



## **“Big Data” Functionality for Oracle 11 / 12 Using High Density Computing and Memory Centric DataBase (MCDB) Frequently Asked Questions**

### **Overview:**

SGI and FedCentric Technologies LLC are pleased to announce “Big Data” functionality, for Oracle 11 / 12 users. Our approach uses High Density Computing and Memory Centric DataBase (MCDB) to provide order(s) of magnitude increase in ingest and process rates.

### **What is High Density Computing?**

High Density Computing is a commodity-based system (Intel x86, DDR3 RAM, PCIe 3 I/Fs, RedHat or SUSE Linux) that enables in-memory processing of Oracle data sets from 64GB to 48TB. This approach enables Oracle users to re-host applications from disk-based Relational Data Base Management Systems (RDBMS) to MCDB with little or no change to those applications.

### **The ABC’s of High Density Computing.**

**A**ffinity - The ability to locate resources in close proximity.

**B**oundaries – A fixed border that requires data and applications to transit from the compute to the networking / IO domains.

**C**onnectivity – The topology used to connect compute resources  
Tightly Coupled – uses high speed computer backplane technology  
Loosely Coupled – uses networking topologies

**D**omains – Architectural sections of the overall system  
Compute Domain  
Communication / IO domain

### **What Is MCDB?**

MCDB is an in-memory database capability that allows Oracle 11 – 12 Users to achieve order(s) of magnitude increases in “Big Data” performance; including ingest rates, query response times and real time analytics. MCDB adapts Oracle TimesTen to an enterprise-class capability using x86 hardware, standard Linux and scalability to 48TB data sets.

## **Why Is MCDB So Exciting?**

Oracle users are currently limited to small data set deployments using x-86-based servers. MCDB extends data size up to 48TBs without the penalties and limitations of traditional approaches

There is a class of problem that exceeds the capacity of traditional / competitive systems. SGI and FedCentric Technologies MCDB address this class of problem.

## **What are traditional approaches?**

Traditional approaches use x-86-based servers or proprietary scale up servers for Oracle and/or Oracle RAC.

x86-based Systems – These servers run at computer speeds as long as data and applications are on a single blade boundary (generally limited to 40 core and 1.5TB RAM). If additional compute resources are required, a network must be introduced. The network becomes an integral part of the system adding latency and jitter.

Proprietary Systems- Feature proprietary RISC chip sets and non-standard Unix, Linux and other proprietary operating systems. These systems provide unique benefits that may prevent you from future migration to x86-based systems.

## **How does this differ from High Density Computing and MCDB?**

FedCentric builds systems based on the SGI UV 2000 x86-based platforms, enabling a commitment to standards and extreme flexibility to handle data sets up to 48TB. This technique is compatible with Oracle 11 / 12.

All data and applications are held within memory and can be executed at computer speeds, offering an order(s) of magnitude increase in database performance, while maintaining a commitment to standards.

## **Does MCDB Acceleration replace Traditional Disk-based RDBMS?**

In one word: No. MCDB is a technique to run applications that simply exceed the capacity of the disk-based Oracle.

MCDB is an ACID compliant enabling technology that can introduce orders of magnitude performance increases to the existing system, while maintaining complete compatibility including; cache connection to the existing database, and minimal rewrites of existing “standards compliant” application code.

## **How Do You Speed Up an Oracle application using MCDB?**

All operations and data structures are in system memory. Data structures have a permanent memory address requiring fewer instructions to get data and indexes from

memory. Taking disks out of the equation equals zero I/O wait states.

MCDB uses system level memory to accelerate performance. Memory is limited by the slowest component, which is the system bandwidth.

MCDB uses disks for capacity not performance, disks on MCDB are used for check point and restart.

## **Do I Need to Purchase Proprietary Systems to Achieve High Density Computing?**

No. Proprietary systems (Vendor-based chip sets and proprietary Unix, Linux or other operating systems) tend to lock you into that vendor. Why go back to the days of RISC chips and vendor specific Unix and/or Linux, to get the scalability needed for today's "Big Data" problem sets. We provide you with x86 compatibility and conformity with standard RedHat or SUSE Linux. SGI platforms can expand to industry leading 4096 Cores and up to 64 TB of RAM.

## **When does MCDB become a compelling technology?**

**"Big Data" Applications-** where Oracle systems cannot provide enough bandwidth and throughput for high speed ingest, high query volumes or access to data in real time.

When Oracle applications require real time and actionable business results.

## **Typical Questions that FedCentric Would Like to Discuss with You.**

Do you use Oracle?

What application would you most like to accelerate?

If we could offer you a 1 to 4 orders of magnitude increase in performance, which applications would you accelerate?

Have you tried to improve performance with certain applications? Which applications? How well did this turn out?

Do you have any concerns about running new applications on your existing system? How might the new applications impact your current system?

Is your data center or facility experiencing shortages of space, power and cooling capacity?

Have you tried to write your own codes to alleviate a performance problem, i.e. Java Hash Tables, Graphs, Object Databases?

What would you do with an order of magnitude increase in database performance?

## **Other MCDB FAQs**

**Can't I just cache my data sets in memory and/or use SSDs to get similar performance using standard Oracle?** No. Even if you could eliminate disk access altogether, you would only achieve approximately 20% performance improvement. 80% of the execution time exhibited by an RDBMS is code path related.

With MCDB all data and application codes are memory-resident. MCDB is optimized for in-memory data management

**Is MCDB like a RAM disk?** No. All data is in memory and the MCDB database engine is optimized for in-memory data management.

**Is MCDB a data warehouse?** No. However, you could use MCDB to build a very effective data warehouse. MCDB is focused on accelerating high value business processes that use a database.

**Is MCDB a replacement for Oracle?** No. MCDB co-exists and enhances regular Oracle processing and has built in synchronization with Oracle.

**What is the level of effort required to implement an MCDB into your current environment?** It depends on the existing application and database. Assuming the application is written to open standards (JDBC ODBC), rewiring the application to run against the MCDB is relatively straight forward. FedCentric can investigate your requirements and provide you with a detailed analysis.

**What kinds of speed-ups can I expect using the MCDB?** It very much depends on the existing application logic but speed-ups from 10 to 775,000 times have been observed during Proofs of Concept demonstrations.

## **Debunking MCDB Myths**

**MCDB is volatile and I can easily lose my database information:** MCDB persistence to disk is configurable from durable to buffered commits. You can configure the MCDB for a range of price / performance tradeoffs. In addition, you can add the MCDB High Availability option which provides redundancy between two or more systems.

**MCDB technology is expensive:** RAM is more expensive than disk, but when you use disks for performance and not capacity, you may require 100's to 1000's of disks to optimize striping performance. There are applications where MCDB is less expensive than disk-based systems, and others where MCDB is more expensive. In addition there are hidden costs with disk-based systems including floor space, power consumption and cooling.

One other aspect to keep in mind: Regardless of the money spent on a disk-based system, it may not be able to adequately perform against requirements. There is a class of application that exceeds the capabilities of disk-based systems.

**MCDB can and should replace Oracle:** No. MCDB is a method to accelerate Oracle performance.

### **Summary**

There is a class of problem that exceeds the capabilities of traditional disk-based RDBMS systems. Business success will increasingly demand in-memory performance and throughput to meet business processing requirements, while operating within power and space constraints.

FedCentric Technologies looks forward to working with you to determine if MCDB is the right approach for your application requirements.

**“What would you do with an order of magnitude increase in database performance?”**

**Big Data  
No Compromise.**

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