Sun StorEdge™

5210/5310 NAS APPLIANCE STORAGE CONSOLIDATION AND WEB SERVING

White Paper
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Introduction

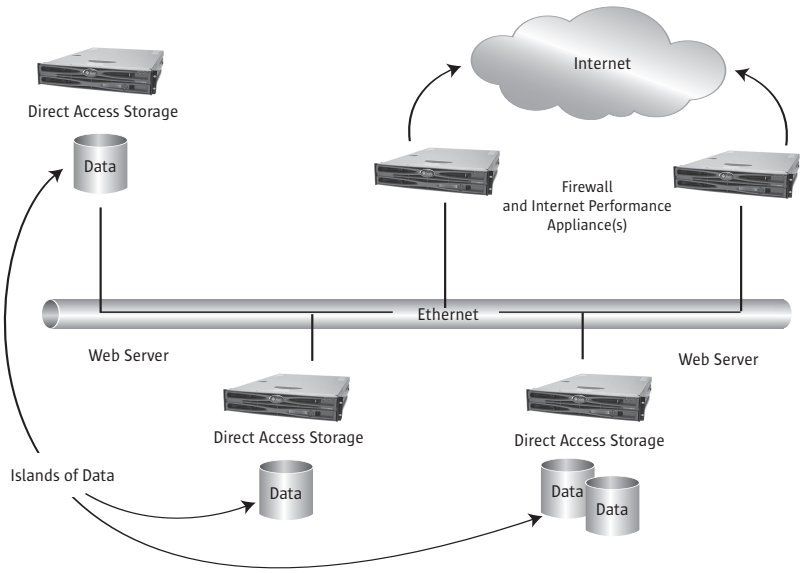
This paper provides a description of implementing a network attached storage (NAS) consolidation architecture in a Web Serving environment. Information Technology (IT) organizations, when initially implementing a web serving environment, often deploy multiple web servers as quickly as possible due to time to market pressures, requiring duplicative processing and storage resources. This causes excessive system, application and storage administration overhead as well as significant risk associated with deployment. These can be easily avoided by implementing a storage consolidation architecture utilizing the Sun StorEdge™ 5000 NAS Appliance.

The Sun StorEdge 5000 NAS Appliance is a simple, fast, reliable and affordable implementation of a NAS appliance. The intended audience for this document is system, web application and/or storage administrators, and requires a basic working knowledge of UNIX, NFS, Microsoft Windows, CIFS/SMB, RAID, Web Application deployment and the Sun StorEdge NAS Appliance.

Web Site Deployment

Historically, web serving environments range from small 'closet data centers' to large enterprise data centers. Web Serving environments have many things in common. Typically, web serving environments start out with development of the web site on purpose-built servers configured to provide key elements of the web site. Often, each server is initially deployed with Direct Access Storage (DAS) or sometimes on a more expensive Storage Area Network (SAN).

Figure 1. Web Serving architecture prior to Storage Consolidation with Islands of Data.



As usage of the web site grows, web servers are added to the computing infrastructure along with more attached storage, duplicating data from the original web servers. All the while, increasing the probability of error as more web servers with their associated duplicated storage are added to the web site to preserve web transaction performance. Network firewall appliances are used to firewall the web site as well as to distribute web site traffic to the multiple web servers with duplicated content.

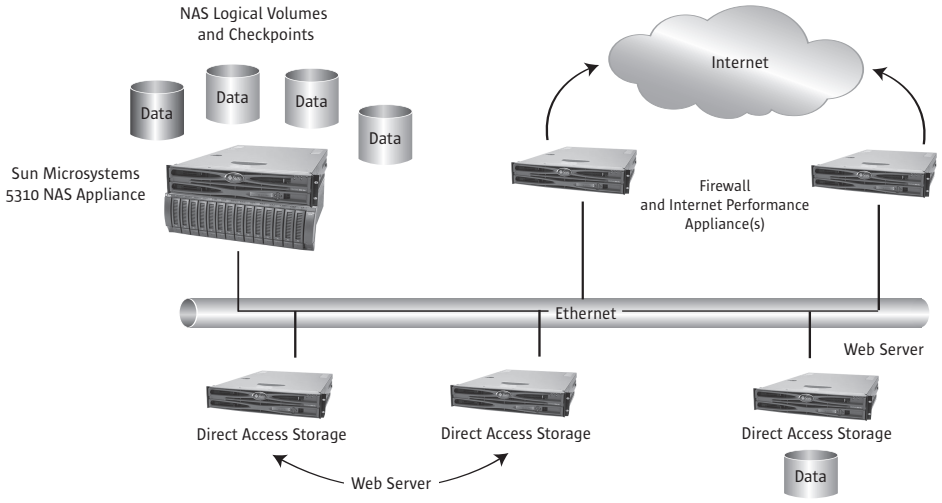
This approach to resolving problems associated with exponential web transaction and storage growth presents problems in two different areas:

First, 'islands of data', as illustrated in Figure 2, are introduced into the web site. With duplicative servers and storage, each time the web site is updated or changed, all content must be copied exactly to preserve consistency among the servers as well the appearance of the web site to the public. This increases the probability of error during web site cutover since content must be duplicated as well as any programmatic materials that are being implemented into the web site. Any errors during distribution of the updated web site introduce risk associated with loss of web site availability.

Second, from an architectural perspective, the Total Cost of Ownership (TCO) of the web service begins to increase since the the infrastructure is being duplicated to provide the essential services to the web site customers. Actual effectiveness of the web servers depends not only on the web servers' computational performance but it's ability to perform Disk I/O. In some cases, web servers may have available computational headroom, but because they will not be able to serve the amount of DAS/SAN storage, some of the servers may be retired prematurely increasing overall TCO.

Note – I/O capability can be limited due to lack of HBA slot and/or LUN size due to OS constraints which in turn effects the performance in the web site.

Figure 2: Web Server based NAS Storage Consolidation



NAS Storage Consolidation

The alternative is to implement web servers as demand requires while consolidating content.

Simplified Storage

Centrally locating data offers several advantages: Content and storage management are simplified by eliminating redundant content. Additionally, data can be organized using the built-in logical volume manager on logical volumes made available to each web server as it is added to accommodate growth.

This logical approach allows data to be shared between the multiple web servers, greatly simplifying the content management task.

Data Protection and Availability

The unique capabilities of the Sun StorEdge 5210 and 5310 NAS Appliances offer a Checkpoint feature which can be used to create logical copies of the entire web site. This allows the web site updates and changes to be made without interfering with web service operations.

It also provides a method of configuration management of all elements of the web site. The built in Volume Manager StorEdge NAS OS allows the web site administrator to allocate additional volumes for web site test purposes. After testing is complete, these volumes with a simple web based GUI function can be renamed to replace the current production web site volumes. If it is necessary to return the web site to it's former state, this same procedure can be accomplished in reverse to recover the web site almost instantaneously.

Backup of the web site is easily accomplished using the Java based web GUI deployed in the StorEdge 5210/5310 NAS Appliance. The Checkpoint feature provides a logical backup of the web site, enabling instantaneous restore in case of accidental data erasure or erroneous update. Physical backup of the web site can then take place using these Checkpoints as a point in time copy. Typically, the backup tooling requires this Checkpoint or snapshot type of feature and the Sun StorEdge 5210 or 5310 NAS Appliance provides this feature in concert with commercially available industry standard backup/restore tools such as Veritas NetBackup and Backup Exec, Legato Networker and Bakbone Netvault. The Sun StorEdge 5210 or 5310 NAS Appliance includes an NDMP Backup/Restore agent at no charge and is imbedded in the StorEdge NAS OS. This agent is certified to function with the aforementioned commercially available backup/restore tooling.

Note – The terms 'snapshot' and 'checkpoint' are used synonymously.

Cost Savings

Web server consolidation on NAS decreases TCO through simplified administration and elimination of redundant content while also providing a means of non-intrusive web server upgrades.

TCO is decreased by reducing the purchase of duplicative storage for each of the web servers. Here, the NAS Storage and data content is shared among all of the production web servers as well as any Development and Test web servers used in the ongoing evolution of the organization's web site. Labor costs are significantly decreased during ongoing web site development since a duplicate storage infrastructure does not have to be purchased and maintained. Development and test can take place on logical volumes allocated and prepared for production usage on the Sun StorEdge 5000 NAS Appliance.

As development and test continues the Checkpoint feature can be used to 'versionize' the web site and establish web site milestones throughout the development and testing phases prior to cutover to production. This increases the efficiency and accuracy of web site testing and shakedown prior to the newly developed web site content cutover into production. Finally, this type of approach to deploying a web site architecture decreases significantly the probability of error during production cutover of the web site, eliminating opportunity costs associated with loss of web site availability.

Solution Components

1. One or more Sun StorEdge 5210 or 5310 NAS Appliances, depending on web service levels required. Benefit: superior data availability and protection in addition to reduced costs from storage consolidation.
2. One or more Sun Microsystems Web Servers to provide the web site with superior performance and reduced TCO.

Conclusion

This document provided information regarding implementing a NAS based storage consolidation paradigm utilizing the Sun StorEdge 5000 NAS Appliance. It discussed the benefits to deploying this type of storage architecture in a Web Serving environment. Please feel free to contact Sun Microsystems, Inc. to inquire about the Sun StorEdge 5000 NAS Appliance and how it can help you consolidate storage, ease administration and reduce your TCO.

Additional Information:

For more information, refer to the following URLs:

http://www.sun.com/storage/5000

http://docs.sun.com/app/docs/prod/storedge#hic

Sun Microsystems, Inc. Network Circle, Santa Clara, CA 95054 USA **Phone** 1-650-960-1300 or 1-800-555-9SUN **Web** sun.com