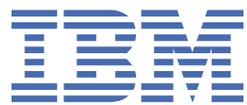


IBM® Tivoli® Netcool/OMNIbus Probe for
Dantel PointMaster
4.0

Reference Guide
March 31, 2011



Note

Before using this information and the product it supports, read the information in [Appendix A, “Notices and Trademarks,”](#) on page 15.

Edition notice

This edition applies to version 4.0 of IBM Tivoli Netcool/OMNIBus Probe for Dantel PointMaster (SC23-7858-02) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC23-7858-01.

© **Copyright International Business Machines Corporation 2006, 2011.**

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

Contents

- Document control page..... V**

- Chapter 1. Probe for Dantel PointMaster..... 1**
 - Summary..... 1
 - Installing probes..... 2
 - Internationalization support..... 2
 - Example multi-byte character set on Solaris..... 3
 - Data acquisition..... 4
 - Chat in and chat out scripts..... 4
 - Hosts file format..... 4
 - Raw stream capture..... 5
 - Inactivity..... 5
 - Peer-to-peer failover functionality..... 6
 - Properties and command line options..... 6
 - Escape codes..... 9
 - Elements..... 9
 - Error messages..... 10
 - ProbeWatch messages..... 12

- Appendix A. Notices and Trademarks..... 15**
 - Notices..... 15
 - Trademarks..... 16

Document control page

Use this information to track changes between versions of this guide.

The IBM Tivoli Netcool/OMNIBus Probe for Dantel PointMaster documentation is provided in softcopy format only. To obtain the most recent version, visit the IBM® Tivoli® Information Center:

<https://www.ibm.com/support/knowledgecenter/SSHTQ/omnibus/probes/common/Probes.html>

Document version	Publication date	Comments
SC23-7858-01	December 31, 2008	Summary table updated. IPv6 support information added. FIPS information added. Installation section added.
SC23-7858-02	March 31, 2011	Installation section replaced by " Installing probes " on page 2.

Chapter 1. Probe for Dantel PointMaster

The Dantel PointMaster is used as an alarm point concentrator for environmental alarms throughout a network. The Probe for Dantel PointMaster is a multi-headed probe that acquires alert data from each Dantel PointMaster system.

This guide contains the following sections:

- [“Summary” on page 1](#)
- [“Installing probes” on page 2](#)
- [“Data acquisition” on page 4](#)
- [“Properties and command line options” on page 6](#)
- [“Elements” on page 9](#)
- [“Error messages” on page 10](#)
- [“ProbeWatch messages” on page 12](#)

Summary

Each probe works in a different way to acquire event data from its source, and therefore has specific features, default values, and changeable properties. Use this summary information to learn about this probe.

The following table provides a summary of the Probe for Dantel PointMaster.

Probe target	Dantel PointMaster
Probe executable name	nco_p_pointmaster
Patch number	4.0
Probe supported on	For details of the operating systems on which the probe is supported, see the following Release Notice on the IBM Software Support website: https://www-304.ibm.com/support/docview.wss?uid=swg21410619
Properties file	<code>\$OMNIHOME/probes/arch/pointmaster.props</code>
Rules file	<code>\$OMNIHOME/probes/arch/pointmaster.rules</code>
Requirements	A currently supported version of IBM Tivoli Netcool/OMNIBus
Connection method	Telnet TCP/IP
Remote connectivity	The Probe for Dantel PointMaster can connect to a device on a remote host. Details of the remote host are specified using connection properties (when connecting to a single device) or by referencing a hosts file (when connecting to multiple devices).
Multicultural support	Not Available

Table 2. Summary (continued)	
Peer-to-peer failover functionality	Available
IP environment	IPv4 and IPv6 Note : The probe is supported on IPv6 when running on IBM Tivoli Netcool/OMNIBus V7.3.0, 7.3.1 and 7.4.0 on all UNIX and Linux operating systems.
Federal Information Protocol Standards (FIPS)	IBM Tivoli Netcool/OMNIBus uses the FIPS 140-2 approved cryptographic provider: IBM Crypto for C (ICC) certificate 384 for cryptography. This certificate is listed on the NIST website at http://csrc.nist.gov/groups/STM/cmvp/documents/140-1/1401val2004.htm . For details about configuring Netcool/OMNIBus for FIPS 140-2 mode, see the <i>IBM Tivoli Netcool/OMNIBus Installation and Deployment Guide</i> .

Installing probes

All probes are installed in a similar way. The process involves downloading the appropriate installation package for your operating system, installing the appropriate files for the version of Netcool/OMNIBus that you are running, and configuring the probe to suit your environment.

The installation process consists of the following steps:

1. Downloading the installation package for the probe from the Passport Advantage Online website.

Each probe has a single installation package for each operating system supported. For details about how to locate and download the installation package for your operating system, visit the following page on the IBM Tivoli Knowledge Center:

http://www-01.ibm.com/support/knowledgecenter/SSSHTQ/omnibus/probes/all_probes/wip/reference/install_download_intro.html

2. Installing the probe using the installation package.

The installation package contains the appropriate files for all supported versions of Netcool/OMNIBus. For details about how to install the probe to run with your version of Netcool/OMNIBus, visit the following page on the IBM Tivoli Knowledge Center:

http://www-01.ibm.com/support/knowledgecenter/SSSHTQ/omnibus/probes/all_probes/wip/reference/install_install_intro.html

3. Configuring the probe.

This guide contains details of the essential configuration required to run this probe. It combines topics that are common to all probes and topics that are peculiar to this probe. For details about additional configuration that is common to all probes, see the *IBM Tivoli Netcool/OMNIBus Probe and Gateway Guide*.

Internationalization support

The probe supports multibyte character sets (for example, Japanese) and character sets that contain individual multibyte characters (for example German, French, and Spanish). To view the character sets correctly, you must configure the locale settings on the host machine correctly.

If you are using a language that contains multibyte characters, you must set the LANG environment variables to the name of your character set, and export the LC_ALL environment variable. For example, if you are using Japanese, set these environment variables to ja_JP.UTF-8; if you are using German, set these environment variables to de_DE.UTF-8. This will enable the probe to recognise the multibyte characters used by your character set when they occur in any network events.

The probe supports the following language locales:

Languages	AIX	HP-UX	Solaris	Linux
English (US)	en_US	en_US	en_US	en_US
Simplified Chinese	zh_CN	zh_CN	zh_CN	zh_CN
Traditional Chinese	zh_TW	zh_TW.eucTW	Zh_TW.big5	zh_TW.big5
Czech	cs_CZ	cs_CZ	cs	cs_CZ
French (standard)	fr_FR	fr_FR	fr	fr_FR
German (standard)	de_DE	de_DE	de	de_DE
Hungarian	hu_HU	hu_HU	hu	hu_HU
Italian (standard)	it_IT	it_IT	it	it_IT
Japanese	ja_JP	ja_JP	ja	ja_JP
Korean	ko_KR	ko_KR	ko	ko_KR
Polish	pl_PL	pl_PL	pl	pl_PL
Portuguese (Brazilian)	pt_BR	pt_BR	pt	pt_BR
Russian	ru_RU	ru_RU	ru	ru_RU
Spanish	es_ES	es_ES	es	es_ES

Example multi-byte character set on Solaris

The following steps describe how to configure Solaris to use the Japanese character set:

1. Install the necessary components for Japanese on to the host machine using the Solaris CD.
2. Set the LANG and LC_ALL environment variables to ja_JP PCK. This uses SJIS encoding.

Note : You may have to set the LANG in the host machine's default settings file and reboot it to make the changes take effect.

3. Make sure that the file \$OMNIBASE/platform/arch/locales/locales.dat has the following entry:

```
locale = ja_JP PCK, japanese, sjis
```

Where ja_JP PCK is the vendor locale, japanese is the Sybase language, and sjis is the Sybase character set.

Data acquisition

Each probe uses a different method to acquire data. Which method the probe uses depends on the target system from which it receives data.

The Probe for Dantel PointMaster connects to the Dantel PointMaster system using a TCP/IP connection. It is a multi-headed probe that can either connect to a single device or that can connect to multiple devices to acquire alert data from a Dantel PointMaster system.

When the probe connects to a single device, it uses the connection properties. When the probe connects to multiple devices, it references a hosts file, which contains details of the devices that the probe connects to and the connection properties for each connection.

Data acquisition is described in the following topics:

- [“Chat in and chat out scripts” on page 4](#)
- [“Hosts file format” on page 4](#)
- [“Raw stream capture” on page 5](#)
- [“Inactivity” on page 5](#)
- [“Peer-to-peer failover functionality” on page 6](#)

Chat in and chat out scripts

Chat in and chat out scripts control probe login and logout. These scripts are on a single line in the expect-send format (for chat in scripts) or send-expect format (for chat out scripts). You can specify chat in and chat out strings using the **ChatinString** and **ChatoutString** properties or the `-chatinstring` and `-chatoutstring` command line options.

The format is:

```
ChatinString : expect send expect send...
```

```
ChatoutString : send expect send expect...
```

Note : Each element in the chat strings is separated by white space. In order to send or expect a sequence that includes white space, surround the sequence with single quotes.

A typical chat in script might be:

```
.*login.*:.* anu\r\n .*assword.*:.* anu\r\n
```

The expect text can use any regular expression, while the send text can send any characters, including control characters using the standard UNIX/C escape sequences described in [“Escape codes” on page 9](#).

Hosts file format

The probe needs a hosts file to connect to multiple hosts. The **HostsFile** property specifies from which file the probe gets host information. The probe reads the hosts file and attempts to connect and log in to each host.

If the **HostsFile** property is defined, the probe attempts to open the specified file. This file must contain the required connection information for the probe in the following format:

```
host port : chi, cho, ft, ia, ri, ra, af;
```

The following table describes the hosts file format.

<i>Table 4. Hosts file format</i>	
Item	Description
host	This item specifies the host to which the probe connects.
port	This item specifies the port to which the probe connects.
chi	This item specifies the chat in string for the host/port.
cho	This item specifies the chat out string for the host/port.
ft	This item specifies the flush time value for the host/port.
ia	This item specifies the inactivity alarm for the host/port.
ri	This item specifies the reconnection interval.
ra	This item specifies the reconnection attempts.
af	This item specifies the active flag. You must set this to True. Setting this to False deactivates the connection.

When you create a hosts file, note the following information:

- In the hosts file, the end of each entry is indicated by a semicolon.
- Whitespace and commas separate individual elements within a line.
- Whitespace characters are sp and tab.
- Comment lines are preceded #.
- Blank lines are ignored.
- You can force the probe reread the hosts file without restarting the probe by issuing a USR1 signal. To do this, enter the command `kill -USR1 pid`, where *pid* is the process identifier of the probe.

Raw stream capture

The probe can capture all the raw data stream sent from a device. This raw data is stored in a log file and can be used for debugging, to develop new features for the probe, or to pass to other management systems that require the same data. To enable stream capture, set the **StreamCaptureFile** property to 1 and specify a log file to store the data using the **StreamCaptureFile** property.

Note : The data stream capture function generates a lot of data. When you no longer require data for debugging, set the **StreamCaptureFile** property to 0 to disable the stream capture function.

Inactivity

The probe has a timeout facility that allows it to disconnect from the socket if it fails to receive the next alarm data within a predefined amount of time. To specify how long the probe waits before disconnecting, use the **Inactivity** property. After this length of time, the probe disconnects from the switch, sends a ProbeWatch message to the ObjectServer, and tries to reconnect.

You can also use the **InactivityRetry** property to specify the number of consecutive inactivity intervals that the probe allows before disconnecting. If this property is set to 0, the probe disconnects after a single period of inactivity.

Peer-to-peer failover functionality

The probe supports failover configurations where two probes run simultaneously. One probe acts as the master probe, sending events to the ObjectServer; the other acts as the slave probe on standby. If the master probe fails, the slave probe activates.

While the slave probe receives heartbeats from the master probe, it does not forward events to the ObjectServer. If the master probe shuts down, the slave probe stops receiving heartbeats from the master and any events it receives thereafter are forwarded to the ObjectServer on behalf of the master probe. When the master probe is running again, the slave probe continues to receive events, but no longer sends them to the ObjectServer.

Example property file settings for peer-to-peer failover

You set the peer-to-peer failover mode in the properties files of the master and slave probes. The settings differ for a master probe and slave probe.

Note : In the examples, make sure to use the full path for the property value. In other words replace \$OMNIHOME with the full path. For example: /opt/IBM/tivoli/netcool.

The following example shows the peer-to-peer settings from the properties file of a master probe:

```
Server      : "NCOMS"
RulesFile   : "master_rules_file"
MessageLog  : "master_log_file"
PeerHost    : "slave_hostname"
PeerPort    : 6789 # [communication port between master and slave probe]
Mode        : "master"
PidFile     : "master_pid_file"
```

The following example shows the peer-to-peer settings from the properties file of the corresponding slave probe:

```
Server      : "NCOMS"
RulesFile   : "slave_rules_file"
MessageLog  : "slave_log_file"
PeerHost    : "master_hostname"
PeerPort    : 6789 # [communication port between master and slave probe]
Mode        : "slave"
PidFile     : "slave_pid_file"
```

Properties and command line options

You use properties to specify how the probe interacts with the device. You can override the default values by using the properties file or the command line options.

The following table describes the properties and command line options specific to this probe. For information about default properties and command line options, see the *IBM Tivoli Netcool/OMNIBus Probe and Gateway Guide* (SC14-7530).

Table 5. Properties and command line options

Property name	Command line option	Description
ChatinString <i>string</i>	-chatinstring <i>string</i>	Use this property to specify the chat in script for connection to the host system. The default is "".
ChatoutString <i>string</i>	-chatoutstring <i>string</i>	Use this property to specify the chat in script for disconnection from the host system. The default is "".
FlushTime <i>integer</i>	-flushtime <i>integer</i>	Use this property to specify the time (in seconds) the probe waits before flushing the event to the ObjectServer. The default is 5.
Host <i>string</i>	-host <i>string</i>	Use this property to specify the name of the host to which the probe connects. The default is localhost.
HostsFile <i>string</i>	-hostsfile <i>string</i>	Use this property to specify the file that the probe uses to connect to multiple hosts. The default is "".
Inactivity <i>integer</i>	-inactivity <i>integer</i>	Use this property to specify the time (in seconds) the probe allows a port to be inactive before disconnecting. The default is 0.
InvalidAlarmLogFile <i>string</i>	-invalidlog <i>string</i>	Use this property to specify the file to which the probe logs invalid alarms. The current date and time will be appended to this file name. The default is \$OMNIHOME/var/pointmaster.invalid.
InvalidAlarmLogging <i>integer</i>	-invalidlogging <i>integer</i>	Use this property to specify whether the probe logs invalid alarms: 0: The probe does not log invalid alarms. 1: The probe logs invalid alarms. The default is 0.

Table 5. Properties and command line options (continued)

Property name	Command line option	Description
MaxEvents <i>integer</i>	-maxevents <i>integer</i>	Use this property to specify the maximum number of events the probe attempts to read before moving on to the next socket. The default is 1.
MaxInvalidAlarmLog FileSize <i>integer</i>	-maxinvalidlog <i>integer</i>	Use this property to specify the maximum size for the invalid alarm file. When this limit is reached, the probe creates a new file with a new date and time. The default is 1048576.
Port <i>integer</i>	-port <i>integer</i>	Use this property to specify the port to which the probe connects. The default is 1.
ReadTimeout <i>integer</i>	-readtimeout <i>integer</i>	Use this property to specify the time (in milliseconds) that the probe allows the socket to be silent. If this time is exceeded, it assumes that there is no more data to be read at this time and checks for data on another connection in the hosts file. The default is 100.
ReconnectionAttempts <i>integer</i>	-reconnectionattempts <i>integer</i>	Use this property to specify the maximum number of times that the probe attempts to reconnect to the socket. The default is 0.
ReconnectionInterval <i>integer</i>	-reconnectioninterval <i>integer</i>	Use this property to specify the time (in seconds) between successive reconnection attempts. The default is 0.
StreamCaptureFile <i>string</i>	-streamcapturefile <i>string</i>	Use this property to specify the file the probes uses to store the input stream log. Omitting this property disables the stream capture feature. The default is "".

Escape codes

You can use C-style escape codes in the **ChatinString** and **ChatoutString** properties. This allows you to easily define whether to send escape code sequences after commands.

For example, the following chatin string sends a carriage return character (`\r`) after the user name and password:

```
ChatinString : ".*: user\r .*: passwd\r .*:"
```

The following table explains the character sequences that are recognized.

Escape code	Character
<code>\b</code>	This escape code specifies the backspace character.
<code>\f</code>	This escape code specifies the form-feed character.
<code>\n</code>	This escape code specifies the new-line character.
<code>\r</code>	This escape code specifies the carriage return character.
<code>\t</code>	This escape code specifies the tab character.
<code>\\</code>	This escape code specifies the backslash character.
<code>\'</code>	This escape code specifies the single quote character.
<code>\"</code>	This escape code specifies the double quote character.

Note : Due to the way in which the above properties are parsed, the escape sequences for backslash, single quote and double quote must be double-escaped. For example, to send a backslash character (`\`), use `\\`.

Elements

The probe breaks event data down into tokens and parses them into elements. Elements are used to assign values to ObjectServer fields; the field values contain the event details in a form that the ObjectServer understands.

The following table describes the elements that the Probe for Dantel PointMaster generates. Not all the elements described are generated for each event; the elements that the probe generates depends upon the event type.

Element name	Element description
<code>\$Acknowledged</code>	This element indicates whether the event has been acknowledged.

<i>Table 7. Elements (continued)</i>	
Element name	Element description
\$AlarmPointNumber	This element displays the PointMaster Alarm Point Number.
\$Date	This element displays the date of the alert.
\$DisplayNumber	This element contains the PointMaster Display Number.
\$Host	This element displays the name of the host.
\$ManagerHost	This element displays the name of the host that the probe is running on.
\$MapAddress	This element displays the Numeric Map Address.
\$Port	This element displays the Socket ID.
\$Scope	This element displays the level of scope, for example, [L] local or [G] global.
\$Severity	This element displays the severity of the alarm.
\$Summary	This element displays the summary of the event.
\$Time	This element displays the time and date the event occurred or was detected.

Error messages

Error messages provide information about problems that occur while running the probe. You can use the information that they contain to resolve such problems.

The following table describes the error messages specific to this probe. For information about generic error messages, see the *IBM Tivoli Netcool/OMNIbus Probe and Gateway Guide*, (SC14-7530).

<i>Table 8. Error messages</i>		
Error	Description	Action
<Filename> File not found	The probe could not find the hosts file.	Check that the host file exists and that the permissions are correct.
Error initializing list	This is an internal probe error.	Re-run the probe. If that does not solve the problem, refer to your support contract for more information about contacting the help desk.
Event from <event source> did not match the expected format	The event was not in the correct format.	Check that you are connected to the correct port.

Table 8. Error messages (continued)

Error	Description	Action
Expect timed out after <seconds> seconds	When the probe tried to log in or out of the host, the expect part of the chat timed out.	Check that the host you are connecting to is running correctly. Check that the login name and password are appropriate for the target host. It may be that the login name was not found and the connection timed out while the target host was trying to validate it.
Failed to compile regular expression	A regular expression is incorrectly formed in the rules file.	Check the rules file for the regular expression and correct the entry.
Failed to read from socket - disconnecting	The probe had successfully logged into the target host, but something interrupted the connection.	Check that the target host is working correctly.
Failed to rollover InvalidAlarmLogFile	The probe was unable to open another alarm log file to write to.	Check that there is sufficient disk space and that the permissions are correct.
Failed to send <sendchat>	When the probe tried to log in or out of the host, the send part of the chat failed. The <SENDCHAT> indicates the part of the chat message the probe was trying to send when it failed.	Check that the host you are connecting to is running correctly.
Invalid <message>	The event was not in the correct format.	Check that you are connected to the correct port.
Invalid <string> Invalid hostfile entry <lineprint> Not valid <string>	A line in the hosts file was formatted incorrectly.	Check the hosts file.
Read error during expect	The probe could not process the response from the host during an expect. This could be caused by a problem with the target that caused the connection to time out or the response from the target could have been corrupted.	If the probe is configured to reconnect, it will try again to establish the connection.
Too many tokens in hostfile entry	A line in the hosts file was formatted incorrectly. There are too many entries on the line.	Check the hosts file.
Unable to open file	The probe was unable to open the hosts file.	Check the hosts file.

Table 8. Error messages (continued)

Error	Description	Action
Unable to write to file <filename> Only managed to write <number> out of <number> characters	The probe was unable to write to the alarm log file.	Check that there is sufficient disk space and that the permissions are correct.
Using DEFAULT_READ_TIMEOUT	The ReadTimeout property has not been set so the probe is using the default value 100ms.	If you want to override the default setting, specify an alternative value using the ReadTimeout property.

ProbeWatch messages

During normal operations, the probe generates ProbeWatch messages and sends them to the ObjectServer. These messages tell the ObjectServer how the probe is running.

The following table describes the raw ProbeWatch error messages that the probe generates. For information about generic ProbeWatch messages, see the *IBM Tivoli Netcool/OMNIBus Probe and Gateway Guide* (SC14-7530).

Table 9. ProbeWatch messages

ProbeWatch message	Description	Triggers/causes
Connection attempted ... (<host>, <port>)	The probe is trying to establish a connection to the host.	The probe is trying to establish a connection to the host.
Connection failed ... (<host>, <port>)	The probe has failed to establish a connection to the host.	General connection failure due either to an incorrect setting of the Host or Port property, or the host refusing a connection request from the probe.
Connection lost ... (<host>, <port>)	The probe has lost the connection to the host.	The device has dropped the connection to the probe.
Connection succeeded ... (<host>, <port>)	The probe has successfully established a connection to the host.	The probe has successfully established a connection to the host.
Disconnected from system due to shutdown signal	The probe has disconnected from the host.	A shutdown signal was sent to the probe.
Disconnecting from system due to Inactivity alarm ... (<host>, <port>)	The probe has disconnected from the device.	The device was silent for the period specified by the Inactivity property. If you want the probe to time out less frequently, increase this value.

Table 9. ProbeWatch messages (continued)

ProbeWatch message	Description	Triggers/causes
Disconnection attempted ... (<host>,<port>)	The probe is attempting to disconnect from the host.	The probe is shutting down or has lost the connection.
Disconnection failed ... (<host>,<port>)	The probe has failed to disconnect cleanly from the host.	The logout procedure failed.
Disconnection succeeded ... (<host>,<port>)	The probe has disconnected from the host.	The probe shut down or lost the connection.
Event from (<host>,<port>) did not match the expected format!	The event received by the probe does not match any of the supported event formats.	The probe has received an event that does not match any of the supported event formats.
Failed to get events	A problem occurred while receiving events.	Either there was a problem initializing the connection due to insufficient memory or (if this message was sent after some events had been parsed) there was a license or a connection failure.
Failed to get license ... (<host>,<port>)	The probe is unable to obtain a license for the connection to the host.	Either the license server is down or there are insufficient licenses in the server.
Going Down ...	The probe is shutting down.	The probe is shutting down after performing the shutdown routine.
Have lost all connections - going down	The probe is shutting down because all of its connections have been deactivated.	The number of times that the probe has attempted reconnection for each of its connections has exceeded that specified by the ReconnectionAttempts property.
License failure - going down	The license server could not be reached.	Either the license has expired, the license server has gone down, or the connection to the license server has been lost.
Login attempted ... (<host>,<port>)	The probe is trying to log in to the host.	The probe is trying to log in to the host.
Login failed ... (<host>,<port>)	The probe has failed to log in to the host. The probe has encountered a problem while logging in.	Check that the ChatinString property is specified correctly.
Login succeeded ... (<host>,<port>)	The probe has logged in to the host.	The probe has logged in to the host.

Table 9. ProbeWatch messages (continued)

ProbeWatch message	Description	Triggers/causes
Logout attempted ... (<host>,<port>)	The probe is trying to log out from the host.	The probe has received a command to shut down.
Logout failed ... (<host>,<port>)	The probe has failed to log out from the host.	The probe has encountered a problem while logging out. Check that the ChatoutString property is specified correctly.
Logout succeeded ... (<host>,<port>)	The probe has logged out from the host.	The probe has logged out from the host.
Running ...	The probe is running normally.	The probe has just been started.

Appendix A. Notices and Trademarks

This appendix contains the following sections:

- Notices
- Trademarks

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other 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
Software Interoperability Coordinator, Department 49XA

3605 Highway 52 N
Rochester, MN 55901
U.S.A.

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 information 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.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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.

All IBM prices shown are IBM's suggested retail prices, are current and are subject to change without notice. Dealer prices may vary.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

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.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_. All rights reserved.

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

Trademarks

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

Adobe, Acrobat, Portable Document Format (PDF), PostScript, and all Adobe-based trademarks are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, other countries, or both.

Intel, Intel Inside (logos), MMX, and Pentium are trademarks of Intel Corporation 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.

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

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

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.



SC23-7858-02

