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Subject: Impact of 2007 USA daylight saving changes on the Oracle database
Doc ID: Note:359145.1
Type: BULLETIN
Last Revision Date: 27-JAN-2007
Status: PUBLISHED
In this Document
[Purpose](#)
[Scope and Application](#)
[Impact of 2007 USA daylight saving changes on the Oracle database](#)
[Do I need a patch?](#)
[What needs to be done?](#)
[Checking the existing data with utltzuv2.sql](#)
[Database time zone fixes](#)
[Applying the Database time zone fixes on clients and middle-tier](#)
[Time Zone patching in the Enterprise](#)
[JVM Fixes](#)
[Frequently Asked Questions](#)
[Change log since 2006-12-15 \(dates in YYYY-MM-DD format\)](#)
[References](#)
Applies to:

Oracle Server - Enterprise Edition - Version: 8.1 to 10.2

Oracle Server - Personal Edition - Version: 8.1 to 10.2

Oracle Server - Standard Edition - Version: 8.1 to 10.2

Information in this document applies to any platform.

Purpose

Under the Energy Policy Act of 2005, passed by US Congress and then signed into law by President George W. Bush on August 8 2005, the start and end dates of Daylight Saving Time (DST) in the US have been changed, starting in 2007.

For an overview of issues in all Oracle Database & Fusion Middleware products please see master [Note 397281.1](#).

The purpose of this document is to inform readers of possible changes that might be needed to Oracle databases because of these changes to DST rules.

Scope and Application

Time zone and DST information is used in Oracle in the following ways:

- **TIMESTAMP WITH LOCAL TIME ZONE (TSLTZ)** and **TIMESTAMP WITH TIME ZONE (TSTZ)** datatypes and the **TZ_OFFSET** function take their time zone information from Oracle's time zone files. These files are part of the database installation, the changes to DST in the USA from 2007 are included in version 3 and higher of these time zone files. These datatypes can be used as column types or as PL/SQL types.
- The Oracle Java Virtual Machine (JVM) uses time zone information embedded in the JVM in the database itself.

There are separate, unrelated, patches available to update the time zone files to version 3, and for the JVM. This note will discuss how to prepare the database for the patches, and which patches to apply.

Other datatypes, including DATES, are not affected by changes to DST rules. For some more background information please see [Note 357056.1](#) (this is not needed to be read before proceeding with this note, it is only presented as a reference for background information).

Impact of 2007 USA daylight saving changes on the Oracle database

Do I need a patch?

There are 2 database patches, one for the JVM and one for the time zone files. These are completely separate, and do not depend on each other in any way. The JVM patch is only ever needed on the database side, the time zone patch might be needed on the database side *and* the clients.

JVM patch - for all Oracle versions 8.1.7, 9.x, 10.x (database only):

- If you have the Oracle JVM installed you are advised to apply the JVM patch. See section "JVM Fixes" below for more details.

Time zone file patch - database side:

- **Oracle 8.1.7 (and lower):**

No time zone file patch is needed for Oracle8, Oracle8 does not use these.

- **Oracle 9.x (see also generic 9.x and 10.x section below):**

In Oracle9 there is no automatic use of the TSTZ and TSLTZ types. Therefore there is only a small chance that the patch is needed:

1. If there are no user-defined TSTZ or TSLTZ columns in the database, and there is no time zone use in PL/SQL, then the time zone files are not used

and the patch is **not needed**.

2. If TSTZ or TSLTZ types or the TZ_OFFSET function are used, but do not use the affected time zones, the patch is **not needed**.

3. If TSTZ or TSLTZ types or the TZ_OFFSET function are used, **and** use the *affected* time zones, then a patch **is needed**.

- **Oracle 10.x (see also generic 9.x and 10.x section below):**

In Oracle10 the data dictionary uses TSTZ types. Therefore it is more likely that affected data is used:

1. If no TSTZ or TSLTZ types are used outside of the data dictionary, **and** the TZ_OFFSET function is not used, **and** the dictionary TSTZ columns do not use the *affected* time zones, the patch is **not needed**.

2. If TSTZ or TSLTZ types or or the TZ_OFFSET function are used outside the dictionary, but do not use the *affected* time zones, **and** the dictionary TSTZ columns do not use the *affected* time zones either, the patch is **not needed**.

3. When any data, either in the dictionary **or** in the user data **or** in the usage of time zones in PL/SQL, uses the *affected* time zones, then the **patch is needed**.

- **Generic for Oracle 9.x and Oracle 10.x:**

1. In order to check if TSTZ columns exist and use the affected time zones, Oracle provides the utltzuv2.sql script, which is discussed further below.

2. For TSLTZ more than 1 time zone is used: the session time zones for all the sessions that use this data, and the database time zone. If one of these is affected, than that means that these TSLTZ are affected.

3. Usage of TSTZ and TSLTZ types goes further than having table columns using these types. They can also be used in parameters, results and variables in PL/SQL, or they can be the result of functions like FROM_TZ and TO_TIMESTAMP_TZ. All these cases count as usage of these types, and therefore the database could be affected even if these types are not used as column types.

4. The TZ_OFFSET function could be used without using any time zone datatypes in the database. If this is used then the database **is also affected**.

5. All uses of time zone information in the database, as described in these points 1-4, are discussed in more detail in:

[Note 406410.1](#) Dealing with existing Database time zone use when updating Oracle TZ-files

6. If the patch is needed, there is a chance that pre- and post-install actions need to be done before applying it, and the patch might also be needed on clients connecting to this database. This is all discussed further below.

7. If the patch is not needed, then this means that it could be installed without any pre- or post-install actions. Therefore despite not being needed, it could be a good idea to install it anyway in case these types will be used in the future.

Time zone file patch - client side:

- **Client software version 8.1.7 (and lower):**

No time zone file patch is needed for Oracle8 software, Oracle8 does not use these.

- **Client software version 9.x and 10.x:**

The time zone file needs to be installed on a client when **all** of the following are true:

1. The client software connects to a database for which the time zone files are (or will be) updated.
2. Time zone datatypes are used from this client.
3. The *affected* time zones are used from this client.

So this means that even if a database is patched, this does not always imply that the clients also need to be patched. This is only needed if and when the affected time zones are actually used on a client. When only non-affected time zones are used from a client, then the patch is not needed there.

Alternatively, if a database is patched only because of affected time zones in the dictionary data, then clients which don't use this information do not need the patch, etc. etc.

Note that if a client does need to be patched, this does not (always) need to be done at the same time as the database. Both sides need to be in-synch when timestamps are used for which the DST information has changed. For the US in 2007 this means between March 11th and April 1st, and between October 28th and November 4th (and on different dates in future years). However, before any of these timestamps are used, the sides can have a different version of the time zone file. So one side can be updated before the other side, as long as both are done by the time the timestamps in the *affected timeframe* are used. This is further discussed below in the section "Applying the Database time zone fixes on clients and middle-tier", and in the note referenced there.

What needs to be done?

Applying new time zone files in a database might affect already existing timestamp data in the database. Before going ahead with the installation of the time zone file patches, we need some preparation first. The steps to perform are:

1. Download a new version of the script `utltzuv2.sql` which checks your TSTZ current data for any rows affected by the updates to the time zone files.
2. Run the `utltzuv2.sql` script to check your TSTZ data
3. Save existing TSTZ data as found by `utltzuv2.sql` as `varchar2`
4. Apply the patch for the Database time zone fixes
5. If you saved data in step 3 then restore this to the timestamp columns
6. Apply the Database time zone fixes to the clients and middle-tiers that connect to this

database

7. Deal with already existing TSLTZ data and other use of the time zone files in the database, which might also be affected by these changes, as per [Note 406410.1](#).
8. When using JVM apply the patch for the JVM time zone fixes

We will cover these points one by one:

Checking the existing data with utltzuv2.sql

Existing TIMESTAMP WITH TIME ZONE data which uses time zones that are updated in the new time zone files, will be affected by the installation of these new time zone files. Oracle provides the utltzuv2.sql script to scan your current data to see if any of this TSTZ data exists. Using the results of this script you can save the affected TSTZ data before the new time zone files are installed in a VARCHAR2 column. After the time zone files are installed the TIMESTAMP values can then be restored to their intended value.

An existing (old) utltzuv2.sql script you already have installed is not sufficient for scanning the updates in the version 3 of the time zone files (which include the changes for the USA from 2007). In order to do this you will need to download and install a new version of the script.

You will need a different version of the script depending on the Oracle version you're currently running on. The correct version of the script can be downloaded as a patch from MetaLink using the following bug numbers:

Table 1: utltzuv2.sql to use before an upgrade to version-3 time zone files

	Generic Platform (valid on all platforms)
9.0.1.5 (*)	5548107
9.2.0.8, 9.2.0.7 & 9.2.0.6	5548107
10.1.0.5 & 10.1.0.4	5126270
10.2.0.2	5601428
Any other version	See Note 399832.1

(*): Note that the "version-3" time zone files do not exist for 9.0.1.x. The utltzuv2.sql script for 9.0.1.5 exists only to be used when upgrading an existing 9.0.1.x database to a higher database version which includes a higher version of the time zone files.

This patch needs to be installed in the database Oracle Home, which places the correct utltzuv2.sql script in your \$ORACLE_HOME/rdbms/admin directory. If the script is not available as a patch for your patchset version then please see [Note 399832.1](#) for manual installation instructions.

After this is installed you can use this script, and deal with its output, as described in the following notes *before* continuing to apply the database time zone fixes:

[Note 396670.1](#) Usage of utltzuv2.sql before updating time zone files in Oracle 9

[Note 396671.1](#) Usage of utltzuv2.sql before updating time zone files in Oracle 10

Database time zone fixes

The changes to DST rules for the USA from 2007 are included in "version 3" of the Oracle time zone files. There are 2 ways in which the new time zone files can be applied to the database:

- Apply a patchset in which these files are included:

- o For 8.0 and 8.1 (8i) these fixes are not needed
- o For 9.0.1 and 9.2 these fixes are *not included* in any patchset
- o For 10.1 these fixes are included in future patchset 10.1.0.6 (note that this patchset is not yet out at this moment)
- o For 10.2 these fixes are included in patchset 10.2.0.3 (availability depends on platform)
- o In Oracle 11 these fixes will be part of the base release
- Apply a one-off patch for Bug 4689959 on top of your current setup.

Note 1: If you apply the new time zone files through a patchset, you still have to go through all the pre-patch steps described above. This always needs to be done when time zone files change, regardless of how the new time zone files are applied.

Note 2: For RAC and single instance databases the same patch is needed.

These patches are currently available from MetaLink on top of the following versions and platforms:

Table 2: Availability of Version-3 Time zone files (patch 4689959)

Note that all patchset versions 9.x and 10.x could be affected, but patches only exist on top of the mentioned patchsets. See notes under column "Other" for available workarounds to apply higher level patches to lower patchset levels.

	9.2.0.7	9.2.0.8	10.1.0.5	>= 10.1.0.6 (***)	10.2.0.2	>= 10.2.0.3 (***)	Other
Solaris SPARC 32 bit	Available	Available	Not Supported	Not Supported	Not Supported	Not Supported	9.2.0.4 requested (****) 9.2.0.6 requested (****) For others see: Note 396387.1
Solaris SPARC 64 bit	Available	Available	Available	Part of patchset (**)	Available	Patchset Available	9.2.0.6 Available 10.1.0.4 Available 10.2.0.1 Available For others see: Note 396387.1
Solaris x86 (32 bit)	Not Supported	Not Supported	not requested	Part of patchset (**)	not requested	Part of patchset (**)	Note 396387.1
Solaris x86-	Not	Not Supported	No	Patchset	Available	Part of	Note

64	Supported		patchset	not planned		patchset (**)	396387.1
Linux x86 (32 bit)	Available	Available	Available	Part of patchset (**)	Available	Patchset Available	9.2.0.6 requested (****) 10.1.0.4 Available 10.2.0.1 Available For others see: Note 396387.1
Linux x86-64	Available	Available	Available	Part of patchset (**)	Available	Patchset Available	Note 396387.1
Linux Itanium	Available	Available	Available	Part of patchset (**)	Available	Patchset Available	Note 396387.1
AIX 5L	Available	Available	Available	Part of patchset (**)	Available	Part of patchset (**)	9.2.0.6 available 9.2.0.4 expected (****) 10.1.0.4 Available For others see: Note 396387.1
HP-UX PA-RISC (64 bit)	Available	Available	Available	Part of patchset (**)	Available	Part of patchset (**)	10.2.0.1 Available For others see: Note 396387.1
HP-UX Itanium	Available	Available	Available	Part of patchset (**)	Available	Part of patchset (**)	10.1.0.4 Available For others see: Note 396387.1
HP Tru64	Available	No patchset	expected (****)	Part of patchset (**)	Available	Part of patchset (**)	Note 396387.1
Windows 32 bit (*)	Patch 13 (bug 5382965)	Patch 2 (bug 5639513)	Patch 9 (bug 5611353)	Part of patchset (**)	Patch 9 (bug 5604010)	Patchset Available	Note 396387.1
64bit Oracle	Not	Not Supported	Not	Not	Patch 9	Patchset	Note

on Windows x86-64 (*)	Supported		Supported	Supported	(bug 5604021)	Available	396387.1
Windows Itanium 64 bit (*)	Patch 13 (bug 5382968)	Patch 3 (bug 5639519)	Patch 9 (bug 5611366)	Part of patchset (**)	Patch 9 (bug 5604017)	Patchset Available	Note 396387.1
HP OpenVMS Alpha	Available	No patchset	No patchset	Part of patchset (**)	Available	Part of patchset (**)	10.1.0.3 requested Note 396387.1
HP OpenVMS Itanium	Not Supported	Not Supported	Not Supported	Not Supported	Available	Part of patchset (**)	Note 396387.1
IBM zSeries based Linux	No patchset	No patchset	not requested	Part of patchset (**)	Available	Part of patchset (**)	Note 396387.1
IBM z/OS (OS/390)	No patchset	Part of cumulative patch: Patch 5490859 (Server/MVS Client) Patch 5738013 (POSIX Client)	Available	Part of patchset (**)	not requested	Patchset Available	Note 396387.1
Other Platforms	not requested	not requested	not requested	Part of patchset	not requested	Part of patchset	n/a

- In Oracle8 time zones files and the time zone datatypes do not exist, so for Oracle8 this patch is never needed.
- In Oracle 9.0.1 the time zone files do exist, but a patch for bug 4689959 will not be created. The use of 9.0.1 as a standalone database came to the end of Error Correction Support on 31-DEC-2003. The use of a 9.0.1 database for the purposes of AS does not require the time zone file fixes as per section I, point 3.1 in [Note 397281.1](#).

(*): For Windows the earliest patch bundle that this fix is included in is listed, if there is a later patch bundle for your patchset you are advised to use that. Information on this can be found in [Note 161549.1](#).

(**): Not yet released, expected release dates for Patchsets are not published by Oracle.

(***): No separate patch needed, version-3 timezone files are included in the patchset.

(****): All remaining 'expected' one-off patches are requested individually through Oracle's standard backport processes. Expected delivery dates cannot be tracked through this note.

If a patch is not available for your specific patchset version, then you can manually install the time zone files from a patch for the same platform and release (but a different patchset version). For details on about this please see: [Note 396387.1](#) Workarounds when Database time zone

patches are not available for your patchset.

If your platform/release combination is not listed as either "Available" or "expected" in this list, and also there is no patch for a different patchset version that you can install manually, then please raise a Service Request with Oracle Support to request the patch.

Applying the Database time zone fixes on clients and middle-tier

Before proceeding with patching the database make sure that you realize the impact this has on the client and middle-tier setup. You will need to patch any 'client' that connects to this database *and* uses the affected time zones as well. This includes "real" clients that connect to the database in client/server mode, but also middle-tiers like Oracle's Application Server (AS), which connect to the database. This is further documented in:

[Note 396426.1](#) Effects on client and middle-tier of applying time zone patches on the Oracle Database

There is no need to run the utltzuv2.sql script on the clients before applying these files, since this script is only used to check the data in the database. The clients simply need to have the same version of the time zone files as the database they connect to (when data in the affected time frame is used).

Time Zone patching in the Enterprise

Because of the effects of time zone patches on the clients it is needed to plan the application of time zone patches carefully. The following note discusses the things that need to be taken into account and formulates the best way to come to a patching strategy for your enterprise:

[Note 402316.1](#) Database Time Zone Patching Strategy in the Enterprise

JVM Fixes

The Oracle Java Virtual Machine (JVM) in the database has its own knowledge of time zones, which needs to be updated.

See [Note 397770.1](#) for details on how to find out if you have the JVM installed, if it is not installed you do not need to apply this patch. Oracle does not provide tools to check your Java code for the existence of affected time zones. Java Stored Procedures are deployed in Oracle, but not managed in Oracle, and in many cases the original Java source code is never even loaded into Oracle. If you wish to check your Java code for usage of affected time zones then we advise to do this outside the database in your development environment. If you are unsure whether (affected) time zones are used in your Java Stored Procedures, we advise to always apply the JVM patches if the JVM is present in the database.

In order to update the JVM with the new DST rules you need to use the following steps:

- Install a patch which contains updated time zone information for the JVM into the Oracle Home.
- This patch will install a new classes.bin file (containing updated time zone information) for Oracle 8 and 9, or new separate time zone information files for Oracle 10.
- These new core Java classes, or the new time zone information files, are then loaded into the database. For most patches this can be done using the "create or replace java system" command. The exception is the patch for Oracle 10.2.0.2, this includes scripts which load the

[Note 396426.1](#) - Effects on client and middle-tier of applying time zone patches on the Oracle Database

[Note 396670.1](#) - Usage of utltzuv2.sql before updating time zone files in Oracle 9

[Note 396671.1](#) - Usage of utltzuv2.sql before updating time zone files in Oracle 10

[Note 396906.1](#) - Patches to Update the Time Zone Transition Rules

[Note 397281.1](#) - USA 2007 Daylight Saving Time (DST) Compliance for Oracle Server Technologies Products

[Note 397770.1](#) - How to check if Oracle JVM is installed in the Database

[Note 399832.1](#) - Workarounds when utltzuv2.sql patches are not available for your patchset

[Note 402316.1](#) - Database Time Zone Patching Strategy in the Enterprise

[Note 402742.1](#) - USA 2007 DST Changes: Frequently Asked Questions for Oracle RDBMS

[Note 403311.1](#) - United States Time Zone Changes 2007: E-Business Suite (EBS)

[Note 406410.1](#) - Dealing with existing Database time zone use when updating Oracle TZ-files

[Note 412160.1](#) - Updated Time Zones in Oracle Time Zone File patches

Keywords

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