

BROCADE FABRIC OS

The source of intelligence for SANs

Highlights

Fabric OS is a robust operating system for high-performance, scalable Storage Area Networks (SANs). Fabric OS allows network managers to:

- Rapidly build highly resilient, fault-tolerant multi-switch SAN fabrics
- Ensure high-speed access to business-critical data
- Allow hosts to dynamically share storage resources
- Rapidly scale the SAN by simply plugging in new devices—no configuration required
- Integrate private loops, private hosts, and private devices with the SAN
- Provide high performance through load balancing and sophisticated SAN management
- Easily manage the switches, hosts, and devices that comprise the SAN

Fabric OS is a real-time operating system that provides the core infrastructure growing businesses need to deploy scalable and robust Storage Area Networks (SANs). Fabric OS runs on the SilkWorm family of Fibre Channel switches. It supports scalable SAN fabrics that interconnect thousands of devices while ensuring high-performance data transfer among connected resources and servers. Fabric OS easily manages both large switch fabrics and Fibre Channel Arbitrated Loop (FC-AL) configurations. Moreover, Fabric OS is highly flexible, making it easy for network administrators to add functionality and scale their SANs at the speed of business.

Reliable Data Services

Fabric OS data services deliver high-speed data transfer among hosts and storage devices. Fabric OS data services include:

- **Universal port support for flexible fabric architectures.** Fabric OS identifies port types and initializes each connection specific to the attached Fibre Channel system, whether it is another switch, host, private loop, or fabric-aware target system.

- **Self-discovery of new devices by the fabric.**

Automatically discovers and registers new devices as they are connected.

- **Continuous monitoring of port for exception conditions.**

Disables data transfer to ports when they fail, such as when there is a loss of reliable communications on a link. The port is automatically re-enabled when the exception condition has been corrected, minimizing impact to production systems not experiencing exceptions.

- **BROCADE ZONING** (optional). Limits access to data by segmenting the fabric into virtual private storage area networks.

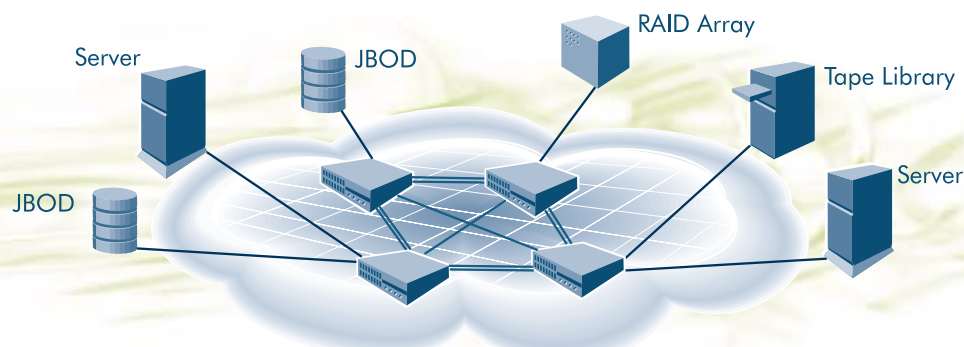
Services Based on Standards

Fabric OS provides a standard set of Fibre Channel services that provide fault resiliency and automatic reconfiguration when a new switch is introduced. These services include:

- **Management Server.** Supports in-band discovery of fabric elements and topology.
- **Simple Name Server (SNS).** Incorporates the latest Fibre Channel standards. SNS registers information about SAN hosts and storage devices. It also provides a Registered State Change Notification when a device state changes or a new devices introduced.
- **Alias Server.** Supports the Multicast Service that broadcasts data to all members of a group.

Support for Private Loop Configurations

Because many devices are designed for FC-AL configurations, a standard Fabric OS facility —*translative mode*—provides a mechanism to support private-loop devices. The fabric registers them, which enables hosts to access private devices as if they were public devices. In addition, QuickLoop™ (optional) provides loop-device support in a fabric. Best described as Private Loop Fabric Attach (PLFA), this advanced service allows attachment of private-



Fabric OS powers highly scalable and available SAN fabrics.

loop hosts and storage devices to a Fabric without modification to host drivers.

Routing Services for High Availability

Fabric OS provides dynamic routing services for high availability and maximum performance. Fabric OS routing services include:

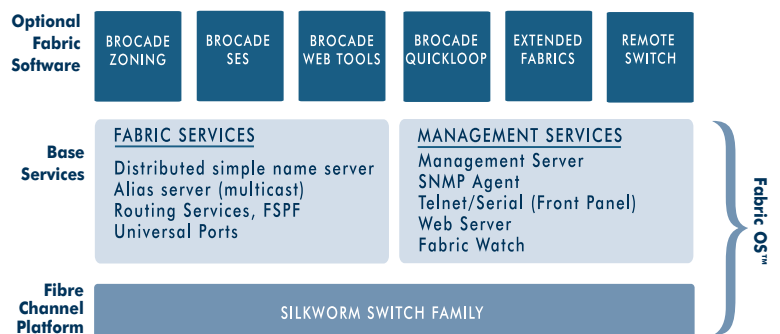
- **Dynamic path selection via Link State Protocols.**
Uses Fibre Channel Shortest Path First (FSPF) to select the most efficient route for transferring data in a multi-switch environment.
- **Load sharing to maximize throughput through Interswitch Links (ISLs).** Supports high throughput by having multiple ISLs between switches.
- **Automatic path failover.** Automatically reconfigures alternate paths when a link fails. Fabric OS distributes the new configuration fabric-wide and re-routes traffic without manual intervention.
- **In-order frame delivery.** Guarantees that frames arrive in order.
- **Automatic re-routing of frames when a fault occurs.** Re-routes traffic to alternative paths in the fabric without interruption of service or loss of data.
- **Routing support for link costs.** Lets network managers manually configure the link costs of individual ISLs to create custom FSPF functionality that support each business' unique network management objectives.
- **Support for high-priority protocol frames** (useful for clustering applications). Ensures that frames identified as priority frames receive priority routing to minimize latency.
- **Static routing support.** Allows network managers to configure fixed routes for some data traffic and ensure resiliency during a link failure.
- **Automatic reconfiguration.** Automatically re-routes data traffic onto new ISLs when they are added to the SAN fabric.

Management Interfaces

Fabric OS includes an extensive set of facilities for end-to-end SAN management, including:

- **Management server based on FC-GS-3.** Permits in-band access to fabric discovery.

- **SNMP management services**, such as:
 - ✓ An SNMP agent and a series of comprehensive Management Information Bases (MIBs). Assists with monitoring and configuring the switches.
 - ✓ An extensive set of trap conditions. Immediately alerts administration about critical exception conditions.
 - ✓ In-band (IP or over a Fibre Channel link) or external Ethernet interface. Gathers SNMP information and provides access to all the switches in the fabric through a single fabric connection.
- **Syslog daemon interface.** Directs exception messages to up to six recipients for comprehensive integration into a host-based management infrastructure.
- **Switch beaconing.** Identifies an individual switch among a group of remotely managed fabric elements.
- **Loop diagnostic facilities.** Assists in fault-isolation for loop-attached devices.
- **Front panel, serial port, telnet interfaces.** Provides an easy-to-use command-line-based management system. Options include:
 - ✓ Front panel management for SilkWorm 2800 switches.
 - ✓ Serial port management for all other models.
 - ✓ Telnet server for all SilkWorm switches.
- **BROCADE WEB TOOLS (optional).** Provides an easy-to-use graphical interface for managing all the switches in the SAN.
- **BROCADE SES (SCSI-3 Enclosure Services – optional).** Enables management without implementing IP.



Brocade Communications Systems Inc.
1901 Guadalupe Parkway, San Jose, CA 95131
T 408.487.8000 info@brocade.com
F 408.487.8101 www.brocade.com

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