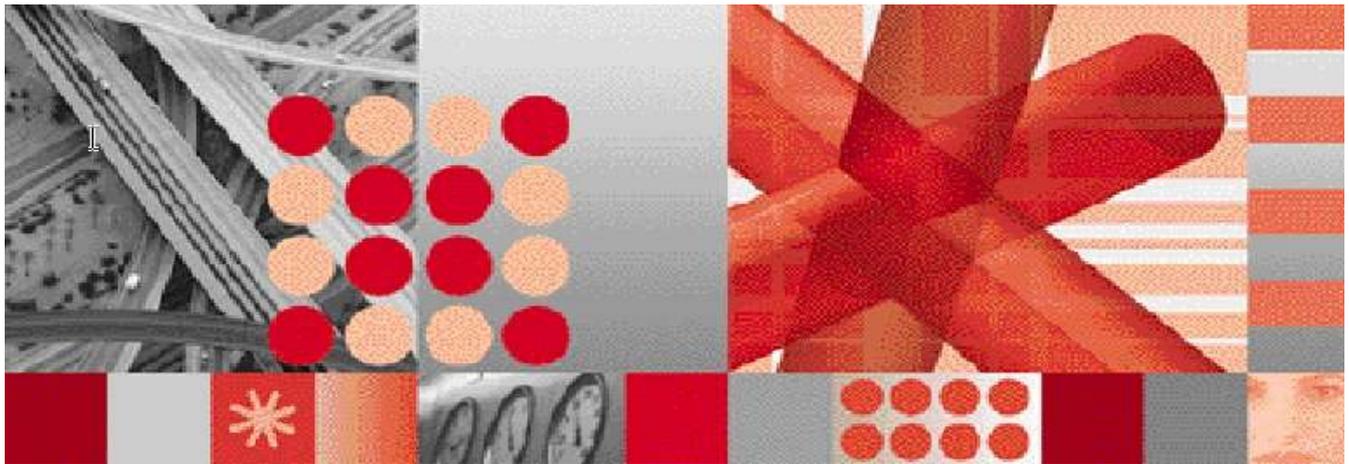




# Netcool Customer Experience Manager Module for UMTS-HSDPA

Version 1.3 IF0001



Installation Guide

**TIVOLI NETCOOL CUSTOMER EXPERIENCE MANAGER MODULE FOR UMTS-HSDPA SERVICE INSTALLATION  
GUIDE**

---

**Note:** Before using this information and the product it supports, read the information in Notices on page 35.

This edition applies to version 1 release 3, modification IF0001 of IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA (Product Number 5724-V48) and to all subsequent releases and modifications until otherwise indicated in new editions.

**© Copyright International Business Machines Corporation 2010. All rights reserved.**

US Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

# Contents

<b>1</b>	<b>About this publication</b>	<b>5</b>
1.1	Intended audience	5
1.2	What this publication contains	5
1.3	Publications	6
	IBM Tivoli Netcool Service Quality Manager core library	6
	IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA library	7
	Prerequisite publications	8
	Related publications	8
	Accessing terminology online	8
	Accessing publications online	8
	Ordering publications	9
1.4	Tivoli technical training	9
1.5	Tivoli user groups	9
1.6	Support information	9
	Online	9
	IBM Support Assistant	10
	Troubleshooting information	10
1.7	Conventions used in this guide	10
	Typeface conventions	10
	Operating system-dependent variables and paths	11
<b>2</b>	<b>Installation parameters and server setup</b>	<b>12</b>
2.1	Installation parameters	12
2.2	Server components	12
<b>3</b>	<b>Installing the Global Object Model (GOM)</b>	<b>13</b>
3.1	Installing the GOM	13
3.2	Provisioning the GOM	14
<b>4</b>	<b>Installing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service</b>	<b>15</b>
4.1	Determining the TNSQM Software Version	15
4.2	Installing the Service Module GOM	16
4.2.1	Installing the Service Module GOM	16
4.2.2	Provisioning the Service Module GOM	17
4.3	Installing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data sources	18
4.3.1	Pre-installation	18
4.3.2	Creating tablespaces	19
4.3.3	Provision the system	20
4.3.4	Creating adapter database tables	21
4.3.5	Deploying the loader	21
4.3.6	Deploy the adapter configuration (for distributed installations)	22
4.3.7	Updating psmt configuration	22
4.3.8	Restarting the sapmgr process	23
4.3.9	Starting the loader	23

<b>5</b>	<b>Uninstalling the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service</b>	<b>24</b>
5.1	Prerequisites .....	24
5.2	Shutdown processes .....	24
5.3	Uninstalling the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data sources .....	25
5.3.1	Un-provisioning the data source .....	25
5.3.2	Dropping the data source schema .....	25
5.3.3	Dropping tablespaces .....	26
5.3.4	Cleaning the gateway server artifacts .....	27
5.3.5	Cleaning the application server artifacts .....	27
5.4	Uninstalling the Service Module GOM .....	27
5.5	Removing the Service Module GOM packages .....	28
5.6	Removing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data source packages .....	28
5.7	Restarting the processes .....	29
	<b>Appendix A Optional procedures .....</b>	<b>30</b>
	Adjusting adapter input data retention .....	30
	Adjusting service module configuration parameters .....	30
	Adjusting collector pattern expressions .....	32
	Backup and restore the adp_deploy.xml file .....	32
	<b>Appendix B Troubleshooting .....</b>	<b>33</b>
	Adapter errors and warning messages .....	33
	Missing customer resource mappings map file .....	33
	Installation errors and warning messages .....	33
	Deploying non-CRM enabled loaders .....	33
	<b>Appendix C: Product acronyms .....</b>	<b>34</b>
	<b>Notices .....</b>	<b>35</b>
	Trademarks .....	37

# 1 About this publication

The *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service* version 1.3 IF0001 *Installation Guide* details the steps required to install the IBM® Tivoli® Netcool® Customer Experience Manager Module for UMTS-HSDPA version v1.3 IF0001, running on Tivoli Netcool Service Quality Manager version 4.1.2.

## 1.1 Intended audience

This publication is for customers who need to install the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA version 1.3 IF0001.

Readers need to be familiar with the following topics:

- Telecommunication and information technology (IT) principles
- IP networking
- Good understanding of UNIX® operating systems

## 1.2 What this publication contains

This publication contains the following chapters:

- Chapter 2 "Installation parameters and server setup"  
Provides a description of the installation parameters and possible values.
- Chapter 3 "Installing the Global Object Model (GOM)"  
Provides the steps required to install the GOM.
- Chapter 4 "Installing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA"  
Provides the steps required to install the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA version 1.3 IF0001.
- Chapter 5 "Uninstalling the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA"  
Provides the steps required to uninstall the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA version 1.3 IF0001.

This publication contains the following appendices:

- Appendix A "Optional procedures"

Provides the following optional procedures:

- Adjusting data input data retention
  - Adjusting Service Module configuration parameters
  - Adjusting collector pattern expressions
  - Backup and restore of the adp\_deploy.xml file.
- Appendix B " Troubleshooting"  
Provides details on some common error and warning scenarios.
  - Appendix C "Product acronyms"  
Provides a description of product acronyms.

### 1.3 Publications

This section lists the following publications:

- IBM Tivoli Netcool Service Quality Manager core library
- IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA library

It also describes how to access Tivoli publications online and how to order Tivoli publications.

#### **IBM Tivoli Netcool Service Quality Manager core library**

- *IBM Tivoli Netcool Service Quality Manager AIX Server Installation Guide, GC23-9847-00*  
Describes how to install the Service Quality Manager Server system on IBM AIX®.
- *IBM Tivoli Netcool Service Quality Manager Solaris Server Installation Guide, GC23-9846-00*  
Describes how to install the Service Quality Manager server system on Solaris.
- *IBM Tivoli Netcool Service Quality Manager Client Installation Guide, GC23-9850-00*  
Describes how to install the Service Quality Manager client.
- *IBM Tivoli Netcool Service Quality Manager Upgrade Guide, SC23-9842-00*  
Details how to upgrade from one Service Quality Manager version to another.
- *IBM Tivoli Netcool Service Quality Manager AIX System Administration Guide, SC23-9845-00*  
Provides an overview of the AIX Service Quality Manager administrative tasks including instructions on how to complete the following tasks:
  - Starting and stopping Service Quality Manager.
  - Running batch processes such as archiving trace files and log files.
  - Backing up and restoring the system.
- *IBM Tivoli Netcool Service Quality Manager Solaris System Administration Guide, SC23-9844-00*  
Provides an overview of the Solaris Service Quality Manager administrative tasks including instructions on how to complete the following tasks:
  - Starting and stopping Service Quality Manager.
  - Running batch processes such as archiving trace files and log files.

- Backing up and restoring the system.
- *IBM Tivoli Netcool Service Quality Manager Provisioning Service SI Guide, SC23-9852-00*  
Reference guide containing information for provisioning the Tivoli Netcool Service Quality Manager system.
- *IBM Tivoli Netcool Service Quality Manager Customer Experience Manager Provisioning Guide, SC23-9843-00*  
Provides information for provisioning the Customer Experience Manager system.
- *IBM Tivoli Netcool Service Quality Manager Customer Experience Manager Monitoring Guide, SC23-9482-00*  
Describes how to use and monitor the Customer Experience Manager feature in Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Monitoring Guide, SC23-9103-01*  
Describes monitoring (Service level agreement (SLA) monitor, Key quality indicator (KQI) analyzer, alarm monitor, audit manager and SLA Webview applications) in Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Configuration Guide, SC23-9102-01*  
Describes SLA provisioning (parties, service level agreement (SLAs), and SLA templates applications) and Service Quality Manager provisioning (service resources, key quality indicator (KQI) models, and service module applications) in Service Quality Manager.
- *IBM Tivoli Netcool Service Quality Manager Business Objects Installation and Configuration Guide, SC23-9473-00*  
Provides information on the steps required to install and configure the BusinessObjects server and client for use with Service Quality Manager.
- *IBM Tivoli Netcool Customer Experience Manager Customer Relationship Management Development Guide, SC23-9857-00*  
Provides an overview of how to write some Java™ code to connect to a customer relationship management system with the Tivoli Netcool Customer Experience Manager product.
- *IBM Tivoli Netcool Service Quality Manager Release Notes, G111-9221-00*  
Provides information on the Service Quality Manager release contents, platform requirements, installation and upgrade procedures, and known issues.

### **IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA library**

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 Installation Guide*  
Provides the steps required to install the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 and its data source.
- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service Overview Guide*  
Provides an overview of the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service product architecture.

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Interface Control Guide*

Provides details of the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA input interface.

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA version 1.3 IF0001 Release Notes*

Provides information on the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA version 1.3 IF0001 release contents, platform requirements, installation procedures, and known issues.

### **Prerequisite publications**

To use the information in this publication effectively, you must have some prerequisite knowledge, which you can obtain from the following publications:

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service Overview Guide*

Provides an overview of the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service product architecture.

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 Release Notes*

Provides information on the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 release contents, platform requirements, installation procedures, and known issues.

### **Related publications**

The following document also provides useful information:

- *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service Interface Control Guide*

Provides details of the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service input interface.

### **Accessing terminology online**

The IBM Terminology Web site consolidates the terminology from IBM product libraries in one convenient location. You can access the Terminology Web site at the following Web address

<http://www.ibm.com/software/globalization/terminology>.

### **Accessing publications online**

The product CD contains the publications that are in the product library. The format of the publications is PDF.

IBM posts publications for this and all other Tivoli products, as they become available and whenever they are updated, to the Tivoli Documentation Central Web site at <http://www.ibm.com/tivoli/documentation>.

**Note:** If you print PDF documents on other than letter-sized paper, set the option in the **File -> Print** window that allows Adobe® Reader to print letter-sized pages on your local paper.

---

## Ordering publications

You can order many Tivoli publications online at

<http://www.elink.ibm.com/publications/servlet/pbi.wss>.

You can also order by telephone by calling one of these numbers:

In the United States: 800-879-2755

In Canada: 800-426-4968

In other countries, contact your software account representative to order Tivoli publications. To locate the telephone number of your local representative, perform the following steps:

1. Go to <http://www.elink.ibm.com/publications/servlet/pbi.wss>.
2. Select your country from the list and click **Go**.
3. Click **About this site** in the main panel to see an information page that includes the telephone number of your local representative.

## 1.4 Tivoli technical training

For Tivoli technical training information, refer to the following IBM Tivoli Education Web site at

<http://www.ibm.com/software/tivoli/education>.

## 1.5 Tivoli user groups

Tivoli user groups are independent, user-run membership organizations that provide Tivoli users with information to assist them in the implementation of Tivoli Software solutions. Through these groups, members can share information and learn from the knowledge and experience of other Tivoli users. Tivoli user groups include the following members and groups:

- 23,000+ members
- 144+ groups

Access the link for the Tivoli Users Group at [www.tivoli-ug.org](http://www.tivoli-ug.org).

## 1.6 Support information

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

### Online

Access the Tivoli Software Support site at

<http://www-01.ibm.com/software/sysmgmt/products/support/index.html?ibmprd=tivman>.

Access the IBM Software Support site at: <http://www.ibm.com/software/support/probsub.html>.

## IBM Support Assistant

The IBM Support Assistant is a free local software serviceability workbench that helps you resolve questions and problems with IBM software products. The Support Assistant provides quick access to support-related information and serviceability tools for problem determination. To install the Support Assistant software, go to <http://www.ibm.com/software/support/isa>.

## Troubleshooting information

See *Appendix A Optional procedures* in the *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 Installation Guide*, it provides the following optional procedures:

- Adjusting data input data retention
- Adjusting Service Module configuration parameters
- Adjusting collector pattern expressions
- Backup and restore of the `adp_deploy.xml` file.

For more information about solving problems, see *Appendix B Troubleshooting* in the *IBM Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service version 1.3 IF0001 Installation Guide*.

## 1.7 Conventions used in this guide

This publication uses several conventions for special terms and actions, operating system-dependent commands and paths, and margin graphics.

### Typeface conventions

This publication uses the following typeface conventions:

#### **Bold**

- Lowercase commands and mixed case commands that are otherwise difficult to distinguish from surrounding text.
- Interface controls (check boxes, push buttons, radio buttons, spin buttons, fields, folders, icons, list boxes, items inside list boxes, multicolumn lists, containers, menu choices, menu names, tabs, property sheets), labels (such as **Tip:**, and **Operating system considerations:**)
- Keywords and parameters in text.

#### *Italics*

- Citations (examples: titles of publications, diskettes, and CDs)
- Words defined in text (example: a nonswitched line is called a *point-to-point line*)
- Emphasis of words and letters (words as words example: "Use the word *that* to introduce a restrictive clause."; letters as letters example: "The LUN address must start with the letter *L*.")
- New terms in text (except in a definition list): a *view* is a frame in a workspace that contains data.
- Variables and values you must provide.... where *myname* represents.....

#### **Monospace**

- Examples and code examples.

- File names, programming keywords, and other elements that are difficult to distinguish from surrounding text.
- Message text and prompts addressed to the user.
- Text that the user must type.
- Values for arguments or command options.

### **Operating system-dependent variables and paths**

This publication uses the UNIX convention for specifying environment variables and for directory notation. When using the Windows® command line, replace *\$variable* with *%variable%* for environment variables and replace each forward slash (/) with a backslash (\) in directory paths. The names of environment variables are not always the same in the Windows and UNIX environments. For example, %TEMP% in Windows environments is equivalent to \$TMPDIR in UNIX environments.

---

**Note:** If you are using the bash shell on a Windows system, you can use the UNIX conventions.

---

## 2 Installation parameters and server setup

### 2.1 Installation parameters

Where applicable in the following chapters, replace the parameters described in Table 1 with actual values in the following sections.

**Table 1: Description of parameters**

<i>Parameter</i>	<i>Description</i>
<owner_user>	The user ID associated with ownership rights to the IBM Tivoli Netcool Service Quality Manager database, typically <b>saowner</b> .
<owner_pwd>	This password is associated with the <b>saowner</b> database user.
<user_pwd>	This password is associated with the saserver database user.
<sadb>	The database SID for the IBM Tivoli Netcool Service Quality Manager installation.

### 2.2 Server components

The Service Quality Manager server architecture consists of three components. The components can be installed together on a single, consolidated server or set up across multiple servers, to form a distributed system.

**Table 2: Server Descriptions**

<i>Parameter</i>	<i>Description</i>
Application Server	The server that is installed with the Service Quality Manager software used to run a Service Quality Manager Framework.
Gateway Server	The server that is installed with Service Quality Manager software which handles the processing of Service Module data.
Database Server	The server that is installed with the Oracle database and the Service Quality Manager data store.

## 3 Installing the Global Object Model (GOM)

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this chapter on the application server only.

---

**Note (for consolidated installations):** All procedures listed in this chapter apply to a consolidated, single-server installation unless otherwise stated.

---

**Note:** Some Service Modules may not require the GOM. See the *Tivoli Netcool Customer Experience Manage Module for UMTS-HSDPA Service version 1.3 IF0001 Release Notes* to determine if the Tivoli Netcool Customer Experience Module for UMTS-HSDPA Service is dependent on the GOM. If the GOM is not required, then proceed directly to chapter 4.

If the GOM is required, see the *Tivoli Netcool Customer Experience Manage Module for UMTS-HSDPA Service version 1.3 IF0001 Release Notes* for the minimum GOM version to be used. If a current or later version of the GOM is already provisioned, then proceed to chapter 4. Execute the following command on the application server as user saserver to determine whether a GOM version is already provisioned:

```
$ package_mgmt -l
```

---

**Note:** If a previous version of the GOM is already provisioned, and is either version 1.1 or 1.2 then, see the *Support information* section of this guide for more details. If version 1.3 is provisioned, see the *IBM Tivoli Netcool Service Quality Manager Global Object Model User Guide* to complete the migration. Execute the following command on the application server as user saserver to determine whether a GOM version is already provisioned:

```
$ package_mgmt -l
```

---

### 3.1 Installing the GOM

Complete the following steps as user saserver:

1. Transfer the Service Quality Manager GOM package to the `<target directory>` directory on the Service Quality Manager host machine. It is recommended to use the `/app1` directory as the `<target directory>` value.
2. Execute the following command:

```
$ ${WMCROOT}/admin/common/install/scripts/deploy-service-solution -package  
<target directory>/ibm-tn-sqm-cots_gom-1.5.tar.gz
```

3. Enter 'yes' when asked if you want to deploy the package.
4. Enter 'yes' when asked if you want to continue.
5. The license agreement will be displayed. Press the Enter key to scroll through the license agreement. After the license agreement is displayed, the following prompt will be displayed:

```
Do you agree with the terms of this license?
```

Enter 'yes' if you agree and wish to continue with the product installation or 'no' if you do not. If you enter 'yes' output similar to the following will be displayed:

```
Installation is complete.
```

```
ok
```

```
All packages installed successfully
```

```
Please view /appl/sa/admin/logs/sa_install.log for package installation logs
```

## 3.2 Provisioning the GOM

Complete the following steps as user saserver:

1. Check the list of processes running by executing the following command:

```
$ sap disp -l
```

2. Stop the monitoring, adapter and Customer Experience Manager process groups by executing the following commands:

```
$ sap stop monitoring
```

```
$ sap stop -f adapters
```

```
$ sap stop cem
```

3. If any of the domain and client processes are not running, contact Service Quality Manager system administration to start these processes.
4. Provision the GOM by executing the following command:

```
$ package_mgmt -i cots_gom_1.5
```

On successful completion the command will display the following:

```
BUILD SUCCESSFUL
```

```
Total time: n seconds
```

## 4 Installing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service

---

**Note (for consolidated installations):** All procedures listed in this chapter apply to a consolidated, single-server installation unless otherwise stated.

---

---

**Note :** The installation procedure requires 2 software distributions of the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service module :

- Tivoli Netcool Customer Experience Manager for UMTS-HSDPA Service module version 1.3, available to download from Xtreme Leverage
  - Tivoli Netcool Customer Experience Manager for UMTS-HSDPA Service module version 1.3 IF0001 (this release)
- 

### 4.1 Determining the TNSQM Software Version

---

**Note (distributed installation):** In a distributed system, complete the procedures in this section on the application server.

---

Determine the TNSQM Software Version by executing the following command

```
$ sap version
```

The following is an example of the output of this command :

```
Baseline Version:
```

```
IBM SQM4.1.2.10
```

```
Current Version:
```

```
CEM4.1.2.28
```

```
Patch History:
```

CEM4.1.2.28

The TNSQM Software Version is indicated under “Current Version”.

## 4.2 Installing the Service Module GOM

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on the application server only.

---

### 4.2.1 Installing the Service Module GOM

Complete the following steps as user saserver:

1. Transfer the Customer Experience Manager Module for UMTS-HSDPA Service GOM package `ibm-tn-cem-cem_umts_iups_gom-1.3.tar.gz` to the `<target directory>` directory on the Service Quality Manager host computer. It is recommended to use the `/app1` directory as the `<target directory>` value.

2. Execute the following command:

```
$ ${WMCROOT}/admin/common/install/scripts/deploy-service-solution -package  
<target directory>/ibm-tn-cem-cem_umts_iups_gom-1.3.tar.gz
```

3. Enter `'yes'` when asked if you wish to deploy the package.
4. Enter `'yes'` when asked if you wish to continue.

The license agreement will be displayed. Press the Enter key to scroll through the license agreement. After the license agreement has been displayed, the following prompt will be displayed:

```
Do you agree with the terms of this license?
```

Enter `'yes'` if you agree and wish to continue with the product installation or `'no'` if you do not. If you enter `'yes'` output similar to the following will be displayed:

```
Installation is complete.
```

```
ok
```

```
All packages installed successfully
```

```
Please view /app1/sa/admin/logs/sa_install.log for package installation logs
```

5. Transfer the additional Customer Experience Manager Module for UMTS-HSDPA Service GOM package `ibm-tn-cem-cem_umts_iups_gom-1.3.0.7.tar.gz` to the `<target directory>` directory on the Service Quality Manager host computer. It is recommended to use the `/app1` directory as the `<target directory>` value.

6. Execute the following command:

```
$ ${WMCROOT}/admin/common/install/scripts/deploy-service-solution -package  
<target directory>/ibm-tn-cem-cem_umts_iups_gom-1.3.0.7.tar.gz
```

7. Enter 'yes' when asked if you wish to deploy the package.
8. Enter 'yes' when asked if you wish to continue.

The license agreement will be displayed. Press the Enter key to scroll through the license agreement. After the license agreement has been displayed, the following prompt will be displayed:

```
Do you agree with the terms of this license?
```

Enter 'yes' if you agree and wish to continue with the product installation or 'no' if you do not. If you enter 'yes' output similar to the following will be displayed:

```
Installation is complete.
```

```
ok
```

```
All packages installed successfully
```

```
Please view /appl/sa/admin/logs/sa_install.log for package installation logs
```

## 4.2.2 Provisioning the Service Module GOM

The following tasks load the Service Module GOM provisioning into the system.

Complete the following steps as user saserver:

1. Check the list of processes running by executing the command:

```
$ sap disp -l
```

2. Stop the monitoring, adapter, and Customer Experience Manager process groups by executing the following commands:

```
$ sap stop monitoring
```

```
$ sap stop -f adapters
```

```
$ sap stop cem
```

3. If any of the domain and client processes are not running, contact Service Quality Manager system administration to start these processes.
4. Provision the system by executing the command:

```
$ package_mgmt -i cem_umts_iups_gom_1.3
```

On successful completion the command will display the following:

```
BUILD SUCCESSFUL
```

Total time: n seconds

## 4.3 Installing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data sources

---

**Note:** Ensure section 4.1 is completed prior to beginning this section.

---

### 4.3.1 Pre-installation

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on the application, gateway, and database servers.

---

Complete the following as user saserver:

1. Transfer the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data source package `ibm-tn-cem-cem_umts_iups_prb-1.3.tar.gz` to the `<target directory>` directory on the Service Quality Manager host computer. It is recommended to use the `/appl` directory as the `<target directory>` value.

2. Execute the following command:

```
$ ${WMCROOT}/admin/common/install/scripts/deploy-service-solution -package  
<target directory>/ibm-tn-cem-cem_umts_iups_prb-1.3.tar.gz
```

3. Enter `'yes'` when asked if you wish to deploy the package.
4. Enter `'yes'` when asked if you wish to continue.
5. The license agreement will be displayed. Press the Enter key to scroll through the license agreement. After the license agreement has been displayed, the following prompt will be displayed:

```
Do you agree with the terms of this license?
```

Enter `'yes'` if you agree and wish to continue with the product installation or `'no'` if you do not. If you enter `'yes'` output similar to the following will be displayed:

```
Installation is complete.
```

```
ok
```

```
All packages installed successfully
```

```
Please view /appl/sa/admin/logs/sa_install.log for package installation logs
```

6. Transfer the additional Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data source package `ibm-tn-cem-cem_umts_iups_prb-1.3.0.7.tar.gz` to the `<target directory>` directory on the Service Quality Manager host computer. It is recommended to use the `/appl` directory as the `<target directory>` value.
7. Execute the following command:

```
$ ${WMCROOT}/admin/common/install/scripts/deploy-service-solution -package
<target directory>/ibm-tn-cem-cem_umts_iups_prb-1.3.0.7.tar.gz
```

8. Enter 'yes' when asked if you wish to deploy the package.
9. Enter 'yes' when asked if you wish to continue.
10. The license agreement will be displayed. Press the Enter key to scroll through the license agreement. After the license agreement has been displayed, the following prompt will be displayed:

```
Do you agree with the terms of this license?
```

Enter 'yes' if you agree and wish to continue with the product installation or 'no' if you do not. If you enter 'yes' output similar to the following will be displayed:

```
Installation is complete.
```

```
ok
```

```
All packages installed successfully
```

```
Please view /appl/sa/admin/logs/sa_install.log for package installation logs
```

### 4.3.2 Creating tablespaces

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the database server.

---

For TNSQM Current Versions up to and including 4.1.2.19 :

Complete the following step as user saserver:

- Create the Service Module tablespace by executing the commands:

```
$ cd ${WMCROOT}/packages/cem_umts_iups_prb_1.3/admin/oracle/bin
```

```
$ ./create_db_tablespace -sid <sadb> -dbowneruser <owner_user> -dbownerpwd
'<owner_pwd>' -name cem_umts_iups_prb_1.3
```

where <owner\_user> is **saowner** and ensuring that the saowner password <owner\_pwd> is enclosed in single quotes ''.

---

**Note :** Creation of the tablespace may take some time.

---

On successful completion, the command will display the following:

```
Database Tablespace Created Successfully
```

For TNSQM Current Versions greater than 4.1.2.20 :

Complete the following steps as user `saserver`:

- Create the Service Module tablespace by executing the commands:

```
$ cd ${WMCROOT}/admin/oracle/bin
```

```
$ ./create_db_tablespace -sid <sadb> -dbowneruser saserver -dbownerpwd '<user_pwd>'  
-name cem_umts_iups_prb_1.3
```

ensuring that the `saserver` password `<user_pwd>` is enclosed in single quotes `'`.

---

**Note :** Creation of the tablespace may take some time.

---

On successful completion, the command will display the following:

```
Database Tablespace Created Successfully
```

### 4.3.3 Provision the system

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on the application server only.

---

Use the following tasks to load the Customer Experience Manager Service Module provisioning within the system.

Complete the following as user `saserver`:

1. Check the list of processes running by executing the command:

```
$ sap disp -l
```

2. Stop the monitoring, adapter and Customer Experience Manager process groups by executing the following commands:

```
$ sap stop monitoring
```

```
$ sap stop -f adapters
```

```
$ sap stop cem
```

3. If any of the domain and client processes are not running, contact Service Quality Manager system administration to start these processes.

4. Provision the system by executing the command:

```
$ package_mgmt -i cem_umts_iups_prb_1.3
```

On successful completion the command will display the following:

```
BUILD SUCCESSFUL
```

Total time: n seconds

#### 4.3.4 Creating adapter database tables

---

**Note (for distributed installations):** Perform the procedures in this section on the database server.

---

**Note:** Contact your Tivoli Netcool Service Quality Manager administrator for the correct passwords.

---

Complete the following as user saserver:

1. Create the adapter database tables by executing the command<sup>2</sup>:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f  
${WMCROOT}/packages/adp_deploy.xml -Ddb.pwd=<user password> do-schema
```

2. On successful completion the command will output the following:

```
[exec] -.... sadb cem_umts_iups_prb_1.3 Schema Creation completed successfully
```

```
[exec] .... Log file is located in
```

```
    /appl/sa/admin/logs/db_createschema_cem_umts_iups_prb_1.3.log
```

```
BUILD SUCCESSFUL
```

```
Total time: n minutes n seconds
```

3. Check log file `${WMCROOT}/admin/logs/db_createschema_cem_umts_iups_prb_1.3.log` for any errors. If any errors then, see the *Support information* section of this guide for more details.

#### 4.3.5 Deploying the loader

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on the gateway server only.

---

Complete the following as user saserver:

1. Deploy the loader by executing the command:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f  
${WMCROOT}/packages/adp_deploy.xml do-gateway-deploy
```

---

**Note:** If you encounter any errors or warnings, refer to *Appendix B Troubleshooting*.

---

On successful completion the command will output the following:

```
BUILD SUCCESSFUL
```

---

<sup>2</sup> Please note that the command can require a large amount of time to run depending on your system configuration.

Total time: n seconds

2. Verify that the loader data directory is created by viewing the content of the following collector configuration file:

```
${WMCROOT}/conf/adapter/collector/cem_umts_iups_prb_loader.properties
```

To find the value of the property that represents the full directory path of the adapter data directory, check the value of the following variable:

```
com.comnitel.sm.adapter.collector.input.directory
```

If the value of the adapter data directory property contains an environment variable name such as `${SAVARDIR}`, the correct value of such variables can be found in this file:

```
${WMCROOT}/conf/environment/default.properties
```

If the adapter data directory is not created it is not necessary to re-execute any of the preceding steps. Instead create the missing directories manually using the `mkdir` command, for example:

```
$ mkdir ${WMCROOT}/var/adapter/cem_umts_iups_prb_loader
```

### 4.3.6 Deploy the adapter configuration (for distributed installations)

---

**Note (for distributed installations):** This section should only be performed for a distributed installation. **For a consolidated system, this section can be ignored.** Complete these steps on the application server.

---

Complete the following steps as user saserver:

1. Deploy the loader by executing the command:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f  
${WMCROOT}/packages/adp_deploy.xml do-application-deploy
```

On successful completion the command will output the following:

```
BUILD SUCCESSFUL
```

```
Total time: n seconds
```

2. Edit the file `${WMCROOT}/conf/processes/processes-cem_umts_iups_prb_loader.properties`. Replace the reference to `${SAHOST}` with the name of the gateway server upon which the loader will be running.

### 4.3.7 Updating psmt configuration

---

**Note :** Only perform the procedures in this section if the TNSQM Current Version is greater than 4.1.2.20..

---

**Note (distributed installation):** In a distributed system, perform the procedures in this section only on the application server.

---

Complete the following steps as user `saserver`:

1. Ensure that the file `${WMCROOT}/conf/service/dom/psmt.properties` contains the following entry, adding it if necessary :

```
psmt.xml.model.directory=${WMCROOT}/conf/service/cem/adapters
```

#### 4.3.8 Restarting the `sapmgr` process

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on the application server.

---

Complete the following steps as user `saserver`:

1. Restart the `sapmgr` process to pick up the newly instantiated loader.

```
$ sapmgr stop
```

```
$ sapmgr start
```

When the `sapmgr` process is successfully restarted, proceed with the next steps.

2. Ensure the loader is available by executing the command:

```
$ sap disp
```

3. Start the monitoring processes and Customer Experience Manager processes, if required (see output from previous step to determine if these processes are already running).

```
$ sap start monitoring
```

```
$ sap start cem
```

#### 4.3.9 Starting the loader

---

**Note (for distributed installations):** In a distributed system, perform the procedures in this section on either the gateway server or application server.

---

Enter the following command as user `saserver`:

```
$ sap start cem_umts_iups_prb_loader
```

For any error and warning messages which appear when starting the adapter, refer to *Appendix B Troubleshooting*.

## 5 Uninstalling the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service

### 5.1 Prerequisites

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the application server only.

---

Before un-installing a Service Module, there is a requirement to delete dependent artifacts which can be created outside of the Service Module provisioning package. These artifacts are any service level agreements (SLAs), SLA templates and combined key quality indicator (KQI) models referencing a resource type defined within the Service Module, or any service-level objectives (SLOs) created using key performance indicator (KPI) metrics defined within this Service Module.

To find dependencies on the Service Module packages execute the following commands as user saserver:

```
$ package_mgmt -d cem_umts_iups_prb_1.3
```

```
$ package_mgmt -d cem_umts_iups_gom_1.3
```

### 5.2 Shutdown processes

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the application server only.

---

Complete the following as user saserver:

- Shutdown the monitoring, adapter and Customer Experience Manager process groups by executing the following commands:

```
$ sap stop monitoring
```

```
$ sap stop -f adapters
```

```
$ sap stop cem
```

## 5.3 Uninstalling the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data sources

### 5.3.1 Un-provisioning the data source

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the application server only.

---

Complete the following as user saserver:

- To un-provision the provisioned artifacts execute the following command:

```
$ package_mgmt -c cem_umts_iups_prb_1.3
```

On successful completion, the command will display the following:

```
BUILD SUCCESSFUL

Total time: n seconds
```

### 5.3.2 Dropping the data source schema

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section only on the database server.

---

Complete the following as user saserver:

---

**Note :** Contact your Tivoli Netcool Service Quality Manager for the correct passwords.

---

1. Drop the schema associated with the data source by executing the following command<sup>3</sup>:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f
${WMCROOT}/packages/adp_deploy.xml -Ddb.pwd=<user_pwd> do-schema-clean
```

On successful completion the command will display the following:

```
[exec] Database Schema Dropped Successfully
[exec] Associated logs are located in the file
      /appl/sa/admin/logs/db_dropschema_cem_umts_iups_prb_1.3.log
[delete] Deleting n files from
      /appl/sa/admin/oracle/schema/cem_umts_iups_prb_1.3

BUILD SUCCESSFUL

Total time: n minutes n seconds
```

---

<sup>3</sup> Please note that the command can require a large amount of time to run depending on your system configuration.

### 5.3.3 Dropping tablespaces

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the database server.

---

#### For TNSQM Current Versions up to and including 4.1.2.19 :

Complete the following step as user saserver:

- Drop the Service Module tablespaces by executing the commands:

```
$ cd ${WMCROOT}/packages/cem_umts_iups_prb_1.3/admin/oracle/bin  
  
$ ./drop_db_tablespace -sid <sadb> -dbowneruser <owner_user> -dbownerpwd  
'<owner_pwd>' -name cem_umts_iups_prb_1.3
```

where <owner\_user> is **saowner** and ensuring that the saowner password <owner\_pwd> is enclosed in single quotes ‘’.

---

**Note :** Deletion of the tablespace may take some time.

---

On successful completion, the command will display the following:

```
Database Tablespace Dropped Successfully
```

#### For TNSQM Current Versions greater than 4.1.2.20 :

Complete the following steps as user saserver:

- Create the Service Module tablespace by executing the commands:

```
$ cd ${WMCROOT}/admin/oracle/bin  
  
$ ./drop_db_tablespace -sid <sadb> -dbowneruser saserver -dbownerpwd '<user_pwd>'  
-name cem_umts_iups_prb_1.3
```

ensuring that the saserver password <user\_pwd> is enclosed in single quotes ‘’.

---

**Note :** Deletion of the tablespace may take some time.

---

On successful completion, the command will display the following:

```
Database Tablespace Dropped Successfully
```

### 5.3.4 Cleaning the gateway server artifacts

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the gateway server.

---

Complete the following steps as user saserver:

1. Execute the following command:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f ${WMCROOT}/packages/adp_deploy.xml  
do-gateway-clean
```

On successful completion the command will output the following:

```
BUILD SUCCESSFUL
```

```
Total time: n seconds
```

2. Remove the processed .csv files by executing the following command:

```
$ rm -f ${WMCROOT}/var/adapter/cem_umts_iups_prb_loader/*.processed
```

### 5.3.5 Cleaning the application server artifacts

---

**Note (for distributed installations) :** Complete the procedures in this section only on the application server. This is only required in the case of a distributed installation.

---

Complete the following as user saserver:

1. Enter the following command:

```
$ wmc_ant -Dsa.package=cem_umts_iups_prb_1.3 -f ${WMCROOT}/packages/adp_deploy.xml  
do-application-clean
```

On successful completion the command will output the following:

```
BUILD SUCCESSFUL
```

```
Total time: n seconds
```

## 5.4 Uninstalling the Service Module GOM

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this chapter on the application server only.

---

The following steps remove the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service Global Object Model (GOM) from the system.

Complete the following as user saserver:

1. Un-provision the GOM by executing the following command:

```
$ package_mgmt -c cem_umts_iups_gom_1.3
```

On successful completion, the command will display the following:

```
BUILD SUCCESSFUL
```

```
Total time: n seconds
```

## 5.5 Removing the Service Module GOM packages

---

**Note:** Complete the procedures in this section on the application server only.

---

Complete the following steps as user saserver:

1. Remove the Service Module GOM, by executing the following commands:

```
$ cd ${WMCROOT}/admin/software/adapters
```

```
$ ./ibm-tn-cem-cem_umts_iups_gom.remove
```

2. Enter 'yes' when asked if you wish to continue.

On successful execution the command will output:

```
Cleaning up init scripts...
```

```
Removing/restoring installed files...
```

```
Checking configuration files...
```

```
Removing empty installation directories...
```

```
Running post-remove commands...
```

```
Removal is complete.
```

## 5.6 Removing the Tivoli Netcool Customer Experience Manager Module for UMTS-HSDPA Service data source packages

---

**Note (for distributed installations):** In a distributed system, complete the procedures in this section on the application, gateway and database servers.

---

Complete the following steps as user saserver:

1. Remove the Service Module data source by executing the following commands:

```
$ cd ${WMCROOT}/admin/software/adapters
```

```
$ ./ibm-tn-cem-cem_umts_iups_prb.remove
```

2. Enter 'yes' when asked if you wish to continue.

On successful execution the command will output:

```
Cleaning up init scripts...
```

```
Removing/restoring installed files...
```

```
Checking configuration files...
```

```
Removing empty installation directories...
```

```
Running post-remove commands...
```

```
Removal is complete.
```

## 5.7 Restarting the processes

---

**Note** Complete the procedures in this section on the application server only.

---

Complete the following steps as user saserver:

1. Enter the following commands:

```
$ sapmgr stop
```

```
$ sapmgr start
```

2. Restart the processes shutdown before uninstall:

```
$ sap start monitoring
```

```
$ sap start cem
```

```
$ sap start adapters
```

3. Verify that the adapter instance has uninstalled successfully, by executing the command:

```
$ sap disp -1
```

## Appendix A Optional procedures

### Adjusting adapter input data retention

Adapter input data is maintained for a limited period in the adapter input directory before being purged to free space. The default retention period for all adapters is seven days.

If this needs to be adjusted for a particular data source, complete the following steps as user saserver:

- Add the following parameter to the collector configuration properties file for the adapter under the `${WMCROOT}/conf/adapter/collector/` directory:

```
com.comnitel.sm.adapter.collector.fileretention=<X>
```

---

**Note:** Because the purge command is based on the UNIX `find(1)` command, the system purges input files that are  $x+1$  days old. For example, if  $X$  is 2, then files that are three days and older are purged.

---

### Adjusting service module configuration parameters

If any configuration properties shipped with the Service Module need to be adjusted (*collector.properties* and *datasource.properties*) they need to follow the correct syntax.

Any correctly escaped special or punctuation character other than the dollar symbol '\$' can be used. The escape character is the back-slash character '\'.

Use of the '\$' character assumes that a matching environment variable exists in the `${WMCROOT}/conf/environment/default.properties` file.

See the table here details on how to specify the keyboard accessible special characters in the property file.

**Table 3: Keyboard accessible special characters**

<i>Character</i>	<i>Tivoli Netcool Customer Experience Manager compatible version</i>	<i>Comment</i>
!	!	
“	\”	Requires escaping
£	£	
\$		Cannot be used
%	%	
^	^	
&	&	
*	*	
(	(	
)	)	
_	_	
+	+	
-	-	
=	=	
{	{	
}	}	
[	[	
]	]	
;	;	
‘	\‘	Requires escaping
#	#	
:	:	
@	@	
~	~	
’	’	
.	.	
/	√	Requires escaping
<	<	
>	>	
\	\\	Requires escaping

## Adjusting collector pattern expressions

In its default configuration the adapter loader searches for comma separated value (CSV) files in the data loader directory. This can be adjusted using pattern matching of input file names by modifying the value of this property:

```
com.comnitel.sm.adapter.collector.input.pattern
```

Within the configuration file:

```
${WMCROOT}/conf/adapter/collector/<service_solution>_<datasource>_loader.properties
```

Entities specified here must conform to the Java Regular Expression (Regex) syntax. More information on this syntax can be found at <http://java.sun.com/j2se/1.5.0/docs/api/java/util/regex/Pattern.html>

The following is an example pattern for matching on a .csv file extension:

```
com.comnitel.sm.adapter.collector.input.pattern= .+\\.csv
```

## Backup and restore the adp\_deploy.xml file

Complete the following steps as user saserver

1. To backup the `adp_deploy.xml` file complete the following steps as saserver:

```
$ cd ${WMCROOT}/packages
```

```
$ cp adp_deploy.xml ${WMCROOT}/
```

2. To restore the `adp_deploy.xml` file execute the following commands:

```
$ cd ${WMCROOT}/packages
```

```
$ cp ${WMCROOT}/adp_deploy.xml ${WMCROOT}/packages
```

## Appendix B Troubleshooting

### Adapter errors and warning messages

#### Missing customer resource mappings map file

Some Service Modules require Custom Resource Mappings (CRMs). If a Service Module requires CRM and if the corresponding CRM map file is not available when the user is starting the Service Module loader the following error can be displayed in the log file:

```
18:10:36,370 [ResourceMappingController_cem_UMTS-HSDPA_cdr_loader0] WARN @.sm.rm.mappin
g - Unable to parse CSV file
/appl/sa/var/adapter/mappings/resources/cem_umts_iups_prb_cellarea.map for mapping
cellareaMap.
18:10:36,371 [ResourceMappingController_cem_umts_iups_prb_loader0] WARN @.sm.rm.mappin
g - The following Resource Mapping could not be created: cem_umts_iups_prb_cellarea. C
heck implementation.
```

When the map file becomes available in the location specified in the Service Module's associated *Interface Control Guide*, the adapter will detect it and process it.

### Installation errors and warning messages

#### Deploying non-CRM enabled loaders

When deploying a non-CRM enabled Service Module, a warning message similar to the following will be displayed:

```
[copy] Warning: Could not find file
/appl/sa/packages/sqm_umts_iups_prb_1.1/conf/service/resourcemgmt/sqm_umts_iups_prb_lo
ader.properties to copy.
```

or

```
[copy] Warning: /appl/sa/packages/sqm_umts_iups_prb_1.1/conf/service/resourcemgmt not
found.
```

These warnings can be ignored, because there are no properties files to be transferred.

## Appendix C: Product acronyms

**Table 4: Description of product acronyms**

<i>Acronym</i>	<i>Description</i>
CDR	Call Detail Record
CSV	Comma Separated Values
HTML	HyperText Markup Language
IP	Internet Protocol
IT	Information Technology
KQI	Key Quality Indicator
KPI	Key Performance Indicator
PDF	Portable Document Format
SLA	Service Level Agreement
SLO	Service-level Objectives
UMTS-HSDPA	Universal Mobile Telecommunications System-High Speed Downlink Packet Access
XML	Extensible Markup Language

## Notices

IBM may not offer the products, services, or features discussed in this document in all countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing  
IBM Corporation  
North Castle Drive  
Armonk NY 10504-1785  
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation  
Licensing  
2-31 Roppongi 3-chome  
Minato-ku  
Tokyo 106-0032  
Japan.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation  
5300 Cork Airport Business Park  
Kinsale Road  
Cork  
Ireland.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

## **Trademarks**

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at [www.ibm.com/legal/copytrade.shtml](http://www.ibm.com/legal/copytrade.shtml)

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.



Other company, product or service names may be trademarks or service marks of others.

IBM®

Printed in the Republic of Ireland