Objectivity/DB: Solving The Most Demanding Data Management Challenges

**Background**
Data management challenges in the Oil and Gas industry are more complicated than ever, and today’s software innovators need industrial-strength products that allow them to build systems to manage massive volumes of complex 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 applications in both energy exploration and refinery process control.

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

**Business Rationale**
Objectivity/DB’s distributed architecture can save organizations hundreds of thousands of dollars by eliminating costly equipment purchases and upgrades. The technology also enables real-time information processing, which enables better decision support and access to the most up-to-date information available at any time. In the oil and gas industry, these results are particularly important as facilities look for ways to manage reservoir assets more quickly and cost-effectively.

**Objectivity/DB in Upstream Operations**
Objectivity/DB is an ideal fit for exploration systems that rely on collecting massive amounts of disparate data in multiple formats (including GPS, acoustic, compass and other sensor data) and using the information for predictive analysis. With Objectivity/DB embedded in an exploration application, analysts can see data as it is collected in real time and determine the size and potential value of a payload before drilling begins. These abilities can significantly reduce the amount of time and resources wasted on mining sites that don’t have a strong yield potential.

**Objectivity/DB in Downstream Operations**
Objectivity/DB not only makes exploration activities more efficient and cost-effective, but it is also an ideal fit for streamlining supply chain management and refining processes. Objectivity/DB can store information from all data points along the supply chain, from production and delivery to the pump, and allow the information to be displayed to multiple parties in a single logical view. With better information sharing and collaboration between points on the supply chain, analysts, operators, and managers can optimize their communication and get product where it needs to be, when it needs to be there.

**The Technology**
Objectivity/DB is a pure object-oriented database that is heterogeneously compatible across multiple hardware platforms, operating systems, and languages. 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.
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**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.

**No Database Server:** Objectivity/DB does not rely on a database server like many relational databases. Objectivity/DB uses a lock-server and a page-server, which 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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