



## HP StorageWorks MSA2000fc HP StorageWorks HBAs (Emulex LightPulse 4Gb/s HBAs) VMware ESX 3.5 / ESXi 3.5

Data sheet

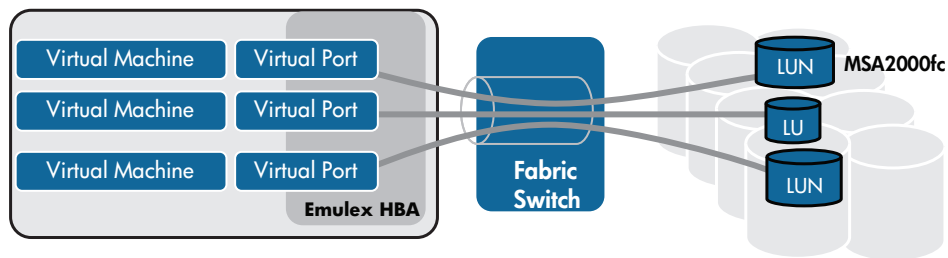
### Deploying HP StorageWorks MSA2000fc with Emulex 4Gb/s HBAs and VMware

N\_Port ID Virtualization (NPIV) is an industry-standard Fibre Channel protocol that extends virtualization to the host bus adapter (HBA) by providing a way of assigning multiple Fibre Channel addresses over the same physical link. IT organizations are turning more and more to VMware server virtualization to transform data centers into "service-centric" shared pools of resources that can be dynamically aggregated, tiered, provisioned and accessed through an intelligent network. Virtualization of standardized server resources dramatically increases

performance levels and reduces total cost of ownership (TCO), while allowing IT organizations to rapidly deploy and scale resources on-demand to match business and application requirements.

A shared storage infrastructure using the MSA2000fc and Emulex Virtual HBAs enables the most compelling features of VMware, including VMotion, Distributed Resource Scheduler (DRS), High Availability (HA), Consolidated Backup, and ESX Server-remote boot. Consolidating the virtual servers on one (or more) MSA2000fc arrays provides opportunities for cost-effective and simplified disaster recovery and business continuity.





## Key features and benefits

- **Lower Total Cost of Ownership (TCO):** Server consolidation with VMware enhances total cost of ownership by improving asset utilization and simplification of management. When used in conjunction with Emulex NPIV-enabled HBAs, a single intelligent HBA port can relay the traffic for multiple virtual machines, offloading network processing, thereby allowing for more cost-effective servers to be deployed.
- **Excellent Quality of Service (QoS):** When used in conjunction with fabric QoS, each VM can be allocated its own logical HBA port, which creates multiple IO paths for traffic prioritization.
- **Higher Availability:** Multiple logical ports are automatically created, offering redundant paths to VMs. Active-active arrays, dual-ported drives, and high-reliability HBAs increase data availability.
- **Role-based Management and Security:** Each VM and its MSA2000fc storage are completely isolated from other VMs, under control of the administrator in charge of protecting corporate data.
- **Simplified Management:** Reduces the need to reconfigure fabric zoning and LUN masking parameters significantly during a VMotion migration.

## VMware ESX 3.5/ VMware ESXi 3.5

The most popular SAN solution not only for VMware ESX and ESXi but for enterprise data center storage consolidation is Fibre Channel. The portability and recovery capabilities of VMware implementations rely on external shared storage, and are most effective in a SAN connectivity environment. VMware servers typically reside in the main data center and draw on enterprise storage resources where Fibre Channel dominates. In addition, the high performance delivered by the Fibre Channel protocol is best positioned to serve the higher I/O requirements for multiple virtual machines running on a single server. SAN connectivity helps enable server virtualization, while server virtualization drives an increased need for SAN connectivity.

## HP BladeSystem c-Class—Virtual Connect, Emulex Virtual HBA, and VMware

HP Virtual Connect is designed to enable a new way to add, move, or replace server blades without impacting networks or requiring multiple experts at each step. Virtual Connect is a major innovation for customers and their businesses by providing a better way for IT organizations to work together and offering benefits to all parties involved without the traditional compromise.

## Servers and Infrastructure

Item Description	HP part/model #(s)
HP StorageWorks Modular Smart Array Controller (for the 2012fc)	AJ744A/MSA2000fc
HP StorageWorks Single Controller Modular Smart Array	AJ742A/MSA2012fc
HP StorageWorks Dual Controller Modular Smart Array	AJ743A/MSA2012fc
HP StorageWorks Dual Enhanced Controller Modular Smart Array	AF745A/MSA2212fc
HP StorageWorks 4Gb/s dual-channel PCI-E mezz card (HBA) for HP BladeSystem c-Class	403621-B21
HP StorageWorks 4Gb/s single-channel PCI-E HBA (Emulex LPe1150)	A8002A/FC2142SR
HP StorageWorks 4Gb/s dual-channel PCI-E HBA (Emulex LPe11002)	A8003A/FC2242SR
HP StorageWorks 4Gb/s single-channel PCI-X HBA (Emulex LP1150)	AD167A/FC2143
HP StorageWorks 4Gb/s dual-channel PCI-X HBA (Emulex LP11002)	AD168A/FC2243
VMware ESX 3.5 / ESXi 3.5	—

Customers using virtualization technologies see immediate compounding of functionality between Virtual Connect and VMware Infrastructure. Customers using VMware products realize the power of flexible infrastructures, removing the traditional constraints that tie an operating system to a physical server.

HP Virtual Connect and Emulex LightPulse Virtual HBA technology both use the NPIV standard. Emulex Virtual HBA Technology applies NPIV at the blade server level to map virtual ports to virtual machines. HP Virtual Connect applies NPIV at the blade server chassis interconnect level to aggregate blade server FC connections into the external fabric. The implementations of NPIV are complementary. Emulex Virtual HBA in the mezzanine card manages the virtual machine connectivity for the HP BladeSystem c-Class in traditional environments while SAN connectivity through Virtual Connect Fibre Channel modules aggregates the HBA traffic through oversubscribed ports.

Virtual Connect oversubscription is user-configurable and allows up to 16 physical or virtual server logins per physical uplink port. Each dual-port Emulex mezzanine card physically links through the chassis mid-plane to two Virtual Connect Fibre Channel modules, one port per module. Each Virtual Connect Fibre Channel module can be configured to utilize 1, 2, 3, or 4 physical uplinks to the SAN fabric.

A blade server in the HP BladeSystem c-Class can accommodate two to three Emulex LightPulse Fibre Channel mezzanine cards dependent on the server model. The Emulex dual-channel 4Gb/s Fibre Channel mezzanine card offers superior performance and throughput for blade systems and has been tuned for a Virtual Connect deployment with a powerful centralized management framework featuring scalable deployment, management and diagnostic capabilities.

Storage administrators using VMware ESX Server 3.5 Virtual Center and raw device mapping (RDM) can create virtual machines that are easier to manage and maintain. Since all VMs have a unique identity to the SAN, SAN administrators can follow best practices such as fabric zoning and array-level LUN masking to implement security in a VMware deployment. Additionally, common SAN management tools that utilize the WWPN can be used to perform tasks such as quality of service (QOS), bi-directional association of storage and virtual machines, and charge back.

Concurrent use of both Virtual Connect and Virtual HBA with the HP BladeSystem c-Class is forthcoming.

## HP StorageWorks 2000fc Modular Smart Array

The HP StorageWorks 2000fc Modular Smart Array selection of SAN devices features the very latest in efficient consolidation, functionality, and technology at very affordable prices. The ideal customers needing to consolidate their storage include smaller companies with tight budgets and limited IT expertise, or larger companies that have perhaps hundreds of smaller departments and remote locations. The MSA2000fc features a high-performance 4Gb/s Fibre Channel connected array. It allows customers to grow their storage as demands increase up to 14.4 TB SAS or 36 TB SATA, supporting up to 64 hosts for Fibre Channel attach. All models support the optional HP StorageWorks 2000 Modular Smart Array Snapshot Software which offers controller-based snapshot and cloning functionality. Planning for future growth is easy by starting with the basic modular pieces and adding capacity as needs arise.

### Key features and benefits

- **New generation SAN implementations using Fibre Channel effectively manages greater data growth:** The HP StorageWorks 2000fc Modular Smart Array manages growing storage requirements across multiple HP ProLiant servers for customers who need a centralized dedicated storage solution for applications. SANs allow for controlled, cost-effective growth and increased protection of the data.
- **Excellent price-performance:** The MSA2000fc arrays offer a choice of drives, high performance enterprise class SAS drives, and low cost, high capacity archival class SATA.
- **Latest Fibre Channel technology:** Significant performance benefits with two 4 Gb/s Fibre Channel ports per controller.

## HP StorageWorks HBAs (Emulex LightPulse 4Gb/s)

Why use Emulex LightPulse 4Gb/s HBAs?

Emulex was first to market with its virtual HBA technology based on industry-standard N\_Port ID Virtualization (NPIV). Emulex LightPulse Virtual HBA technology provides virtual machines with independent access to the SAN through shared HBA resources, enabling customers to leverage critical SAN management tools and best practices within virtualized server environments. Emulex is extending support for industry-standard Virtual Fabric within its LightPulse Virtual HBA technology, to enable simultaneous native access to multiple virtual fabrics.

Every Emulex LightPulse host bus adapter (HBA) leverages eight generations of advanced, field-proven technologies to deliver a distinctive set of benefits that are relied upon by the world's largest enterprises. From the unique firmware upgradeable architecture, to the common driver model, Emulex HBAs are simply "Generations Ahead" of competing solutions. These attributes make Emulex LightPulse Fibre Channel HBAs the better solution for mixed-OS and virtual server environments. With powerful management capabilities and broad platform support, Emulex HBAs provide improved performance in the broadest range of applications and environments.

### Key features and benefits

- **Comprehensive virtualization capabilities:** Support for NPIV and Virtual Fabric Host to Fabric FC-SP authentication
- **Common driver model:** A unique Service Level Interface (SLI™) allows a single driver to support all Emulex HBAs on a given OS and easy deployment of new firmware with reduced server reboots
- **Efficient centralized administration:** Emulex provides powerful management tools which interface to HP Systems Insight Manager (SIM) and HP Storage Essentials (SE)

### For more information

For more information, visit [www.emulex.com](http://www.emulex.com)

## Technology for better business outcomes

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To learn more, visit [www.hp.com/go/msa2000fc](http://www.hp.com/go/msa2000fc)

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