



Release Notes

Note: Before using this information and the product it supports, read the information in “Notices” on page 23.

This edition applies to version 1, release 4, modification 4 of IBM Tivoli Netcool Service Quality Manager GPRS service solution and to all subsequent releases and modifications until otherwise indicated in new editions.

© **Copyright International Business Machines Corporation 2008, 2009, 2010. All rights reserved.**

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

Table of contents

1	About this documentation.....	4
1.1	Audience.....	4
1.2	Required skills and knowledge	5
1.3	Guide conventions	5
1.4	User Publications	6
2	Release details	10
3	Hardware specification.....	10
4	Software requirements	11
5	Installation	11
5.1	Installation.....	11
5.2	Service solution model version	12
5.3	Default resource mapping	12
5.4	Test data.....	13
6	Known issues	14
7	Fixed issues.....	14
8	Changes in this release.....	14
8.1	GPRS RAN PM datasource - New KQI metrics on Location resource type.....	14
8.1.1	KQI Measurement Levels.....	14
8.1.2	Location Mapping.....	15
8.1.3	KPI Schema update – Location ID added	15
8.1.4	Business Objects updates	15
8.1.5	Additional KQI metrics in GPRS RAN PM 1.4.4	15
8.2	GPRS GB PP datasource - New KQI metrics on Location resource type.....	18
8.2.1	KQI Measurement Levels.....	18
8.2.2	KPI Schema update – Location ID added	18
8.2.3	Business Objects updates	19
8.2.4	Location Mapping.....	19
8.2.5	Additional KQI metrics in GPRS GB PP 1.4.4	19
	Notices	23

1 About this documentation

The *IBM Tivoli Netcool Service Quality Manager GPRS Service Solution Release Notes* guide is organized into the following chapters:

Table 1 Guide structure

<i>Chapter</i>	<i>Description</i>
About this documentation	An overview of the Tivoli Netcool Service Quality Manager GPRS service solution documentation, which gives details of the intended audience and the structure of the guide.
Release details	Information on functionality provided in the release.
Hardware specification	Details of hardware required for the release.
Software requirements	Details of software required for the release.
Installation	Details on guides to be followed during the installation of the product for the release.
Known issues	Details on known issues included in the release and workarounds, if available.

1.1 Audience

The target audience of this guide is IBM® Tivoli® Netcool® Service Quality Manager GPRS (General Packet Radio Service) service solution customers. They must be familiar with telecommunication and IT (Information Technology) principles and must also have a good understanding of Solaris and IBM AIX®.

IMPORTANT: Before attempting an installation of the Tivoli Netcool Service Quality Manager GPRS service solution you are strongly advised to read the release notes distributed with your Tivoli Netcool Service Quality Manager GPRS software. Release notes may contain information specific to your installation. Failure to consult release notes may result in a corrupt, incomplete or failed installation.

Note: Tivoli Netcool Service Quality Manager administrators must not, without prior consultation and agreement from IBM, make any changes to the index organized tables or database schema. Changes to the index organized tables or database schema can result in corruption of data and failure of the Service Quality Manager system. This applies to all releases of Tivoli Netcool Service Quality Manager using all versions of interfaces.

1.2 Required skills and knowledge

This guide assumes you are familiar with the following:

- General IT principles
- UNIX® operating systems
- IP (Internet Protocol) networking
- GPRS
- Service Quality Manager modeling concepts i.e. service resources, KPIs (Key Performance Indicators), KQIs (Key Quality Indicators) and SLAs (Service Level Agreements).

This guide also assumes that you are familiar with your company's network and with procedures for configuring, monitoring, and solving problems on your network.

1.3 Guide conventions

The following command prompts can be seen throughout this guide where the user has to enter commands at the command line:

- # (hash): This prompt will be displayed if the user is logged in as user `root`.
- \$ (dollar): This prompt will be displayed if the user is logged in as either the `saserver` or `oracle` user.

Please note the above prompts are not part of commands. All commands must be entered after these prompts.

This guide uses the typographical conventions shown in the following table:

Table 2: General guide conventions

<i>Format</i>	<i>Examples</i>	<i>Description</i>
ALL UPPERCASE	GPS NULL MYWEBSERVER	Acronyms, device names, logical operators, registry keys, and some data structures.
<u>Link</u>	See www.ibm.com	For links within a document or to the Internet.
Bold	Note: The busy hour determiner is...	Heading text for Notes, Tips, and Warnings.

SMALL CAPS	The STORED SQL dialog box... ...click VIEW... In the main GUI window, select the FILE menu, point to NEW, and then select TRAF-FIC TEMPLATE.	Any text that appears on the GUI.
<i>Italic</i>	A <i>busy hour</i> is... A web Server <i>must</i> be installed... See the <i>User Guide</i>	New terms, emphasis, and book titles.
Monospace	./wminstall \$ cd /cdrom/cdrom0 /xml/dict addmsc.sh core.spec Type OK to continue.	Code text, command line text, paths, scripts, and file names. Text written in the body of a paragraph that the user is expected to enter.
Monospace Bold	[root] # pkginfo grep -i perl system Perl5 On-Line Manual Pages system Perl 5.005_03 (POD Documentation) system Perl 5.005_03	For contrast in a code example to show lines the user is expected to enter.
<Monospace italics>	# cd <oracle_setup>	Used in code examples: command-line variables that you replace with a real name or value. These are always marked with arrow brackets.
[square bracket]	log-archiver.sh [-i][-w][-t]	Used in code examples: indicates options.

1.4 User Publications

The following user publications are provided with the GPRS Service Quality Manager service solution:

Table 3 : GPRS service solution user documentation

Document	Description
<i>Tivoli Netcool Service Quality Manager Service Solutions Installation Guide</i>	Details the generic steps required to install any Service Quality Manager service solution.
<i>Tivoli Netcool Service Quality Manager GPRS RAN PM Service Solution Interface Control Guide</i>	Details the GPRS RAN PM service solution input interface.

<i>Tivoli Netcool Service Quality Manager GPRS End to End AT Service Solution Interface Control Guide</i>	Details the GPRS End to End AT service solution input interface.
<i>Tivoli Netcool Service Quality Manager GPRS CORE GGSN PM Service Solution Interface Control Guide</i>	Details the GPRS CORE GGSN PM service solution input interface.
<i>Tivoli Netcool Service Quality Manager GPRS CORE SGSN PM Service Solution Interface Control Guide</i>	Details the GPRS CORE SGSN PM service solution input interface.
<i>Tivoli Netcool Service Quality Manager GPRS GB PP Service Solution Interface Control Guide</i>	Details the GPRS GB PP service solution input interface.
<i>Tivoli Netcool Service Quality Manager GPRS Service Solution Release Notes</i>	Provides information on the GPRS Service Solution release contents, platform requirements, installation and upgrade procedures, and known issues.

The following user publications are provided with the Service Quality Manager core software as Adobe® PDFs (Portable Document Format). Online help is available in HTML format.

Table 4: Service Quality Manager user documentation

Guide title	Description
<i>Release Notes</i>	Provides information on the Service Quality Manager release contents, platform requirements, installation and upgrade procedures, and known issues.
<i>Configuration Guide</i>	Describes SLA provisioning (Parties, SLAs, and SLA templates applications) and Service Quality Manager provisioning (services resources, KQI models and service models applications) in Service Quality Manager.
<i>Monitoring Guide</i>	Describes monitoring (SLA Monitor, KQI analyzer, alarm monitor, audit manager and SLA web monitor applications) in Service Quality Manager.
<i>Customer Experience Manager Monitoring Guide</i>	Describes how to use and monitor the Customer Experience Manager feature in Service Quality Manager.
<i>Customer Experience Manager Provisioning Guide</i>	Reference guide containing information for provisioning the Customer Experience Manager system.

<i>Solaris Server Installation Guide</i>	Describes how to install the Service Quality Manager server system on Solaris 10g.
<i>Client Installation Guide</i>	Describes how to install the Service Quality Manager client.
<i>AIX Installation Guide</i>	Describes how to install the Tivoli Netcool Service Quality Manager server system on IBM AIX® 5.3L.
<i>Solaris System Administration Guide</i>	Provides an overview of the Service Quality Manager administrative tasks including instructions on how to complete these tasks: <ul style="list-style-type: none"> - Starting and stopping Service Quality Manager. - Running batch processes such as archiving trace files and log files. - Backing up and restoring the system.
<i>AIX System Administration Guide</i>	Provides an overview of the AIX Service Quality Manager administrative tasks including instructions on how to complete these tasks: <ul style="list-style-type: none"> - Starting and stopping Service Quality Manager. - Running batch processes such as archiving trace files and log files. - Backing up and restoring the system.
<i>Upgrade Guide</i>	Details how to upgrade from one Service Quality Manager version to another.
<i>BusinessObjects Installation and Configuration Guide</i>	Provides information on the steps required to install and configure the BusinessObjects (v 6.5 or XI) server and client for use with Service Quality Manager.
<i>Service Quality Manager Core Online Help</i>	Provides information and procedures for using Service Quality Manager client applications.

<i>Customer Experience Manager Online Help</i>	Describes how to use and monitor the Customer Experience Manager feature in the Service Quality Manager.
<i>SLA Webview Online Help</i>	Describes how to use and monitor the SLA Webview feature in the Service Quality Manager.

2 Release details

Service Quality Manager GPRS v1.4.4 service solution provides the following data sources:

- End-to-End Active Test (E2E AT)
- Gateway GPRS Support Node – Performance Management (CORE GGSN PM)
- Serving GPRS Support Node – Performance Management (CORE SGSN PM)
- Radio Access Network – Performance Management (RAN PM)
- Gb Probe - (GB PP)

3 Hardware specification

The Service Quality Manager GPRS service solution can be installed on a Solaris system with the following configuration:

- Machine with T2/SPARC64 VI or UltraSPARC IV+ processor
- 146GB of disk space
- 32GB of memory
- Gigabit Ethernet

The Service Quality Manager GPRS service solution can be installed on an AIX system with the following configuration:

- JS22 blade or equivalent
- 146GB of disk space
- 32GB of memory
- Gigabit Ethernet

4 Software requirements

The minimum pre-requisite software requirements are:

- Tivoli Netcool Service Quality Manager v4.1.2 with Fix Pack 0001 (4.1.2-TIV-TNSQM-FP0001) and Interim Fix 0004 (4.1.2-TIV-TNSQM-IF0004) installed.
- Tivoli Netcool Service Quality Manager GOM v1.4.10 or later.

Note: Refer to *Tivoli Netcool Service Quality Manager Version 4.1.2 Release Notes* for the minimum software required to operate this product.

5 Installation

5.1 Installation

To install the Tivoli Netcool Service Quality Manager GPRS Service Solution version 1.4.4, refer to the Tivoli Netcool Service Quality Manager GPRS Service solution Upgrade guide included with this delivery.

Note: Tivoli Netcool Service Quality Manager GPRS service solution is dependant on the Tivoli Netcool Service Quality Manager GOM version v1.4.10 or later. Deploy this software using the instructions in chapter 3 of the *Tivoli Netcool Service Quality Manager Service Solutions Installation Guide* prior to proceeding with the installation of Tivoli Netcool Service Quality Manager GPRS service solution.

5.2 Service solution model version

Note: Chapter 4 of the *Tivoli Netcool Service Quality Manager Service Solutions Installation Guide* requires the person installing the software to input the service solution name, data source name and model version of the GPRS service solution.

The service solution name, data source name and model version of the GPRS service solution, are as follows:

- Solution name = gprs
- Data source name = e2e_at
- Model Version = 1.4.4

- Solution name = gprs
- Data source name = core_ggsn_pm
- Model version = 1.4.4

- Solution name = gprs
- Data source name = core_sgsn_pm
- Model version = 1.4.4

- Solution name = gprs
- Data source name = ran_pm
- Model version = 1.4.4

- Solution name = gprs
- Data source name = gb_pp
- Model version = 1.4.4

5.3 Default resource mapping

This service solution supports Tivoli Netcool Service Quality Manager "Default Resource" instances. These are provided so that data with the following characteristics can be processed and stored by the service solution adapter:

- Any data row which contains ResourceType references that cannot be recognized against the provisioned resource set.
- Any data row which has missing references to one or more resource types.

In each of these cases, the reference is attributed to the "Default Resource" instance of that ResourceType. For example, if the ResourceType is "CellArea" then the default resource for that ResourceType is named "unknown_CellArea". For all other purposes, the default resource can be treated the same as any other instance of the ResourceType. The service solution will produce KQI values for the default resource and these can be monitored for diagnostic purposes if required. The default resource metrics will also be visible in the BusinessObjects reports.

If a customer does not wish to have any default resource metrics created, the default resource instances can be safely deleted using the Tivoli Netcool Service Quality Manager user interface or the provisioning broker. Any data rows matching the characteristics detailed above will then not be included for any KQI metrics and will they not be included in metrics displayed in BusinessObject reports either.

5.4 Test data

Please note that the adapter test input files supplied with the GPRS RAN PM and GPRS GB PP release v1.4.3 are not compatible with 1.4.4. New sets of data have been provided to test these loaders.

6 Known issues

There are no known issues to report with the v1.4.4 release of Tivoli Netcool Service Quality Manager GPRS service solution.

7 Fixed issues

There are no fixed issues to report with the v1.4.4 release of Tivoli Netcool Service Quality Manager GPRS service solution.

8 Changes in this release

This release includes the following important changes which should be noted carefully:

8.1 GPRS RAN PM datasource - New KQI metrics on Location resource type

The GPRS RAN PM datasource has been updated to provide values for existing RAN PM KQI metrics on the TNSQM Location resource type. This update allows customers to evaluate the RAN PM metrics on a geographic basis in addition to the existing network element basis.

8.1.1 KQI Measurement Levels

KQI measurements will be produced at all levels in the Location hierarchy for each new KQI definition. The levels in the Location hierarchy are as follows (in ascending order)

Area

Market

Region

Nation

Values produced will be independent from each other. Drilldown and rollup from level to level is not supported for these metrics in the TNSQM User interface.

8.1.2 Location Mapping

The GPRS RAN PM datasource has been updated to support a new *Cell to LocationArea* map file. The Interface Control Guide (ICG) has been updated to document this new data requirement. If the *Cell to LocationArea* map file is not available when the loader is started, all Location metrics will be produced for the default Location instances as follows

unknown_Area
unknown_Market
unknown_Region
unknown_Nation

8.1.3 KPI Schema update – Location ID added

The GPRS RAN PM KPI database schema has been updated to include the following new field

Table 5: Additional KPI table fields in GPRS RAN PM

Name	Type	Description
Location_ID	Number	The ID value for the resolved Location Area

This field stores the ID value for the Location Area resolved from the *Cell to Location* map file.

8.1.4 Business Objects updates

The Business Objects reporting universe for GPRS RAN PM 1.4.4 has been updated to include the KPI schema updates for Location ID dimension. This is to facilitate customer adhoc reporting on Location data from the GPRS RAN PM schema. The reports have not been modified in this release.

8.1.5 Additional KQI metrics in GPRS RAN PM 1.4.4

Definitions for the following KQI metrics on the Location resource type have been added in GPRS RAN PM 1.4.4

Table 6: Additional KQI metrics in GPRS RAN PM 1.4.4

Category	KQI Name	Description
GPRS_RAN_Accessibility	Temporary Block Flow (TBF) Uplink Success Rate	TBF Success Rate in the Uplink direction
GPRS_RAN_Accessibility	Temporary Block Flow (TBF) Downlink Success Rate	TBF Success Rate in the Downlink direction
GPRS_RAN_Accessibility	Overall Temporary Block Flow (TBF) Success Rate	TBF Success Rate in both directions
GPRS_RAN_Accessibility	PDCH Occupancy	This is a measure of the PDCHs that are available to be used compared to the PDCHs that are currently in use or have been in use during the measurement period.
GPRS_RAN_Accessibility	PDCH Allocation Success Rate	This is a measure of the ability of the system to allocate PDCHs from the circuit switched domain when they are required.

GPRS_RAN_Accessibility	Cell Availability	This is a measure of the availability of Cells in a Cell Area in the measurement period.
GPRS_RAN_Retainability	Temporary Block Flow (TBF) Drop rate	This is a measure of the TBF Drop Rate in both directions.
GPRS_RAN_Data_Quality	Temporary Block Flow (TBF) Average UL throughput	This is the Average UL throughput per TBF.
GPRS_RAN_Data_Quality	Temporary Block Flow (TBF) Average DL throughput	This is the Average DL throughput per TBF.
GPRS_RAN_Data_Quality	Temporary Block Flow (TBF) Average UL throughput (EDGE)	This is the Average UL throughput per TBF (Edge).
GPRS_RAN_Data_Quality	Temporary Block Flow (TBF) Average DL throughput	This is the Average DL throughput per TBF (Edge).

GPRS_RAN_Usage	Total Data Volume	This is the Total Data Volume.
GPRS_RAN_Other	Soft Blocking Rate	This is the Soft Blocking Rate.
GPRS_RAN_Other	Hard Blocking Rate	This is the Hard Blocking Rate.

8.2 GPRS GB PP datasource - New KQI metrics on Location resource type

The GPRS GB PP datasource has been updated to provide values for existing GB PP KQI metrics on the TNSQM Location resource type. This update allows customers to evaluate the GB PP metrics on a geographic basis in addition to the existing network element and Enterprise customer basis.

8.2.1 KQI Measurement Levels

KQI measurements will be produced at all levels in the Location hierarchy for each new KQI. The levels in the Location hierarchy are as follows (in ascending order)

Area
Market
Region
Nation

Values produced will be independent from each other. Drilldown and rollup from level to level is not supported for these metrics in the TNSQM User interface.

8.2.2 KPI Schema update – Location ID added

The GPRS GB PP KPI database schema has been updated to include the following new field

Table 7: Additional KPI table fields in GPRS GB PP

Name	Type	Description
Location_ID	Number	The ID value for the resolved Location Area

This field stores the ID value for the Location Area resolved from the *Cell to Location* map file.

8.2.3 Business Objects updates

The Business Objects reporting universe for GPRS GB PP 1.4.4 has been updated to include the KPI schema updates for the Location ID dimension. This is to facilitate customer adhoc reporting on Location data from the GPRS GB PP schema. The reports have not been modified in this release

8.2.4 Location Mapping

The GPRS GB PP datasource has been updated to support a new *Cell to LocationArea* map file. The Interface Control Guide (ICG) has been updated to document this new data requirement. If the *Cell to LocationArea* map file is not available when the loader is started, all Location metrics will be produced for the default Location instances as follows

```
unknown_Area
unknown_Market
unknown_Region
unknown_Nation
```

8.2.5 Additional KQI metrics in GPRS GB PP 1.4.4

Definitions for the following KQI metrics on the Location resource type have been added in GPRS GB PP 1.4.4

Table 8: Additional KQI metrics in GPRS GB PP 1.4.4

Category	KQI Name	Description
----------	----------	-------------

GPRS_Gb_Accessibility	Attach Success Rate	Probability that the end-customer can perform an Attach to the GPRS Service when requested.
GPRS_Gb_Retainability	MS Initiated Detach Success Rate	Probability that the end-customer can perform an MS Initiated Detach from the GPRS Service when requested.
GPRS_Gb_Retainability	Network Initiated Detach Success Rate	Probability that the end-customer can perform a Network Initiated Detach from the GPRS Service when requested.
GPRS_Gb_Retainability	Network Initiated Detach Rate	Proportion of Detaches that were Network-Initiated.
GPRS_Gb_Accessibility	Average Attach Duration	Average time to Attach to the network.
GPRS_Gb_Retainability	Average MS Initiated Detach Duration	Average time to perform an MS Initiated Detach from the network.

IBM TIVOLI NETCOOL SERVICE QUALITY MANAGER GPRS SERVICE SOLUTION RELEASE NOTES

GPRS_Gb_Retainability	Average Network Initiated Detach Duration	Average time to perform a Network Initiated Detach from the network.
GPRS_Gb_Accessibility	Mobile Initiated Primary PDP Context Activation Success Rate	Probability that the end-customer can perform a PDP Context Activation to the UMTS core network when requested.
GPRS_Gb_Retainability	Mobile Initiated PDP Context Deactivation Success Rate	Probability that the end-customer can perform a PDP Context Deactivation when requested.
GPRS_Gb_Retainability	Network-Initiated PDP Context Deactivation Success Rate	Probability that the end-customer can perform a Network Initiated PDP Context Deactivation to the UMTS core network when requested.
GPRS_Gb_Retainability	Network-Initiated PDP Context Deactivation Rate	Proportion of PDP Context Deactivations that are network-initiated.
GPRS_Gb_Accessibility	PDP Context Activation Duration	Average time to perform a PDP Context Activation.

IBM TIVOLI NETCOOL SERVICE QUALITY MANAGER GPRS SERVICE SOLUTION RELEASE NOTES

GPRS_Gb_Retainability	Mobile Initiated PDP Context Deactivation Duration	Average time to perform a PDP Mobile Initiated Context Deactivation to the network.
GPRS_Gb_Retainability	Network Initiated PDP Context Deactivation Duration	Average time to perform a PDP Network Initiated Context Deactivation to the network.

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:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
3-2-12, Roppongi, Minato-ku,
Tokyo 106-8711

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 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](http://www.ibm.com/legal/copytrade.shtml)" at 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.

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

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

IBM®

Printed in the Republic of Ireland.