



Coffee Break:

Improving Storage Expansion for Servers and Applications

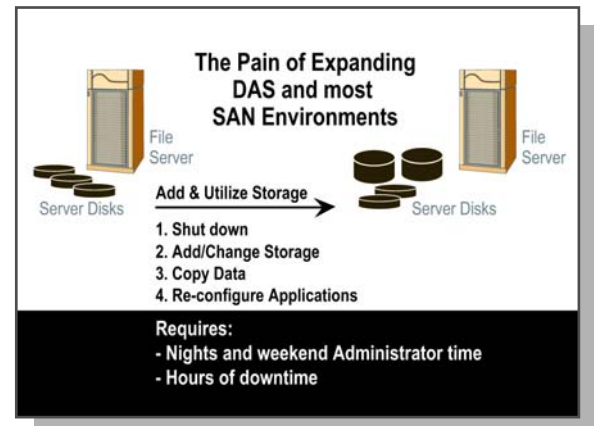
Ease expansion by shifting the work to the storage system.

Call it growth, scaling, or expansion – whatever you call it, increasing your storage resources often strikes fear and loathing in the heart of the IT administrator. It conjures up visions of downtime, extra management tasks, frustrated users, and working nights and weekends. In addition, since capacity and performance are intimately connected, increasing storage resources can require balancing changes that affects the entire the SAN.

A solution that can scale storage completely – online, without downtime or disruption – makes growth painless and eliminates the need for over-provisioning.

The Pain of Expanding

The challenges of expansion stem from multiple factors – in particular, your storage architecture, hardware, operating system, applications, and operational requirements. For example, when adding a disk in a direct-attached storage (DAS) configuration, the first step is to get a screwdriver – which means you must shut down applications and turn off the system (assuming there are slots for additional storage available). Once you have added the new disk, the applications are still using the original storage, so you need to stop the applications, copy and divide the data manually between drives, reconfigure the application so it is aware of the changes, and then re-start. This process is disruptive and time consuming – and as a result, many IT shops over-provision storage up front in hopes of avoiding the expansion process altogether. This plan costs money and wastes resources, but many IT managers find it the lesser of two evils.



In a storage area network (SAN), expansion is only slightly easier – at least it takes the screwdriver out of your hand. However, you are commonly still forced into offline copying and balancing operations.

Expanding your storage can also create performance bottlenecks. After adding disks, will the controllers be able to handle the additional throughput? Will your cache handle the extra capacity? What about SAN bandwidth into the storage arrays? Have you added network links? With most solutions, no additional controllers, cache, or network links are added, so these components become over-burdened and require re-balancing. The result: performance suffers.

Select the storage solution and operating system that offer you the most functionality and least disruption, whether you are adding storage for existing applications or new ones.

Qualifying Questions for Storage Expansion

Can all resources be expanded online, without downtime or disruption?

Is the process of expanding storage resources and putting it into use completed online, or will some management tasks need to be completed offline?

When adding disk drives, are controllers, capacity, and network links also scaled?

When adding capacity, how will performance be affected for existing applications?

In a SAN, will each application environment require individual load balancing, or can that be done automatically?

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Expansion for New and Existing Applications

There are two general reasons for expanding your storage capacity. First, you may expand when your current system is running well but you want to add storage to support new applications. In this scenario, you may not have to shut existing applications down and reconfigure – you can just add the storage and deploy the new application. However, as mentioned before, additional storage places additional burden on your controllers, cache, and network links, so re-balancing is required because of these shared resources – causing planned downtime and after-hours administrative tasks.

The second scenario is when you want to add resources to existing applications to improve performance or increase capacity. Because applications are running, online vs. offline expansion and re-configuration becomes critical. The ability to add disks online is helpful, but you still have to shut down applications to manually reconfigure and load balance storage – which is both inconvenient and counterproductive.

Who's Doing What?

It's important to understand exactly what steps are involved in both adding storage and making the additional resources useful to applications. Some storage vendors talk about adding capacity online, but only mean you can start the process online (such as adding a disk). Finishing the process – having the storage resources in use by applications in a balanced manner – requires downtime for manual reconfiguration and load balancing.

Be sure to ask questions regarding expanding your solution, and ask for detailed answers – including how various functions are implemented. It's important to understand what the products specifically do on their own vs. what must be done by the vendor's services staff or your IT staff. When you scale infrastructure, you want more of everything – capacity, performance, and bandwidth – but you don't want more work.

Solution: Shift The Work To The Storage System

What administrators really need is more capability than is offered by most SAN vendors. Vendors may say that you can add storage and place it into production online, while only meaning that disks can be added to a cabinet – rather than put into expanded and balanced application use – online. Unless you ask probing questions this distinction may not be apparent.

With EqualLogic PS Series arrays, expansion provides additional components without adding management tasks. Each unit provides not only disks, but also controllers, cache, and network links, to avoid bottlenecks. In addition, PS Series arrays automatically perform the management tasks required – including configuring RAID and load balancing data across spindles and arrays to optimize performance – all online. The page-based architecture provides for expansion to be started and finished during running operations without downtime or interruption. Now, growth can be truly painless.



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