

## Database Edition/Advanced Cluster™ for Oracle9i Real Application Clusters

### THE MOST MANAGEABLE SOLUTION FOR ORACLE9i RAC

VERITAS Database Edition / Advanced Cluster™ for Oracle9i Real Application Clusters (RAC) provides an industry leading cluster framework and cluster file system for implementing robust, manageable, and scalable Real Application Clusters. Database Edition / Advanced Cluster leverages core VERITAS storage management and clustering technologies that have been optimized for Oracle9i RAC.

#### MANAGEABILITY A WITH CLUSTER FILE SYSTEM

Oracle9i RAC requires that database files be shared among all nodes. Historically, this sharing could only be done using RAW storage devices. Raw devices require more planning and administration by System Administrators and DBAs. Raw devices are also more prone to errors by IT staff and may reduce overall system availability. With the release of Database Edition / Advanced Cluster, VERITAS has introduced the first and only cluster file systems for RAC on the Solaris and HP-UX platforms. Cluster file systems are an advanced technology that significantly eases the burden of RAC installation and ongoing management.

**Sun, HP, AIX and Windows users must run RAC on difficult-to-manage raw devices until a company like VERITAS comes out with a clustered file system for their environments.**

**Mark Shainman  
Senior Research Analyst, META Group**

#### INTUITIVE USER INTERFACE

Database Edition/Advanced Cluster provides administrators with an easy to use, Java-based graphical user interface (GUI) that simplifies storage and cluster management. Furthermore, the ability to manage the full environment, encompassing all the servers and storage simplifies administration, reducing the costs of managing the RAC environments. A fully featured command line interface is also provided.

#### HIGH AVAILABILITY

Due to the increasing criticality of enterprise data, proactive planning for 24x7 uptime is becoming a necessity for more and more applications. Database Edition/Advanced Cluster provides a comprehensive management solution to increase the availability of Oracle databases. Using VERITAS Cluster Server™ technology and the VERITAS Cluster Server Agent for Oracle, Database Edition / Advanced Cluster monitors the environment for any failures and takes appropriate actions to minimize downtime. Most common administration task can be done without taking the database down. An example of this is the ability of VERITAS Cluster Server to add nodes to the cluster, while the cluster is up and running.

#### SCALABILITY

Database Edition / Advanced Cluster, allows administrators to add storage to their RAC environment without bringing down the database down, making RAC an always-on and scalable database solution. Both the Cluster Volume Manager, and the Cluster File System, allow dynamic re-sizing of the storage environment. New disks can be added to disk groups, free disk space can be added to volumes, and the file system can grow to take advantage of the new capacity. All of this can be done while your Oracle RAC database is up and running.

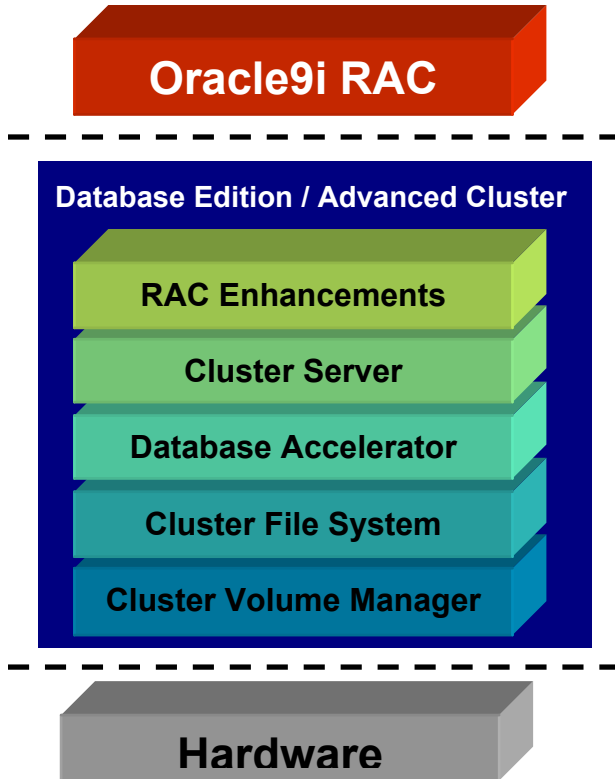
#### CERTIFIED

Database Edition / Advanced Cluster has been **certified** by Oracle to run with RAC to ensure a high level of interoperability. To make certain that customer issues are responded to quickly, VERITAS and Oracle maintain cooperative customer support agreement.

#### FLEXIBILITY

IT architects can craft solutions that meet their specific needs because Database Edition/Advanced Cluster provides freedom of choice when it comes to storage devices. This flexibility allows businesses to use RAC with their existing storage systems and provides additional flexibility and negotiating power if new storage devices will be acquired.

## DATABASE EDITION / ADVANCED CLUSTER TECHNOLOGY OVERVIEW



### CLUSTER VOLUME MANAGEMENT

Database Edition / Advanced Cluster uses VERITAS Volume Manager technology to enable physical disks to be managed as logical devices or volumes. Cluster Volume Manager is an extension to the VERITAS Volume Manager that allows multiple nodes to have parallel access to storage enabling simultaneous access to the Oracle database. The Cluster Volume Manager also provides flexible mirroring and striping (RAID 0, RAID 1, RAID 1+0, and RAID 0+1) configurations to improve performance and availability. Dynamic multipathing allows multiple connections from a node to the storage array to further improve performance and availability. The VERITAS solution also has online administration capabilities so administrators can reconfigure the storage topology while the system is up and running.

### CLUSTER FILE SYSTEM

The VERITAS Cluster File provides simultaneous access to a file system from all nodes in the RAC cluster. VERITAS's implementation is a true cluster file system that supports concurrent read and write access to storage from all nodes. In case of node failure, the cluster file system will continue to provide services to the surviving other nodes with no interruptions.

The VERITAS cluster file system allows tablespaces to grow online without the need to pre-allocate storage capacity and "invisible" tablespaces are eliminated.

### DATABASE ACCELERATOR

Database Edition / Advanced Cluster includes integration with the Oracle Disk Manager (ODM) API for Oracle9i RAC. VERITAS's solution allows users to have the improved manageability of a file system without the overhead and performance degradation of traditional file systems. When a VERITAS cluster file system is placed under ODM control the RAC instances are allowed direct IO access to the raw volumes. No file system locking or buffering is done, allowing greater performance. This solution provides the excellent performance of direct IO to raw volumes and the improved management of a file system.

### CLUSTER SERVER AND RAC ENHANCEMENTS

VERITAS Cluster Server™ (VCS) is the industry's leading UNIX clustering solution. Database Edition / Advanced Cluster uses VCS technology to control startup and shutdown of the component layers of a RAC system.

I/O fencing is the method of ensuring the integrity of critical information by preventing data corruption in the event of a "split brain" condition – a situation in which two servers try to independently control the storage. CVM has implemented I/O fencing using SCSI-III persistent reservation technology allowing the underlying storage to dynamically change without compromising data integrity.

### Cluster Transport

Oracle has defined an API to pass information such as lock data between nodes in an RAC cluster. Database Edition/Advanced Cluster has implemented this layer using the VCS Low Latency Transport (LLT). LLT uses standard off-the-shelf networking hardware, but does not incur the overhead of TCP/IP stack. Furthermore, Database Edition/Advanced Cluster has implemented this layer to take advantage of multiple network links between the nodes in a RAC implementation.

### SUMMARY

Database Edition/Advanced Cluster provides the utmost in availability from the storage software leader. By integrating leading storage management components from VERITAS with Oracle 9i RAC, VERITAS delivers the most manageable RAC solution in the industry.

### MINIMUM SYSTEM REQUIREMENTS:

Oracle9i Real Application Clusters Release 2 or later  
Sun/SPARC systems running Solaris 8 or 9  
Hewlett-Packard PA-RISC systems running HP-UX 11i  
Server must have at least 2 CPUs and 1 GB RAM  
At least two Ethernet connections between nodes  
Storage system must support SCSI-3 Persistent Reservation