NETAPP WHITE PAPER

REDUCE IT COST AND COMPLEXITY: ENABLE BUSINESS AGILITY WITH GRID COMPUTING

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A PRACTICAL APPROACH TO GRID COMPUTING

Network Appliance provides scalable and flexible storage solutions that allow companies to approach grid computing from the storage layer. With this method, IT executives can begin to deploy the grid computing model at a rate that meets their priorities and budgets. While short term results will be delivered on a per project basis, each of these projects lays the foundation for a scalable and flexible infrastructure that can be adopted across enterprise applications, lines of business, and—ultimately—the entire company. The long-term results: improved application uptime and increased flexibility with reduced cost and complexity.

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1 THE PROMISE OF GRID COMPUTING

Information technology (IT) executives are faced with contradictory challenges. They need to increase the business value of IT with solutions that provide high application availability, efficient resource utilization, and improved business flexibility while simultaneously reducing costs. Companies have used various methods to achieve an optimal balance of these needs. However; none of them has provided the desired long-term results of simultaneously delivering flexibility, availability, and higher business value.

From an infrastructure perspective, grid computing—the ability to dynamically share resources such as servers, storage, and networking systems across enterprise applications—offers an excellent approach to achieving the long-term benefits of reduced costs through higher resource utilization using standards-based hardware and software. In addition, grid computing provides a model for effectively consolidating disparate IT systems to raise management efficiency and meet higher service-level agreements (SLAs). However, transitioning to a grid model can increase complexity, offsetting infrastructure savings. This complexity results from the fact that an enterprise's IT infrastructure is a constantly growing and evolving pool of systems, some new, some legacy, some compatible, and some incompatible.

The emergence of high-performance, standards-based servers as well as fast global networking, server and storage virtualization technologies, and adaptive enterprise application frameworks has encouraged IT vendors to develop solutions to reduce cost and complexity and to enable easier adoption of grid computing. However, many companies still hesitate to make the transition. The reason is clear. The immediate migration and system deployment costs as well as the required changes to IT processes and staff skill sets seem to outweigh the long-term benefits. How do enterprises make the transition from today's reliable but relatively inflexible and costly IT infrastructure to a grid computing model that maintains or improves reliability and increases flexibility, while reducing costs?

This white paper explores a practical approach to moving to a grid computing model using an advanced storage layer as a foundation. Network Appliance™ (NetApp®) storage solutions enable grid computing through a unified storage architecture, virtualization, integration through application-aware technologies, plus high availability and disaster recovery capabilities.

2 THE CHALLENGE OF THE MODERN IT PORTFOLIO

Global competition, financial pressures, and increasingly complex regulations require businesses to innovate quickly. Enterprise applications and associated IT infrastructure enable businesses to make timely decisions, improve business processes, and compete more effectively. However, most modern enterprise applications are deployed on a per application basis, designed to use specific storage, server, and database infrastructures (Figure 1).

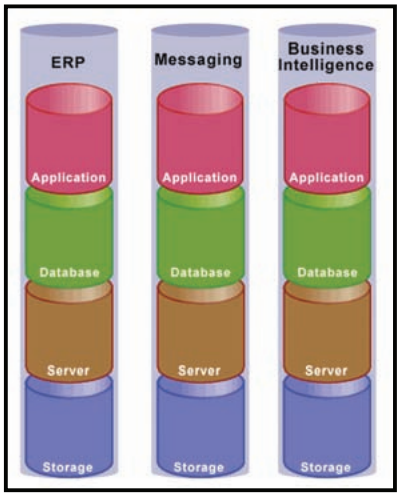

Figure 1) The modern IT portfolio.

The primary benefit of this application-driven approach to IT infrastructure is that it enables stable application performance and excellent accountability. This approach allows each application owner to guarantee service levels. The downside, however, is the creation of silos of IT systems that become increasingly complex and expensive to manage and maintain, particularly as new applications are added. To illustrate the challenges, a variety of IT skill sets are required to manage the plethora of systems in use. Resource and capacity utilization are often very low due to incompatibilities between systems. Ever-rising complexity creates a stable, but rigid environment that is difficult and expensive to modify to meet changing business needs. Ultimately, even the reliability and stability of the infrastructure degrade as the cost and complexity of integrating many disparate IT systems outweigh the benefits of the application-driven approach to IT infrastructure.

3 CURRENT COST REDUCTION METHODS AND RELATED OBSTACLES

To deal with the challenges that come from the modern IT portfolio, companies have implemented a phased approach to reduce costs. These methods, however, are not without their share of obstacles (Table 1).

Table 1) Various approaches and obstacle to reducing costs.

Phases	Cost Reduction Methods	Obstacles
Phase 1: IT Layer Optimization	Optimize costs within each individual IT layer (storage, server, database, and application) to squeeze cost out of the IT stack.	Provides diminishing returns, addresses direct costs only.
Phase 2: Shared IT Infrastructure	Increase infrastructure utilization by sharing each layer of the infrastructure stack across applications.	-Complex and unproven technologies hinder adoption. -Loss of control places application SLAs at risk.
Phase 3: Application-Aware Integration	Link applications to the infrastructure and automate the integration tasks required between layers of the application stack.	-Enabling technologies are at varying degrees of advancement, hampering interoperability. -Requires a change in IT staff roles.

The combination of the shared IT infrastructure of phase 2 and application-aware integration of phase 3 is helping companies evolve toward grid computing. However, companies implementing them must overcome both technical and organizational challenges. Understanding these obstacles and implementing plans to overcome them are keys to obtaining cost savings and IT flexibility.

PHASE 1: IT LAYER OPTIMIZATION METHOD

The most basic approach to reducing IT cost is by optimizing each layer (storage, server, database, application) of the IT portfolio (Figure 2). Specifically, companies reduce costs by negotiating volume and licensing discounts from each vendor. As a result, new system and application licensing costs for larger-scale deployments are reduced. The clear benefits of this approach are that it is relatively simple to implement, and cost reductions are immediate. However, this method has diminishing returns and only addresses direct costs, which are typically only about a third of total costs. Moreover, it does not address operational or downtime costs, which compose the majority of total costs.[1]

[1] www.netapp.com/library/ar/ar1038.pdf

Figure 2) Squeeze costs out of each layer.

PHASE 2: SHARED IT INFRASTRUCTURE

With an aggressive procurement program in place, companies have further reduced costs by shifting IT system deployment from a purely application-driven approach to a shared infrastructure approach (Figure 3).

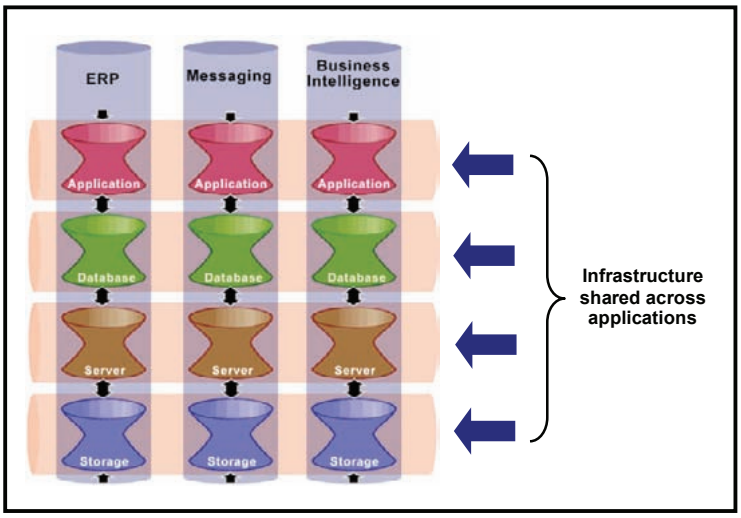

Figure 3) Reduce costs through a shared infrastructure.

At the server level, while it is still common for the largest production databases to run on specialized large-scale servers, modular, low-cost, high-performance, industry-standard servers are meeting the service level requirements of an increasingly large number of enterprise workloads. These standards-based servers, running Linux® and/or Windows® with server virtualization technologies such as VMware, enable a much higher level of sharing and deliver high server utilization rates. At the storage level, advanced storage solutions such as those from NetApp provide capabilities that enable shared pools of storage for both specialized UNIX® servers and industry standard servers. At the database level, Oracle® Database 10*g* and similar software technologies enable a shared IT infrastructure. With a shared IT infrastructure, the shared pool of storage, servers or databases is allocated across multiple applications. The results: increased utilization, more agility for the infrastructure to respond to changing business requirements, as well as lower cost and complexity.

SHARED IT INFRASTRUCTURE OBSTACLES

The technologies that provide the foundation of a shared IT infrastructure include dynamic server and storage allocation as well as automated provisioning. While these technologies exist, they are at varying degrees of advancement. For example, server-level virtualization technologies such as VMware Server, Microsoft® Virtual Server, and others are advancing quickly, but are still relatively new among enterprise IT departments. Traditional RAID storage arrays are often complex to provision and unable to support all the common storage-server communication protocols required by enterprise databases and applications.

Beyond the technical barriers, organizational issues also hinder adoption of the shared infrastructure approach. They can be vexing challenges to overcome because they frequently cross organizational boundaries. The most common issue stems from application owners' loss of control over the shared elements of their infrastructure. This loss of control frequently causes application owners to block sharing of some infrastructure components. Unless managed by the shared infrastructure owners, this loss of control can place application SLAs at risk.

PHASE 3: APPLICATION-AWARE INTEGRATION

Application-aware integration (Figure 4) leverages virtualization technologies at each layer of the infrastructure and can be extended to future applications based on service-oriented architectures (SOAs). An SOA enables applications to be developed as loosely coupled services and reused in other business processes.

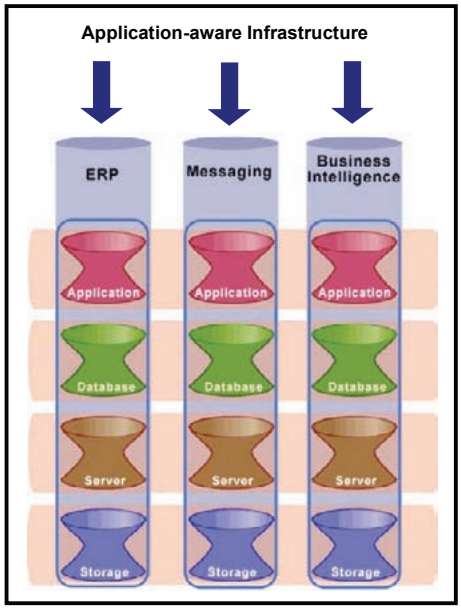

Figure 4) Application-aware integration.

As the name suggests, application-aware integration requires tight communication between applications and the underlying IT layers (database, servers, and storage), enabling the shared infrastructure to adapt readily to application needs as well as manage quality of service. Application-aware integration is the most advanced cost reduction method as it not only lowers costs but also enables the infrastructure to be more responsive to applications' needs. Deploying application-aware systems on a shared IT infrastructure magnifies the benefits.

While virtualization techniques at the server, storage, and database levels have been in use for a number of years, application-aware integration is relatively new. In its simplest form, application integration of the server and storage infrastructure enables an application administrator (such as a Microsoft Exchange messaging administrator) to manage the infrastructure through application-level tools. For storage and system administrators, application-aware integration transforms their role from being task oriented (such as provisioning a LUN or a server) to policy oriented (such as frequency and sequence of backups). Even in its

simple form, application-aware integration has shown dramatic cost savings and dramatic increases in IT productivity.

A June 2006 Mercer Management Consulting total cost comparison study found that "NetApp Exchange solutions require almost two times fewer resources to administer, monitor, and manage than"[2] comparable environments. Using application-level tools such as SnapManager® for Exchange and Single Mailbox Recovery, a U.S.-based high-tech company reduced mailbox recovery time from hours to minutes.

APPLICATION-AWARE INTEGRATION OBSTACLES

From a technical perspective, application virtualization and adaptive application technologies exist, but are still quite new and are at various stages of maturity. The result is a lack of interoperability among technologies, which can become a roadblock to realizing the benefits of application-aware integration. Products in the market today such as Fujitsu Siemens FlexFrame for mySAP Business Suite clearly show the path to highly adaptive applications based on SOAs. Looking forward, as enterprise application companies such as SAP and Oracle develop their next-generation applications on SOAs, all layers of the IT portfolio will need seamless integration to deliver end-to-end virtualization.

Beyond the technical maturity of application-aware integration, there are organizational implications to implementing this strategy as well. For example, tasks such as provisioning are replaced by tasks such as setting performance and capacity policies. This shift requires a staff that is more comfortable with assessing and predicting application demand. Similar shifts in roles need to be considered for those involved in other layers of the IT stack. In general, application-aware integration requires a deeper understanding of virtualization and automation, causing IT organizations to need less task-oriented personnel, but an increase in experienced architects and administrators who are comfortable with policy-setting objectives. This shift can polarize the existing IT organization as existing processes must be modified to take advantage of the application-aware infrastructure.

OVERCOMING THE OBSTACLES

Clearly, reducing cost and management complexity is a goal of most IT organizations, but how can the challenges described above be overcome? The organizational obstacles are as complex to solve as the technical issues, and perhaps even more so. However, recognizing these challenges is the first step in implementing the process changes required to create a shared and integrated infrastructure.

The next section describes a phased approach to implementing a grid computing model that maximizes cost savings, improves business flexibility, and increases application availability. This approach addresses the technical issues described above by using proven shared IT infrastructure and application-aware technologies that enable further deployment of emerging technologies once they mature. It addresses the organizational obstacles by phasing in changes to administrator roles and responsibilities. For many administrators, these changes are viewed as a chance to advance technically.

[2] www.netapp.com/promo/mercer/exchange/mercer-tco-exchange.pdf

4 THE GRID COMPUTING VISION

Shared infrastructure and application-aware integration technologies are key components of enterprise grid computing. Grid computing achieves higher scalability at lower cost by leveraging standards-based systems and technologies (such as Linux) as well as commodity hardware. Applications within a grid computing environment include enterprise applications such as enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM), and messaging systems.

The vision for enterprise grid computing is a model that delivers predictable and guaranteed service levels across a variety of applications, provides efficient resource utilization, and is flexible and scalable as demands on IT infrastructure change (Figure 5). In addition, grid computing is expected to be the foundation for next-generation SOA-based applications.

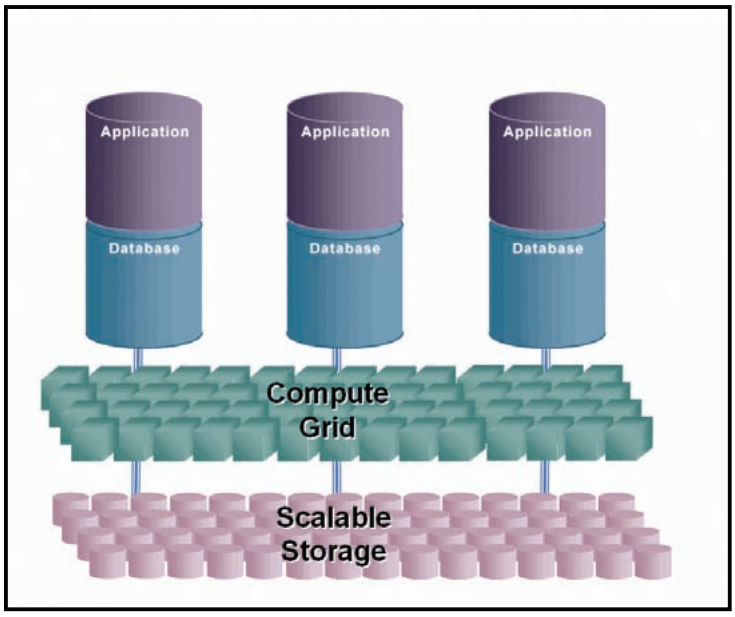

Figure 5) The vision of grid computing.

5 THE REALITY OF GRID COMPUTING

To truly implement a complete grid computing environment, companies must overhaul their entire IT infrastructure, radically transform IT processes, and deploy compatible virtualization hardware and adaptive frameworks across all applications and throughout the entire IT stack—an approach that is highly impractical and cost-prohibitive. In reality, enterprises are starting to implement the grid model on a per application basis. For instance, a company may upgrade its business intelligence infrastructure to an enterprise grid architecture for storage and servers (Figure 6), then apply the same method to the other applications that require an upgraded infrastructure. Over time, the foundations are put in place for a wide-scale enterprise grid.

From a practical perspective, storage is the layer that can be moved to the grid fastest because virtualization technologies are the most mature. For this reason, many enterprises are implementing virtual storage pools faster than they are implementing wide-scale server and database virtualization.

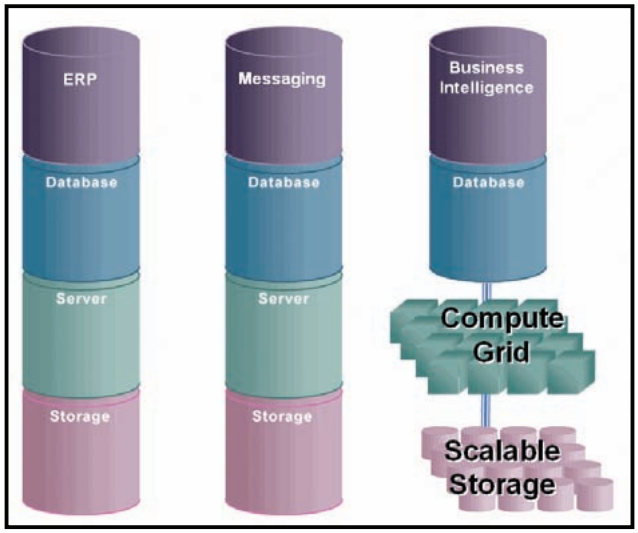

Figure 6) The grid computing reality.

6 LAYING THE FOUNDATION OF GRID COMPUTING USING A SCALABLE STORAGE INFRASTRUCTURE

A practical approach to deploying a grid computing environment is to start with a storage layer that can scale and meet application requirements (Figure 7).

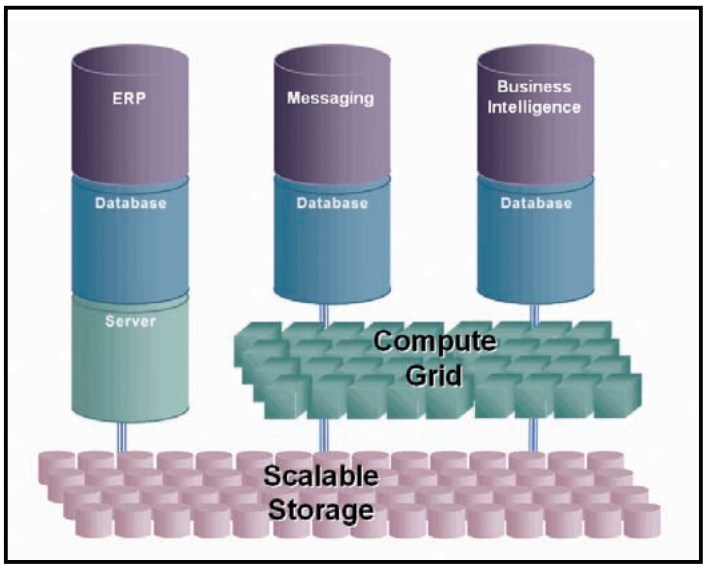

Figure 7) The scalable storage grid.

The primary reasons to begin at the storage layer are:

- The storage layer is the easiest layer in the stack to integrate into the existing infrastructure.
- Changes in the server, database, and application-level infrastructure are easily implemented on the storage grid.
- Storage is a large component of the cost of IT.
- The overall impact to personnel is positive. The shift from task-oriented to policy-oriented work is viewed as higher business value.

The bottom line: setting the foundation for grid computing starting with the storage layer offers the least disruption to IT operations and enables a company to incrementally transition to a grid computing model and immediately reduce complexity and realize a strong initial ROI.

The NetApp approach to grid computing consists of an advanced storage infrastructure that provides:

- Sharing of resources using a unified storage architecture and advanced virtualization technologies
- Cost-effective high availability and disaster recovery capabilities
- Seamless integration across all IT layers
- Simplified data management capabilities that produce real return on investment (ROI)

UNIFIED ARCHITECTURE AND VIRTUALIZATION FACILITATE SHARED STORAGE

All NetApp enterprise storage systems use a common operating system, Data ONTAP® 7G, which can simultaneously support Fibre Channel and IP storage area networks (SANs) as well as network-attached storage (NAS) on a single platform. As a result, NetApp enables both file-based and block-based applications to easily share storage resources. Applications drive the need for various levels of storage performance, availability, and server-to-storage connectivity. Therefore, multiprotocol support is a critical enabler for reducing costs and increasing flexibility and system uptime in grid environments. In addition, the common operating system lowers management costs. Storage administrators can leverage a single management environment for all tiers of storage (primary, secondary, and archive), resulting in lower training costs and repeatable processes that lead to higher productivity.

The NetApp Data ONTAP 7G operating system embeds industry-leading virtualization capabilities designed to improve storage utilization, simplify common tasks such as provisioning, improve overall system performance, and speed application development. Key features include FlexVol®, FlexClone™, and FlexShare™ technology. NetApp FlexVol breaks the physical connection between disks and applications, enabling rapid and flexible storage provisioning. With FlexVol companies can dynamically allocate, distribute, and reprovision storage based on each application's needs.

After William Beaumont Hospitals upgraded its storage infrastructure software to NetApp Data ONTAP 7G, utilization rose to 76%, reflecting a more than 50% increase in overall utilization, which had been only 43% to 50% prior to the upgrade.[3] "We need to respond quickly to user needs," states Jess Carruthers, Project Manager at William Beaumont Hospitals. "With NetApp Data ONTAP 7G and FlexVol technology, we can expand in seconds. We utilize more of our storage because we don't have so much of it in reserve, waiting for things to happen."

FlexClone allows the creation of space- and performance-efficient clones for rapid application testing, development, and QA. The results are reduced test and development costs and faster time to market. To ensure service levels, the relative performance of each storage volume can be managed using NetApp FlexShare, allowing performance prioritization for critical applications.

The unified architecture and virtualization technologies of NetApp storage allow companies to deploy an enterprise storage grid infrastructure that combines SAN and NAS and a mix of workloads such as decision support systems, collaboration, transactional databases, and file services. As applications are added to the grid environment, storage can be easily provisioned or reallocated based on business needs. The results are scalability, flexibility, improved uptime, and higher storage utilization.

[3] www.netapp.com/library/cs/beaumont.pdf?xCountry=US&xLanguage=EN

ENABLE DATA PROTECTION WITH COST-EFFECTIVE HIGH AVAILABILITY AND DISASTER RECOVERY

Since applications are the lifeblood of an enterprise, unplanned downtime must be minimized. By design, a grid-enabled infrastructure enables resource availability; however, unplanned downtime can occur due to operational, application, and component failures as well as site failures and regional disasters. The grid infrastructure must provide intrinsic high availability and provisions for disaster recovery for applications that require them. Comprehensive NetApp storage technologies address all causes of unplanned application downtime and include solutions for:[4]

- **Recovering from operator and application errors.** Snapshot™, SnapVault®, and SnapRestore® technologies enable fast recovery of online and archived application data.
- **Maintaining application uptime.** NetApp SnapManager software provides integrated backup and recovery for Oracle and Microsoft (Exchange and SQL Server) applications, allowing application administrators to perform frequent and efficient backups in seconds and complete full data recovery in minutes rather than hours or days.
- **Recovering from disasters.** Flexible software such as MetroCluster (Sync) and SnapMirror® (Async) allows synchronous, semi-synchronous, and asynchronous data replication to a remote location.

Ford Otosan, a joint venture between Ford Motor Company, and Koc Holding, Turkey's leading conglomerate built on NetApp for faultless disaster recovery.[5] With its facilities located in an area hard hit by a 1999 earthquake, Ford Otosan initiated a disaster recovery and business continuity project that required security and immediate uptime of its business in the event of any type of failure.

Ford Otosan deployed a NetApp solution that addressed the company's stringent availability requirementsand includes the use of Snapshot copies, MetroCluster, SnapMirror, and SnapVault software running on primary and secondary storage systems. Since this deployment, Ford Otosan has experienced 100% data availability. "Our ability to maintain operations 24x7x365 keeps our manufacturing facilities on schedule, helping us serve the demands of thousands of drivers worldwide," states Faik Kutner, Operations and Network Assistant IT Manager, IT and IS Department, Ford Otosan.

NetApp high availability and disaster recovery solutions provide the storage foundation for a grid environment that is both cost-effective and flexible, enabling companies to protect more of their business applications. In addition, NetApp archiving, security, and compliance solutions allow application data to be classified, migrated, secured, and archived to lower cost secondary storage systems.

INTEGRATION AND SELF-SERVICE DATA MANAGEMENT IMPROVE PRODUCTIVITY

The NetApp approach to grid computing not only relies on a scalable storage infrastructure but emphasizes data management along with disk management capabilities. Innovative data management software enables seamless integration with servers, databases, and applications, including technologies from Microsoft, Oracle, SAP, and Symantec as well as operating systems such as UNIX, Linux, and Windows.

The NetApp manageability software family offers integrated data management capabilities that empower application, database, server, and storage administrators to control their environments using tools that enable self-service data management. Administrators are able to perform relevant tasks themselves, making tasks such as provisioning, backup, restore, and archiving much more efficient. In addition, true cloning functionality with NetApp FlexClone enables administrators to instantly replicate storage volumes without consuming additional storage space until cloned volumes are changed. FlexClone improves productivity of application testing, development, and upgrades.

Blackboard, a leading provider of education enterprise software applications and services was able to shorten time to market by 75% due to NetApp FlexClone technology. In the past, Blackboard experienced lengthy data replication process in its test and development environment, taking up to 30 hours. NetApp

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[4] www.netapp.com/ftp/app-availability-wp.pdf
[5] www.netapp.com/library/cs/ford.pdf?xCountry=US&xLanguage=EN

FlexClone technology allowed developers to create working copies of preproduction data. “Using FlexClone technology, we can clone a 2.5TB database quickly, allowing our developers to start working in an hour instead of two days,” said Josh Parker, Storage Architect at Blackboard. “Developers can move to different versioning of their projects, move seamlessly between the versions, and destroy and recreate new versions as necessary.” [6]

These self-service data management capabilities ensure application data availability, speed application time to market, and improve productivity, enabling companies to reap additional benefits within a grid-enabled computing environment.

SIMPLIFIED DATA MANAGEMENT PRODUCES REAL ROI

The single NetApp operating system, which supports multiple protocols while providing advanced data management capabilities, has been proven to lower the total cost of ownership and produce real return on investment. Several cost comparisons[7,8,9] conducted by Mercer Management Consulting demonstrated that NetApp solutions in combination with various enterprise applications vendors, including SAP, Microsoft, and Oracle, consistently delivered 30% to 40% lower overall costs compared to traditional modular disk arrays and over 60% lower costs than frame arrays (Figure 8).

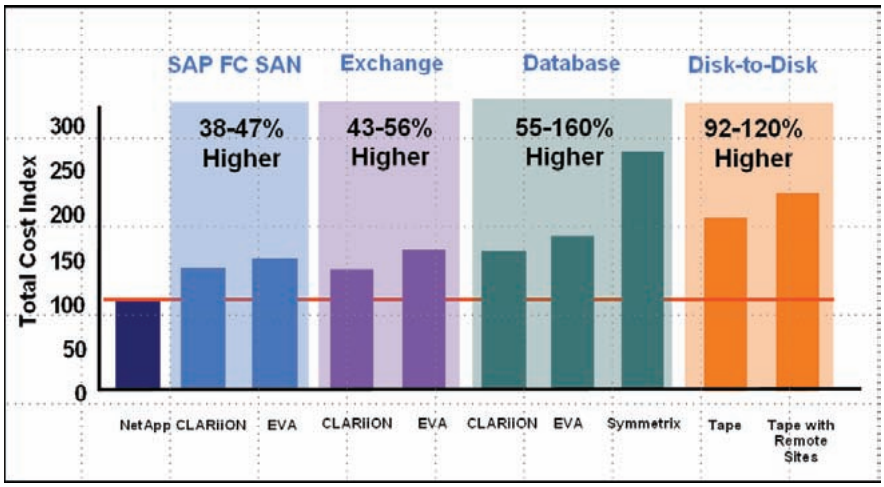

Figure 8) NetApp lowers TCO.

For example, a March 2006 Mercer Management Consulting total cost comparison for enterprise database environments found that “a Network Appliance solution deployed in a Fibre Channel SAN environment is 36% less expensive than a typical EMC CLARiiON solution, 42% less expensive than a typical HP EVA solution, and 62% less than a typical EMC Symmetrix solution for the same size database.”[10] The report went on to conclude that the NetApp operating system, Data ONTAP 7G, offers further benefits as a result of FlexClone and FlexVol.

[6] www.netapp.com/library/cs/blackboard.pdf?xCountry=US&xxxCountry=7516FD43ADAA5E0B8A65A672C39845D2&xLanguage=EN&xxxLanguage=AA85F1840E282D8A8304DBC2C0D7C9B2&Customer=NetApp
[7] www.netapp.com/library/ar/ar1038.pdf
[8] www.netapp.com/promo/mercer/exchange/mercer-tco-exchange.pdf
[9] www.netapp.com/go/sap/mercer-netapp-sap-cost-comparison.pdf
[10] Mercer Management Consulting, www.netapp.com/library/ar/ar1038.pdf

7 CUSTOMER SUCCESSES

TELSTRA DELIVERS "STORAGE EVERYWHERE" MODEL USING NETAPP

Telstra, Australia's leading telecommunications and information services company, needed a more responsive storage infrastructure to meet its development and time-to-market goals. It became too challenging to manage and operate nearly 6,000 servers and storage assets, hindering the timely delivery of capacity and performance to its users.

The Telstra and Network Appliance teams designed and implemented the Telstra Omnipresence platform, which is an enterprise storage solution that leverages the NetApp unified storage technology to simultaneously support NFS, CIFS, and iSCSI protocols as well as software "to consolidate multiple pools of data storage into virtual partitions for simplified administration and improved storage resource utilization."[11]

"We can activate new storage within days or even within hours in many cases. The process is templated, repeatable, and in large part automated … we found that the high-performance-application I/O demands were twice the original estimate. We activated additional storage and resolved the problem almost immediately for our front-of-the-house business users—that ultimately means faster time to market."

- Andrew Crabb, Group Manager, Data and Storage Solution Centre, Telstra

CIBA SPECIALTY CHEMICALS GAINS FLEXIBILITY WITH NETAPP

Ciba Specialty Chemicals is a leading global company, headquartered in Basel, Switzerland, dedicated to producing high-value effects such as adding performance, protection, color, and strength to plastics, paper, automobiles, personal care products, and more.[12] The company was challenged with keeping up with the high data growth from e-mail and database environments, which were primarily stored on direct-attached storage. Increasing storage capacities required time-consuming procedures and service interruptions for users.

Ciba chose NetApp not only for its single platform support for multiple protocols and access methods but, more importantly, for its exceptional flexibility and simplicity. NetApp Data ONTAP 7G with FlexVol technology enabled Ciba to easily allocate and change the capacity of individual projects. This dynamic provisioning capability simplified capacity allocation and reduced wasted capacity previously associated with overprovisioning. This thin provisioning capability enabled the company to virtualize storage resources and allowed maximum utilization of storage assets.[13]

"In contrast to the other vendors we considered, NetApp convinced us with highly flexible storage management … The NetApp solution simplifies administration and has helped us to significantly reduce costs."

- Thomas Enderli, Head of Storage and ERP, Ciba Specialty Chemicals AG

SOUTH CHINA MORNING POST REPORTS LONG-TERM FLEXIBILITY AND SAVINGS

The South China Morning Post, the flagship publication of the SCMP Group, is Asia's premier English-language newspaper. It needed a storage solution that could keep pace with its 30% annual data growth. Performance, reliability, ease of administration, and low TCO were the decisive factors. On-site testing with NetApp storage systems, which involved the transfer of production data, yielded results that included a 20% increase in performance since standardizing on NetApp. In addition, South China Morning Post minimized training and management costs and benefited from on-the-fly scalability.[14]

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[11] www.netapp.com/library/cs/telstra.pdf?xCountry=AU&xLanguage=EN
[12] www.cibasc.com/index/cmp-index/cmp-about.htm
[13] www.netapp.com/library/cs/ciba.pdf?xCountry=US&xLanguage=EN
[14] www.netapp.com/library/cs/scmp.pdf?xCountry=US&xLanguage=EN

"Standardizing our Oracle infrastructure on NetApp ensures production stability and management simplicity for a very low TCO. The enterprise-class NetApp architecture delivers the performance our users require and enhances our flexibility to grow and compete in a business environment of rapid change."

- Philip Wong, Assistant Director, Technology SCMP Group

ORACLE PARTNERS WITH NETAPP TO ENABLE A FLEXIBLE GRID ENVIRONMENT[15]

Oracle is the world's largest enterprise software company, specializing in database, middleware, and business applications for managing and automating processes and other critical business infrastructure software. In the late 1990s, Oracle's internal IT environment consisted of a highly distributed environment of more than 50 data centers for its education, ERP, and CRM-based systems. Spending in this environment became so high that an alternative was needed. Fortunately, the arrival of Internet-based applications enabled Oracle to standardize and consolidate on a Web-based architecture. It then became practical for Oracle to extend the standardization to its servers and storage systems. The introduction of Oracle Database 10*g* offered new capabilities to enable a flexible grid computing environment. However, to make the grid vision a reality, Oracle needed a scalable and flexible storage infrastructure. With unified storage solutions capable of delivering data regardless of access method (NFS, FCP, iSCSI), NetApp was the clear vendor of choice to meet the storage needs of Oracle.

Today, NetApp supports the storage needs of the Oracle internal IT division as well as its Oracle On Demand business (which stores more than 6PB of data on NetApp storage systems in its Austin Data Center). Oracle has realized numerous benefits from adopting a grid architecture, including lowering overhead costs associated with storage and data management activities by 50% as well as an overall savings of $2 billion in a span of five years. Oracle leveraged storage virtualization technology using NetApp FlexVol to enforce processes that enable rapid provisioning and decommissioning of systems from one purpose to another, resulting in higher asset utilization. The flexibility and scalability benefits of this architecture were further exhibited after the acquisition and integration of 14 companies, including PeopleSoft.

"NetApp technology provides flexibility of repurposing, ease of overall management, ease of maintenance, strong performance per megabyte data rate transfer, easier integration into existing technology stack, and a commitment to future improvement that increased performance while decreasing the data center footprint."

- Bill Weils, Senior Director, Oracle Global IT Command Center

[15] www.netapp.com/go/techontap/tot-march2006/0306tot_winningwar.html

8 CONCLUSION

Organizations have used various methods to reduce IT cost and complexity, including IT layer optimization, development of shared IT infrastructures, and adoption of application-aware technologies. These approaches face both technical and organizational obstacles that hinder companies from achieving further progress.

Enterprise grid computing leverages shared IT infrastructure and application-aware technologies to further reduce cost and complexity. Moving to a grid architecture requires careful planning. Which storage solution to implement is a critical component of overall success. A grid-capable storage infrastructure must deliver multiprotocol support for all major operating systems as well as tiered storage and advanced virtualization techniques within a common operating environment. Furthermore, the storage platform must integrate tightly with leading applications and have the capabilities to support next-generation SOA-based applications.

NetApp offers a highly scalable and flexible storage infrastructure that can serve as an ideal foundation for a grid computing environment. The benefits of an advanced storage infrastructure based on NetApp technology include:

- A single, unified architecture
- Advanced virtualization
- Application-aware storage software
- Proven high availability
- Cost-effective disaster recovery
- Simplified data management

Using NetApp storage systems as the foundation for grid computing, companies can reduce infrastructure cost and complexity, enabling business agility. The immediate benefits include increased business value from the IT infrastructure, higher application availability, and improved flexibility to enable business change. Looking forward, the NetApp approach to simplifying data management provides a solid base for deploying upcoming SOA-based applications.

MORE INFORMATION

NETAPP SOLUTIONS

www.netapp.com/solutions

RUNNING ON THE GRID: ORACLE MAGAZINE ARTICLE ON THE AUSTIN DATA CENTER

www.netapp.com/ftp/oracle-austin-datacenter.pdf