FedCentric Technologies
Memory Centric DataBase (MCDB) Accelerator Solution
Frequently Asked Questions

Overview:

SGI and FedCentric Technologies LLC are pleased to announce the Memory Centric DataBase (MCDB) Accelerator at Oracle Open World in San Francisco, CA, November 12-15.

The FedCentric MCDB Accelerator is a database acceleration solution that can provide up to 4 orders of magnitude increase in DB performance through use of Memory Centric Architectures and In Memory Database techniques.

Why Is MCDB So Exciting?

The MCDB Accelerator has potential to provide from 1 to 4 orders of magnitude increase in application performance.

The MCDB solution uses system level memory versus cluster techniques and disks to accelerate database performance. SGI has unique advantages in providing greater densities per processor (6.5 times that of IBM). Fewer processors per memory equals lower SW cost and more attractive price / performance. Most competitive solutions cannot scale beyond 2.1TB in a Single Operating System Image. There is a class of problem that exceeds the capacity of traditional / competitive systems. FedCentric Technologies MCDB addresses this class of problem.

How Do You Speed Up An RDBMS Application Using Traditional Approaches?

Traditional Disk-Based Approaches use the following methods to accelerate performance:

Disk Striping Techniques - this approach involves placing small amounts of data across many disks to gain parallel read and write performance gains. This technique allows simultaneous reads and writes to gather or update information quickly. The use of disks to accelerate performance may increase disk requirements from 10's to 1000's of times the actual data size. As you know, disks consume vast amounts of power and floor space and significantly increase data center cooling costs.

Memory Caching Techniques - this method involves placing most frequently used information into memory to speed up performance. This technique is very hard to implement, tune and administer.

Administrators must monitor and maintain buffer cache of the system. As a result the system must execute more complex instructions to get data, indexes and sort space from disk to buffer cache.

In addition, code path restrictions serve to limit the effectiveness of this approach.

RAM Disk Implementations - Implementing RAM disk reduces the latency impact of spinning disks. This method can speed up performance 3 to 5 times that of disks. Limitations still exist because the bottleneck moves from the spinning disks to the next slowest component, the disk I/O interface.

RAM disk is also limited by RDBMS code path that treats RAM disks like spinning disks and not system level memory.

Traditional approaches use disk for performance and not for capacity
This may require 100's to 1000's of times more disk than would be required by the actual data size to gain significant performance.

Does MCDB Acceleration replace Traditional Disk-based RDBMS?

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

MCDB does not replace the disk-based system. It 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 RDBMS application using MCDB Acceleration?

All operations and all data structures are in system memory. All 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 (450GB per second of bisectional bandwidth).

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

When does MCDB become a compelling technology?

High Throughput Applications- where disk based systems cannot provide enough bandwidth and throughput due to slowest component issues.

Lengthy Query Times – caused by spinning disk latency issues and / or code path bottlenecks.

Data Center Constraints – many data centers are running out of floor space, power and cooling capacity. MCDB helps by providing orders of magnitude performance without adding significantly more disk. When viewed in this light, MCDB provides a very "Green" environmental approach.

Applications that Require Real Time and Actionable Business Results

When should you Proceed with an MCDB Solution?

You have optimized all aspects of your traditional system and still cannot achieve application performance requirements and results.

You have tried to build a home-grown, in-memory solution; including, Java hash tables, graph query languages and/or object oriented databases.

You are considering RAM disk technology to accelerate performance.

When should you Proceed with Caution with an MCDB Solution?

MCDB does not support Oracle Objects, Spatial, Text and Label Security nor does it support stored procedures or triggers. These items are not show stoppers but do require additional scrutiny by FedCentric personnel.

Typical Questions that FedCentric Would Like to Discuss with You.

What database do you currently use?

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?

Is your current system written using "standards compliant" SQL? Do you use or need Label Security, PL/SQL, Stored Procedures, Triggers, Text, Oracle Spatial or user defined objects in your application?

Other MCDB FAQs

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 10g? No. MCDB co-exists and enhances regular Oracle 10g 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 10g: 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?"

Please contact us at:
FedCentric Technologies
4908 Jamestown Road
Bethesda, MD 20816
gerry.kolosvary@fedcentric.com
joseph.conway@fedcentric.com
301 263-0030.

