Data Center Virtualization and ATTO Products

Building Blocks

Overview

Virtualization technologies are rapidly becoming the foundation of modern data centers as IT managers seek dramatic improvements in resource and operational efficiencies as well as responsiveness to business needs. Three key technologies are significant: (i) Server Virtualization, (ii) Fabric Virtualization and (iii) Storage Virtualization. This paper describes how ATTO products serve as key building blocks for each of these virtualization solutions and offers an end-to-end approach that incorporates all three solutions.

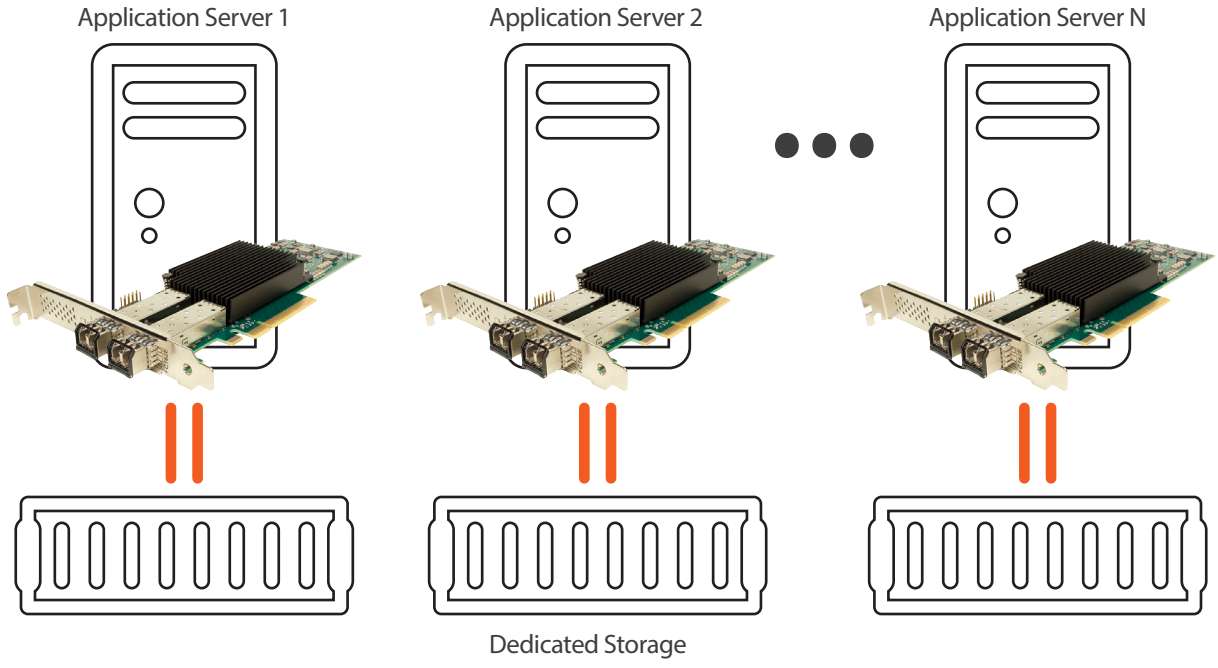
Challenge

The advent of open systems computing has promoted a rapid expansion in the number of deployed servers, often with each dedicated to a single application or business function. At the same time, IT managers have faced an explosion of online data with a corresponding proliferation of storage devices. The result is an infrastructure that is nearly unmanageable. Many of the servers and storage devices are underutilized; floor space, power, and cooling concerns have become real limitations to data center expansion; and the sheer number of deployed devices has become almost impossible to track.

Challenges include:

- Complexity of managing a growing infrastructure
- Underutilized server and storage devices
- Power and cooling constraints
- Limited IT budgets and resources – need to do more with less
- Access limitation to data and applications

Typical Data Center Without Virtualization



Solution

For 25 years ATTO has been a key supplier of storage and network connectivity solutions. With a broad deployment of Fibre Channel enabled host, infrastructure and storage products, ATTO is well positioned to power the data center's virtualized infrastructure. ATTO Fibre Channel technology contains key building blocks that enable customers to fully realize the benefits of server virtualization deployed in a SAN environment, and extends the value of Fabric virtualization. With end to end solutions, ATTO offers important enabling technology for partners building virtualized data centers.

Key Benefits

- Cost effective deployment of new applications
- Faster, flexible provisioning for new applications, dynamic resizing of servers for growing applications, and development and test platforms.
- Easier workload balancing, incident resumption and disaster recovery, as "virtual machines" are more readily portable to alternate hardware resources and offer tools to automate these operations.
- Improved scalability for large or rapidly growing server and virtual server environments
- Reduced management from the network edge to the center of the SAN
- Support for heterogeneous SAN configurations without reduced functionality for server connectivity

Data Center Virtualization

To keep pace with growing business demands, data centers are transitioning to highly virtualized data center environments. This approach enables organizations to consolidate and simplify their IT resources, resulting in increased business agility and lower capital and operating expenses. But virtualization is not without its challenges. Data centers must keep up with the explosive data growth and dynamic changes driven by virtualized workloads. Having a suite of products that are designed specifically to work together is key to realizing the full benefits of these virtualized architectures.

Server Virtualization & ATTO Products

Server virtualization enables the deployment of multiple full-featured application environments called "virtual machines" (VM) across one or a few hardware platforms yielding a dramatic increase in server hardware utilization. Hardware resource scheduling and management is run behind the scenes by a "hypervisor", a user-invisible operating system. Users report going from 15-20% up to 75 to 80% usage, with a proportional increase in server return on investment and reduction in management and maintenance overhead.

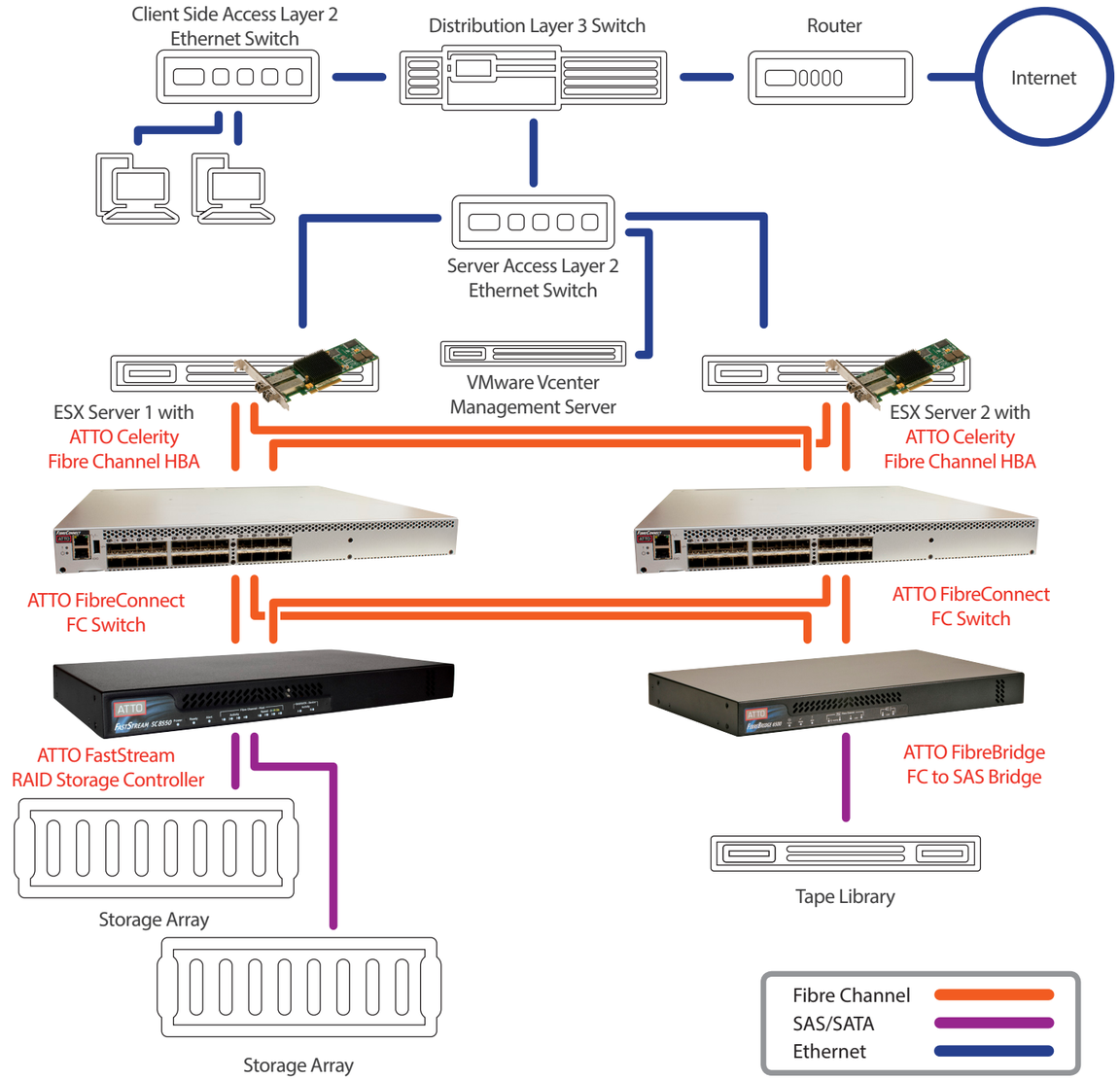
ATTO Celerity host bus adapters (HBA) play an important role in data center virtualization. In order to take full advantage of the benefits, HBAs must support the ability to virtualize Fibre Channel ports, provide guaranteed response time, transparently support connection into virtual fabrics, as well as enable co-hosted applications to be configured and operating within separate virtual fabrics. The latest generation of ATTO high performance Gen5 16Gb Fibre Channel HBAs bring virtual fabric integration to the next level by enabling a single adapter to connect into multiple virtual fabrics. N-Port ID Virtualization (NPIV), a key feature of ATTO's HBA technology, enables each Fibre Channel HBA to define multiple "virtual ports", identified by Worldwide Ports Names (WWPN). These virtual ports can then be assigned to each virtual machine. NPIV enables administrators to manage storage on behalf of the virtual machine in much the same way they manage storage attached to physical machines, leveraging familiar best practices and existing SAN management tools.

ATTO Celerity HBA's support real-time virtual environments resulting in higher application performance, better transaction processing, and the ability to handle larger workloads and client counts. For those more robust virtualized workloads, Gen 5 16Gb Quad-Port HBA's provides the highest IOP capabilities and support the greatest number of virtual machines per physical server, thereby requiring fewer physical servers. By implementing server virtualization with Celerity HBA technology, energy and management costs are reduced, while asset utilization and total cost of ownership (TCO) are improved.

Fabric Virtualization & ATTO Products

The simple SAN has often grown into multiple complex SANs spread across multiple sites. Instead of building one large Fabric or multiple disparate Fabrics, Fibre Channel has standardized techniques to break up large Fabrics and selectively put them back together. Virtual Fabrics provide the ability to segment a SAN into many logical SANs, each with its own set of Fabric services. This allows SAN infrastructures to be more efficiently utilized, while the costs are spread over more applications or users.

Virtualized Network



* Solution available in Gen5 16Gb or 8Gb Fibre Channel.

Fabric Virtualization & ATTO Products (continued)

ATTO FibreConnect switches provide a critical building block for today's highly virtualized data center environments and offers low-cost access to industry-leading Storage Area Network (SAN) technology while providing non-stop operation with consistent delivery of more than five-nines availability to evolving storage environments. ATTO FibreConnect switches support multi-tenancy in virtual environments through Virtual Fabrics, Quality of Service (QoS), and Fabric-based zoning features. FibreConnect switches meet the demands of data center environments by delivering market-leading Gen 5 Fibre Channel technology with additional capabilities that support highly virtualized environments and fabric virtualization. Designed to maximize application uptime and performance while reducing overall operational expenses, these high-performance, mid-range switches provide flexible and saleable configurability with 8, 12 and 24 port options. ATTO's FibreConnect switches support 2, 4, 8, or 16 Gbps speeds in an efficiently designed 1U package. A simplified deployment process and a point-and-click user interface make the ATTO FibreConnect Switch both powerful and easy to use.

Storage Virtualization & ATTO Products

Storage systems may use virtualization concepts as a tool to enable better functionality and more advanced features within and across storage systems. Storage virtualization is the pooling of physical storage from multiple network storage devices into what appears to be a single storage device that is managed from a central console. Storage virtualization helps the storage administrator perform the tasks in less time by disguising the actual complexity of a storage area network (SAN).

FastStream 16Gb/s and 8Gb/s Fibre Channel RAID Storage Controllers complement virtualized environments with storage virtualization technology that enables a logical presentation of data which is not limited by the physical storage infrastructure. Data is protected with ATTO's RAID technology using standard SAS Storage Array's while increasing storage utilization on a high performance, reliable platform where storage pools can be utilized with VMware, Hyper-V or Citrix applications. ATTO's Advanced Data Streaming (ADS™) technology efficiently provides access to a large number of virtual machines when accessing the same storage pool. Additionally, when used in conjunction with ATTO Celerity Multipath Director™ the FastStream provides improved productivity and superior performance over other solutions.

FibreBridge™ Fibre Channel to SAS/SATA Bridges introduce significant storage-related performance gains in the data center. With the embedded Virtual Device Manager, virtual devices within the bridge accomplish individual tasks without performance degradation. This feature enables ATTO's Virtual Drive Response (VDR) technology which gives devices the capability to queue commands on behalf of busy or unresponsive tape storage connected to the bridge thereby reducing the number of failed or incomplete backups. This is especially important when backing up data from a large number of virtual machines. The FibreBridge also contains patented Drive Map Director™ technology that provides a logical, static topology which reduces downtime or reconfiguration when using disk based storage behind the bridge.

Conclusion

This paper has described three important data center technologies: server, fabric and storage virtualization. It has also described a blueprint for how all three technologies can be utilized together to realize maximum benefits - flexibility, operational and resource efficiencies - in a fully virtualized data center. ATTO products – Celerity Fibre Channel HBAs with ADS, FibreConnect switches, FastStream RAID storage controllers and FibreBridge SAS to Fibre Channel storage bridges act as core building blocks for each of these three virtualization technologies. With the Fully Virtualized Data Center blueprint from the previous page in mind, only ATTO provides the breadth of solutions and is working closely with its partners to ensure these products work seamlessly together in a robust, interoperable and integrated fashion. While possible, it is unlikely that an IT manager will deploy all three of these virtualization technologies in one fell swoop. Instead, IT managers should carefully analyze and determine their own phased deployment approach and ensure that each step is compatible with the next. IT managers should ensure that future purchases of HBAs, intelligent switches and other appliances meet the requirements for building towards the Fully Virtualized Data Center. Working from the blueprint, ATTO's current and future products will clearly support this phased implementation approach.

ATTO Products for Virtualized Data Centers

- Celerity 16Gb/s and 8Gb/s Fibre Channel HBAs
- FibreConnect 16Gb/s and 8Gb/s Fibre Channel Switches
- FastStream 16Gb/s and 8Gb/s Fibre Channel RAID Storage Controller
- FibreBridge Fibre Channel to SAS/SATA Bridges