BlueArc Introduces Titan of Storage Consolidation

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Management Summary

Storage consolidation has become like motherhood and apple pie – everyone agrees it is a good thing. It allows enterprises to get their arms around spiraling storage requirements, costs, and complexities. In our modern business world, it is a given that enterprises must deal with continuous data growth as their business processes rely increasingly on IT systems. Storing and protecting all of this data is a challenge, and many have turned to storage consolidation as an effective tool for managing it.

However, not all storage consolidation is the same. The basic concept is to bring economies of scale to storage, but there are varying degrees and different techniques of consolidation. It can simply mean replacing many, small storage arrays with a few, large ones. It can also mean going a step further by networking the storage (i.e., SAN and NAS) and allowing even more servers to connect to fewer storage arrays. In any case, the art and practice of storage consolidation continue to evolve, and there is plenty of room for innovation.

In this spirit, the vendor BlueArc has introduced an innovative solution for storage consolidation called *Titan SiliconServer*. It goes further still by combining in one system:

- **Block and file storage (SAN and NAS)** – Titan simultaneously provides shared file access over IP and block storage over Fibre Channel and IP (the latter via iSCSI). Volumes are virtualized and can be dynamically created, expanded, and reallocated.

- **Multiple storage tiers** – By supporting both Fibre Channel and ATA drives, it delivers multiple service levels for online, backup, and archival purposes.

- **High scalability and performance** – It can grow capacity to 256 TB in one file system and delivers up to 5 Gbps of throughput today, scaling to 20 Gbps in the future with a modular server upgrade. Multiple Titan systems can also perform as a single entity through n-way clustering.

- **Centralized and distributed storage** – Titan also works in concert with caching appliances at remote offices to provide distributed storage with centralized management and protection.

If you add these to BlueArc's data replication capabilities, **then you have a singular storage solution that would otherwise require an integration of multiple different components.** And when it comes to storage consolidation, less is more. Read on for details.

Origins of BlueArc

BlueArc began in 1998 with the idea of creating a high-speed NAS platform using hardware acceleration.   It drew from the evolution of the network router industry for inspiration. Products there started as:

(1) *General-purpose servers running routing software*, moved to

(2) *Dedicated appliances with specialized operating systems*, and then finally to

(3) *Dedicated appliances with the logic built into customized ASICs*[1].

The first approach is like using a minivan that, while versatile, is not particularly fast. The third approach is more like a two-seater sports car that is optimized for doing one thing well – going fast and having fun. As products moved through the evolution, performance in terms of throughput increased and manufacturing costs at volume decreased.

While most NAS products were and still are constructed using the first two approaches, BlueArc skipped to the last phase with a product called *SiliconServer*. It used field programmable gate array (FPGAs) to implement network and file system processing in hardware. The result was very fast, wire-speed performance and a resilient architecture. Its speed also meant an enterprise did not have to purchase as many units to maintain a particular user response time, helping to improve the economics of management and capital costs.   BlueArc has sold SiliconServers to enterprises in a variety of industries, especially in applications where performance was critical.

Enter the Titan

Not content to remain just a NAS vendor, BlueArc recently broadened the scope of its offering with *Titan SiliconServer*, its new networked storage platform. Titan incorporates in one system block and file access, multiple storage tiers, data migration between tiers, modular scalability of performance and capacity, and centralized management. It also works in tandem with storage caching appliances for distributed environments. **Titan is a singular solution for a spectrum of requirements – like a Swiss army knife of storage consolidation.**

The SiliconServer architecture is the foundation of Titan, which means it uses FPGAs to accelerate performance in hardware.   The system has two main components: front-end server modules and back-end disk arrays. The servers process file requests over IP networks using the *NFS* (*Unix*) and *CIFS* (*Windows*) protocols. They also provide block-level storage access over Fibre Channel, the de facto SAN transport[2], and IP networks using the up-and-coming iSCSI protocol. Most enterprises need both block and file storage. (S*ee sidebar on next page.*)

Titan scales performance in two dimensions. First, an individual system delivers up to 5 Gbps of throughput, which can support a lot of applications and users, depending on requirements. BlueArc also has in development a future module upgrade that will deliver 20 Gbps. Second, Titan can cluster multiple systems together so they act as one entity. Performance is aggregated across them and data is still accessible if node(s) fail. So, Titan scales *up* and scales *out*.

The back-end disk arrays can contain both Fibre Channel and ATA drives at multiple rotational speeds.   This capability forms the basis of establishing storage tiers with different price/performance characteristics.[3]   High-performance Fibre Channel drives are used for production applications, while inexpensive but less robust ATA drives are geared for secondary copies, backups, and archiving. Supporting both allows enterprises to match data with the appropriate storage tier through its lifecycle and optimize overall storage costs.   Furthermore, Titan helps enable information lifecycle management by moving data between tiers automatically based on pre-defined policies.

Volumes within the array are virtualized for ease of management and striped across RAID controller sets for better performance. Administrators can expand or reduce the volume size dynamically and without disrupting access, making the provisioning process easier and more robust. Striping boosts performance by allowing

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[1] Application Specific Integrated Circuits.

[2] See *Fibre Channel – The Defending Champion Has Staying Power* in **The Clipper Group Explorer** dated December 14, 2001, at http://www.clipper.com/research/TCG2001012.pdf.

[3] See *Tiered Storage Classes Save Money – Getting the Most Out Of Your Storage Infrastructure* in **The Clipper Group Explorer** dated August 29, 2002, at http://www.clipper.com/research/TCG2002030.pdf.

SAN and NAS – Storage Bedfellows

Consider a stack of lumber versus a house. Both are wood, but the lumber is raw material and the house is a final product. The lumber is flexible and can be turned into anything – a fence, a shed, or a million tooth-picks. The house, though, has "structure" and serves a more specific purpose.

Likewise, both SAN and NAS are networked storage. A SAN presents LUNs – "raw" block-level data – to host servers. The servers assemble the LUNs into volumes for storing data pertinent to their respective applications. SANs are usually based on Fibre Channel networking, though technologies like iSCSI allow IP to be used.

NAS presents a network file system to multiple users and applications over an IP network. A file system, built on top of a volume, is more structured than block-level data. It stores files (e.g., spreadsheet, word processor, video) in a directory and keeps contextual information (or metadata) such as size, date created, last modified, and who created it. It also allows multiple applications and users to share files, unlike SANs which dedicate LUNs to specific host servers.

So SAN and NAS are storage bed-fellows, serving different but important roles in the arena of networked storage.

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the volumes to take advantage of the aggregate throughput of multiple RAID controllers and the drive spindles behind them. This means the system can actually get faster as storage is added. Titan supports up to 256 TB in a single file system.

Titan also comes with a feature called *Accelerated Data Copy*. It copies and moves data within and between systems (including over long distances for data protection purposes) without disrupting access to the source volume. This is useful for reducing backup windows and making production data available for other purposes like data analysis and application testing and development.

Finally, Titan's management utility provides

a single point of control for multiple Titan systems within an enterprise. Titan can also interface with BlueArc caching appliances at remote sites for providing fast local data access while keeping all data under centralized protection and management at the main data center.

List prices start at $50,000 for an entry-level configuration with ATA disks, and a 3 TB configuration with Fibre Channel disks would be around $100,000.

Benefits to the Business

Put simply, the concept behind consolidation is that it is easier and more efficient to manage a few big things than an abundance of small ones. This is as true for manufacturing plants and stock portfolios as it is for storage. A corollary is that fewer and bigger usually mean better. This is where BlueArc Titan has its advantage because it does in one system what would usually require multiple, different SAN and NAS platforms. As a result, it can offer:

- **Lower acquisition costs** – Multiple storage tiers help optimize capacity costs. The scale, virtualization, and networkability of the system contribute to better overall storage utilization.

- **Lower operating costs** – Centralized management of a highly consolidated system translates into simplicity and, therefore, lower operating costs. Management, especially skilled labor, is by the largest component of storage total cost of ownership.

Conclusion

With the introduction of Titan, BlueArc is bursting its mold as a specialized, high-speed NAS player into the broader space of consolidated, networked storage. If you thought BlueArc was just about NAS, it is time to have another look.

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