Objectivity/DB: Solving The Most Demanding Data Management Challenges

Background
Data management challenges are more complicated than ever before, and today’s software innovators are increasingly looking for industrial-strength products that allow them to build systems to manage massive volumes of complex and inter-related data.

From the world’s largest databases and real-time, distributed, multi-source data challenges to complex inter-related data fusion systems with demanding performance challenges, Objectivity/DB is becoming the standard for building data fusion and interoperability applications in Complex Manufacturing.

Systems based on Objectivity/DB meet and exceed high performance specifications that require systems to ingest, fuse, store, correlate and navigate immense volumes of data at extremely high ingest rates.

Business Rationale
Objectivity/DB’s distributed architecture saves organizations thousands to hundreds of thousands of dollars by eliminating costly equipment purchases and upgrades. The technology also enables real-time information processing, interoperability and a single, logical view comprised of data from multiple sources. The result is a tool that automation vendors can use to build applications for digital operations, which are essential for manufacturers that need to compete in a rapidly changing global marketplace.

Manufacturing, Process Control and Automation
The emergence of the “Flat World” raises new challenges for traditional manufacturers. In order to navigate the shifting landscape, enterprises must find new ways of achieving interoperability and collaboration between multiple physical locations as well as multiple systems to optimize efficiency and speed. In addition, the emergence of the digital plant has made it imperative for manufacturers to explore new methods of production and control engineering.

In 2007, Objectivity was recognized as one of 40 emerging software vendors by Manufacturing Business Technology magazine. Editors selected Objectivity/DB for its ability to manage large volumes of complex data, which has enabled leading manufacturers to achieve interoperability among plants spread across the globe, which is a fundamental component of any digital plant architecture.

The Technology
Objectivity/DB is a pure object-oriented database that is heterogeneously compatible across multiple hardware platforms, operating systems, and languages. Current language support includes Java, C++, C#, Python, and Small-Talk. An application written in any of these languages can persist objects into a database and retrieve objects written in any of these languages. Write objects with Java and read with C++. Modify using C++ and read again using Python. Modify with Python and read again with Java.

No O-R Mapping Layer: Objectivity/DB does not use an Object-Relational mapping layer to store objects in a relational database, greatly reducing the costs of development and maintenance.

Objectivity/DB databases and applications can be embedded in devices, installed on single machines, or widely distributed across thousands of machines

Replication: Objectivity/DB databases can be replicated to multiple locations so that applications can have local copies of relevant data. All of the necessary controls (locking and quorum negotiation) are managed by the Objectivity/DB software.
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**No Database Server:** Objectivity/DB does not rely on a database server like many relational databases. Objectivity/DB consists of a small application library linked into the application, a lock-server process and a page-server process. The lock-server and the page-server are lightweight applications that manage locks and data pages for all of the Objectivity/DB applications accessing a federated database.

**Schema Evolution:** Objectivity/DB provides complete support for Schema Evolution, allowing schema definitions to evolve over time to handle new requirements without jeopardizing existing data. The data shapes are evolved as needed to reflect the schema shapes.

**Object Clustering:** Objectivity/DB allows you to place related objects of different types close to each other on disk, often on the same disk page. This feature can greatly accelerate application performance.

**Scalable Collections:** Objectivity/DB provides a broad range of scalable collections to allow data indexing in several different ways, including Sets, Lists, and Maps.

**Object Relationships:** Objectivity/DB relationships alleviate the need to perform joins to access related data by allowing the creation of persisted “pointers” between objects that applications can then follow to retrieve related objects. This capability is considerably faster than using SQL joins.

**Fully Distributed:** Objectivity/DB supports many data models. Organizations can distribute the applications and leave the data on a centralized server, or distribute the data across hundreds or thousands of computers and support centralized applications, or distribute the applications and the data. Developers can also use replication to move copies of data closer to their point-of-use.

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