



## Product Analysis

# Is Atlantis USX the future of Software Defined Storage?

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Software Defined Storage (SDS) has certainly caught the attention of IT planners looking to reduce the cost of storage by liberating them from traditional storage hardware lock-in. As SDS evolves the promise of lower storage CAPEX, increased deployment and architecture flexibility, paired with lower OPEX through decreased complexity may emerge from suppliers of this technology. [Atlantis USX](#) looks to lead this trend, claiming to deliver all-flash array performance for half the cost of a traditional SAN.

### Atlantis USX Architecture

From an architectural perspective, USX has the same roots as Atlantis's VDI solution, except that it's focused on virtual server workloads instead of virtual desktops. As part of the enhancements for server virtualization, USX has added the ability to pool any storage resource between servers (SAN, NAS, Flash, RAM, SAS, SATA), it's added data protection to ensure reliability in case of a host failure and has built its own high availability that is equivalent to dual storage controllers. This means that IT planners will be dealing with a well-vetted storage solution whose core is already at work in hundreds of production installations. USX is a software-only product that installs on the existing virtualized hosts in the environment. It has the ability to aggregate various memory and storage resources resident in those hosts, or on the SAN, into a shared pool of abstracted storage capacity. It also takes an inventory of all available RAM or flash on the network and uses those resources to accelerate the performance of the SDS volumes.

### In-Memory Software Defined Storage

The RAM capacity potential of a new physical server today is significantly higher than it used to be, based on the number of DIMM slots in current server designs. At these capacity levels RAM represents an economical way to create an extremely high speed storage area, especially when amplified by patented inline deduplication and compression data services. With optimization rates at 80% capacity reduction the DRAM street price of \$10/GB for raw capacity drops to an effective rate of \$2/GB, making RAM a low-cost and high performance storage resource for SDS. But while the hypervisor and guest server VM operating system may "consume" much of the available memory, they don't fully exploit this resource or make efficient use of it. As a result excess memory sits idle or administrators don't make the relatively small extra investment to fully populate server RAM slots.

Atlantis USX is unique in the way it leverages available memory inside these server hosts for in-memory storage optimization and efficiency. By taking advantage of local high speed RAM resources, Atlantis USX can perform real-time, inline deduplication, compression and write coalescing. Each of these functions reduces the amount of data that ends up consuming storage capacity, IOPS, controller cycles and network bandwidth.

Typically, when a data segment is being written or updated it changes repeatedly within a short period of time. All that really needs to be stored is the last version modified within that given window. This is a technology that is commonly called "Write Coalescing". It improves write performance by turning random I/O into larger sequential I/O, a format that delivers significant performance benefits for writes on both flash and traditional spinning disk storage.

USX intercepts all I/O coming out of the hypervisor, analyzing each write to see if it has already been written to the shared pool of storage. Since Atlantis USX uses local RAM resources the metadata to perform that block-level content analysis is located on the server with ideal locality of reference to the actual workload. It does not need to check a deduplication meta-table on the network. If the data is not unique the appropriate tables and pointers are updated but no data is written. This approach does not put data at risk because writes are only acknowledged from RAM when the USX metadata already knows that the same block exists on non-volatile storage media. If the data is unique then it's compressed and written to the appropriate storage pool.

Compression and deduplication complement each other because some workloads compress well and others de-duplicate well. Most SDS solutions have no data efficiency services built into them and few can do both deduplication and compression. These data services, delivered from the hypervisor to any class of storage, are the key differentiator of Atlantis USX.

The first benefit of this coalescing and data reduction process is that it optimizes flash storage. Not only are redundant data segments eliminated but the unique segments are written sequentially, which is better suited for flash, hard disk media and the deduplication process. This results in an increase in the usable capacity and number of desktops that can be run on flash.

The second benefit is reduced network utilization. Most converged SDS solutions gloss over the fact that a shared pool created from the local storage of multiple physical hosts is absolutely dependent on the network connecting each server. Every write has to be sent across that network which induces latency. While USX requires a 10GbE network, the optimization and acceleration data services described above all occur prior to data being sent out across that network, giving Atlantis potentially the most optimized use of this new storage network of any of its competitors.

#### In-Memory Software Defined Storage Performance

As described above, leveraging server memory as part of a software defined storage solution pays real dividends by providing a high performance area that can be used to improve data efficiency. After this work is done the remaining memory in the server hosts can be combined in the same manner as storage capacity in servers and used as an extremely high performance storage tier.

The impact is a high-speed storage resource that is essentially free because it's made up of RAM that would otherwise go unused. Of course, once the benefits of this high performance storage tier are understood an increase in server memory could be justified, prompting a retrofit of existing servers and the ordering of new servers with additional capacity as well. In the absence of available RAM for existing data centers, Atlantis USX can also make use of local PCI Flash, SSDs or even new "Flash on DIMM" technology that is starting to become available from server vendors such as IBM (soon to be Lenovo).

#### The In-Memory Differentiator

Atlantis's ability to use existing RAM resources, in addition to server-side flash and hard disk storage, is a key differentiator for USX. The fact is most software defined storage solutions leave server memory untouched instead of leveraging this valuable resource to improve performance and increase efficiency. Atlantis also carries the work they have done optimizing storage all the way through to the capacity tiers, both in the servers and those shared on a traditional storage network. With Atlantis USX, existing storage investments (NAS/SAN/Flash) will support more than 5x as many VMs – allowing IT organizations to get more out of the storage already on hand. Finally, Atlantis allows the use of network-attached storage as a capacity backup tier, which again can be optimized for maximum space efficiency.

#### No Storage Left Behind

Atlantis USX not only aggregates internal server storage and server DRAM but also has the ability to leverage more traditional shared SAN, NAS or All-flash storage. This storage can be used as a capacity tier or, in the case of a shared flash array, as part of the performance tier. The important consideration is that this SDS solution does not force IT Planners to buy only internal server storage going forward or be locked into to a specific vendor, class or type of storage. It also allows organizations to modify their mix of shared SAN/NAS storage vs. local server storage resources over time without disrupting their existing infrastructure.

## Conclusion

Storage solutions abound that claim to be software defined. However, most of these simply replace the existing storage services and do little to take advantage of the environments they are being placed in. While reducing storage costs by breaking storage hardware lock-in is certainly important, software defined storage solutions have the potential to provide far greater value.

Atlantis USX delivers this value by improving three key areas of storage. The software first accelerates and expands the capacity of any storage under its control. Second, the solution can add new data services to traditional storage. Third, it can pool storage from different platforms including DAS across multiple hosts, traditional shared storage systems and even cloud storage.

Atlantis is separating itself from the field by leveraging server RAM to further reduce the cost of storage capacity and open a new performance frontier based on RAM. Whether in-memory storage is used to accelerate SAN/NAS or as a tier of storage, the potential for this essentially "free" high-speed capacity is significant. For data centers looking to converge their infrastructures behind a software defined storage platform Atlantis USX deserves strong consideration.

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