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## APIs by Example: System Date and Time APIs and Utilities

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IBM continues to add to the System i date and time support from release to release. This support involves different system components and facilities including Work Management, CL commands, IBM Systems Director Navigator for i5/OS, as well as system APIs. Regarding the latter, release 5.3 brought quite a few new date and time APIs, some of which I presented in a number of earlier APIs by Example articles. Please follow links at the end of this article to look up these articles.

Today, I discuss and demonstrate some of the APIs that I haven't yet covered. To help me fulfill that objective, I've written three new date and time CL commands that serve both as a date and time API introduction and as utilities providing alternate access to system date and time information. The three commands are named Adjust System Time (ADJSYSTIME), Set System Time (SETSYSTIME), and Display System Time Information (DSPSYSTIME).

Not only were new date and time APIs introduced with release 5.3, but the system's Licensed Internal Code (LIC) changed the way it tracks time in that release. It now keeps track of time internally, in Coordinated Universal Time (UTC) instead of local time. Although IBM officially has expressed no commitment to how and when complete time zone support at job level will be fully implemented, you will notice that from release to release, an increasing number of improvements in terms of system and job attributes pointing in time zone direction are surfacing. Looking at job attributes on my 5.4 system shows for example the following set of date and time attributes:

```

Job date . . . . . : 22-11-2008

Date format . . . . . : *DMY

Date separator . . . . . : -

Time separator . . . . . :

Job time:

Current date . . . . . : 22-11-2008

Current time . . . . . : 11:05:09

Time zone . . . . . : QP0100CET4

Current offset . . . . . : +01:00

Full name . . . . . : Central
European Time
  
```

```
Abbreviated name . . . . . : CET
```

However, there's currently no way of setting these date and time attributes, even on IBM i 6.1. At job initiation time, they're simply copied from the corresponding system values. However, I suspect that this situation will change at some point in the future when all related time-sensitive system components have been updated to ensure a consistent and coherent behavior throughout the operating system and its interfaces. The underlying idea would be that all date and time information should be stored as UTC values. The job time zone can then be used to convert the UTC time value to the corresponding job time zone time value, and vice versa when input date and time values are stored.

If the UTC support were extended to the database component, all this could even happen transparently to your application. If it were possible to tag a database file's timestamp field(s) with an attribute defining the content as a UTC timestamp, you could have the database manager perform all conversion between UTC and the job time zone automatically as part of the I/O operation. We're not there yet, but as I intend to convince you with the API examples provided with this article, the date and time APIs as well as job information APIs have already been improved to support UTC date and time processing. So let me proceed and present the three system time CL commands.

The ADJSYSTIME command adjusts the current system time by increasing or decreasing the system's time-of-day clock in a continuing system process until the full requested adjustment is complete. The ADJSYSTIME command prompt offers the following input parameters:

```

Adjust System Time (ADJSYSTIME)

Type choices, press Enter.

Time adjustment amount . . . . . 1-7200000000,
*STOP
Time adjustment unit . . . . . *SECOND *HOUR, *MINUTE,
*SECOND...
Time adjustment direction . . . *INCREASE *INCREASE,
*DECREASE

```

You specify a time adjustment amount; a time adjustment unit qualifying the aforementioned amount to either hour(s), minute(s), second(s), milliseconds or microseconds; and finally the direction of the requested time adjustment defining either an increase or a decrease of the time-of-day clock. Once you've initiated the time adjustment, the process will run until one of the following events occurs:

- A new time-of-day clock adjustment is started for the system.
- The time-of-day clock for the system is changed.

- The system is powered off.

To watch the time adjustment process, the DSPSYSTIME command comes in handy--here's the very simple command prompt:

```

                                Display System Time Info (DSPSYSTIME)

Type choices, press Enter.

Output . . . . . *                *, *PRINT

```

To interactively monitor an ongoing system time adjustment, select the default output parameter directing the DSPSYSTIME output to the screen of your current job. Here's an example of a recently initiated time adjustment specifying a time adjustment amount and unit of one minute:

```

                                System Time Information

WYNDHAMW                                                                23-11-08
12:00:00
System name . . . . . : WYNDHAMW

System time zone . . . . : QP0100CET4  CET

System UTC offset . . . . : +0100
Job time zone . . . . . : QP0100CET4  CET

System UTC time . . . . . : 2008-11-23-11.00.00.804608

System time of day . . . . . : 2008-11-23-12.00.00.804608
Job time of day . . . . . : 2008-11-23-12.00.00.804608
Time adjustment supported . . . . : *YES

Time adjustment:

Status . . . . . : *ACTIVE

Direction . . . . . : *DECREASE

Time amount . . . . . : 59257232
00000:00:59:257:232
Duration . . . . . : 592572584
00000:09:52:572:584

```

```

Bottom
F3=Exit      F5=Refresh      F6=Adjust system time      F7=Set
system time
F8=Work with time zones      F9=Work with system values      F12=Cancel

```

The above display shows system name, time zone, and UTC offset plus the current job time zone in the header part. Below, you'll notice the current system UTC time followed by the time zone correlated system time-of-day and job time-of-day, as well as a flag indicating whether time adjustment is supported by the current system and release. Currently the system and job time zone will always be the same, but that might change in a future release, when full time zone support is implemented in the operating system.

The time adjustment section specifies details about the system's current time adjustment status, an active time adjustment's direction and finally two counters specifying the remaining time adjustment amount and the estimated duration for the adjustment to complete. Both values are in microseconds. To ease the translation process between microseconds and a recognizable time format, I've included a right column specifying the time amount and duration in an HHHHHH:MM:SS:LL:CC (hours:minutes:seconds:milliseconds:microsecond) format. As you can see from the above example, the duration of a time adjustment is approximately 10 times the time adjustment (i.e., one minute's time adjustment takes 10 minutes to complete).

The above panel also includes function key shortcuts to the ADJSYSTIME, SETSYSTIME, WRKTIMZON, and WRKSYSVAL commands. As always, you can also rely on the included cursor-sensitive help facility, which explain the panel, fields, and function keys in more detail.

And now we come to the SETSYSTIME command, which lets you set the system's current UTC time directly. The command prompt uses a prompt override program to offer the current UTC date and time as an input template. Be sure to fully comprehend that, when using this command, you're actually updating the system's UTC date and time, as opposed to the system's local time-of-day clock. Here's how the SETSYSTIME command prompt looks:

```

                                Set System Time (SETSYSTIME)

Type choices, press Enter.

System date   . . . . . '23-11-08'   Date
System time   . . . . . '12:14:49'   Time

```

System microseconds . . . . . '000000' 000000-999999
--

I recommend that you consult the SETSYSTIME command's online help text before running the command, to ensure that no unintended change of the system date and time information occurs. As I mention above, running the SETSYSTIME command also implicitly causes any ongoing time adjustment process to immediately end.

### **This APIs by Example includes the following sources:**

```
CBX1981  -- RPGLE  -- Adjust System Time - CPP
CBX1981H -- PNLGRP -- Adjust System Time - Help
CBX1981V -- RPGLE  -- Adjust System Time - VCP
CBX1981X -- CMD    -- Adjust System Time

CBX1982  -- RPGLE  -- Set System Time - CPP
CBX1982H -- PNLGRP -- Set System Time - Help
CBX1982O -- RPGLE  -- Set System Time - POP
CBX1982X -- CMD    -- Set System Time

CBX1983  -- RPGLE  -- Display System Time Information - CPP
CBX1983H -- PNLGRP -- Display System Time Information - Help
CBX1983P -- PNLGRP -- Display System Time Information - Panel Group
CBX1983X -- CMD    -- Display System Time Information

CBX198M  -- CLP    -- System Time Commands - Build commands
```

To create all these objects, compile and run CBX198M, following the instructions in the source header. As always, you'll also find compilation instructions in the respective source headers.

### **Previously published related articles:**

IBM Systems Director Navigator for i5/OS: Inside Time Management:

<http://systeminetwork.com/article/ibm-systems-director-navigator-i5os-inside-time-management>

APIs by Example: Locales, APIs, and Time Zones:

<http://systeminetwork.com/article/apis-example-locales-apis-and-time-zones>

APIs by Example: Date and Time APIs:

<http://systeminetwork.com/article/apis-example-date-and-time-apis>

APIs by Example: User Application Information APIs – Parts 1, 2, and 3:

<http://systeminetwork.com/article/apis-example-user-application-information-apis>

<http://systeminetwork.com/article/apis-example-user-application-information-apis-part-2>

<http://systeminetwork.com/article/apis-example-user-application-information-apis-part-3>

### **Date and Time information on the web:**

Wikipedia - Coordinated Universal Time (UTC):

[http://en.wikipedia.org/wiki/Coordinated\\_Universal\\_Time](http://en.wikipedia.org/wiki/Coordinated_Universal_Time)

time and date.com:

<http://www.timeanddate.com/worldclock>

The official US time:

<http://www.time.gov/timezone.cgi?UTC/s/o>

World Time Server:

<http://www.worldtimeserver.com>

Greenwich Mean Time:

<http://wtp.greenwichmeantime.com>

### **IBM documentation:**

Time Management IBM i 5.3:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r3/index.jsp?topic=/rzati/rzatikickoff.htm>

Time Management IBM i 5.4:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/rzati/rzatikickoff.htm>

Time Management IBM i 6.1:

<http://publib.boulder.ibm.com/infocenter/systems/scope/i5os/topic/rzati/rzatikickoff.htm>

### **This article demonstrates the following Date and Time APIs:**

Adjust Time (QWCADJTM) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/qwcadjtm.htm>

Set System Time (QWCSETTM) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/qwcsettm.htm>

Retrieve System Time Information (QWCRTVTM) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/qwcrvtm.htm>

Retrieve Time Zone Description (QWCRTVTZ) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/qwcrvtz.htm>

Convert Date and Time Format (QWCCVTDT) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/qwccvtdt.htm>

Date and Time APIs V5R4:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r4/topic/apis/catdate.htm>

Date and Time APIs V6R1:

<http://publib.boulder.ibm.com/infocenter/systems/scope/i5os/topic/apis/catdate.htm>

### **You can retrieve the source code for this API example from:**

[http://www.pentontech.com/IBMContent/Documents/article/57500\\_790\\_SysDateTime.zip](http://www.pentontech.com/IBMContent/Documents/article/57500_790_SysDateTime.zip)

**Source URL:** <http://iprodeveloper.com/rpg-programming/apis-example-system-date-and-time-apis-and-utilities>