



@server

iSeries

SNTP

Version 5 Release 3





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iSeries

SNTP

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Note

Before using this information and the product it supports, be sure to read the information in "Notices," on page 11.

Fourth Edition (August 2005)

This edition applies to version 5, release 3, modification 0 of IBM Operating System/400 (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.

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Simple Network Time Protocol (SNTP)

➤ Simple Network Time Protocol (SNTP) is a time maintenance application that allows you to synchronize networked hardware. You can use an iSeries^(TM) 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.

Refer to the following topics for more information about SNTP:

“What’s new for V5R3”

Find out about new features and information for SNTP.

“Print this topic” on page 2

Print a PDF of this SNTP information.

“Scenario: Synchronize clocks with iSeries server” on page 2

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

“SNTP concepts” on page 5

Learn about the SNTP protocol and how it is implemented on the OS/400^(R) operating system.

“Configure SNTP” on page 7

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

“Troubleshoot SNTP” on page 8

View this topic to troubleshoot problems you may encounter. This topic describes a variety of problems and specifies recovery steps.

SNTP is a tool that you can use as part of your time management strategy. For more information about time management on the iSeries server, see Time management. <<

What’s new for V5R3

This topic highlights changes to SNTP for V5R3.

New SNTP server

New for V5R3, you can use your iSeries^(TM) server as an SNTP server. This allows you to use your iSeries as a time source for other clients.

Changed SNTP client



For V5R3, the SNTP client has been changed. Instead of altering the software clock, as it did in prior releases, the client now adjusts the system clock.

Enhancements to SNTP information

The SNTP topic now provides information about the features described above. It also provides an overview of “SNTP concepts” on page 5 and a “Scenario: Synchronize clocks with iSeries server” on page 2 that demonstrate how to use SNTP in a network.


How to see what’s new or changed

To help you see where technical changes have been made, this information uses:

- The  image to mark where new or changed information begins.
- The  image to mark where new or changed information ends.

To find other information about what's new or changed this release, see the Memo to Users.

Print this topic

 To view or download the PDF version of this document, select SNTP (about 170 KB).



You can view or download this related topic: Time management. This topic contains concepts and configuration information for managing time on your iSeries^(TM) 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 **Save Target As...** if you are using Internet Explorer. Click **Save Link As...** if you are using Netscape Communicator.
3. Navigate to the directory in which you would like to save the PDF.
4. Click **Save**.

Downloading Adobe Acrobat Reader

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Scenario: Synchronize clocks with iSeries server



Situation

As an administrator of your company's network, you must maintain both your iSeries^(TM) 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 OS/400^(R) 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.

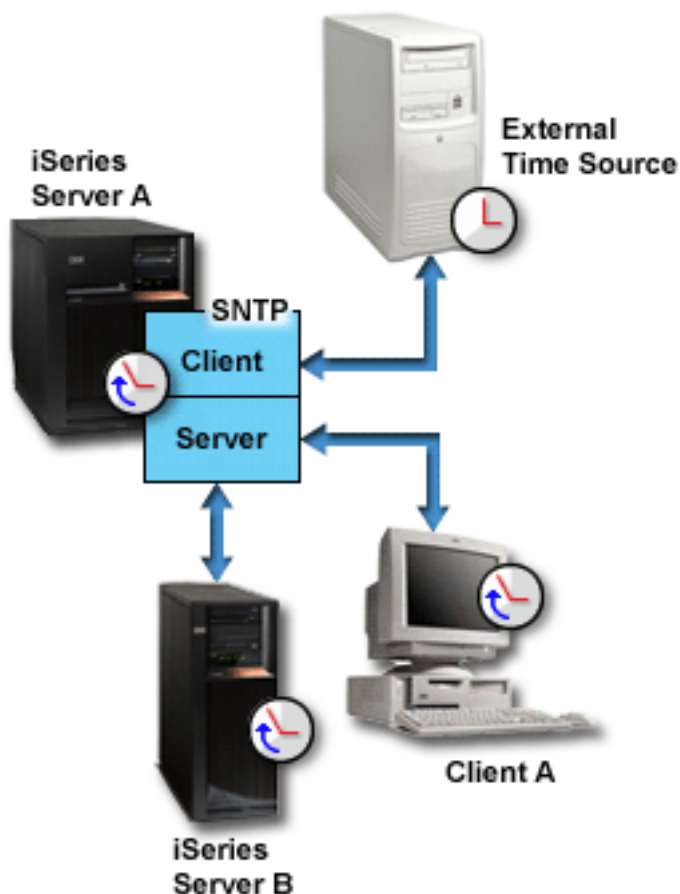
The objectives of this scenario are as follows:

- 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 1: *SNTP as a client and a server*



In Figure 1, 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 will 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 OS/400 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

1. Configure iSeries A as an SNTP client and server (page 4)
2. Configure your firewall to allow SNTP traffic (page 4)
3. Configure the SNTP client on other systems in the network (page 4)
4. Specify SNTP as your time maintenance application (page 4)



Scenario details: Synchronize clocks with iSeries server

» The following steps show how to configure the YourCo, Inc. network to use SNTP. Before completing these tasks, complete all the necessary prerequisites (page 3).

Step 1: 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:
 - Select **Server activity logging**: Only when an error status is returned by the server
 - 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.

Step 2: 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.

Step 3: 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 may need to refer to other system documentation to configure clients in your network.

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, select **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

Step 4: 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. For more information, see Time management.

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 select **Properties**.
3. On the **Date and Time System Values** page, click the **Time** tab.
4. In the **Time maintenance application** field, verify 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 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.



SNTP concepts

» SNTP is used to keep device clocks in sync with each other. OS/400^(R) SNTP is based on RFC 2030. SNTP can be useful for tracking processes and for interactions between machines by using time stamps that are kept synchronized. Before working with Simple Network Time Protocol (SNTP), familiarize yourself with these concepts.

“SNTP client” on page 6

This topic provides information about the SNTP client on OS/400.

“SNTP server” on page 7

Starting with V5R3, you can configure your iSeries^(TM) server as an SNTP server. This topic explains how you can use this feature to maintain time on your network.

Time

Read this topic to understand the concepts associated with time. You will read an overview of time that involves numerous other concepts that are related to the concept of time on the iSeries server. The following concepts related to time are discussed: system time, job time, coordinated universal time (UTC), offset from UTC, and time zone.

Daylight saving time

Read this topic to learn about daylight saving time (DST). Find out what DST is and which time zones use DST.

Date and time system value: Time zone

Use the time zone system value, also known as QTIMZON, to specify the time zone of the system. This value is used to determine UTC offset.

Time adjustment

Read this topic to learn about time adjustments. Learn how a time maintenance application automatically adjusts system time and how you can manually make time adjustments to the system time. Also, learn how a time adjustment is different from manually setting the time of day system value and why a time adjustment is the preferred method when changing the system time.

Date and time system value: Time adjustment




Use the time adjustment system value, also known as QTIMADJ, to identify the software (such as SNTP) used to adjust the system clock for synchronization with an external time source.

SNTP RFCs


Requests for Comments (RFCs) are written definitions of protocol standards and proposed standards that are used for the Internet. The following RFC may be helpful for understanding SNTP and its related functions:

RFC 2030

This RFC discusses the Simple Network Time Protocol.

To view the RFC listed above, go to the RFC index search engine  located on the RFC editor  Web site. Search for the RFC number you want to view. The search results display the corresponding RFC title, author, date, and status. 

SNTP client

 When SNTP is configured as a client, the iSeries^(TM) server retrieves a time value from an external time source. You may 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 OS/400^(R) 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" or see the following Web sites for more information:

- NTP: The Network Time Protocol (<http://www.ntp.org/>) 
- Public NTP Time Servers (<http://www.eecis.udel.edu/~mills/ntp/servers.html>) 

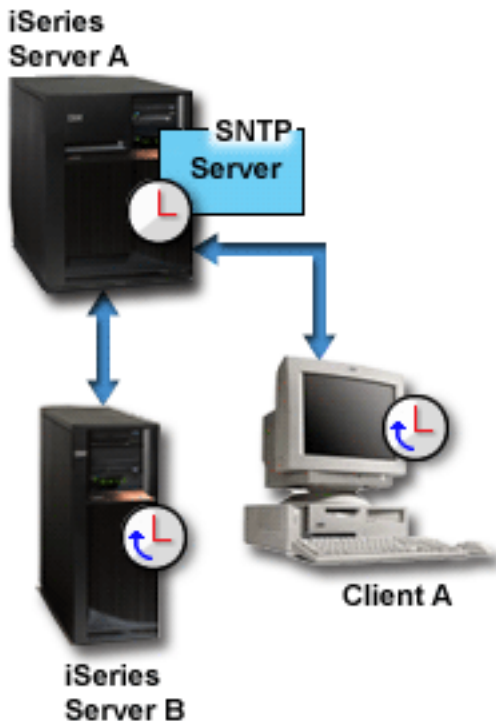
You can run the SNTP client and the SNTP server concurrently on your iSeries server. This allows you to obtain time from an outside source, and then serve that time to clients on your network. For an example, refer to "Scenario: Synchronize clocks with iSeries server" on page 2.

For information about configuring the SNTP client, see "Configure SNTP" on page 7. 

SNTP server

» You can use your iSeries^(TM) 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.

Figure 1: SNTP as a server



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.

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” on page 2.

For information about configuring the SNTP server, see “Configure SNTP.” <<

Configure SNTP

» SNTP can be used to adjust system time. Since 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^(TM) Navigator will depend on what version of the OS/400^(R) operating system you are running on your server and what version of iSeries Access for Windows^(R) 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...
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 may 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 character-based interface by typing CHGNTPA (Change SNTP Attributes).

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



Troubleshoot SNTP

» Use this information to understand your options when problems arise related to SNTP. This topic describes problems that your system may encounter when adjusting time using SNTP.

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

The following topics identify problems you may encounter and how 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 may 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^(TM) 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. <<

Log SNTP activity

» This topic explains how to use the logging function to help you to 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 QTOTYYYYMMDD, where YYYY represents the year, MM represents the month, and DD represents the day.

The CCSID of the file will be the default system CCSID. If the system default CCSID is changed during the time when the activity log is in use on same day, the original CCSID of the file will still be used. Since the resulting file may 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.

Logging client activity

To log SNTP client activity, follow these steps:

1. In iSeries^(TM) Navigator, expand **your iSeries server** —> **Network** —> **Servers** —> **TCP/IP**.
2. Right-click **SNTP**, and select **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)
```

Logging 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 select **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.
```



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