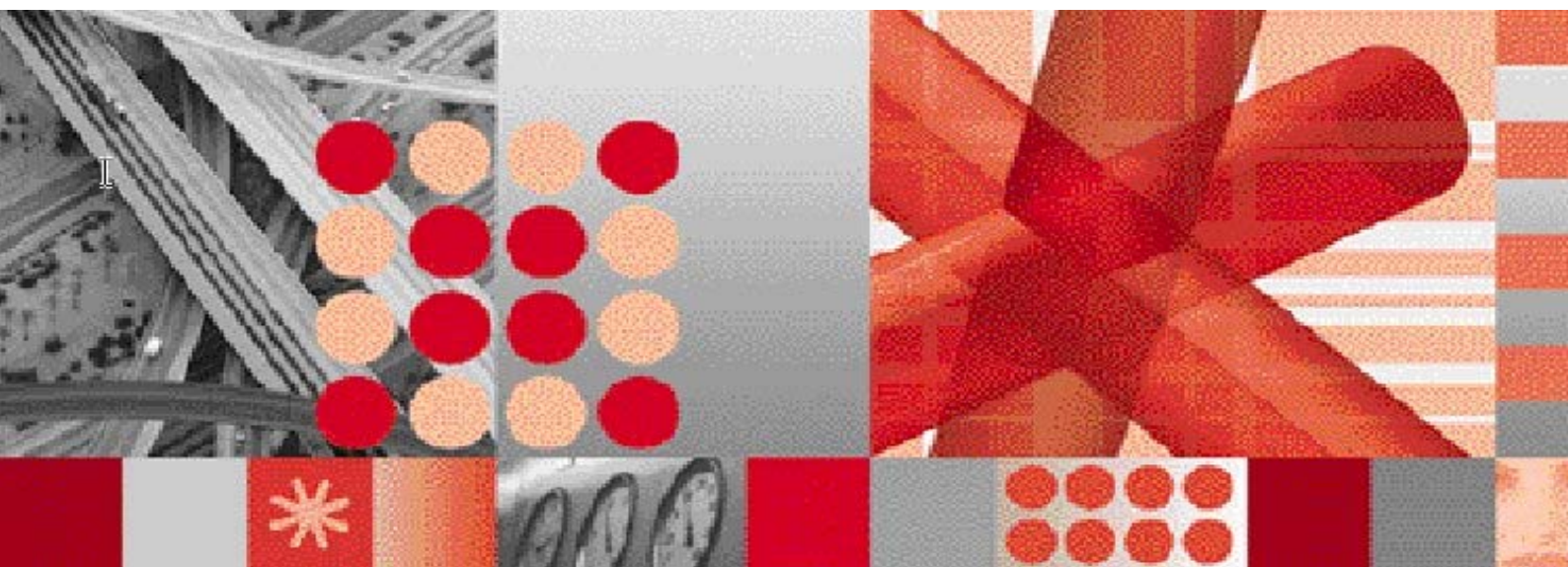




Netcool Service Quality Manager BlackBerry Service Solution

Version 5.2.1.4

The IBM logo, featuring the letters "IBM" in white serif font on a black rectangular background.



BlackBerry MIB Agent Installation and MIB Interface Control Guide

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

Note: Before using this information and the product it supports, read the information in Notices on page 48.

This edition applies to version 5 release 2, modification 1.4 of IBM Tivoli Netcool Service Quality Manager BlackBerry Service Solution and to all subsequent releases and modifications until otherwise indicated in new editions.

© Copyright International Business Machines Corporation 2008. 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	5
1.1	Audience	5
1.2	Required Skills and Knowledge	5
1.3	Document Conventions.....	6
1.4	Document Structure	7
1.5	User Publications	7
2	Installing the BlackBerry MIB Agent.....	11
2.1	Hardware Specification	11
2.2	Software Specification.....	11
2.3	Installing the BlackBerry MIB Agent Software	12
2.4	Starting and Stopping the BlackBerry MIB Agent	23
2.4.1	Starting the BlackBerry MIB Agent	23
2.4.2	Stopping the BlackBerry MIB Agent	24
2.5	Client Administration Specification.....	24
2.6	Uninstalling the BlackBerry MIB Agent Software	24
3	Interface Specifications	27
3.1	Overview	27
3.2	Supported Version	27
3.3	Interface Definition	27
3.3.1	File Naming Convention	27
3.4	Data Specification	29
3.4.1	BlackBerry MIB CSV File Format	29
3.4.2	SQM Delivery/Collection Mechanism	36
3.5	Advanced Configurations	37
3.5.1	Deploying Multiple Agent Instances on a Single System	37
4	Appendix A Character Set for COMMUNITY String.....	39
5	Appendix B Pattern Matching Rules.....	41
5.1	Backslashes, Escapes, and Quoting	46
5.2	Character Classes.....	46
5.3	Examples.....	46
	Notices.....	48

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

1 About this Documentation

The *IBM® Tivoli® Netcool® Service Quality Manager BlackBerry MIB Agent Installation and MIB Interface Control Guide* details the steps required to install the Service Quality Manager BlackBerry MIB Agent software and describes the format of the data extracted from a BlackBerry Enterprise Server SNMP MIB.

This guide was last updated 14 January 2009.

1.1 Audience

This guide is intended for users of Service Quality Manager BlackBerry Service Solutions.

IMPORTANT: Before attempting an installation of any Service Quality Manager Service Solution you are strongly advised to read the release notes distributed with your Service Quality Manager Service Solution. Release notes may contain information specific to your installation not contained in this guide. Failure to consult release notes may result in a corrupt, incomplete or failed installation.

1.2 Required Skills and Knowledge

This guide assumes you are familiar with the following:

- General IT Principles
- IP Networking
- Microsoft® Windows® Operating Systems
- Unix® Operating Systems
- General Service Solutions

1.3 Document Conventions

The following command prompts can be seen throughout this document 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 document uses the typographical conventions shown in the following table:

Table 1: General Document 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.sun.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 TRAFFIC TEMPLATE.	Any text that appears on the GUI.
<i>Italic</i>	<i>A busy hour is...</i> <i>A web server must be installed...</i> <i>See the User Guide</i>	New terms, emphasis, and book titles.
Monospace	<code>./wminstall</code> <code>\$ cd /cdrom/cdrom0</code> <code>/xml/dict</code> <code>http://java.sun.com/products/</code> <code>addmsc.sh</code> <code>core.spec</code> <code>Type OK to continue.</code>	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	<code>[root] # pkginfo grep -i perl</code> 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.
<i><Monospace italics></i>	<code># cd <oracle_setup></code>	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]	<code>log-archiver.sh [-i][-w][-t]</code>	Used in code examples: indicates options.

1.4 Document Structure

This guide is organized into the following chapters:

Table 2: Document Structure

Chapter	Description
Installing the BlackBerry MIB Agent	Details the steps required to install the BlackBerry MIB Agent software.
Interface Specifications	Details the format of the data extracted from a BlackBerry Enterprise Server SNMP MIB.
Appendix A	Details the character set for the COMMUNITY String.
Appendix B	Details pattern matching rules.

1.5 User Publications

The following user publications are provided with each Service Quality Manager Service Solution:

Table 3 Service Solution Documentation

Document	Description
<i>Tivoli Netcool Service Quality Manager BlackBerry Service Solution Release Notes</i>	Provides information on the BlackBerry Service Solution release contents, platform requirements, installation procedures and known issues.

TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE CONTROL GUIDE

<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 BlackBerry MIB Agent Installation and MIB Interface Control Guide</i>	Provides information on installing the BlackBerry MIB Agent software and the format of the data extracted from a BlackBerry Enterprise Server SNMP MIB.
<i>Tivoli Netcool Service Quality Manager BlackBerry Service Solution Overview Guide</i>	Provides an overview of the BlackBerry Service Solution product architecture.

The following user publications are provided with the Service Quality Manager software in Adobe® PDF format. Online Help is available in HTML format.

Table 4: Service Quality Manager User Documentation

Document	Description
<i>Release Notes</i>	Provides information on the Service Quality Manager 4.1.1 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 SQM 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>CEM Monitoring Guide</i>	Describes how to use and monitor the Customer Experience Management [CEM] feature in Service Quality Manager.
<i>CEM Provisioning Guide</i>	Reference Guide containing information for provisioning the Customer Experience Management 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 Server Installation Guide</i>	Describes how to install the <i>Tivoli Netcool Service Quality Manager Server</i> system on AIX 5.3L.

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

<i>Solaris System Administration Guide</i>	Provides an overview of the Service Quality Manager administrative tasks including instructions on how to complete the following 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 the following 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 from v3.1.3 to v 4.1.1
<i>BusinessObjects Installation & 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 Service Solution Installation Guide</i>	Details the generic steps required to install any Service Quality Manager Service Solution including CEM GPRS.
<i>CEM GPRS Service Solution Interface Control Guide</i>	Details the CEM GPRS Service Solution input interface.
<i>CEM GPRS Service Solution Overview Guide</i>	Provides an overview of the CEM GPRS Service Solution product architecture.
<i>Service Quality Manager Core Online Help</i>	Provides information and procedures for using Service Quality Manager client applications
<i>Customer Experience Management Online Help</i>	Describes how to use and monitor the Customer Experience Management 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 Installing the BlackBerry MIB Agent

Note: The BlackBerry MIB Agent software should be installed on a PC within the same subnet as the BlackBerry Enterprise Server and the BlackBerry Enterprise Server MIB Agent SNMP port should be accessible from that PC.

2.1 Hardware Specification

The following details the minimum hardware specification for the BlackBerry MIB Agent PC:

- 1.5GHz Processor.
- 512MB RAM.
- 100MB of disk space must be available for the Service Quality Manager BlackBerry MIB Agent software.

The minimum BlackBerry Enterprise Server specification is:

- 2GB RAM.

2.2 Software Specification

Note: It is the customer's responsibility to ensure the Windows Operating System is installed before installing the BlackBerry MIB Agent software.

The Service Quality Manager BlackBerry MIB Agent software supports the following Windows Operating Systems:

- Windows 2000 and 2003
- Windows XP

The Service Quality Manager BlackBerry MIB Agent supports the following versions of BlackBerry Enterprise Server:

- Version 3.6 and higher
-

2.3 Installing the BlackBerry MIB Agent Software

To install the software, complete the following:

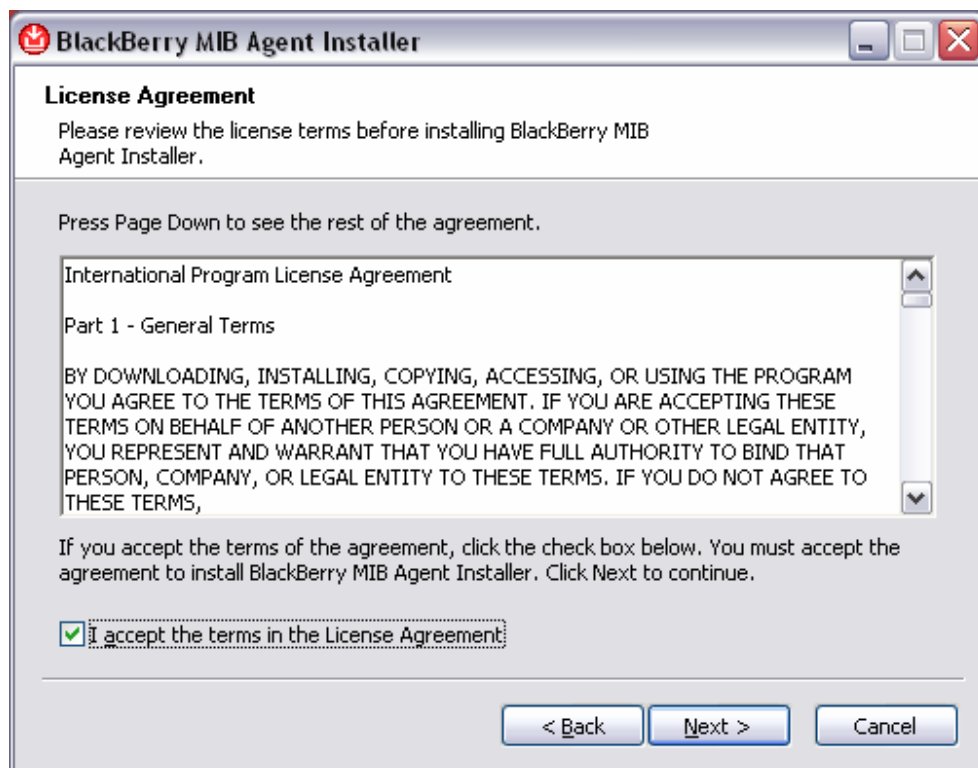
1. Close all applications on the BlackBerry MIB Agent PC.
2. Unzip the BlackBerry MIB Agent software package to any directory. The package will contain these two files:
 - jre.zip
 - setup.exe
3. Double-click the `setup.exe` file. The first page of the BlackBerry MIB Agent Installer Wizard displays as shown in Figure 1.

Figure1: BlackBerry MIB Agent Installer Window



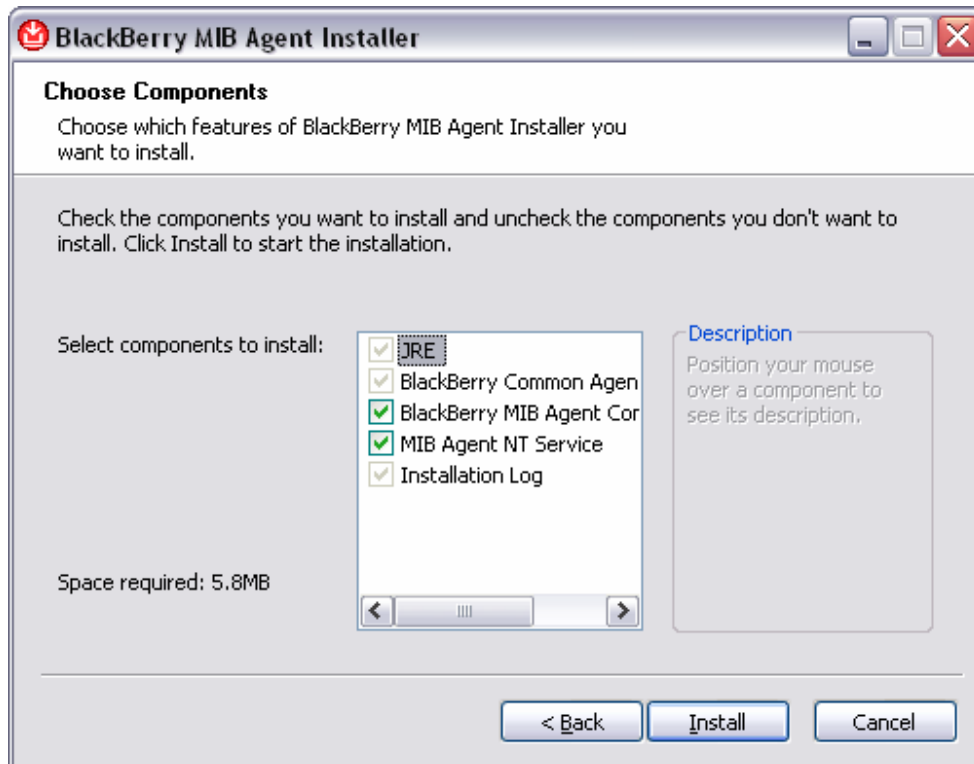
4. Click NEXT. The License Agreement page displays as shown in Figure 2.

Figure 2: License Agreement



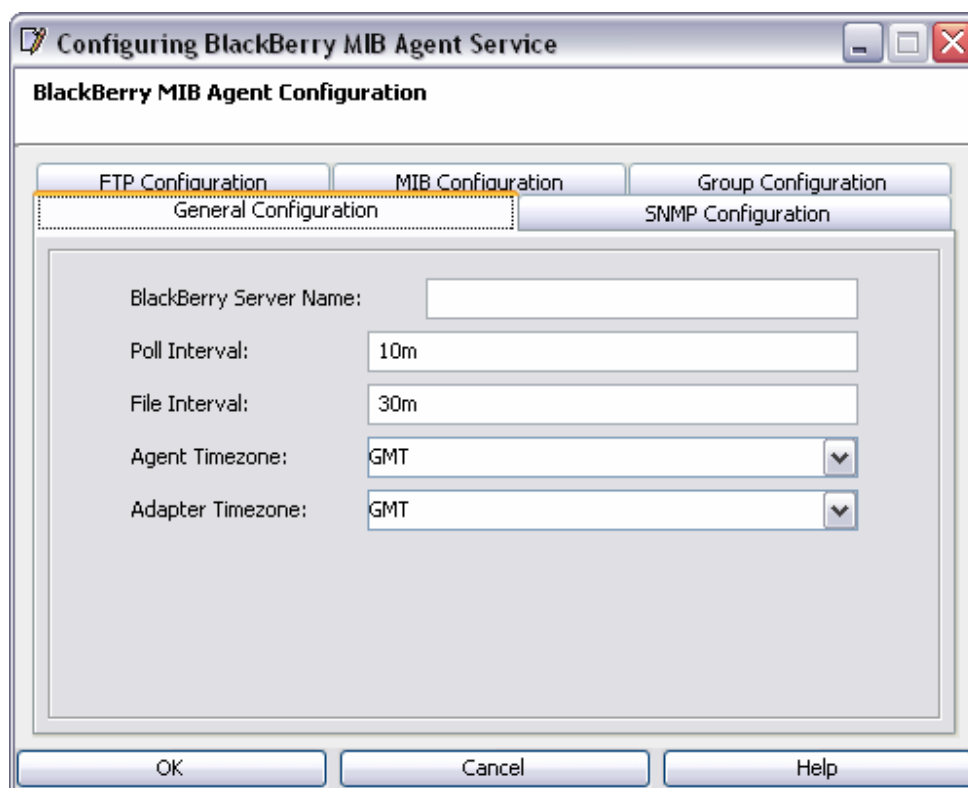
5. Accept the terms in the License Agreement and click NEXT. The CHOOSE COMPONENTS page displays as shown in Figure 3.

Figure 3: Choose Components Window



6. Click INSTALL. After a few minutes, the BLACKBERRY MIB AGENT CONFIGURATION page displays as shown in Figure 4.

Figure 4: BlackBerry MIB Agent Configuration Window

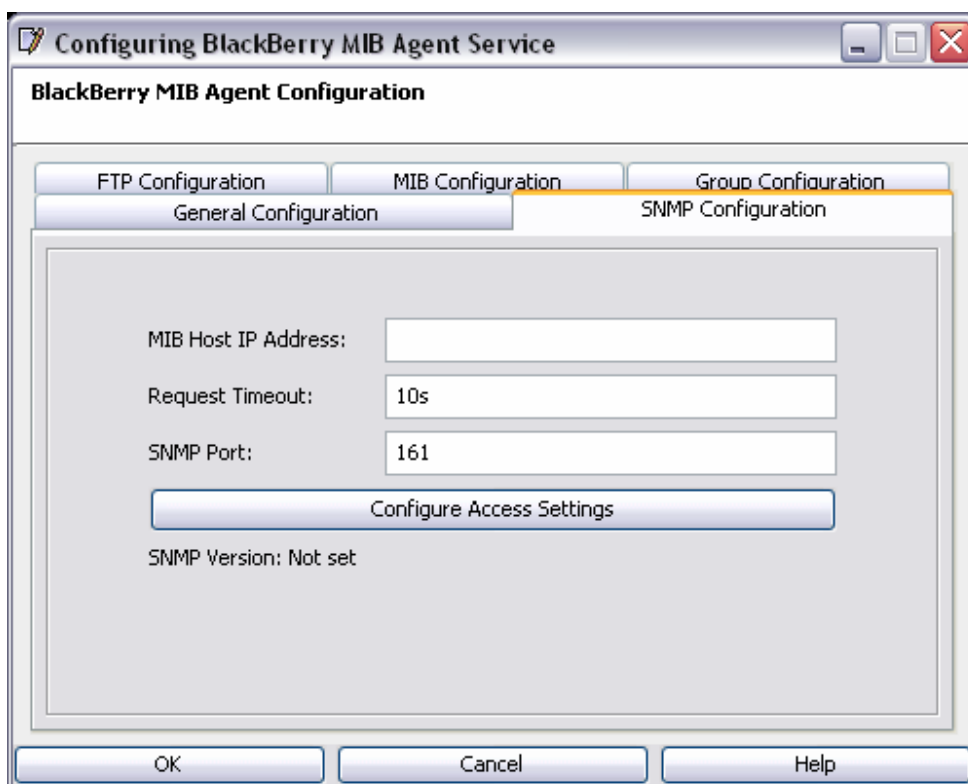


7. Enter a unique name for the BlackBerry Server in the BLACKBERRY SERVER NAME field. This name is then used as the Enterprise Name and as part of the .CSV filename.

Note: Time zone should be specified in GMT notation, for example, GMT -2, GMT+2.

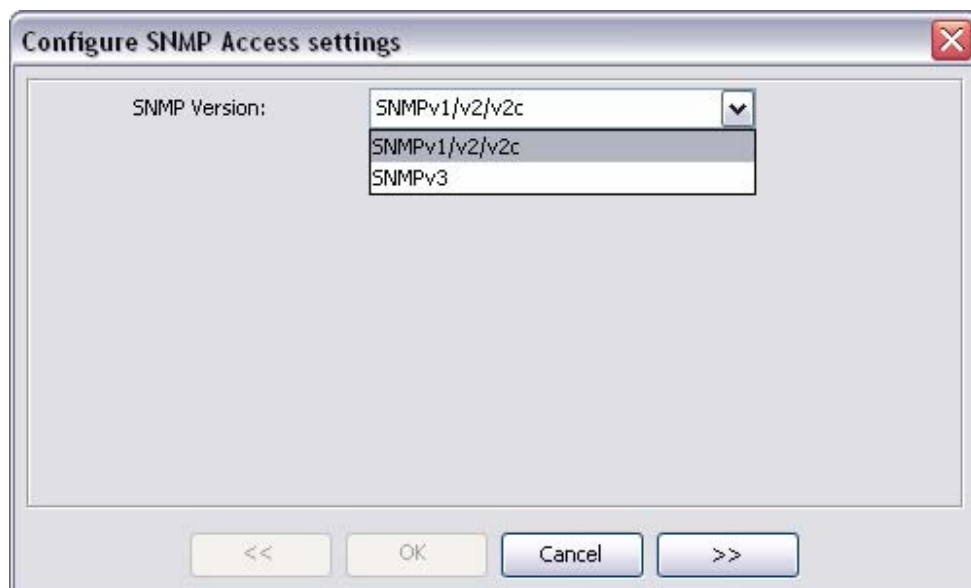
8. Enter the time zone of the MIB Agent in the AGENT TIMEZONE field.
9. Enter the time zone of the MIB Adapter in the ADAPTER TIMEZONE field.
10. Enter the desired values for the poll and file intervals or accept the defaults. See page 36 for more details on poll and file intervals.
11. Click the SNMP CONFIGURATION tab and the tab displays as shown in Figure 5.

Figure 5: BlackBerry MIB Agent Configuration Window



12. Enter the IP address of the BlackBerry Enterprise Server you intend to poll in the MIB HOST IP ADDRESS field.
13. Edit the value in the SNMP PORT field if required by your configuration.
14. Edit the value in the REQUEST TIMEOUT field if a longer timeout is required. Request Timeout controls how long the MIB Agent will wait before aborting a poll of the MIB. If a timeout occurs the request will be retried twice. A further timeout will cause the MIB Agent to log an error and skip the poll attempt.
15. Click the CONFIGURE ACCESS SETTINGS to launch the access configuration dialog as shown in Figure 5.a.

Figure 5.a: BlackBerry MIB SNMP Version Selection Window



16. Select the SNMP version required and click NEXT >>. Figure 5.b displays the BLACKBERRY MIB SNMPv1/v2/v2C CONFIGURATION page.

Figure 5.b: BlackBerry MIB SNMP v1/v2/v2c Configuration Window



17. Enter the value for COMMUNITY. The list of permitted characters for Community strings are shown in APPENDIX A.

18. If a SNMPv3 configuration is required make the appropriate selection on the version selection screen and click the NEXT >>. Figure 5.c displays the BLACKBERRY MIB SNMP v3 CONFIGURATION page.

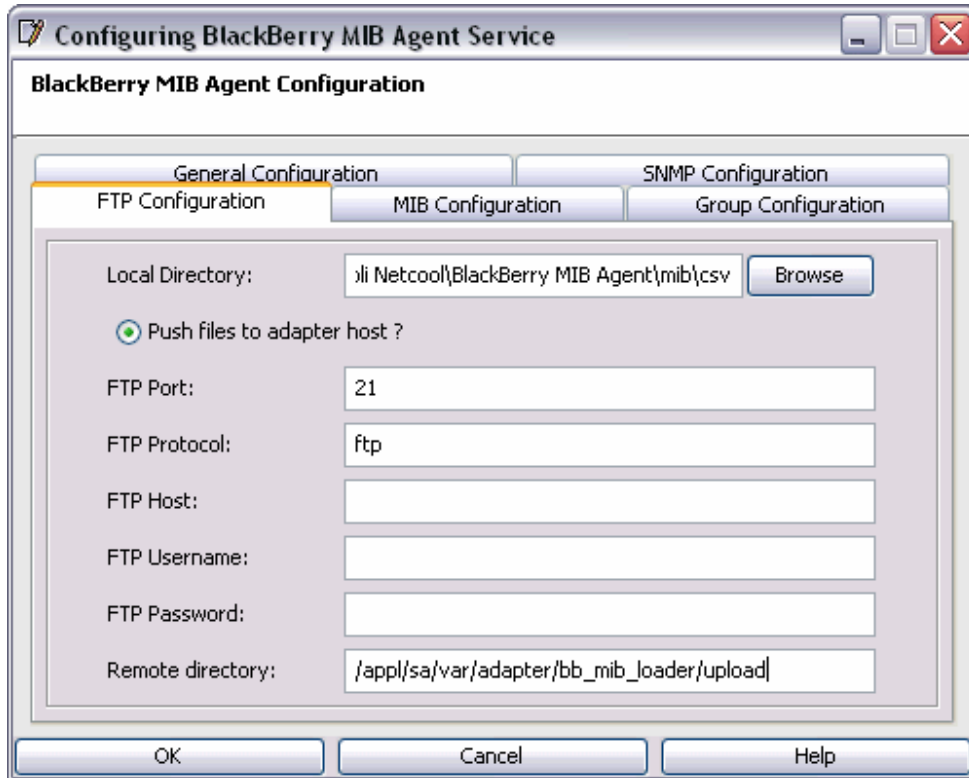
Figure 5.b: BlackBerry MIB SNMP v3 Configuration Window



The screenshot shows a window titled "Configure SNMP Access settings". Inside the window, there are six labeled input fields arranged vertically: "Security Name:", "User Name:", "Auth Protocol:" (which is a dropdown menu currently showing "None"), "Auth Password:", "Privacy Protocol:" (which is a dropdown menu currently showing "None"), and "Privacy Password:". At the bottom of the window, there are four buttons: "<<", "OK", "Cancel", and ">>".

19. Enter the value for SECURITY NAME.
20. Enter the value for USER NAME.
21. Select a value for AUTH PROTOCOL. Supported values are **None**, **SHA**, **MD5**. Select **None** if no authentication protocol is required.
22. Enter the value for AUTH PASSWORD or leave blank if **None** is selected for AUTH PROTOCOL.
23. Select a value for PRIVACY PROTOCOL. Supported values are **None**, **DES**, **AES-128**. Select **None** if no privacy protocol is required.
24. Enter the value for PRIVACY PASSWORD or leave blank if **None** is selected for PRIVACY PROTOCOL.
25. Click the FTP CONFIGURATION tab. The tab displays as shown in Figure 6.

Figure 6: FTP Configuration tab



Note: The next four entries refer to the FTP destination server, which is the Service Quality Manager server on which the BES adapter is running.

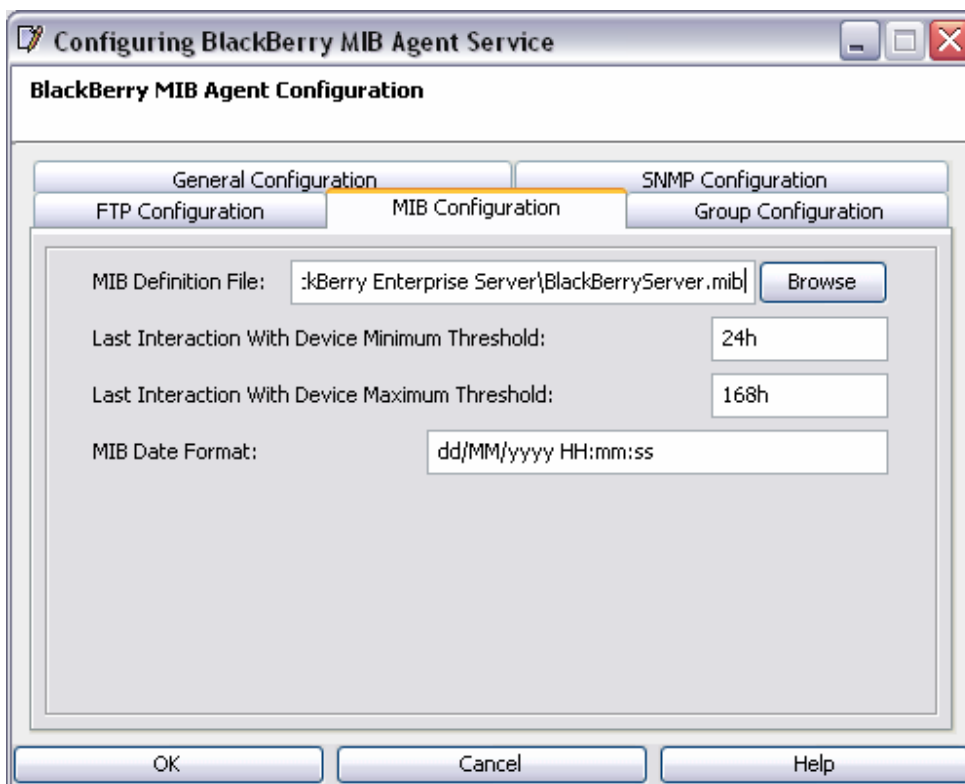
Note: For a SFTP configuration, change the FTP Port and FTP Protocol fields as follows:

FTP Port: 22

FTP Protocol: SFTP

26. Enter the host IP address for the FTP destination server in the FTP HOST field.
 27. Enter the FTP host username for the FTP destination server in the FTP USERNAME field.
 28. Enter the FTP host password for the FTP destination server in the FTP PASSWORD field.
 29. Enter the FTP host remote directory for the FTP destination server in the REMOTE DIRECTORY field or accept the default.
 30. Enter any local directory which has a minimum of 100MB of free disk space in the LOCAL DIRECTORY field.
 31. Click the MIB CONFIGURATION tab. The tab displays as shown in Figure 7.
-

Figure 7: MIB Configuration tab



32. Enter the location of the `BlackBerryServer.mib` file in the MIB DEFINITION FILE field.

Note: The `BlackBerryServer.mib` file is usually stored in the following directory on the BlackBerry Enterprise Server `C:\Program Files\Research in Motion\BlackBerry Enterprise Server`. If the MIB Agent is not being installed on the BlackBerry Enterprise Server, copy the file from the BlackBerry Enterprise Server.

33. Enter the date format as matching the MIB field

`BESUSERHEALTHLASTINTERACTIONWITHDEVICE` in the MIB DATE FORMAT field.

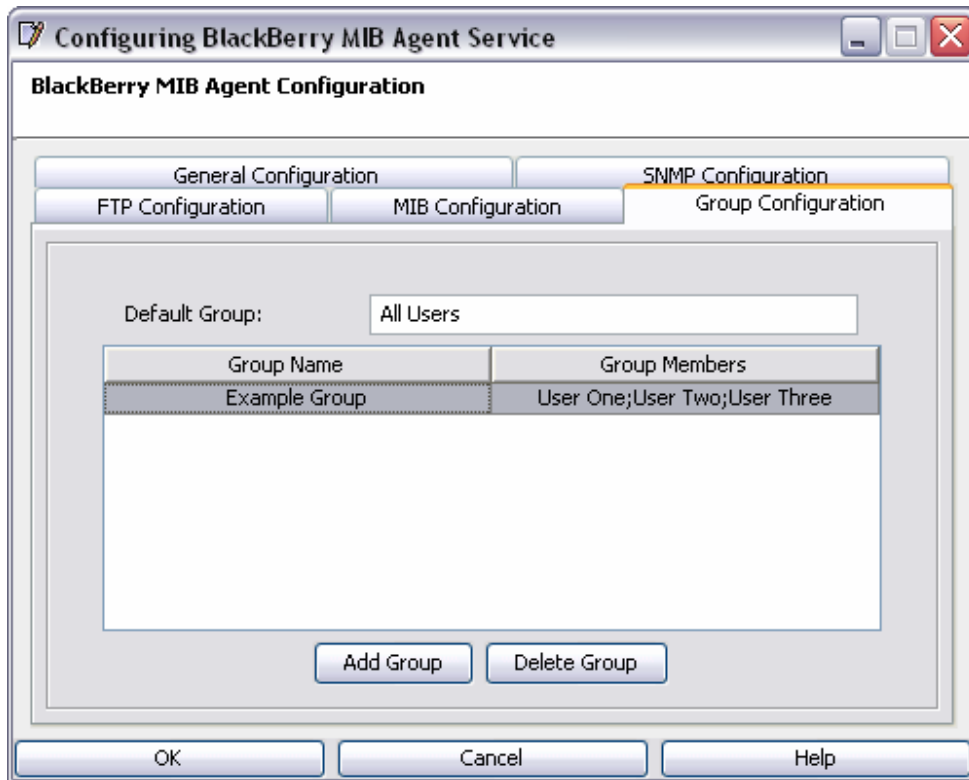
The MIB Agent MIB timestamp format must be aligned with the format used to represent dates in the MIB, which is locale-dependent. Java™ date-formatting characters must be used to specify the format. The format can be identified by examining any timestamp attributes in the MIB, for example, `BESUSERHEALTHLASTINTERACTIONWITHDEVICE`.

For example:

- US time format: 7/11/2007 6:35:00 would be specified as `M/d/yyyy h:mm:ss a`
- UK time format: 11/07/2007 18:35:00 would be specified as `dd/MM/yyyy HH:mm:ss`

34. Click the GROUP CONFIGURATION tab. The tab displays as shown in Figure 8.

Figure 8: BlackBerry MIB Agent Configuration Window



Group Configuration enables the Enterprise to segment the BlackBerry users into functional groups within the organization. For example, groups such as Company-NE-Sales, Company-SW-Sales. A BlackBerry user can only reside within one group. If the user is not defined within a group they will be a member of the default group, for example Company-AllOthers.

35. Enter a unique name for the default group of users in the DEFAULT GROUP field.

This name will represent all users who do not match an expression.

36. Click ADD GROUP.

37. Enter a unique name for each user group in the GROUP NAME field.

38. Enter the members of the group in the GROUP MEMBERS field. Pattern matching can be used to specify the members of a group. For example, to specify a group whose members belong to the finance group enter the following value in the GROUP MEMBERS field:

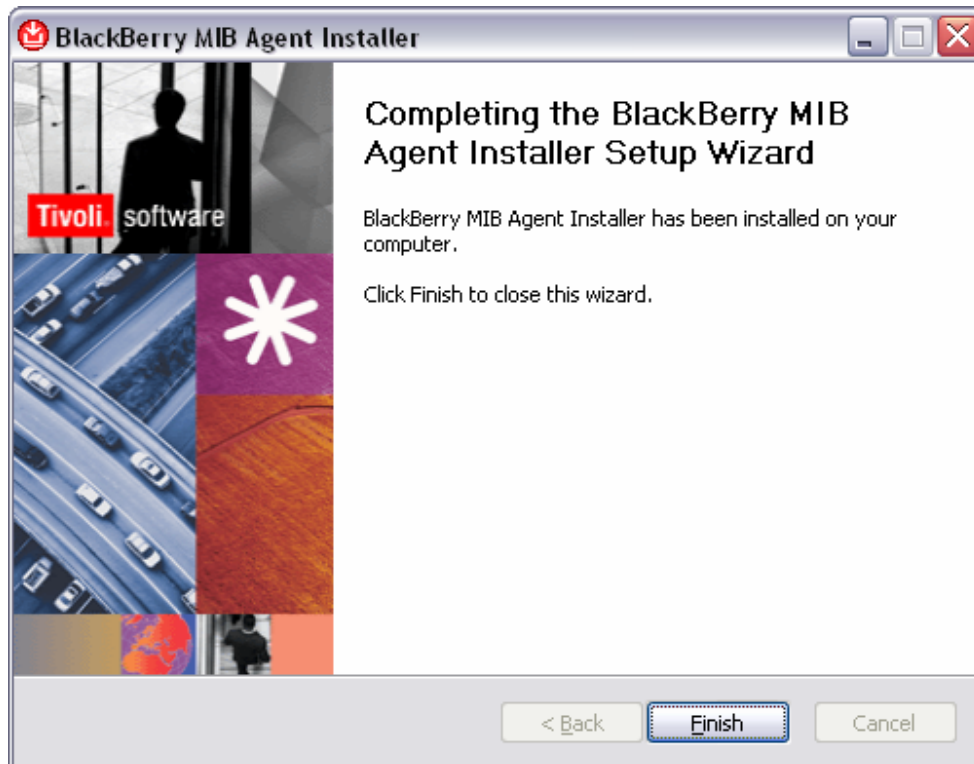
`.*\Finance\.*`

The username must match users defined in the BlackBerry Enterprise Server field BESUSERHEALTHUSERNAME. Therefore, in the example above, all BESUSERHEALTHUSERNAME entries containing the string '/Finance/' will be added to the finance group.

Note: Regular expression such as ".*" can be used for wild card matching. The ";" separates members entries. For more information on pattern matching please refer to Appendix B.

39. Click OK to exit the configuration.

Figure 9: BlackBerry MIB Agent Installer



40. Click FINISH on the Installation Wizard to complete the installation.

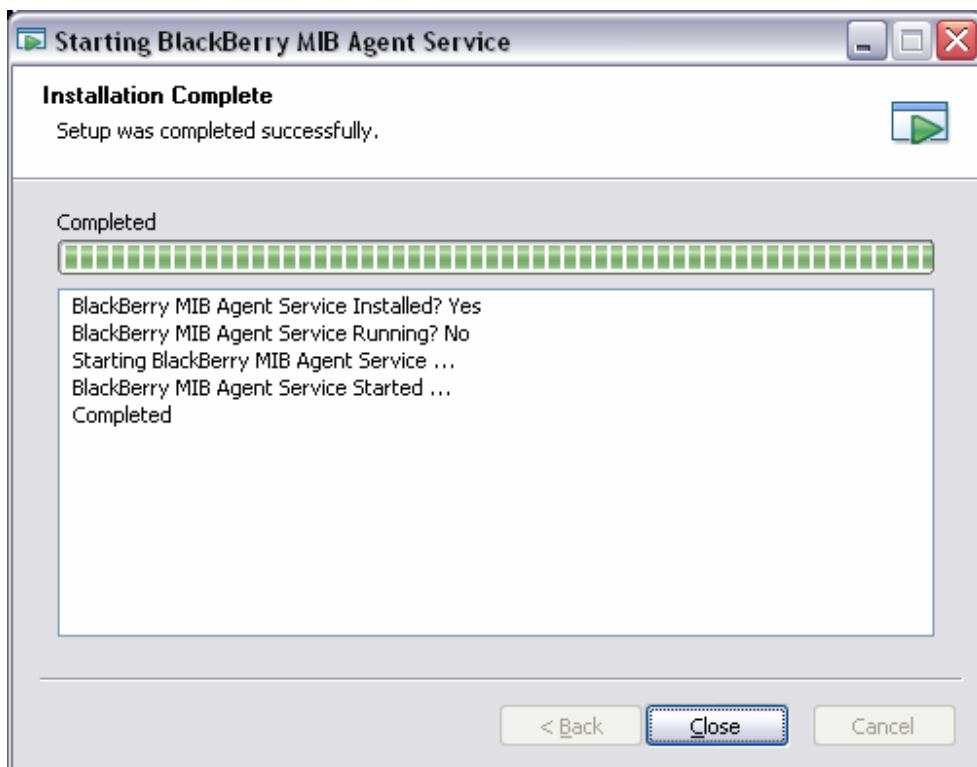
2.4 Starting and Stopping the BlackBerry MIB Agent

2.4.1 Starting the BlackBerry MIB Agent

- To start the BlackBerry MIB Agent, select START->ALL PROGRAMS->IBM TIVOLI NETCOOL->BLACKBERRY MIB AGENT->START BLACKBERRY MIB AGENT SERVICE.

The STARTING BLACKBERRY MIB AGENT SERVICE page displays as shown in Figure 10.

Figure 10: Starting BlackBerry MIB Agent Service



If you are using a firewall, complete the following to verify that the firewall has allowed the Agent Service to start:

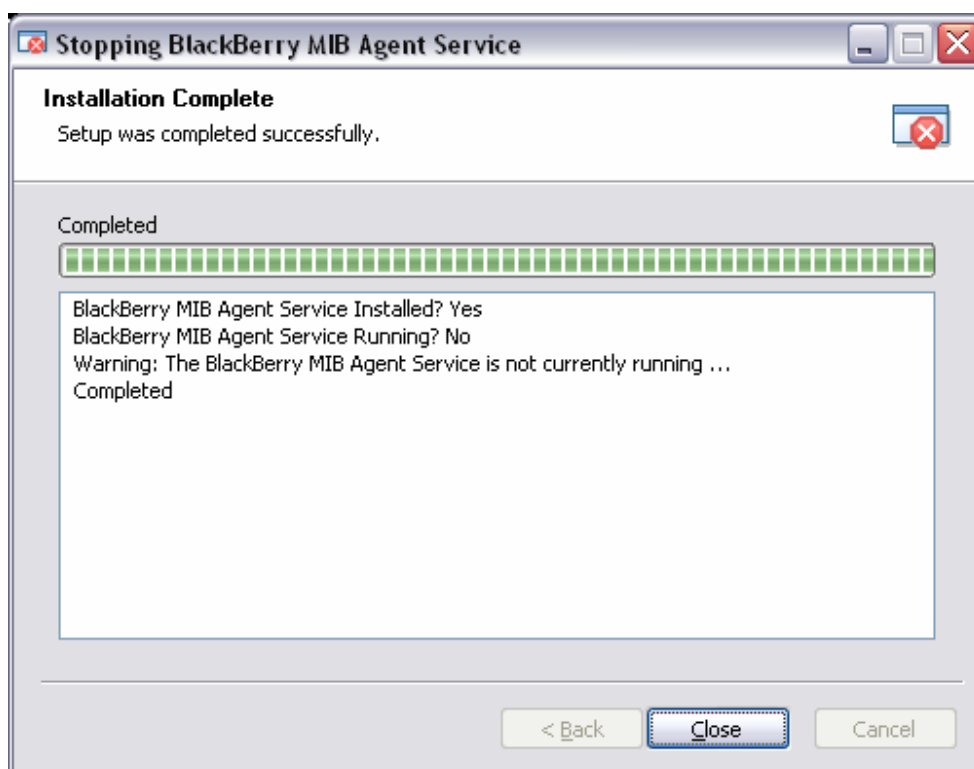
1. Select START, CONTROL PANEL, ADMINISTRATIVE TOOLS.
2. Select SERVICES.
3. Verify the state of the BlackBerry MIB Agent service.
4. Verify with the local IT Administrator that the BlackBerry MIB Agent can connect to the BlackBerry Enterprise Server SNMP MIB.

2.4.2 Stopping the BlackBerry MIB Agent

- To stop the BlackBerry MIB Agent, START->ALL PROGRAMS ->IBM TIVOLI NETCOOL->BLACKBERRY MIB AGENT ->STOP BLACKBERRY MIB AGENT SERVICE.

The STOPPING BLACKBERRY MIB AGENT SERVICE page displays as shown in Figure 11.

Figure 11: Stopping BlackBerry MIB Agent Service Window



2.5 Client Administration Specification

- To update the client configuration, select START->ALL PROGRAMS->IBM TIVOLI NETCOOL->BLACKBERRY MIB AGENT->UTILITIES->MIB AGENT CONFIGURATION.

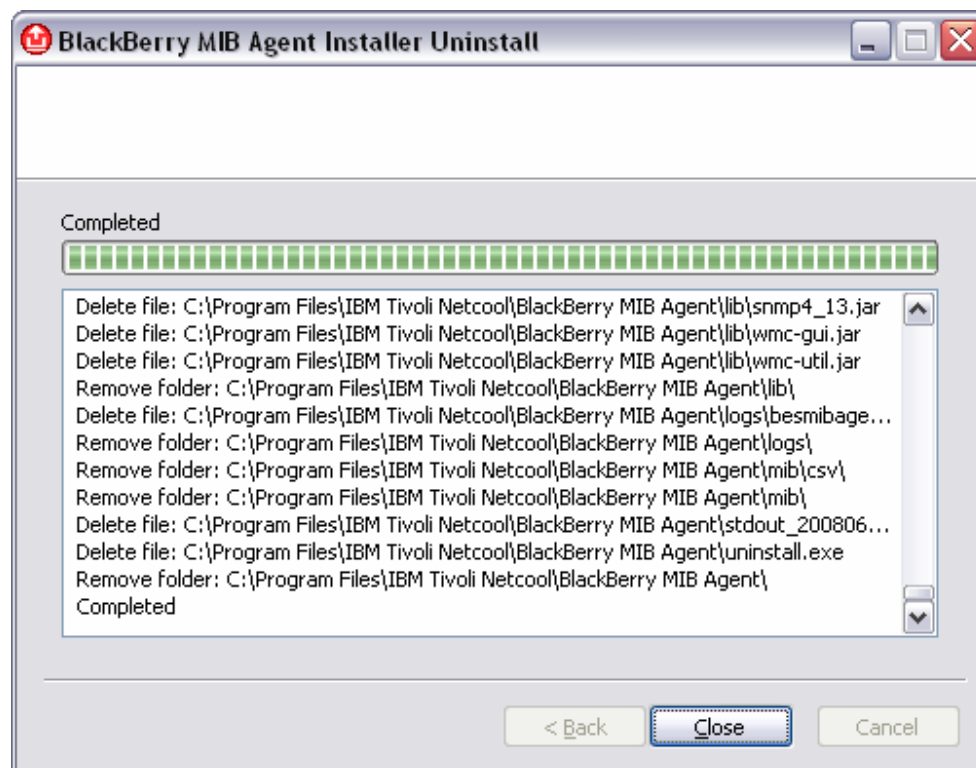
Note: The MIB Agent will need to be restarted to pick up new configurations.

2.6 Uninstalling the BlackBerry MIB Agent Software

- To uninstall the BlackBerry MIB Agent software, select START->ALL PROGRAMS->IBM TIVOLI NETCOOL->BLACKBERRY MIB AGENT->UNINSTALL.

The BLACKBERRY MIB AGENT INSTALLER UNINSTALL page displays as shown in Figure 12.

Figure 12: BlackBerry MIB Agent Uninstall Window



3 Interface Specifications

3.1 Overview

This chapter describes the format of the data extracted from a BlackBerry Enterprise Server SNMP MIB for processing by the Service Quality Manager BlackBerry MIB Service Solution.

3.2 Supported Version

BlackBerry MIB Service Solution BES 5.2.1.4 is supported.

3.3 Interface Definition

3.3.1 File Naming Convention

The file naming convention is as follows:

```
A<YYYYMMDD>.<hhmm>-<YYYYMMDD>.<hhmm>[_<UniqueID>]_<fileId>.csv
```

Where:

<YYYYMMDD>.<hhmm> elements correspond to the file interval start time and end time respectively:

- YYYY is the year in four-digit notation.
- MM is the month in two digit notation (01 - 12).
- DD is the day in two-digit notation (01 - 31).
- hh is the two-digit hour of the day (local time), based on 24-hour clock (00 - 23).
- mm is the two digit minute of the hour 00-59 (local time).

UniqueID is used to uniquely identify the BlackBerry Enterprise Server system and will contain the value of the BLACKBERRY SERVER NAME parameter specified in the MIB Agent configuration.

`fileId` identifies the MIB table the data was extracted from and there will be one file per system per interval for each of the following values:

- `besUserHealth` – indicating the UserHealth MIB table.
- `besMailServerHealthTable` – indicating the MIB MailServerHealth table.
- `besMibConnect` – indicating the MIB connectivity data.
- `besSysHealth` – indicating the SysHealth MIB table.
- `besConfigTable` – indicating the MIB ConfigTable.

For example, here are two files named using the naming convention above:

- Filename: `A20080212.0000-20080212.0030_Customer1_besMibConnect.csv`
- Filename: `A20080212.0000-20080212.0030_besUserHealthTable.csv`

3.4 Data Specification

3.4.1 BlackBerry MIB CSV File Format

The data files provide the fields in the top-down order as shown in the tables below. The files contain a standard CSV header line containing the field names shown for each file. The value each field is extracted from is described in the Comments column.

3.4.1.1 besUserHealthTable File Format

Table 5: besUserHealthTable File Format

Field Name	Field Description	Comments (MIB OID where applicable)	Example
besUserHealthServerInstance	Instance ID of the BlackBerry Server	1.3.6.1.4.1.3530.5.30.1.1	1
besUserHealthUserName	User name of the BlackBerry user	1.3.6.1.4.1.3530.5.30.1.3	Joe Bloggs/SampleTown/SampleCompany
besUserHealthEnabled	Is the user currently enabled?	1.3.6.1.4.1.3530.5.30.1.35	1
besUserHealthMsgToHandheld	Total number of messages that passed the filter criteria and were sent out to the handheld. Messaging only (no calendar). number of messages that passed the filter	1.3.6.1.4.1.3530.5.30.1.41	1
besUserHealthMsgFromHandheld	Total number of messages sent from handheld. Messaging only (no calendar).	1.3.6.1.4.1.3530.5.30.1.42	0
besUserHealthMsgPending	Total number of messages pending delivery.	1.3.6.1.4.1.3530.5.30.1.44	0
besUserHealthMsgExpired	Total number of messages expired.	1.3.6.1.4.1.3530.5.30.1.45	0
besUserHealthMsgErrors	Total number of messages that were non-deliverable due to error.	1.3.6.1.4.1.3530.5.30.1.46	0
besUserHealthMsgForwardedFromDevice	Total number of messages the user has forwarded from the device.	1.3.6.1.4.1.3530.5.30.1.48	0
besUserHealthMsgRepliedToWithText	Total number of messages that were replies-with-text from the device.	1.3.6.1.4.1.3530.5.30.1.49	0

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

besUserHealthLastInteractionWithDevice	Datetime of the last interaction the BES had with the device.	1.3.6.1.4.1.3530.5.30.1.61	Sun Nov 01 07:03:08 EST 2009
besUserHealthAvgKBForwarded	Average size of messages forwarded from the device (in kb). That is, if I receive a message with a 5mb attachment and forward it from my handheld to another user, this value would be 5120kb.	1.3.6.1.4.1.3530.5.30.1.70	0
besUserHealthAvgKBReplyWithText	Similar to besUserHealthAvgKBForwarded, but for messages that are replies-with-text.	1.3.6.1.4.1.3530.5.30.1.71	0
besUserHealthAvgLatencyInSecLast10Msg	For the last 10 messages sent to the handheld, the average length of time (in sec) between the message arriving in the mail system and a DELIVERED on the device.	1.3.6.1.4.1.3530.5.30.1.72	45
lastErrorTime	The datetime of the last error for the user	1.3.6.1.4.1.3530.5.30.1.11	Sun Nov 01 07:03:08 EST 2009
lastErrorTimeDelta	The elapsed time since the last error	Calculated by the Agent	0
besUserHealthLastErrorText	The last time an operation for this user failed, this is the error text we got back.	1.3.6.1.4.1.3530.5.30.1.10	Fri Oct 29 09:12:08 EST 2009
MSAvailable	MS Available time for pending users	Taken from MSAvailbleAllUsers if there are pending messages. Computed by mediation.	
TZ	Timezone	Timezone as specified in agent configuration	GMT
TotalMsgLatency	Total Message Latency	Calculated in mediation : if (besUserHealthMsgtoHandheld > 0) then (besUserHealthAvgLatencyInSecLast10Msg * MsgLatencyDenom)	
MsgLatencyDenom	Message Latency Multiplier	Taken from the MsgLatencyMultiplier in the configuration file	10
UserGroup	The name of the UserGroup	Taken from the User group assignments in	SampleTown

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

		configuration.	
Enterprise	The name of the Enterprise	Taken from the Enterprise name in configuration	SampleEnt
ActiveUser	Active User	Is the user active as defined by the threshold in the config file and the lastInteractionTime	1
MSAvailableAllUsers	MS Available for all users.	Calculated on a sliding scale if the user has interacted with the BES between 2 thresholds. Default thresholds at present are 1 day (24hr) and 7 days (168hr). The value will be 1 if interacted within last 24 hr and 0 if more than 168 hours.	1800

3.4.1.2 Example Data

The following is example data showing header and fields:

```
besUserHealthServerInstance,besUserHealthUserName,besUserHealthEnabled,besUserHealthMsgToHandheld,besUserHealthMsgFromHandheld,besUserHealthMsgPending,besUserHealthMsgExpired,besUserHealthMsgErrors,besUserHealthMsgForwardedFromDevice,besUserHealthMsgRepliedToWithText,besUserHealthLastInteractionWithDevice,besUserHealthAvgKBForwarded,besUserHealthAvgKBReplyWithText,besUserHealthAvgLatencyInSecLast10Msg,lastErrorTime,lastErrorTimeDelta,besUserHealthLastErrorText,MSAvailable,TZ>TotalMsgLatency,MsgLatencyDenom,UserGroup,Enterprise,ActiveUser,MSAvailableAllUsers
```

```
2,"Lath, Alister W",1,0,0,0,0,0,0,0,7497,0,0,0,,0,0,GMT+1,,10,"Sample BB Mib User Group 2","Sample Courier",0,0
```

```
1,"Hargreaves, Andrew",1,2,0,0,0,2,1,0,724,0,0,0,,0,,600,GMT,,10,"Sample BB Mib User Group","Sample Bank",1,600
```

3.4.1.3 besMailServerHealthTable File Format

Table 6: besMailServerHealthTable File Format

BB MIB BESMailServerHealthTable CSV File Format				
Field Name	Field Description	Constraints	Comments (MIB Oid where applicable)	Example
besMailServerHealthServerInstance	Instance ID of the BlackBerry Server	Only Applicable to Domino Mail Servers	1.3.6.1.4.1.3530.5.26.1.1	1
besMailServerHealthServerName	Name of the Mail Server	Only Applicable to Domino Mail Servers	1.3.6.1.4.1.3530.5.26.1.2	sampleserver/24/m/company
besMailServerHealthAvgResponseTime10min	Average response time (in milliseconds) for operations for users on this mail server in the last 10 minutes.	Only Applicable to Domino Mail Servers	1.3.6.1.4.1.3530.5.26.1.11	203
besMailServerHealthFailedConn10min	Number of failed connection attempts to this mail server in the last 10 minutes.	Only Applicable to Domino Mail Servers	1.3.6.1.4.1.3530.5.26.1.12	0
TZ	Timezone	Timezone as specified in config	Timezone taken from agent configuration	GMT
Enterprise	Name of the Enterprise	Name of the Enterprise as specified in config	Taken from agent configuration	Ent

3.4.1.4 Example Data

The following is example data showing header and fields:

```

besMailServerHealthServerInstance, besMailServerHealthServerName,
besMailServerHealthAvgResponseTime10min, besMailServerHealthFailedConn10min, TZ,
Enterprise
1, MailServer1, 72, 0, GMT, "Sample Bank"
2, MailServer2, 192, 3, GMT, "Sample Bank"

```


3.4.1.5 *besMibConnect File Format*

Table 7: besMibConnect File Format

The data in this file is derived solely from statistics gathered in relation to connection attempts made by the MIB Agent to the SNMP MIB.

BB MIB BESMibConnect CSV File Format			
Field Name	BB Abstract Field Name	Field Description	Example
besInstance	BES Instance	BES Instance	1
Enterprise	Enterprise	Enterprise	Sample Bank
ConnectSuccess	Connect Success	Count of the successful connections to the MIB	3

3.4.1.6 *Example Data*

The following is example data showing header and fields:

```
besInstance, Enterprise, ConnectSuccess
1,"Sample Bank",30
2,"Sample Courier",0
```

3.4.1.7 *besSysHealthTable File Format*

Table 8: besSysHealthTable File Format

BB MIB BESSysHealth CSV File Format			
Field Name	Field Description	Comments (MIB OID where applicable)	Example
besSysHealthServerInstance	BlackBerry Server instance number	1.3.6.1.4.1.3530.5.25.1.1	1
besSysHealthServerConnectedState	Is the BlackBerry Server connected to the SRP Host?	1.3.6.1.4.1.3530.5.25.1.10	1
besSysHealthServerLastConnectDate	Datetime of last successful connection to the SRP Host.	1.3.6.1.4.1.3530.5.25.1.11	Thu Oct 01 18:09:56 EDT 2009
besSysHealthServerLastErrorTime	Datetime of the last connection error.	1.3.6.1.4.1.3530.5.25.1.16	
besSysHealthServerLastErrorText	Error text about the last failed connection attempt.	1.3.6.1.4.1.3530.5.25.1.15	

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

besSysHealthSrpReconnectSuccess	Number of times the BlackBerry Server has successfully reconnected to SRP Host since it was started.	1.3.6.1.4.1.3530.5.25.1.12	0
besSysHealthSrpReconnectsFail	Number of times the BlackBerry Server has tried, but failed, to connect to SRP Host since it was started.	1.3.6.1.4.1.3530.5.25.1.13	0
besSysHealthSrpTotalSecNotConnected	Total number of seconds the BlackBerry Server has NOT been connected to SRP Host since startup.	1.3.6.1.4.1.3530.5.25.1.14	0
TZ	Timezone	Timezone as specified in agent configuration	GMT
Enterprise	The name of the Enterprise	Enterprise as specified in agent configuration	ENT

3.4.1.8 Example Data

The following is example data showing header and fields:

```

besSysHealthServerInstance,besSysHealthSrpConnectedState,besSysHealthSrpLastConnectDate,besSysHealthSrpLastErrorTime,besSysHealthSrpLastErrorText,besSysHealthSrpReconnectSuccess,besSysHealthSrpReconnectsFail,besSysHealthSrpTotalSecNotConnected,TZ,Enterprise
3,1,"Tue May 06 11:37:29 GMT 2008","Mon May 05 16:12:08 GMT 2008","Connectivity Error",1,0,98,GMT-3,"Sample Agency"
2,1,"Tue May 06 11:36:57 GMT 2008","Sun May 04 16:12:08 GMT 2008","MIB Not Available",3,1,456,GMT+1,"Sample Courier"

```

3.4.1.9 besConfigTable File Format

Table 9: besConfigTable File Format

BB MIB BESConfigTable CSV File Format			
Field Name	Field Description	Comments	Example
besConfigServerInstance	BlackBerry Server instance number	1.3.6.1.4.1.3530.5.20.1.1	1
besConfigReleaseMaj	Major release.	1.3.6.1.4.1.3530.5.20.1.11	4
besConfigReleaseMin	Minor release.	1.3.6.1.4.1.3530.5.20.1.12	1

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

besConfigReleaseServicePack	Service Pack release.	1.3.6.1.4.1.3530.5.20.1.13	1
besConfigReleaseBuild	Build number.	1.3.6.1.4.1.3530.5.20.1.14	25
besConfigLicenceTotal	Total number of licences installed on the server.	1.3.6.1.4.1.3530.5.20.1.20	0
besConfigLicenceRemaining	Total number of licences remaining for use.	1.3.6.1.4.1.3530.5.20.1.22	0
TZ	Timezone	Timezone as specified in agent config	GMT
Enterprise	The Name of the Enterprise	Enterprise as specified in agent config	ENT

3.4.1.10 Example Data

The following is example data showing header and fields:

```

besConfigServerInstance, besConfigReleaseMaj, besConfigReleaseMin, besConfigReleaseServicePack, besConfigReleaseBuild, besConfigLicenceTotal, besConfigLicenceRemaining, TZ, Enterprise
3, 4, 0, 3, 7, 20, -95, GMT-3, "Sample Agency"
2, 4, 0, 3, 7, 20, -91, GMT+1, "Sample Courier"

```

3.4.2 SQM Delivery/Collection Mechanism

3.4.2.1 Transfer Mechanism

The data files are transferred by FTP Data Push to the data directory on the Service Quality Manager host platform. The MIB Agent also supports the Data Pushing across the SFTP transfer protocol. In turn OpenSSH is required on AIX or SSH on Solaris to utilize the SFTP Functionality.

3.4.2.2 Data Directory

The data directory is configurable on the Service Quality Manager platform. The default value is:
`/appl/sa/var/adapter/bb_mib_loader/upload`

The Service Quality Manager operator must ensure that the MIB Agent can deliver files to the configured location.

3.4.2.3 File Interval

The MIB Agent will collect data into files for each file collection interval. The default file interval is 30 minutes occurring on actual half-hour boundaries. For example, 16:00 to 16:30. The file interval of the MIB Agent must match that of the BlackBerry MIB Service Solution.

3.4.2.4 Poll Interval

The MIB Agent will poll the MIB tables at each poll interval. The default poll interval is 10 minutes.

3.4.2.5 Transfer Latency

The transfer latency is configurable by the Service Quality Manager operator. The default value is 60 minutes. The value of this parameter represents the maximum delay allowed in data presentation at the data directory.

3.4.2.6 Files per Interval

The BlackBerry MIB Service Solution expects 1 set of files per BlackBerry system per interval.

3.5 Advanced Configurations

3.5.1 Deploying Multiple Agent Instances on a Single System

Note: Repeat this section for each additional agent required.

The following steps describe how to create multiple MIB Agents on the same MIB Agent PC.

<ROOT_DIR> refers to the location where the BlackBerry MIB Agent software has been installed, usually C:\Program Files\IBM Tivoli Netcool\BlackBerry MIB Agent. For each new MIB Agent to be added, complete the following procedure:

1. Stop the existing MIB Agent if already running. Select START->ALL PROGRAMS->IBM TIVOLI NETCOOL-> BLACKBERRY MIB AGENT ->STOP BLACKBERRY MIB AGENT SERVICE.
2. Backup the following in the <ROOT_DIR>\config directory and move them to a temporary location:
 - besmibagent.properties
 - besmibagenttrace.properties
3. Launch the configuration UI. Select START->ALL PROGRAMS->IBM TIVOLI NETCOOL-> BLACKBERRY MIB AGENT ->UTILITIES\MIB AGENT CONFIGURATION.
4. Update the configuration with the parameters of the new MIB agent. Click OK to save the changes. Refer to Section 2, steps 7 to 39 on how to configure the MIB agent.
5. In <ROOT_DIR>, create a new logging directory with a name that is easily associated with the MIB Agent.
6. In <ROOT_DIR>\mib, create a new CSV directory with a name that is easily associated with the MIB Agent.
7. In <ROOT_DIR>\config, create a copy of the besmibagent.properties file and name it appropriately, for example, besmibagent_<hostname>.properties.
8. Update the configuration in the new properties file. At a minimum, the following properties will need to be updated:
 - localDir: this should be set to the CSV directory created in step 2.
 - besname: each besname must be unique.
 - mibHost: update to the host of the new BES MIB by entering the hostname or IP address of the new BES MIB.
9. In <ROOT_DIR>\config, create a copy of the besmibagenttrace.properties file and name it appropriately, for example besmibagenttrace_<hostname>.properties.
10. Update the property log4j.appender.R.file to reference the new logging directory created in step 1.
11. Create a copy of the create_mibagent_service.cmd script that is located in <ROOT_DIR>\bin.
12. Update the following:
 - a. //IS//BBMIBAgentService - BBMIBAgentService needs to be updated to uniquely identify the Windows service representing the MIB Agent.
 - b. --DisplayName="BBMIBAgentService" — Update the display name to the value in step a.

- c. `-Dagentname=besmibagent` — Update the name to match the config file name (minus suffix `'.properties'`).
 - d. `-Dtraceconfig` — Update to reference the trace properties file.
 - e. `-Dagentconfig` — Update to reference the configuration properties file.
13. To create the service for an MIB Agent, run the `cmd` script created in step 7.
14. Restore the configuration for the default agent by copying the following files from the temporary location in step 2 to `<ROOT_DIR>\config` location:
- `besmibagent.properties`
 - `besmibagenttrace.properties`
15. Start the Windows service for each MIB Agent from the Services utility in the normal way.
-

Note: The entries on the START menu for the BlackBerry MIB Agent will act only on the original agent instance created as part of the BlackBerry MIB Agent installation. Therefore it will not be possible to start/stop manually created MIB Agents from the START menu. Such instances can only be controlled via the Windows Service Control Applet.

4 Appendix A Character Set for COMMUNITY String

The valid character set which can be used when specifying the COMMUNITY string is listed in the table below.

Note: Some characters require escaping in order to be read correctly by the application.

Table 10: Character Set

Character Value	Specify in UI as	Comment
!	!	
"	"	Double Quote
£	£	
\$	Cannot be specified	Cannot be specified
%	Cannot be specified	Cannot be specified
^	^	
&	&	
*	*	
((
))	
—	—	Underscore
+	+	

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

-	-	Hyphen
=	=	
{	{	
}	}	
[[
]]	
;	;	Semi colon
'	'	Apostrophe
#	#	
:	:	Colon
@	@	
~	~	
,	,	Comma
.	.	
/	/	
<	<	Period
>	>	
\	\	

5 Appendix B Pattern Matching Rules

The following pattern matching rules are used when specifying group members. The information below is taken from the Java pattern matching specification. For more information on this specification please refer to <http://java.sun.com/j2se/1.5.0/docs/api/java/util/regex/Pattern.html>.

Table 11: Characters

Character Value	Matches
<code>x</code>	The character <code>x</code> .
<code>\\</code>	The backslash character.
<code>\0n</code>	The character with octal value <code>0n</code> ($0 \leq n \leq 7$).
<code>\0nn</code>	The character with octal value <code>0nn</code> ($0 \leq n \leq 7$).
<code>\0mnn</code>	The character with octal value <code>0mnn</code> ($0 \leq m \leq 3, 0 \leq n \leq 7$).
<code>\xhh</code>	The character with hexadecimal value <code>0xhh</code> .
<code>\uhhhh</code>	The character with hexadecimal value <code>0xhhhh</code> .
<code>\t</code>	The tab character (<code>"\u0009"</code>).
<code>\n</code>	The newline (line feed) character (<code>"\u000A"</code>).
<code>\r</code>	The carriage-return character (<code>"\u000D"</code>).
<code>\f</code>	The form-feed character (<code>"\u000C"</code>).
<code>\a</code>	The alert (bell) character (<code>"\u0007"</code>).
<code>\e</code>	The escape character (<code>"\u001B"</code>).
<code>\cx</code>	The control character corresponding to <code>x</code> .

Table 12: Character Classes

Character Value	Matches
[abc]	a, b, or c (simple class).
[^abc]	Any character except a, b, or c (negation).
[a-zA-Z]	a through z or A through Z, inclusive (range).
[a-d[m-p]]	a through d, or m through p: [a-dm-p] (union).
[a-z&&[def]]	d, e, or f (intersection).
[a-z&&[^bc]]	a through z, except for b and c: [ad-z] (subtraction).
[a-z&&[^m-p]]	a through z, and not m through p: [a-lq-z](subtraction).

Table 13: Predefined Character Classes

Character Value	Matches
.	Any character (may or may not match line terminators).
\d	A digit: [0-9].
\D	A non-digit: [^0-9].
\s	A whitespace character: [\t\n\x0B\f\r].
\S	A non-whitespace character: [^\s].
\w	A word character: [a-zA-Z_0-9].
\W	A non-word character: [^\w].

Table 14: POSIX Character Classes (US-ASCII only)

Character Value	Matches
\p{Lower}	A lower-case alphabetic character: [a-z].
\p{Upper}	An upper-case alphabetic character:[A-Z].
\p{ASCII}	All ASCII:[\x00-\x7F].
\p{Alpha}	An alphabetic character:[\p{Lower}\p{Upper}].
\p{Digit}	A decimal digit: [0-9].
\p{Alnum}	An alphanumeric character:[\p{Alpha}\p{Digit}].
\p{Punct}	Punctuation: One of !"#\$%&'()*+,-./:;<=>?@[\\]^_`{ }~

**TIVOLI NETCOOL SERVICE QUALITY MANAGER BLACKBERRY MIB AGENT INSTALLATION AND MIB INTERFACE
CONTROL GUIDE**

\p{Graph}	A visible character: [\p{Alnum}\p{Punct}].
\p{Print}	A printable character: [\p{Graph}\x20].
\p{Blank}	A space or a tab: [\t].
\p{Cntrl}	A control character: [\x00-\x1F\x7F].
\p{XDigit}	A hexadecimal digit: [0-9a-fA-F].
\p{Space}	A whitespace character: [\t\n\x0B\f\r].

Table 15: Java.lang Character Classes (Simple Java Character Type)

Character Value	Matches
\p{javaLowerCase}	Equivalent to java.lang.Character.isLowerCase().
\p{javaUpperCase}	Equivalent to java.lang.Character.isUpperCase().
\p{javaWhitespace}	Equivalent to java.lang.Character.isWhitespace().
\p{javaMirrored}	Equivalent to java.lang.Character.isMirrored().

Table 16: Character Classes of Unicode Blocks and Categories

Character Value	Matches
\p{InGreek}	A character in the Greek block (simple block).
\p{Lu}	An uppercase letter (simple category).
\p{Sc}	A currency symbol.
\P{InGreek}	Any character except one in the Greek block (negation).
[\p{L}&&[^\p{Lu}]]	Any letter except an uppercase letter (subtraction).

Table 17: Boundary Matches

Character Value	Matches
^	The beginning of a line.
\$	The end of a line.
\b	A word boundary.
\B	A non-word boundary.
\A	The beginning of the input.
\G	The end of the previous match.

$\backslash Z$	The end of the input but for the final terminator, if any.
$\backslash z$	The end of the input.

Table 18: Greedy Quantifiers

Character Value	Matches
$X?$	X , once or not at all.
X^*	X , zero or more times.
X^+	X , one or more times.
$X\{n\}$	X , exactly n times.
$X\{n,\}$	X , at least n times.
$X\{n,m\}$	X , at least n but not more than m times

Table 19: Relutant Quantifiers

Character Value	Matches
$X??$	X , once or not at all.
$X^*?$	X , zero or more times.
$X^+?$	X , one or more times.
$X\{n\}?$	X , exactly n times.
$X\{n,\}?$	X , at least n times.
$X\{n,m\}?$	X , at least n but not more than m times.

Table 20: Possessive Quantifiers

Character Value	Matches
$X?+$	X , once or not at all.
X^*+	X , zero or more times.
X^{++}	X , one or more times.
$X\{n\}^+$	X , exactly n times.
$X\{n,\}^+$	X , at least n times.
$X\{n,m\}^+$	X , at least n but not more than m times.

Table 21: Logical Operators

Character Value	Matches
XY	X followed by Y .
$X Y$	Either X or Y .
(X)	X , as a capturing group.

Table 22: Back References

Character Value	Matches
$\backslash n$	Whatever the n^{th} capturing group matched.

Table 23: Quotation

Character Value	Matches
\backslash	Nothing, but quotes the following character.
$\backslash Q$	Nothing, but quotes all characters until $\backslash E$.
$\backslash E$	Nothing, but ends quoting started by $\backslash Q$.

Table 24: Special Constructs (Non Capturing)

Character Value	Matches
$(?:X)$	X , as a non-capturing group.
$(?idmsux-idmsux)$	Nothing, but turns match flags on – off.
$(?idmsux-idmsux:X)$	X , as a non-capturing group with the given flags on – off.
$(?=X)$	X , via zero-width positive lookahead.
$(?!X)$	X , via zero-width negative lookahead.
$(?<=X)$	X , via zero-width positive lookbehind.
$(?<!X)$	X , via zero-width negative lookbehind.
$(?>X)$	X , as an independent, non-capturing group.

5.1 Backslashes, Escapes, and Quoting

The backslash character ('\\') serves to introduce escaped constructs, as defined in the table above, as well as to quote characters that otherwise would be interpreted as unescaped constructs. Therefore the expression \\ matches a single backslash and \{ matches a left brace.

It is an error to use a backslash prior to any alphabetic character that does not denote an escaped construct; these are reserved for future extensions to the regular-expression language. A backslash may be used prior to a non-alphabetic character regardless of whether that character is part of an unescaped construct.

Backslashes within string literals in Java source code are interpreted as required by the Java Language Specification as either Unicode escapes or other character escapes. It is therefore necessary to double backslashes in string literals that represent regular expressions to protect them from interpretation by the Java bytecode compiler. The string literal "\\b", for example, matches a single backspace character when interpreted as a regular expression, while "\\b" matches a word boundary. The string literal "\\(hello\\)" is illegal and leads to a compile-time error; in order to match the string (hello) the string literal "\\(hello\\)" must be used.

5.2 Character Classes

Character classes may appear within other character classes, and may be composed by the union operator (implicit) and the intersection operator (&&). The union operator denotes a class that contains every character that is in at least one of its operand classes. The intersection operator denotes a class that contains every character that is in both of its operand classes.

The precedence of character-class operators is as follows, from highest to lowest:

1	Literal escape	\\x
2	Grouping	[...]
3	Range	a-z
4	Union	[a-e][i-u]
5	Intersection	[a-z&&[aeiou]]

Note that a different set of metacharacters are in effect inside a character class than outside a character class. For instance, the regular expression . loses its special meaning inside a character class, while the expression - becomes a range forming metacharacter.

5.3 Examples

The following examples demonstrate some common pattern matching strings used.

1. To match all users in the finance group where the field BESUSERHEALTHUSERNAME for such users is specified as 'John Smith/Finance/Ireland/IBM' for example use the

pattern matcher `.*\Finance\.*`. Note that this matches the string `/Finance/`. The `/` character must be escaped; hence the use of `\`.

2. To match all users whose `BESUSERHEALTHUSERNAME` value begins with `'SalesTeam'` use the pattern matcher `^SalesTeam`.

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, IBM logo, Tivoli, and Netcool are trademarks of International Business Machines Corporation in the United States, other countries or both.

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.

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



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.

Intel and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries 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.