



Technical Report

NetApp Technology Deployment at Oracle

August 2004 | TR-3330

ARCHIVAL COPY
Contents may be out-of-date

**MAKING COMPLEX STORAGE ENVIRONMENTS SIMPLER TO MANAGE
WITH A LOW TCO**

TABLE OF CONTENTS

1	INTRODUCTION	3
2	MEETING STORAGE CHALLENGES.....	3
3	NETAPP DEPLOYMENT WITHIN ORACLE.....	4
4	CONCLUSION: SERVICE COMPLETES THE PICTURE.....	8

ARCHIVAL COPY
Contents may be out-of-date

1 INTRODUCTION

The rapid business growth of the 1990s created significant storage challenges for many IT departments. IT infrastructures were built primarily around core servers, and storage deployment was carried out to meet immediate needs with little consideration for longer term consequences. The current trend toward storage consolidation is a direct result of the chaos created by server-centric storage deployment, resulting in multiple islands of storage that cannot be shared and increasing management complexity. Today, IT customers are recognizing the strategic importance of data storage and moving to a more storage-centric model in which centralized storage provides business continuity as server technology evolves from one generation to the next.

Nowhere is this more true than at Oracle® Corporation. As the world's largest enterprise software company, Oracle must not only contend with the significant storage needs created by its own business operations; it must also provision storage for a large and rapidly growing On Demand business, plus provide effective development and test environments for teams of developers working all over the world. To satisfy these diverse storage needs, Oracle has turned to NetApp® storage technology.

Today, Oracle has one of the largest global deployments of NetApp storage in the world and relies on NetApp throughout the enterprise to meet its most demanding storage needs. This paper discusses the challenges that Oracle faced throughout its operations and explores the ways that unique storage solutions from NetApp have helped overcome these challenges.

Table 1) NetApp storage deployment throughout Oracle.

Oracle Group	Functions
Global IT	Internal business operations Oracle On Demand Oracle ERP Oracle education services Web services
Applications Development	Development and QA for Oracle E-Business Suite
Applications Demonstration Services	Global Web-based Oracle E-business Suite and Oracle Database demonstration environment
Oracle Collaboration Suite Files Online	Oracle Collaboration Suite Files Online corporate infrastructure serving over 40,000 employees
Platform Engineering	Product build and release factory for all Oracle products and services on multiple platforms.

2 MEETING STORAGE CHALLENGES

Many of the storage challenges Oracle faces are common across its operations. Prior to the introduction of NetApp storage, these operations were built primarily around servers with direct-attached storage, resulting in a cumbersome mix of storage technologies that was inflexible, difficult to manage, and frequently unreliable. Storage consolidation to increase operational flexibility, enhance data access, and decrease total cost of ownership (TCO) was therefore a primary concern. Likewise, because of continued rapid growth in storage deployment, scalability and performance were critically important throughout the company.

Oracle has deployed NetApp storage because of its ability to satisfy these challenges, as well as accommodate more specific needs in each department. When Oracle began using NetApp storage, some people in the industry questioned whether networked storage could deliver the performance required by demanding database applications, but Oracle—and thousands of Oracle customers—has discovered that NetApp storage yields the same or better performance while improving availability, simplifying management, and reducing TCO of storage. NetApp technology has allowed Oracle to consolidate

storage and gain greater operational flexibility. NetApp software technologies such as Snapshot™, SnapRestore®, and SnapMirror® provide capabilities that complement the busy Oracle production and development environments to simplify operations and ensure access.

Since the introduction of Oracle Database 10g in the fall of 2003, Oracle has been accelerating its migration toward grid architecture for much of its IT infrastructure. (A grid pools large numbers of servers and storage into a flexible resource to meet enterprise computing needs.) NetApp technology meets the demands of grid computing, with its storage grid vision, proven scalability, and unified storage solutions, which are capable of delivering data regardless of access method (NAS, iSCSI, FC, etc.).

3 NETAPP DEPLOYMENT WITHIN ORACLE

GLOBAL IT

The Oracle Global IT organization is tasked not only with supporting the substantial Oracle internal IT requirements, but also with managing the large and rapidly growing Oracle On Demand business. To meet these needs, Oracle purchased a large state-of-the-art data center facility in Austin, Texas. The Austin Data Center (ADC) is now the primary Oracle data center, servicing both internal Oracle needs as well as Oracle On Demand.

The ADC is designed using a grid architecture, which provides Oracle with much greater flexibility than the previous direct-attached storage environment. “Since the transition to a grid infrastructure based on Linux® and NetApp, we’re able to make servers a disposable commodity and reuse the storage as the primary ingredient to maintain continuity while evolving technology in our environment,” says Bill Weils, senior director of Oracle Global IT Services Command Center.

The data center contains literally thousands of rack-mounted Linux systems connected via state-of-the-art networks and the largest single NetApp installation in the world. The Linux systems run Oracle E-Business Suite, Oracle Databases, and other Oracle applications, while data is stored and accessed on NetApp storage appliances, which have been clustered to achieve the highest possible levels of storage availability.

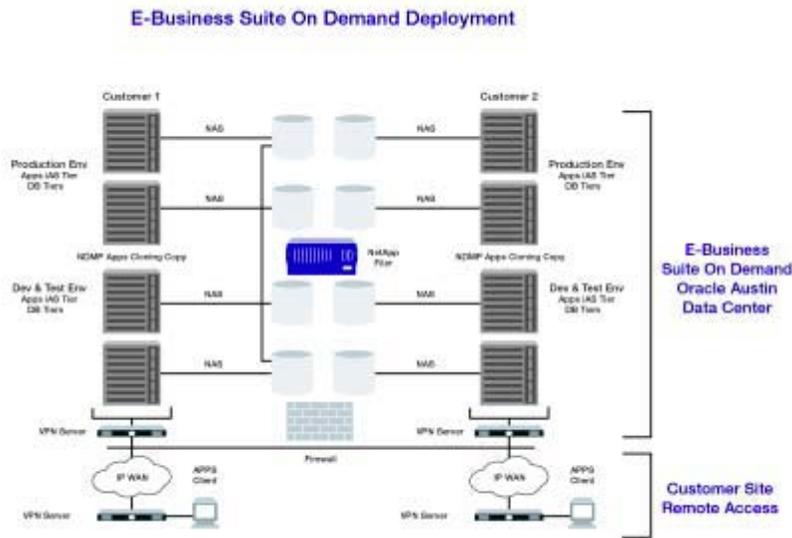
The grid architecture allows Oracle to quickly and easily allocate compute and storage resources where they are needed and quickly reallocate those same resources as needs change. This architecture is critical for Oracle On Demand. According to Michael Rocha, executive vice president for Global Support Services, “As clients move into our environment, they move into an architecture that will grow with them. We don’t want to do a lot of complex validation and up-front sizing; we really want to incrementally adjust compute and storage resources as the clients grow or their needs change. NetApp helps us do that. NetApp gives us the storage infrastructure to deliver value and manage growth.”

Backup and recovery are no simple matters when you’re managing hundreds of terabytes of mission-critical data. Global IT uses NetApp Snapshot and SnapRestore to meet these needs. Regular Snapshot copies of all user data protect against application and user errors. Since creating a Snapshot copy takes only seconds, and a single storage system can maintain hundreds of simultaneous Snapshot copies per volume, there is no impact to ongoing operations.

If a problem occurs with a running application, the most recent Snapshot copy can be brought back, logs can be replayed, and the application can be restarted in minutes versus the hours or or days it might take for tape recovery.

This basic configuration (Figure 1) is replicated for each of the hundreds of customers served by E-Business Suite On Demand.

Figure 1) E-Business Suite On Demand configuration at Oracle Austin Data Center.



Oracle education programs are an important example of the substantial leverage provided by the ADC and NetApp technology. Oracle worldwide education centers used to have their own systems and support staff. That infrastructure has been consolidated to run over a Web-based interface from the ADC. Oracle now requires far fewer systems and less support staff to teach the same number of classes. Staff in the ADC can quickly set up training environments, provision them with storage, and make them accessible anywhere in the world.

ORACLE E-BUSINESS SUITE DEVELOPMENT

Oracle E-Business Suite—also referred to as Oracle Applications—is a complete set of applications for managing and automating business processes throughout an enterprise. The number and complexity of the modules that make up Oracle E-Business Suite create some unique challenges for the development organization responsible for it.

The biggest challenge is the thousands of Oracle E-Business Suite environments needed at any one time for ongoing development and testing. Each environment consumes from 30GB to 300GB of disk space. In addition to the space required, new environments are needed—and old ones are abandoned—on a regular basis. Provisioning and managing storage under these conditions are extremely difficult. Prior to NetApp, the Oracle E-Business Suite development infrastructure was all homegrown. Each environment had to be customized and assigned to an individual developer. That required a lot of hardware, was very hard to manage, and ultimately became impractical. Since the introduction of NetApp technology, the servers are now completely separate from the storage, and the environment is virtualized into a grid architecture.

Using NetApp SnapMirror, a large number of environments can be replicated very efficiently. Complete Oracle E-Business Suite environments can be created much more rapidly, and storage can be immediately recovered when it is no longer needed. This increases developer efficiency, allows Oracle to run more test cycles in less time, improves productivity, and ultimately reduces time-to-market.

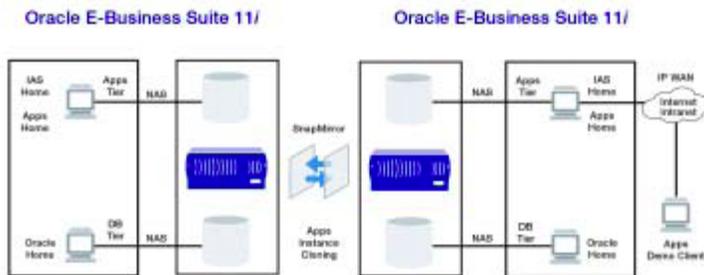
According to Jerome Labat, vice president of Operations and Infrastructure for E-Business Suite Development, "We had a vision of a centralized development environment that allowed every developer to access her or his working environment from any location in the world. To do that, you have to be able to host the storage in an efficient way over NFS; only NetApp had the right solution at the right time. Because of our tight partnership with NetApp, we've been able to transform our development infrastructure and become a more efficient, leaner machine."

APPLICATIONS DEMONSTRATION SERVICES

Applications demonstration services (ADS) is another significant business function delivered by Oracle Global IT. Hosted at the ADC, ADS uses NetApp storage to support demonstrations of Oracle E-Business Suite worldwide. By combining E-Business Suite with the advanced features of NetApp storage, ADS is able to rapidly meet the demonstration requirements of Oracle sales representatives.

A sales representative simply enters a request, and the team at the ADC configures a complete demonstration environment to the request's specifications, which can then be accessed through E-Business Suite's Web-based interfaces. Using NetApp tools such as Snapshot, SnapRestore, and SnapMirror, administrators can clone a complete environment in minutes rather than the hours the task previously took. This dramatically streamlines the whole process, making product demonstrations simpler, less expensive, and more effective.

Figure 2) Rapid provisioning of demonstration environments by Oracle applications demonstration services.



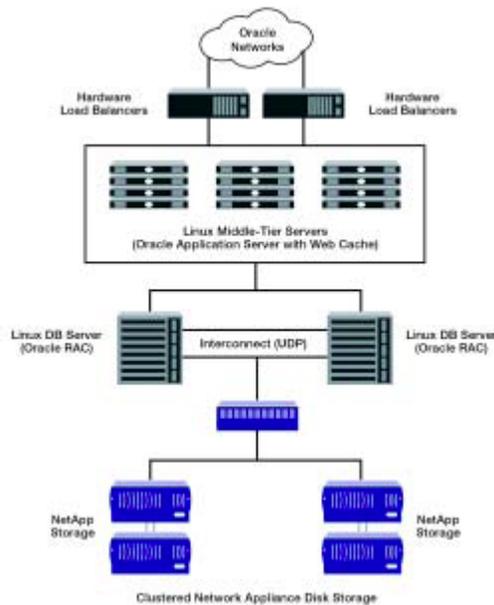
A generic environment is rapidly cloned using SnapMirror and customized to meet the requirements of each customer. The customized environment can then be accessed over the Internet.

ORACLE COLLABORATION SUITE—FILES ONLINE

Files Online is a document management and collaboration tool available to all of the 40,000 Oracle employees. Files Online uses the Oracle Files component of Oracle Collaboration Suite to efficiently manage the sharing of critical internal documents. Oracle Files provides self-service management that lets users create workspaces to develop and publish content. Users know exactly where they should be storing, sharing, and collaborating. Users also save time searching for documents and messages: with one enterprise-wide search they can find the files they need. Workflow capabilities make it easier to maintain documents and control versioning.

Global IT has provisioned NetApp storage for this important internal function. NetApp file system and storage management capabilities are perfectly suited to the front-end capabilities supported by Oracle Collaboration Suite. In fact, one of the largest single instances of Oracle on NetApp runs with Files Online.

Figure 3) Oracle Collaboration Suite—files online. NetApp provides a storage infrastructure supporting 40,000 users.



PLATFORM ENGINEERING

The Oracle Platform Engineering organization is responsible for the product build and release of all Oracle products on a wide range of OS platforms. The broad platform coverage of Oracle products creates a unique challenge for Platform Engineering, which must support multiple platform environments.

In the past, the storage infrastructure was based on vendor-specific technologies and local disk storage. It wasn't uncommon to find an individual server with 200GB to 300GB of local direct-attached storage. Reprovisioning that server to some other function required moving storage around—a very costly process. Each platform also had its own backup environment, further adding to the complexity. Platform Engineering needed a next-generation storage infrastructure that could serve all its diverse platforms, while isolating servers and storage to improve manageability and centralize backups.

According to Craig Yappert, senior director, IT Operations for Platform Engineering, "Use of NetApp technology allowed us to consolidate all of our disparate storage systems. We chose NetApp first of all for its cost effectiveness. NetApp allowed us to implement new, high-capacity storage solutions in our critical development centers utilizing very little physical space with relatively modest power requirements. We can now service our development teams with substantially reduced facilities cost.

"Even more important," continues Yappert, "is manageability. Now we can provision systems much more quickly, dramatically reducing the time it takes to prepare an environment for our development and engineering staff. Expanding storage, data backup, and data recovery—which used to take hours and hours—have all become simple operations. We're seeing faster deployment, better performance, and a significant savings in the maintenance of our storage environment."

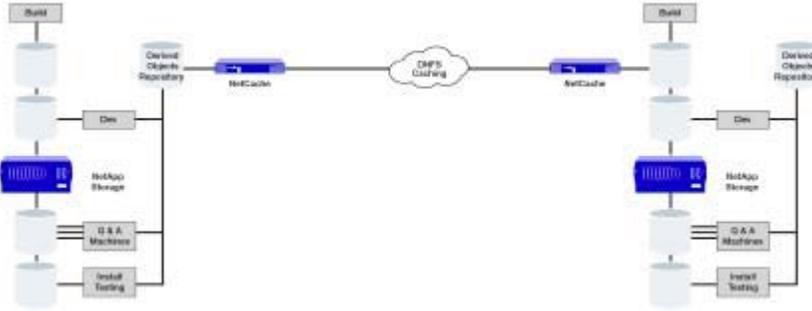
Platform Engineering also sees substantial benefit in the area of backup. Now—instead of having to back up a huge number of individual systems—backups are focused on a centralized storage pool using a single set of tools. The ultimate goal is to replace as much traditional tape backup with a disk-based backup model using NetApp NearStore® technology for critical source code, thus ensuring that data can be recovered without delay.

Platform Engineering leverages all of the NetApp technologies to meet its diverse storage needs. High-speed storage is used for the high-transaction environment, while NetApp storage products are used for

operations such as Oracle E-Business Suite testing. NetCache® allows Oracle to share code from one development center to another efficiently and transparently.

“Our development environment is distributed across multiple data centers around the United States and in India and the UK. One of the key technologies that NetApp gives us is the ability to distribute our NFS infrastructure across those development centers. With DNFS it is literally transparent to the engineering staff where their files are. That’s a significant benefit,” points out Yappert.

Figure 4) Platform engineering development environment.



NetApp storage provides rapid cloning while NetCache is used to distribute files across multiple development centers.

4 CONCLUSION: SERVICE COMPLETES THE PICTURE

NetApp technology has made a tremendous difference for Oracle by consolidating storage, increasing operational flexibility, enhancing storage availability, streamlining storage management, and decreasing total cost of ownership while delivering the scalability and performance to meet Oracle storage demands now and in the future.

Still, technology is not the end of the story. Just as important for Oracle has been the great relationship between the two companies and the support that NetApp provides. “Service has been a critical element of the partnership between NetApp and Oracle,” concludes Mitchell McGovern, vice president of Global Data Center Operations. “We have systems engineers from NetApp working side by side with our engineers to ensure we achieve the highest possible availability and scalability without sacrificing manageability. They’re just part of the family.”

For more information on how Oracle leverages NetApp technology, please see the companion success story, “Oracle Implements NetApp Storage for Its Global IT Infrastructure,” at www.netapp.com/case_studies/oracle.html