A Guide to Deploying
Oracle9*i* Certified
Configurations for Dell

By Sudhir Shetty and Nicolas Pujol

Oracle® Certified Configurations for Dell are pre-tested, factory-installed database systems that provide high reliability and performance for organizations of all sizes. These configurations reduce the cost and risk of implementing Oracle software on Dell™ systems while speeding and simplifying database deployments and efficiently utilizing critical IT resources.

Dell and Oracle have partnered to deliver Oracle® Certified Configurations for Dell, pre-installed database systems that comprise integrated software and hardware stacks. These configurations let organizations rapidly deploy and implement an Oracle environment built with supported components, which are integrated and tested as one system for optimal interoperability. By standardizing the computing environments, this method of deployment can eliminate complexity; reduce risk, ongoing maintenance, and support costs; and improve serviceability.

Two types of Oracle Certified Configurations for Dell are available: one for implementing the Oracle9*i*™ database system and one for Oracle9*i* Real Application Clusters.

Deploying a single-node database configuration

The Oracle9*i* Database Certified Configuration for Dell is a pre-tested Oracle9*i* stack for deploying a stand-alone database server. It is well suited for enterprises with large IT infrastructures, offering a known and tested configuration for deployment of standardized departmental databases. For small and medium businesses whose needs do not justify a database cluster alternative, it provides a cost-effective and reliable Oracle database.

Figure 1 shows a simple deployment that includes a Dell™ PowerEdge™ 6650 server as the database server and a Dell PowerVault™ 220S storage enclosure. In this deployment, different database clients connect to the database tier:

▸ **Application servers:** Application servers provide a middle-tier infrastructure that hosts the business logic and the services necessary for clients to access the database in a reliable, scalable manner.

▸ **Web servers:** These servers use server-side scripting mechanisms such as servlets, Java™ Server Pages, Active Server Pages (ASP), and the Common Gateway Interface (CGI) to access the database through standard interfaces.

▸ **Oracle client applications:** The Oracle client application resides on a remote server and accesses the database using standard application programming interfaces (APIs).
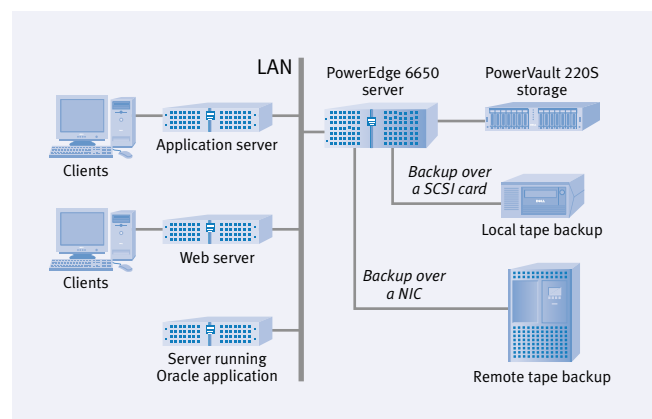

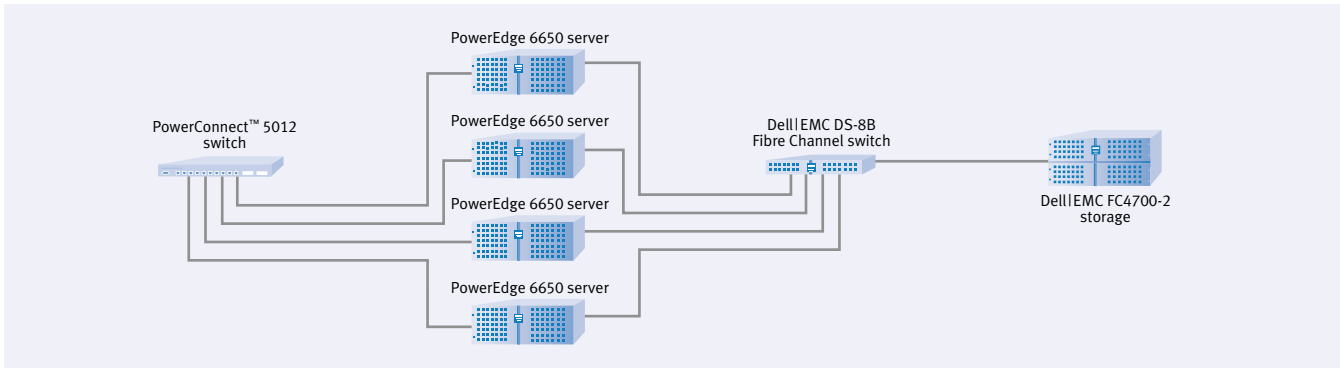*Figure 1. Deployment of an Oracle9*i *Database Certified Configuration for Dell*

Figure 2. Four-node deployment of an Oracle9i Real Application Clusters Certified Configuration for Dell

Deploying clustered database configurations

The Oracle9*i* Real Application Clusters Certified Configuration for Dell offers a highly available and scalable enterprise deployment.[1] Figure 2 illustrates a simple four-node cluster deployment. For higher availability, administrators can add redundancy to various components in the configuration; consult a Dell representative for supported configurations.

Fibre Channel switch redundancy

Dual Dell|EMC Fibre Channel switches add redundancy to the switch fabric (see Figure 3). This redundancy can be leveraged through the EMC® PowerPath™ software, which defines and manages multiple I/O paths from the server to the storage subsystem. Residing in a software layer above the driver software, PowerPath offers an application-transparent mechanism for failing over from one host bus adapter (HBA) to another.

Network redundancy

Network redundancy helps eliminate the single points of failure for private interconnect components such as the network interface card (NIC) and the Gigabit Ethernet[†] switch. A second switch provides an alternative path for the private traffic, increasing the reliability of the clustered solution (see Figure 4).

Configuring RAID for Oracle deployments

A variety of factors influence the selection of an appropriate RAID level for an Oracle deployment. Administrators should consult the references listed in the "For more information" box at the end of this article, which provide insight into I/O configuration and design.

An Oracle database comprises several different elements, such as data files, index files, archive logs, redo logs, and so forth, which can be assigned to RAID volumes. These elements could be separated on different volumes to eliminate contention.

RAID-10 is the preferred RAID level for an Oracle database deployment. The mirroring provides the fault tolerance and availability required for mission-critical database applications. The striping across several spindles offers a performance benefit without suffering from the overhead of parity calculations, as experienced in other RAID implementations. Increasing the number of disk spindles translates into better performance because I/O requests
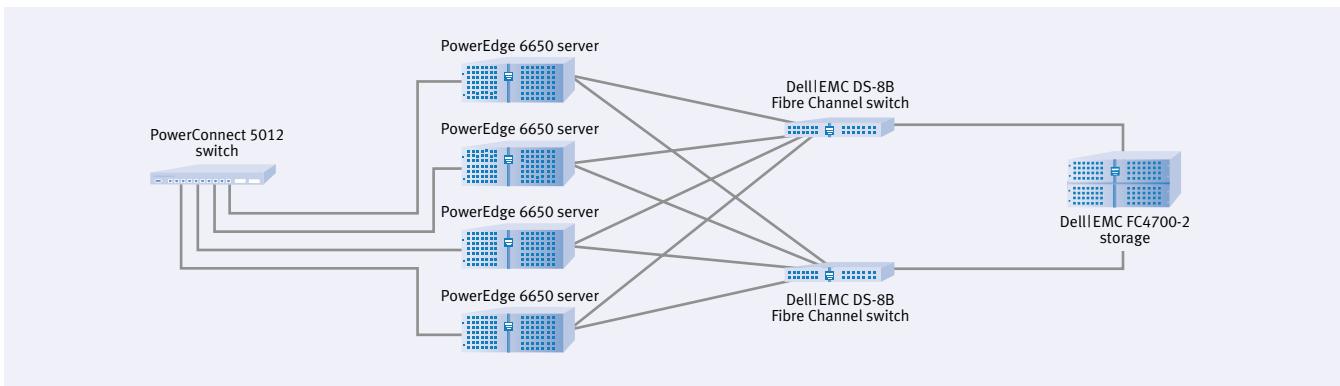

Figure 3. Four-node deployment of Oracle9i Real Application Clusters with redundant Fibre Channel switches

[1] Sudhir Shetty and Guatam Reddy, "Oracle9*i* Real Application Clusters Deployment for the Enterprise," Dell *Power Solutions*, March 2002.
[†] Gigabit Ethernet indicates compliance with IEEE 802.3ab and does not connote speeds of 1 Gbps.

can run in parallel across several spindles. With the falling prices of disk drives, the cost of mirrored disks is less of a concern.

However, when cost is an overwhelming factor or the application environment is read-intensive, RAID-5 is a viable alternative. The FC4700-2 storage array has optimized the parity overhead on a write by performing more intelligent caching of the data that needs to be written out to a RAID-5 volume.

Because redo and archive logs are sequential in nature, they are often implemented as RAID-1 volumes.

Backing up Oracle databases

Several mechanisms are available for backing up data. The Oracle Recovery Manager (RMAN) utility provides advanced routines that back up and recover data. It interfaces with software from various third-party media management vendors such as VERITAS and Legato to back up the data stream to tape. A tape device can be connected to the Fibre Channel switch through a SCSI bridge or directly to the backup server.

Examining real-world deployments

Real-world deployment scenarios illustrate how small and large organizations can take advantage of Oracle Certified Configurations.

Migrating from UNIX to Linux

In the past, organizations commonly deployed an Oracle database on some proprietary version of the UNIX® operating system, typically on a large symmetric multiprocessing (SMP) server. Even though the up-front investment and the maintenance cost were prohibitive, this approach was viewed as the best technology choice for an Oracle database. However, in recent years, the open Linux® operating system has become a viable option because of its core product strengths.

Today, migrating a database from UNIX to Linux has several advantages. The Red Hat® Linux Advanced Server operating system has significant kernel enhancements to its memory management and I/O subsystems, providing a stable platform for enterprise-class deployments. In addition, database administrators familiar with UNIX find the transition easy, because the architecture of Linux is similar to its proprietary equivalent. Finally, organizations can usually achieve significant cost savings by adopting open standards, from both a hardware and a software standpoint.

Consolidating servers and storage

Scalable and expandable, Oracle Certified Configurations enable server and storage consolidation, which together can increase overall availability by using redundant hardware and can simplify management by centralizing equipment and data. Enterprises can become more efficient by consolidating multiple databases onto Oracle9i Real Application Clusters. Current configurations allow for up to four servers with four processors per server, which would create a highly scalable and available database cluster of 16 Intel® Xeon™ processors at speeds up to 1.6 GHz.

Storage area networks (SANs) enable enterprises to consolidate and share storage subsystems among multiple servers. A range of servers, such as e-mail, file, print, and database, can be connected to the same switched fabric and configured through zoning, appropriate LUN masking, and other techniques so that they can access mutually exclusive storage devices.

Standardizing departmental databases

An organization that has multiple small- to medium-size database servers throughout its IT infrastructure can standardize its deployment by using the Oracle9i Database Certified Configuration for Dell. By selecting a known and tested configuration with a common hardware and software stack, database administrators and IT managers can quickly and efficiently deploy an Oracle system.

Achieving cost-effective database deployments

Tested for interoperability and pre-installed at the factory, Oracle Certified Configurations for Dell include all necessary hardware and software and are delivered with easy-to-use deployment guides and
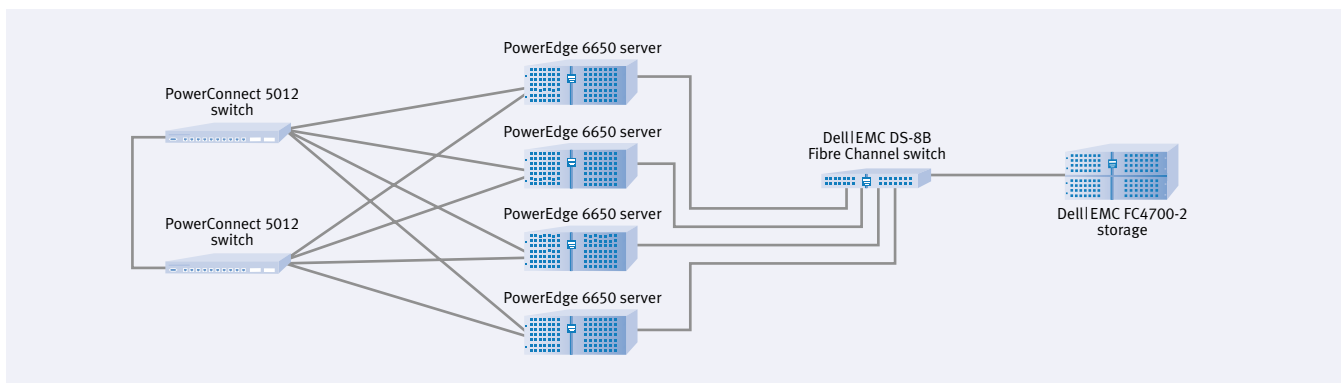

Figure 4. Four-node deployment of Oracle9i Real Application Clusters with network redundancy

DELL COMPONENTS FOR ORACLE CERTIFIED CONFIGURATIONS

Oracle Certified Configurations for Dell are hardware and software components that have been integrated, pre-tested, and pre-installed for reliable, effective deployment of Oracle software.

Hardware stack components

Dell hardware components used in the Certified Configurations include different Dell server and storage alternatives.

Dell PowerEdge 6650. The PowerEdge 6650 enterprise server supports up to four Intel Xeon processors of speeds starting at 1.4 GHz. These processors support Hyper-Threading, an Intel technique that enables one physical processor to act as two logical processors. Hyper-Threading can enhance the performance of multithreaded applications.

The PowerEdge 6650 offers hot-plug redundant power supplies, hot-plug PCI-X (Peripheral Component Interconnect Extended) slots, hot-plug redundant cooling fans, and hot-plug SCSI hard drives. The redundancy and hot-plug features help maximize server uptime.

The server scales to 16 GB of RAM and supports advanced optional features such as memory banks and mirroring for increased availability in the presence of memory errors.

Other PowerEdge servers. For organizations requiring a different PowerEdge server (for example, to accommodate a budget or the need for internal storage), Dell offers pre-tested Certified Configurations that include a deployment CD to simplify the installation of the operating system and Oracle software. Organizations can contact a Dell representative to learn about Certified Configurations based on other PowerEdge servers.

Dell PowerVault 220S. The tested external storage option of a single-node database server, this 3U storage enclosure holds up to 14 SCSI drives. With 73 GB drives, the unit can scale to 1022 GB of data storage. It includes redundant power supplies and cooling fans. When used with a PowerEdge Expandable RAID Controller (PERC), multiple RAID configurations are supported.

Dell⎮EMC FC4700-2. The tested external storage option for the Oracle9*i* Real Application Clusters, the FC4700-2 RAID array is a midrange Fibre Channel storage subsystem that offers high availability through redundant built-in hardware components. Administrators can expand the subsystem's storage capacity by adding disk array enclosures to the main disk processor enclosure.

Optional storage management software is available for the FC4700-2. The EMC SnapView™ tool takes a point-in-time logical snapshot of the storage logical unit numbers (LUNs), allowing nondisruptive backup of data. The EMC MirrorView™ tool remotely mirrors storage over an extended optical network for disaster recovery purposes.

Software stack components

Software used in the Certified Configurations includes a Linux operating system and Oracle database software.

Red Hat Linux Advanced Server, version 2.1. Red Hat and Oracle have extensively tested and tuned this operating system in Oracle environments under simulated high loads to eliminate memory and I/O subsystem bottlenecks.

Oracle9*i* Database. Oracle9*i* Database is a reliable, scalable database application that lets organizations store transactional content in online transaction processing (OLTP) and decision support system (DSS) environments.

recovery software. A Certified Configuration provides a reliable, turnkey database solution that is easy to configure and manage.

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FOR MORE INFORMATION

Dell and Oracle solutions:
http://www.dell.com/oracle

I/O configuration and design:
*Oracle9*i *Database Performance Guide and Reference.*
http://download-west.oracle.com/otndoc/oracle9i/901_doc/server.901/a87503/toc.htm

"Optimal Storage Configuration Made Easy."
http://otn.oracle.com/deploy/availability/pdf/oow2000_same.pdf

Vaidyanatha, Gaja Krishna. "Implementing RAID on Oracle." http://www.quest.com/whitepapers/Raid1.pdf