


[print](#) | [close](#)

APIs by Example: Date and Time APIs

[System iNetwork Programming Tips Newsletter](#)

[Carsten Flensburg](#)

Carsten Flensburg

Thu, 10/20/2005 (All day)

For the first time, the APIs by Example column focuses on APIs tied to V5R3. And time is exactly the topic of this week's article, or to be more precise, Coordinated Universal Time (UTC). You can use UTC time recording to make timestamps time zone independent. Today, I show you some examples of how to use UTC timestamps in your applications, and I offer a service program to perform the functions involved in this approach.

However, let's begin with a little context information. UTC is the standard time zone that all other time zones use as offset base.

You can see this demonstrated by the V5R3 command WRKTIMZON (Work with Time Zone Descriptions), which presents the following panel when you run it:

```

Work with Time Zone Descriptions

Type options, press Enter.
  2=Change   4=Delete   5=Display details   6=Print
  8=Update system value

Opt  Offset      Time      -----Standard Time-----
      Offset      Zone      Abbr      Full
-04:00  QN0400UTC2  UTC-04:00S  (GMT - 4:00) Caracas, La Paz
-05:00  QN0500EST   EST         Eastern Standard Time
-05:00  QN0500EST2   EST         Eastern Standard Time
-05:00  QN0500UTCS   UTC-05:00S  UTC-05:00 Standard Time
-06:00  QN0600CST     CST         Central Standard Time
-06:00  QN0600S       S           Central Standard Time
-06:00  QN0600UTCS   UTC-06:00S  UTC-06:00 Standard Time
-07:00  QN0700MST     MST         Mountain Standard Time
-07:00  QN0700MST2   MST         Mountain Standard Time
-07:00  QN0700T       T           Mountain Standard Time
-07:00  QN0700UTCS   UTC-07:00S  UTC-07:00 Standard Time

```

The Offset column to the left defines, for each time zone, that time zone's offset to the UTC time zone. Prior to 1986, Greenwich Mean Time (GMT) was the world standard time, but in 1986 UTC replaced GMT. UTC is based on atomic measurements rather than the earth's rotation, and in some contexts (e.g., military and navigation) is referred to as Zulu time. GMT, however, is still the standard time zone for the prime meridian (zero degrees longitude).

In case your interest has been piqued, I've included a number of links where you can find more details on the time zone topic:

Greenwich mean time has its own site, which you can find here:

<http://wwp.greenwichmeantime.com/>

Read more about time zone history at the following link:

<http://wwp.greenwichmeantime.com/info/time-zones-history.htm>

Here is the official U.S. government definition of UTC:

http://www.its.bldrdoc.gov/fs-1037/dir-009/_1277.htm

And finally the Atomic Web Clock from the U.S. government's National Institute of Standards and Technology (NIST) site provides the current local time:

<http://www.time.gov/>

Another V5R3 addition is the Retrieve System Time Information (QWCRTVTM) API, which can return a UTC timestamp. I introduce you to the QWCRTVTM API in more detail shortly.

Starting with V5R3, time zones also were introduced in the shape of both a system value and a job attribute, QTIMZON and TIMZON, respectively. Currently, whenever a job is created on a system, the TIMZON job attribute is simply set by the QTIMZON system value, but that might change in the future.

IBM has not made any official statement that it plans to make such a change, but adding a time zone attribute to job descriptions, user profiles, and for example, the SBMJOB (Submit Job) command, would enable a very flexible and useful time zone setting at the job level, as opposed to the way it is today, with a system or logical partition level being the lowest achievable.

You can read documentation about the iSeries time zone facility in the Information Center:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/rzati/rzatimanagetz.htm>

And now, back to the QWCRTVTM API. Besides the UTC system timestamp that I already mentioned, it offers access to a number of time-adjustment-related attributes and readings. In this example, I use only the UTC timestamp retrieval function, but check out the API documentation for the other services of the QWCRTVTM API — just follow the link at the end of this article.

The UTC timestamp is returned in the format of an 8-byte system timestamp. To make this timestamp format readable to the human eye, a conversion needs to be performed. This is where the Convert Date and Time Format (QWCCVTDT) API comes in handy. I have often used this API to convert a system timestamp in the past, but the new time zone support in V5R3 has also led to a significant enhancement of this API.

IBM has added an optional group of parameters, which let you specify the time zone of the input date and time and the output date and time parameters, as well as specify their precision (i.e., whether milliseconds or microseconds are required and returned for the date and time input and output parameters). If you include this optional parameter group, the QWCCVTDT API takes the specified time zones into account while performing the conversion process, as I demonstrate a little later in this article.

The first step involved in using time zone support in your applications is to retrieve and store the UTC timestamp whenever you want to record a date and time in your programs and database. To do so, use the QWCRTVTM API to retrieve the current UTC system timestamp, and the QWCCVTDT

```
UtcDts = GetZonDts( '*UTC' );
```

Call Pgm (CBX145T)

```

:
: Current UTC timestamp . . . : 2005-10-15-11.39.25.052040
:
:
:
:
:
: Bottom
: F12=Cancel
:
:
:

```

```
JobDts = CvtZonDts( UtcDts: '*UTC': '*JOB' );
```

- *SYS - The time zone specified by the time zone system value.
- *JOB - The time zone specified by the time zone job attribute.
- *UTC - The UTC time zone.

```

:
:
: UTC timestamp . . . . . : 2005-10-15-12.16.08.631592
: Job time zone . . . . . : QP0100CET2
: Job timestamp . . . . . : 2005-10-15-14.16.08.631592
:
:
:
: Bottom

```

```

:   F12=Cancel
: .....
:

```

The test program displays a couple of other examples and finally prompts you to enter your own favorite time zone (in upper case) and then displays the UTC timestamp value converted to that time zone.

So now you should have the tools necessary to start using UTC timestamps in your applications:

- Use the GetZonDts() function to retrieve UTC timestamps.
- Use the CvtZonDts() function to convert UTC timestamps to your local time zone.

Until IBM completes the time zone support by adding the time zone configuration options that I mentioned earlier, you can support only one local time zone using the system configuration. If you don't want to wait for that, you could also build your own time zone support for more time zones. For example, you could create a system file or user space to hold each user profile's or display device's named time zone, and retrieve and use that when converting the UTC timestamp.

This approach obviously requires some effort to implement consistently throughout all time zone –sensitive applications, but it would be a nice framework to have in place, if and when IBM adds the missing pieces to iSeries time zone support.

The following source code is included with this article:

CBX145 -- Retrieve UTC time information - services
 CBX145B -- Retrieve UTC time information - binder source
 CBX145T -- Test calls of UTC time services - service program

Compilation instructions are in the source headers.

On a side note, a PTF has been released to add additional time zones needed for the European Union:

[Click Here to View the Cover Letter](#)

The time zone support for V5R3 includes a number of new date and time APIs. Follow this link to see the documentation for all the date and time APIs at release V5R3:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/apis/catdate.htm>

This article demonstrates the following APIs:

Retrieve System Time Information (QWCRTVTM) API:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/apis/qwcrtvtm.htm>

Convert Date and Time Format (QWCCVTDT) API:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/apis/qwccvtdt.htm>

Retrieve Product Information (QSZRTVPR) API:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/apis/qszrtvpr.htm>

Send Program Message (QMHSNDPM) API:

<http://publib.boulder.ibm.com/infocenter/iseries/v5r3/topic/apis/QMHSNDPM.htm>

Receive Program Message (QMHRCVPM) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r3/topic/apis/QMHRCVPM.htm>

Display Long Text (QUILNGTX) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r3/topic/apis/quilngtx.htm>

Retrieve Job Information (QUSRJOBI) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r3/topic/apis/qusrjobi.htm>

Retrieve System Values (QWCRSVAL) API:

<http://publib.boulder.ibm.com/infocenter/iserics/v5r3/topic/apis/qwcrsval.htm>

You can retrieve the source code for this API example from the following link:

http://www.pentontech.com/IBMContent/Documents/article/51703_43_DateAndTime.zip

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