

eXtremeDB™ Standard Edition

High-performance, low footprint main memory database system for embedded devices.

Product Datasheet

"eXtremeDB gave us the performance and flexibility we required to manage the complex data in our applications."

-- Genesis Microchip

Overview

eXtremeDB Standard Edition is McObject's core product. It was designed for performance, with a strict memory-based architecture and direct data manipulation. Data is stored and manipulated exactly in the form used by the application, removing overheads associated with caching and translation. Typical read and write accesses are at the level of a few microseconds, or less. The engine is reentrant, allowing for multiple execution threads, with transactions supporting the ACID properties, assuring transaction and database integrity.

The Runtime Environment

Accelerated transactions. eXtremeDB accelerates data management by storing data entirely in main memory, eliminating the need for disk access, caching and other processes that add overhead to disk-based databases. The eXtremeDB transaction manager is optimized for high transaction rates.

Ultra-small footprint. By intelligently redesigning and streamlining core database functions, McObject offers an unbelievably small RAM footprint of approximately **100K!** This makes eXtremeDB a powerful enhancement to many intelligent devices with resource limits that, until now, ruled out the use of a database system.

Direct data access. By working with data directly in main memory, eXtremeDB eliminates the overhead of duplicate data sets and of copying data between locations.

No Translation. eXtremeDB stores data in the exact form in which it is used by the application - no mapping a C data element to a relational representation, for example, or requiring additional code to pick fields from tables and copy them to C structures.

High reliability. For data integrity, eXtremeDB transactions support the ACID properties, ensuring that operations grouped into transactions will complete together or the database will be rolled back to the pre-transaction state.

The Development Environment

Developers strive to produce readable, maintainable, efficient code in the shortest possible time. eXtremeDB includes several features that boost the developer's capabilities when integrating eXtremeDB in demanding real-time applications.

Incorporating third party software often means learning and adopting an API that does not completely fit an application. eXtremeDB's **project-specific API** ensures that each database operation in the API reflects the type of data being manipulated.

McObject offers full source code, to give an in-depth understanding of eXtremeDB within an application.

eXtremeDB supports complex data types including structures, arrays, vectors and BLOBs.

eXtremeDB provides extremely efficient indexing for queries. Rather than storing duplicate data, indexes contain only a reference to data, keeping memory requirements to an absolute minimum.

- Hash indexes for exact match searches
- Tree indexes for pattern match, range retrieval and sorting
- R-tree indexes for geospatial searches
- Patricia Trie indexes for network, telecom
- Object-identifier references, for direct access

To help in application debugging, the eXtremeDB runtime includes **progressive error detection and consistency features.**

By default, the eXtremeDB runtime implements many verification traps and consistency checks. Obviously, that does not come free; the runtime requires extra CPU cycles and space for that. However, when the application is debugged and consistently passes verification tests, developers can generate the optimized version of the eXtremeDB runtime, removing the traps and internal checks to restore valuable clock cycles.

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Database Specifications (32-bit)

| | |
|--|------------------|
| Maximum objects per database: | 2,147,483,647 |
| Maximum classes per database: | 32,767 |
| Maximum indexes per database: | 32,767 |
| Maximum fields or vectors per class: | 32,767 |
| Maximum fields per index: | 32,767 |
| Maximum elements per vector: | 32,767 |
| Memory requirements: | As little as 60K |
| Maximum simultaneous connections per database: | 64 |
| Maximum databases open simultaneously: | 16 |

Supported Data types

- 1, 2, 4, 8-byte signed/unsigned integers
- float, double
- date, time
- char (fixed length)
- string (variable length)
- Unicode
- boolean
- enum
- fixed-size array
- variable-length vector
- structs (embedded to any depth)
- autoid (auto-increment)
- user-defined object-id and references

eXtremeDB XML Extensions

McObject developed the *eXtremeDB* XML Extensions to facilitate simple schema evolution and the exchange of data between *eXtremeDB* and external systems. With the XML-enabled version of *eXtremeDB*, the *eXtremeDB* schema compiler generates new interface functions for each object that provide the means to

- retrieve an object encoded as XML
- create an object in the database from an XML document
- replace (update) the contents of an object already in the database with the content of an XML document
- generate the XML schema for each class in the database

Supported Platforms

Embedded Platforms:

- VxWorks 5.4, 5.5
- INTEGRITY OS
- QNX 4.x, QNX 6.x
- Various Real-Time Linux distributions
- Lynx OS
- RTXQ Quadros, RTXQ 3.2
- Microsoft Windows Embedded
- eCos
- Nucleus
- Bare bones boards (no operating system required)

Server and Desktop Platforms:

- Sun Solaris 8 and Solaris 9
- HP-UX 11.x
- SGI Altix
- Linux distributions
- Classic Windows platforms (98/NT/2000/XP/Vista)

Development Environments:

- gnu toolchain (gcc 2.95 and higher)
- Tornado 2.0 and 2.2 (GNU and Diab compilers)
- QNX Momentics IDE (C, C++, Embedded C++)
- Metrowerks CodeWarrior IDE (various platforms)
- GreenHills Multi
- Microsoft Visual Studio (C/C++, .NET)

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