection user ID of the user who opens the defect or feature.

outputversions
Specifies the number of versions of build output parts to be retained in ReleaseCreate or ReleaseModify actions.

owner Specifies the component owner in CompCreate actions.

parent Specifies the parent of the part to generate a report on using the Report -view PartView action.

parentcomponent
Specifies the parent component for Component actions.

parentname
Specifies the parent of a part in a build tree in PartAdd, PartConnect, and PartDisconnect actions.

parenttype
Specifies the part type of the parent of a part in a build tree in PartAdd, PartConnect, and PartDisconnect actions. In Report actions, this parameter specifies the part type of the parent of the part to generate a report on using the Report -view PartView action.

parsername
Specifies the name of the parser used to create an output part.

parsercommand
Specifies the command file you want to associate with the parser. This can be an .exe, a .com, a .cmd, or a .bat file. The executable file needs to be in the execution path of the TeamConnection family server.

partpathName
Specifies the path name of a part in Part actions.

parttype
Specifies the type of a part, such as TCPart or vgdata.

pathName
Specifies the path name of parts in Collision actions.

paths Specifies a concatenated set of paths that define where the parser looks for parts when processing the set of dependencies returned from the command file. These dependencies come in two types:

- A dependency in which the file is stored in the TeamConnection database. For example, hello.c includes hello.h, and both files are stored in the TeamConnection database. During a build, these dependencies must be extracted to a path accessible by the build processor.
- A dependency on a file that is not stored in the TeamConnection database. An example of such a dependency is stdio.h, which is typically stored in a compiler's include path and not in the TeamConnection database.

poolname
Specifies the build pool used to build a part.

prefix Defect or feature prefix.

primeworkareaname
Prime corequisite workarea name.

process
Specifies the component process in CompModify actions.

processoroptions
Parameters specified for passing to a builder upon builder -create.

reference
Defect or feature reference.

relationtoparent
How a part is related to its parent in the build tree, where:

1	input
2	output
3	dependent

release
Name of the release.

releasedatabasename
Name of a separate database for the part data (the contents of each part) in a release.

releaseowner
Specifies the owner of a release.

remarks
For defect or feature actions, this is defect remarks or feature remarks. For part actions, this is part remarks added when a new version is created.

reportcriteria
The criteria entered as the -where clause for a Report action.

reporttype
The type of report format requested, where:

0	stanza
1	raw
2	table
3	long
4	process
5	html

User exit messages are not displayed if the -raw format is selected.

retainlockFlag
Specifies that a part is to remain locked after is it checked in.

root This is the specified directory on the designated host where the extracted part tree is to be placed.

script Specifies the name of the build script.

secondworkareaname
Second corequisite workarea name.

sendmailaddress
The e-mail address to which a user’s notification messages are sent.

severity
Defect severity driver.

sizetext
The sizing information for a defect or feature.

sizetype
Specifies whether the sizing record is associated with a defect or a feature.

source Specifies the name of a workarea with which abnother workarea is refreshed.

sourcerelease
Specifies the original release of a part to be linked using the PartLink action.

sourceversion
Specifies the original version of a part to be linked using the PartLink action.

sourceworkareaname
Specifies the original workarea of a part to be linked using the PartLink action.

StandardFields
Contains any fields abbreviated by users, requiring interpretation and verification on the TeamConnection server. Actions with configurable fields allow for the ambiguity in parameter names that requires intervention by the server.

state Specifies the state of parts in Collision actions.

superuserprivilegeflag
A value of `yes` indicates on; a value of `no` indicates off.

target Specifies the value of the workarea target field for a WorkareaUndo action.

targetenvironment
Specifies the environment for which build output is generated.

targetrelease
Specifies the new release of a part to be linked using the PartLink action.

targetworkareaname
Specifies the new workarea of a part to be linked using the PartLink action.

TeamcUserID
The user’s TeamConnection user ID on the client workstation. In AIX, HP-UX, Solaris, and Windows NT environments, this is the login ID.

In OS/2, Windows 3.1, and Windows 95 environments, this is the value of the TC_USER environment variable.

temporaryfilename
: Indicates if the -temporary flag is used on a Part -modify command.

temporaryfileonserver
: For some part actions, the contents of the file on the client are copied to a temporary file on the server. This parameter is the name for the temporary file on the server.

temporaryFlag
: Indicates the part is a temporary part on PartAdd and PartModify actions.

testersname, TesterName
: Specifies the full name of the person responsible for testing an object.

timeout
: Specifies the amount of time that the build processor waits for a build script to complete before assuming a failure has occurred. The default is 1440 minutes (24 hours).

translation
: Specifies how the part is related to the translation process. For example, a part might be translated into another language, used while translating other parts, or completely unrelated to translation.

translation state
: Specifies the translation state of the part. Valid values are `notReady` and `ready`.

transmitFlag
: Indicates whether the builder part is to be copied from the client to the server or not. Specify 0 or 1.

type Specifies whether the sizing record is associated with a defect or a feature on Test actions.

typename
: Specifies the type of parts being handled by Collision actions.

uid Specifies ownership of extracted parts by identifying the internal number that uniquely identifies the user to the system.

usersfullname
: Specifies the full name of a user.

value This parameter is used with the consition parameter to determine if a build event was successful.

VerboseFlag
: Specifies that you want to see a confirmation message after you issue

this action. 0 indicates off; 1 indicates on. The user exit program can use this flag to include confirmation or status messages only when the -verbose flag is on.

versionname
Part version name.

viewname
The name of the view (for example, partView) that is being reported on.

WorkAreaName
Specifies the name of a workarea.

workareaOwner
Specifies the owner of a workarea.

workareastate
The value can be approve, fix, integrate, commit, test, or complete.

workareatarget
Specifies the target field used when creating or modifying a workarea in WorkAreaFreeze actions.

workareaType
The value can be defect or feature.

Appendix F. TeamConnection NLS and DBCS considerations

This appendix describes how to use IBM VisualAge TeamConnection Enterprise Server Version 3 in situations that require National Language Support (NLS) and Double-Byte Character Sets (DBCS) in all the supported platforms.

The following topics are addressed in this appendix:

- The overview of the NLS and DBCS support provided by IBM VisualAge TeamConnection Enterprise Server Version 3, such as usage of locale XPG/4 I18N programming model, and the supported locales and platforms.

  The locale support is already provided by the UNIX operating systems. However, in OS/2 and Windows 32-bit, the locale support is not provided by these operating system, instead it is provided by TeamConnection during the installation process.
- The main characteristics and limitations related to NLS/DBCS, such as the interoperability between clients and server, and special cases for the manipulation of data by TeamConnection.
- The main issues related to installation, administration and runtime, such as directory structure of the installed code, and why you should not change the code page of an existing TeamConnection family.

More information on NLS and DBCS considerations for TeamConnection may be available in technical reports on the IBM VisualAge TeamConnection Enterprise Server Library home page. To access this home page, select Library from the IBM VisualAge TeamConnection home page at Web address http://www.software.ibm.com/ad/teamcon.

Overview of TeamConnection NLS and DBCS support

Language and culture sensitive information in TeamConnection

VisualAge TeamConnection supports the I18N (Internationalization) locale model proposed by XPG/4 (X/Open Portability Guide, issue 4) in which the language and culture sensitive information are not hard coded in the executable files; instead, they are provided as system resources by means of a ″locale″ that the user can specify at run-time.

One of the components of a locale is the code page in which the characters will be handled. For example, in AIX 4, the default locale is ″en_US″ which is for the English language used in the USA and the associated code page is

ISO8859-1, which is different than the default code page used for English in OS/2 (code page IBM-850) but the ISO8859-1 code page is similar to the one used for English in Windows (code page MS-1252 Latin 1).

The locale model for XPG/4 establishes several environment variables that can be used for controlling the culture sensitive information. Table 8 describes these environment variables, their function and how TeamConnection deals with them.

Table 8. How TeamConnection handles the locale environment variables

Locale environment variable	**Function**	**How TeamConnection uses it**
LANG	Specifies the installation default locale.	It is an identifier that is used to resolve the complete path where the message catalogs and other language-sensitive files are located in the system. The specification for TeamConnection is shown in note (3).
NLSPATH	Specifies the full path for the message catalog file.	It is the specification of the full path where the message catalog file is located. The specification for TeamConnection is shown in note (4).
LC_ALL	Overrides the value of other LC_* environment variables.	It is not explicitly exploited by TeamConnection.
LC_COLLATE	Determines the character-collation or string-collation rules.	It is ignored by TeamConnection. (See Note 1).
LC_CTYPE	Determines the character handling rules governing the interpretation of sequences of bytes of text data characters and classification of characters.	It is ignored by TeamConnection. However, if LANG is not defined, then the value of LC_CTYPE is used by the UNIX operating system. The default value is the C locale.
LC_MESSAGES	Determines the rules governing affirmative and negative responses, and the locale for messages and menus.	It is ignored by TeamConnection.

Table 8. How TeamConnection handles the locale environment variables (continued)

Locale environment variable	Function	How TeamConnection uses it
LC_MONETARY	Determine the rules governing monetary-related formatting.	It is ignored by TeamConnection, because it does not handle this kind of information.
LC_NUMERIC	Determine the rules governing non-monetary numeric formatting.	It is ignored by TeamConnection, because it handles only integer numbers with no separation for thousands.
LC_TIME	Determine the rules governing date and time formatting.	It is ignored by TeamConnection. There is no special processing for the date and time information. (See Note 2).

Notes:

1. TeamConnection itself does not perform any sorting of data. Instead, the sorting is performed by the database.
2. The date and time in TeamConnection is represented as `YYYY/mm/dd hh:mm:ss`, where `YYYY` is the year, `mm` is the month, `dd` is the day, `hh` is the hour, `mm` is the minute, and `ss` is the second. Because four digits are used to represent a year, TeamConnection is compliant with the Year 2000 specifications.
3. The specification for LANG for TeamConnection is (Korn shell):
   ```
   export LANG=en_US
   ```
4. The specification for NLSPATH for TeamConnection is (Korn shell):
   ```
   export NLSPATH=/usr/teamc/nls/msg/%L/%N
   ```

   Specify %L and %N as shown in uppercase. The placeholder %L is for all practical purposes a synonym for the value of the variable LANG, and the placeholder %N is used by the TeamConnection code to specify during run-time the name of the file that has the messages to be displayed (message catalog).

Supported locales (languages and code pages)

VisualAge TeamConnection Version 3 provides support for the following locales (which include the translated message catalogs):

- Single-Byte Character Set (SBCS) locales; see "Supported Single-Byte Character Set (SBCS) locales" on page 334.
- Double-Byte Character Set (DBCS) locales; see "Supported Double-Byte Character Set (DBCS) locales" on page 335.

The majority of the locale names follow a format similar to `en_US`, where the first 2 characters represent the abbreviation for language names defined in ISO 639 (such as ″en″ for English) and the last 2 characters represent the abbreviations for country names defined in ISO 3166 (such as ″US″ for the United States of America).

In some cases, the locale names may have a suffix which represents a special identification, such as the HP-UX locale ″zh_TW.big5″.

Locales supported by DB2 Universal Database (UDB) Version 5

TeamConnection uses DB2 Universal Database (UDB) Version 5 which is enabled to handle DBCS, regardless of the locale. The installation of TeamConnection also includes the installation of DB2 UDB V5 and its corresponding locales. Most of the information in the following tables was obtained from Table 101 ″Supported Languages and Code Sets″ from Appendix M, ″National Language Support,″ in the *DB2 UDB V5 Administration Guide*.

Supported Single-Byte Character Set (SBCS) locales

VisualAge TeamConnection supports the following Single-Byte Character Set (SBCS) locales. It is important to emphasize that the locales ″En_US″ (code page 850) and ″en_US″ (code page ISO8859-1) are different. For example, if you use a TeamConnection family in AIX with the ISO locale en_US (code page ISO8859-1), and a TeamConnection client in OS/2 with the En_US locale (code page IBM-850), then you will see ″code page incompatibility″ problems (in which some characters will NOT be shown or will not look OK).

United States of America: The relevant codes for United States of America are:

Country Name
United States of America

Country Codes
1, US

Language Codes
enu, en

The supported code pages and locales for United States of America are shown below.

Table 9. United States of America - supported code pages and locales

Code Page	Code Set	Locale	Operating System	Notes
819	ISO8859-1	en_US	AIX	
850	IBM-850	En_US	AIX	

Table 9. United States of America - supported code pages and locales (continued)

Code Page	Code Set	Locale	Operating System	Notes
819	iso8859-1	en_US.iso88591	HP-UX	
1051	roman8	en_US.roman8	HP-UX	
819	ISO8859-1	en_US	Solaris	
437	IBM-437	En_US	OS/2	
850	IBM-850	En_US	OS/2	
1252	1252	en_US	Win32	(1)
37	IBM-037	-	OS/390	

Notes:

1. The Microsoft Latin code page 1252 is very similar to ISO8859-1 (Latin 1). This code page is only used in the TeamConnection GUI tools. For details on the conversion of code pages in Windows, see “No conversion of code points when exchanging data” on page 339.

Supported Double-Byte Character Set (DBCS) locales

VisualAge TeamConnection supports the following Double-Byte Character Set (DBCS) locales. It is important to emphasize that the locales ″Ja_JP″ and ″ja_JP″, and ″Zh_TW″ and ″zh_TW″ are different. For example, if you use a TeamConnection family in AIX with the EUC locale ja_JP (code page IBM-eucJP), and a TeamConnection client in OS/2 with the Ja_JP locale (code page IBM-932) then you will see ″code page incompatibility″ problems (in which some characters will NOT be shown or will not look OK).

Japan: The relevant codes for Japan are:

Country Name
Japan

Country Codes
81, JP

Language Codes
jap, ja

The supported code pages and locales for Japan are shown below.

Table 10. Japan - supported code pages and locales

Code Page	Code Set	Locale	Operating System	Notes
954	IBM-eucJP	ja_JP	AIX	
932	IBM-932	Ja_JP	AIX	

Table 10. Japan - supported code pages and locales (continued)

Code Page	Code Set	Locale	Operating System	Notes
954	eucJP	ja_JP.eucJP	HP-UX	
5039	SJIS	ja_JP.SJIS	HP-UX	
954	eucJP	ja	Solaris	
932	IBM-932	Ja_JP	OS/2	(1)
942	IBM-942	Ja_JP	OS/2	(1)
943	IBM-943	Ja_JP	OS/2	(1)
943	IBM-943	Ja_JP	Win32	(1)
930	IBM-930	-	OS/390	
939	IBM-939	-	OS/390	
5026	IBM-5026	-	OS/390	
5035	IBM-5035	-	OS/390	

Notes:

1. The Japanese IBM-932, IBM-942 and IBM-943 code pages have very small differences between them, but generally speaking, they are compatible with each other.

South Korea: The relevant codes for South Korea are:

Country Name
South Korea

Country Codes
82, KR

Language Codes
kor, ko

The supported code pages and locales for South Korea are shown below.

Table 11. South Korea - supported code pages and locales

Code Page	Code Set	Locale	Operating System	Notes
970	IBM-eucKR	ko_KR	AIX	
970	eucKR	ko_KR.eucKR	HP-UX	
970	eucKR	ko_KR	Solaris	
949	IBM-949	ko_KR	OS/2	(1)
1363	1363	ko_KR	Win32	(1)
933	IBM-933	-	OS/390	

Notes:

1. The Korean code page for Windows NT/95 is called UHC (Unified Hangeul Code). The 1363 code page extends IBM-949 by adding missing Hangeul characters with no change of assignments in code points for IBM-949.

People's Republic of China (PRC): The relevant codes for People's Republic of China (PRC) are:

Country Name
People's Republic of China (PRC)

Country Codes
86, CN

Language Codes
chs (Simplified), zh

The supported code pages and locales for People's Republic of China (PRC) are shown below.

Table 12. People's Republic of China (PRC) - supported code pages and locales

Code Page	Code Set	Locale	Operating System	Notes
1383	IBM-eucCN	zh_CN	AIX	
1386	GBK	Zh_CN.GBK	AIX	
1383	eucCN	zh_CN.hp15CN	HP-UX	
1383	eucCN	zh	Solaris	
1381	IBM-1381	Zh_CN	Win32	
1386	GBK	Zh_CN	Win32	(1)
935	IBM-935	-	OS/390	
1381	IBM-1381	Zh_CN	OS/2	
1386	GBK	Zh_CN	OS/2	(1)

Notes:

1. The code page for Simplified Chinese for Windows NT/95 is called GBK (Guo Biao Kuo). The IBM-1386 code page is equivalent to Microsoft 936. The IBM-1386 code page extends IBM-1381 by adding missing Unicode characters with no change of assignments in code points for IBM-1381.
2. The EUC code page for Traditional Chinese (IBM-eucTW) for AIX 4.1 has been enhanced with respect to AIX 3.2, but it keeps the same locale name (zh_TW). This means that if the user in AIX 4.1 exploits the new characters in the enhanced locale version, there could be compatibility problems when the user uses the old locale version.

Taiwan, Republic of China (ROC): The relevant codes for Taiwan, Republic of China (ROC) are:

Country Name
: Taiwan, Republic of China (ROC)

Country Codes
: 886, TW

Language Codes
: cht (Traditional), zh

The supported code pages and locales for Taiwan, Republic of China (ROC) are shown below.

Table 13. Taiwan, Republic of China (ROC) - supported code pages and locales

Code Page	Code Set	Locale	Operating System	Notes
938	IBM-938	-	OS/2	old?
948	IBM-948	-	OS/2	old?
950	big5	Zh_TW	OS/2	(1)
950	big5	Zh_TW	AIX	(1)
964	IBM-eucTW	zh_TW	AIX	(2)
950	big5	zh_TW.big5	HP-UX	(1)
964	eucTW	zh_TW.eucTW	HP-UX	
950	big5	big5	Solaris	(1,3)
964	eucTW	zh_TW	Solaris	
950	big5	Zh_TW	Win32	(1)
937	IBM-937	-	OS/390	

Notes:

1. The PC code page for Traditional Chinese is called Big-5.
2. The EUC code page for Traditional Chinese (IBM-eucTW) for AIX 4.1 has been enhanced with respect to AIX 3.2, but it keeps the same locale name (zh_TW). This means that if the user in AIX 4.1 exploits the new characters in the enhanced locale version, there could be compatibility problems when the user uses the old locale version.
3. The Solaris code page 950 (Taiwan) does not support certain characters from the IBM-850 code page.

Characteristics and limitations of NLS and DBCS support

No conversion of code points when exchanging data

The TeamConnection clients and servers do not alter the code points of the data. This means that the data is NOT converted from one code page to another when entered by the user, when stored in the database used by the family or when exchanged between a client and the server. :p. The information about the code page in which the data was entered is not stored with TeamConnection objects; furthermore, there is no exchange of information between the client and the server to indicate which code page is being used by each of them.

No impact if using English characters

Because most code pages have the same code points for the first 128 characters, which includes all the characters used in the English alphabet, then in practice there is no effect in using different code pages between clients and servers, if using only English characters.

As an example, the default multilingual code page for OS/2 is IBM-850, for Windows is MS-1252 Latin 1, and for AIX Version 4 is ISO8859-1. In these code pages the first 128 characters are the same, and thus, there is no impact in code points the English characters are used when remarks are entered for a defect in the OS/2 client, stored in the AIX server and retrieved by the Windows client.

For example, the code point value of 100 is the lower case letter ″d″ which has the same graphic representation in most of the code pages, as exemplified in the following table.

Table 14. Graphical representation of code point 100 in several code pages

Platform	Locale	Code Page	Representation
OS/2	English	IBM-437	lower case ′d′
OS/2	English	IBM-850	lower case ′d′
Windows, DOS mode	English	MS-437	lower case ′d′
Windows, DOS mode	English	MS-850	lower case ′d′
Windows, Graphical	English	MS-1252	lower case ′d′
AIX	En_US	IBM-850	lower case ′d′
AIX	en_US	ISO8859-1	lower case ′d′
OS/2	Japanese	IBM-932	lower case ′d′
Windows	Japanese	MS-932	lower case ′d′

Table 14. Graphical representation of code point 100 in several code pages (continued)

Platform	Locale	Code Page	Representation
AIX	ja_JP	IBM-eucJP	lower case ’d’

Impact if using non-English characters

However, if the customer wants to use non-English characters, which are characters with code points greater than 128, such as accented characters, umlauts, double-byte characters, then the code pages differ greatly in this respect.

For example, the character with code point value of 252 (which can be entered by pressing ALT and typing 2, 5 and 2 from the numeric keypad in most systems) has the following different representations, as shown in the following table.

Table 15. Graphical representation of code point 100 in several code pages

Platform	Locale	Code Page	Representation
OS/2	English	IBM-437	superscript ’n’
OS/2	English	IBM-850	superscript ’3’
Windows, DOS mode	English	MS-437	superscript ’n’
Windows, DOS mode	English	MS-850	superscript ’3’
Windows, Graphical	English	MS-1252	lower case ’u’ with dieresis
AIX	En_US	IBM-850	superscript ’3’
AIX	en_US	ISO8859-1	lower case ’u’ with dieresis
OS/2	Japanese	IBM-932	First byte of DBCS character
Windows	Japanese	MS-932	First byte of DBCS character
AIX	ja_JP	IBM-eucJP	First byte of DBCS character

In the above case, a German customer using Windows in Graphical Mode, with code page MS-1252 may enter a string that contains the u with umlaut and store it in TeamConnection, but the same customer when retrieving the data from OS/2 using IBM-850 code page, the character in the string will be shown as the number 3 in superscript.

To maximize compatibility, use same/similar code page

As shown in "Impact if using non-English characters" on page 340, it is important that the customers who are using multiple platforms with TeamConnection, must understand the implications of using different code pages when dealing with non-English characters.

If possible, the customer should use the same (or similar) code page in the TeamConnection client and in the server.

Once a family is created, do not change the code page

To avoid compatibility problems, if a family is created and used with a given code page, then this code page should not be changed later on.

For example, if a family is created with the Japanese IBM-932 code page in OS/2 and then migrated to the Japanese IBM-eucJP code page in AIX, then there might be several DBCS characters that are valid in the IBM-932 code page that will not be displayed properly when using the IBM-eucJP code page.

Using UNICODE in the future to solve incompatibilities

In the future, once the support for the UNICODE code page is widespread and available in all the platforms supported by TeamConnection, then the customer could choose to use the UNICODE code page for the clients and the server, and in this way, avoid the current incompatibility between different code pages.

Another alternative that we studied to solve to this incompatibility problem between code pages was to add an extra field for EVERY SINGLE piece of data that is handled by TeamConnection in order to identify the code page that was used when the data was originated; then, this would require that the TeamConnection server should get the code page used by each client that is requesting a service, and then do the necessary conversions when exchanging the data. Because this alternative is very expensive to implement and has a lot of ramifications, and because UNICODE is the right way for the long term, we are not implementing this alternative to tag each piece of data.

Exceptions to the handling of characters in TeamConnection

The ¦ split vertical bar character could be changed

The ¦ (split vertical bar) character is used to separate the fields in the ″teamc report -raw″ command. Thus, if this character is found in a field that is shown by this command, such as in the abstract of a defect, then the character is changed to ″!″ (exclamation point) by the TeamConnection client. Thus, the server does not see these split vertical bar characters.

The reason for this change is to avoid confusion during the parsing of the -raw output because the split vertical bar is used to separate the fields. If in the output to be parsed there is a split vertical bar character that is NOT intended to be a separator of a field, then the parsing routine will not be able to guess that this particular split vertical bar should not be considered as a field separator. In other words, ALL split vertical separator bars are considered to be field separators, and thus, any such characters in the abstract will not be parsed appropriately.

For example, when opening a defect, if the abstract field is left blank then the first 63 characters of the remarks field will be placed in the abstract. The abstract is a field that is shown with the ″teamc report -raw″ command, but the remarks field is not shown with this command. Thus, if the first 63 characters of the remarks have split vertical bar characters they will be left untouched in the actual remarks, but they will be converted to ″!″ in the abstract.

Keyword expansion

TeamConnection supports the expansion of certain keywords embedded in the text during the extraction of text files. The routines that handle the expansion are NLS and DBCS enabled.

The important characteristic to remember is that the expansion is done by the TeamConnection family server and not by the client.

CR (carriage return) and LF (line feed)

Although this is not an NLS issue, this is another topic that is worth including in this technical report, because some users may think, incorrectly, that this could be caused by code conversion processing done by TeamConnection.

The end of a line of text in OS/2 or in Windows is represented by the character pair CR-LF (carriage return and line feed), whereas in UNIX is represented simply by the character LF (line feed).

In TeamConnection, the model of what-you-see-is-what-you-get is used. This means that if a user creates a file in TeamConnection, regardless of the platform of the server, then TeamConnection will NOT do any conversion of LF or CRLF on that file. There are choices in the -extract action to allow for more fine tuning of these on-the-fly-conversions. For example, an AIX user may wish to extract with only LF a file that was stored originally from OS/2 that has CRLF.

The following file will be the source file to be used in the rest of the examples in this section:

```
This is line 1
This is line 2
This is line 3
```

If the source file is created from an OS/2 client and later on is extracted into a UNIX client without CRLF conversion, then the resulting file will have the CR character at the end of each line and the file would look like:

```
This is line 1^M
This is line 2^M
This is line 3^M
```

If the source file is created from a UNIX client and later on is extracted into an OS/2 client without CRLF conversion, then the resulting file will not have the CR character at the end of each line and the file would look like:

```
This is line 1
              This is line 2
                            This is line 3
```

All clients in the same host must use the same language (Intel only)

For OS/2 and Windows NT clients, all the TeamConnection clients that execute from one single host must use the same language if they run at the same time.

This limitation is due to the inherent limitation of these platforms in which ONLY ONE version of given DLL can be loaded at the same time, and because these platforms are not fully compliant with the XPG/4 model that allows usage of multiple locales. If there are different versions of some DLLs for each language, and if the English version of the DLL is loaded, the Japanese one cannot be loaded at the same time. This precludes having clients that have different languages to run at the same time.

Untraslated strings that are visible to the users

There are certain kinds of strings that are visible to the user that are not translatable:

- command, action and flag names
- state names
- database table and view names
- database table column headings
- action name used in the audit log, the mail notifications, and the authority and interest tables
- the type field in the config database table

DBCS Limitations

The following limitations apply to DBCS character sets:

1. The administration tools for the TeamConnection Server expect SBCS characters as the reply for Yes (y) and No (n).
2. The administration tools for the TeamConnection Server have the following limitations for DBCS:

   a. The *.ld files (authority, interest, cfgcomproc and cfgrelproc) in the family account can accept DBCS characters in the first field for each entry. The maximum size for this field is 15 bytes.
   b. The config.ld file in the family account can accept DBCS characters in the following fields (the positions are defined from left to right):
      - Field position 1 ("Field Type"): limit is 15 bytes
      - Field position 2 ("Value"): limit is 15 bytes
      - Field position 6 ("Description"): limit is 63 bytes
   c. The tcadmin program can accept only SBCS characters in the following fields related to configurable fields:
      - CMD attribute
      - DB Column Name
   d. The tcadmin program can accept DBCS characters in the following fields related to configurable fields:
      - Field label: limit is 15 bytes
      - Title label: limit is 15 bytes
      - Type: must be a valid type defined in config.ld (limit is 15 bytes).
3. The TeamConnection Commands Reference manual, in Appendix A, "Querying the TeamConnection database", shows the datatype and the size limit for the attributes of the TeamConnection objects; however, the actual size limit for many of the character attributes is smaller than the specified limit. For example, the field "login" in the "Users" table shows that the limit is 31 bytes, but in reality only 15 characters (SBCS or DBCS) can be stored in that field. The fields affected are usually related to names, such as the User login, the Component name, etc.

   If you specify a string that has DBCS characters and that the size of the string goes beyond the limit, then the following error message will be displayed by the TeamConnection server:

   ```
   0010-149 Your request cannot be completed.
   The attribute flag argument  xxx is not valid.
   ```
4. Warning on the use of 0x7C as a second byte in a DBCS character

   The Ox7C character corresponds to the vertical bar ('|') which in TeamConnection is interpreted as a field separator when dealing with reports and with handling windows and fields in the GUI.

   You can use this value as the 2nd byte of a DBCS character, however, when the data that contains this 2nd byte is handled in a TeamConnection client that has an SBCS code page (and not a DBCS code page), then, the output shown by the client may be displaced, that is, the 0x7C value will be interpreted as the field separator. Moreover, this situation will apply for any string in the *.ld files and in the configurable fields.

Installation, administration, and runtime issues

Installation issues related to NLS and DBCS

The installation process for TeamConnection is similar in UNIX, in OS/2 and Windows with respect to NLS. The similarities and the differences are explained in the following sections.

After the installation process, the executable code and the language related files will be installed in separate directories that are system wide, that is, they are not exclusive to one account.

When a TeamConnection family is created, several files are copied into the directory for the TeamConnection family; several of these files contain language sensitive information (such as the config.ld file and the files in the chfField directory). The family administrator can modify these files for the specific family; these files are not shared with other families.

Using a similar directory structure across all the platforms

Even though there are differences in the NLS facilities that are available from the UNIX and the Intel (OS/2 and Windows) platforms the installation of TeamConnection in these platforms creates a similar directory structure whose top directory is shown below (using the default directory):

AIX 4 /usr/teamc

HP-UX 10
/opt/teamc

Solaris
/opt/teamc

OS/2 c:\teamc

Windows NT and 95
c:\Program Files\TeamConnection

Storing the language-independent files: The language-independent files for the TeamConnection code are stored in similar directories, as shown in the following example. The teamc server daemon (teamcd) is located in the subdirectory ″bin″, from the TeamConnection top directory as shown below:

AIX 4 /usr/teamc/bin

HP-UX 10
/opt/teamc/bin

Solaris
/opt/teamc/bin

OS/2 c:\teamc\bin

Windows NT and 95
c:\Program Files\TeamConnection\bin

Storing the language-dependent files: In a similar way, the language-dependent files for the TeamConnection code are stored in a similar subdirectory structure, which is the subdirectory ″nls″ as parent and then the ″msg″ for messages and ″cfg″ for configuration items.

For example, the ISO US English message catalog will be stored as shown below, using the default location:

AIX 4 /usr/teamc/nls/msg/en_US

HP-UX 10
/opt/teamc/nls/msg/C (which really is a symbolic link to /usr/lib/nls/msg/C)

Solaris
/opt/teamc/nls/msg/C (which really is a symbolic link to /usr/lib/nls/msg/C)

OS/2 c:\teamc\nls\msg\enu

Windows NT and 95
c:\Program Files\TeamConnection\nls\msg\enu

List of language-dependent files: The ″nls″ directory (see previous section for the complete path) contains the following subdirectories and files:

nls/msg/<locale>/
All message catalog files, such as teamcv3.cat; all help files; all resource DLLs for the GUI that are specific to a language.

nls/doc/<locale>/
All documentation: PDF, HTML, etc.

nls/cfg/<locale>/
All configuration files, such as config.ld, and files for the configurable fields; the original teamcv3.ini file.

Installation issues for UNIX

During the installation process for TeamConnection in UNIX, it is necessary to select the appropriate language version to install. The code is not bundled together with the language sensitive information. That is, there is an individual installable package just for the language sensitive information that could be installed independently.

Because AIX 4 and HP-UX 10 operating systems already include the explicit support for the XPG/4 I18N locale model, the TeamConnection installation process will not install additional files for this matter (as in OS/2 and Windows).

The message catalog that contains the language sensitive information is located by the executable code by means of the combination of the NLSPATH and LANG environment variable. By default, this variable is set as follows:

```
set NLSPATH=/usr/lib/nls/msg/%L/%N
```

Where:

- %L is a variable that at runtime represents the value of the LANG environment variable; it must be in uppercase.
- %N is a variable that at runtime represents the name of the message catalog to be used; it must be in uppercase.

Installation issues with OS/2 and Windows

During the installation process for TeamConnection in OS/2 and Windows, it is necessary to select the appropriate language version to install. The code and the language sensitive information is bundled together in a package and it is installed appropriately. That is, there is not an individual package just for the language sensitive information that can be installed independently.

Because the OS/2 and Windows operating systems do not include at this moment explicit support for the XPG/4 I18N locale model, the TeamConnection installation process will install any necessary support for this model.

The message catalog that contains the language sensitive information is located by the executable code by means of the NLSPATH environment variable. By default, this variable is set as follows:

```
set NLSPATH=:\teamc\nls\%N
```

Where:

- :\teamc represents the appropriate drive and top directory where the TeamConnection code is installed in your system
- nls is the directory that contains the NLS related files
- %N is a variable that at runtime represents the name of the message catalog to be used; it must be in uppercase.

Family administration issues

A family should use the same language all the time

Although technically it could be possible for a family to be created using the en_US locale and then change it later on to another language, we consider that this process has the potential to cause a lot of confusion with the users, especially for the mapping of code points.

Therefore, this is treated as a limitation and if the customers try it, it is at their own risk and we will not help them. However, the customer may decide to delete the family, change the language by reinstalling the code for Intel and specify the new language, or to install the new language message catalogs for UNIX and change the LANG variable, and then create a new family to use the new setting.

This decision affects the arrangement of the subdirectories of a family: there is no provision in either UNIX or Intel to have language dependent directories inside the family directory.

The following sections contain examples that will clarify this point.

UNIX: An AIX customer installed the TeamConnection server, using the en_US locale. The config.ld file (which is language dependent) resides in /usr/lib/nls/cfg/enu/config.ld. The ″testfam″ TeamConnection family is created, and the config.ld file is copied from the system directory to the top directory of the family, /home/testfam/config.ld There is no ″/home/testfam/enu/config.ld″ path.

Intel: An OS/2 customer installed the TeamConnection server, using the en_US locale. The config.ld file (which is language dependent) resides in c:\teamc\nls\cfg\enu\config.ld. The ″testfam″ TeamConnection family is created, and the config.ld file is copied from the system directory mentioned above into the top directory of the family, c:\testfam\config.ld. Notice that there is no ″c:\testfam\enu\config.ld″ path.

Client runtime issues

A client should use the same language all the time

Although technically it could be possible for a TeamConnection client to be installed with one language (such as the IBM-850 code page in OS/2 or the en_US locale in AIX) and then change the language in the middle, this process has the potential to cause a lot of confusion with the users, specially for the mapping of code points with the teamcv3.ini file, as explained below.

In the UNIX platforms, thanks to the use of the LANG variable, it would be possible to install additional message catalogs for other languages and the user could setup the language to use by setting the variable LANG. However, the teamcv3.ini file for the GUI will NOT be changed, and this file may contain characters that were valid in the original setup but that cannot be displayed in the new setup.

Because the Intel platforms do not provide the LANG variable, then it is not possible to have message catalogs for multiple languages for TeamConnection. This means that if the customer decides to change the language then it is necessary to reinstall the code specifying the new language.

The following sections contain examples that will clarify this point.

UNIX:

1. A Japanese AIX customer installs the TeamConnection client using the ja_JP and en_US message catalogs. The teamcv3.ini files (which are language dependent) reside in /usr/lib/nls/cfg/ja_JP/teamcv3.ini and /usr/lib/nls/cfg/enu/teamcv3.ini.
2. The customer uses the Japanese GUI for the first time (LANG=ja_JP), and the GUI detects that the following file does not exist: :$HOME/teamcv3.ini.
3. The customer uses the GUI and creates several entries written in Japanese in the task list which are stored in the teamcv3.ini file.
4. The customer exits the GUI.
5. The user invokes the GUI again, and the GUI detects that the teamcv3.ini file exists in $HOME and therefore the GUI uses it, and does not try to overwrite it with the file in the directory /usr/lib/nls/cfg/ja_JP.
6. The customer decides then to switch the locale to en_US, by setting LANG=en_US, exits and logs in again.
7. The user brings up the English TeamConnection GUI and now the task list shows entries that may not be legible because their original code points were set with the ja_JP locale.

Intel:

1. A Japanese OS/2 customer installs the TeamConnection client and specifies the jpn language only, because she cannot install multiple languages. The code page is IBM-932. The PATH and the NLSPATH variables point to the jpn directories. The teamcv3.ini file (which is language dependent) resides in c:\teamc\nls\cfg\jpn\teamcv3.ini.
2. The customer uses the Japanese GUI for the first time (LANG=jpn), and the GUI detects that the following file does not exist: c:\os2\teamcv3.ini. The GUI copies the original teamcv3.ini file from the appropriate jpn directory, c:\teamc\nls\cfg\jpn\teamcv3.ini, into c:\os2\teamcv3.ini.
3. The customer uses the GUI and creates several entries written in Japanese in the task list, and this list is stored in the teamcv3.ini file.
4. The customer exits the GUI.
5. The user invokes the GUI again, and the GUI detects that the teamcv3.ini file exists in c:\os2 and therefore the GUI uses it, and does not try to overwrite it with the file in the directory c:\teamc\nls\cfg\jpn.

6. The customer decides then to switch the locale to enu, by uninstalling the TeamConnection client and reinstalling it again specifying now the language enu, and reboots. The PATH and the NLSPATH variables are updated and they do not point to the non-existing jpn directories, but point to the new enu directories.
7. If the customer keeps the same code page, IBM-932, then when the user brings up the English TeamConnection GUI, the task list shows entries that are legible because their original code points were set with the IBM-932 code page. If the customer changes the code page, let’s say to IBM-850, then when the user brings up the English TeamConnection GUI the task list shows entries that may not be legible because their original code points were set with the IBM-932 code page.

Services and Support

VisualAge TeamConnection Services and Support

Services

IBM consultants are available to help you, from planning to production and everything in between. For information about these services, please visit the following web site:

`<http://www.software.ibm.com/ad/teamcon/services/>`

If you are interested in VisualAge TeamConnection Services, contact IBM Software Development Services via e-mail at:

`websphere_consulting@us.ibm.com`

Support

If you have a question or problem regarding VisualAge TeamConnection, you can find support information and our telephone numbers at the following web site:

`<http://www.software.ibm.com/ad/teamcon/support/>`

Newsgroup

You can access VisualAge TeamConnection technical information, exchange messages with other VisualAge TeamConnection users, and receive information regarding the availability of FixPaks by visiting our newsgroup at:

`news://news.software.ibm.com/ibm.software.teamcon`

Bibliography

IBM VisualAge TeamConnection Enterprise Server library

The following is a list of the TeamConnection publications. For a list of other publications about TeamConnection, including white papers, technical reports, a product fact sheet, and the product announcement letter, refer to the IBM VisualAge TeamConnection Enterprise Server Library home page. To access this home page, select **Library** from the IBM VisualAge TeamConnection Enterprise Server home page at Web address <http://www.software.ibm.com/ad/teamcon>.

- **License Information:**

  Contains license, service, and warranty information.
- **Verifying Installation of TeamConnection:**

  Explains how to verify that TeamConnection has been installed correctly. Guides you through the process of creating an initial test family.
- **Administrator's Guide:**

  Provides instructions for configuring the TeamConnection family server and administering a TeamConnection family.
- **User's Guide:**

  A comprehensive guide for TeamConnection administrators and client users that helps them install and use TeamConnection.
- **Commands Reference:**

  Describes the TeamConnection commands, their syntax, and the authority required to issue each command. This book also provides examples of how to use the various commands.

TeamConnection technical reports

The following is a list of technical reports available for TeamConnection. Refer to the IBM VisualAge TeamConnection Enterprise Server Library home page for the most up-to-date list of technical reports. To access this home page, select **Library** from the IBM VisualAge TeamConnection Enterprise Server home page at Web address <http://www.software.ibm.com/ad/teamcon>.

29.2147	SCLM Guide to TeamConnection Terminology
29.2196	Using REXX Command Files with TeamConnection MVS Build Scripts
29.2231	TeamConnection Interoperability with MVS and SCLM
29.2235	Using REXX Command Files with TeamConnection MVS Build Scripts for PL/I Programs

29.2266	TeamConnection frequently asked questions: National Language Support (NLS) and Double-Byte Character Sets (DBCS)
29.2307	Data Driven TeamConnection User Exits
29.2333	Evolution of a New TeamConnection Family, Common Dos and Don'ts
29.2357	Evolution of a New VisualAge TeamConnection Family: Taking Advantage of Automation
29.3076	Configuration and Administration of DB2 Universal Database V5 by Users of VisualAge TeamConnection Enterprise Server V3
29.3088	Moving a VisualAge TeamConnection Version 3 Family
29.3090	Evolution of a VisualAge TeamConnection family: Using the Web and Shadowing to Build and to Distribute
29.3094	VisualAge TeamConnection 3: How to Do Routine Operating System Tasks
29.3096	Comparison Between CMVC 2.3.1 and VisualAge TeamConnection Enterprise Server 3
29.3098	VisualAge TeamConnection Version 3: Simple Build Function in UNIX
29.3099	VisualAge TeamConnection V3 Frequently Asked Questions: GUI and Line Command Clients for UNIX, OS/2, and Windows 32-bit
29.3113	Migrating CMVC 2.3.1 to VisualAge TeamConnection V3

DB2

The following publications are part of the IBM DB2 Universal Database library of documents for DB2 administration. DB2 publications are available in HTML format from the DB2 Product and Service Technical Library at the following Web address:

`<http://www.software.ibm.com/data/db2/library/>`

- *Administration Getting Started* (S10J-8154–00)

  An introductory guide to basic administration tasks and the DB2 administration tools.
- *SQL Getting Started* (S10J-8156–00)

  Discusses basic concepts of DB2 SQL.
- *Administration Guide* (S10J-8157–00)

  A complete guide to administration tasks and the DB2 administration tools.
- *SQL Reference* (S10J-8165–00)

  A reference to DB2 SQL for programmers and database administrators.
- *Troubleshooting Guide* (S10J-8169–00)

  A guide to identifying and solving problems with DB2 servers and clients and to using the DB2 diagnostic tools.
- *Messages Reference* (S10J-8168–00)

  Provides detailed information about DB2 messages.
- *Command Reference* (S10J-8166–00)

Provides information about DB2 system commands and the command line processor.

- *Replication Guide* (S10J-0999–00)

  Describes how to plan, configure, administer, and operate IBM replication tools available with DB2.
- *System Monitor Guide and Reference* (S10J-8164–00)

  Describes how to monitor DB2 database activity and analyze system performance.
- *Glossary*

  A comprehensive glossary of DB2 terms.

Related publications

- Transmission Control Protocol/Internet Protocol (TCP/IP)
  - *TCP/IP 2.0 for OS/2: Installation and Administration* (SC31-6075)
  - *TCP/IP for MVS Planning and Customization* (SC31-6085)
- MVS
  - *MVS/XA JCL User's Guide* (GC28-1351)
  - *MVS/XA JCL Reference* (GC28-1352)
  - *MVS/ESA JCL User's Guide* (GC28-1830)
  - *MVS/ESA JCL Reference* (GC28-1829)
- NLS and DBCS
  - *AIX 4, General Programming Concepts: Writing and Debugging Programs.* (SC23-2533-02). See chapter 16 "National Language Support" for an updated contents of the AIX 3 material (see below).
  - *AIX 4, System Management Guide: Operating System and Devices* (SC23-2525-03). See chapter 10, "National Language Support" for system tasks.
  - *AIX Version 3.2 for RISC System/6000, National Language Support* (GG24-3850).
  - *Internationalization of AIX Software, A Programmer's Guide* (SC23-2431).
  - *National Language Design Guide Volume 1* (SE09-8001-02). This manual contains very good information on how to enable an application for NLS.
  - *National Language Design Guide Volume 2* (SE09-8002-02). This manual provides information on the IBM language codes (consult the "Language codes" chapter).

Glossary

This glossary includes terms and definitions from the *IBM Dictionary of Computing*, 10th edition (New York: McGraw-Hill, 1993). If you do not find the term you are looking for, refer to this document's index or to the *IBM Dictionary of Computing*.

This glossary uses the following cross-references:

Compare to
Indicates a term or terms that have a similar but not identical meaning.

Contrast with
Indicates a term or terms that have an opposed or substantially different meaning.

See also
Refers to a term whose meaning bears a relationship to the current term.

A

absolute path name. A directory or a part expressed as a sequence of directories followed by a part name beginning from the root directory.

access list. A set of objects that controls access to data. Each object consists of a component, a user, and the authority that the user is granted or is restricted from in that component. See also *authority*, *granted authority*, and *restricted authority*.

action. A task performed by the TeamConnection server and requested by a TeamConnection client. A TeamConnection action is the same as issuing one TeamConnection command.

agent. See *build agent*.

alternate version ID. In collision records, the database ID of the version of a driver, release, or workarea where the conflicting version of a part is visible.

approval record. A status record on which an approver must give an opinion of the proposed part changes required to resolve a defect or implement a feature in a release.

approver. A user who has the authority to mark an approval record with accept, reject, or abstain within a specific release.

approver list. A list of user IDs attached to a release, representing the users who must review part changes that are required to resolve a defect or implement a feature in that release.

attribute. Information contained in a field that is accessible to the user. TeamConnectionenables family administrators to customize defect, feature, user, and part tables by adding new attributes.

authority. The right to access development objects and perform TeamConnection commands. See also *access list*, *base authority*, *explicit authority*, *granted authority*, *implicit authority*, *restricted authority*, and *superuser privilege*.

authority group. A group of TeamConnection actions that a member of the authority group is authorized to perform.

B

base authority. The set of actions granted to a user when a user ID is created within a TeamConnection family. See also *authority*. Contrast with *implicit authority* and *explicit authority*.

base name. The name assigned to the part outside of the TeamConnection server environment, excluding any directory names. See also *path name*.

base part tree. The base set of parts associated with a release, to which changes are applied over time. Each committed driver or workarea for a release updates the base part tree for that release.

build. The process used to create applications within TeamConnection.

build associate. A TeamConnection part that is not an input to or an output from a build. An example of such a part is a read.me file.

build cache. A directory that the build processor uses to enhance performance.

build dependent. A TeamConnection part that is needed for the compile operation to complete, but it will not be passed directly to the compiler. An example of this is an include file. See also *dependencies*.

builder. An object that can transform one set of TeamConnection parts into another by invoking tools such as compilers and linkers.

build event. An individual step in the build of an application, such as the compiling of hello.c into hello.obj.

build input. A TeamConnection part that will be used as input to the object being built.

build output. A TeamConnection part that will be generated output from a build, such as an .obj or .exe file.

build pool. A group of build servers that resides in an environment. The environment in which several build servers operate. Typically, several servers are set up for each environment that the enterprise develops applications for.

build scope. A collection of build events that implement a specific build request. See also *build event*.

build script. An executable or command file that specifies the steps that should occur during a build operation. This file can be a compiler, a linker, or the name of a .cmd file you have written.

build server. A program that invokes the tools, such as compilers and linkers, that construct an application.

build target. The name of the part at the top of the build tree which is the final output of a build. TeamConnection uses the build target to determine the scope of the build. See also *build tree*.

build tree. A graphical representation of the dependencies that the parts in an application have on one another. If you change the relationship of one part to another, the build tree changes accordingly.

C

change control process. The process of limiting and auditing changes to parts through the mechanism of checking parts in and out of a central, controlled, storage location. Change control for individual releases can be integrated with problem tracking by specifying a process for the release that includes the tracking subprocess.

check in. The return of a TeamConnection part to version control.

check out. The retrieval of a version of a part under TeamConnection control. In non-concurrent releases, the check out operation does not allow a second user to check out a part until the first user has checked it back in.

child component. Any component in a TeamConnection family, except the root component, that is created in reference to an existing component. The existing component is the parent component, and the new component is the child component. A parent component can have more than one child component, and a child component can have more than one parent component. See also *component* and *parent component*.

child part. Any part in a build tree that has a parent defined. A child part can be input, output, or dependent. See also *part* and *parent part*.

client. A functional unit that receives shared services from a server. Contrast with *server*.

collision record. A status record associated with a workarea or driver, a part, and one of the following:
- The workarea or driver's release
- Another workarea

TeamConnection generates a collision record when a user attempts to replace an older version of a part with a modified version, another user has already modified that part, and the first user's modification is not based on this latest version of the part.

command. A request to perform an operation or run a program from the command line interface. In TeamConnection, a command consists of the command name, one action flag, and zero or more attribute flags.

command line. (1) An area on the Tasks window or in the TeamConnection Commands window where a user can type TeamConnection commands. (2) An area on an operating system window where you can type TeamConnection commands.

committed version. The revision of a part that is visible from the release.

common part. A part that is shared by two or more releases, and the same version of the part is the current version for those releases.

comparison operator. An operator used in comparison expressions. Comparison operators used in TeamConnection are > (greater than), < (less than), >= (greater than or equal to), <= (less than or equal to), = (equal to), and <> (different from).

component. A TeamConnection object that organizes project data into structured groups, and controls configuration management properties. Component owners can control access to data and notification of TeamConnection actions. Components exist in a parent-child hierarchy, with descendant components inheriting access and notification information from ancestor components. See also *access list* and *notification list*.

concurrent development. Several users can work on the same part at the same time. TeamConnection requires these users to reconcile their changes when they commit or integrate their workareas and drivers with the release. Contrast with *serial development*. See also *workarea*.

configurable field. A field that a family administrator can add to certain TeamConnection objects to customize the kind of information that TeamConnection stores in relation to those objects.

configuration management. The process of identifying, managing, and controlling software modules as they change over time.

connecting parts. The process of linking parts so that they are included in a build.

context. The current workarea or driver used for part operations.

corequisite workareas. Two or more workareas designated as corequisites by a user so that all workareas in the corequisite group must be included as members in the same driver, before that driver can be committed. If the driver process is not used in the release, then all corequisite workareas must be integrated by the same command. See also *prerequisite workareas*.

current version. The last visible modification of a part in a driver, release, or workarea.

current working directory. (1) The directory that is the starting point for relative path names. (2) The directory in which you are working.

D

daemon. A program that runs unattended to perform a standard service. Some daemons are triggered automatically to perform their task; others operate periodically.

database. A collection of data that can be accessed and operated upon by a data processing system for a specific purpose.

default. A value that is used when an alternative is not specified by the user.

default query. A database search, defined for a specific TeamConnection window, that is issued each time that TeamConnection window is opened. See also *search*.

defect. A TeamConnection object used to formally report a problem. The user who opens a defect is the defect originator.

delete. If you delete a development object, such as a part or a user ID, any reference to that object is removed from TeamConnection. Certain objects can be deleted only if certain criteria are met. Most objects that are deleted can be re-created.

delta part tree. A directory structure representing only the parts that were changed in a specified place.

dependencies. In TeamConnection builds there are two types of dependencies:

- **automatic**. These are build dependencies that a parser identifies.
- **manual**. These are build dependencies that a user explicitly identifies in a build tree.

See also *build dependent*.

descendant. If you descendant a development object, such as, a part or a user ID, any reference to that object is removed from TeamConnection. Certain objects can be descendant only if certain criteria are met. Most objects that are descendants can be re-created.

disconnecting parts. The process of unlinking parts so that they are not included in a build.

driver. A collection of workareas that represent a set of changed parts within a release. Drivers are only associated with releases whose processes include the track and driver subprocesses.

driver member. A workarea that is added to a driver.

E

end user. See *user*.

environment. (1) A user-defined testing domain for a particular release. (2) A defect field, in which case it is the environment where the problem occurred. (3) The string that matches a build server with a build event.

environment list. A TeamConnection object used to specify environments in which a release should be tested. A list of environment-user ID pairs attached to a release, representing the user responsible for testing each environment. Only one tester can be identified for an environment.

explicit authority. The ability to perform an action against a TeamConnection object because you have been granted the authority to perform that action. Contrast with *base authority* and *implicit authority*.

extract. A TeamConnection action you can perform on a builder, part, driver or release builder. An extraction results in copying the specified builder, part, or parts contained in the driver or release to a client workstation.

F

family. A logical organization of related data. A single TeamConnection server can support multiple families. The data in one family cannot be accessed from another family.

family administrator. A user who is responsible for all nonsystem-related tasks for one or more TeamConnection families, such as planning, configuring, and maintaining the

TeamConnection environment and managing user access to those families.

family server. A workstation running the TeamConnection server software.

FAT. See *file allocation table*.

feature. A TeamConnection object used to formally request and record information about a functional addition or enhancement. The user who opens a feature is the feature originator.

file. A collection of data that is stored by the TeamConnection server and retrieved by a path name. Any text or binary file used in a development project can be created as a TeamConnection file. Examples include source code, executable programs, documentation, and test cases.

file allocation table (FAT). The DOS-, OS/2-, Windows 95-, and Windows NT-compatible file system that manages input, output, and storage of files on your system. File names can be up to 8 characters long, followed by a file extension that can be up to 3 characters.

fix record. A status record that is associated with a workarea and that is used to monitor the phases of change within each component that is affected by a defect or feature for a specific release.

freeze. The freeze action saves changed parts to the workarea. Thus, TeamConnectiontakes a snapshot of the workarea, including all of the current versions of parts visible from that workarea, and saves this image of the system. The user can always come back to this stage of development in the workarea. Note, however, that a freeze action does not make the changes visible to the other people working in the release.

Compare with *refresh*.

full part tree. A directory structure representing a complete set of active parts associated with the release.

G

Gather. A tool to organize files for distribution into a specified directory structure. This tool can be used as a prelude to further distribution, such as using CD-ROM or through electronic means like NetView DM/2. It can also be used by itself for distributing file copies to network-attached file systems.

GID. A number which uniquely identifies a file's group to a UNIX system.

granted authority. If an authority is granted on an access list, then it applies for all objects managed by this component and any of its descendants for which the authority is not restricted. See also *access list*, *authority*, and *inheritance*. Contrast with *restricted authority*.

graphical user interface (GUI). A type of computer interface consisting of a visual metaphor of a real-world scene, often as a desktop. Within that scene are icons, representing actual objects, that the user can access and manipulate with a pointing device.

GUI. Graphical user interface.

H

high-performance file system (HPFS). In the OS/2 operating system, an installable file system that uses high-speed buffer storage, known as a cache, to provide fast access to large disk volumes. The file system also supports the existence of multiple, active file systems on a single personal computer, with the capacity of multiple and different storage devices. File names used with HPFS can have as many as 254 characters.

host. A host node, host computer, or host system.

host list. A list associated with each TeamConnection user ID that indicates the client machine that can access the family server and act on behalf of the user. The family server uses the list to authenticate the identity of a client machine when the family server receives a command. Each entry consists of a login, a host name, and a TeamConnection user ID.

host name. The identifier associated with the host computer.

HPFS. See *high-performance file system*.

I

implicit authority. The ability to perform an action on a TeamConnection object without being granted explicit authority. This authority is automatically granted through inheritance or object ownership. Contrast with *base authority* and *explicit authority*.

import. To bring in data. In TeamConnection, to bring selected items into a field from a matching TeamConnection object window.

inheritance. The passing of configuration management properties from parent to child component. The configuration management properties that are inherited are access and notification. Inheritance within each TeamConnection family or component hierarchy is cumulative.

integrated problem tracking. The process of integrating problem tracking with change control to track all reported defects, all proposed features, and all subsequent changes to parts. See also *change control*.

interest group. The list of actions that trigger notification to the user IDs associated with those actions listed in the notification list.

J

job queue. A queue of build scopes. One job queue exists for each TeamConnection family.

L

local version ID. In collision records, the database ID of the version of the current workarea.

lock. An action that prevents editing access to a part stored in the TeamConnectiondevelopment environment so that only one user can change a part at a time.

login. The name that identifies a user on a multi-user system, such as AIX or HP-UX, Solaris, or Windows NT. In OS/2 and Windows 95, the login value is obtained from the TC_USER environment variable.

M

map. The process of reassigning the meaning of an object.

metadata. In databases, data that describe data objects.

N

name server. In TCP/IP, a server program that supplies name-to-address translation by mapping domain names to Internet addresses.

National Language Support (NLS). The modification or conversion of a United States English product to conform to the requirements of another language or country. This can include the enabling or retrofitting of a product and the translation of nomenclature, MRI, or documentation of a product.

Network File System (NFS). The Network File System is a program that enables you to share files with other computers in networks over a variety of machine types and operating systems.

notification list. An object that enables component owners to configure notification. A list attached to a component that pairs a list of user IDs and a list of interest groups. It designates the users and the corresponding notification interest that they are being granted for all objects managed by this component or any of its descendants.

notification server. A server that sends notification messages to the client.

NTFS. NT file system.

NVBridge. A tool for automatic electronic distribution of TeamConnection software deliverables within a NetView DM/2 network.

O

operator. A symbol that represents an operation to be done. See also *comparison operators*.

originator. The user who opens a defect or feature and is responsible for verifying the outcome of the defect or feature on a verification record. This responsibility can be reassigned.

owner. The user who is responsible for a TeamConnection object within a TeamConnection family, either because the user created the object or was assigned ownership of the object.

P

parent component. All components in each TeamConnection family, except the root component, are created in reference to an existing component. The existing component is the parent component. See also *child component* and *component*.

parent part. Any part in a build tree that has a child defined. See also *part* and *child part*.

parser. A tool that can read a source file and report back a list of dependencies of that source file. It frees a developer from knowing the dependencies one part has on other parts to ensure a complete build is performed.

part. A collection of data that is stored by the family server and retrieved by a path name. They include text objects, binary objects, and modeled objects. These parts can be stored by the user or the tool, or they can be generated from other parts, such as when a linker generates an executable file.

path name. The name of the part under TeamConnection control. A path name can be a directory structure and a base name or just a base name. It must be unique within each release. See also *base name*.

pool. See *build pool*.

pop-up menu. A menu that, when requested, appears next to the object it is associated with.

prerequisite workareas. If a part is changed to resolve more than one defect or feature, the workarea referenced by the first change is a prerequisite of the workarea referenced by later changes. A workarea is a prerequisite to another workarea if:

- Part changes are checked in, but not committed, for the first workarea.
- One or more of the same parts are checked out, changed, and checked in again for the second workarea.

problem tracking. The process of tracking all reported defects through to resolution and all proposed features through to implementation.

process. A combination of TeamConnection subprocesses, configured by the family administrator, that controls the general movement of TeamConnection objects (defects, features, workareas, and drivers) from state to state within a component or release. See also *subprocess* and *state*.

Q

query. A request for information from a database, for example, a search for all defects that are in the open state. See also *default query* and *search*.

R

raw format. Information retrieved on the report command that has the vertical bar delimiter separating field information, and each line of output corresponds to one database record.

refresh. This TeamConnection action updates a workarea with any changes from the release, and it also freezes the workarea, if it is not already frozen.

relative path name. The name of a directory or a part expressed as a sequence of directories followed by a part name, beginning from the current directory.

release. A TeamConnection object defined by a user that contains all the parts that must be built, tested, and distributed as a single entity.

restricted authority. The limitation on a user's ability to perform certain actions at a specific component. Authority can be restricted by the superuser, the component owner, or a user with AccessRestrict authority. See also *authority*.

root component. The initial component that is created when a TeamConnection family is configured. All components in a TeamConnection family are descendants of the root component. Only the root component has no parent component. See also *component, child component*, and *parent component*.

S

search. To scan one or more data elements of a set in a database to find elements that have certain properties.

serial development. While a user has parts checked out from a workarea, no one else on the team can check out the part. The user develops new material without interacting with other developers on the project. TeamConnection provides the opportunity to hold the part until the user is sure that it integrates with the rest of the application. Thus, the lock is not released until the workarea as a whole is committed. Contrast with *concurrent development*. See also *workarea*.

server. A workstation that performs a service for another workstation.

shadow. A collection of parts in a filesystem that reflects the contents of a TeamConnection workarea, driver, or release.

shared part. A part that is contained in two or more releases.

shell script. A series of commands combined in a file that carry out a function when the file is run.

SID. The name of a version of a driver, release, or workarea.

sizing record. A status record created for each component-release pair affected by a proposed defect or feature. The sizing record owner must indicate whether the defect or feature affects the specified component-release pair and the approximate amount of work needed to resolve the defect or implement the feature within the specified component-release pair.

stanza format. Data output generated by the Report command in which each database record is a stanza. Each stanza line consists of a field and its corresponding values.

state. workareas, drivers, features, and defects move through various states during their life cycles. The state of an object determines the actions that can be performed on it. See also *process* and *subprocess*.

subprocess. TeamConnection subprocesses govern the state changes for TeamConnection objects. The design, size, review (DSR) and verify subprocesses are configured for component processes. The track, approve, fix, driver, and test subprocesses are configured for release processes. See also *process* and *state*.

superuser. This privilege lets a user perform any action available in the TeamConnectionfamily.

system administrator. A user who is responsible for all system-related tasks involving the TeamConnection server, such as installing, maintaining, and backing up the TeamConnectionserver and the database it uses.

T

TCP/IP. Transmission Control Protocol/Internet Protocol.

TeamConnection client. A workstation that connects to the TeamConnection server by a TCP/IP connection.

TeamConnection part. A part that is stored by the TeamConnection server and retrieved by a path name, release, type, and workarea. See also *part*, *common part*, and *type*.

TeamConnection superuser. See *superuser*.

tester. A user responsible for testing the resolution of a defect or the implementation of a feature for a specific driver of a release and recording the results on a test record.

test record. A status record used to record the outcome of an environment test performed for a resolved defect or an implemented feature in a specific driver of a release.

track subprocess. An attribute of a TeamConnection release process that specifies that the change control process for that release will be integrated with the problem tracking process.

Transmission Control Protocol/Internet Protocol (TCP/IP). A set of communications protocols that support peer-to-peer connectivity functions for both local and wide area networks.

type. All parts that are created through the TeamConnection GUI or on the command line will show up in reports with the type of TCPart as the part type. The TeamConnection GUI and command line can only check in, check out, and extract parts of the type TCPart.

U

user exit. A user exit allows TeamConnection to call a user-defined program during the processing of TeamConnection transactions. User exits provide a means by which users can specify additional actions that should be performed before completing or proceeding with a TeamConnection action.

user ID. The identifier assigned by the system administrator to each TeamConnection user.

V

verification record. A status record that the originator of a defect or a feature must mark before the defect or feature can move to the closed state. Originators use verification records to verify the resolution or implementation of the defect or feature they opened.

version. (1) A specific view of a driver, release, or workarea. (2) A revision of a part.

version control. The storage of multiple versions of a single part along with information about each version.

view. An alternative and temporary representation of data from one or more tables.

W

workarea. An object in TeamConnection that you create and associate with a release. When the workarea is created, you see the most current view of the release and all the parts that it contains. You can check out the parts in the workarea, make modifications, and check them back into the workarea. You can also test the modifications without integrating them. Other users are not aware of the changes that you make in the workarea until you integrate the workarea to the release. While you work on files in a workarea, you do not see subsequent part changes in the release until you integrate or refresh your workarea.

working part. The checked-out version of a TeamConnection part.

Y

year 2000 ready. IBM VisualAge TeamConnection Enterprise Server is Year 2000 ready. When used in accordance with its associated documentation, TeamConnection is capable of correctly processing, providing and/or receiving date data within and between the twentieth and twenty-first centuries, provided that all products (for example, hardware,

software and firmware) used with the product
properly exchange accurate date data with it.

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Administrator's Guide

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