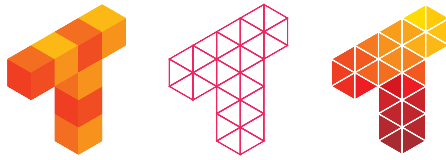




Innovative leader of RDBMS



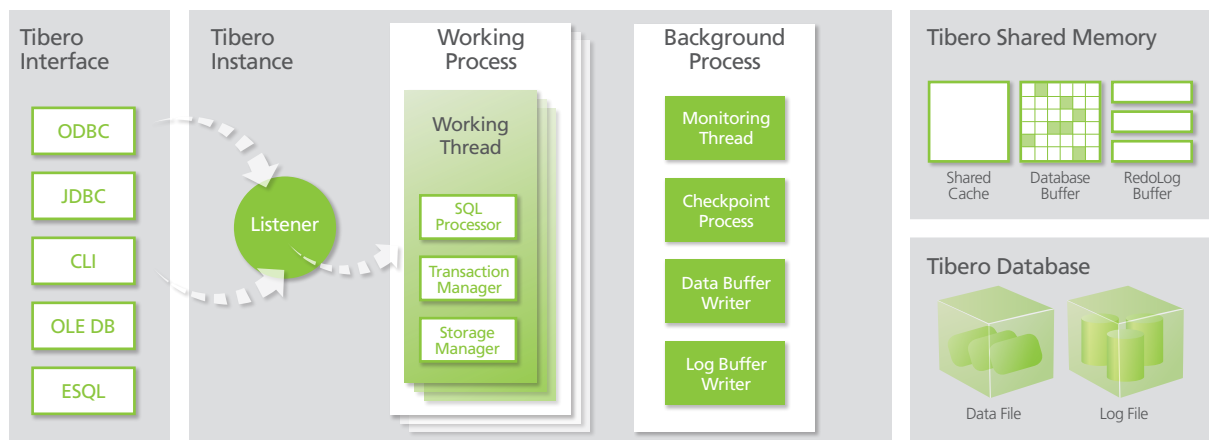
TIBERO RDBMS

New Paradigm for RDBMS

Tibero RDBMS opens a new paradigm for enterprise RDBMS.

Architecture

Tibero RDBMS is the standard DBMS based on the relational model. It provides consistent and efficient data processing performance for large-scale users to simultaneously handle vast amounts of data. Its architecture has following characteristics to efficiently respond to high-volume data processing requests:



Multi-Process, Multi-Thread based Architecture

- Minimizes context switching between processes
- Efficient use of limited system resources

- Rapid response to client requests
- More stable transaction performance as the number of sessions increases

Efficient synchronization between memory and disks

- Management based on Tibero System Number (TSN)
- Cache structure based on Least Recently Used (LRU)

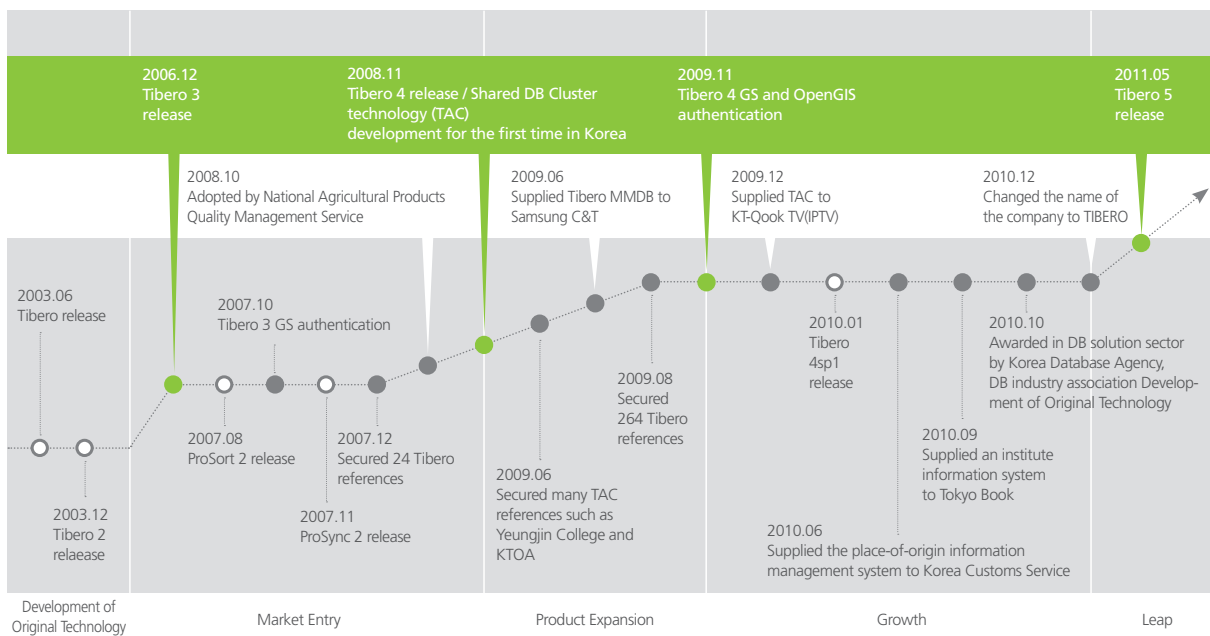
- Synchronization control by a series of Check Point events
- Adjusts the Check Point cycle to minimize disk I/O

TIBERO's Continuous Advancements

Tibero RDBMS delivers proven performance and stability benefitting from continuous technology development.

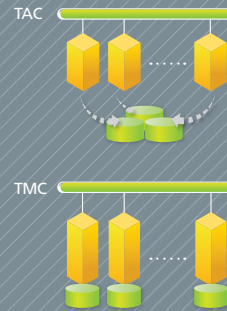
History

TIBERO succeeded in acquiring original technology for developing a DBMS through its engine development in 2002, and established disk based RDBMS for the first time in Korea in 2003. For the past 9 years, the company has continually made deep investments in research and development to ensure that its various DBMS solutions align with the requirements of DBMS developers and administrators worldwide.



Shared disk DB cluster technology, ensuring high availability and high performance **Tibero Active Clustering (TAC)**

Next generation cluster technology, supporting data warehouse and the cloud environment **Tibero Massive Clustering (TMC)**



Tibero Clustering

Tibero RDBMS selectively provides the clustering architecture optimized to OLTP or OLAP according to the purpose of Tibero RDBMS customers.

Tibero Active Clustering (TAC)

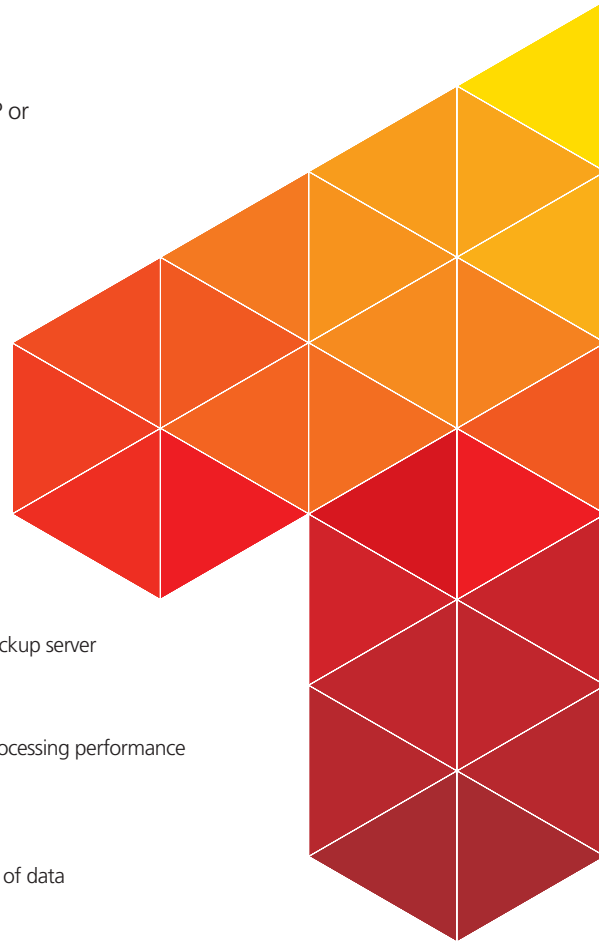
- Architecture appropriate for OLTP data processing
- Shared disk (RAID based storage)
- Sensitive to performance and stable transaction handling
- Symmetric Multi-Processing (SMP) method
- Network traffic occurrence for memory synchronization among Tibero instances

Tibero Standby Clustering (TSC)

- Architecture appropriate for OLTP data processing
- Stable transaction handling by operating a backup server without shared storage
- Shared Nothing and Log Replication
- Log based traffic occurrence because of replications from a Tibero active server to a backup server

Tibero Massive Clustering (TMC)

- Architecture appropriate for large amounts of data acceptance and high OLAP data processing performance
- Cloud data service and enterprise DW
- Shared Nothing, Tablet Distribution, and Replication
- Massive Parallel Processing (MPP) method
- Traffic occurs because of automatic distribution among Tibero instances and collection of data replicated and processed in parallel
- Scheduled to release in the first half of 2012



Maintains high performance and accepts many **CONCURRENT USERS** while stably handling a large scale session at the same time
 Stably handles **LARGE AMOUNT** of **TRANSACTIONS**, without loss of performance
 Provides **SUPERIOR STABILTY** and **AVAILABILITY** so that down-time does not occur even when a failure is experienced
 Has **COMPLETE COMPATIBILITY** with various DBMS and applications.

Feature of Tibero

Tibero RDBMS provides excellent stability to process large amounts of data used simultaneously by many users without loss of performance. It also has complete compatibility with existing RDBMS.

Row-Level Locking

- Processes a lock only by row to minimize the range of the lock
- Minimizes performance load by avoiding lock escalation

Partition Table

- Supports various partitions such as Range, Hash, List, and Composite Partition
- Supports Global and Local Index

Standard Support

- Standard SQL support
- Provides various standard interfaces
- Supports JDBC, ODBC, OLE DB, and CLI (Call Level Interface)

DB Link

- Integrates with other vendors' DBMS through ODBC and JDBC gateways
- Oracle, DB2, MS SQL, and Sybase

Stored Procedure Compatibility

- Supports tbPSM compatible with PL / SQL syntax
- Can be used in Tibero without source code change

Multi-Version Concurrency Control

- Avoids a lock by managing versions of DB block where data is changed at concurrently
- No interference between writing and reading operations
- Ensures Serializable Isolation transaction Level

Parallel Query

- Rapid response by multiple threads cooperative query processing in parallel
- Processes a bunch of automatically organized Operation Groups that can be executed independently in parallel

Backup and Recovery

- Provides services without a break during backup using the Online Backup feature
- Makes a specific tablespace offline and recovers the tablespace using the Online Recovery feature
- Supports Incremental Backup to minimize backup time

Embedded SQL Compatibility

- Supports tbESQL compatible with Pro*C
- Reusable only with extension change and recompiling

Benefits

Tibero RDBMS drastically reduces TCO and rapidly migrates DB under the favor of compatibility with existing DBMS. These jobs can be carried out by existing IT staffs without additional training.

Drastic TCO reduction

- Max. 60% of TCO reduction compared to existing DBMS (based on 5 years)
- 1 year warranty
- Supports free training

DB Administrator Usability

- The same operating environment as that of the existing DB
- Can be operated by existing DB administrators with minimal (4 hours) basic training
- Easy to secure DB administrators from already existing DB-related human resource pool

Rapid and Convenient DB Migration

- Migration based on proven compatibility without source code change
- Easy data migration with provided tools
- Takes about 3 months according to the range of systems integrated and 3rd party solutions

Case Study

Tibero has more than 450 references as of July 2011. Globally, it is adopted by 14 companies such as Nomura Securities in Japan and DSME Shandong in China. Tibero Active Clustering (TAC) has also been adopted and operated in many places such as KT, National Agricultural Products Quality Management Service, and Yeungjin College.

Public Industry



(more than 230 references)

Financial Industry



(more than 80 references)

Manufacturing and Communication Industry



(more than 120 references)

Major Features

Tibero RDBMS can be broadly used with various features and conveniently operated with various user tools.

Monitoring and Analysis

- Application Performance Monitoring : Periodically saves performance and session status of system and automatically analyzes DBMS performance transition
- Collects and analyzes various system symptoms as events by adopting Event-based Analysis Framework

OpenGIS

- Complies with the OpenGIS Simple Feature Specification for SQLRev 1.1 standard and supports 7 spatial objects
- Supports R-Tree index
- Provides generating functions, basic membership functions, spatial relation check function, and spatial operation function using WKT and WKB

Development and Operation Utility

- tbAdmin: SQL client tool
- tbMigrator: Migration automation tool
- tbExport and tbImport
- tbLoader: High speed large amounts of data loading tool

Flashback

- Flashback Query: Uses Undo Tablespace, manages Undo Data after Transaction Commit, and recovers from a logical corrupt if necessary
- Flashback Drop: Recovers from Object Drop when it occurs due to a user fault and completely removes it with the Purge command

Data Encryption

- DES, AES, ARIA, and SEED encryption algorithms
- Supports encryption with the column of tables and tablespaces

Various Join Methods

- Nested Loop
- Sort Merge Join
- Hash Join

Etc.

- Supports IPv6
- Supports International and Unicode

Authentication

Tibero RDBMS ensures stability and high performance by acquiring GS authentication from the Telecommunications Technology Association (TTA) in Korea. It also acquires OpenGIS authentication, the global standard in the Geographic Information System (GIS) industry, from the Open Geospatial Consortium (OGC) for the first time among domestic DBMS products.



GS Authentication (Good Software)

A SW product can acquire GS authentication if it passes the test model based on the global standard and is satisfied with the authentication standard.



Open Geospatial Consortium

OGC is the organization leading the global standard establishment of OpenGIS. International Organization for Standardization (ISO) accepted the OGC standard as it is and published it as the international standard.



3rd Party Integration

Tibero RDBMS has proven its stability through integration tests with more than 90 solutions including the following 3rd party solutions and continues to expand the coverage.

Classification	Solution	Vendor	Classification	Solution	Vendor
Backup	BackupXcelerator	NCerti	ETL/CDC	TeraStream	DataStreams
Clustering/HA	EVIDIAN SafeHA	WITHNCOMPANY	DB Access Security	Chakra	WareValley
	EnCluster HA	Clunix		DBSafer	PNP Secure
Monitoring	MaxGauge	EXEM		Dgriffin	Sinsiway
DB Development Management	Orange	WareValley		DB-i	SOMANSA
Modeling Tool	DA#	Encore		Middleman	Banet
OLAP	OZ Report	FORCS	DB Encryption	D' Amo	PentaSecurity
	REXPORT	ClipSoft		CubeOne	eGlobal
	Report Designer	M2Soft		XecureDB	SoftForum