

ORACLE TIMESTEN[®] IN-MEMORY DATABASE

OVERVIEW



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- Near-zero administration
- Flexible deployment options
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- Cache Connect to Oracle (option)

Oracle TimesTen In-Memory Database is a memory-optimized relational database that empowers applications with the instant responsiveness and very high throughput required by today's real-time enterprises and industries such as telecom, capital markets and defense. Deployed in the application tier as a cache or embedded database, Oracle TimesTen In-Memory Database operates on databases that fit entirely in physical memory using standard SQL interfaces.

Real-Time Performance

How would your business change if applications could access, capture and update information many times faster than before? You can have the power to attract and retain more customers, sense and respond to business-critical events as they happen, and deliver new services that are otherwise impossible – using standard relational database technology and familiar programming interfaces.

Oracle TimesTen In-Memory Database delivers real-time performance by changing the assumptions around where data resides at runtime. By managing data in memory, and optimizing data structures and access algorithms accordingly, database operations execute with maximum efficiency, achieving dramatic gains in responsiveness and throughput, even compared to a fully cached disk-based RDBMS. Oracle TimesTen In-Memory Database is designed as an embeddable database within the applications to further improve performance of database operations by eliminating inter-process communication and unnecessary network operations.

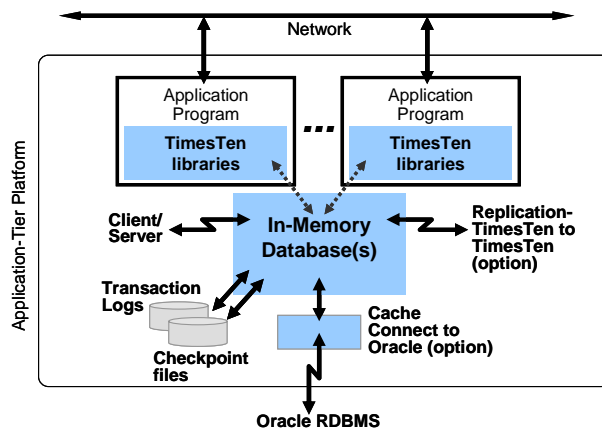


Figure 1. TimesTen Components

Real-time data management has two performance dimensions – response time and throughput. With Oracle TimesTen In-Memory Database, a transaction that reads a

database record takes less than 15 microseconds (a microsecond is one millionth of a second), and transactions that update or insert a record take less than 35 microseconds. Consequently, throughput is measured in tens to hundreds of thousands of transactions per second, using commodity hardware.

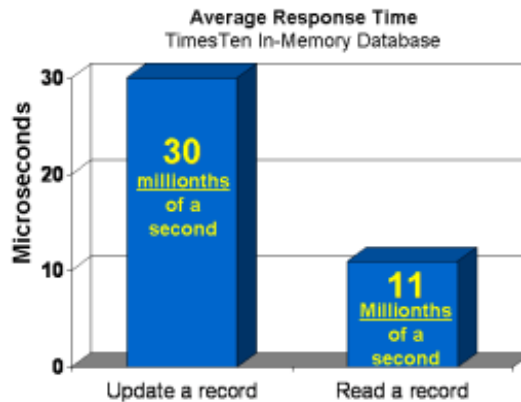


Figure 2. TimesTen Response Times

Multi-User Concurrency

In-memory databases are often misperceived as limited to single-user applications and exposed to data loss when a server fails. Neither is true with Oracle TimesTen In-Memory Database. Multiple users and multi-threaded applications are common, using row-level locking with committed-read isolation. Lock contention between readers and writers is eliminated through internal record versioning, providing consistent response times and high levels of concurrency.

Durability and Persistence

Oracle TimesTen databases are persistent and recoverable. Durability is achieved through a combination of transaction logging and database checkpointing to disk. Applications may choose the setting of their transaction ACID properties according to their performance requirements. Log records are written to disk asynchronously or synchronously with respect to the completion of the transaction, and controlled by the application at the transaction level. For systems where maximum throughput is paramount, such as non-monetary transactions within network systems, asynchronous disk logging allows extremely high throughput with minimal exposure. In cases where data integrity requirements are more stringent, such as securities trading, synchronous disk logging ensures complete durability at transaction commit time.

Standards-Based

Previously, most real-time applications were custom-developed using hard-coded functions specific to the application. Even specialty commercial products designed for high performance require the use of proprietary, “under the covers” APIs and custom data models to achieve performance expectations. In contrast, a primary objective of Oracle TimesTen In-Memory Database has always been the adoption of open industry standards, tuned for a memory-optimized architecture.

Following the standard relational data model, SQL, JDBC and ODBC are used to

ORACLE TIMESTEN IN-MEMORY DATABASE

REAL-TIME DATA MANAGEMENT FOR PERFORMANCE-CRITICAL APPLICATIONS:

- Telecom and networking
- Capital markets
- Defense and intelligence
- Call Center applications
- Travel and reservations
- Service-Oriented Architectures (SOA)
- Middle-tier data caching
- Operational data stores
- Business intelligence
- Business activity monitoring
- Self-service portals

RELATED PRODUCTS AND SERVICES:

- Replication – TimesTen to TimesTen
- Cache Connect to Oracle

access Oracle TimesTen databases. New services can be quickly added into a production environment simply by adding application modules, tables and columns. As with any mainstream RDBMS, a cost-based optimizer automatically determines the fastest way to process queries and transactions. In short, any developer familiar with RDBMS and SQL interfaces will be immediately productive developing real-time applications with Oracle TimesTen In-Memory Database.

Oracle Database Compatibility

Mainstream data types are supported and compatible with Oracle Database. Globalization support includes the recommended Oracle Database 10g database character sets, linguistic index sorting, multi-byte string comparisons.

Near-Zero Administration

Installation, setup and administration of Oracle TimesTen databases require minimal time and no dedicated administrators. The simplicity of the disk structures and the relatively small and consistent size of an in-memory database obviate most of the traditional DBA's tasks.

Administration tasks are performed primarily through programmatic interfaces and command-line utilities; these are often embedded within the applications for unattended operations. Utilities are provided to backup, restore, copy and migrate databases, and to monitor the transaction and system status. Applications can also monitor system status via SNMP event notifications.

Flexible Deployment Options

Oracle TimesTen In-Memory Database supports a variety of deployment configurations to accommodate a wide range of scenarios, from transient look-up caches to operational data stores to mission-critical transaction processing systems.

While in-memory databases are usually embedded inside applications, conventional client-server access is also supported when applications running on a number of servers must share access to a common in-memory database.

Due to the mission-critical nature of the applications, most deployments add the *Replication – TimesTen to TimesTen* option for high-availability and load balancing. For application-tier caching, such as in support of a Service-Oriented Architecture, the *Cache Connect to Oracle* option expands an in-memory database into an updatable cache, managing data loading and synchronization between Oracle Databases and Oracle TimesTen In-Memory Databases.

For more information about Oracle TimesTen In-Memory Database, visit

<http://www.oracle.com/technology/products/timesten>

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