IBM Systems - iSeries

Networking
Simple Network Time Protocol

Version 5 Release 4

IBM Systems - iSeries

Networking
Simple Network Time Protocol

Version 5 Release 4

Note

Before using this information and the product it supports, read the information in “Notices,” on page 11.

Fifth Edition (February 2006)

This edition applies to version 5, release 4, modification 0 of IBM i5/OS (product number 5722-SS1) and to all subsequent releases and modifications until otherwise indicated in new editions. This version does not run on all reduced instruction set computer (RISC) models nor does it run on CISC models.

Contents

Simple Network Time Protocol

Simple Network Time Protocol (SNTP) is a time maintenance application that allows you to synchronize networked hardware.

You can use an iSeries™ server as an SNTP server, SNTP client, or both. You can specify an amount of time that clients can vary from the time provided by a time server and allow for adjustment to keep the clocks synchronized. This function is particularly important in the use of network authentication service.

SNTP is a tool that you can use as part of your time management strategy.

Related concepts

Network authentication service

Time management

Printable PDF

Use this to view and print a PDF of this information.

To view or download the PDF version of this document, select SNTP (about 231 KB).

You can view or download this related topic: Time management. This topic contains concepts and configuration information for managing time on your iSeries server.

Saving PDF files

To save a PDF on your workstation for viewing or printing:

1. Right-click the PDF in your browser (right-click the link above).
2. Click the option that saves the PDF locally.
3. Navigate to the directory in which you want to save the PDF.
4. Click **Save**.

Downloading Adobe Reader

You need Adobe Reader installed on your system to view or print these PDFs. You can download a free copy from the Adobe Web site (www.adobe.com/products/acrobat/readstep.html)  .

SNTP concepts

Learn about the Simple Network Time Protocol (SNTP) and how it is implemented on the i5/OS™ operating system.

SNTP is used to keep device clocks in sync with each other. i5/OS SNTP is based on Request for Comments (RFC) 2030. You can view RFC 2030 by searching for the number with the RFC index search engine located on the RFC editor Web site. SNTP can be useful for tracking processes and for interactions between machines by using time stamps that are kept synchronized. Before working with SNTP, familiarize yourself with the concepts of SNTP client and SNTP server.

Related concepts

Time

Daylight saving time

Date and time system value: Time zone

Time adjustment

Date and time system value: Time adjustment

Related information

RFC index search engine (http://www.rfc-editor.org/rfcsearch.html)

RFC editor (http://www.rfc-editor.org/)

SNTP client

This topic provides information about the SNTP client on i5/OS.

When SNTP is configured as a client, the iSeries server retrieves a time value from an external time source. You can specify from which sources (up to three) to retrieve the time value. This external time value is compared to the iSeries system time. If the iSeries time value does not match the external time source, a time adjustment begins. The iSeries system time is adjusted until the required time value is reached.

The SNTP client allows you to configure the i5/OS operating system to poll a Network Time Protocol (NTP) or SNTP server to find out the time. The SNTP client updates the system clock. Most applications use the system clock as their time source. By updating the system clock, applications reflect the synchronized time obtained from the time server.

The first server in the list that can provide valid time service will be selected. When the selected time server fails, a new time server will be selected. The time server should be selected based on minimum network response time delay at the location where the iSeries server is installed.

A list of public time servers is maintained on the Internet. To locate a time server, you can use a search engine with a query of *NTP servers*.

You can run the SNTP client and the SNTP server concurrently on your iSeries server. This allows you to obtain time from an outside source, and then serve that time to clients on your network. To do this, you need to synchronize the clocks on your network.

Related concepts

"Scenario: Synchronize clocks with iSeries server" on page 3
This scenario demonstrates using the iSeries server as both an SNTP server and an SNTP client.

Related tasks

"Configure SNTP" on page 7
This information provides details about how to configure SNTP on your iSeries server.

Related information

NTP: The Network Time Protocol (http://www.ntp.org/)

Public NTP Time Servers (http://www.eecis.udel.edu/~mills/ntp/servers.html)

SNTP server

You can configure your iSeries server as an SNTP server. This topic explains how you can use this feature to maintain time on your network.

You can use your iSeries server as an SNTP server. This enables you to configure your iSeries to act as a time server for other devices. Other SNTP clients check time by polling your iSeries SNTP server. If a client's time values do not match the iSeries SNTP server time, a time adjustment begins. The client's system time is adjusted until the required time value is reached. This can be useful for maintaining time within a network.

In Figure 1, the iSeries Server A uses the SNTP server. In this situation, the coordinated universal time (UTC) is retrieved from the iSeries server rather than being synchronized with an external time source. This internal time value is sent to all SNTP client systems (iSeries Server B and Client A) connected to it.

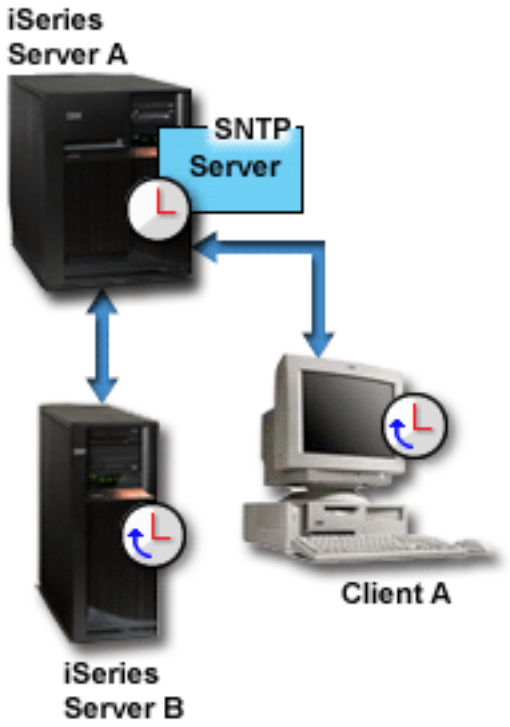

Figure 1. SNTP as a server

In addition to using the SNTP server to synchronize clocks on the network, you can concurrently run your iSeries as an SNTP client to obtain time from an outside time source. For an example, refer to Scenario: Synchronize clocks with iSeries server.

Related concepts

"Scenario: Synchronize clocks with iSeries server"
This scenario demonstrates using the iSeries server as both an SNTP server and an SNTP client.

Related tasks

"Configure SNTP" on page 7
This information provides details about how to configure SNTP on your iSeries server.

Scenario: Synchronize clocks with iSeries server

This scenario demonstrates using the iSeries server as both an SNTP server and an SNTP client.

Situation

As an administrator of your company's network, you must maintain both your iSeries server and network clients. Time stamps are critical to your transactions, and you need to maintain synchronization in the network. This scenario demonstrates how you can configure SNTP on your iSeries in order to synchronize clocks on your network.

Objectives

In this scenario, YourCo, Inc. wants to use the SNTP client on the i5/OS operating system to receive time from an outside Network Time Protocol (NTP) server. To maintain the time within your network, you will use your iSeries server as an SNTP server. In addition to configuring the SNTP client and server on your iSeries, you will need to configure your firewall to allow the SNTP client to obtain the time from an external NTP server.

The objectives of this scenario are as follows:

- To synchronize your iSeries server with an outside NTP server.
- To act as an SNTP server for clients within your network.

Details

The following figure shows the solution environment for this scenario.

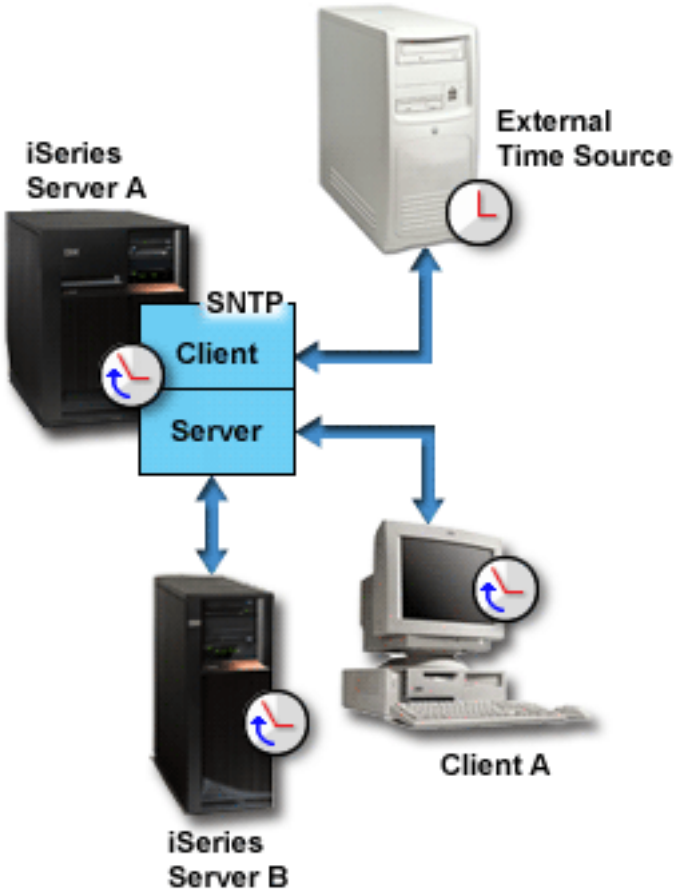

Figure 2. SNTP as a client and a server

In Figure 2, the iSeries server (Server A) uses the SNTP application as a client and a server. The SNTP client retrieves a time value from an external time source. You specify the address of the external time source. The SNTP application synchronizes Server A's coordinated universal time (UTC) with the time value from the external time source. Then, the SNTP server (Server A) sends the time value to all SNTP client systems (iSeries Server B and Client A) connected to it.

Prerequisites and assumptions

This scenario depends on the following prerequisites and assumptions:

- Server A (serverA.yourco.com) is running on i5/OS V5R3 or later.
- Server B (serverB.yourco.com) is running on i5/OS V5R3 or later.
- Server B (serverB.yourco.com) and Client A are running SNTP clients.
- You have a time management strategy.
- You have already set the time zone system value.
- You want to use SNTP as the time maintenance application on your iSeries.

Configuration steps

The configuration tasks show how to configure the YourCo, Inc. network to use SNTP. Before completing these tasks, complete all the necessary prerequisites.

Related concepts

"SNTP client" on page 2
This topic provides information about the SNTP client on i5/OS.

"SNTP server" on page 2
You can configure your iSeries server as an SNTP server. This topic explains how you can use this feature to maintain time on your network.

Related tasks

Set the time zone system value

Configure iSeries A as an SNTP client and server

In order to configure the YourCo, Inc. network to use SNTP, first you need to perform the following steps to configure iSeries A as an SNTP client and server:

1. In iSeries Navigator, expand **iSeries Server A** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP** and select **Properties**.
3. Click the following tabs to set the parameters:
   a. On the **General** tab, select **Client** and **Server** to start SNTP when TCP/IP starts.
   b. On the **Client** tab, specify the following values:
      - Time servers: `timesrvr1.external.com`
      - Poll interval: 60 minutes
      - Minimum adjustment: 20 milliseconds
      - Maximum adjustment: 20 minutes
      - Adjustment threshold: Maximum adjustment
      - Activity logging: Only when adjusting the system clock
   c. On the **Server** tab, select the following:
      - Click **Server activity logging**: Only when an error status is returned by the server
      - Click **Server must be synchronized before valid time is served** to specify that you want your iSeries to act as a client to obtain time from another source before serving time to other clients.

Configure your firewall to allow SNTP traffic

For this scenario, you are running a firewall on iSeries Server A. To allow SNTP traffic, you must configure the firewall to allow the passing of UDP packets on port 123. Refer to your firewall documentation for steps to complete this task.

Configure the SNTP client on other systems in the network

After your SNTP server is running, you must configure the other systems on the network to use iSeries A as an SNTP server. Use the following steps to configure the SNTP client on iSeries Server B. You might need to refer to other system documentation to configure clients in your network.

To configure the SNTP client on other systems, perform the following steps:

1. In iSeries Navigator, expand **iSeries Server B** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP** and select **Properties**.
3. Click the following tabs to set the parameters:
   a. On the **General** tab, click **Client** to start the SNTP client when TCP/IP starts.
   b. On the **Client** tab, specify the following values:
      - Time servers: `serverA.yourco.com`
      - Poll interval: 60 minutes
      - Minimum adjustment: 20 milliseconds
      - Maximum adjustment: 20 minutes
      - Adjustment threshold: Maximum adjustment
      - Activity logging: Only when adjusting the system clock

Specify SNTP as your time maintenance application

After you have configured the SNTP server and client, you need to verify the time adjustment (QTIMADJ) system value to ensure that SNTP can operate as the time maintenance application on your iSeries. If another application is listed, you must take action to ensure multiple time applications do not conflict when setting the time.

The time adjustment system value only serves as an identifier. The system does not enforce the software specified; it only identifies the software to use. This value should be maintained by the time adjustment software and is intended as an aid to prevent having multiple time adjustment applications conflict with each other. The system does not verify this value or that this software is or is not performing time adjustments.

To set the time adjustment (QTIMADJ) system value to use SNTP for time management, follow these steps:

1. In iSeries Navigator, expand **iSeries server A** → **Configuration and Service** → **System Values**.
2. In the right pane, right-click **Date and Time** and click **Properties**.
3. On the **Date and Time System Values** page, click the **Time** tab.
4. In the **Time maintenance application** field, verify that the value is either `*NONE` or `QIBM_OS400_SNTP`.

   Note: If the system value is set to `*NONE`, SNTP will automatically change the value to `QIBM_OS400_SNTP` when the client is started. If another application is listed, you must take action to ensure that multiple time applications do not conflict when setting the time.
5. Click **OK** to save your changes.
6. Repeat these steps for iSeries Server B.

Start SNTP manually

To enable the SNTP application you have configured, you need to start SNTP manually. You also need to do this when you want to restart SNTP service in conditions where you are changing configuration.

Note: If you are making changes to an existing SNTP server configuration, you must first stop the SNTP server before you can restart it. For information about how to stop SNTP, see Method 1: Stop the current SNTP session.

Note that the starting processes are different for iSeries A used as both client and server and SNTP client.

To start SNTP on the iSeries A server that has been configured as an SNTP client and server, perform the following steps:

1. In iSeries Navigator, expand **iSeries Server A** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP** and click **Start** → **All**.

To start SNTP on clients on other systems in the network, perform the following steps:

1. In iSeries Navigator, expand **iSeries Server B** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP** and click **Start** → **Client**.

Configure SNTP

This information provides details about how to configure SNTP on your iSeries server.

SNTP can be used to adjust system time. As most applications use the system time, this means that those applications will obtain accurate time from the system clock.

The options you see in iSeries Navigator depend on what version of the i5/OS operating system you are running on your server and what version of iSeries Access for Windows® you are using. In iSeries Navigator, click **Help** or press F1 for help that describes the procedures for your version.

To work with SNTP, follow these steps:

1. In iSeries Navigator, expand **your iSeries server** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP** and select **Properties**. Click the following tabs to set the parameters:

Select this tab	Then do this
General	Specify whether to start SNTP when TCP/IP starts. You can set this preference for the server and the client separately.
Client	Specify up to three time servers that the client can poll. Also specify the poll interval, adjustment preferences, and logging preference.
Server	Specify your logging preference. By default, the SNTP server will serve the system time when you start it. You might want to select **Server must be synchronized before valid time is served** to specify that you want your iSeries to act as a client to obtain time from another source before serving time to other clients.

In addition to iSeries Navigator, you can work with SNTP settings using the Change SNTP Attributes (CHGNTPA) command on character-based interface.

Note: If you are using the SNTP client through a firewall, the firewall configuration might need to be updated to allow the passing of UDP packets on port 123.

Related concepts

"SNTP client" on page 2
This topic provides information about the SNTP client on i5/OS.

"SNTP server" on page 2
You can configure your iSeries server as an SNTP server. This topic explains how you can use this feature to maintain time on your network.

Troubleshoot SNTP

Use this information to understand your options when problems related to SNTP arise. This topic describes problems that your system might encounter when you adjust time using SNTP.

Log SNTP activity can help you to identify problems with the server or client.

The following topics identify problems you might encounter and provide ways to recover:

- **I want to contact an SNTP server through a firewall**

  If you are using the SNTP client through a firewall, the firewall configuration might need to be updated to allow the passing of UDP packets on port 123.
- **Server does not serve time to clients**

  If you have selected **Server must be synchronized before valid time is served** on the **Server** page of SNTP properties, you must have the iSeries server configured as an SNTP client connected to an active time server before the server can respond to client polls.
- **I want to stop SNTP**

  If SNTP is not making correct time adjustments or if you want to start a new time adjustment, you need to ensure that SNTP is stopped properly.

For more information on troubleshooting problems related to time management, see Time management troubleshooting.

If the problem is outside of the SNTP topic, see Troubleshooting to learn about the options you have regarding general problems with the iSeries server. For additional help, see Service and support.

Related concepts

Time management troubleshooting

Troubleshooting

Service and support

Related tasks

Stop SNTP

Log SNTP activity

This topic explains how to use the logging function to help you track activity and identify problems with the server or client.

Logging is used to create records of the actions of the SNTP client or server. Use logging to assist in problem analysis, not during normal running situations.

One log file will be created each day, with the name in the form QTOT *YYYYMMDD*, where *YYYY* represents the year, *MM* represents the month, and *DD* represents the day.

The coded character set identifier (CCSID) of the file is the default system CCSID. If the system default CCSID is changed during the time when the activity log is in use on the same day, the original CCSID of the file will still be used. Because the resulting file might become unreadable, it is recommended that you stop the SNTP client, rename the activity log, and restart the SNTP client so that a new log will be created using the new CCSID.

Log client activity

To log SNTP client activity, follow these steps:

1. In iSeries Navigator, expand **your iSeries server** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP**, and click **Properties** to open the SNTP Properties pages.
3. Go to the **Client** page. Select when you want to log SNTP client activity.
4. Click **OK** to save your selection.

The client activity logs are created in the Integrated File System directory /QIBM/UserData/OS400/TCPIP/NTP. An example of a client log follows:

```
SNTP Client Activity Log QTOTNTP/QNTP/097229  08/21/03 12:00:48.502 AM
TCP9136 SNTP Client started.
TCP9146 Using time server TIME.
TCP9162 08/21/03 12:00:48.548 AM Time remaining for adjustment is 0.000 seconds.
TCP9116 08/21/03 12:00:48.548 AM NTP server UTC time is 08/21/03 5:00:48.196.
TCP9117 08/21/03 12:00:48.548 AM Client clock UTC time is 08/21/03 5:00:48.197.
TCP9120 08/21/03 12:00:48.548 AM Client clock adjusted = 1  (0 = not adjusted, 1 = adjusted)
TCP9146 Using time server TIME.
TCP9162 08/21/03 12:01:48.590 AM Time remaining for adjustment is 0.000 seconds.
TCP9116 08/21/03 12:01:48.590 AM NTP server UTC time is 08/21/03 5:01:48.589.
TCP9117 08/21/03 12:01:48.590 AM Client clock UTC time is 08/21/03 5:01:48.589.
TCP9120 08/21/03 12:01:48.590 AM Client clock adjusted = 1  (0 = not adjusted, 1 = adjusted)
```

Log server activity

To log SNTP server activity, follow these steps:

1. In iSeries Navigator, expand **your iSeries server** → **Network** → **Servers** → **TCP/IP**.
2. Right-click **SNTP**, and click **Properties** to open the SNTP Properties pages.
3. Go to the **Server** page. Select when you want to log SNTP server activity.
4. Click **OK** to save your selection.

The server activity logs are created in the Integrated File System directory /QIBM/UserData/OS400/TCPIP/NTP/SERVER. An example of a server log follows:

```
SNTP Server Activity Log QTOTNTP/QNTP/097326  08/21/03 2:46:04.329 PM
TCP9159 SNTP Server started.
TCP9161 08/21/03 2:46:20.828 PM Client 9.5.150.56 Unsynchronized status returned.
TCP9163 08/21/03 2:46:20.854 PM SNTP system client unable to contact server.
TCP9161 08/21/03 2:47:21.181 PM Client 9.5.150.57 Unsynchronized status returned.
TCP9162 08/21/03 2:47:21.195 PM Time remaining for adjustment is .534 seconds.
TCP9160 08/21/03 2:48:21.242 PM Client 9.5.56.158, UTC time returned is 08/21/03 19:48:21.241.
TCP9160 08/21/03 2:48:21.532 PM Client 9.130.69.21.159, UTC time returned is 08/21/03 19:48:21.531.
```

Related tasks

Stop SNTP

Appendix. 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 YBWA
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, IBM License Agreement for Machine Code, 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.

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.

Programming Interface Information

This SNTP publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM i5/OS.

Trademarks

The following terms are trademarks of International Business Machines Corporation in the United States, other countries, or both:

| eServer
| e(logo)server
| i5/OS
| IBM
| IBM (logo)
| iSeries

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

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

Terms and conditions

Permissions for the use of these publications is granted subject to the following terms and conditions.

Personal Use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative works of these publications, or any portion thereof, without the express consent of IBM.

Commercial Use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED ″AS-IS″ AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Printed in USA