Fusion-io maximizes performance for Oracle-based data warehousing, online transaction processing (OLTP), and online analytical processing (OLAP) applications. Fusion-io also allows staff to manage more data on less hardware, reduce IT costs through consolidation, and make better business decisions in real time.

CUSTOMER RESULTS

Fusion’s ioDrives use ioMemory technology to form a non-volatile memory tier that delivers Oracle server CPUs the lowest latency data access by using NAND flash with PCI Express. Recent TechValidate Surveys show the significant performance improvements that Fusion-io provides Oracle:

- 37% of IT organizations saw 6x or more performance
- 73% of IT organizations saw 50% or greater latency reduction

Case studies illustrate how these improvements helped Fusion-io customers’ businesses:

- Book eRetailer, Alibris, improved search speeds of its database 6x to ensure customer satisfaction, conversion, and retention
- Hosted call center workforce management provider, Pipkins, improved the workload its system could support by 6x
- Marketing analysis company, Datalogix, realized 40x faster data warehouse queries
- Business intelligence provider for the semiconductor industry, Sytricity, improved its Oracle-based applications’ performance an average 5-10x
- Dutch Oracle hosting company, MCX Administration Services BV, doubled transaction load capacity to ensure consistently high performance for many varying database loads

FLEXIBLE DEPLOYMENT OPTIONS

Fusion-io provides a drop-in solution that improves Oracle performance for many configurations, including the following:

- Large Data Set, Single Instance Oracle Improvement
- Small Data Set, Single Instance Oracle on Fusion-io
- High Availability with Oracle Data Guard
- Oracle RAC with Fusion-io
- Applying Oracle to Web Applications
- Optimizing I/O Load with Automatic Storage Management (ASM)
**LARGE DATA SET, SINGLE INSTANCE ORACLE IMPROVEMENT**

This configuration is ideal when the entire database cannot fit within one or more ioMemory devices. Customers place hot or active files, such as redo logs, data files, and frequently accessed table spaces on the ioDrives while keeping other files accessible in external storage.

**Configuration**
- Place hot or active files on a Fusion-io device:
  - Data files
  - Redo logs
  - Archive logs
  - Temp tablespace
  - Undo tablespace

**Advantages**
- Huge improvement in transactions per second
- Reduced infrastructure cost of configuring disks for IOPS
- Simple deployment
- Extend life of existing equipment

**SMALL DATA SET SINGLE INSTANCE ORACLE ON FUSION-IO**

This configuration is ideal when the entire database easily fits on one or more ioMemory devices. Placing the entire database on ioMemory grants the highest throughput and shrinks server footprints. Multiple ioMemory devices can be aggregated together for a larger, single volume. This configuration allows the highest transactions per second, as all data is coming from flash memory, as opposed to reverting to slower rotating media, such as disk drives.

**Configuration**
- Host entire Oracle database on Fusion-io
- Use ioDrives instead of disks

**Advantages**
- Highest performance in IOPS and throughput
- Much lower cost in infrastructure, operation, power consumption, and cooling
- Simpler installation and maintenance procedures
HIGH AVAILABILITY WITH ORACLE DATA GUARD

Oracle Data Guard can create active/passive configurations to provide automatic and instant failover that protects database systems from failures, human error, and data corruption. A major advantage of ioMemory in this configuration is that replication from flash-to-flash is significantly faster than replication from disk drives. Complete redundancy is realized with far less hardware and without complex cluster schemes, delivering huge time savings on server and disk administration and maintenance.

Configuration
- Management, monitoring, and automation to create and maintain standby databases
- Protects Oracle data from failures, disasters, human error, and data corruption
- Automatic failover with Oracle Fast Restart and Broker

Advantages
- Speed of flash-to-flash replication
- Tunable parameters for user and workload appropriate availability
- Lower costs, simpler installation and maintenance than clustering

ORACLE RAC WITH FUSION-IO

ioMemory improves Oracle RAC configurations when implemented as an extension to the buffer cache via Oracle’s Smart Flash Cache software, an optional component in Oracle 11gR2 or Oracle Enterprise Linux. Adding ioMemory to RAC systems provides terabytes of addressable memory space and greatly improves response times, as data can be retrieved from cache as opposed to spinning disks.

Oracle RAC with Fusion-io is ideal where clustering is required.

Configuration
- Smart Flash Cache—optional component in Oracle 11gR2 or Oracle Enterprise Linux
- Extension of database buffer cache can be stored and used on Fusion-io
- Terabytes of addressable memory space, improving response times

Advantages
- Higher transactions per second
- Lower infrastructure costs
- Straightforward installation and maintenance
For further reading on using Fusion-io with Oracle RAC, see [Accelerating Dell Oracle 11g R2 Database Solutions Using PCIe Solid State Storage](#) and [MCX More Than Doubles Its Hosting Platform’s Data Load without Upgrading Its SAN](#).

**FUSION POWERED ORACLE IN WEB APPLICATIONS**

You can deliver the performance of Fusion Powered Oracle to web-scale environments with a pod-like, building-block architecture that leverages Data Guard in an active/passive server configuration.

**Configuration**
- Leverage Data Guard
- Active/passive server configuration
- Set design of single pod

**Advantages**
- Robust Oracle software ecosystem
- Scale with less expensive, basic-level Oracle licenses

This pod-based configuration allows customers to scale without the need for Oracle RAC by replicating the pods and using load balancers to direct traffic to the appropriate pod.
OPTIMIZING I/O LOAD WITH AUTOMATIC STORAGE MANAGEMENT (ASM)

ioMemory can also be used with Oracle’s Automatic Storage Management software to mirror and stripe across several ioDrives in a single server. Being Oracle-aware and storage-aware, ASM can auto-balance the I/O load if an ioMemory device is showing higher than average I/O stress—meaning if a certain portion of the database is under particular stress, ASM will help allocate that stress and keep the data appropriately spread across multiple devices. This is particularly effective when large data sets are stored across many ioDrives in a single server. Using ASM with multiple ioDrives can provide a huge performance improvement at a very opportunistic price point.

SUMMARY

Fusion ioMemory devices enable Oracle databases to maintain consistent low latency responses as user load increases. It provides near-DRAM speeds for active data at a much lower price, and reserves traditional disks for larger files and archives. Because ioMemory integrates with the host server at the system and kernel level, it avoids unnecessary hand-offs between the host and device processor, and the SAS and SATA interface translation. The result is a faster, more resilient, and simpler database system that dramatically improves the performance of all applications accessing it.

CONTACT

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