Server Connectivity for Next-Generation Data Centers

Today’s IT professionals face the difficult challenge of reducing data center cost and complexity while satisfying numerous Service Level Agreements (SLAs) and performance requirements. As a result, organizations are seeking ways to improve server and storage utilization, reduce ongoing operational costs, and increase their flexibility and responsiveness.

Two major industry trends aimed at reducing cost and complexity—server consolidation and virtualization—have quickly become the highest priorities for server administrators. Most data centers were designed to meet basic connectivity needs for physical servers, switches, and storage. However, consolidation and virtualization drive new connectivity requirements that legacy solutions are no longer able to meet, such as streamlined manageability, increased performance, and virtualization awareness. Performance of the applications under load and manageability are often critical concerns for organizations deploying server virtualization.

While legacy HBA providers focus on simple connectivity, the Brocade 4 Gbps and 8 Gbps HBAs leverage five generations of Application-Specific Integrated Circuit (ASIC) design. The current ASIC is an evolution of the industry-leading Brocade Fibre Channel switching ASIC. It leverages the same technology and features that make Brocade the market leader in storage networking, including frame-based trunking for additional performance and availability, and Virtual Channels (VCs) for Quality of Service (QoS) and isolation. This enables organizations to extend essential Virtual Machine (VM)-aware Brocade Advanced Fabric Services into the server.

**UNIFIED MANAGEMENT**

Brocade Network Advisor can monitor and manage multiple HBAs across a data center simultaneously—along with Brocade switches and backbones—all from a single central location. This enables organizations to

The Brocade One® strategy helps simplify networking infrastructures through innovative technologies and solutions. Brocade 415, 425, 815, and 825 Host Bus Adapters (HBAs) support this strategy by simplifying and optimizing server connectivity to Fibre Channel fabrics in highly virtualized data centers.
monitor performance across groups of HBAs and HBA ports at the same time, capture diagnostics information automatically in the event of a failure, and receive proactive alerts when HBA events occur (see Figure 1).

Brocade HBAs also enable VM discovery in VMware ESX environments within Brocade Network Advisor. VM discovery provides an end-to-end view of the VM-to-Logical Unit Number (LUN) path information for all the VMs running on each physical server, with detailed information such as host OS, assigned CPU and memory resources, and all the data stores associated with each VM. This provides unprecedented levels of visibility into the virtual server infrastructure for SAN administrators, enabling them to more efficiently manage their storage network resources. Coupled with N_Port ID Virtualization (NPIV), Brocade Network Advisor can also provide end-to-end performance statistics with VM granularity.

Boot-over-SAN enables the deployment of both Direct-Attached Storage (DAS) point-to-point topology as well as diskless servers and centralized management of OS images in the shared storage pool. Traditional boot-over-SAN environments, however, require access to each individual HBA BIOS (and each individual server console), making them cumbersome to configure, laborious to maintain, and prone to human error.

To simplify the management of boot-over-SAN environments, Brocade HBAs provide fabric-based boot LUN discovery—a feature that enables each server to automatically retrieve its boot LUN information from the switch fabric. This provides a centralized management point for all boot-over-SAN operations through Brocade Network Advisor, enabling organizations to fully reap the benefits of diskless servers.

All HBA management and VM visibility features are available across all three editions of Brocade Network Advisor: Professional, Professional Plus, and Enterprise. For simple device configuration, driver updates, or to obtain HBA and port statistics, a Graphical User Interface (GUI) element manager and a Command Line Interface (CLI) are also available. Both Brocade Network Advisor and the element manager provide open APIs and standards-based interfaces for integration with popular third-party applications and higher-level frameworks to help orchestrate Brocade hardware and SAN services.

UNMATCHED PERFORMANCE
With the recent advances in server technology, including Intel Nehalem processors, servers are now capable of running more workloads than ever. This drives higher consolidation and virtualization ratios, with more VMs being deployed per server, which in turn drives unprecedented I/O requirements. The superior performance of Brocade HBAs provides the necessary bandwidth and I/O power for the most demanding environments (see Figure 2).

Ultimately, this means that businesses of all sizes can scale their virtual server deployments and virtualize highly demanding applications with greater confidence, resulting in better server resource utilization and lower capital and operational costs.

OPTIMIZED FOR VIRTUAL ENVIRONMENTS
In a non-virtualized environment, every application is tied to a physical server, which in turn connects to a physical SAN switch port in a “static” manner. Applying network policies such as zoning or QoS—or monitoring application performance—is simple because the application is permanently associated with the physical port.

With server virtualization, multiple applications reside in a physical server and

Figure 1. Brocade Network Advisor provides unified management of SAN and HBA resources with end-to-end VM visibility.

Figure 2. Brocade HBAs can provide nearly three times the performance of competing offerings in real-world application scenarios.

Figure 3. SAO extends QoS to the VM level.
share a physical SAN port. Furthermore, applications can move across the virtualized server infrastructure, based on a number of user-defined policies, to respond to dynamic business requirements. A virtualization-aware SAN infrastructure and server connectivity solution enables organizations to apply network policies at the VM level. Such policies will then be able to “follow” the application transparently as it moves to a new physical server.

Brocade HBAs were built from the ground up with virtualization in mind. They support NPIV with up to 255 virtual ports, and they are qualified with all major hypervisor solutions in the industry. Leveraging NPIV technology, organizations can not only extend Brocade fabric services to the server, but all the way to the VM and application level. Server Application Optimization (SAO) helps IT organizations avoid downtime and more effectively meet their SLAs by allowing them to apply QoS policies with a per-VM granularity and ensure that mission-critical VMs will not be affected in the event of HBA link congestion—even as they move across the infrastructure (see Figure 3). SAO also provides isolation to protect individual VMs from the effect of slow-drain devices that would otherwise impact the entire physical server and all applications.

### BROCADE 415, 425, 815, AND 825 SPECIFICATIONS

<table>
<thead>
<tr>
<th>Models</th>
<th>Single-port, 4 Gbps HBA</th>
<th>Dual-port, 4 Gbps HBA</th>
<th>Single-port, 8 Gbps HBA</th>
<th>Dual-port, 8 Gbps HBA</th>
</tr>
</thead>
</table>

| Fibre Channel Specifications | Brocade 415/425: 4 Gbps (800 MB/sec); 2 Gbps (400 MB/sec); 1 Gbps (200 MB/sec) (per port) | Brocade 815/825: 8 Gbps (1600 MB/sec); 4 Gbps (800 MB/sec); 2 Gbps (400 MB/sec) (per port) |

<table>
<thead>
<tr>
<th>Data rate</th>
<th>Performance</th>
<th>Protocols</th>
<th>Topology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 500,000 IOPS per port at 4 Gbps and 8 Gbps</td>
<td>Brocade 415/425: 4 Gbps (800 MB/sec); 2 Gbps (400 MB/sec); 1 Gbps (200 MB/sec) (per port)</td>
<td>SCSI-FCP, FCP-2, FCP-3, FC-SP (See Documentation) for full list of supported protocols.</td>
<td>Point-to-point (N_Port), switched fabric (N_Port), including N_Port Trunking with frame-based load balancing, FC-AL, and FC-AL2</td>
</tr>
</tbody>
</table>

#### Optimal Support for Windows Server 2012

By supporting Windows Server 2012, Brocade Fibre Channel HBAs enhance their ability to support Windows-based virtual workloads. Furthermore, their support of the Hyper-V virtual Fibre Channel feature enables direct connectivity to Fibre Channel SANs from within a Hyper-V VM, allowing Fibre Channel SANs to seamlessly support Windows-based virtualized workloads. Support for Fibre Channel in Hyper-V guests also includes support for many high-availability features, such as virtual SANs, clustered VMs, live migration, and Multi-Path I/O (MPIO).

#### SIMPLIFYING SERVER DEPLOYMENT WITH DYNAMIC FABRIC PROVISIONING AND ENHANCED DIAGNOSTICS

Dynamic Fabric Provisioning (DFP) allows organizations to eliminate fabric reconfiguration when adding or replacing servers through the virtualization of host World Wide Names (WWNs). It combines Brocade switch and adapter technology to reduce or eliminate the need to modify zoning or Logical Unit Number (LUN) masking. In addition, DFP enables pre-provisioning of virtual WWNs, helping organizations eliminate time-consuming steps when deploying new equipment or moving devices within a switch.

Diagnostic Ports (D_Ports) are a new port mode that enables administrators to quickly identify and isolate optics and cable problems, reducing fabric deployment and diagnostic times. Organizations also can use D_Ports to run a variety of tests through Brocade Network Advisor or Command Line Interface (CLI) to test ports, SFPs, and cables for faults, latency, and distance.

#### BROCADE GLOBAL SERVICES

Brocade Global Services has the expertise to help organizations build scalable, efficient cloud infrastructures. Leveraging 15 years of expertise in storage, networking, and virtualization, Brocade Global Services delivers world-class professional services, technical support, network monitoring services, and education, enabling organizations to maximize their Brocade investments, accelerate new technology deployments, and optimize the performance of networking infrastructures.

#### MAXIMIZING INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include professional services, technical support, and education. For more information, contact a Brocade sales partner or visit [www.brocade.com](http://www.brocade.com).
### Host Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Server platform</strong></td>
<td>Intel (IA32, IEM64T), AMD (x86, 64), and Sun (x86, SPARC)</td>
</tr>
<tr>
<td><strong>Server chipset</strong></td>
<td>Intel, nVIDIA, ServerWorks/Broadcom, AMD/ATI, and SPARC</td>
</tr>
<tr>
<td><strong>Bus interface</strong></td>
<td>PCI Express Gen 2.0 (x8) and Gen 3.0 compatible, with MSI-X and INTx</td>
</tr>
</tbody>
</table>

### Software

**Management**
- Brocade Network Advisor (Professional, Professional Plus, Enterprise), including multiple host driver updates
- Brocade Host Connectivity Manager (HCM) Command Line Interface (CLI)

**Driver- and HCM-supported operating systems**
- Microsoft Windows, Red Hat Linux, SUSE Linux, Oracle Linux and Oracle Solaris, VMware (ESX/ESXi), Microsoft Hyper-V, Oracle VM, Citrix XenServer, Xen for Red Hat, Xen for SUSE

**APIs**
- SNIA-HBA-API 2.0 and FDMI-I

### Warranty and Support

- Three years advance replacement hardware warranty with 24×7×365 telephone/e-mail support and lifetime software updates

### Physical Specifications

**Transceivers**
- Brocade 415/425: 4 Gbps Fibre Channel LC-style pluggable (SFP), MMF (850 nm), hot-swappable
- Brocade 815/825: 8 Gbps Fibre Channel LC-style pluggable (SFP+), MMF (850 nm), hot-swappable

**Form factor**
- PCI Express low-profile form factor; 16.77 cm × 6.89 cm (6.60 in. × 2.71 in.)

**Bracket size**
- Standard: 1.84 cm × 12.08 cm (0.73 in. × 4.76 in.)
- Low profile: 1.84 cm × 8.01 cm (0.73 in. × 3.15 in.)

### Agency Approvals

- **United States**: Bi-Nat UL/CSA 60950-1 1st Ed; ANSI C63.4; cCSAus; FCC Class B
- **Canada**: Bi-Nat UL/CSA 60950-1 1st Ed; ICES-003 Class B; cCSAus
- **Japan**: CISPR22 Class B and JEIDA (Harmonics); VCCI-B
- **European Union**: EN60950-1; EN55022 Class B and EN55024; TUVBauart, CE Mark
- **Australia, New Zealand**: EN55022 and CISPR22 Class B or AS/NZS CISPR22; C-Tick
- **Russia**: IEC60950-1; 51318.22-99 and 24-99; GOST Mark
- **Korea**: KN22 and KN24; MIC Mark Class B
- **Taiwan**: CNS 14336(94); CNS 13438(95) Class A; BSMI Mark

### Environmental and Power Requirements

- **Airflow**: No airflow required
- **Operating temperature**: 0° C/32° F to 55° C/131° F (dry bulb)
- **Non-operating temperature**: −43° C/−49° F to 73° C/163° F (dry bulb)
- **Operating humidity**: 5% to 93% (relative, non-condensing)
- **Non-operating humidity**: 5% to 95% (relative, non-condensing)
- **Power dissipation**: 6 W (full line rate)
- **Operating voltage**: 3.3 V

---

**Corporate Headquarters**
San Jose, CA USA
T: +1-408-333-8000
info@brocade.com

**European Headquarters**
Geneva, Switzerland
T: +41-22-799-56-40
emea-info@brocade.com

**Asia Pacific Headquarters**
Singapore
T: +65-6538-4700
apac-info@brocade.com

© 2012 Brocade Communications Systems, Inc. All Rights Reserved. 09/12 GA-DS-1478-02

ADX, Brocade, Brocade Assurance, Brocade One, the B-wing symbol, DCX, Fabric OS, ICX, MLX, MyBrocade, SAN Health, VCS, and VDX are registered trademarks, and AnyIO, HyperEdge, NET Health, OpenScript, and The Effortless Network are trademarks of Brocade Communications Systems, Inc., in the United States and/or in other countries. Other brands, products, or service names mentioned may be trademarks of their respective owners.

Notice: This document is for informational purposes only and does not set forth any warranty, expressed or implied, concerning any equipment, equipment feature, or service offered or to be offered by Brocade. Brocade reserves the right to make changes to this document at any time, without notice, and assumes no responsibility for its use. This informational document describes features that may not be currently available. Contact a Brocade sales office for information on feature and product availability. Export of technical data contained in this document may require an export license from the United States government.