SanDisk and Atlantis Computing Inc. Partner for Software-Defined Storage Solutions

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Introduction

Data centers are facing a storage crisis. Storage capacity shipped is expected to double from 2015 to 2017,1 outpacing companies' abilities to buy, manage and operate storage hardware. Data centers are also in the midst of a fundamental transformation from inefficient silos of hardware to intelligent software-defined datacenters (SDDC). While the rapid adoption of server virtualization—with nearly 40% of x86 servers in 20142—has reduced server costs, the inefficiency of traditional enterprise storage in virtualized datacenters is driving exponential storage growth that is not compatible with existing storage approaches and economics.

Today, enterprises buy storage to match the specific capacity, performance or availability needs of their applications. As a result, enterprises often end up with four or more classes of storage including SAN, NAS, all-flash arrays and many forms of direct-attached storage (DAS).

Managing and maintaining these separate silos of storage is costly and inefficient. To make matters worse, enterprises are forced to over-provision either capacity or performance. And, they are limited by the data protection built into the storage hardware. This leads to waste and inefficiencies that drive up the cost of delivering and managing storage.

The Business Value of Software-Defined Storage

This challenge is being addressed by software-defined storage (SDS), which is software that gives customers a way to manage data across their datacenter—and to pull it together into a unified virtual resource that can be viewed in a comprehensive way—and optimized to deliver more storage capacity and performance at a lower cost.

Businesses must efficiently manage all the storage in their enterprise networks. IT must overcome the barriers of “siloead” architecture, which was adopted over the years, through many waves of IT deployment. Pooling distributed storage allows IT organizations—and the business they supports—to get a full view of all data resources, and to efficiently manage all of those storage devices as one unified virtual resource.

For IT managers, software-defined storage is a work-in-progress, as they discover multiple sources of data that must be combined in order to present a holistic view of distributed data. Here, the past is prologue—as the company’s history of virtualizing server resource to drive datacenter efficiency can now be extended to data center storage.

For business managers, the details of SDS may not be as interesting as its ability to affect meaningful business cost reductions and performance improvements. Most importantly, SDS has the capacity to improve business innovation, and business agility, by adjusting the company’s business model to take advantage of new opportunities for growth and profitability.

Atlantis and SanDisk Partner for SDS Solutions

Atlantis Computing Inc., and SanDisk Corp. are partnering to provide customers with SanDisk's high-performance solid-state drives (SSDs) with the Atlantis USX software-defined storage solution. By doing this, they are tapping SanDisk's ULLtraDIMM™ SSD storage on the memory bus, SanDisk's SAS and SATA SSDs and SanDisk's Fusion-ioMemory™ PCIe high-density flash storage to bring multiple terabytes (TB) of data—and building it directly into today's servers.
Together, Atlantis Computing’s software and SanDisk high-performance SSDs unlock the potential of software-defined storage, providing orders of magnitude lower cost and better performance than traditional datacenter storage. With this joint solution, enterprises will be able to increase their available storage capacity a factor of 10 times as much. At the same time, they will be able to use drive-based storage in servers, and to get performance equivalent to that of all-flash arrays.

ULLtraDIMM SSD storage sits directly inside server DIMM slots, next to a server’s memory bus. This design puts flash on the memory bus—and reduces the I/O transit time for large datasets moving into—and out of—a system’s central processors (CPUs). ULLtraDIMM provides data-access times in the range of 3-5 microseconds—which is an order of magnitude less than the milliseconds-range latency seen in hard-disk drives (HDDs) that are widely used in servers to store in-system data.

Atlantis and SanDisk provide an ultra-low-latency storage solution that is built around Atlantis USX software and SanDisk high-performance direct-attached storage (DAS). This combination offers lower cost storage capacity, performance and scalability for server virtualization, desktop virtualization and database workloads that are running in virtualized computing environments.

Both companies have collaborated in the Virtual Desktop Infrastructure (VDI) and server-based computing spaces, enhancing the performance of VDI applications that deliver business applications to end-users in a timely, consistent and secure manner. For these reasons, the SanDisk/Atlantis solution improves the end-users’ on-screen experience, increasing employee productivity and bringing business value to the entire organization.

Likewise, other workloads will benefit from this hardware/software solution, especially for workloads that rely on high performance with low latency. SanDisk’s ULLtraDIMM SSD delivers latency in the range of three to five microseconds, on a consistent basis—in sharp contrast to latency in the milliseconds range, as delivered by systems relaying on HDDs.

**The Atlantis Software-Defined Storage Solution**

Atlantis USX 2.0 is an SDS solution that virtualizes datacenter storage, providing Tier 1 data services, such as compression, inline deduplication, cloning, snapshots, replication and thin provisioning.

The USX 2.0 software can leverage SanDisk’s UltraDIMM, SSD or PCIe flash products, as installed in any x86 server, into enterprise-class shared storage using the SanDisk server-resident resources as primary storage and/or an acceleration tier for existing SAN and NAS storage arrays.
SanDisk and Atlantis Computing Inc. Partner for Software-Defined Storage Solutions

Deployment features of Atlantis SDS Software

Enterprises typically deploy Atlantis software-defined storage in three phases—storage consolidation; hyper-convergence of servers and storage deployed in distributed scale-out commodity servers; and hybrid cloud storage that supports the pooling of storage across many servers and storage resources.

The following sections further describe the key elements of the Atlantis storage-management software framework, which supports many types of system-management frameworks in wide use today in enterprise data centers:

Automation

Automation of any platform is a key requirement in a cloud-enabled world, and automation is critical for enabling software defined datacenter deployments. The entire user interface for Atlantis USX is built on the USX REST API, which is open and publicly documented. This REST API provides instant integration capability for the major management systems deployed in data centers today, including VMware vCAC, HP Operations Manager, IBM Tivoli, CloudStack, and Openstack.
**Policy-Based Management**

Atlantis USX policy-based storage management enables customers to efficiently manage capacity, performance and availability across all of the storage in the data center, irrespective of underlying capability of each storage device. Block storage can now be managed in the same way as file-based storage. If more capacity is required, a new volume can be created or an additional resource can be added to the storage pool. The storage devices can be dissimilar—and yet all of them can be added to the virtualized storage pool. This allows for easy migration from one underlying storage platform to another.

**Data Services**

Atlantis HyperDup™ Content-Aware Data Services leverage Atlantis’ patented real-time deduplication (de-dup) technology to provide data reduction, I/O acceleration, provisioning, data mobility, security and business continuity for any storage device.

**Storage Pooling and Abstraction**

The Atlantis software platform resides between virtual machines (VMs) and the storage infrastructure. As a separate software layer, it integrates with the hypervisors in the environment, presenting an abstracted view of all storage—including SAN, NAS, flash, DAS, hybrid, and even cloud-based storage. Atlantis USX can pool and abstract all datacenter storage that is visible to the hypervisor including shared storage (SAN, NAS, AFA), direct-attached storage (flash, SSD, SAS, SATA) and VMware Virtual SAN (VSAN).

**How SanDisk’s Hardware Works with Atlantis USX Software**

Over time, organizations can use SDS to execute a strategic migration from shared SAN and NAS storage to reduce costs and increase the performance of DAS-based hyper-converged architectures. Ultimately, companies can transform their datacenters to become completely software-defined and leverage hybrid cloud storage. SanDisk flash storage provides inside-the-server storage capacity that scales up to multiple terabytes, while avoiding a lengthy access time as data is retrieved from remote devices.

**ULLtraDIMM Flash on the Memory Bus**

Customers using the SanDisk/Atlantis solution gain the scalable performance and ultra-low latency of SanDisk’s ULLtraDIMM SSD. The ULLtraDIMM SSDs are designed to be deployed in a server’s DIMM slots, providing multiple terabytes of storage capacity right on the memory bus—near the system’s processor for ultra-fast performance.

These ULLtraDIMM SSDs are available in servers from multiple OEM server vendors, providing ultra-low latency of less than 10 microseconds, compared to an average latency in the milliseconds range for many types of HDDs and SSDs.

The unique parallel architecture of the ULLtraDIMM—and its direct connection to the server’s ultra-fast memory bus—eliminates traditional bus contention for resources. This architecture allows it to provide high IOPS rates (I/Os per second), supporting high bandwidth performance with consistent low latency that results in accelerated application performance.
SanDisk’s Fusion-ioMemory PCIe Flash Memory

Other scenarios for deployment include the use of SanDisk’s Fusion-ioMemory PCIe flash memory to accelerate workload performance inside the server.

With the SanDisk/Atlantis solution, customers can start with as few as three servers and scale up to include thousands of servers, delivering an aggregate capacity of petabytes of storage throughout the data center or enterprise. The same software can be leveraged to access data in PCIe storage devices, such as the SanDisk ION Accelerator, the Fusion ioMemory products, and a range of solutions built around Fusion-io technology.

SanDisk/Atlantis Solutions for Virtual Desktop Infrastructure (VDI) Workloads

The success of VDI projects begin with the end user experience. Users transitioning from a free-standing PC to a virtual desktop should expect to see equal or better performance, yet most VDI deployments provide a fraction of the storage performance required per desktop (measured in IOPS and latency). Many VDI deployments suffer from performance issues associated with high latency and a lack of sufficient IOPS. When that happens, it negatively impacts employee productivity, reducing the organization’s effectiveness at dealing with ever-changing business conditions.

The most critical aspects of user experience—such as boot, logon, application launch and search—require vast amounts of storage performance. Without adequate storage capacity, these application suffer, and end-users see less-than-stellar results on-screen. Atlantis software with SanDisk flash delivers better VDI performance, even for users and applications that demand the highest level of IOPS.

Conclusion

Atlantis Computing and SanDisk are partnering in the marketplace, providing an integrated hardware/software solution for the software-defined storage (SDS) marketplace. As companies transform their datacenters, modernize their applications, and expect to do “more with less,” the ability to become more efficient when working with Big Data becomes ever more important. Scaling up by scaling out—combining the storage capacity that is housed inside distributed servers with existing shared SAN and NAS storage—is gaining adoption in enterprise datacenters.

Harnessing the processing power of distributed servers is a productive way to leverage resources that have already been installed in the data center. SanDisk and Atlantis recognize the potential of bringing low-latency storage to the server world—and managing that distributed storage as a single, virtual resource. This approach, rather than wholesale replacements to boost storage capacity, reduces operational costs for customers who would otherwise face “forklift” upgrades to meet growing demand for storage and processing power.
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