BROCADE 1860 FABRIC ADAPTER FREQUENTLY ASKED QUESTIONS

Introduction

Brocade provides the industry's leading family of Host Bus Adapters (HBA), Converged Network Adapters (CNA), and fabric adapters, including the Brocade® 1860 Fabric Adapter. Gen 5 Fibre Channel is the purpose-built, data center-proven network infrastructure for storage, delivering unmatched reliability, simplicity, and 16 Gbps performance. The Brocade 1860 Fabric Adapter with Gen 5 Fibre Channel unleashes the full potential of high-density server virtualization, cloud architectures, and next-generation storage.

For product information, visit: www.brocade.com/adapters.

General Questions and Answers

Q What is Gen 5 Fibre Channel?

A Gen 5 Fibre Channel is the purpose-built, data center-proven network infrastructure for storage, delivering unmatched reliability, simplicity, and 16 Gbps performance. Brocade switches and adapters with Gen 5 Fibre Channel unleash the full potential of high-density server virtualization, cloud architectures, and next-generation storage.

Q What is the Brocade 1860 Fabric Adapter?

A The Brocade 1860 Fabric Adapter is a new class of adapters that combines a Gen 5 Fibre Channel Host Bus Adapter (HBA), a Converged Network Adapter (CNA), and a Network Interface Card (NIC) into a single product that can meet all server connectivity needs in next-generation, cloud-enabled data centers, while delivering unmatched performance, application-aware services, unified management, and reduced cost and complexity. It is the simplest, most flexible, and most powerful server connectivity product to support the growth of highly demanding virtualized environments.

Featuring Brocade AnyIO™ technology, the Brocade 1860 supports the following protocols, which can be configured on-demand by software command to run on any individual port and run simultaneously in a single product:

- 16/8/4/2 Gbps Fibre Channel
- 10 Gigabit Ethernet (GbE)
  - TCP/IP
  - Data Center Bridging (DCB)
    - Priority-based Flow Control (PFC), 802.1Qbb
    - Enhanced Transmission Selection (ETS), 802.1Qaz
    - Data Center Bridging Exchange (DCBX), 802.1Qaz

- Fibre Channel over Ethernet (FCoE)
- Internet Small Computer System Interface (iSCSI)
    - iSCSI Type-Length Value (TLV) for DCB

The Brocade 1860 is available in the following models:

- **Brocade 1860-1F:** Single port, one 16 Gbps Fibre Channel SWL SFP+ included
- **Brocade 1860-2F:** Dual port, two 16 Gbps Fibre Channel SWL SFP+ included
- **Brocade 1860-1P:** Single port, one 10 GbE SR SFP+ included
- **Brocade 1860-2P:** Dual port, two 10 GbE SR SFP+ included
- **Brocade 1860-1C:** Single port, no media included
- **Brocade 1860-2C:** Dual port, no media included

Q What is a fabric adapter?

A A fabric adapter is the industry's first multiprotocol server connectivity product that can natively connect to both Fibre Channel and Ethernet fabrics, and extend valuable services from the fabrics to the servers, the Virtual Machines (VMs), and the applications running on them—simplifying and optimizing I/O in virtualized environments.

Q What is Brocade AnyIO technology?

A Brocade AnyIO technology is an industry-unique capability that allows a single Brocade 1860 Fabric Adapter to support either native Gen 5 Fibre Channel (16 Gbps) or 10 GbE on a port-by-port, user-selectable basis via software command. It provides unmatched flexibility for organizations to standardize on a single adapter and choose the connectivity protocol that best fits each application's needs. Brocade AnyIO technology enables a dual-port adapter to run 16 Gbps Fibre Channel on one port, and 10 GbE on the other port. In addition, the Brocade 1860 can run TCP/IP, Fibre Channel over Ethernet (FCoE), and iSCSI simultaneously on the same 10 GbE port. A Brocade 1860 adapter port can be configured in any of the following modes (no licensing required):

- **HBA mode:** Appears as a Gen 5 Fibre Channel (16 Gbps) HBA to the operating system (OS).
- **NIC mode:** Appears as a 10 GbE NIC to the OS. It supports 10 GbE with DCB, iSCSI, and TCP/IP simultaneously.
- **CNA mode:** Appears as two independent devices—a Gen 5 Fibre Channel (16 Gbps) HBA and a 10 GbE NIC to the OS. It supports 10 GbE with DCB, FCoE, iSCSI, and TCP/IP simultaneously.

Q What are the key features of the Brocade 1860 Fabric Adapter?

A The key features of the Brocade 1860 include:

- Brocade AnyIO technology: 16/8/4/2 Gbps Fibre Channel and 10 GbE DCB for TCP/IP, FCoE, and iSCSI
- Single- and dual-port models
- Line-rate 16 Gbps Fibre Channel, 1600 MB/sec throughput per port (3200 MB/sec full-duplex)
- Line-rate 10 GbE performance with stateless networking offloads for the highest levels of performance and CPU efficiency
- Jumbo frame support, up to 9600 bytes
- Over 500,000 IOPS per port for storage (Fibre Channel/FCoE/iSCSI)

- Initiator-based LUN masking for storage traffic isolation
- Brocade Server Application Optimization (SAO): Application-aware Quality of Service (QoS) and N_Port Trunking
- Brocade Virtual Machine Optimized Ports (VMOPs): Offload the hypervisor of network packet classification and sorting tasks
- Brocade virtual Fabric Link (vFLink) I/O Virtualization (IOV): Up to eight virtual adapters with flexible minimum and maximum bandwidth allocations
- Single-Root IOV: Brocade vFLink capability can extend support for up to 255 Virtual Functions (VFs) in the future.
- Boot from SAN (Storage Area Network), including Direct-Attach Storage (DAS, point-to-point topology) and Brocade Fabric-based Boot LUN Discovery for unmatched simplicity
- Boot-up delay in 1-, 2-, 5-, and 10-minute intervals
- Bare-metal provisioning, allowing organizations to provision and configure storage and network attributes on the Brocade 1860 through the server BIOS UEFI HII menu
- Dynamic Fabric Provisioning (DFP): Virtualizes host WWNs to simplify pre-provisioning and eliminate time-consuming fabric reconfigurations when replacing servers and adapters (Fabric Assigned Worldwide Name, or FA-WWN)
- Brocade ClearLink Diagnostic Ports (D_Ports): A new port mode that enables administrators to quickly identify and isolate optics and cable problems
- Seamless support of Windows Server 2012 Virtual Fibre Channel and network QoS (bandwidth management) capabilities
- Pre-boot eXecution Environment (PXE and gPXE) for booting over a network connection
- PCI-Express (PCIe) Gen2 (2.0), x8 lanes, with INTx and MSI-X support
- Low-profile design for industry-standard 1U rack servers (high-profile bracket also included)
- Multiple media options, including Short Wave-Length (SWL) and Long Wave-Length (LWL) optics for Fibre Channel; and Short-Reach (SR), Long-Reach (LR), and active Twinax copper for 10 GbE

Q What are the key benefits of the Brocade 1860 Fabric Adapter?

A The Brocade 1860 provides the following key benefits:

- Enables organizations to standardize on a single adapter for all of their servers, providing the flexibility to choose the connectivity protocol that is most appropriate for each application
- Enables I/O consolidation of multiple 1 GbE NICs and 4/8 Gbps Fibre Channel HBAs into a single adapter while maintaining management isolation and QoS, delivering unprecedented CapEx and OpEx savings
- Delivers 50 percent server rack space savings by downsizing to a 1U rack-mount server with fewer PCIe adapter slots, while still maintaining adapter redundancy
- Provides application-aware networking services by extending Fibre Channel and Ethernet fabric services to the VM and application level
- Enables efficient sharing of I/O devices in virtualized environments through Brocade vFLink IOV

- Provides unmatched storage performance with over 500,000 IOPS per port to support the highest virtualization densities and the most demanding mission-critical workloads
- Enables native I/O performance by allowing VMware and Hyper-V VMs to bypass the hypervisor and communicate directly with the adapter
- Simplifies and unifies the management of adapter, SAN, and LAN resources through a single pane of glass with Brocade Network Advisor

Product Details

Q What operating systems and hypervisors are supported?

A The list of supported operating systems is constantly expanding. For the latest Brocade and OEM interoperability matrices, visit www.brocade.com/adapters.

Q What new capabilities are supported in Brocade Adapter Software 3.2.0.0?

A The highlights of Brocade Adapter Software 3.2.0.0 for the Brocade 1860 Fabric Adapter are as follows:

- Enables ClearLink Diagnostics (D_Port) for Gen 5 Fibre Channel adapters with 16 Gbps performance, allowing tests to be initiated from the switch (aligns with Brocade Fabric OS® [FOS] 7.1)
- Forward Error Correction (FEC) (aligns with Brocade FOS 7.1)
- FC Credit Recovery (aligns with Brocade FOS 7.1)
- LUN-level I/O latency and profile
- OS support updates
  - Solaris 11 support for Brocade fabric adapter and Brocade Network Advisor drivers
  - RHEL 5.9, Citrix XenServer DUDs, RHEL 5.7

Q What new capabilities are supported in Brocade Adapter Software 3.1.0.0?

A The highlights of Brocade Adapter Software 3.1.0.0 for the Brocade 1860 Fabric Adapter are as follows:

- Support for Windows Server 2012 Virtual Fibre Channel and network QoS (bandwidth management) features
- Dynamic Fabric Provisioning (DFP) and ClearLink Diagnostic Port (D_Port) capability for advanced diagnostics
- Assignment of minimum bandwidth levels to virtual adapters or vNICs (in addition to the existing capability of provisioning maximum bandwidth level per vNIC)

Q What are the benefits of Windows Server 2012 Virtual Fibre Channel and network QoS capabilities?

A Support of Windows Server 2012 Hyper-V Virtual Fibre Channel 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).

Brocade 1860 support of Windows Server 2012 policy-based Quality of Service (QoS) enables administrators to specify network bandwidth controls based on application type,

users, and servers for the physical network. In addition, support of Hyper-V QoS enables cloud hosting providers and enterprises to deliver predictable network performance for multiple types of traffic for VMs on Windows Server 2012 servers equipped with Brocade 1860 adapters running in DCB mode.

Q What are the benefits of the new Brocade 1860 Fabric Adapter Dynamic Fabric Provisioning capability?

A 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.

Q How is the Brocade 1860 Fabric Adapter managed?

A The following tools are available to manage the Brocade 1860:

- **Brocade Configuration Utility (BCU):** Command Line Interface (CLI) to configure all aspects of the Brocade 1860.
- **Brocade Host Connectivity Manager (HCM):** Graphical User Interface (GUI) element manager included with the driver for configuring a single adapter or multiple adapters within a single server.
- **Brocade Network Advisor:** Simplified management of adapters, SAN, and LAN resources from a central location. It can monitor and manage multiple adapters across a data center, including performance monitoring across groups of adapters, diagnostics capture, event management, and group BIOS and driver upgrades. Brocade Network Advisor reduces Total Cost of Ownership (TCO) through features such as customizable dashboards and historical data visibility. In addition, seamless configuration capabilities such as wizard-based configuration, integrated SAN diagnostics, policy monitoring, bottleneck detection, FICON Port Decommissioning, and Boot LUN Zoning improve business agility. It provides end-to-end VM-to-Logical Unit Number (LUN) path visibility in VMware ESX environments. Multiple host driver updates can be accomplished via Brocade Network Advisor. Coupled with N_Port ID Virtualization (NPIV), Brocade Network Advisor can also provide end-to-end performance statistics with VM granularity, increasing visibility down to the LUN level.
- **Third-party management frameworks:** Brocade Network Advisor provides integration with industry-leading third-party management applications, including IBM Systems Director, IBM Tivoli Productivity Center (TPC), EMC Next-Generation Resource Management Suite, HP Virtual Connect Enterprise Manager (VCEM), HP Storage Provisioning Manager (SPM), Microsoft System Center Operations Manager (SCOM), and VMware vCenter, giving organizations freedom to choose the management framework that best fits their needs.

Q What kind of media options does the Brocade 1860 Fabric Adapter support?

A The Brocade 1860 Fabric Adapter supports the following media options:

- Brocade 16 Gbps Fibre Channel SFP+: SWL (850 nm) and LWL 10 km (1310 nm), supporting 16/8/4 Gbps with new pull-tab (black on SWL, blue on LWL)

- Brocade 8 Gbps Fibre Channel SFP+: SWL (850 nm) and LWL 10 km (1310 nm), supporting 8/4/2 Gbps
- Brocade 10 GbE SFP+: SR (850 nm), LR 10 km (1310 nm), and USR
- Brocade 10 GbE direct-attached active Twinax SFP+ copper cable (1 m, 3 m, 5 m)
- Non-Brocade 10 GbE direct-attached active Twinax SFP+ copper cable (1 m, 3 m, 5 m, 7 m, 10 m); requires Brocade Adapter Software version 3.0.3 or later

All SFP modules are hot-swappable and field-replaceable, helping ensure the highest levels of uptime for the applications.

Q Does the Brocade 1860 Fabric Adapter support Target Rate Limiting and Dynamic Fabric Provisioning features?

A Yes. Brocade Adapter Software release 3.0 and onward for the Brocade 1860 Fabric Adapter supports Target Rate Limiting (TRL), which throttles network traffic based on the target's (slower) speed capability to avoid back-pressure. Brocade Adapter Software 3.1 provides software enablement for the Dynamic Fabric Provisioning (DFP) feature, allowing fabric-assigned WWN.

Q Is the Brocade 1860 Fabric Adapter compatible with Fibre Channel and Ethernet switches from other vendors?

A Yes. The Brocade 1860 is based on open industry standards, and it can connect to other vendors' Fibre Channel and Ethernet networks, including Cisco, QLogic, HP, Juniper, Arista, and many others. For the most up-to-date interoperability information, visit www.brocade.com/adapters.

Many of the advanced features, however, require tight integration with the switch ASIC present in Brocade switches and backbones, and will therefore be available only when connected to Brocade products.

Q Does the Brocade 1860 Fabric Adapter support PCIe Gen1 (1.0)?

A Yes. The Brocade 1860 is backward-compatible with PCIe Gen1 slots, and it will operate according to the PCIe Gen1 specifications.

Q Does the Brocade 1860 Fabric Adapter support PCIe Gen3 (3.0)?

A The Brocade 1860 can be installed in PCIe Gen3-compliant slots. However, it will operate at PCIe Gen2 speeds. Eight lanes of PCIe Gen2 provide 40 Gbps of bandwidth. Even with the PCIe protocol overhead, it is more than enough to support two ports of 16 Gbps Fibre Channel at full line-rate speed.

Q Will Brocade discontinue the current offering of server connectivity products?

A No. The current offering of 4 Gbps and 8 Gbps Fibre Channel HBAs (Brocade 415/425/815/825) and 10 GbE DCB CNAs (Brocade 1010/1020) will continue to be available for the foreseeable future.

Q Are the Brocade 1860 Fabric Adapter drivers compatible with previous Brocade HBAs and CNAs?

A The Brocade 1860 driver is a unified driver supporting every Brocade server connectivity product, including:

- Brocade 415/425 Fibre Channel HBAs
- Brocade 815/825 Fibre Channel HBAs
- Brocade 804 HBA mezzanine card for HP BladeSystem c-Class
- Brocade 1010/1020 CNAs
- Brocade 1007 CNA mezzanine card for IBM BladeCenter
- Brocade BR1741M-k CNA mezzanine card for Dell M-Series blade servers

A minimum Brocade Adapter Software version of 3.0 is required to support the Brocade 1860.

Q Which ASIC is the Brocade 1860 Fabric Adapter based on?

A The Brocade 1860 Fabric Adapter is based on the Catapult-2 ASIC.

Ethernet

Q What types of networking offloads are available in the Brocade 1860 Fabric Adapter?

A The Brocade 1860 supports stateless networking offloads, including:

- IPv4 header and checksum offload
- IPv6 checksum offload
- TCP checksum offload
- UDP checksum offload
- TCP Segmentation Offload (TSO)
- Receive Side Scaling (RSS)
- Header Data Split (HDS)
- Large Receive Offload (LRO)
- VLAN insertion/stripping and filtering

Q Does the Brocade 1860 Fabric Adapter support iSCSI TLV over DCB?

A Yes. The Brocade 1860 can map all iSCSI traffic to its own dedicated priority lane independent of other TCP/IP networking or FCoE traffic, enabling enterprise-class iSCSI storage. iSCSI TLV is supported with Brocade VDX® switches and the Brocade 8000 Switch.

Q What is Brocade Virtual Machine Optimized Ports?

A Brocade Virtual Machine Optimized Ports (VMOPs) is a feature that leverages the hypervisor multi-queue technologies, such as VMware NetQueue or Microsoft VMQ, to offload the incoming packet classification and sorting tasks from the hypervisors into the adapter. This frees the CPU for additional application processing while enabling line-rate 10 GbE networking performance in virtualized environments.

Fibre Channel

Q What is Server Application Optimization?

A Brocade Server Application Optimization (SAO) is a technology that enables the extension of Advanced Fabric Services from Brocade Fibre Channel fabrics all the way to the server and VM level. With Brocade SAO, organizations can extend QoS from the fabric to the application level to provide application-aware QoS. N_Port Trunking with frame-level hardware-based load balancing is another feature that can be extended to the host through SAO. To enable these features, an SAO license needs to be installed on the edge switch where the Brocade 1860 Fabric Adapter is connected.

Q What is Brocade Fabric Vision technology?

A Brocade Fabric Vision technology is an advanced hardware and software architecture that combines capabilities from the Brocade Condor3 ASIC, Brocade FOS, and Brocade Network Advisor to help administrators address problems before they impact operations, accelerate new application deployments, and dramatically reduce operational costs.

Fabric Vision technology provides unprecedented visibility and insight across the storage network through innovative diagnostic, monitoring, and management technology.

Q What are the advantages of Brocade Fabric Vision technology?

A Brocade Fabric Vision technology maximizes uptime, simplifies SAN management, and provides unprecedented visibility and insight across the storage network. Offering innovative diagnostic, monitoring, and management capabilities, Fabric Vision technology helps administrators avoid problems, maximize application performance, and dramatically reduce operational costs. For more information about Fabric Vision technology, visit www.brocade.com/FabricVision.

Q What is Brocade ClearLink Diagnostics?

A The Brocade ClearLink Diagnostics tool, a patent-pending technology, leverages ClearLink Diagnostic Port (D_Port) mode to ensure optical and signal integrity for Gen 5 Fibre Channel optics and cables, simplifying deployment and support of high-performance fabrics. By proactively monitoring critical transceivers, organizations can quickly address any physical layer issues without the need for special optical testers.

ClearLink Diagnostics allows users to automate a battery of tests to measure and validate latency and distance across the switch links, as well as verify the integrity of all 16 Gbps transceivers in the fabric—either prior to deployment or when there are suspected physical layer issues. With ClearLink Diagnostics, only the ports attached to the link being tested need to go offline, leaving the rest of the ports to operate online.

In addition to switch-to-switch link validation, Brocade FOS 7.1 provides several enhancements, including:

- Dynamic ClearLink Diagnostics support between Gen 5 Fibre Channel switches and Brocade 1860 Fabric Adapters when running at 16 Gbps
- Support for Gen 5 Fibre Channel switches running in Brocade Access Gateway mode

Through collaboration with industry partners, Brocade will extend ClearLink Diagnostics to end devices, providing end-to-end physical layer diagnostics and validation.

Organizations also can use ClearLink Diagnostics to run a variety of tests through Brocade Network Advisor or Command Line Interface (CLI) in order to test ports, SFPs, and cables for faults, latency, and distance. ClearLink D_Ports can be configured either explicitly by the user in static mode or forced by the switch port in dynamic mode. Dynamic mode automatically configures D_Ports on the adapter from the switch, streamlining deployment and reducing operational overhead. To take advantage of ClearLink Diagnostics functionality, the Brocade 1860 needs to be in HBA mode and requires 16 Gbps optics.

Q What are Credit Recovery and Forward Error Correction?

A Credit Recovery is a buffer credit loss detection and automatic recovery storage feature. The Brocade 1860 supports this feature when operating at 16 Gbps link speed.

Forward Error Correction (FEC) is an error recovery mechanism to correct bit errors without referring back to the originator of the frame. The Brocade 1860 supports FEC when operating at 16 Gbps link speed.

The Brocade 1860 extends Credit Recovery and FEC from the SAN fabric to the server level, which improves link resiliency and enhances overall application performance and availability.

Q What Fibre Channel speeds does the Brocade 1860 Fabric Adapter support?

A Depending on the type of Fibre Channel SFP+ installed, the Brocade 1860 can support 16/8/4 Gbps (with a 16 Gbps SFP+ module) or 8/4/2 Gbps (with an 8 Gbps SFP+ module), providing backward compatibility with millions of Fibre Channel ports deployed worldwide.

Q Does the Brocade 1860 Fabric Adapter support Fibre Channel Arbitrated Loop?

A With Brocade Adapter Software release 3.1, the Brocade 1860 Fabric Adapter supports Fibre Channel Arbitrated Loop (FC-AL) topologies.

Q Does the Brocade 1860 Fabric Adapter support Point-to-Point topologies?

A Yes. The Brocade 1860 supports Point-to-Point (P2P) direct-attach and switched fabric topologies.

I/O Virtualization and Virtual Switching

Q What is Brocade vFLink I/O Virtualization?

A Brocade virtual Fabric Link (vFLink) I/O Virtualization (IOV) allows a single physical adapter to be partitioned into multiple virtual fabric links. Using multiple PCI Physical Functions (PFs)—the same way that CNAs today present a storage device (HBA) and a networking device (NIC) to the operating system—Brocade vFLink supports the creation of up to eight virtual adapters (four per port), with flexible bandwidth allocations.

Organizations can partition a single adapter into as many as eight virtual adapters (vNICs) in hardware by using multiple Physical Functions (PFs) at the PCIe bus level, appearing as separate physical devices at the OS level. These virtual links can be assigned minimum and/or maximum bandwidth levels allocated in 100 Mbps increments, with a maximum of 10 Gbps for Ethernet.

Brocade vFLink technology enables organizations to reduce adapter sprawl in virtual server environments by consolidating multiple 1 GbE NICs and 4/8 Gbps HBAs into a single adapter while maintaining QoS, isolation, and fine-tuning for the different types of networks—including management, backup, live migration, or production.

Q What is direct I/O?

A Direct I/O is an option available in some virtualization hypervisors to grant VMs direct access to hardware resources, in order to alleviate hypervisor involvement in I/O and optimize performance. In VMware ESX environments, direct I/O is performed through a feature called VMDirectPath I/O. Direct I/O relies on server chipset technologies such as Intel Virtualization Technology for Directed I/O (VT-d) or AMD I/O Virtualization (AMD-Vi) that implement I/O Memory Management Units (IOMMUs), providing Address Translation Services (ATS) to take care of translating from virtual memory addresses to physical ones.

Learn More

Q How may I obtain a Brocade 1860 Fabric Adapter for evaluation in my test, development, or lab environment?

A Send an e-mail message to HBAsamples@brocade.com. A Brocade representative will contact you to assess your environment and coordinate the delivery of the evaluation cards.

Q Where do I go for support on the Brocade 1860 Fabric Adapter?

A Please call Brocade Technical Support toll-free at 1-800-752-8061 and make sure that you have activated your adapter warranty. To activate your warranty, visit: www.brocade.com/warranties.

Q Where can I find more information about the Brocade 1860 Fabric Adapter?

A Visit www.brocade.com/adapters or contact hbasales@brocade.com for more information.