

# Oracle® TimesTen In-Memory Database

Release Notes

Release 11.2.1

**E13080-19**

November 2010

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This document provides late-breaking information for **TimesTen release 11.2.1.7.0**, as well as information that is not yet part of the formal documentation. The latest version of this document is the `readme.html` file in your installation directory. Release notes may also be updated from time to time in the documentation library at

<http://www.oracle.com/technetwork/database/timesten/documentation/>

Information about TimesTen 11.2.1 releases before **11.2.1.6.0** can be found at

<http://www.oracle.com/technetwork/database/timesten/documentation/1121-historic-183693.html>

To install the Oracle TimesTen In-Memory Database, run `setup` from the installation media pack. For installation information, see *Oracle TimesTen In-Memory Database Installation Guide*. This guide can be accessed from `install_dir/doc/` at the root of the installation media pack.

This document contains the following sections:

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## 1 Changes in this release

This section lists changes between releases:

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## 1.1 Changes for Release 11.2.1.7.0 from Release 11.2.1.6.6

The `behaviorchanges.txt` file is no longer included in the installation directory. Behavior changes are included in this document.

### 1.1.1 Behavior changes in Release 11.2.1.7.0

- Previous behavior: If `SUBSTR()` result is longer than the target column, the result is silently truncated and an insert or update succeeds with the truncated string.

New behavior: If the result of `SUBSTR()` is longer than the target column in an insert or update statement, the operation fails with error 982: "String exceeds column width". For example, if column `x` is of type `CHAR(4)`, `SET x=SUBSTR('abcdefg', 2)` results in error 982. `SUBSTRB()` in a multibyte character set continues to silently truncate the string, and insert or update continues to succeed with the truncated string.

### 1.1.2 New features and changes in Release 11.2.1.7.0

See the "What's New" prefaces in the documentation to see the new features documented in a specific guide.

- You can create an explicitly loaded global cache group in a cache grid. If the cache tables on the local grid member do not contain data that satisfies a query, then the cache instance is transferred from other grid members to the local grid member in a grid data transfer operation. If the grid does not contain the cache instance that satisfies the query, data is not loaded from the Oracle tables and the query returns no results. See *Oracle In-Memory Database Cache User's Guide*.
- Oracle Data Provider for .NET 11.1.0.7.110 is available for Oracle TimesTen In-Memory Database. It enables fast data access for .NET applications using ADO.NET. This data provider supports TimesTen release 11.2.1.6.1 or later on Microsoft Windows 32-bit and 64-bit platforms. It supports the .NET 2.0, 3.0 and 3.5 frameworks with Microsoft Visual Studio 2005 or later, and .NET 4.0 with Visual Studio 2010. The Oracle Data Provider for .NET is available for download on Oracle Technology Network:

<http://www.oracle.com/technetwork/database/timesten/downloads>

For more information, see *Oracle Data Provider for .NET Oracle TimesTen In-Memory Database Support User's Guide*.

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**Note:** Oracle Data Provider for .NET 11.1.0.7.110 supports Oracle TimesTen In-Memory Database only. A future release of Oracle Database Provider for .NET will support both Oracle Database and Oracle TimesTen In-Memory Database.

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- Tables with aging are not supported with track-based parallel replication. In this release, TimesTen prevents the user from including a table with aging from being part of a replication scheme when `ReplicationApplyOrdering=1`.
- TimesTen is supported for SUSE 11 on Linux x86-64.
- The default value for the `-maxsupportlogsize` daemon option has been changed from 1 to 10 MB. See *Oracle TimesTen In-Memory Database Operations Guide*.

- Aging statistics have been added to the `SYS.SYSTEMSTATS` system table. See *Oracle TimesTen In-Memory Database System Tables and Limits Reference*.
- Using TimesTen with IBM Java SDK 1.6 for 32-bit and 64-bit on Linux x86 is supported. To use this Java SDK, a fix from IBM is required, published as APAR IZ76406, which is included in Java 6 SR8 FP1.
- The `ScriptInstallDir` attribute is not required to configure Oracle Clusterware with TimesTen. The attribute is deprecated in this release.

### 1.1.3 Bug fixes in Release 11.2.1.7.0

- The `ttMigrate` utility returns exit codes. See *Oracle TimesTen In-Memory Database Reference*. (BugDB 8637795)
- In previous releases, `ttBulkCp` failures returned an incorrect code. This problem has been fixed. (BugDB 9414206)
- In previous releases, the `-showdate` daemon option was not enabled for the Server process. This problem has been fixed. (BugDB 9722055)
- A `CREATE VIEW` statement fails if the view definition contains a union, and one side of the union is a query that selects from a derived table that is a join. In this release, TimesTen returns an error message that describes the problem. (BugDB 9864076)
- Create cache group checks if the user has the appropriate Oracle privilege. For example, it checks if the user has `SELECT ON` privileges on each table in the cache group. In the 11.2.1.7.0 release, the code checks for individual privileges, as well as those granted through a role. In earlier releases, it was not checking against role privileges. (BugDB 9873532)
- When grid failed to allocate memory a message will be logged to the daemon log to indicate this fact. The message will have the following format: Member '`memberName`' failed to allocate temp space, errorcode='`errNo`' - '`errMessage`'. (BugDB 9893472)
- Public access to TimesTen objects in the Oracle database that are used for cache operations is no longer allowed. (BugDB 9957021)
- In previous releases, the fractional second field of an Oracle `TIMESTAMP` value contained in a PL/SQL variable buffer was inadvertently modified when it was prepared for conversion into the TimesTen `TT_TIMESTAMP` format. This problem has been fixed. (BugDB 9903966)
- SQL operations executed internally by PL/SQL may generate warnings, for example, because of low memory or replication failures. In previous releases these warnings could cause ORA-0600 errors to be emitted. In this release ORA-0600 errors do not result from these temporary warning conditions. (BugDB 9916812)
- In a client/server configuration, errors in starting child server processes resulted in an "unexpected server exit" and no additional information. Now startup errors are reported. (BugDB 9934387)
- Internal trace buffers are now flushed when the database is loaded into memory. Previously, trace data left over from a prior load of the database could interfere with new traces, causing errors that could result in database invalidation. (BugDB 9939628)
- In previous releases, a call to the `ttOptEstimateStats` built-in procedure could result in an assertion when a concurrent transaction committed after deleting a

large number of rows. In this release, TimesTen returns an error if TimesTen cannot perform the estimate. The new error has the form: "Estimate statistics on *owner.table* failed due to too some concurrent operation; try again." (BugDB 9954300)

- In previous releases, altering a cache group could cause a core dump when the TimesTen configuration tables on the Oracle database were empty. This problem has been fixed. (BugDB 9956288)
- The message for error 6226 has been changed to replace the obsolete `LogBufSize` connection attribute name with `LogBufMB`. (BugDB 9961676)
- The stability of TimesTen PL/SQL after unexpected application failures is improved. (BugDB 10011855)
- In previous releases, a master-master replication scheme with two-safe enabled could create a backlog of replication records that were never sent to a subscriber database. This problem has been fixed. (BugDB 10029655)
- In previous releases, calls to the `ttOptSetFlag` built-in procedure incorrectly reset the values set by the `ttOptUseIndex` built-in procedure. This problem has been fixed. (BugDB 10034510)
- Dynamic load operations use the SQL command cache more efficiently than in previous releases. (Bug DB 10036720)
- Dynamic load operations no longer cause a round trip to the Oracle database when the parent row is already in the IMDB Cache. (BugDB 10036751)
- The `log.commit.file.reads` statistic in the `SYS.SYSTEMSTATS` system table keeps track of how often TimesTen reads from the file system during commit processing. In previous releases, this statistic was higher than `log.file.reads`, which keeps track of total file system reads. The `log.commit.file.reads` statistic is now calculated correctly. (BugDB 10134912)
- In previous releases, a replication agent or an XLA application could encounter an assertion failure `blklen <= startIdMap->offset` in the `sbLogBufLRNNextLocate` function. This problem has been fixed. (BugDB 10145152, 10194728 and 10196227)
- A problem has been fixed where an assertion could occur while executing `SELECT` statement through a procedure from a JDBC application. (BugDB 10167873)
- In previous releases, the replication agent could crash and invalidate the database when the replication agent was reading close to the end of the in-memory logs. This problem could occur when the value of the connection attribute `LogBufParallelism` was greater than 1. In that case, one particular log record could cause a log strand reader to block and cause other strand-readers to read records in an incorrect order. This problem has been fixed. (BugDB 10174319 and 10176689)
- In previous releases, a bad pointer caused an assertion in the `sblogCtnWrapComplete` function. This problem has been fixed. (BugDB 10176825)
- A problem has been fixed where timing issues after a `ttCWAdmin -init` operation could generate false positives. (BugDB 10208113)
- In previous releases, global dynamic AWT cache groups checked the Oracle tables for unique primary keys when inserts were performed on the TimesTen cache tables. This uniqueness check no longer occurs, which enables inserts to take place

in TimesTen cache tables when the Oracle database is not available. (BugDB 10211940)

- In previous releases, when a direct-linked application was terminated abnormally, other active connections or subsequent connections could cause database invalidation. This problem has been fixed. (BugDB 10008657 and 10214446)
- An assertion could occur when parallel replication was enabled. The transmitter would crash when reading close to the end of the log, causing an incorrect check that failed when a connection changed its replication track number. This problem has been fixed. (BugDB 10218953)
- A problem has been fixed where parallel replication would hang while running `ttrepadmin -dsn DSN -receiver list`. (BugDB 10223328)

## 1.2 Changes for Release 11.2.1.6.6 from Release 11.2.1.6.5

- A problem has been fixed where, if a secondary group was chosen during the installation and the TimesTen daemon is started by the `root` user, the daemon would run under the primary group rather than the intended group. (BugDB 9968811)
- For AIX on POWER systems, a problem has been fixed in which a misplaced memory barrier could lead to an assertion failure in `sbLogStrandGetNextRecord`. (BugDB 10008972)
- A problem has been fixed where information about the group that owned the database was incorrectly removed from the database when duplicating or restoring the database. This caused subsequently created log files to have incorrect ownership, group, and/or permissions. (BugDB 10020189)
- A problem has been fixed where the delete of the dummy row generated for concurrency control might be incorrectly treated as a deferred delete of AWT cache group. This might cause an error to be returned when the member attempted to reload the instance after it had been transferred or unloaded. (BugDB 10023143)
- A problem has been fixed where a mutex used for cache grid concurrency control might be released by a process other than the process that acquired the mutex. This problem could cause an assertion failure. (BugDB 10049032)

## 1.3 Changes for Release 11.2.1.6.5 from Release 11.2.1.6.4

- You can use the `ttRepStateGet` built-in procedure to return the grid state as well as the database role after failover in an active standby pair grid member. See *Oracle TimesTen In-Memory Database Reference* for details.
- A problem has been fixed where tracing could cause a database to become invalidated. (BugDB 9088582 and 9940513)
- A problem has been fixed where a `FIRST N` in a `SELECT` query with a `SET MINUS` operator and many joins would choose a bad plan, consume a large amount of temporary space and not execute. (BugDB 9867351)
- A problem has been fixed where an assertion failure could occur when the allocated buffer to store the foreign key of a dynamic load was too small. (BugDB 9924227)
- Concurrent operations on detail tables of a materialized view could sometimes cause the materialized view to get out of sync. (BugDB 9977046)

## 1.4 Changes for Release 11.2.1.6.4 from Release 11.2.1.6.3

- In previous releases, durable commits could continue after the recovery of a failed standby master node in an active standby pair with `RETURN TWOSAFE DURABLE COMMITTS` specified. This problem is fixed. (BugDB 9296545)
- A warning message is now included in the `ttmesg.log` when an error occurs with the configuration of HugePages on Linux systems. (BugDB 9582712)
- Array binds to PL/SQL are not supported in TimesTen. In previous releases, attempts to bind an array would not return an error message, in some cases. Now the error message ORA-1335 "feature not supported" is returned when the calling program tries to specify an array (of more than one element) to a PL/SQL procedure call. (BugDB 9645256)
- A problem has been fixed where a multi-table query with a `LIKE` predicate that passed a string whose length exceeded the width of the target column did not have optimal performance and would take longer to complete than expected. (BugDB 9647431)
- A problem has been fixed where the `ttbackupstatus` built-in procedure would return the name of a backup file, even after a the `ttBackup` operation had been terminated before completing the backup. (BugDB 9658978)
- Previously, the selectivity of the `LIKE` predicate with patterns ending in the wildcard character (e.g. "starts\_with\_this%") was underestimated, causing the optimizer to pick suboptimal plans for queries with an `AND` condition. (BugDB 9741326)
- A problem has been fixed where a `ttMigrate` operation would fail when attempting to migrate a PL/SQL package that contained multibyte character set comments. (BugDB 9747278)
- In previous releases, `SQLFetch` and `SQLFreeStmt (hstmt, SQL_CLOSE)` could, in some circumstances, return the underlying error code (846 or 994) rather than trigger a failover. In this release, a failover notification is returned. (BugDB 9795626)
- In previous releases, when permanent space was exhausted, a cache grid assertion failure could occur. This problem has been fixed. (BugDB 9871235)
- A problem has been fixed where the status report that is displayed when a user calls `ttRepAdmin -showstatus` would incorrectly show fewer receivers than transmitters. This problem occurred when using parallel replication. (BugDB 9837882)
- A problem has been fixed where applications that use PL/SQL procedures could consume a lot of memory. (BugDB 9846145)
- A problem has been fixed where receiver thread information would continue to appear in the status report that is displayed when a user calls `ttRepAdmin -showstatus` even after the receiver had been disconnected. This problem occurred when using parallel replication. (BugDB 9850072)
- In previous TimesTen 11.x releases, if the database was created group restricted, and there was a failure to change group ownership of a log file, it could cause the database to become invalidated. This has been fixed. TimesTen now retries changing group ownership and returns more details about the operating system error if a failure occurs. (BugDB #9891312)

## 1.5 Changes for Release 11.2.1.6.3 from Release 11.2.1.6.1

- In previous 11.2.1 releases, use of an unreplicated XLA bookmark on a standby database in an active standby pair scheme could stop replication between the active and standby stores and also lead to high CPU usage. This problem has been fixed. (BugDB 9800186)

## 1.6 Changes for Release 11.2.1.6.1 from Release 11.2.1.6.0

- In previous releases, on AIX systems, the user had to call `setsockopt` at the kernel level to get the benefits of the `TCP_RFC1323` option. It is no longer necessary for the user to make this call. TimesTen makes the call by default. (BugDB 6800684)
- A problem has been fixed where a disconnect from a standby store in an active standby pair with cache grid could hang. (BugDB 9538780)
- In previous releases, creating many joins in a large materialized view could hang. This problem has been fixed. (BugDB 9581951)
- TimesTen now returns ODBC error S1000: Unable to load NLS initialization data from /bogus/nls/data if the TimesTen client driver cannot find or load NLS files. (BugDB 9595956)
- In previous releases, a replication agent could fail with this assertion failure: `eolCnt + eofCnt == logc->strandCnt`. This bug has been fixed. (Bug 9644085).
- During an upgrade from previous 11.2.1 releases to 11.2.1.6.0, the replication agent could fail to start due to error `TT2211: Referenced column P.TRACK_ID not found`>. This problem is fixed. (BugDB 9733793)

## 1.7 Changes for Release 11.2.1.6.0 from Release 11.2.1.5.2

### 1.7.1 Behavior changes in Release 11.2.1.6.0

- New behavior: The results for addition and subtraction with `DATE` and `TIMESTAMP` types for `INTERVAL MONTH` are not closed. For example, adding 12 months to the `DATE` or `TIMESTAMP` of '2004-02-29' results in a date arithmetic error (TimesTen error message 2787) because February 29, 2005 does not exist. (2005 is not a leap year.) Adding `INTERVAL '1' MONTH` to `DATE '2005-01-30'` results in the same error because February never has 30 days. This behavior is documented in *Oracle TimesTen In-Memory Database SQL Reference*, but the code did not return an error previously.

Previous behavior: If the date is the last day of the month or if the resulting month has fewer days than the day component of `DATE`, then the result is the last day of the resulting month. Otherwise, the result has the same day component as `DATE`. Use the `ADD_MONTHS` function to get the old behavior. For example, `ADD_MONTHS (DATE '2004-02-29', 12)` gives the result as `DATE '2005-02-28'`, the last day of the month. `ADD_MONTHS (DATE '2005-01-30', 1)` results in `DATE '2005-2-28'`, the last day of the month.

- The `SELECT` privilege has been granted to `PUBLIC` on the `SYS.SYSTEM_PRIVILEGE_MAP` and `SYS.TABLE_PRIVILEGE_MAP` system tables. Public synonyms have also been created for these two tables.

- JDBC client/server driver does not validate the *index* parameter in `PreparedStatement.setXXX()` calls. Validation occurs during `PreparedStatement.execute()` calls.

### 1.7.2 New features and changes in Release 11.2.1.6.0

See the "What's New" prefaces in the documentation to see the new features documented in a specific guide.

- You can perform a global query on cache tables and noncache tables across all nodes in a cache grid. You can also unload a cache group on all grid members by specifying a global unload operation. Use the `GlobalProcessing` optimizer flag. For a detailed description, see the *Oracle In-Memory Database Cache User's Guide*.
- `TTClasses` now supports PL/SQL `IN`, `OUT` and `IN OUT` parameters and `REF CURSORS`.
- User-defined parallel replication can be configured for applications that have predictable transactional dependencies and do not require the commit order on the source database to be the same as the commit order on the target database. User-defined parallel replication is available for replication schemes that are not active standby pairs. See *Oracle TimesTen In-Memory Database TimesTen to TimesTen Replication Guide* for more information. This feature includes:
  - New database attributes `ReplicationParallelism` and `ReplicationApplyOrdering` and the connection attribute `ReplicationTrack`.
  - New SQL `SET REPLICATION_TRACK` clause of the `ALTER SESSION` statement.
  - The new `TT_REPLICATION_TRACK` ODBC connection option for the `SQLSetConnectOption` ODBC function.
  - The new `setReplicationTrack()` method of the `TimesTenConnection` JDBC class

The `ALTER TABLE...USE INDEX` operation is not permitted when user-defined parallel replication is used and replication agent is running.
- Oracle Clusterware can be configured with a cache grid by setting the `GridPort` attribute in the `cluster.oracle.ini` file. See *Oracle TimesTen In-Memory Database TimesTen to TimesTen Replication Guide*.

### 1.7.3 Bug fixes in Release 11.2.1.6.0

- In previous releases, if you did a client-only install into a root directory, TimesTen would fail to find TimesTen servers during a Client DSN setup. This problem has been fixed. (BugDB 9261243)
- A problem has been fixed where a flush cache group operation would hold row locks on child tables. This problem could block an update statement that touched the child table. (BugDB 9359437)
- In previous releases, executing a query against multiple outer joins with the set operators `UNION`, `MINUS` or `INTERSECT` could result in abnormal termination. This problem has been fixed. (BugDB 9382127)
- A problem has been fixed where the cache agent would not start if the `ORA_NLS`, `ORA_NLS10` and `ORA_NLS33` variables were set in the environment of the TimesTen main daemon. (BugDB 9382534)

- A deadlock or lock timeout error that could be encountered during a parallel `ttMigrate` restore operation has been fixed. (BugDB 9388441)
- In previous releases, an autorefresh polling query incorrectly used a full table scan. In this release, the query uses an index. (BugDB 9434677)
- An assertion failure that resulted from an inconsistency in TimesTen internal lock structures has been fixed in this release. (BugDB 9436967)
- In previous releases, an assertion could occur if the total number of rows for a single value needed more than 65K pages in a bitmap index and subsequent fast recoveries would hang. This has been fixed. (BugDB 9445235)
- In previous TimesTen 11.2.1. releases, replication would fail during an `ALTER REPLICATION` operation when replicating from a TimesTen 11.2.1.x release to a pre-11.2.1 release. This has been fixed. (BugDB 9447493)
- A problem has been fixed for Windows systems where Shared Memory IPC client server connections would fail sometimes. (BugDB 9478491)
- The SQL command ID is included as output to `ttXactAdmin`. This ID is helpful as input for the built-in procedure `ttSQLCmdCacheInfo` to associate the SQL statement with the ID. (BugDB 9496444)
- A problem has been fixed where a TimesTen daemon disconnect would fail with an error -8 in the `StopManaging` function if a process had exited ungracefully. (BugDB 9499437)
- A problem has been fixed where projected constants in a `JOIN` of tables and views could create duplicate result column names. (BugDB 9503696)
- In previous releases, when timestamp based aging is used, rows with date values in the future could be aged out. This problem has been fixed. (BugDB 9541351)
- A problem has been fixed where PL/SQL procedures could be stored incorrectly in the database. Any attempt to use these procedures would result in a crash. (BugDB 9542428)
- In previous releases, when the value of the `LogBufParallelism` attribute was greater than 1, it could cause the transmitter in the replication agent to crash. This problem has been fixed. (BugDB9588242)

## 2 Platforms

Environment	32-bit	64-bit	Compiler notes
Microsoft Windows 2000, Windows XP, Windows Vista and Windows Server 2003 and 2008 for Intel IA-32 and EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 8. VS .NET 2003, VS 2005 and VS 2008 are also supported. To use the TimesTen debug library, you <i>must</i> use VS .NET 2003.
Asianux 2.0 and 3.0 for Intel IA-32 and EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 9.1. gcc 3.4.6 and 4.1.0 are also supported.

<b>Environment</b>	<b>32-bit</b>	<b>64-bit</b>	<b>Compiler notes</b>
Solaris 9 and 10 for UltraSparc CPUs.	Yes	Yes	Compiled with Sun Studio 11. Shipped with a TimesTen client library compiled with gcc 3.2.3.
Solaris 10 for x86-64.	No	Yes	Compiled with Sun Studio 10. Tested on AMD64 CPUs.
SUSE Linux Enterprise Server 10 for Intel IA-32 and EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 9.1. gcc 3.4.6 and 4.1.0 are also supported.
SUSE Linux Enterprise Server 10 for Itanium2 CPUs.	No	Yes	Compiled and tested with Intel 9.1. gcc 3.4.5 and 4.1.0 are also supported.
SUSE Linux Enterprise Server 11 for Linux x86-64	No	Yes	gcc 4.3
Red Hat Enterprise Linux 4 and 5 for Intel Itanium2 CPUs.	No	Yes	Compiled and tested with Intel 9.1. gcc 3.4.5 and 4.1.0 are also supported.
Red Hat Enterprise Linux 4 and 5 for Intel IA-32 and EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 9.1. gcc 3.4.6 and 4.1.0 are also supported.
Oracle Linux 4 and 5 for Intel IA-32 and EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 9.1. gcc 3.4.6 and 4.1.0 are also supported.
Monta Vista Linux Carrier Grade Edition Release 4.0 and 5.0 for Intel IA-32, EM64T and AMD64 CPUs.	Yes	Yes	Compiled and tested with Intel 9.1. gcc 3.4.6 and 4.1.0 are also supported.
HP-UX 11i v2 and 11iv3 for PA-RISC.	Yes	Yes	Compiled and tested with the HP compiler.
HP-UX 11i v2 and 11iv3 for Itanium2.	Yes	Yes	Compiled and tested with the HP compiler.
AIX 5L 5.3 and 6.1 for POWER CPUs.	Yes	Yes	Compiled and tested with the AIX compiler.
Mac OS X 10.6	Yes	No	Compiled and tested with gcc 4.2.1.

TimesTen is supported on Oracle VM guest x86 and x86-64 operating systems on Oracle Linux 4 and 5 or Red Hat Enterprise Linux 4 and 5 systems.

## 3 Software requirements

For software requirements, refer to *Oracle TimesTen In-Memory Database Installation Guide*.

## 4 Deliverables

You should receive the following with your copy of the Oracle TimesTen In-Memory Database:

- **Release Notes.** This document (which you are now reading) covers late-breaking information not included in the formal documentation.
- **Oracle TimesTen Media Pack.** The media pack includes the Oracle TimesTen libraries and executables, demo programs, utilities and online documentation. The documentation included on the media pack consists of:
  - **Oracle TimesTen In-Memory Database Release Notes (Part Number E13080).** See the description above.
  - **Oracle TimesTen In-Memory Database Installation Guide (Part Number E13063).** See the description above.
  - **Oracle In-Memory Database Cache Introduction (Part Number E14261).** This guide describes the features of Oracle In-Memory Database Cache and provides information to help developers plan an IMDB Cache application.
  - **Oracle TimesTen In-Memory Database Operations Guide (Part Number E13065).** This guide provides information about configuring TimesTen and using the `ttIsql` utility to manage a database. It also provides a basic tutorial for TimesTen.
  - **Oracle TimesTen In-Memory Database C Developer's Guide (Part Number E13066).** This guide describes how to compile and link your C application with Oracle TimesTen and how to set up and work with Oracle TimesTen databases. It covers topics that include error handling, event management and performance tuning. It also provides a reference for C language-specific APIs.
  - **Oracle TimesTen In-Memory Database Java Developer's Guide (Part Number E13068).** This guide describes how to compile and link your Java application with Oracle TimesTen and how to set up and work with Oracle TimesTen databases. It covers topics that include error handling, event management and performance tuning. It also provides a reference for Java language-specific APIs.
  - **Oracle TimesTen In-Memory Database TTClasses Guide (Part Number E13074).** This guide describes the Oracle TimesTen C++ Interface Classes library. The library provides wrappers around the most common ODBC functionality.
  - **Oracle TimesTen In-Memory Database PL/SQL Developer's Guide (Part Number E13076).** This guide describes and explains how to use PL/SQL in the TimesTen database. It is intended for anyone developing PL/SQL-based applications for the Oracle TimesTen In-Memory Database.
  - **Oracle TimesTen In-Memory Database PL/SQL Packages Reference (Part Number E14000).** This guide provides a reference to all PL/SQL packages available for use with the TimesTen database. It is intended for anyone developing PL/SQL-based applications for the Oracle TimesTen In-Memory Database.

- **Oracle TimesTen In-Memory Database Reference (Part Number E13069).** This guide provides a reference to all Oracle TimesTen utilities, built-in procedures and attributes and provides a reference to other features of TimesTen.
- **Oracle TimesTen In-Memory Database SQL Reference (Part Number E13070).** This guide contains a complete reference to all TimesTen SQL statements, expressions and functions, including TimesTen SQL extensions.
- **Oracle TimesTen In-Memory Database Error Messages and SNMP Traps (Part Number E13071).** This guide contains a complete reference to the TimesTen error messages and information about using SNMP traps with TimesTen.
- **Oracle TimesTen In-Memory Database System Tables and Limits Reference (Part Number E17114).** This document provides a reference for TimesTen system tables, replication tables and system limits.
- **Oracle TimesTen In-Memory Database TimesTen to TimesTen Replication Guide (Part Number E13072).** This guide provides background information to help you understand how Oracle TimesTen replication works and step-by-step instructions and examples that show how to perform the most commonly needed tasks. It includes information about TimesTen integration with Oracle Clusterware.
- **Oracle In-Memory Database Cache User's Guide (Part Number E13073).** This guide provides background information to help you understand how to create and manage Oracle In-Memory Database Cache and cache grid.
- **Oracle TimesTen In-Memory Database Troubleshooting Procedures Guide (Part Number E13075).** This guide describes how to troubleshoot some of the problems users encounter when using TimesTen.
- **Oracle TimesTen In-Memory Database JDBC Extensions Java API Reference (Part Number E13083) and Oracle TimesTen In-Memory Database JMS/XLA Java API Reference (Part Number E13084).** These references describe TimesTen extensions to JDBC classes and interfaces and the TimesTen JMS/XLA package.
- **Oracle Enterprise Manager System Monitoring Plug-in for Oracle TimesTen In-Memory Database Release Notes (Part Number E13081) and Oracle Enterprise Manager System Monitoring Plug-in for Oracle TimesTen In-Memory Database Installation Guide (Part Number E13082).** This guide and release notes document describe the Oracle Enterprise Manager Plug-in for TimesTen.

If any of these items is missing, contact Oracle TimesTen support. See "[Contacting support](#)" on page 22.

## 5 Advance notice

This section lists deprecated and removed items and desupport of platforms, Oracle releases, JDK releases and compilers.

### 5.1 Deprecated items in Release 11.2.1.7.0

The `ScriptInstallDir` Clusterware attribute

## 5.2 Removed items in Release 11.2.1.4.0

The `-lsn` option of the `ttXactAdmin` utility

## 5.3 Deprecated items in Release 11.2.1.1.0

- `LogBuffSize` attribute. Use `LogBufMB` instead. The units have changed from kilobytes to megabytes.
- Including sequence values in a `CREATE VIEW` statement is deprecated.

## 5.4 Removed items in Release 11.2.1.1.0

- `Authenticate` attribute
- It is not possible to set the `Logging` attribute to 0. The only possible value is 1.
- Built-in procedures: `ttCommitLSN`, `ttLogBufPrint`, `ttuser`, `ttUserPrivileges`
- The `-at` and `-af` options of the `ttXactLog` utility have been removed.

## 5.5 Deprecated items in Release 11.2.1.0.0

- The `GroupRestrict` and `Authenticate` attributes are deprecated. They are scheduled to be removed in a later release.

## 5.6 Removed items in Release 11.2.1.0.0

- `SELECT FOR UPDATE ON ORACLE SQL` statement
- `DURATION` clause in `CREATE CACHE GROUP` and `ALTER CACHE GROUP SQL` statements
- The `ttCacheAgingMemoryThresholdSet` and `ttCacheAgingIntervalSet` built-in procedures
- The `TransparentLoad` attribute and the `TT_TRANSPARENT_LOAD` ODBC option have been removed. Use dynamic cache groups instead.
- The `OracleID` attribute has been removed. Use `OracleNetServiceName` instead.
- The `ExclAccess` attribute has been removed.
- The Cache Administrator (web-based user interface) has been removed.
- TimesTen no longer supports these platforms: AIX 5.2, HP-UX 11i v1, RedHat 3, Solaris 8 (Sparc), Solaris 10 x86 32-bit, SUSE Linux 9 and TRU 64.
- TimesTen no longer supports Oracle9i or Oracle 10.1.0.x.
- TimesTen no longer supports JDK 1.4.x on all platforms. Also, `classes15.jar` and `classes16.jar` have been removed.
- TimesTen no longer supports the gcc 3.2.3 compiler, Visual C++ 6.0, Visual Studio .NET 2002 and Sun Studio 10.

## 6 Known problems and limitations

This section contains known problems and limitations.

## 6.1 Installing and uninstalling TimesTen

- TimesTen is not supported with these Oracle Linux 5 kernels: Oracle Linux 5 GA with virtualization option (2.6.18-8.el5xen), Oracle Linux 5 Update 1 with virtualization option (2.6.18-53.el5xen), Oracle Linux 5 Update 2 with virtualization option (2.6.18-92.el5xen).

TimesTen is supported with these Oracle Linux 5 kernels: Oracle Linux 5 kernel version 2.6.18\* without the `xen` suffix and without the virtualization option, Oracle Linux 5 Update 4 with virtualization option (2.6.18-164.el5xen), Oracle Linux 5 Update 5 with virtualization option (2.6.18-194.el5xen).

The `uname -r` Linux command displays the Linux kernel version.

- If you are installing Oracle TimesTen on a new 64-bit RedHat Linux system, you may find that it is not enabled for 32-bit applications. According to the Redhat Enterprise Linux installation guide: 'Users of AMD64, Intel(R) EM64T, and Itanium systems who want support for developing or running 32-bit applications are encouraged to select the Compatibility Arch Support and Compatibility Arch Development Support packages to install architecture specific support for their systems.'
- On Windows 64-bit systems, TimesTen 32-bit and 64-bit instances cannot coexist on the same system.
- On Windows systems, you cannot perform a modified or incremental installation. For example, if you originally installed only the Oracle TimesTen Client and later wanted to install the Oracle TimesTen Data Manager, you need to uninstall TimesTen and reinstall all of the components you wish to have on your system.
- When uninstalling TimesTen on Windows, the `oci.dll` file shipped with the TimesTen installation sometimes cannot be removed because it is in use by a process that is not part of TimesTen.
- To run TimesTen 32-bit on AIX, you must install the appropriate fix or higher mentioned at:

<http://www-01.ibm.com/support/docview.wss?uid=isg1fixinfo105065>

Without this operating system patch, core dumps or other serious problems may occur when running TimesTen.

The root IBM APAR is: IZ10231: R27 OVERWRITTEN AFTER DLSYM EXECUTION APPLIES TO AIX 5300-06.

See <http://www-01.ibm.com/support/docview.wss?uid=isg1IZ10231>.

- For releases 11.2.1.5.0 and later, you must relink applications on AIX after installing TimesTen. Failure to do so results in an application execution error similar to the following:  

```
Could not load program _application_:
Dependent module _tt_inst_dir_/lib/libtten.a(libtten.so) could not be loaded.
File _tt_inst_dir_/lib/libtten.a is not an archive or the file could not be
read properly.
System error: Exec format error
```
- When re-installing TimesTen on UNIX, existing `sys.odbc.ini` and `sys.ttconnect.ini` files are optionally saved as `sys.odbc.ini.old` and `sys.ttconnect.ini.old` files and new demo files are installed. In this case,

you must manually merge any additional DSNs that may have been defined after reinstalling.

## 6.2 Upgrading TimesTen

- The `ttMigrate` utility cannot migrate foreign key dependencies between objects owned by different users to TimesTen release 11.2.1.1.0 and later without a workaround. To work around this problem, first restore the parent tables. Then grant the owner of the child tables the appropriate `REFERENCES` privileges on its parent tables. Finally, restore the child tables.
- The `ttMigrate` utility cannot migrate materialized views to TimesTen release 11.2.1.1.0 and later without a workaround. To work around this problem, first restore the detail tables referenced by the materialized view. Then grant the owner of the materialized view `SELECT` privileges on every detail table. Finally, restore the materialized view.

## 6.3 Log Files

- Support log files do not rotate properly on Windows operating systems. When the `MaxSupportLogFiles` limit is reached, new log files should overwrite old files in the order they were created. On Windows systems, new log files randomly overwrite the old files.

## 6.4 PL/SQL

- PL/SQL is not supported on Solaris x86 and Linux Itanium systems.
- `PLSQL_CODE_TYPE=NATIVE` can be specified, but it is implemented as `INTERPRETED`.
- JRockit on 32-bit Linux allocates a default heap that is 50 percent of available physical memory up to 1 gigabyte. Users of JRockit on 32-bit platforms may need to choose a value for `PLSQL_MEMORY_ADDRESS` other than the default (10000000). Consider values such as `B0000000`, which ensures that the PL/SQL shared memory is not part of the JRockit heap.
- Using `q' (quoting syntax) is not supported.`
- The `EXECUTE IMMEDIATE` statement cannot be used to execute a PL/SQL anonymous block.
- `UTL_FILE` access is limited to a temporary directory located in `install_dir/plsql/utl_file_temp`. The instance administrator can grant access to `UTL_FILE` to specific database users. Users can reference the directory using `UTL_FILE` if and only if they provide the string `'UTL_FILE_TEMP'` for the location parameter string.
- With Java 6 on 32-bit AIX, connections to a PL/SQL-enabled database using the TimesTen direct driver may fail because of a memory address conflict between the Java memory segment and the TimesTen PL/SQL memory segment. Such a failure is reported as error `TT8517`:

```
SQLException: [TimesTen][TimesTen 11.2.1.4.0 ODBC Driver][TimesTen]TT8517:  
Cannot attach PL/SQL shared memory;  
PLSQL_MEMORY_ADDRESS not valid or already in use
```

The conflict can be resolved by specifying a smaller Java memory maximum size using the `-Xmx` option to `java` or the `IBM_JAVA_OPTIONS` environment variable. For example: `java -Xmx64M`. Use `java -verbose:sizes` to see the current default Java memory size.

An alternative solution is to explicitly set the TimesTen `PLSQL_MEMORY_ADDRESS` connection attribute to a value that does not conflict with the Java segment. Potential good values for `PLSQL_MEMORY_ADDRESS` may include `0xe0000000` and `0xa0000000`, depending on the environment and other factors. See the AIX documentation for a complete discussion of how Java uses memory on AIX.

## 6.5 TimesTen OCI support

See "Oracle Call Interface Support" in *Oracle TimesTen In-Memory Database C Developer's Guide* for detailed information about known problems and limitations.

- TimesTen OCI is not supported on Solaris x86 or Linux Itanium systems.
- Certain PL/SQL blocks with `OUT` parameters, when executed against TimesTen OCI, can generate an ORA-12899 error when the data coming back from the PL/SQL block overflows the bound output buffer. This occurs only when the parameters are bound with the UTF16 character set.
- If `NLS_LANG` is set to a value that is not supported by TimesTen, spurious errors such as "Cannot connect" may result.
- When an `INSERT` or `UPDATE` statement is executed which has an array of structures bound as parameters (using `OCIBindArrayOfStruct`), the first execution of the statement succeeds. Subsequent executions may result in a numeric overflow error, a uniqueness constraint violation or a truncation error.

## 6.6 TimesTen support for Oracle Pro\*C/C++ Precompiler

See "TimesTen Support for Oracle Pro\*C/C++ Precompiler" in *Oracle TimesTen In-Memory Database C Developer's Guide* for detailed information about known problems and limitations.

- The windows link line for a Pro\*C application that uses `SQLLIB` functions should include both `OCI.LIB` and `ORASQL11.LIB`. The correct order is `OCI.LIB` first, then `ORASQL11.LIB`. Reversing the order can lead to the `SQLLIB` functions not working.
- The Oracle Pro\*C pre-compiler can fail when the path length to the pre-compiler is greater than 100 characters. The work-around is to use either a relative path or a symbolic link that has a path length less than 100 characters.
- When a variable is declared as `long long` on 32-bit Solaris and 32-bit HP-UX platforms, Pro\*C generates its size as `long`.
- When compiling a Pro\*C/C++ demo, this message may appear: "System default option values taken from: `install_dir/ttoracle_home/instantclient_11_1/precomp/admin/pcscfg.cfg`." The path name may be incorrect.

## 6.7 JDBC

- On HP-UX 11 systems, 32-bit JDBC client and direct drivers cannot co-exist in one JVM due to some problems with loading shared libraries.

- If a JDBC application running in a time zone that has Daylight Savings Time selects a non-existent time using `ResultSet.getTimestamp()`, it gets a time that is an hour behind. For example, in Pacific Standard Time, on the day when the time changes from Standard to Daylight Savings Time, the time between 2:00 a.m. and 2:59 a.m. does not exist. So, if a JDBC application running in Standard Time selects a value of `'2002-04-07 02:00:00'` using `getTimestamp()` it gets `'2002-04-07 01:00:00'`.

## 6.8 JMS/XLA

- TimesTen does not generate an XLA (Transaction Log API) record for `CREATE MATERIALIZED VIEW LOG` operations. See *Oracle TimesTen In-Memory Database C Developer's Guide* for other details about XLA.
- JMS/XLA depends on the Oracle GDK for internationalization support. TimesTen distributions include a version of `orai18n.jar` in `install_dir/lib` that JMS/XLA is tested against. JMS/XLA may work with other versions of `orai18n.jar` but those versions are not supported. See *Oracle TimesTen In-Memory Database Java Developer's Guide* for other details.
- To achieve the highest throughput, JMS/XLA applications running on Linux should follow performance guidelines presented in the section entitled "Handling high event rates" in *Oracle TimesTen In-Memory Database Java Developer's Guide* to work around these issues.

## 6.9 Cache grid

- If an insert of a new instance in one grid node does not propagate to the Oracle database before a dynamic load operation for the same instance is executed on a child table in another grid node, then the dynamic load operation results in "0 rows found".

## 6.10 IMDB Cache

- When trying to create a global cache group, the database can become invalidated if there are more than 15 errors in the cache group definition. This only happens when connecting to the 11.2.0.1 Oracle Server. The workaround is to use Oracle Server release 10g, 11gR1, or an 11gR2 release higher than 11.2.0.1.0.
- There is a known issue (BugDB 9359437) that during a `FLUSH CACHE GROUP` operation, TimesTen may lock the tables and rows in the cache group tables. This can cause blocking or a deadlock if your application attempts to update the rows concurrently.
- If an application performs more than one `UNLOAD BY ID` operation on a cache group, there is potential for a deadlock with the autorefresh transaction executed by the cache agent. The deadlock occurs only if those same rows are being updated on the Oracle database at the same time.
- `CREATE`, `ALTER` and `DROP CACHE GROUP` statements are not supported in serializable isolation mode.
- If DDL tracking is enabled on the Oracle database, destroying a database that has cache groups may result in the DDL trigger on a cached table not being dropped from the Oracle database. The user must manually drop each of these triggers using the `DROP TRIGGER` statement on the Oracle database. The DDL trigger name of a table with an Oracle object with identifier `X` is `TT_X_DDL_T`. The object

identifier of an Oracle table can be retrieved from the V\$ALL\_OBJECTS view on the Oracle database.

- For autorefresh cache groups, after a transaction that executes several DML operations on an Oracle base table (for example in a bulk insert), we recommend that you coalesce the autorefresh log table index (the logseq column in the change table). Use `ALTER INDEX index_name COALESCE`.
- Oracle server bug 7512227 causes TimesTen autorefresh to miss inserts and updates on the Oracle base table. Autorefresh does not miss deletes. The Oracle Server bug applies to Oracle 10g releases 10.2.0.3 and above but does not occur in Oracle Database 11g. There are two solutions:
  - Set the `CURSOR_SHARING` Oracle server parameter to `EXACT`.
  - Install the appropriate Oracle patch for Oracle release 10.2.0.3 or above.See Metalink document 793948.1.
- Caching an Oracle synonym that is owned by a different user results in error 5140: `Could not find owner.synonym in Oracle. May not have privileges`. The workarounds are:
  - The owner of the synonym can create the cache group.
  - Create a new private synonym that points to the original synonym and then create the cache group. The user who owns the cache group that caches the synonym must match the owner of the synonym.
- For IMDB Cache to work correctly, the value returned by the `hostname` command and the `uname -n` command (UUCP address) must be the same. If `hostname` and `uname -n` return different values, IMDB Cache may report constraint violation failures on Oracle. Alternatively, you can use `uname -s` to make sure that the Internet and the UUCP addresses are the same.
- Set `SQLNET.SEND_TIMEOUT` and `SQLNET.RCV_TIMEOUT` to a value large enough to avoid unnecessary timeouts during normal operations. For example, setting each parameter to 100 seconds forces any communication call from TimesTen to Oracle to time out within 200 seconds.
- With `Passthrough=3`, if a JDBC application calls `setTimestamp()` on a `passthrough` statement when binding more than one field, the session `NLS_TIMESTAMP_FORMAT` is lost. You can work around this issue by changing the SQL statement to use `TO_TIMESTAMP(?, 'yyyy-mm-dd hh24:mi:ss.ff9')` and `TO_DATE(?, 'yyyy-mm-dd hh24:mi:ss')`.
- The description of the `PassThrough` general connection attribute in *Oracle TimesTen In-Memory Database Reference* should include this statement: "Passthrough execution of DDL statements does not result in commits on TimesTen."
- Nullable foreign keys can result in rows without a corresponding parent row. The rows may become stale and may not be refreshed properly through a manual refresh or autorefresh operation. They may not get removed through unload or aging operations, and they may not be updated on Oracle through a flush statement.
- When using IMDB Cache, the following JDBC methods are not supported with Oracle pass-through modes 1 through 3:  
`PreparedStatement.setAsciiStream()`,  
`PreparedStatement.setUnicodeStream()`,

```
PreparedStatement.setBinaryStream(),
PreparedStatement.setCharacterStream().
```

## 6.11 TimesTen integration with Oracle Clusterware

- When you perform one of these actions:
  - Answer the prompt for which host should be designated as the host for the active database.
  - Enter the `ttCWAdmin -create` command.

You receive the message:

```
"Warning!! Data store on host(s) host list may be destroyed
in Order to be duplicated from active after the roll out.
Please back up this data store manually if necessary, before
executing ttCWAdmin -start".
```

If a database with the specified DSN exists on the host for the standby database, the old database will be destroyed and replaced with the database that is created by the `ttCWAdmin -create` command.

The warning has no meaning if there is no database with the specified DSN on the standby host.

- The TimesTen integration with Oracle Clusterware is not available on these platforms: Solaris 32-bit SPARC, HP-UX PA-RISC, HP-UX Itanium 32-bit, AIX 32-bit, Linux Itanium and Windows 64-bit.
- Spurious internal errors in the logs may be generated during TimesTen Clusterware operations. These errors are benign. Run `ttCWAdmin -status` to verify the status of the system.

## 6.12 TimesTen to TimesTen Replication

- Replication for an altered table can fail if the replication agent is stopped immediately after the `ALTER TABLE` statement has been issued and the agent has not advanced past the end of the `ALTER TABLE` transaction. This problem can occur regardless of return service policy. If you need to stop the replication agent after an `ALTER TABLE` transaction, issue a `ttRepSubscriberWait` call to ensure that the replication agent restart point has advanced beyond the alter table operation.
- TimesTen can return error message `TT6003` when using master-subscriber two-safe replication and autorefresh cache groups. This can occur, specifically, if the first replicated two-safe transaction has either a `LOAD CACHE GROUP` or an `ALTER CACHE GROUP SET AUTOREFRESH STATE` operation on an autorefresh cache group. To work around this problem, either avoid doing a `LOAD` or `ALTER` on the first replication transaction or use active standby pair replication.
- Access to the `NEXTVAL SQL` function of a sequence is not supported in a query on a standby node of an active standby pair.
- If the first operation in a two-safe user session is an `ALTER TABLE` operation, the `ALTER TABLE` is not replicated. The workaround is to do some other operation on the table in the same session before altering the table.

- Under very rare circumstances, it is possible for a pair of replicated detail tables and their corresponding materialized view to diverge. This divergence can only happen if the materialized view satisfies both of the following conditions:
  - The view definition has two or more predicates.
  - One of the predicates contains an expression that can generate an exception such as numeric overflow, division by zero or string truncation.

Replicating an update to a detail table can cause divergence if differences in the order of predicate evaluation on the two databases cause a predicate to be evaluated and generate an exception only on the receiving database. The store then rejects the update, resulting in divergence of the detail table and the materialized view. To prevent such divergence, users should avoid replicating materialized views that have predicates that can generate exceptions during expression evaluation. The SQL CAST operator can be used in some cases to avoid arithmetic overflow.

- Foreign key and uniqueness constraints cannot be checked at the statement level if `ttXlaApply` is used to implement replication.
- For replication to work efficiently, it must be able to quickly translate host names of peers into IP addresses. For this to happen efficiently on Windows, make sure that a Windows system is set up to query either a valid WINS server or a valid DNS server that has correct information about the hosts on the network. In the absence of such servers, static HOST-to-IP entries can be entered in either a `%windir%\system32\drivers\etc\hosts` or `%windir%\system32\drivers\etc\lmhosts` file.

Without any of these four options, a Windows system resorts to broadcasting, which is extremely slow, to detect peer nodes. Also, if the Windows system cannot communicate with a defined WINS server or DNS server, or if incorrect information is stored on those servers, the hostname resolution will be extremely slow. Use the `ping` command to test whether a host can be efficiently located. The `ping` command should immediately respond if host name resolution is set up properly.

- When changing the state of a replication receiver (that is, to start or stop) when replication has been configured to use a secondary IP address, a misconfiguration of the `/etc/hosts` file may cause `ttRepAdmin` to print the error: `Alter replication with 'ALTER REPLICATION...port 0' failed: TT0907: Unique constraint (REPSTORESIX) violated.` This error is caused by replication not recognizing the local database. This situation can be confirmed by the following query:

```
SELECT * FROM ttrep.ttstores WHERE is_local_store <> 0x0;
```

If this query returns no rows, or returns a row with the main host name of the database set to the result of the `hostname` command rather than the host you specified, you have encountered a configuration problem with `/etc/hosts`.

To correct the problem, you must make sure that the special host name you are using is defined in `/etc/hosts` and that there is an IP address in common between your special host name and the result of the `hostname` command.

Example: your `hostname` command returns `softswitch` and your system has two Ethernet cards with the addresses `10.10.15.136` and `192.168.15.136`. Then the IP addresses defined for `softswitch` should include both IP addresses.

## 6.13 SQL\*Plus

- TimesTen does not support SQL\*Plus connections to TimesTen databases. Use `ttIsql`.

## 6.14 SQL, utilities and procedures

- Executing a query against multiple outer joins with the set operators UNION, MINUS or INTERSECT can result in abnormal termination. To work around this problem, define a view to encapsulate each of the outer joins. Then execute the query against the views.
- When using scalar functions that accept TIME, DATE or TIMESTAMP data types as arguments, you must prefix the function with a literal indicating the data type. For example:

```
SELECT GREATEST (TIME '10:10:10', TIME '12:12:12' ) FROM DUAL;
```

If you do not specify the datetime literal, TimesTen treats the data type as CHAR. Functions that accept datetime literals as arguments are: GREATEST, LEAST, ROUND and ADD\_MONTHS.

- The ORDER BY clause is not supported in a CREATE TABLE AS SELECT statement.
- The maximum sum of the total number of tables specified in a query and all temporary aggregates needed to handle the query is 32. A temporary aggregate is needed to handle scalar or aggregate subqueries. A query fails with the message `Statement that needs more than 31 nesting levels has not been implemented` when the sum of tables and temporary aggregates in a query is greater than 32.
- COUNT distinct with CHAR type uses binary sorting order and binary comparison semantics even when the NLSSORT attribute was set to a value different than binary.
- When the NLS\_SORT session parameter is set to a multilingual sort (for example, FRENCH\_M), the LIKE operator may produce incorrect results when the pattern match wild-card symbols are applied to the space character.
- SQL query strings in JDBC applications should contain only characters from the database character set. Unicode characters not in the database character set are converted to replacement characters during parsing of the query. Potential workarounds include:
  - Using AL32UTF8 as the database character set.
  - Parameterizing the query to avoid non-database character set characters in the query text.
- The TO\_CHAR SQL function provides inconsistent results (truncates or rounds) when applied to BINARY\_FLOAT and BINARY\_DOUBLE values. TO\_CHAR also truncates some NUMBER values that should instead be rounded.
- If an application process on HP-UX is connected to a TimesTen database and if the application process calls the `ttXactIdRollback` utility API for a transaction associated with the same database, the call may fail due to the inability to attach to the shared memory segment for the database.

- The fourth argument (`stats`) to the `ttOptSetColIntvlStats` built-in procedure is a compound structure that cannot be parameterized using ODBC functions. This means that a statement such as the following fails:

```
SQLPrepare(hstmt, "call ttOptSetColIntvlStats('t1', 'c1', 1, ?)", SQL_NTS);
```

Similarly, the `ttIsql describe` command fails because the "stats" argument does not have one of the known types.

## 6.15 TTClasses

- A problem with TTClasses causes NCHAR or NVARCHAR2 parameters and columns to be bound incorrectly. This results in parameter and column data being transferred to or from the database without a null terminator.

## 6.16 Client/Server

- In the Windows ODBC **Client DSN Setup** dialog box, when the **Server Name** refers to a UNIX host, the **Refresh** button to get the list of DSNs on that server sometimes fails to obtain the list. Enter a known DSN in the **Server DSN** field to create the client DSN entry successfully. TimesTen connections from Windows using that client DSN work normally.
- When setting multiple client connections to a TimesTen server, do not set the stack size (using the `-ServerStackSize` daemon option or `ServerStackSize` attribute) to less than 64KB on 64-bit systems and 48KB on 32-bit systems. If the stack size is too small, the TimesTen Server dies with `SIGSEGV` on most UNIX system, or `SIGBUS` on HP-UX. The default stack size is 128 KB on 32-bit systems and 256 KB on 64-bit systems.
- On UNIX, when using `ttlocalhost`, a client of one TimesTen instance cannot connect with a server of another TimesTen instance. For example, a 32-bit TimesTen client cannot connect to a 64-bit TimesTen server when using `ttlocalhost`. The workaround is to use `ttShmHost` (shared memory IPC) or `localhost` (127.0.0.1).
- While using shared memory as IPC, the application may see the error message 24 from the client driver if the application reaches the system-defined, per process file descriptor limit. This may happen during a connect operation to the Client DSN when the `shmat` system call fails because the application has more open file descriptors than the system-defined per-process file descriptor limit.

## 7 Contacting support

For information about obtaining technical support for Oracle TimesTen products, go to the following Web address: <http://www.oracle.com/support/contact.html>

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Oracle TimesTen In-Memory Database Release Notes, Release 11.2.1  
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