

Oracle TimesTen In-Memory Database

What's New and Changed in the TimesTen 22.1 Release

Name

TimesTen Product Management Team November 2024

What is TimesTen

Relational Database



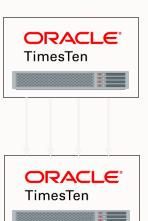


- Pure in-memory
- ACID compliant
- Standard SQL
- Entire database in RAM
- Relational IMDB and Cache
 - Read-only and read-write cache for Oracle Database

Extremely Fast



- Microseconds response time
- Very high throughput

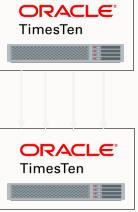


Persistent and Recoverable

- Database and Transaction logs persisted on local storage
- Automatic recovery after failure

Highly Available

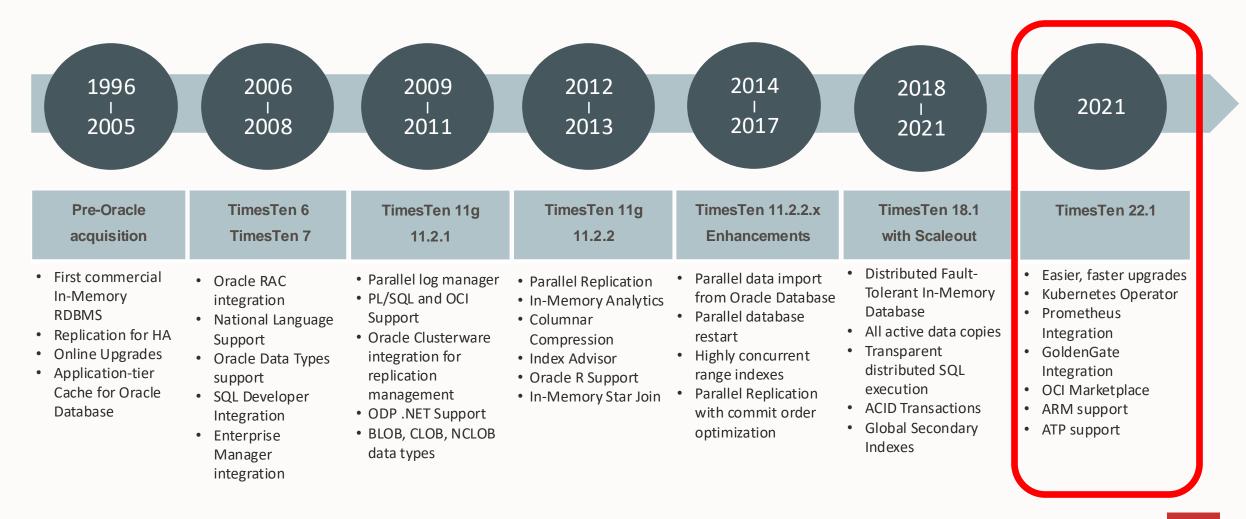
- Active-Standby and multi-master replication
- High performance parallel replication
- HA and Disaster Recovery





Oracle TimesTen – Class Leading In-Memory Database

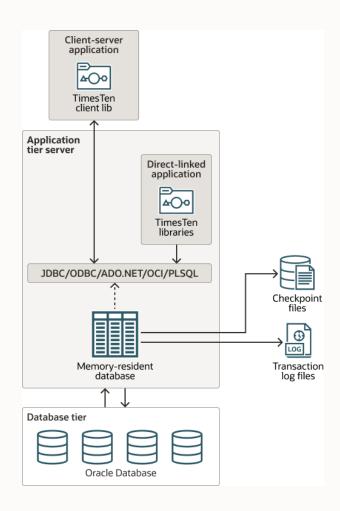
+25 Years of Extreme Performance



TimesTen Kubernetes Operator

Containerized Cloud-Agnostic Environments

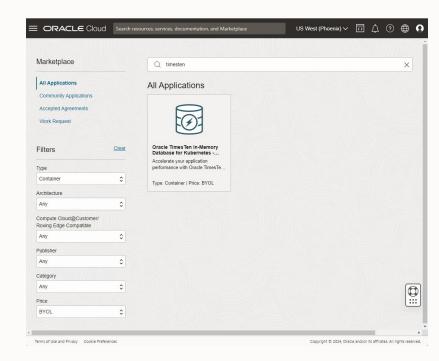
- TimesTen is supported in containerized environments
- TimesTen provides a feature rich Kubernetes Operator
 - ✓ Quick, easy deployment
 - ✓ Automated Upgrade
 - ✓ Monitoring, Management, Metrics, and HA management
 - ✓ Any Kubernetes Environment
 - ✓ Any public cloud
 - ✓ On-premises
 - ✓ Production proven
 - ✓ Fully supported part of TimesTen
- Can operate as a database of record or as a cache





Oracle TimesTen In-Memory Database for Kubernetes

- An offering that enables the deployment of TimesTen databases on Oracle Cloud Infrastructure (OCI)
 - You access the Oracle TimesTen In-Memory Database for Kubernetes using Oracle Cloud Infrastructure Marketplace applications.
- In addition to the cost of the compute resources used for your Kubernetes cluster, Oracle TimesTen In-Memory Database for Kubernetes supports the following billing option:
 - Bring Your Own License (BYOL), which allows you to reuse your existing on-premises TimesTen In-Memory Database and TimesTen Application Tier Database Cache licenses.





Platform support

Server platforms

Operating System	OS Versions	Java versions
Oracle Linux 64-bit	7.4+, 8.2+, 9.2+	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
Oracle Linux ARM 64-bit	8.4 or later	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
RedHat Enterprise Linux 64-bit	7.4+, 8.2+, 9.2+	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
RedHat Enterprise Linux ARM 64-bit	8.4 or later	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
SUSE Enterprise Server 64-bit	12, 15	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
Ubuntu	22.04	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
Solaris Intel and SPARC 64-bit	11.3, 11.4	Oracle Java 8 (both), 11 (SPARC only)
IBM AIX for Power PC 64-bit	7.1, 7.2, 7.3	IBM JDK 8 IBM Semeru Runtime Certified Edition Version 11, 17, and 21



Platform support

Client platforms

Operating System	OS Versions	Java versions
Microsoft Windows 64-bit	10, 11, Server 2012 R2, Server 2016, Server 2019 Server 2022	Oracle Java 8, 11, 17, 21 and OpenJDK 8, 11, 17, 21
macOS Intel 64-bit	14.3 Sonoma13.2 Ventura12.6 Monterey	Oracle Java 8, 11, 17, 21 and OpenJDK 11, 17, 21



Platform support

Oracle Database, Kubernetes and Clusterware

- TimesTen Cache features support
 - Oracle Database 11.2.0.4, 12.1, 19c, 21c, 23ai
 - Oracle Autonomous Transaction Processing (ATP) 19c and 23ai
- Kubernetes 1.28, 1.29, 1.30
 - amd64, arm64, or multi-architecture clusters
- TimesTen Active-Standby Pair Replication supports Oracle Clusterware 19c for A/S pair management
- TimesTen ships the Oracle Database 19c version of Instant Client

Security

Support for password complexity checking functions in profiles

Utility to create self-signed certificates: ttCreateCerts

For client/server and replication TLS

TimesTen now supports FIPS 140-2 encryption

Cache Administrator credentials now stored in an Oracle Wallet

SNMPv3 support

- SNMP support updated to v3
 - Can still generate v1 traps, but use is discouraged (v1 is insecure)
- Uses net-snmp package
 - Customer must install this separately; not packaged with TimesTen
- Supports use of D-TLS to encrypt communications
 - Requires use of net-snmp 5.6 or later with tsm security model enabled



Prometheus exporter for TimesTen

Facilitates monitoring of TimesTen using Prometheus

Configurable network buffer size for Client-Server

Can significantly improve throughput with large result sets and/or slow networks

New ttPageLevelTableInfo builtin to display details of table page allocations

PL/SQL support for multiple OUT reference cursors

TimesTen Driver Manager (TTDM) productized and supported

Minor changes to TTClasses API for ODBC 3 64-bit support

Change to naming of directory for bundled Oracle instant client

• Instant client directory name is now release independent



Upgrade Oracle library versions and PL/SQL version used by TimesTen (RDBMS 19.1)

TTCWADMIN enhancements for silent installation

Diagnostics enhancements:

- TimesTen adds an entry to the daemon log when there are changes to the settings for tracing
- Tracing is turned off after loading a database into memory
- The replication agent now periodically logs statistical information to the daemon log



New ramPolicy (enduring) for 'persistent' shared memory

Database segment persists across instance stop/start

Fast software upgrades for patch releases and patch sets

- Utilizes ramPolicy 'enduring'
- Avoids the need to unload/load the database from/to memory during a patch and patch set release upgrade

Explicit support for running the instance daemon under systemd

ttSchema database user handling



New Cache features

Dynamic loading of multiple cache instances

- Increases the range of SQL statements that qualify for dynamic load
- Limited to single table cache groups in this release

LRU aging based on table row thresholds

- A more granular alternative to the existing memory threshold-based mechanism
- More suitable for some use cases

Hybrid (rootless) cache groups



New TimesTen Kubernetes Operator features

Helm charts

• Ability to provision and upgrade TimesTen and the TimesTen Operator via Helm or YAML

The TimesTen Kubernetes Operator now publishes metrics to Prometheus.

- Automatic configuration of TimesTen databases and the TimesTen Operator in Prometheus
- Requires use of the Prometheus Operator

Support for non-replicated TimesTenClassic databases

Example use case: Manage multiple read-only caches

Simplified installation process.

- Only one container image is required both to run the Operator and to run TimesTen itself
- Customer created or Oracle supplied container images
- Automatically determined memory requests and limits

Automated upgrades

The Operator can automatically upgrade TimesTen from one patch release to another



GoldenGate compatibility

An alternative cache refresh mechanism for READONLY caching

Certified with GoldenGate 21c and 23ai

GoldenGate parallel replicat is supported (with GoldenGate 21.3 and later) for higher throughput



Newly deprecated features

Deprecated in this release, will be removed in a future release

TimesTen Scaleout

Temporary databases (Temporary=1)

Static autorefresh cache groups with legacy replication

The TTC_RollbackRequiredOnFailover client connection attribute

The default for this is now always 1 (on)

Local shared memory ipc (shmipc) for client-server connections



Removed features

Were deprecated in a previous release

The ttSQLCmdCacheInfo2 and ttSQLCmdCacheInfo3 builtins

• Users and applications should query the SYS.V\$SQL_CMD_CACHE system view instead, using an explicit select list

Asynchronous Materialized Views

ReceiverThreads DSN attribute

Some ttMigrate options

- -convertTypesToTT
- -convertTypesToOra



Significant behavior changes

May impact users or applications

Two extra columns in the ttSQLCmdCacheInfo result set

• Users and applications should query the SYS.V\$SQL_CMD_CACHE system view instead, using an explicit select list

The TTC_RollbackRequiredOnFailover client connection attribute

The default for this is now always 1 (on)

TTClasses API changes

Type changes for some method arguments.

ttRepAdmin –duplicate

- The –setMasterRepStart option is now the default
- Use -noSetMasterRepStart in the unlikely event that you want the original behavior



Licensing

High Performance In-Memory Database with High Availability







TimesTen is licensed in two distinct ways

- TimesTen In-Memory Database
 - ✓ Separate product
 - ✓ Includes all deployment modes and functionality
 - ✓ Any use case
- TimesTen Application Tier Database Cache
 - ✓ Oracle Database Enterprise Edition <u>option</u> (needs an associated DB EE license)
 - ✓ Includes all deployment modes and functionality
 - ✓ Deployment must be a caching use case (native or GoldenGate)
 - ✓ You license the CPUs where TimesTen is deployed, <u>not</u> the Oracle Database CPUs



Want to learn more?

TimesTen Product Portal (https://www.oracle.com/database/technologies/related/timesten.html)

- ✓ Product Information
 - ✓ Presentations, customers, use cases, technical briefs, FAQs, ...
- ✓ Software Downloads
- ✓ Product Documentation
- ✓ TimesTen Demo / Learning VM download

TimesTen QuickStart and Samples (https://github.com/oracle/oracle-timesten-samples)

TimesTen Blog (https://blogs.oracle.com/timesten)



Our mission is to help people see data in new ways, discover insights, unlock endless possibilities.

