



A unique router featuring multiprotocol service capabilities helps increase Storage Area Network (SAN) connectivity options and improve resource utilization.

SILKWORM MULTIPROTOCOL ROUTER

Highlights

- Supports simple and efficient SAN sharing to maximize the value of high-end resources
- Enables secure, selective Fibre Channel device connectivity across SAN boundaries through Logical SANs (LSANs)
- Hosts three types of multiprotocol routing services on a port-by-port basis for maximum flexibility to meet a wide range of business needs
- Supports non-disruptive geographical connectivity and resource sharing over long distances to facilitate business continuance solutions for native Fibre Channel or IP networks
- Enables low-cost iSCSI servers to access shared Fibre Channel SAN resources
- Utilizes Ports on Demand for fast, easy, and cost-effective scalability from 8 to 16 ports
- Is configured by standard Brocade software utilities and familiar administrative procedures to simplify management

A Better Way to Extend SAN Value

As SANs play a more prominent role in today's data centers, many organizations are searching for innovative solutions that extend the benefits of their SANs throughout the enterprise. To support this effort, the unique Brocade® SilkWorm® Multiprotocol Router increases the functionality, connectivity, and versatility of today's SANs. The Multiprotocol Router is designed to host routing services that include:

- Brocade FC-FC Routing Service for SAN connectivity
- Brocade FCIP Tunneling Service for SAN extension over distance
- Brocade iSCSI Gateway Service for sharing Fibre Channel storage with iSCSI servers

These services provide new options for connecting SANs and extending SAN benefits over multiple networks, to larger SAN sizes, and across longer distances (see Figure 1). The primary advantage of this approach is the ability to interconnect devices between SAN fabrics without

merging those fabrics—thereby providing a more secure and flexible storage networking foundation.

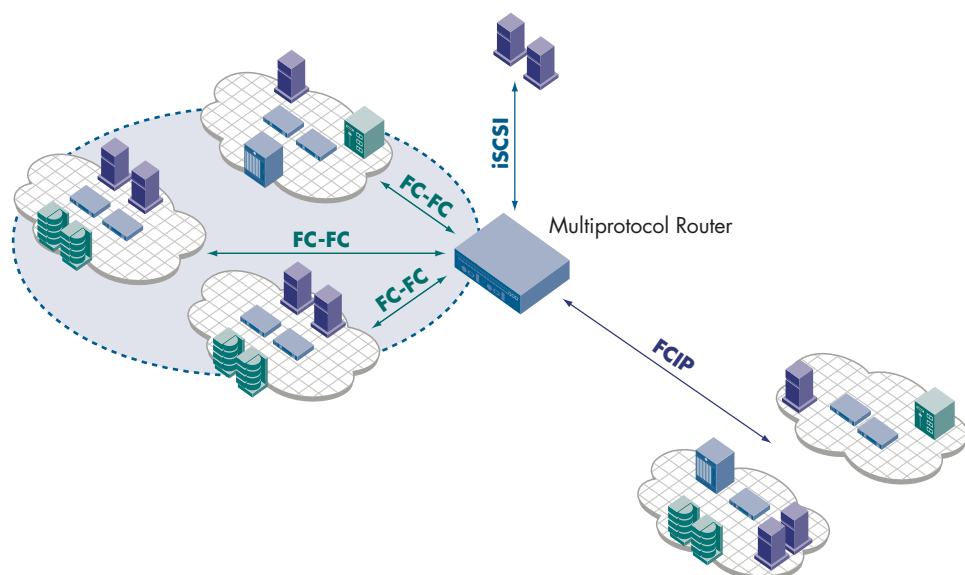
This level of SAN connectivity gives organizations a better way to reduce or even eliminate disruptions associated with common operational events, including:

- Data migration from 1 Gbit/sec storage arrays to 2 Gbit/sec systems, or migration between logically separated environments such as test/development SANs and production SANs
- Data center consolidation that requires the movement of data between physical locations
- Storage and application rebalancing between previously isolated SANs

FC-FC ROUTING SERVICE

One of the services on the Multiprotocol Router, the FC-FC Routing Service, enables devices located in separate SAN fabrics to establish communication without requiring the fabrics to merge into a single large SAN. By using this service,

Figure 1. The Brocade SilkWorm Multiprotocol Router and routing services help extend SAN capabilities across the enterprise.



organizations can interconnect devices without having to redesign or reconfigure their entire environment. FC-to-FC routing capabilities provide key strategic advantages, such as:

- Simplifying SAN design, implementation, and management
- Providing a seamless way to share resources across multiple SANs without the complexity of physically merging those SANs
- Creating a more unified SAN environment with easier interconnection and support for SANs and SAN resources deployed for different purposes

When devices on different SAN fabrics are allowed to communicate through the Multiprotocol Router, the connectivity group is known as a Logical SAN (LSAN). Created with zoning procedures already familiar to SAN administrators, LSANs enable selective, secure resource sharing across multiple SAN fabrics and facilitate scalability by:

- Minimizing the risk and complexity of large SAN fabrics
- Right-sizing SANs based on application and business requirements rather than over-building just to avoid possible availability risk

- Enabling dynamic resource sharing without requiring changes in cabling
- Simplifying management and fault isolation while protecting existing technology investments

FCIP TUNNELING SERVICE

The FCIP Tunneling Service enables organizations to extend their Fibre Channel SANs over distances that would be impractical or expensive with native Fibre Channel links, or in situations where dark fiber links would be impractical but in which IP WAN connectivity already exists. Deploying FCIP on the Multiprotocol Router is more flexible and cost-effective than an external gateway. As a result, organizations have a more manageable way to share resources across geographical boundaries and implement reliable business continuance solutions.

Using the FCIP Tunneling Service in conjunction with the FC-to-FC routing capability enables two fabrics to remain separate rather than merging them into a single fabric that would permit any-to-any connectivity between all devices. This combined FC-to-FC routing and FCIP approach enables organizations to maintain separate fabrics for administrative simplicity and increased security—enabling a more secure distance-connectivity solution for business continuance.

ISCSI GATEWAY SERVICE

The iSCSI Gateway Service enables organizations to integrate low-cost Ethernet-connected servers into Brocade Fibre Channel SANs by bridging the iSCSI protocol to the Fibre Channel protocol. This capability allows iSCSI servers to leverage shared SAN resources, improving asset utilization and enabling new applications such as centralized back-up. This integration greatly reduces the cost of connecting servers to centrally managed storage and helps provide a cost-effective solution to introduce utility computing into the enterprise.

FLEXIBLE SERVICES FOR A WIDE RANGE OF BUSINESS NEEDS

Brocade multiprotocol routing services support a wide variety of business solutions, including:

- **Multiple SAN consolidation:** FC-to-FC routing capabilities enable organizations to connect devices in separate SANs without merging the fabrics, making it easier to support equipment from multiple OEMs and multiple firmware revisions. As a result, organizations can better implement secure, selective resource sharing through LSANs while improving resource utilization to achieve consolidation.
- **Backup consolidation:** Organizations can utilize FC-to-FC routing capabilities to consolidate the backup of multiple SANs in a single location. The key benefit of this centralized backup approach is optimizing the value of backup devices to increase staff productivity, reduce management overhead, and leverage off-peak network activity.
- **Long-distance SAN extension for business continuance:** The Brocade Extended Fabrics feature supports native Fibre Channel solutions up to 300 kilometers at full performance. With FCIP support, organizations without dedicated fiber can connect SANs through

existing IP WAN infrastructures. This longer-distance connectivity enables organizations to securely share SAN resources and move data between geographies more efficiently to support business continuance. Organizations can further reduce risk by combining Extended Fabrics or FCIP with FC-to-FC routing capabilities for SAN extension.

- **Low-cost server connectivity to SAN resources:** iSCSI-to-Fibre Channel protocol conversion provides a standards-based iSCSI integration solution that leverages existing Ethernet infrastructure. It also reduces costs by eliminating the need to purchase Fibre Channel Host Bus Adapters (HBAs) in order for iSCSI servers to access Fibre Channel storage resources in the SAN.

THE INNOVATIVE MULTIPROTOCOL ROUTER PLATFORM

The Multiprotocol Router is based on the SilkWorm Fabric Application Platform, the industry's first open, intelligent switching platform for hosting multiprotocol routing services and storage management applications within the SAN fabric. Designed to seamlessly integrate into existing SAN infrastructures, the Multiprotocol Router provides a single point of control and management for multiprotocol routing services.

A key aspect of this approach is the capability to support any of the multiprotocol routing services on a port-by-port basis. By integrating multiple services in a central platform, the Multiprotocol Router helps provide a flexible foundation for implementing a utility computing infrastructure and efficient Information Lifecycle Management (ILM) within a familiar Brocade SAN environment. As a result, it can be an ideal solution for improving operational efficiency while maximizing the value of both current and future SAN investments.

HIGH PERFORMANCE AND SIMPLIFIED MANAGEMENT

The Multiprotocol Router provides 16 ports in a 2U form factor, with each port operating at 1 or 2 Gbit/sec and capable of supporting Fibre Channel switching, Fibre Channel routing, iSCSI protocol conversion, or FCIP data traffic. In this way, the Multiprotocol Router provides the high performance required to run storage applications at line-rate speed.

Organizations can manage the Multiprotocol Router with the same tools they use to manage other Brocade SAN switches: a standard command line interface, Brocade Web Tools, or Brocade Fabric Manager. After the Multiprotocol Router is configured and connected to the SAN, no additional management is required. All LSAN management is performed from the SAN switches using a preferred zoning tool. For enhanced security, Brocade Advanced Zoning permits only authorized devices and applications to access data, increasing security and control.

SCALABILITY WITH PORTS ON DEMAND

The Multiprotocol Router comes with a minimum of eight ports enabled or a maximum of 16 ports enabled, giving organizations the flexibility to address their particular business needs. Organizations can easily expand from eight to 16 ports by activating a license. Because the Multiprotocol Router is easily upgradeable, it extends the Brocade modular "pay-as-you-grow" approach to support cost-effective business growth.

MAXIMIZING SAN INVESTMENTS

Brocade and its partners offer complete SAN solutions to meet a wide range of technology and business requirements. These solutions include education and training, support, service, and professional services to help optimize SAN investments. For more information, contact an authorized Brocade sales partner or visit www.brocade.com.

SILKWORM MULTIPROTOCOL ROUTER

Systems Architecture

Dual-mode ports	16 ports, Fibre Channel (E, F, EX) and Gigabit Ethernet
SilkWorm switch interoperability	SilkWorm 2xxx running Fabric OS® v2.6.1 or later SilkWorm 3200, 3800, 3600 running Fabric OS v3.1 or later (with limited support for v3.0.2g and later v3.0.xy versions) SilkWorm 3900 and 12000 running Fabric OS v4.1 or later (with limited support for v4.0.2x and later 4.0.xy versions) SilkWorm 3250, 3850, 24000 running Fabric OS v4.2.0x code or later SilkWorm 4100 running Fabric OS v4.4.0x code
Performance	Fibre Channel: 1.063/2.125 Gbit/sec line speed, full duplex; auto-sensing of 1 and 2 Gbit/sec port speeds; optionally programmable to fixed port speed; speed matching between 1 and 2 Gbit/sec ports Ethernet: 1.25 Gbit/sec
Aggregate bandwidth	64 Gbit/sec
Fabric latency	Depends on storage application
Maximum frame size	2112-byte payload for Fibre Channel, 1518 bytes for standard Gigabit Ethernet, 2250 bytes for networks supporting jumbo packet
Classes of service	Class 3
Port types	FL_Port (restricted), F_Port, EX_Port, and E_Port; self-discovery based on switch type (U_Port); Gigabit Ethernet
Media types	Small Form-Factor Pluggable (SFP) laser. Short-wave up to 500 m (1640 feet); long-wave up to 25 km (15.5 miles); and extended long-wave up to 100 km (62.1 miles). Distance depends on fiber optic cable and port speed.
Fabric services	Standard services include Simple Name Server, Registered State Change Notification (RSCN), Brocade Advanced Zoning, Brocade Exchange-based Trunking, Brocade Web Tools – AP Edition, iSCSI Gateway Service, and Brocade Extended Fabrics Service. Optional services include FCIP and Fibre Channel Routing Services.
Options	Redundant power supply, SFP media

Management

Supported management software	Telnet; SNMP (FE MIB, FC Management MIB); Brocade Advanced WEB TOOLS – AP Edition and Brocade Fabric Manager; third-party applications utilizing Brocade Fabric Access API
Management access	Dual 10/100 Ethernet (RJ-45), serial port
Diagnostics	POST and embedded online/offline diagnostics

Mechanicals

Enclosure	Non-cable-side to cable-side airflow; power from cable-side; 2U, 19-in.-EIA-rack compliant
Size	Height: 8.8 cm (3.5 in) Width: 42.7 cm (16.8 in) Depth: 63.5 cm (25.0 in)
System weight	15.9 kg (35.0 lb) with one power supply 18.1 kg (40.0 lb) with two power supplies

Environmentals

	Operating	Non-Operating
Temperature	10° to 40°C	-25°C to 70°C
Humidity	20 to 85%, non-condensing	20 to 85%, non-condensing
Altitude	3 km	3 km
Shock	105 G, 2.5 ms, half-sine	40 G, 13 ms, trapezoidal
Vibration	0.5 G (5-500-5Hz)	2.0 G (5-500-5Hz)
Power		
AC input	Nominal: 6.0A@100-120 VAC; 3.0A@200-240 VAC	
Frequency	47 to 63 Hz	

For information about supported SAN standards, visit www.brocade.com/sanstandards



Corporate Headquarters

San Jose, CA USA
T: (408) 333-8000
info@brocade.com

European and Latin American Headquarters

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

Asia Pacific Headquarters

Tokyo, Japan
T: +81-3-5402-5300
japan-info@brocade.com

© 2005 Brocade Communications Systems, Inc. All Rights Reserved. 02/05 GA-DS-665-03

Brocade, the Brocade B weave logo, Fabric OS, Secure Fabric OS, and SilkWorm are registered trademarks of Brocade Communications Systems, Inc., in the United States and/or in other countries. FICON is a registered trademark of IBM Corporation in the U.S. and other countries. All other brands, products, or service names are or may be trademarks or service marks of, and are used to identify, products or services 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.