

# Voltaire Powers Oracle Exadata and HP Oracle Database Machine

## InfiniBand Removes I/O Bottlenecks, Delivering Extreme Oracle RAC Performance



Data volumes have continued to grow exponentially. As a result, conventional database solutions struggle to efficiently deliver results. Performance of traditional storage arrays is stagnant beyond 1 terabyte of data due to two main factors: excessive I/O access by the compute nodes, and narrow data throughput between compute nodes and storage arrays. The result is batch jobs that extend into the next business day and queries that should be completed in real-time but rather are executed in 30 minutes or even hours.

The HP Oracle Database Machine is built for extreme performance for data warehousing environments. Built using top of the line hardware from HP, smart storage software from Oracle and a high performance InfiniBand interconnect from Voltaire, the HP Oracle Database Machine is a complete, optimized and preconfigured package of software, servers, and storage.

Simple and fast to implement, the HP Oracle Database Machine is ready to tackle large-scale business queries immediately—and often run them 10x faster or more. Queries and reports that used to take hours now only require minutes or seconds. An analyst who could previously run 2-3 queries per day can now run dozens of queries per day. Instead of running a single batch report throughout the night, you can have multiple reports completed before you walk in the door in the morning.

The performance gains do not have to stop there! Further performance gains can be made by extending the Oracle HP Database Machine's performance with InfiniBand connectivity all the way out to the application servers.

### Oracle Exadata Storage Server

Oracle Exadata Storage Servers are a key building block for the HP Oracle Database Machine. The unique technology driving HP Oracle Database Machine's performance gains is the Exadata Storage Server. Each Exadata Storage Server has "Smart Scan" software built-in to execute rapid table scans, sending only required rows and columns through a fast InfiniBand server interconnect for processing by database servers.

The combination of "Smart Scan" technology along with InfiniBand's 20 Gbps bandwidths, microsecond latencies and Remote Direct Memory Access (RDMA) capabilities eliminates I/O bottlenecks and frees database server CPU cycles to run even more queries faster.

### Key Features and Benefits

- Extreme application performance by removing I/O bottlenecks
- Unlimited scalability across application, database and storage servers
- Oracle RAC 11g and Oracle Linux Certified
- Supported by Oracle, HP and Voltaire



### Powering HP Oracle Database Machine with InfiniBand and Reliable Datagram Sockets

HP Oracle Database Machine uses Reliable Datagram Sockets (RDS) to provide a high bandwidth, low latency, ultra reliable inter-process communication (IPC) protocol that dramatically improves the performance of I/O-intensive applications.

RDS is a socket offload mechanism used by Oracle RAC for IPC communications. It allows the processing of IPC traffic to be offloaded to Voltaire's I/O hardware. RDS enables Remote Direct Memory Access (RDMA), providing extreme levels of performance. Oracle has found RDS to reduce communication latency and CPU utilization by up to 50%. The result is drastically improved application performance and improved scalability

Leveraging Voltaire's InfiniBand's built-in high availability and load balancing features, RDS has been rigorously tested by Oracle to meet the most demanding enterprise requirements.

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## Building Scalable Storage Grids

Oracle Exadata Storage Servers can be installed into a standard 19-inch rack and are connected to database servers via Voltaire's InfiniBand. Oracle Exadata Storage Servers have dual 20 Gigabit InfiniBand links which provide connectivity many times faster than traditional storage or server networks. Further, Oracle's interconnect protocol uses direct data placement (RDMA) to ensure very low CPU overhead by directly moving data from the wire to database buffers with no extra data copies being made.

Oracle Exadata Storage Servers are architected to scale-out to any level of performance. To achieve higher performance and greater storage capacity, additional Oracle Exadata Storage Servers are added to the system. Scaling out is easy, and as more Oracle Exadata Storage Servers are added, capacity and performance increases linearly. This coupled with faster InfiniBand interconnect and the reduction of data transferred due to the offload processing yields very large performance improvements. A 10x speed up in query performance is often achieved compared to traditional data warehouse storage architectures, and 50x improvement or greater is achievable.

## Hardware from HP, Software from Oracle, InfiniBand by Voltaire

As a complete, turnkey solution, the HP Oracle Database Machine can be relied on by enterprise customers to deliver scalability and performance. Voltaire is HP's preferred InfiniBand partner for building the world's highest performance data centers with a complete line of InfiniBand products that remove I/O bottlenecks to increase the performance of I/O-intensive applications in industries such as Manufacturing, Financial Services, High Performance Computing, Energy and Life Sciences.

Voltaire is also a longtime partner of Oracle as a member of the Oracle Partner Network (OPN) and a participating member of Oracle's Multi-Vendor Support Program (MVSP). The Multi-Vendor Support Program is how Oracle Support Services works with third parties to resolve common end-user support-related issues. Voltaire solutions have also received Oracle RAC 11g and Oracle Enterprise Linux certifications letting applications run in Oracle RAC environments with extreme levels of database performance and scalability while using fully certified solutions.



## Oracle HP Database Machine

The HP Oracle Database Machine is a complete system, including software, servers, storage and Voltaire InfiniBand switches, designed to run multi-terabyte data warehouses with 10x faster performance than conventional database solutions. The HP Oracle Database Machine uses 14 Oracle Exadata Servers along with 8 Oracle RAC 11g database servers connected using redundant Voltaire InfiniBand switches. Not only does the Oracle HP Database Machine take advantage of InfiniBand's 20 Gigabit bandwidth, it also uses RDS and RDMA for enhanced compute nodes performance and high availability in order to deliver extreme performance.

## Oracle Exadata Server

A combination of high performance storage software and hardware that improves data warehouse query performance by a factor of 10X or more. Oracle Exadata Storage is a combination of smart storage software from Oracle running on industry-standard, top of line hardware from HP (HP ProLiant DL180 G5 server). Oracle Exadata uses a massively parallel architecture in combination with Voltaire InfiniBand switches to remove I/O bottlenecks in order to dramatically increase data bandwidth between the database server and storage.



Contact Voltaire to Learn More

1.800.865.8247  
info@voltaire.com  
www.voltaire.com

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