



Acquiring Storage from IBM in a Difficult Economy

Spotlight

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27 October 2008

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It's an old saw, but it's time once again to do more with less. Regardless of what the economic pundits say, it's safe to assume that we live in recessionary times. So how, then, can IT Administrators manage storage growth with fewer resources?

Here are a few suggestions out of a number that we could propose:

1. Extend the useful life of storage arrays by acquiring modular storage.
2. Explore leasing options as lower-cost alternatives to purchasing storage infrastructure.
3. Insert a virtualized storage controller in the data path between application hosts and storage arrays to increase capacity utilization.
4. Look into de-duplication of primary data storage.

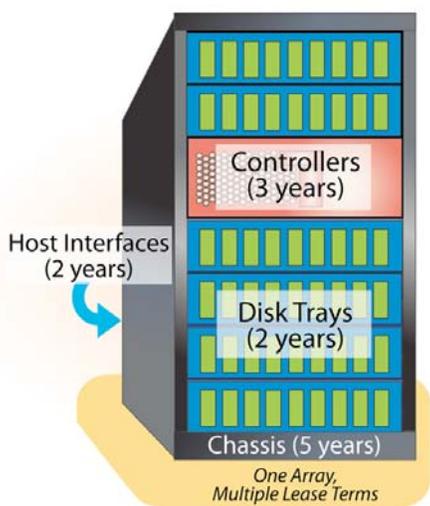
In this report we focus on how IBM customers can combine modular storage with flexible leasing options as a way to both reduce the cost of storage capacity acquisitions over the next few years, and extend the useful life of storage arrays. We also touch briefly on storage virtualization as a way to boost capacity utilization rates from an average of 30% to 60% or better.¹

More Modular Now Than Ever

In spite of the appearance of increasingly modular disk storage array architectures, most IT administrators still see the useful life of a storage array as a three-year proposition. The traditional view is that since storage arrays are essentially mechanical devices (full of spinning disks), they can't be expected to perform reliably in a production data center setting for longer than that. Additionally, technology advances quickly. Technical obsolescence is measured in two- to three-year increments.

Array modularity hasn't really changed these perceptions in the minds of IT administrators. That's odd when one considers what technologies within the array are most likely to change over time or need replacement. These include:

- Host interface cards
- Internal processors and controllers
- Disk drives
- Cache



¹ For a discussion on de-duplication of primary data storage, see our [NetApp Enables Datacenter Transformation](#)

What really doesn't change is the array chassis. One can slide modular components in and out of the chassis pretty much at will. In fact, the array chassis can remain in place and in productive use for many years so long as its modular components can be replaced as needed to either maintain a consent level of reliability or keep pace with technological advancement.

We focus on modular design as a way to extend the useful life of an array for a reason. The world's economic climate has changed dramatically in the last few months. Credit availability is uncertain even for the most credit-worthy borrowers. The economic outlook is uncertain at best. The result, we believe, is that CFOs will rein in spending and conserve cash. That means that if IT administrators are to keep pace with storage capacity demands that continue despite an economic downturn, they will have to find alternatives to the normal capital equipment acquisition process in order to bring in new capacity.

Equipment leasing is now an attractive alternative for storage acquisition. One can find equipment lessors that will inject a residual value of a storage array into the calculation of the monthly lease rate. For the IT administrator, this means that the cost for using an array will actually be less on a net present value (NPV) basis than outright purchase of the array.

But what does equipment leasing have to do with modularity? The computer leasing industry has evolved over many years to a point where leasing vendors are now adept at building customized flexibility into an operating lease.² If the array chassis has a useful life of five years, then it can be leased for a five year term. If, on the other hand, the modules (disk trays, controllers, etc.) only have a three-year life cycle, those can be put on a three-year equipment schedule and made part and parcel of the same lease.

² Here we use the Financial Accounting Standards Board (FASB) Rule 13 definition of an operating lease: it's an operating lease if the NPV of the firm term lease stream is less than or equal to 90% of the purchase value of an asset. This assumes a residual value injection of 10% or more.

Here we look at IBM's recently announced DS5000 disk array as a stand-alone array, and in conjunction with IBM's SVC as an example of storage subsystem modularity. We add to that a discussion of how leasing options can be applied to bring acquisition alternatives to the table, and use IBM's Global Financing leasing program for DS5000 as an example of that.

DS5000

DS5000 functionally replaces the DS4800. IBM claims a 30% increase in I/O operations per second (IOPS), a 60% reduction in response time, and a 250% increase in throughput (MB/sec) as compared to the 4800.³ In terms of software, the DS5000 will support all of the partitioning, data copy, data migration, and remote mirroring functions supported on the DS4800.

However, for the purpose of this discussion we highlight the DS5000's advanced modularity. Modularity in storage arrays has lost some of its cachet lately, but that hasn't stopped vendors from introducing increasingly modular storage platforms. Here, modularity is really defined by an ability to upgrade and/or replace individual array components non-disruptively and as needs dictate. DS5000 modular components include:

- Dual active, hot-swappable controllers with:
 - Intel Xeon 2.8 GHz processor
 - Dedicated, mirrored, battery-backed, cache (8-32 GB)
 - Fully-redundant active-active I/O path from host to drives with automated failover
 - Hardware-assisted RAID 6
- Power supplies and many non-disruptive firmware upgrades
- Host interface cards—up to 16 4 Gb/sec Fibre Channel (FC) ports on first release, with support for 8 Gb/sec FC and 10 Gb/sec Ethernet/iSCSI in future releases

³ Performance claims are based on SPC-1 and SCP-2 benchmarks.

- Disk modules—up to 256 drives per array (intermixing FC and SATA drives) with support for 448 drives in future releases
- Redundant channels to back-end disk—up to 16 4 Gb/sec FC

Each of these modules is field-replaceable, but more important for the purposes of this discussion, each can be looked at as separate assets or aggregated assets from the standpoint of a lease. The typical computer infrastructure lease consists of a master lease agreement to which multiple equipment schedules can be attached. The master lease sets out the terms and conditions. Each equipment schedule addresses the actual asset(s) to be leased, the lease term, and the monthly payment. An array chassis with its associated serial number can have one lease term, five years for example, while the modular components can be placed on additional schedules with shorter lease terms. This structure allows an IT administrator to replace the modular components in two to three-year life cycles, while maintaining the lease on the chassis and array serial number for a longer term.

To help underline the perception of extended useful life, IBM has also upgraded the warranty provisions for the DS5000 vs. the 4800. The new DS5000 warranty provisions are essentially the same as those offered on the higher-end DS8000.

Adding the SAN Volume Controller

IBM's SAN Volume Controller can add a virtualization layer above the DS5000. Customers may want to do this for at least two reasons:

- The SVC supports storage pooling and thin provisioning, a way to provision storage capacity to applications on an as-needed basis without pre-allocating blocks of unused storage. Thin provisioning greatly accelerates the capacity provisioning process and enables IT administrators to increase overall array capacity utilization rates from an average of 25% to over 60%.
- The SVC supports the attachment of installed arrays from other vendors plus the DS5000. Therefore, the benefits of virtualization can be

applied to these arrays as well. SVA's storage pooling and thin provisioning functions, IT administrators can boost capacity utilization rates up to 60% on these arrays as well.

The Leasing Connection

Leasing can be a good fit with modular storage if the lease is constructed properly. First, as we have already mentioned, one has to separate conceptually the modular components from the array chassis. One can lease the array for five years for example, but with built-in options to upgrade and/or replace the modular components during the 5-year period. By exercising these replacement/upgrade options, the modular components are in fact leased for shorter periods of time—perhaps as little as 18 months. As an IT administrator, you would get the advantage of a lower lease rate by going with a longer-term contract.⁴ If the lease is so constructed, it is possible to have the payment stream remain level during the full term of the lease while taking advantage of the upgrade/replacement options.

There are other options potentially available depending on the leasing company:

Purchase and take-out of already installed arrays – As a general rule, computer leasing vendors offer a number of options regarding the disposition of the storage array(s) to be replaced. The leasing vendor can offer to buy the displaced storage hardware at some value negotiated between buyer and seller. The price is paid in cash or can be applied to the lease transaction as a way to lower the monthly payment on the new array. If the displaced array is of little or no value, but must be securely disposed of, the leasing vendor may offer those services.

Purchase and leaseback of installed hardware – It is also possible to raise working capital by selling installed hardware to a leasing vendor and leasing it back for some predefined term. This can be done in conjunction with new hardware coming in to be leased, or as a mechanism simply aimed at

⁴ The longer the term in general, the lower the monthly payment assuming all other variables remain constant.

generating cash from capital assets. It may be advisable to structure a purchase leaseback of the installed array to be replaced if the old and new arrays will be run in tandem for some time.

Economic Stimulus Act– While we may have long forgotten the economic stimulus legislation passed in the US Congress in April 2008, there is a provision in this legislation that could make leasing even more affordable. This provides for a tax reduction aimed at companies purchasing new equipment. A leasing company can purchase the equipment and return the tax credit in the form of a reduced lease rate.

Project financing – It is often the case that IT departments acquire other hardware (servers, for example), software, and services in conjunction with a new storage array. Some leasing vendors can blend the lease of the array in a larger package that includes equipment software and services.

Payment deferral – It is possible to get a leasing vendor to defer the commencement of monthly payments against the lease. The advantage here is that if the IT department doesn't have budget available for the new lease payments during the fiscal quarter for example, but will in a succeeding quarter, then the leasing vendor can defer the commencement of the lease, while the IT department still gets productive use of the array.

IBM Global Financing

In spite of the current credit crisis, IBM Global Financing (IGF), using its own sources of capital, can continue to provide equipment, software, and project financing. IGF has announced a special leasing program in conjunction with the DS5000. IGF can, for example, write a long-term lease of five years on the DS5000 chassis, power supply, backplane, and other elements that are typically not upgraded, and shorter-term leases on the disk trays, control units, and cache modules. IGF can also structure proposals that include the take-out of

older arrays, purchase and leaseback of installed equipment, and project financing—in other words, the lease features described above.

Finally, IGF is currently the only computer leasing vendor we are aware of that addresses the provisions in Economic Stimulus Act, signed into law earlier this year, that are aimed at stimulating investment in infrastructure by enterprises. IGF offers its US customers in 2008 two ways to take advantage of ESA, even though they aren't the actual buyers:

- Deferral of monthly lease payments for three months after installation and customer acceptance of the installation.
- A reduction in monthly payments that is spread over the initial term of the lease.

Conclusion

We believe that, overall, IT budgets will likely be reduced in 2009, forcing IT administrators to do as much as they can with what they currently have, with modest extensions. Seen in that light, a virtualized storage controller such as IBM's SVC can be used to create storage pools from an aggregation of disparate arrays. Once virtualized, administrators can find and unlock unused capacity hidden in these arrays. The net effect of increasing utilization from 30% to 60% would be an immediate doubling of capacity.

And, while we can't predict economic futures, we are certain that enterprise CFOs will proceed with increasing caution during the next few quarters, if not the next years. CFOs will likely want to conserve capital and leverage the operational side of the balance sheet. As a result, leasing will become an increasingly attractive way to acquire needed storage capacity, remembering that businesses' (and thus IT's) ever present need for additional capacity marches on despite the economic climate.