IBM i
Version 7.2

Systems management
Time management

IBM

> **Note**
>
> Before using this information and the product it supports, read the information in "Notices" on page 45.

Contents

Time management

Within the time management component of IBM® Navigator for i, you can work with the time zone and time adjustment functions. With these functions, you can choose a time zone for your system to use and adjust the system time.

In addition, you can identify the software to use as the time maintenance application that synchronizes your system time with an external time source.

With the time zones function, you can specify a time zone for your system to use. Many time zone descriptions are provided with the system and you can also create your own. Time zone descriptions include whether your system should observe daylight saving time (DST). If your system observes DST, the system automatically updates the system time when DST starts and ends.

The time adjustment function allows you to adjust the system time by manually starting a time adjustment. In addition, you can identify a time maintenance application to use to adjust the system clock to keep it synchronized with an external time source.

Related information

IBM Navigator for i tasks on the Web

PDF file for Time management

You can view and print a PDF file of this information.

To view or download the PDF version of this topic, select Time management.

You can view or download these related topics:

- System values
- Simple Network Time Protocol

Saving PDF files

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

1. Right-click the PDF link in your browser.
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).

Time management concepts

Before you work with system time, you need to understand some basic time concepts, such as time zones, Coordinated Universal Time (UTC), and daylight saving time (DST).

Related tasks

Setting up time management

To begin taking advantage of the time management function, you need to set up your systems to use time management. For example, you need to set up your systems to use time zones and time adjustment applications.

Time

Time on a system involves several time concepts, such as time zones, Coordinated Universal Time (UTC), system time, and job time. Each system or partition uses system time. System time is displayed through the time of day system value.

System time is one important time concept. However, you need to understand the various time concepts that play an important role in time management. The following concepts are important concepts that relate to time:

Local system time (system time)
Local system time is determined by applying the system's time zone offset and year offset values to UTC. The Time of day system value displays the local system time. Local system time and system time are used interchangeably.

Local job time
Local job time is determined by applying the job's time zone offset and year offset values to UTC. To view a job's local date and time, view the Date/Time page of the job's properties.

Coordinated Universal Time
Coordinated Universal Time is used to calculate local system time and job time. The offset from UTC and the year offset values are applied to UTC time to calculate the local system time (system time).

Offset from Coordinated Universal Time
Offset from Coordinated Universal Time represents the difference in hours and minutes between UTC and the local system time. A negative offset indicates that the time is west of UTC and a positive offset indicates that the time is east of UTC.

Year offset
Year offset indicates the difference in years between the current Gregorian year and the current year in the calendar used with the time zone for your system.

Daylight saving time
Daylight saving time (DST) is the portion of the year in which the local time of a region is advanced from the standard official time of the region.

Daylight saving time shift
Daylight saving time shift represents the number of minutes that local time moves forward when DST starts, or the number of minutes that local time moves backward when DST ends.

Time zone
The time zone settings specify the offset from UTC and whether to observe DST. Each logical partition on a system can specify a time zone to use.

To combine these time concepts into the various time values associated with a system, examine two systems that use different time zones.
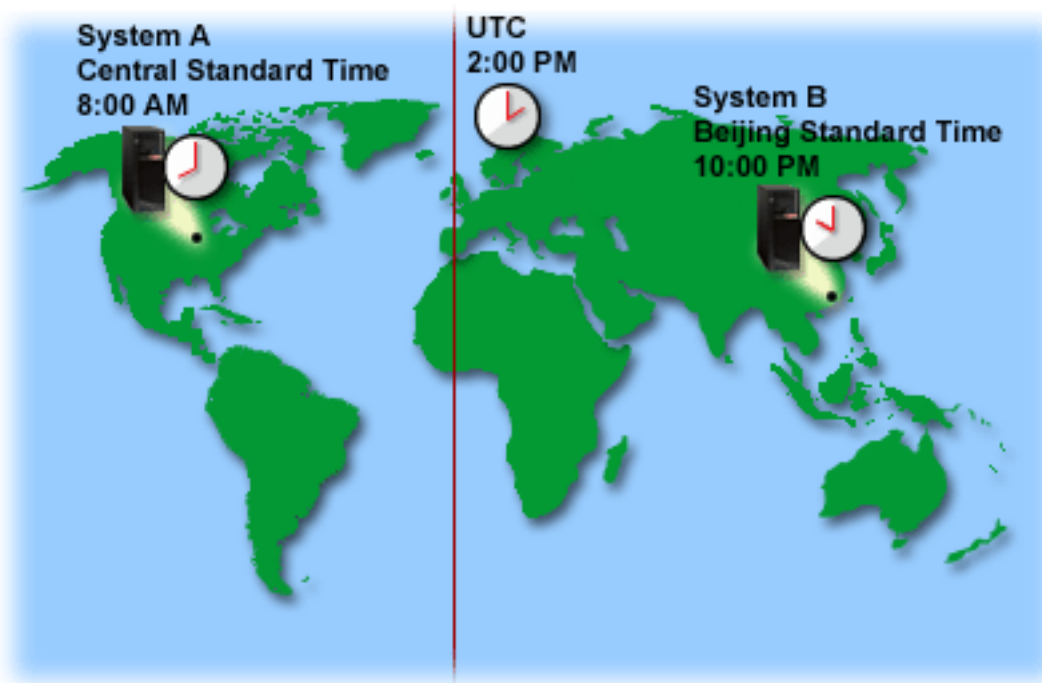
This figure shows two systems in two different time zones. System A is in the Central Standard Time zone and System B is in the Beijing Standard Time zone.

Each system's time values are as follows:

	System A	System B
Local system time	8:00 a.m.	10:00 p.m.
Local job time	8:00 a.m.	10:00 p.m.
Time zone	Central Standard Time	Beijing Standard Time
Offset from UTC	-6:00	+8:00
UTC	2:00 p.m.	2:00 p.m.

Related concepts

Coordinated Universal Time
Coordinated Universal Time (UTC) is a time scale that is kept by time laboratories around the world and is determined by highly precise atomic clocks. The UTC time is accurate to approximately a nanosecond (billionth of a second) per day. UTC is based on the current Gregorian year and is located at 0 degree latitude, the Prime Meridian.

Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Daylight saving time
Daylight saving time (DST) is the portion of the year in which a region's local time is advanced from its standard official time. The local time typically changes by one hour, but the actual amount is controlled by the DST shift value of the time zone description.

Managing time zones

The Time zone (QTIMZON) system value specifies the name of the time zone description used to calculate the local system time. Depending on the time zone description in use, the IBM i operating system can automatically adjust the local system time to observe daylight saving time (DST).

Related information

Date and time system values: Time of day

Coordinated Universal Time

Coordinated Universal Time (UTC) is a time scale that is kept by time laboratories around the world and is determined by highly precise atomic clocks. The UTC time is accurate to approximately a nanosecond (billionth of a second) per day. UTC is based on the current Gregorian year and is located at 0 degree latitude, the Prime Meridian.

Gregorian UTC is used as the starting point to calculate the system time. To calculate the system time from UTC, the system's offset from UTC is added to UTC. The offset specifies the number of hours and minutes that the system is either west or east of UTC. Everything west of the Prime Meridian has a negative offset and everything east has a positive offset. Then, the offset is applied to UTC to calculate the system time. The system time is displayed in the Time of day system value.

For systems observing a non-Gregorian calendar, the Year offset value is applied to the UTC year to calculate the local system year. For example, if the time zone description specifies a Year offset value of -57, then the local system year is the current Gregorian year minus 57.

The following figure shows where UTC is located relative to System A. UTC has a time value of 4:00 p.m. System A is located in the United States of America in the Central Standard Time zone. System A is located west of UTC 6 hours. Therefore, System A is offset from UTC by -06:00 hours. To calculate System A's system time, add a negative 6 hours (-06:00) to 4:00 p.m., which is the current time value for UTC. With this calculation, System A's local system time is 10:00 a.m.
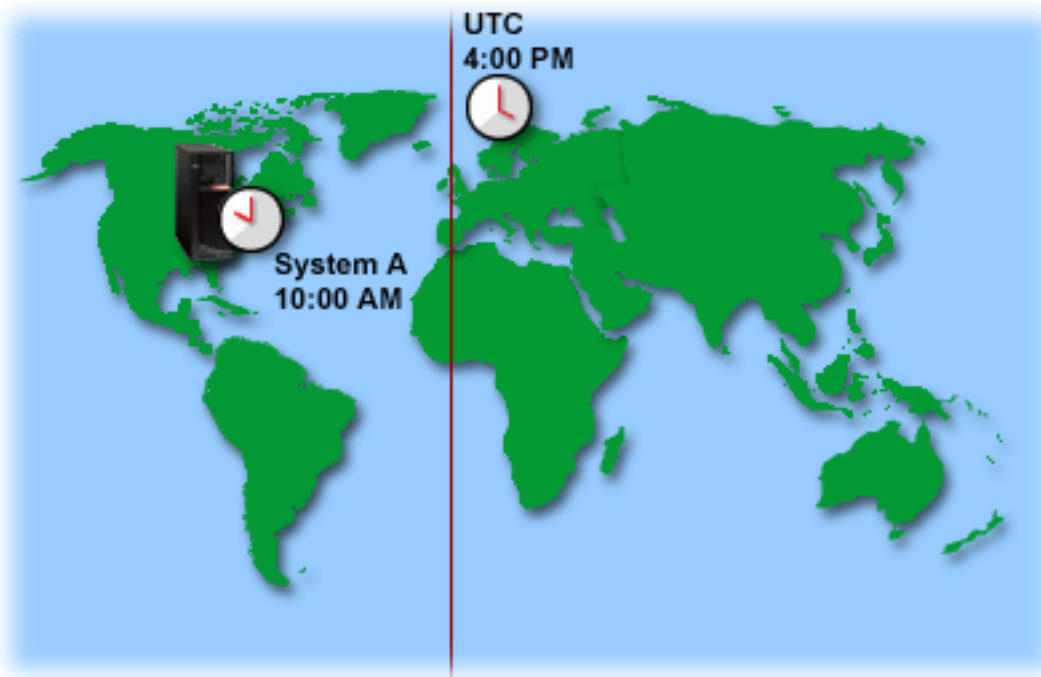
Related concepts

Time

Time on a system involves several time concepts, such as time zones, Coordinated Universal Time (UTC), system time, and job time. Each system or partition uses system time. System time is displayed through the time of day system value.

Related information

Date and time system values: Time of day

Time maintenance application

A time maintenance application maintains the system time with an external time source.

Each time maintenance application is unique and is programmed differently. However, the overall purpose of a time maintenance application is to retrieve a time value from an external time source and compare it to the system's time value. If the two values differ, a time adjustment begins. The amount of time that the two values must differ before a time adjustment begins is unique to the actual time maintenance application that you are using.

Use the time adjustment (QTIMADJ) system value to identify the software to use to adjust the system clock to keep it synchronized with an external time source. 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. IBM time adjustment offerings use identifiers that start with QIBM such as QIBM_OS400_SNTP. Other software suppliers should follow a similar naming convention of company name and product name.

Time adjustment software should check this system value before starting. If this system value has an identifier for other time adjustment software, then the software being started should notify the user of this potential conflict and confirm that this time adjustment software should be started. When there is no identifier associated with this system value, the software should update this system value to identify that it is now responsible for adjusting the system clock. Time adjustment software should check this system value again before ending. This system value should be set to None only if the current value identifies this time adjustment software that is ending.

You can use the SNTP application to maintain your system time. The SNTP application is an IBM-supplied time maintenance application that you can use as a client, server, or both.

In , System A uses the SNTP application as a client and a server. The SNTP client retrieves a time value from an external time source. The external time source is determined by what you specify to use. The SNTP application synchronizes System A's Coordinated Universal Time (UTC) with the time value from the external time source. Then, the SNTP server (System A) sends the time value to all SNTP client systems (System B and Client A) connected to it.
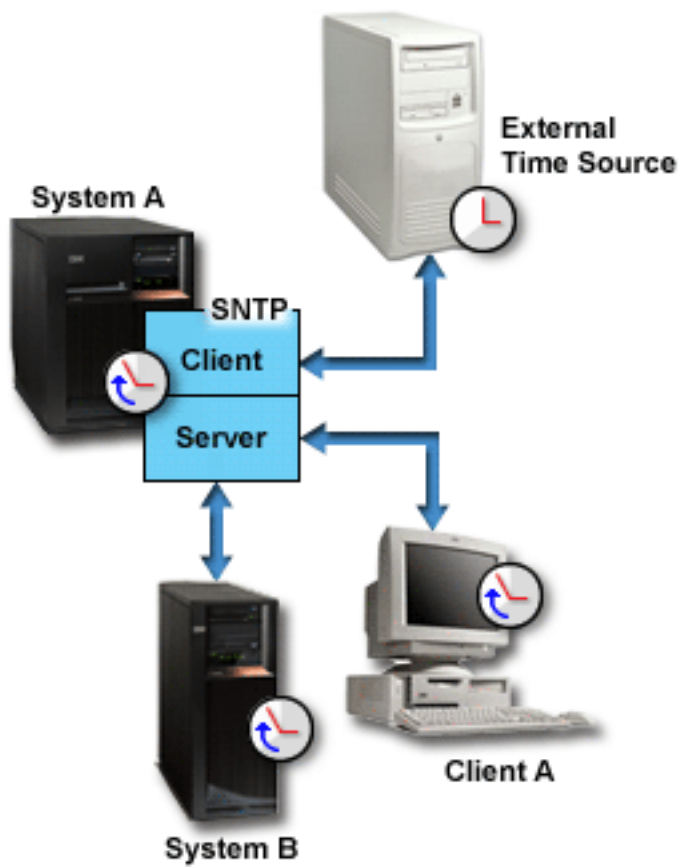
Figure 1. SNTP as a client and a server

In , System A uses the SNTP server. In this situation, the UTC time is retrieved from the system rather than being synchronized with an external time source. This internal time value is sent to all SNTP client systems (System B and Client A) connected to it.
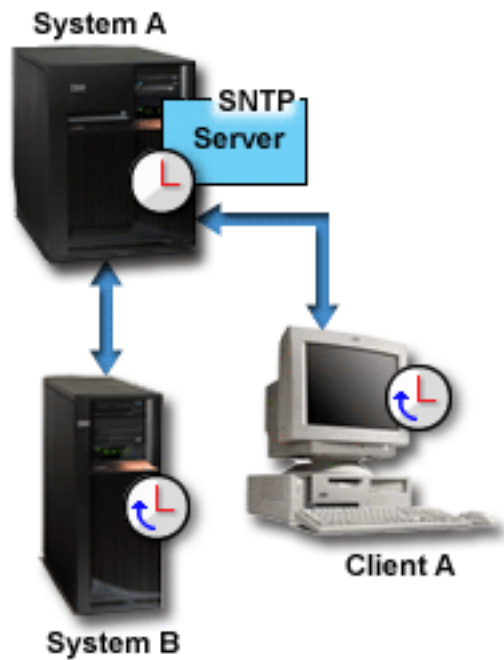
Figure 2. SNTP as a server

Related concepts

Time adjustment
You can use the time adjustment function of IBM Navigator for i to adjust the system time, or use a time maintenance application to adjust the system time automatically.

Setting up time maintenance
If you want to use a time maintenance application to synchronize your system time with an external time source, you need to configure the time maintenance application on each system. You can use the Simple Network Time Protocol (SNTP) time maintenance application or an application of your own.

Related information

Date and time system values: Time adjustment

Simple Network Time Protocol

Time adjustment

You can use the time adjustment function of IBM Navigator for i to adjust the system time, or use a time maintenance application to adjust the system time automatically.

Time adjustments are preferred over manually setting the time of day system value because a time adjustment speeds up or slows down time in small increments rather than making a single, instantaneous time change.

If you do not use the time adjustment function, you can manually change the system time using the time of day system value. For example, if you want to set the system time backward three minutes, you can manually change the time of day system value from 3:00:00 (HH:MM:SS) to 2:57:00. By doing this, the system time from 2:57:00 to 3:00:00 is repeated. This can cause problems for applications recording time.

To avoid these types of problems, you can use the time adjustment function to change the system time and time will not be skipped or repeated. Adjusting the clock means to incrementally speed up or slow down the clock so that time is gradually adjusted to the desired time value. Adjusting does not cause large jumps in time that can be experienced with setting the clock with the time of day system value. However, adjusting does take time to complete because it is not a single, instantaneous change to the clock. For example, adjusting the clock by 1 second can take 10 seconds of real time to complete.

The following figure shows the difference between manually setting the time of day system value and using the time adjustment function. The lines represent the progression forward in time. The section highlighted in blue shows the period of time that is either skipped or repeated (during manual changes), or continuous (during time adjustments).

Manual Change

Time Adjustment

The Manual Change figure shows that if you set the system time from 9:00 a.m. to 11:00 a.m., the two-hour interval from 9:00 a.m. to 11:00 a.m. is skipped. Also, if you set the time backward from 11:00 a.m. to 9:00 a.m., the system time repeats the time frame from 9:00 a.m. to 11:00 a.m.

The Time Adjustment figure shows that if you adjust the system time using the time adjustment function, the flow of time is neither skipped nor repeated. Time gradually speeds up or slows down until the appropriate time value is reached. The amount of time that an adjustment takes to complete depends on the length of the adjustment. A two-hour time adjustment, either negative or positive, is the maximum adjustment allowed. Time adjustment ensures that the system time flows continuously. Therefore, time adjustment is the suggested method for changing system time.

For more information about how to change the system time, either a manual time change or a time adjustment, see Updating system time.

Related concepts

Time maintenance application
A time maintenance application maintains the system time with an external time source.

Scenario: Adjusting the system time by 3 minutes
You can manually adjust the system time by 3 minutes. A time adjustment is different from changing the time of day system value. A time adjustment is the suggested method for system time changes.

Related tasks

Updating system time
You can adjust system time using a time adjustment, which is the preferred method. If you need to change the system time immediately, you can manually change the system time using the time of day system value.

System time is off more than 2 hours

This situation can happen if your system time was incorrectly adjusted for observance of daylight saving time (DST), or if the time zone was set incorrectly during IBM i installation.

Related information

Date and time system values: Time of day

Time zone

The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

You can specify a time zone for each system in your business environment. The time zone setting specifies the offset from Coordinated Universal Time (UTC) and whether to observe daylight saving time (DST). If you specify to observe DST, the system automatically updates the system time when DST begins and ends. You do not need to manually set the system time when DST begins and ends.

In a time zone description, the Year offset value indicates the difference in years between the current Gregorian year and the current year in the calendar used with the time zone for the system. For systems observing a non-Gregorian calendar, this Year offset value is applied to the UTC year to calculate the local system year. For example, if the time zone description specifies a Year offset value of -57, then the local system year is the current Gregorian year minus 57.

In a time zone description, the Daylight saving time shift value represents the number of minutes that local time moves forward when DST starts, or the number of minutes that local time moves backward when DST ends.

In a time zone description, the Alternate name value specifies the corresponding Olson database entry used by Java™. You can specify a maximum of 128 characters for this value.

Note: The Year offset value, the Daylight saving time shift value, and the Alternate name value are not supported on systems running IBM i V5R4, or earlier.

You can use one of the IBM-supplied time zones, or create your own time zones. If you want to edit one of the supplied time zones, you need to create a new time zone based on the existing time zone. This prevents your changes from being lost when you install the operating system in the future. When the operating system is installed, the system-supplied time zones are overwritten. All IBM-supplied time zone identifiers begin with the character Q, and the full and abbreviated names of time zones are retrieved from the messages in the QCPFMSG message file. If you create a time zone (whether it is new or based on an existing time zone), the time zone identifier should not begin with the character Q. All time zone identifiers that begin with the character Q are reserved for IBM.

Use the time zone (QTIMZON) system value to specify the time zone for your system to use. To use the time zone system value, you must be using IBM i V5R3, or later.

The following table identifies the time zones included with the system.

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
Q0000UTC	0:00	UTC	CPX0910	Coordinated Universal Time (UTC)	N/A	N/A	N/A	N/A
Q0000GMT	0:00	GMT	CPX0911	Greenwich Mean Time (GMT)	N/A	N/A	N/A	N/A
Q0000GMT2	0:00	Europe/London	CPX0911	Greenwich Mean Time (GMT)	CPX0912	British Summer Time (BST)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
Q000GMT3	0:00	Europe/London	CPX0911	Greenwich Mean Time (GMT)	CPX0912	British Summer Time (BST)	Last Sunday in March at 1:00 a.m.	Last Sunday in October at 2:00 a.m.

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QN0100UTCS	-1:00	GMT-1	CPX0913	UTC-01:00 Standard Time (UTC-01:00S)	N/A	N/A	N/A	N/A
QN0200UTCS	-2:00	GMT-2	CPX0914	UTC-02:00 Standard Time (UTC-02:00S)	N/A	N/A	N/A	N/A
QN0300UTCS	-3:00	GMT-3	CPX0915	UTC-03:00 Standard Time (UTC-03:00S)	N/A	N/A	N/A	N/A
QN0300UTC2	-3:00	America/ Sao_Paulo	CPX0916	(GMT - 3:00) Brasilia (UTC-03:00S)	CPX095D	(GMT - 3:00) Brasilia Daylight Saving Time (UTC-03:00D)	Third Saturday in October at 2:00 a.m.	Second Friday in February at 2:00 a.m.
QN0330NST	-3:30	America/St_Johns	CPX0917	Newfoundland Standard Time (NST)	CPX0918	Newfoundland Daylight Time (NDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0330NST2	-3:30	America/St_Johns	CPX0917	Newfoundland Standard Time (NST)	CPX0918	Newfoundland Daylight Time (NDT)	First Sunday in April at 12:01 a.m.	Last Sunday in October at 12:01 a.m.
QN0330NST3	-3:30	America/St_Johns	CPX0917	Newfoundland Standard Time (NST)	CPX0918	Newfoundland Daylight Time (NDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0330NST4	-3:30	America/St_Johns	CPX0917	Newfoundland Standard Time (NST)	CPX0918	Newfoundland Daylight Time (NDT)	Second Sunday in March at 12:01 a.m.	First Sunday in November at 12:01 a.m.
QN0400UTCS	-4:00	GMT-4	CPX0919	UTC-04:00 Standard Time (UTC-04:00S)	N/A	N/A	N/A	N/A
QN0400AST	-4:00	Atlantic/Bermuda	CPX091A	Atlantic Standard Time (AST)	CPX091B	Atlantic Daylight Time (ADT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0400AST2	-4:00	Atlantic/Bermuda	CPX091A	Atlantic Standard Time (AST)	CPX091B	Atlantic Daylight Time (ADT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0400CLT	-4:00	America/Santiago	CPX095E	Chile Time (CLT)	CPX095F	Chile Summer Time (CLST)	Second Saturday in October at 12:00 a.m.	Second Saturday in March at 12:00 a.m.
QN0400UTC2	-4:00	America/Caracas	CPX091C	(GMT - 4:00) Caracas, La Paz (UTC-04:00S)	N/A	N/A	N/A	N/A
QN0500UTCS	-5:00	GMT-5	CPX091D	UTC-05:00 Standard Time (UTC-05:00S)	N/A	N/A	N/A	N/A

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QN0500EST	-5:00	America/New_York	CPX091E	Eastern Standard Time (EST)	CPX091F	Eastern Daylight Time (EDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0500EST2	-5:00	GMT-5	CPX091E	Eastern Standard Time (EST)	N/A	N/A	N/A	N/A
QN0500EST3	-5:00	America/New_York	CPX091E	Eastern Standard Time (EST)	CPX091F	Eastern Daylight Time (EDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0600UTCS	-6:00	GMT-6	CPX0920	UTC-06:00 Standard Time (UTC-06:00S)	N/A	N/A	N/A	N/A
QN0600CST	-6:00	America/Chicago	CPX0921	Central Standard Time (CST)	CPX0922	Central Daylight Time (CDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0600CST2	-6:00	America/Chicago	CPX0921	Central Standard Time (CST)	CPX0922	Central Daylight Time (CDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0600CST3	-6:00	America/ Mexico_City	CPX0921	Central Standard Time (CST)	CPX0922	Central Daylight Time (CDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0600S	-6:00	America/Chicago	CPX0923	Central Standard Time (S)	CPX0924	Daylight Saving Time (DST)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0700UTCS	-7:00	GMT-7	CPX0925	UTC-07:00 Standard Time (UTC-07:00S)	N/A	N/A	N/A	N/A
QN0700MST	-7:00	America/Denver	CPX0926	Mountain Standard Time (MST)	CPX0927	Mountain Daylight Time (MDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0700MST2	-7:00	America/Phoenix	CPX0926	Mountain Standard Time (MST)	N/A	N/A	N/A	N/A
QN0700MST3	-7:00	America/Denver	CPX0926	Mountain Standard Time (MST)	CPX0927	Mountain Daylight Time (MDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0700MST4	-7:00	America/Mazatlan	CPX0926	Mountain Standard Time (MST)	CPX0927	Mountain Daylight Time (MDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0700T	-7:00	America/Denver	CPX0928	Mountain Standard Time (T)	CPX0924	Daylight Saving Time (DST)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QN0800UTCS	-8:00	GMT-8	CPX0929	UTC-08:00 Standard Time (UTC-08:00S)	N/A	N/A	N/A	N/A
QN0800PST	-8:00	America/ Los_Angeles	CPX092A	Pacific Standard Time (PST)	CPX092B	Pacific Daylight Time (PDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0800PST2	-8:00	America/ Los_Angeles	CPX092A	Pacific Standard Time (PST)	CPX092B	Pacific Daylight Time (PDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN0800PST3	-8:00	America/Tijuana	CPX092A	Pacific Standard Time (PST)	CPX092B	Pacific Daylight Time (PDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0800U	-8:00	America/ Los_Angeles	CPX092C	Pacific Standard Time (U)	CPX0924	Daylight Saving Time (DST)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0900UTCS	-9:00	GMT-9	CPX092D	UTC-09:00 Standard Time (UTC-09:00S)	N/A	N/A	N/A	N/A
QN0900AST	-9:00	America/ Anchorage	CPX092E	Alaska Standard Time (AKST)	CPX092F	Alaska Daylight Time (AKDT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN0900AST2	-9:00	America/ Anchorage	CPX092E	Alaska Standard Time (AKST)	CPX092F	Alaska Daylight Time (AKDT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN1000UTCS	-10:00	GMT-10	CPX0930	UTC-10:00 Standard Time (UTC-10:00S)	N/A	N/A	N/A	N/A
QN1000HAST	-10:00	America/Adak	CPX0931	Hawaii-Aleutian Standard Time (HAST)	CPX0932	Hawaii-Aleutian Daylight Time (HADT)	First Sunday in April at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QN1000HAS2	-10:00	America/Adak	CPX0931	Hawaii-Aleutian Standard Time (HAST)	CPX0932	Hawaii-Aleutian Daylight Time (HADT)	Second Sunday in March at 02:00 a.m.	First Sunday in November at 02:00 a.m.
QN1000HST	-10:00	Pacific/Honolulu	CPX0963	Hawaii Standard Time (HST)	N/A	N/A	N/A	N/A
QN1100UTCS	-11:00	GMT-11	CPX0933	UTC-11:00 Standard Time (UTC-11:00S)	N/A	N/A	N/A	N/A
QN1200UTCS	-12:00	GMT-12	CPX0934	UTC-12:00 Standard Time (UTC-12:00S)	N/A	N/A	N/A	N/A
QP1245UTCS	+12:45	Pacific/Chatham	CPX0935	Chatham Islands Standard Time (UTC+12:45S)	CPX0936	Chatham Islands Daylight Time (UTC+12:45D)	First Sunday in October at 2:00 a.m.	Third Sunday in March at 2:00 a.m.

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QP1245UTC2	+12:45	Pacific/Chatham	CPX0935	Chatham Islands Standard Time (UTC+12:45S)	CPX0936	Chatham Islands Daylight Time (UTC+12:45D)	First Sunday in October at 2:45 a.m.	Third Sunday in March at 03:45 a.m.
QP1200UTCS	+12:00	GMT+12	CPX0937	UTC+12:00 Standard Time (UTC+12:00S)	N/A	N/A	N/A	N/A
QP1200NZST	+12:00	Pacific/Auckland	CPX0938	New Zealand Standard Time (NZST)	CPX0939	New Zealand Daylight Time (NZDT)	First Sunday in October at 2:00 a.m.	Third Sunday in March at 2:00 a.m.
QP1200NZS2	+12:00	Pacific/Auckland	CPX0938	New Zealand Standard Time (NZST)	CPX0939	New Zealand Daylight Time (NZDT)	First Sunday in October at 2:00 a.m.	Third Sunday in March at 3:00 a.m.
QP1200NZS3	+12:00	Pacific/Auckland	CPX0938	New Zealand Standard Time (NZST)	CPX0939	New Zealand Daylight Time (NZDT)	Last Sunday in September at 02:00 a.m.	First Sunday in April at 03:00 a.m.
QP1100UTCS	+11:00	GMT+11	CPX093A	UTC+11:00 Standard Time (UTC+11:00S)	N/A	N/A	N/A	N/A
QP1000UTCS	+10:00	GMT+10	CPX093B	UTC+10:00 Standard Time (UTC+10:00S)	N/A	N/A	N/A	N/A
QP1000AEST	+10:00	Australia/Sydney	CPX093C	Australian Eastern Standard Time (AEST)	CPX093D	Australian Eastern Daylight Saving Time (AEDT)	Last Sunday in October at 2:00 a.m.	Last Sunday in March at 2:00 a.m.
QP1000AES2	+10:00	Australia/Sydney	CPX093C	Australian Eastern Standard Time (AEST)	CPX093D	Australian Eastern Daylight Saving Time (AEDT)	Last Sunday in October at 2:00 a.m.	Last Sunday in March at 3:00 a.m.
QP1000AES3	+10:00	Australia/Sydney	CPX093C	Australian Eastern Standard Time (AEST)	CPX093D	Australian Eastern Daylight Saving Time (AEDT)	First Sunday in October at 2:00 a.m.	First Sunday in April at 3:00 a.m.
QP0930ACST	+9:30	Australia/Adelaide	CPX093E	Australian Central Standard Time (ACST)	CPX093F	Australian Central Daylight Saving Time (ACDT)	Last Sunday in October at 2:00 a.m.	Last Sunday in March at 2:00 a.m.
QP0930ACS2	+9:30	Australia/Adelaide	CPX093E	Australian Central Standard Time (ACST)	CPX093F	Australian Central Daylight Saving Time (ACDT)	Last Sunday in October at 2:00 a.m.	Last Sunday in March at 3:00 a.m.
QP0930ACS3	+9:30	Australia/Adelaide	CPX093E	Australian Central Standard Time (ACST)	CPX093F	Australian Central Daylight Saving Time (ACDT)	First Sunday in October at 2:00 a.m.	First Sunday in April at 3:00 a.m.
QP0900UTCS	+9:00	GMT+9	CPX0940	UTC+09:00 Standard Time (UTC+09:00S)	N/A	N/A	N/A	N/A
QP0900JST	+9:00	Asia/Tokyo	CPX0941	Japan Standard Time (JST)	N/A	N/A	N/A	N/A

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QP0900KST	+9:00	Asia/Seoul	CPX0942	Korea Standard Time (KST)	N/A	N/A	N/A	N/A
QP0900WIT	+9:00	Asia/Jayapura	CPX0943	Waktu Indonesia Timur (WIT)	N/A	N/A	N/A	N/A
QP0800UTCS	+8:00	GMT+8	CPX0944	UTC+08:00 Standard Time (UTC+08:00S)	N/A	N/A	N/A	N/A
QP0800AWST	+8:00	Australia/Perth	CPX0945	Australian Western Standard Time (AWST)	N/A	N/A	N/A	N/A
QP0800AWS2	+8:00	Australia/Perth	CPX0945	Australian Western Standard Time (AWST)	CPX0964	Australian Western Daylight Saving Time (AWDT)	First Sunday in December at 02:00 a.m.	Last Sunday in March at 03:00 a.m.
QP0800AWS3	+8:00	Australia/Perth	CPX0945	Australian Western Standard Time (AWST)	CPX0964	Australian Western Daylight Saving Time (AWDT)	Last Sunday in October at 02:00 a.m.	Last Sunday in March at 03:00 a.m.
QP0800BST	+8:00	Asia/Shanghai	CPX0946	Beijing Standard Time (BST)	N/A	N/A	N/A	N/A
QP0800JIST	+8:00	Asia/Hong_Kong	CPX0947	Jung Yuan Standard Time (JIST)	N/A	N/A	N/A	N/A
QP0800WITA	+8:00	Asia/ Ujung_Pandang	CPX0948	Waktu Indonesia Tengah (WITA)	N/A	N/A	N/A	N/A
QP0700UTCS	+7:00	GMT+7	CPX0949	UTC+07:00 Standard Time (UTC+07:00S)	N/A	N/A	N/A	N/A
QP0700WIB	+7:00	Asia/Jakarta	CPX094A	Waktu Indonesia Barat (WIB)	N/A	N/A	N/A	N/A
QP0600UTCS	+6:00	GMT+6	CPX094B	UTC+06:00 Standard Time (UTC+06:00S)	N/A	N/A	N/A	N/A
QP0600UTC2	+6:00	Asia/Almaty	CPX094C	Asia/Almaty (UTC+06:00S)	CPX094D	Asia/Almaty Daylight Saving Time (UTC +06:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in September at 2:00 a.m.
QP0600UTC3	+6:00	Asia/Almaty	CPX094C	Asia/Almaty (UTC+06:00S)	CPX094D	Asia/Almaty Daylight Saving Time (UTC +06:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 3:00 a.m.
QP0530IST	+5:30	Asia/Calcutta	CPX094E	Indian Standard Time (IST)	N/A	N/A	N/A	N/A
QP0500UTCS	+5:00	GMT+5	CPX094F	UTC+05:00 Standard Time (UTC+05:00S)	N/A	N/A	N/A	N/A

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QP0500UTC2	+5:00	Asia/Aqtobe	CPX0950	Asia/Aqtobe (UTC+05:00S)	CPX0951	Asia/Aqtobe Daylight Saving Time (UTC +05:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in September at 2:00 a.m.
QP0500UTC3	+5:00	Asia/Aqtobe	CPX0950	Asia/Aqtobe (UTC+05:00S)	CPX0951	Asia/Aqtobe Daylight Saving Time (UTC +05:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 3:00 a.m.
QP0400MSK	+4:00	Europe/Moscow	CPX0961	Moscow Time (MSK)	N/A	N/A	N/A	N/A
QP0400UTCS	+4:00	GMT+4	CPX0952	UTC+04:00 Standard Time (UTC+04:00S)	N/A	N/A	N/A	N/A
QP0400UTC2	+4:00	Asia/Aqtau	CPX0953	Asia/Aqtau (UTC +04:00S)	CPX0954	Asia/Aqtau Daylight Saving Time (UTC +04:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QP0400UTC3	+4:00	Asia/Aqtau	CPX0953	Asia/Aqtau (UTC +04:00S)	CPX0954	Asia/Aqtau Daylight Saving Time (UTC +04:00D)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 3:00 a.m.
QP0300MSK	+3:00	Europe/Moscow	CPX0961	Moscow Time (MSK)	CPX0962	Moscow Summer Time (MSD)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 3:0 a.m.
QP0300UTCS	+3:00	GMT+3	CPX0955	UTC+03:00 Standard Time (UTC+03:00S)	N/A	N/A	N/A	N/A
QP0200UTCS	+2:00	GMT+2	CPX0956	UTC+02:00 Standard Time (UTC+02:00S)	N/A	N/A	N/A	N/A
QP0200EET	+2:00	Europe/Tallinn	CPX0957	Eastern European Time (EET)	CPX0958	Eastern European Daylight Saving Time (EEDST)	Last Sunday in March at 2:00 a.m.	Last Sunday in September at 2:00 a.m.
QP0200EET2	+2:00	GMT+2	CPX0957	Eastern European Time (EET)	N/A	N/A	N/A	N/A
QP0200EET3	+2:00	Europe/Tallinn	CPX0957	Eastern European Time (EET)	CPX0958	Eastern European Daylight Saving Time (EEDST)	Last Sunday in March at 3:00 a.m.	Last Sunday in October at 4:00 a.m.
QP0200SAST	+2:00	Africa/ Johannesburg	CPX0959	South African Standard Time (SAST)	N/A	N/A	N/A	N/A
QP0100UTCS	+1:00	GMT+1	CPX095A	UTC+01:00 Standard Time (UTC+01:00S)	N/A	N/A	N/A	N/A
QP0100CET	+1:00	Europe/Zurich	CPX095B	Central European Time (CET)	CPX095C	Central European Daylight Saving Time (CEST)	Last Sunday in March at 2:00 a.m.	Last Sunday in September at 2:00 a.m.

Time zone object	Offset from UTC	Alternate name	Message ID[2]	Standard Time full name (abbreviated name)[1]	Message ID[3]	DST full name (abbreviated name)[1]	DST start	DST end
QP0100CET2	+1:00	Europe/Zurich	CPX095B	Central European Time (CET)	CPX095C	Central European Daylight Saving Time (CEST)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 2:00 a.m.
QP0100CET3	+1:00	Europe/Zurich	CPX095B	Central European Time (CET)	CPX095C	Central European Daylight Saving Time (CEST)	Last Monday in March at 2:00 a.m.	Last Sunday in September at 2:00 a.m.
QP0100CET4	+1:00	Europe/Zurich	CPX095B	Central European Time (CET)	CPX095C	Central European Daylight Saving Time (CEST)	Last Sunday in March at 2:00 a.m.	Last Sunday in October at 3:00 a.m.

Notes:

1

The abbreviated and full names of the time zone are specified in messages to allow for translation.

2

The Standard Time names of the time zone are retrieved from the message ID specified. The message ID is located in the QCPFMSG message file. The name is specified in the second-level text of the message ID.

3

The Daylight Saving Time names of the time zone are retrieved from the message ID specified. The message ID is located in the QCPFMSG message file. The name is specified in the second-level text of the message ID.

N/A

Not applicable.

Related concepts

Time

Time on a system involves several time concepts, such as time zones, Coordinated Universal Time (UTC), system time, and job time. Each system or partition uses system time. System time is displayed through the time of day system value.

Scenario: Changing DST start or end due to time-sensitive programs

Time-sensitive programs scheduled to run during the time frame at which daylight saving time (DST) either starts or ends might encounter unpredictable results. To avoid this situation, you can change when DST starts or ends on your system.

Related tasks

Setting the time zone before upgrading to IBM i V5R3, or later

If you have a previous release of the IBM i operating system installed and are upgrading to IBM i V5R3, or later, you need to set the time zone before your system is upgraded to the new release. This is the preferred method because your time zone can be set correctly as soon as the upgrade is complete.

Setting the time zone after an IPL

You can use IBM Navigator for i to change the Time zone (QTIMZON) system value after an initial program load (IPL). You can also use this method to ensure that the time zone is set properly if the Offset from Coordinated Universal Time (UTC) value was not correct during the upgrade or installation of IBM i software.

Creating a time zone

Using the time management function of IBM Navigator for i, you can create a time zone specific to your needs. You can create either a new time zone, or a new time zone based on an existing time zone.

Editing a time zone

If you create a time zone and realize later that a property is not set correctly, you can edit the time zone. You can edit the time zone while it is being used by the system.

Deleting a time zone

When you delete a time zone, the time zone object is removed from the system. You can no longer access the time zone object.

Related information

Date and time system values: Time zone

Initial time zone setting

During the initial startup, the IBM i operating system sets the initial time zone. This topic describes how the system determines the initial value for the time zone (QTIMZON) system value.

There is no shipped default value for the QTIMZON system value. You can set this system value in IBM Navigator for i and from the IPL Options display during an attended initial program load (IPL).

To determine the initial value for the QTIMZON system value, the operating system performs the following actions:

1. The system attempts to retrieve the time zone from the QWCTIMZON data area.

   During the IPL of an IBM i software upgrade, the operating system looks for a data area named QWCTIMZON in the QSYS library. To create the data area before installation, see "Setting the time zone before upgrading to IBM i V5R3, or later" on page 25. If the data area is found, the following steps are taken:

   a. The system attempts to find a time zone description object whose name matches the time zone description object named in the data area. If this step fails, the system proceeds to "1.b" on page 17.

   b. The system attempts to find a time zone description object whose name is derived from the offset specified in the data area.

      This name consists of the letter Q, followed by an N if the offset is negative, or a P if the offset is positive; then it is followed by the offset hours and minutes; and finally by the letters UTCS. For example, if the offset specified in the data area is -06:00, the operating system attempts to find a time zone description named QN0600UTCS. Note that if the offset is zero, the character representing the sign (N or P) is omitted, and the name used is Q0000UTC. If this step fails, the system proceeds to "1.c" on page 17.

   c. The system attempts to create a new time zone description whose name and offset match the information specified in the data area.

      This time zone description does not support DST. For example, if the data area specified is -05:15MYTIMEZONE, the operating system attempts to create a time zone description named MYTIMEZONE with an offset of negative five hours and 15 minutes. If this step fails, the system proceeds to "2" on page 17.

2. The system attempts to retrieve the time zone from the offset from UTC (QUTCOFFSET) system value.

   If the data area QWCTIMZON does not exist, or if the preceding steps fail, the operating system attempts to use the value specified in the QUTCOFFSET system value. The following steps are performed:

   a. The system attempts to find a time zone description object whose name is derived from the offset specified in the QUTCOFFSET system value. See "1.b" on page 17 for information about how this name is derived. If this step fails, the system proceeds to "2.b" on page 17.

   b. The system attempts to create a new time zone description whose name was derived in the previous step "2.a" on page 17 and whose offset matches the information specified in the QUTCOFFSET system value. This time zone description does not support daylight saving time.

If all of the preceding steps fail, the QTIMZON system value is not set. In IBM Navigator for i, the **Time Zone** field is blank, and in the character-based interface, the time zone parameter is set to *N (not available). In addition, the offset from Coordinated Universal Time (UTC) value is set to 0. Then, the system's local system time is set to the current UTC.

Related tasks

Setting the time zone before upgrading to IBM i V5R3, or later

If you have a previous release of the IBM i operating system installed and are upgrading to IBM i V5R3, or later, you need to set the time zone before your system is upgraded to the new release. This is the preferred method because your time zone can be set correctly as soon as the upgrade is complete.

Setting the time zone during an attended IPL
You can set the Time zone (QTIMZON) system value during an attended initial program load (IPL) of the IBM i operating system. This is the preferred method if you are installing software on a new system or partition because it ensures that the time zone can be set correctly as soon as you complete the IPL.

Offset from UTC was incorrectly set during IBM i installation
If the Offset from UTC (QUTCOFFSET) system value was not set correctly during the installation, the initial time zone value for your system might not be correct.

System time is incorrect and jobs are not running with the proper time
If your system time is incorrect and your jobs are not running with the proper time, your time settings might not have been specified correctly.

Related information

Date and time system values: Time zone

Date and time system values: Offset from Coordinated Universal Time (UTC)

Daylight saving time

Daylight saving time (DST) is the portion of the year in which a region's local time is advanced from its standard official time. The local time typically changes by one hour, but the actual amount is controlled by the DST shift value of the time zone description.

Many countries or regions specify that their local system time be adjusted forward or backward by one hour, to accommodate annual changes in the number of daylight hours. This change might also be accompanied by a change in the time zone name. For example, in Toronto, Canada, 1 p.m. is announced in the winter as 1 p.m., Eastern Standard Time (EST), and is announced in the summer as 1 p.m., Eastern Daylight Time (EDT). Daylight saving time is also known as *Advanced Time*, *Summer Time*, or *Legal Time* (with Standard Time also known as *Winter Time*) in certain countries or regions. Daylight saving time adjustments in the southern hemisphere are opposite to those in the northern hemisphere.

A general rule for DST changes is that the change from Standard Time to DST needs to be completed before 03:00 (local time) on the date or day that DST is to begin. Likewise, when changing from DST to Standard Time, the time change occurs between midnight and 03:00 (local time) on the date or day when DST ends.

Also note that if you use other automatic methods to adjust for DST in combination with a time zone that observes DST, you need to disable the other methods. Otherwise, your local system time might adjust more than 1 hour for DST.

Related concepts

Time
Time on a system involves several time concepts, such as time zones, Coordinated Universal Time (UTC), system time, and job time. Each system or partition uses system time. System time is displayed through the time of day system value.

Scenarios: Working with time zones and time adjustments

These scenarios help you take full advantage of the time management function. They serve as a guide for completing specific tasks. Each scenario describes a specific situation and identifies how to use time management to meet your business needs.

Scenario: Creating a time zone using a message file for abbreviated and full names

You can create a time zone that uses a message file. The message file contains the full and abbreviated time zone names.

Situation

As an administrator, you are creating a time zone specific to your company's needs. In doing so, you want the time zone name to be retrieved from a message file rather than being generated by the system.

One of the many reasons that you might want to use a message file to store the Standard Time and daylight saving time (DST) full and abbreviated names is for translation purposes.

Objectives

In this scenario, MyCompany, Inc. wants its time zone to retrieve the Standard Time names and DST names from a message file.

The objectives of this scenario are as follows:

- To create a new time zone
- To specify the full and abbreviated Standard Time names using a message in a message file
- To specify the full and abbreviated DST names using a message in a message file
- To have the time zone retrieve the time zone's Standard Time and DST names from the message file

Details

MyCompany, Inc. has one system (System A) in its environment. This system needs to use a time zone that specifies to use a message file for the time zone's full and abbreviated names.

- System A is running IBM i V5R3, or later, and conducts all of the business processes.
- You are using IBM i Access for Windows or IBM iSeries Access for Windows V5R3, or later, to communicate with System A.

Prerequisites and assumptions

- System A is running IBM i V5R3, or later.
- You are using IBM i Access for Windows or IBM iSeries Access for Windows V5R3, or later, to communicate with System A.
- MYLIB library exists on the system.

Configuration steps

To create a time zone that uses a message file, follow these steps:

Related tasks

Setting the time zone after an IPL
You can use IBM Navigator for i to change the Time zone (QTIMZON) system value after an initial program load (IPL). You can also use this method to ensure that the time zone is set properly if the Offset from Coordinated Universal Time (UTC) value was not correct during the upgrade or installation of IBM i software.

Creating a message file that specifies the Standard Times and DST names
To use a message file for the Standard Time names and the daylight saving time (DST) names, you need to create a message file that specifies the names to use.

To create a message file, complete the following steps:

1. Open a character-based interface and connect to System A.

2. Type the following command from a command line and press F4 (Prompt):

```
CRTMSGF
```

3. Specify MYTZMSG for the name of the message file.
4. Specify MYLIB for the name of the library to store the message file, or specify the name of an existing library.
5. Press Enter.
6. Complete the following steps to specify the Standard Time names in the message file:
   a) Type the following command and press F4:

   ```
   ADDMSGD
   ```

   b) Specify MSG1001 for the message identifier.
   c) Specify MYTZMSG for the message file.
   d) Specify MYLIB for the library.
   e) Specify first-level text that is enclosed in single quotation marks.

      You can specify text in between the single quotation marks or leave it blank. The single quotation marks are required.
   f) Specify 'MCST MyCompany Standard Time' for the second-level text message, including the single quotation marks.

      The first 10 characters are used for the abbreviated name and the next 50 characters are used for the full name.
   g) Press Enter to create the message description.
7. Complete the following steps to specify the DST names in the message file:
   a) Type the following command and press F4:

   ```
   ADDMSGD
   ```

   b) Specify MSG1002 for the message identifier.
   c) Specify MYTZMSG for the message file.
   d) Specify MYLIB for the library.
   e) Specify first-level text that is enclosed in single quotation marks.

      You can specify text in between the single quotation marks or leave it blank. The single quotation marks are required.
   f) Specify 'MCDST MyCompany Daylight Saving Time' for the second-level text message, including the single quotation marks.

      The first 10 characters are used for the abbreviated name and the next 50 characters are used for the full name.
   g) Press Enter to create the message description.

The MYTZMSG message file and two messages now exist in the MYLIB library. Now, you need to create a new time zone and specify this message file for the Standard Time names and the DST names.

Creating a new time zone that specifies the message file to use
After you have created the message file, you can create a new time zone that specifies the message file to use.

To create a time zone, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. Click **New**.
4. On the General page, type MYTIMEZONE for the **Identifier**.

5. Specify the hours and minutes that you want the time to be **Offset** from UTC.
6. Specify the following information to use the message file that was created in Step 1 for the Standard Time full and abbreviated names:
   a) Select **Use name specified in message**.
   b) Type MSG1001 in the **Message ID** field.
   c) Type MYTZMSG in the **Message file** field.
   d) Type MYLIB in the **Library** field.
7. Specify **Time zone that uses a message description** in the **Description** field.
8. On the Daylight Saving Time page, select **Enable Daylight Saving Time**.
9. Specify the following information to use the message file that was created in Step 1 for the Daylight Saving Time full and abbreviated names:
   a) Select **Use name specified in message**.
   b) Type MSG1002 in the **Message ID** field.
10. Specify when to **Start** daylight saving time.
11. Specify when to **End** daylight saving time.
12. After you have completed specifying the time zone properties, click **OK**.

MYTIMEZONE is displayed in the list of **Available time zones**.

For help specific to each field, see the online help.

Note: Time zones are initially created with use (*USE) authority even if you are creating a time zone based on an existing time zone. If you want to change the time zone authority, click **Edit** on the Time Zones dialog box. Then, click **Permissions** on the General page to edit the authority of the time zone object.

The time zone is created and shown in the list of **Available time zones**. To use the new time zone on System A, click **Change system value**.

Scenario: Changing DST start or end due to time-sensitive programs

Time-sensitive programs scheduled to run during the time frame at which daylight saving time (DST) either starts or ends might encounter unpredictable results. To avoid this situation, you can change when DST starts or ends on your system.

Situation

Time-sensitive programs are scheduled to run during the hour that DST starts or ends. Because that hour is skipped or repeated, time-sensitive programs might encounter unpredictable results. The following conditions can occur:

- Jobs might run twice, thus unnecessarily affecting the performance of the system.
- Jobs might not run at all; thus, work is not completed.
- Programs might retrieve the wrong time value.

Objectives

The DST start or end, depending on which is in effect, needs to be scheduled to occur during a different time frame. A different time frame is necessary because you have time-sensitive programs scheduled to run during the time frame specified for the current time zone.

The objectives for this scenario are as follows:

- To allow the time-sensitive programs to run as scheduled
- To either change the current DST start or end time to a time frame when no time-sensitive programs are scheduled to run
- To temporarily use a different time zone that has a DST start or end time frame that does not impact time-sensitive programs

Details

The system might encounter errors if a job is scheduled to run during an hour that is either skipped or repeated, or if a job is currently running, depending on whether you are starting or ending DST. For example, if DST begins at 2:00 a.m., your system time moves forward 1 hour at 2:00 a.m. In this case, the system does not recognize the hour from 2:00 a.m. to 3:00 a.m. Time-sensitive jobs cannot be scheduled to run during this hour. The same situation applies to ending DST. You cannot schedule jobs during the hour that is repeated.

If you change the DST to a time frame when no time-sensitive programs are scheduled to run, you can continue using the current time zone. However, you need to change the DST start or end time back to the original value after the DST goes into effect.

If you create a new time zone based on the current time zone, you do not need to change the current time zone's DST properties. However, after the DST time change, you need to change the time zone system value back to the original time zone.

Recovery steps

If you have jobs scheduled to run during the start or end of DST, you can delay DST or create a new time zone that uses different start and end times for DST. If you are using an IBM-supplied time zone, create a new time zone based on the supplied time zone. This ensures that you are not editing a time zone that is supplied with the system. Otherwise, delay DST by editing the time zone description.

Related concepts

Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Method 1: Delaying DST for the current time zone
One way to solve the problem of having jobs scheduled to run during the starting or ending of daylight saving time (DST) is to delay DST.

To delay DST for the current time zone, perform the following steps.

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. View the time zones listed in the **Available time zones** field and select the system's time zone.
4. Click **Edit**.
5. On the Daylight Saving Time page, change the Daylight Saving Time **Start** or **End** field to a time when time-sensitive jobs are not active.
6. Click **OK** to save and close the time zone properties.
7. Click **OK** to close the Time Zones dialog box.

The DST start or end occurs during the time value specified. If you do not want to use these time values for the next DST observance, be sure to change the time value back to the original start or end time. This ensures that it is set correctly for the next DST observance.

Method 2: Creating a new time zone with the proper DST values
If you are using an IBM-supplied time zone, you can create a new time zone based on the supplied time zone to avoid the problem of having jobs scheduled during the starting or ending of daylight saving time (DST).

To create a new time zone with the proper DST values, perform the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. View the time zones listed in the **Available time zones** field and select the time zone that you want to copy.
4. Click **New Based On**.

5. Specify a time zone **Identifier**.
6. Ensure that the time zone properties on the General page are correct.
7. On the Daylight Saving Time page, specify the daylight saving time start or end time. Ensure that the start or end time does not conflict with time-sensitive programs.
8. After you have specified all of the time zone properties, click **OK** to create the time zone.
9. Select the time zone from the list of **available time zones**.
10. Click **Change system value**.
11. Click **OK** to confirm the system value change.
12. Click **OK** to close the Time Zones dialog box.

If you created this time zone to use temporarily, you need to change the Time zone (QTIMZON) system value back to the original time zone after the DST change.

Scenario: Adjusting the system time by 3 minutes

You can manually adjust the system time by 3 minutes. A time adjustment is different from changing the time of day system value. A time adjustment is the suggested method for system time changes.

Situation

As an administrator of your company's network, you need to maintain the system time on your IBM i platform. Your system is set to use the Eastern Standard Time zone, but you notice that the system time on your system is off by 3 minutes. Instead of manually setting the system time using the time of day system value, you need to make a time adjustment to ensure that your jobs run with the proper time. This also ensures that time does not jump either forward or backward in one instantaneous change.

Objectives

In this scenario, MyCompany, Inc. needs to adjust the system time 3 minutes. Jobs retrieve their time values from the system time. Therefore, it is critical that the system time be accurate so that jobs run with the proper time.

The objectives of this scenario are as follows:

- To adjust system time backward 3 minutes
- To ensure that jobs run with the proper time
- To ensure that time does not jump forward or backward in one instantaneous change

Details

The system time on System A is 3 minutes ahead. The system time needs to be slowed down until it is set to 3 minutes less than the current time. You cannot manually change the time of day system value because this can essentially repeat the last 3 minutes of system time. This type of repetition can cause unpredictable errors, if time-sensitive programs are running.

Prerequisites and assumptions

Based on this scenario, your system must meet the following requirements to make a time adjustment:

- You are running IBM i V5R3, or later.
- You are using IBM i Access for Windows or IBM iSeries Access for Windows V5R3, or later, to communicate with your system.
- Your system does not retrieve UTC from an external time source.

In addition, you should turn off any time maintenance applications in use. A manual time adjustment might conflict with any adjustments that the time maintenance application might make.

Time-adjustment steps

Assuming that time adjustments are allowed on your system, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Adjustment** and click **Open**.
3. On the Time Adjustment dialog box, click **Start a new time adjustment**. If a time adjustment is in progress, the current time adjustment will be stopped. Before proceeding, make sure that the current adjustment can be stopped.
4. Specify **-0:03:00** (3 minutes).
5. Click **OK** to start the time adjustment.
6. View the **Time Adjustment** fields on the Time Adjustment dialog box. The following fields should be displayed:

   - Adjustment in progress: Yes
   - Adjustment remaining: HH:MM:SS (where HH represents the hours, MM represents the minutes, and SS represents the seconds)
   - Estimated time until completion: HH:MM:SS

A time adjustment is in progress until the system time reaches the time value specified. Click **Refresh Now** to update the statistics displayed.

Related concepts

Time adjustment
You can use the time adjustment function of IBM Navigator for i to adjust the system time, or use a time maintenance application to adjust the system time automatically.

Setting up time management

To begin taking advantage of the time management function, you need to set up your systems to use time management. For example, you need to set up your systems to use time zones and time adjustment applications.

Complete the following tasks:
Related concepts

Managing time zones
The Time zone (QTIMZON) system value specifies the name of the time zone description used to calculate the local system time. Depending on the time zone description in use, the IBM i operating system can automatically adjust the local system time to observe daylight saving time (DST).

Managing system time
You can manage your system time in various ways. You can use a time maintenance application to make time adjustments, or you can manually specify a time adjustment.

Examining your network of systems

Before setting up your systems to use time management, you need to examine your systems with respect to which time zone to use and whether your systems meet the proper hardware and software requirements necessary to make time adjustments.

You can use the time zones and time adjustment functions in combination with one another or separately.

If you plan on using the time zones function of the IBM i operating system, you need to determine the time zone to use for each system. One single physical system can be divided into logical systems (partitions) that use different time zones.

If you plan on using a time maintenance application, the system must meet the proper hardware and software requirements needed to use the time adjustment function of IBM Navigator for i. To make time adjustments, you must use IBM i V5R3, or later.

When you examine your systems, consider the following questions:

- What time zone are the users of the system in?
- What time zone do you want the jobs to run with? The job's time is equivalent to the system time that is derived from the time zone.
- Have the system met the proper hardware and software requirements to use a time maintenance application to make time adjustments?

After you have evaluated each system's time zone needs and system requirements for time adjustments, you can set each system's time zone.

Setting the Time zone (QTIMZON) system value

You can set the QTIMZON system value before upgrading IBM i software, either during an initial program load (IPL) or after the installation using IBM Navigator for i.

The method that you use depends on whether you are upgrading from a previous release, or installing the operating system. Otherwise, you can always work with the time zone using IBM Navigator for i.

Note: If a change to a different time zone description results in a different offset, the change will cause the local system time, system value QTIME, to change. In addition, the system value QUTCOFFSET will change to match this new offset.

Related concepts

Managing time zones
The Time zone (QTIMZON) system value specifies the name of the time zone description used to calculate the local system time. Depending on the time zone description in use, the IBM i operating system can automatically adjust the local system time to observe daylight saving time (DST).

Setting the time zone before upgrading to IBM i V5R3, or later
If you have a previous release of the IBM i operating system installed and are upgrading to IBM i V5R3, or later, you need to set the time zone before your system is upgraded to the new release. This is the preferred method because your time zone can be set correctly as soon as the upgrade is complete.

To set the time zone before upgrading, you must have a supported release for the IBM i software upgrade.

To define the time zone object for the system before an IBM i software upgrade, create a data area named QWCTIMZON in the system (QSYS) library. When you perform an initial program load (IPL), the system uses this object when it attempts to determine the default value for the Time zone (QTIMZON) system value.

To create the data area for the time zone, complete the following steps:

1. Sign on to your system using a 5250 emulator session.
2. Type the following command and press F4:

   ```
   CRTDTAARA
   ```

3. Specify QWCTIMZON for the name of the Data Area (DTAARA).
4. Specify QSYS for the library of the Data Area (DTAARA).
5. Specify *CHAR for the Type parameter.
6. Press Enter.
7. Specify 16 for the Length parameter.
8. For the Initial Value, use the following format:

Byte 1:	Sign for current Offset from UTC (either '+' or '-')
Byte 2-3:	Hours for current Offset from UTC (00 to 12)
Byte 4:	Time separator
Byte 5-6:	Minutes for current Offset from UTC (00 to 59)

| **Byte 7-16:** | Time zone description name, left-aligned and padded on the right with blanks. |

Table 1. Example

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	-	0	6	:	0	0	Q	N	0	6	0	0	C	S	T	

9. Press Enter to create the data area.

During the upgrade of the operating system, the system uses this data area to set the Time zone (QTIMZON) system value.

Related concepts

Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Related reference

Initial time zone setting
During the initial startup, the IBM i operating system sets the initial time zone. This topic describes how the system determines the initial value for the time zone (QTIMZON) system value.

Related information

Date and time system values: Time zone

Setting the Year offset value before upgrading the operating system
If you are upgrading a system that observes a non-Gregorian calendar to IBM i V6R1, or later, you need to set the Year offset value before the system is upgraded to the new release. This is the preferred method because your time zone can be set correctly with this year offset as soon as the upgrade is complete.

Before the upgrade, complete the following steps:

1. Create a user-defined time zone object based on the time zone that your system currently uses.

   a) From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
   b) Right-click on **Time Zones** and click **Open**.
   c) Click **New Based On**.
   d) Complete the fields as necessary.

2. Create the QWCYEAROFS data area in the QSYS library.

   The QWCYEAROFS data area should be a character data area with a minimum length of 14 characters.

   a) Sign on to your system using a 5250 emulator session.
   b) Type the following command and press F4 (Prompt):

   ```
   CRTDTAARA
   ```

   c) Specify QWCYEAROFS for the name of the data area.
   d) Specify QSYS for the library of the data area.
   e) Specify *CHAR for the Type parameter and press Enter.
   f) Specify 14 for the Length parameter.
   g) For the Initial value field, use the following format, and press Enter:

Byte 1:	Sign for the current Year offset (either + or -)
Byte 2-4:	Year offset from Gregorian year (000 to 140)
Byte 5-14:	Time zone description name, left-aligned and padded on the right with blanks.

You can use a special value of *SYSVAL to indicate that the current time zone object specified in the Time zone (QTIMZON) system value should be changed. If you use this special value, you must complete an extra step to set the QTIMZON system value with the time zone object that you create (in step 1) before the upgrade. If the time zone that you specify does not exist, the current QTIMZON value is used.

During the upgrade of the operating system, the system observes the following rules to set the QTIMZON system value.

Table 2. Setting the QTIMZON system value	
If	**Then**
The QWCTIMZON data area exists.	The system uses this data area to set the QTIMZON system value.
The QWCYEAROFS data area exists.	1. The time zone value specified in this data area overrides any time zone value that is determined by the QWCTIMZON data area.
	2. The system looks for the QWCYEAROFS data area when determining the default Year offset value. The Year offset value is set in the time zone object that is determined by the QWCYEAROFS data area.
	3. The QTIMZON system value is set with this time zone description.

For more information about the QWCTIMZON data area, see .

Sample contents of the data area

Here are some examples of the contents of the data area.

```
1...5....0....
-057QP0400UTC2       Example 1 (Thai Buddhist)
+012QP0900JST         Example 2 (Japan)
-057*SYSVAL           Example 3 (Thai Buddhist with *SYSVAL)
```

Related tasks

Creating a time zone
Using the time management function of IBM Navigator for i, you can create a time zone specific to your needs. You can create either a new time zone, or a new time zone based on an existing time zone.

Setting the time zone during an attended IPL
You can set the Time zone (QTIMZON) system value during an attended initial program load (IPL) of the IBM i operating system. This is the preferred method if you are installing software on a new system or partition because it ensures that the time zone can be set correctly as soon as you complete the IPL.

The IPL Options display allows you to specify the date, time, and time zone for your system (indirectly your offset from UTC is also set). If the system time zone field is changed, verify that the date and time are set correctly. By setting these three fields, the appropriate date and time system values are set to reflect these field values.

If you want to set your time zone during an attended IPL, complete the following steps:

1. On the IPL Options display, move the cursor to the row that contains the System time zone field and specify the identifier of a time zone, or press F4 (Prompt) to open the Select Time Zone Description display.

```
                         IPL Options

 Type choices, press Enter.

     System date  . . . . . . . . . . . . 04 / 21 / 03  MM / DD / YY
     System time  . . . . . . . . . . . . 10 : 23 : 29  HH : MM : SS
     System time zone . . . . . . . . . . QN0600CST      F4 for list
     Clear job queues . . . . . . . . . . N             Y=Yes, N=No
     Clear output queues  . . . . . . . . N             Y=Yes, N=No
     Clear incomplete job logs  . . . . . N             Y=Yes, N=No
     Start print writers  . . . . . . . . Y             Y=Yes, N=No
     Start system to restricted state . . N             Y=Yes, N=No


     Set major system options . . . . . . N             Y=Yes, N=No
     Define or change system at IPL . . . N             Y=Yes, N=No
```

2. If you are using the Select Time Zone Description dialog box to select a time zone, complete the following steps:

   a) On the Select Time Zone Description display, type 1 next to the time zone that you want to use.

   b) Press Enter to return to the IPL Options display. The System time zone field is updated with the time zone you selected.

3. Ensure the System time field is correct.

4. Ensure the System date field is correct.

5. Press Enter to continue the IPL.

Note: If you set the System time zone field on the IPL Options display, then this new value takes precedence over the previous value set by the system.

Related reference

Initial time zone setting
During the initial startup, the IBM i operating system sets the initial time zone. This topic describes how the system determines the initial value for the time zone (QTIMZON) system value.

Setting the time zone after an IPL
You can use IBM Navigator for i to change the Time zone (QTIMZON) system value after an initial program load (IPL). You can also use this method to ensure that the time zone is set properly if the Offset from Coordinated Universal Time (UTC) value was not correct during the upgrade or installation of IBM i software.

You can change or edit the QTIMZON system value using IBM Navigator for i. You can also specify this system value in a 5250 emulator session by using the Work with System Values (WRKSYSVAL) or the Change System Value (CHGSYSVAL) command.

Note: If a change to a different time zone description results in a different offset, the change will cause the local system time, system value QTIME, to change. In addition, the system value QUTCOFFSET will change to match this new offset.

Complete the following steps to change the Time zone (QTIMZON) system value using IBM Navigator for i:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.

2. Right-click on **Time Zones** and click **Open**.

3. View the time zones listed in the **Available time zones** field, and select the time zone you want to use on the system.

   You can also create your own time zone.

4. Click **Change system value**.

5. Click **OK** to continue with the change request.

View the online help for more information specific to each field.

Related concepts

Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Scenario: Creating a time zone using a message file for abbreviated and full names
You can create a time zone that uses a message file. The message file contains the full and abbreviated time zone names.

Related tasks

Creating a time zone
Using the time management function of IBM Navigator for i, you can create a time zone specific to your needs. You can create either a new time zone, or a new time zone based on an existing time zone.

Setting up time maintenance

If you want to use a time maintenance application to synchronize your system time with an external time source, you need to configure the time maintenance application on each system. You can use the Simple Network Time Protocol (SNTP) time maintenance application or an application of your own.

For your time maintenance application to make the necessary time adjustments, your system must meet the proper hardware and software requirements. To make time adjustments, you must use IBM i V5R3, or later.

Related concepts

Time maintenance application
A time maintenance application maintains the system time with an external time source.

Time maintenance application programming tips
Here are some basic techniques for properly setting up a typical time maintenance application.

Each time maintenance application is unique to your business environment. You can use the IBM-supplied Simple Network Time Protocol (SNTP) application or an application of your own to use for time maintenance.

When writing a time maintenance application, you should ensure that the software checks the time adjustment (QTIMADJ) system value before starting. If this system value has an identifier for other time adjustment software, then the software being started should notify the user of this potential conflict and confirm that this time adjustment software should be started. When there is not an identifier associated with the time adjustment (QTIMADJ) system value, the software should update the system value to identify that it is now responsible for adjusting the system clock. Time adjustment software should check this system value again before ending. The time adjustment (QTIMADJ) system value should be set to the value None (*NONE) only if the current value identifies this time adjustment software that is ending.

You can use the IBM-supplied SNTP application as a time maintenance application. The SNTP application can act as a client or a server.

Related concepts

SNTP as the time maintenance application for your system
If you do not have a time maintenance application of your own or you want to take advantage of the IBM-supplied time maintenance application, you can use Simple Network Time Protocol (SNTP).

Related tasks

I want to stop Simple Network Time Protocol
There are circumstances in which you might want to stop Simple Network Time Protocol (SNTP). Use this topic to find out how to do this in different situations.

Related information

Date and time system values: Time adjustment

SNTP as the time maintenance application for your system
If you do not have a time maintenance application of your own or you want to take advantage of the IBM-supplied time maintenance application, you can use Simple Network Time Protocol (SNTP).

To understand the various ways that you can use to configure SNTP, you need to be familiar with the following concepts and their related topics:

SNTP client
> When SNTP is configured as a client, the system retrieves a time value from an external time source. You can specify from which source to retrieve the time value. This external time value is compared to the system time. If the time value does not match the external time source, a time adjustment begins. The system time is adjusted until the appropriate time value is reached.

SNTP server
> When SNTP is configured as a server, the system sends its system time to the clients connected to it. If a client's time values do not match the SNTP server time, a time adjustment begins. The client's system time is adjusted until the appropriate time value is reached.

Scenario: Synchronizing clocks with IBM i (SNTP as a client and server)
> In this situation, the system specified as the SNTP client/server retrieves the time from an external time source and uses that time to maintain its local system time. The local system time is also provided to other systems connected to the system. The local system's time value is compared to each client's system time. If any of the system's time values differ from the local system time on the system specified as the SNTP server, a time adjustment begins.

Related concepts
Time maintenance application programming tips
Here are some basic techniques for properly setting up a typical time maintenance application.

Related information
SNTP client
SNTP server
Scenario: Synchronizing clocks with <keyword conref="rch4xsym.dita#rch4xsym/i5os"></keyword>

Managing system time

You can manage your system time in various ways. You can use a time maintenance application to make time adjustments, or you can manually specify a time adjustment.

In addition, you might want to view a job's time to ensure that the time zone is specified correctly.

Related tasks
Setting up time management
To begin taking advantage of the time management function, you need to set up your systems to use time management. For example, you need to set up your systems to use time zones and time adjustment applications.

Updating system time

You can adjust system time using a time adjustment, which is the preferred method. If you need to change the system time immediately, you can manually change the system time using the time of day system value.

If your system time is not correct or jobs are running with the wrong time, you might need to adjust or change the system time. The time adjustment method is the preferred method for changing the system time unless you need to change the system time more than two hours.

Related concepts
Time adjustment

You can use the time adjustment function of IBM Navigator for i to adjust the system time, or use a time maintenance application to adjust the system time automatically.

Related tasks

Verifying the system values related to time
You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

System time is off more than 2 hours
This situation can happen if your system time was incorrectly adjusted for observance of daylight saving time (DST), or if the time zone was set incorrectly during IBM i installation.

Using the time adjustment function
If you need to adjust the system time by 2 or fewer hours, use the time adjustment function to change the system time.

A time adjustment is preferred over manually changing the time of day system value because it incrementally speeds up or slows down the rate at which time moves forward rather than making one single, instantaneous change in time. A large jump in time, either forward or backward, can cause unpredictable errors if jobs are concurrently accessing system time.

If your system time is off more than 2 hours and you do not need to change the system time immediately, you can use multiple time adjustments to reach the desired time value. For example, if your system time is off 3 hours, you can make a 2-hour time adjustment and a 1-hour adjustment to make a total adjustment of 3 hours.

To make a time adjustment, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Adjustment** and click **Open**.
3. On the Time Adjustment dialog, click **Start New Time Adjustment**.

   If a time adjustment is in progress, the current time adjustment is stopped. Before proceeding, ensure that you should stop the current adjustment.
4. Specify the desired time adjustment value.
5. Click **OK** to begin the time adjustment.
6. View the **Time Adjustment** fields on the Time Adjustment dialog. The following fields should be displayed:

   • Adjustment in progress: Yes
   • Adjustment remaining: HH:MM:SS
   • Estimated time until completion: HH:MM:SS
7. Click **OK** to close the Time Adjustment dialog.

See the time adjustment online help for more details.

Manually changing the Time of day system value
If your system time is off by more than 2 hours and you need to change the system time immediately, you need to manually change the Time of day system value. You can use multiple time adjustments until the appropriate time value is reached.

There might be a number of reasons that your system time is off by more than 2 hours:

• The Time zone (QTIMZON) system value is not set properly.
• The time maintenance application is not functioning appropriately.
• The Offset from UTC (QUTCOFFSET) system value is not set correctly.

Before manually changing the system time, verify that the following settings are correct:

• The time zone
• The offset from UTC

If the system time is still off by more than 2 hours and you need to change the system time immediately, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **System Values**.
2. Right-click on **Date and Time** and click **Properties**.
3. On the Time page, specify the desired time value in the **Time of day** field.
4. Click **OK** to confirm the time of day change.
5. Click **OK** to close the Date and Time dialog.

Note: Before making a change to the Time of day system value, ensure that no time-sensitive jobs are running. A system value change might cause unpredictable errors if jobs are concurrently accessing system time.

Related information

Date and time system values: Time zone

Date and time system values: Offset from Coordinated Universal Time (UTC)

Date and time system values: Time of day

Viewing a job's time

If you have specified a new time zone, you can view a job's properties to make sure that the job is running with the correct time. You might also want to view a job's properties if you have configured a time maintenance application.

The local job's time is equivalent to the system time.

By viewing the job's time, you can determine whether your system time is set correctly. If the job is not running with the correct time, you can perform some troubleshooting actions.

To verify that jobs are running with the correct time, follow these steps:

1. Locate the job in IBM Navigator for i.
2. After you have located a particular job, right-click the job and select **Properties**.
3. On the **Properties** dialog, select the **Date/Time** page.
4. View the **Job local date and time** field.
5. If the job's date and time are correct, click **OK** to close the Properties dialog box.
6. If the date or time of the job is not correct, verify that the following settings are correct:

   - The job's time zone
   - The offset from Coordinated Universal Time (UTC)

Related information

Finding jobs

Date and time system values: Time zone

Date and time system values: Offset from Coordinated Universal Time (UTC)

Verifying the system values related to time

You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

To view these time-related system values and their associated values, follow these steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **System Values**.
2. Right-click on **Date and Time** and click **Properties**.
3. On the Time page, determine whether a time adjustment is in progress.

   a) If an adjustment is in progress, the **Time of day** field will not reflect the adjusted time value until the adjustment is complete. Continue to Step 4.

   b) If an adjustment is not in progress, continue to the next step.

4. Verify that the **Time of day** is correct. See Updating system time to make the proper time adjustment.
5. Verify that the **Offset from Coordinated Universal Time (UTC)** is correct.

   If the value is not correct, follow this information:

   a) If you are using IBM i Access for Windows or iSeries Access for Windows V5R3, or later, with IBM i V5R3, or later, verify the time zone properties.

      The offset from UTC is determined by the time zone being used on the system.

   b) If you are using iSeries Access for Windows V5R2, or earlier, with IBM i V5R3, or later, verify the Time zone (QTIMZON) system value using the character-based interface. Use the Work with System Values (WRKSYSVAL) command.

   c) If you are using iSeries Access for Windows V5R2, or earlier, with OS/400® V5R2, or earlier, change the Offset from UTC system value to the correct value.
6. Click **OK** to close the **Date and Time** system values.

Related tasks

Updating system time
You can adjust system time using a time adjustment, which is the preferred method. If you need to change the system time immediately, you can manually change the system time using the time of day system value.

Verifying the time zone properties
You can view or change the Time zone system value.

Offset from UTC was incorrectly set during IBM i installation
If the Offset from UTC (QUTCOFFSET) system value was not set correctly during the installation, the initial time zone value for your system might not be correct.

System time is incorrect and jobs are not running with the proper time
If your system time is incorrect and your jobs are not running with the proper time, your time settings might not have been specified correctly.

System time is off more than 2 hours
This situation can happen if your system time was incorrectly adjusted for observance of daylight saving time (DST), or if the time zone was set incorrectly during IBM i installation.

Managing time zones

The Time zone (QTIMZON) system value specifies the name of the time zone description used to calculate the local system time. Depending on the time zone description in use, the IBM i operating system can automatically adjust the local system time to observe daylight saving time (DST).

Related concepts

Time
Time on a system involves several time concepts, such as time zones, Coordinated Universal Time (UTC), system time, and job time. Each system or partition uses system time. System time is displayed through the time of day system value.

Related tasks

Setting up time management
To begin taking advantage of the time management function, you need to set up your systems to use time management. For example, you need to set up your systems to use time zones and time adjustment applications.

Setting the Time zone (QTIMZON) system value

You can set the QTIMZON system value before upgrading IBM i software, either during an initial program load (IPL) or after the installation using IBM Navigator for i.

Creating a time zone

Using the time management function of IBM Navigator for i, you can create a time zone specific to your needs. You can create either a new time zone, or a new time zone based on an existing time zone.

The method you choose depends on the time zone properties that you want to use. If the properties of the time zone that you want to create are similar to those of an existing one, use the New based on method.

When the IBM i operating system is installed, the IBM-supplied time zones are overwritten. All IBM-supplied time zone identifiers begin with the character Q and the time zone names are retrieved from the QCPFMSG message file. If you create a time zone (that is, new or based on an existing time zone), the time zone identifier should not begin with the character Q. All time zone identifiers that begin with the character Q are reserved for IBM.

To create a time zone, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. View the Time Zones listed in the **Available time zones** field.
4. If an existing time zone is similar to the time zone that you want to create, highlight the time zone and click **New based on**. Otherwise, click **New**.
5. Specify the time zone properties on the General page.

   In the **Alternate name** field, you can specify an alternate name that provides additional information for describing the time zone description. This field indicates the Olson value used by Java. For information about the default Alternate name values of IBM-supplied time zone descriptions, see "Time zone" on page 9.

   If the system is using a non-Gregorian calendar, you need to specify the correct Year offset value for the time zone description of the system.
6. Specify the time zone properties on the Daylight Saving Time page.
7. Click **OK** to save and close the time zone properties.

View the online help for more information specific to each field.

Note: Time zones are initially created with use (*USE) authority, even if you are creating a time zone based on an existing time zone. If you want to change the time zone authority, click **Edit** on the Time Zones dialog, and then click **Permissions** on the General page to edit the authority of the time zone object.

The time zone is created and appears in the list of **Available time zones**. To use the new time zone on your system, click **Change system value**.

Related concepts

Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Related tasks

Setting the time zone after an IPL
You can use IBM Navigator for i to change the Time zone (QTIMZON) system value after an initial program load (IPL). You can also use this method to ensure that the time zone is set properly if the Offset from

Coordinated Universal Time (UTC) value was not correct during the upgrade or installation of IBM i software.

Editing a time zone

If you create a time zone and realize later that a property is not set correctly, you can edit the time zone. You can edit the time zone while it is being used by the system.

To edit a time zone, you need to make sure you have the required authority to edit the time zone.

To edit a time zone, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. On the Time Zones dialog, view the time zones listed in the **Available time zones** field and select the time zone you want to edit.
4. Click **Edit**.
5. Edit the properties on the General page.

   For help specific to each field, see the online help.
6. Edit the properties on the Daylight Saving Time page.

   For help specific to each field, see the online help.
7. Click **OK** to save and close the time zone properties.

You have successfully edited the time zone. The changes take effect immediately.

Related concepts
Time zone
The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Related tasks
I cannot edit my time zone
If you cannot edit a time zone, typically, it is because you do not have the proper authority.

Deleting a time zone

When you delete a time zone, the time zone object is removed from the system. You can no longer access the time zone object.

You can only delete time zones that you have authority to. In addition, you cannot delete the time zone that is currently in use on the system.

Note: You should not delete the IBM-supplied time zones.

To delete a time zone, follow these steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. On the Time Zones dialog, view the time zones listed in the **Available time zones** field and select the time zone you want to delete.
4. Click **Delete**.
5. Click **OK** to confirm the delete.
6. Click **OK** to close the Time Zones dialog.

Related concepts
Time zone

The IBM i operating system provides many time zones. You can use one of the time zones included with the system, or create your own time zones.

Verifying the time zone properties

You can view or change the Time zone system value.

You can use a time zone that is supplied with the system or create your own time zone. If you want to edit a time zone that is supplied with the system, you need to create a new time zone based on the supplied time zone. This ensures that the edited time zone is not replaced when the IBM i operating system is upgraded or reinstalled.

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. On the Time Zones dialog, verify that the time zone specified in the **Current time zone system value** field is correct.
   a) If the current time zone is not correct, select a time zone from the list of available time zones and click **Change system value**. Otherwise, create a new time zone.
   b) Click **OK** to confirm the system value change.
4. Select the current time zone from the list of **available time zones** and click **Edit**.
5. On the General page, verify that the **Offset** is specified correctly.
6. On the Daylight Saving Time page, verify that the daylight saving time start and end times are specified correctly, if applicable.
7. Click **OK** to close the time zone properties.
8. Click **OK** to close the Time Zones dialog.

Related tasks

Verifying the system values related to time
You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

Creating a time zone
Using the time management function of IBM Navigator for i, you can create a time zone specific to your needs. You can create either a new time zone, or a new time zone based on an existing time zone.

Offset from UTC was incorrectly set during IBM i installation
If the Offset from UTC (QUTCOFFSET) system value was not set correctly during the installation, the initial time zone value for your system might not be correct.

System time is incorrect and jobs are not running with the proper time
If your system time is incorrect and your jobs are not running with the proper time, your time settings might not have been specified correctly.

System time is off more than 2 hours
This situation can happen if your system time was incorrectly adjusted for observance of daylight saving time (DST), or if the time zone was set incorrectly during IBM i installation.

Verifying the time zone message properties

If the Standard Time names or the daylight saving time (DST) names for a time zone are not displayed correctly when you use a message file to retrieve the names, verify the time zone's message properties.

To verify the Standard Time names and the DST names for a time zone, follow these steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. Select the time zone that you want to work with from the list of **Available time zones**.
4. Click **Edit**.
5. On the General page, ensure the **Message file** is specified correctly.
6. Ensure that the **Library** name is specified correctly.

7. Ensure **Use name specified in message** is selected.

8. Ensure the **Message ID** is specified correctly.

9. If your system is observing DST, complete the following steps to verify that the DST message properties are specified correctly:

   a) On the Daylight Saving Time page, ensure **Enable daylight saving time** is selected.

   b) Ensure that **Use name specified in message** is selected.

   c) Ensure that the **Message ID** is specified correctly.

10. Click **OK** to close the time zone properties.

If the Standard Time names or the DST names are still not displayed correctly, continue with the recovery process of the troubleshooting topic "My time zone is not displaying the Standard Time and DST names correctly" on page 41.

Troubleshooting time management

Your system might encounter problems with system time. This information provides solutions and recovery steps for some common system time problems.

Related information

Troubleshooting SNTP

Troubleshooting

Service and support

Offset from UTC was incorrectly set during IBM i installation

If the Offset from UTC (QUTCOFFSET) system value was not set correctly during the installation, the initial time zone value for your system might not be correct.

If you set the time zone before the installation of the IBM i operating system, the offset from UTC is set according to the time zone you specified. If you set the time zone during an initial program load (IPL), the offset from UTC is set according to the time zone you specified during the IPL. Otherwise, the offset from UTC is determined by the initial time zone value.

This troubleshooting topic assumes that you did not set the Time zone (QTIMZON) system value before installation or during an IPL.

The offset might be incorrect if any of the following conditions exist:

- The Offset from UTC (QUTCOFFSET) system value was set to 00:00 (HH:MM) before installation and it is not the actual offset.

- The system was observing daylight saving time during the installation. Therefore, the system chose a time zone description based on an incorrect offset.

Recovery steps

The Offset from Coordinated Universal Time (QUTCOFFSET) system value is derived from the Time zone (QTIMZON) system value. Therefore, if the time zone is not correct, the offset is not correct either. After the Time zone system value is set correctly, the offset from UTC is correct.

To troubleshoot this situation, complete the following steps:

1. Verify the time zone properties.

2. Verify the time system values.

Related tasks

Verifying the time zone properties

You can view or change the Time zone system value.

Verifying the system values related to time

You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

Related reference

Initial time zone setting
During the initial startup, the IBM i operating system sets the initial time zone. This topic describes how the system determines the initial value for the time zone (QTIMZON) system value.

Related information

Date and time system values: Offset from Coordinated Universal Time (UTC)

System time is incorrect and jobs are not running with the proper time

If your system time is incorrect and your jobs are not running with the proper time, your time settings might not have been specified correctly.

The local job time is equivalent to the system time; therefore, if jobs are not running with the proper time, your system time might not be specified correctly. The system time relies on a number of settings that relate to time.

Any of the following conditions can lead to your system time being incorrect:

- The time zone is not specified correctly.
- The Offset from UTC (QUTCOFFSET) system value was not set properly during installation.
- A time adjustment might be in progress; thus, the system time has not reached the appropriate time value yet.
- The time zone properties might be incorrect.

Recovery steps

Complete the following steps to ensure that your time values are specified correctly and to determine how to set the system time correctly:

1. Verify the time zone properties are correct.
2. Verify the time system values are correct.

Related tasks

Verifying the time zone properties
You can view or change the Time zone system value.

Verifying the system values related to time
You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

Related reference

Initial time zone setting
During the initial startup, the IBM i operating system sets the initial time zone. This topic describes how the system determines the initial value for the time zone (QTIMZON) system value.

Related information

Date and time system values: Offset from Coordinated Universal Time (UTC)

System time is off more than 2 hours

This situation can happen if your system time was incorrectly adjusted for observance of daylight saving time (DST), or if the time zone was set incorrectly during IBM i installation.

If the system time is off more than 2 hours, one or more of the following conditions might exist:

- The time zone automatically adjusted the system time one hour for DST and the system time was adjusted manually one hour for DST. Therefore, the system time adjusted a total of 2 hours for DST rather than one hour.
- The time zone was set incorrectly during the installation of the operating system due to any of the following conditions:

- – The offset used to determine the time zone was wrong.
- – The wrong time zone was selected.
- – The offset specified in the time zone description was incorrect.

If you attempt to make a time adjustment for more than 2 hours, you will receive an error message stating that you cannot make an adjustment that is greater than 2 hours.

Recovery steps

To recover from this situation, you can perform one of two different methods. You can manually change the Time of day system value or you can use multiple time adjustments until the desired time value is reached. The method you use to change the time of day depends on how quickly the system time needs to be fixed.

If you need to change the system time immediately, you must manually change the Time of day system value. If you do not need to change the system time immediately, you can use multiple time adjustments to gradually reach the desired time value. The adjustment method requires multiple time adjustments because the maximum time adjustment allowed is 2 hours and your system time is off more than 2 hours. For more information about the implications of manually changing the system time versus using a time adjustment, see Time adjustment.

Before changing the system time using either method, complete the following steps:

1. Verify the time zone properties.
2. Verify the time system values.

Note: If you are making an adjustment using the time adjustment function, you will need to make multiple time adjustments until the desired time is reached.

Related concepts

Time adjustment
You can use the time adjustment function of IBM Navigator for i to adjust the system time, or use a time maintenance application to adjust the system time automatically.

Related tasks

Updating system time
You can adjust system time using a time adjustment, which is the preferred method. If you need to change the system time immediately, you can manually change the system time using the time of day system value.

Verifying the time zone properties
You can view or change the Time zone system value.

Verifying the system values related to time
You can view or change the system values related to time on the IBM i operating system. These system values include Time of day (QTIME), Offset from UTC (QUTCOFFSET), and Time zone (QTIMZON).

System time adjusted 2 hours for DST rather than 1 hour

If the current Time zone (QTIMZON) system value observes daylight saving time (DST), the system automatically updates the system time for DST. If the system is also set to use other automatic adjustments for DST, more than one time adjustment might occur.

If your Time zone (QTIMZON) system value is set to Eastern Standard Time (EST), your system time adjusts one hour forward on the second Sunday in March to observe Eastern Daylight Time (EDT). In addition, you have set the IBM i job scheduler of IBM Navigator for i to automatically adjust the system time one hour forward on the second Sunday in March. With this environment, the system time adjusts two hours forward on the second Sunday in March rather than one hour.

Recovery steps

If your system time was adjusted by other automatic methods (such as the IBM i job scheduler), you need to disable the automatic adjustments and adjust the system time 1 hour to compensate for the additional hour. To do this, complete the following steps:

1. Disable any other automatic time adjustments, if the time zone that you are using observes DST.

    Note: The steps to disable automatic adjustments are unique to the application in use.
2. Adjust the system time by 1 hour by completing the following steps:

    a) From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.

    b) Right-click on **Time Adjustment** and click **Open**.

    c) Click **Start New Time Adjustment**.

    If a time adjustment is in progress, the current time adjustment will be stopped. Before proceeding, ensure that you should stop the current adjustment.

    d) Specify one hour positive or negative, depending on whether you are starting or ending DST.

    e) Click **OK** to start the time adjustment.

    f) If a time adjustment is already in progress, click **OK** to stop the current adjustment and to begin the new adjustment.

Related information

Date and time system values: Time zone

Time adjustment is incorrect

If a time maintenance application is performing an incorrect time adjustment, or if you manually specified an incorrect time adjustment, you can stop the current time adjustment.

You need to stop the time adjustment if the time maintenance application is not making the proper time adjustments or if you specified the wrong time value for a time adjustment.

These recovery steps stop the current time adjustment that is incorrect, whether it was initiated by a time maintenance application or manually. These steps do not stop the time maintenance application from making additional time adjustments. You need to stop the time maintenance application to stop it from making additional adjustments to the system time. The procedure to stop an application is unique to each time maintenance application.

After the time adjustment stops, the system time is set to the current time value. The system does not go back and set the time value to the original setting before the adjustment began, nor does the system complete the adjustment. Therefore, you need to start a new time adjustment to set the system time back to its original value. The original value is the system time before the time adjustment began.

To stop the current time adjustment and specify a time adjustment that is correct, complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Adjustment** and click **Open**.
3. View the amount of time in the **Adjustment remaining** field. You will need this value when you adjust the time to its original value.
4. Click **Stop adjustment**.
5. Click **OK** to continue the request.
6. Click **Start new time adjustment** to start a new time adjustment.
7. Specify an **Amount of time** that includes the amount of time that the system time adjusted incorrectly.

    To determine the amount of time needed to adjust the system time to its original value, subtract the adjustment remaining (from "3" on page 40) from the original time adjustment. This is the amount of time to adjust to make up for the incorrect time adjustment. For an example, see **Details**.
8. Click **OK** to start the new time adjustment.

Details: To determine the amount of time for the new time adjustment, consider this example. Before any time adjustments occurred, the system time was 2:30 p.m. Then, you started a time adjustment of -00:30:00 (30 minutes backward). Then, you realized that the time adjustment was supposed to be +00:30:00 (30 minutes forward). By this time, the system time had adjusted 5 minutes of the total 30 minutes. The adjustment remaining field specified 00:25:00 (25 minutes). Therefore, you need to start a

new time adjustment that compensates for the 5 minutes that the time adjusted incorrectly. The new time adjustment needs to be +00:35:00 (35 minutes forward) where 5 minutes compensate for the incorrect adjustment that has already been completed and 30 minutes for the correct adjustment.

I cannot edit my time zone

If you cannot edit a time zone, typically, it is because you do not have the proper authority.

Recovery steps

To edit a time zone, you must have change (*CHANGE) authority to the time zone object. Each time zone is initially created with public use (*USE) authority, not change (*CHANGE) authority, even if you create a time zone based on a time zone with a different authority. However, if a time zone is created using a CL command, you can specify an authority other than public use (*USE) authority.

If you do not have change (*CHANGE) authority and need to edit a time zone, a system administrator or user with change (*CHANGE) authority and object management (*OBJMGT) authority needs to give you authority. The public can be granted change (*CHANGE) authority or only you can be granted authority by specifying your user name.

To change the authority level, a system administrator or user with change (*CHANGE) authority and object management (*OBJMGT) authority must complete the following steps:

1. From IBM Navigator for i, expand **Configuration and Service** > **Time Management**.
2. Right-click on **Time Zones** and click **Open**.
3. On the Time Zones dialog, highlight the time zone you want to edit.
4. Click **Edit**.
5. On the General page, click **Permissions**.
6. On the Permissions dialog box, select change (*CHANGE) authority for the public or click **Add** to grant a specific user change authority.
7. Edit the Permissions as necessary.
8. Click **OK** to close the Permissions dialog.
9. Click **OK** to close the time zone properties.
10. Click **Close** to close the Time zones dialog.

Note: If you want to edit one of the IBM-supplied time zones, you should create a new time zone based on the existing time zone. This prevents your changes from being lost when you install the IBM i operating system in the future.

Related tasks

Editing a time zone
If you create a time zone and realize later that a property is not set correctly, you can edit the time zone. You can edit the time zone while it is being used by the system.

My time zone is not displaying the Standard Time and DST names correctly

The time zone uses a message file to specify the full or abbreviated names for either Standard Time or daylight saving time (DST). However, the time zone names are not displayed correctly when the system fails to retrieve the message.

When the message cannot be retrieved, the name parameters in the character-based interface display *N (not available) and the time zone name fields in IBM Navigator for i are blank. In addition, if the second-level text of the message description is not formatted correctly, the name displays incorrectly.

Recovery steps

If the time zone uses a message to specify the time zone full and abbreviated names, the names are not displayed if you are not authorized to the message file or its library.

If you are authorized to the message file and its library, complete the following steps to ensure the time zone names are properly retrieved from the message file:

1. Ensure that the time zone properties specify the correct library, message file, and message ID.
2. Verify that the library specified exists on the system.
3. Verify that the message file exists in the library specified.
4. Verify that the message ID exists in the specified message file.
5. Verify that the message description is specified in the second-level text of the message and not the first-level text. In addition, verify that the message is formatted correctly with the first 10 characters as the abbreviated name and the next 50 characters as the full name.

I want to stop Simple Network Time Protocol

There are circumstances in which you might want to stop Simple Network Time Protocol (SNTP). Use this topic to find out how to do this in different situations.

You might want to stop SNTP for a variety of reasons. For example, you might want to stop SNTP if any of the following conditions arises:

- You want to start a time adjustment and the SNTP has a time adjustment in progress.
- SNTP is not making proper time adjustments.

Recovery steps

The method that you use to stop SNTP depends on whether you want to stop SNTP from starting when TCP/IP is restarted, or you want to temporarily stop SNTP for the current TCP/IP session. You might want to complete both recovery methods if you want to stop SNTP immediately and do not want it to start when TCP/IP restarts.

Related concepts

Time maintenance application programming tips
Here are some basic techniques for properly setting up a typical time maintenance application.

Related information

Date and time system values: Time of day
Date and time system values: Time zone
Date and time system values: Offset from Coordinated Universal Time (UTC)

Method 1: Stopping the current SNTP session
These instructions stop the Simple Network Time Protocol (SNTP) client and server for the current TCP/IP session. However, SNTP starts again when TCP/IP restarts.

Complete these steps if you want to stop the SNTP server temporarily.

1. From IBM Navigator for i, expand **Network** > **Servers** > **TCP/IP Servers**.
2. Right-click **SNTP**, and select **Stop**.

SNTP will not make time adjustments to your system time during the current TCP/IP session. However, SNTP will restart when TCP/IP is restarted. To stop SNTP from starting when a new TCP/IP session begins, complete the steps in "Method 2: Stopping SNTP" on page 42 also.

Method 2: Stopping SNTP
You can stop the Simple Network Time Protocol (SNTP) client and server from starting when TCP/IP restarts.

Complete these steps if you want to stop the SNTP client server from starting when TCP/IP restarts. These instructions do not stop SNTP immediately.

1. From IBM Navigator for i, expand **Network** > **Servers** > **TCP/IP Servers**.
2. Right-click **SNTP**, and select **Properties**.
3. On the General page, deselect **Client**, **Server** or both, depending on how SNTP was originally configured. For V5R2 or earlier systems, deselect **Start when TCP/IP is started**.
4. Click **OK**.

SNTP will not start when a new TCP/IP session begins. However, the current TCP/IP session can still make time adjustments. To stop SNTP immediately, complete the instructions for .

Additional recovery steps
You might need to complete some additional recovery steps to stop Simple Network Time Protocol (SNTP).

Depending on the condition that led you to stop SNTP, you might want to consider these additional recovery steps:

1. Verify that SNTP's external time source is specified correctly.
2. Verify that the connection between SNTP and the external time source is working properly.
3. If you are using IBM i V5R3, or later, verify that the Time zone system value is specified correctly.
4. If you are using OS/400 V5R2, or earlier, verify that the Offset from Coordinated Universal Time (UTC) system value is specified correctly.
5. Verify that the Time of day system value is specified correctly.

When stopping a time maintenance application, you should follow certain simple programming techniques.

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:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 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 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.

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. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample 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_.

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

Programming interface information

This Time Management publication documents intended Programming Interfaces that allow the customer to write programs to obtain the services of IBM i.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds 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.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

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

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

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

Other product and service names might be trademarks of IBM or other companies.

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.