BROCADE

Brocade Fabric OS v6.0.0a
Release Notes v2.0

December 14, 2007

Document History

Document Title	Summary of Changes	Publication Date
Brocade Fabric OS v6.0.0a Release Notes v1.0	First release	December 10, 2007
Brocade Fabric OS v6.0.0a Release Notes v2.0	Second release: Added Brocade DCX connectivity modes for interoperating with M-EOS fabrics, including table of FOS features supported in interopmodes.	December 14, 2007

Contents

Quick Look

If you are already using the most recent version of the Fabric OS v6.0.0 Release Notes, here are the changes between that version and this version.

- The table at the end of these notes contains a list of the defects closed since the release of the Fabric OS v6.0.0 release notes.
- The TopTalkers feature now supports switch-wide E_port information, and issues with F_port information accuracy have been resolved.
- Issues with long distance configurations on the FC10-6 blade have been resolved and are now addressed automatically by FOS.
- The Brocade DCX can support up to four FA4-18 blades per chassis.
- The Brocade DCX supports new connectivity modes for interoperating in M-EOS fabrics in either McDATA Fabric Mode or Open Fabric Mode.
- FCR scalability limits have been increased, and the table now includes both tested and supported scalability limits.
- An important note for the DCX has been added in the "Others" section regarding the *switchstatusshow* command.
- Minor update to the *Brocade Fabric OS Administrator's Guide* documentation section noting a change in the Admin Guide.

Overview

Brocade Fabric OS v6.0.0 supports the following new hardware platforms and blades:

• The Brocade® DCX Data Center Backbone, 384 ports at 8Gbit with 64 Inter Chassis Links
• FC8-16 16-port 8Gb FC blade for both the Brocade DCX and the Brocade 48000 enterprise-class platforms
• FC8-32 32-port 8Gb FC blade for the DCX
• FC8-48 48-port 8Gb FC blade for the DCX

In addition to support for the new hardware platform and blades, there are numerous new features in Fabric OS v6.0, including:

- New Security Features
  - 1MB Security Database
  - Active Directory support (all platforms)
  - FIPS compliance (certification in progress with v6.0.0)
- New Adaptive Networking Features
  - Ingress Rate Limiting (8G capable ports in DCX or 48000)
  - Flow Based Prioritization (DCX)
- Traffic Isolation Zones
- FCIP
  - IPv6 support
  - VLAN Tagging (FR4-18i/7500)
- USB Support (DCX only)
- Inter Chassis Links or "ICLs" (DCX only)
- M-EOS Native Fabric Interoperability (Brocade DCX, 48000, 7500, 7600, 5000, 4900, 200E, 4012, 4016, 4018, 4020 and 4024)
- Enhancements to Access Gateway

        - Auto port configuration policy
        - Port Grouping and Preferred N_Port failover policy
        - Multiple fabric support
    - TopTalkers (DCX, 48000, 5000, 4900, 4100 only)

New Feature Descriptions

Security Features:

- **1MB Security database-** Fabric OS now supports a security database up to 1MB in size, four times the previous 256KB database. This database, which is used to store DCC, SCC, and FCS policies, can now accommodate ACL security settings for environments with up to approximately 14,000 attached devices. This is supported on all platforms other than 200E.
- **Active Directory** – Provides Lightweight Directory Access Protocol (LDAP) client module support in FOS for user authentication and authorization against Active Directory services in corporate networks.
- **FIPS Compliance** – Fabric OS v6.0 introduces a new Federal Information Processing Standard (FIPS) mode in FOS where only FIPS 140-2 compliant algorithms will be allowed. The certification of the v6.0.0 code is in progress.

Adaptive Networking with QoS (licensed feature):

- **Ingress Rate Limiting** – This feature allows the ASIC to delay the return of BB credits to the external device. By doing so, a user can limit the throughput on the ingress side of a port, thereby removing potential congestion scenarios within a fabric caused by heavy bandwidth consumption by low priority applications. Ingress rate limiting is only supported on F/FL ports, and is only available on 8G capable ports.
- **Flow Based Prioritization** – By exploiting the Virtual Channel (VC) capability in Brocade's advanced ASICs, a user can specify a specific priority for any existing zones. This new licensed Quality of Service (QoS) capability, available on all 8G capable ports in the DCX, allocates the largest portion of available bandwidth to high priority traffic and the smallest amount to low priority traffic. SID/DID flow pairs not explicitly set as having high or low priority automatically default to medium priority. Flow Based Prioritization can be configured by utilizing existing zones, allowing the user to quickly establish priority for specific application flows within a fabric.

TopTalkers

The new TopTalkers feature, part of the optional Advanced Performance Monitoring license, provides real-time information about the top 'n' bandwidth consuming flows passing through a specific point in the network. TopTalkers can be enabled on individual F_ports as well as provide information about top consumers of bandwidth for all E_port connections on a switch.

Traffic Isolation Zones

Traffic Isolation Zones is a new capability that allows the user to isolate traffic assigned to ISLs within the fabric. This provides the option to segregate some applications from others, guaranteeing separate paths through the fabric.

FCIP

- **FCIP IPv6** – With FOS v6.0, the individual FCIP tunnels can be configured as either IPv4 or IPv6

- **VLAN Tagging** – Each FCIP tunnel has the option to specify whether VLAN tagging will be supported, with a designated VLAN ID and L2 CoS (priority bits) specified at the time of creation. All frames will be tagged according to IEEE 802.1Q and 802.1p specifications.

DCX

- **Blades supported in DCX:**
  - FC8-16/32/48
  - FR4-18i
  - FC10-6
  - FA4-18
- **USB Support** – The DCX chassis supports a USB port on the CP that can be used for various serviceability functions. The USB port is designed to attach an optional USB storage device, and will support downloading of new firmware images, collection of supportsave data, and configdownload/upload data.
- **Inter Chassis Links** – Also known as ICLs, these high bandwidth connections are supported on the DCX and provide dedicated links between two chassis. Enabling the ICL capability requires an optional license to be installed on each unit. When fully enabled, ICLs provide 1Tb of bidirectional bandwidth, allowing more ports on the DCX to be designated for connections to hosts and arrays.

M-EOS Interoperability

- **M-EOS Native Fabric Mode support –** Fabric OS v6.0 supports "interopmode 2", which allows a FOS-based switch to participate directly in M-EOS fabrics running in **McDATA Fabric Mode**. Interopmode 2 is supported on the Brocade DCX with 8G blades, 48000 with 4G blades, 7500, 7600, 200e, 4900, 5000 and the 4012/4016/4018/4020/4024 embedded switches. M-EOS products in the fabric must be operating with M-EOS v9.6.2 or later.
- **M-EOS Open Fabric Mode support –** Fabric OS v6.0 supports "interopmode 3", which allows a FOS-based switch to participate directly in M-EOS fabrics running in **Open Fabric Mode**. Interopmode 3 replaces the interopmode 1 capability provided in earlier versions of Fabric OS. This capability is supported on the Brocade DCX with 8G blades, 48000 with 4G blades, 7500, 7600, 200e, 4900, 5000 and the 4012/4016/4018/4020/4024 embedded switches. M-EOS products in the fabric must be operating with M-EOS v9.6.2 or later.

Access Gateway Enhancements:

- **Auto Port Configuration (APC) Policy–** Provides the ability to automatically discover port types (host vs. fabric) and dynamically update the routing maps when a new connection is detected. This policy is intended for a fully hands-off operation.
- **Multi-Fabric Connectivity –** Fabric OS v6.0 allows an AG enabled product to connect to multiple fabrics. This is done through partitioning related host and fabric connections into independently operated groups.
- **Enhanced Path Failover –** Customers can explicitly restrict N_Port failover to a group of N_Ports (Port Grouping Policy) or to a single secondary path (Preferred N_Port).

Optionally Licensed Software

This Fabric OS release includes all basic switch and fabric support software, as well as the following optionally licensed software that is enabled via license keys:

- Brocade Web Tools—Administration, configuration, and maintenance of fabric switches and SANs (license provided on all products)
- Brocade Advanced Zoning—Division of a fabric into virtual private SANs (license provided on all products)
- Brocade Ports on Demand—Allows customers to instantly scale the fabric by provisioning additional ports via license key upgrade (applies to some models of switches).
- Brocade Extended Fabrics—Provide up to 500 km of switched fabric connectivity over long distances.
- Brocade ISL Trunking—Provides the ability to aggregate multiple physical links into one logical link for enhanced network performance and fault tolerance.
- Brocade Fabric Manager—Enables administration, configuration, and maintenance of fabric switches and SANs with host-based software.
- Brocade Advanced Performance Monitoring—Enables performance monitoring of networked storage resources. This license includes the new TopTalkers feature described in this document.
- FC-IP Services (For the FR4-18i and Brocade 7500) -- This license key will also include the FC Fastwrite feature.
- Brocade Fabric Watch—Monitors mission-critical switch operations.
- FICON Management Server— Also known as "CUP" (Control Unit Port), enables host-control of switches in Mainframe environments. (Available only on FICON-qualified products)
- ICLs, or Inter Chassis Links — Provide dedicated high-bandwidth links between two Brocade DCX chassis, without consuming valuable front-end 8G ports. Each DCX must have the ICL license installed in order to enable the ICL connections. (Available on the DCX only)
- Adaptive Networking with QoS—This is a new feature in Fabric OS v6.0.0 providing a rich framework of capability allowing a user to ensure high priority connections to obtain the bandwidth necessary for optimum performance, even in congested environments. The QoS SID/DID Prioritization and Ingress rate limiting features are the first components of this license option.

Licensed Software Bundled as Standard

The following licensed software is bundled with the hardware and no additional purchase is necessary:

- IPSec – IP Security (for the Brocade 7500 and FR4-18i blade in the Brocade 48000)
- NPIV – N-port ID Virtualization, allowing up to 256 virtual addresses per physical port

Supported Switches

Fabric OS v6.0.0 supports the Brocade 4012/4016/4018/4020/4024, 4100, 4900, 5000, 7500, 7600, 200E, 48000 and DCX.
Access Gateway is also supported by Fabric OS v6.0.0, and is supported on the following switches: the Brocade 200E, 4012, 4016, 4018, 4020, and 4024.

Standards Compliance

This software conforms to the Fibre Channel Standards in a manner consistent with accepted engineering practices and procedures. In certain cases, Brocade might add proprietary supplemental functions to those specified in the standards. For a list of standards conformance, visit the following Brocade Web site: *http://www.brocade.com/sanstandards*

Technical Support

Contact your switch supplier for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information immediately available:

1. General Information

- Technical Support contract number, if applicable
- Switch model
- Switch operating system version
- Error numbers and messages received
- **supportSave** command output
- Detailed description of the problem, including the switch or fabric behavior immediately following the problem, and specific questions
- Description of any troubleshooting steps already performed and the results
- Serial console and Telnet session logs
- Syslog message logs

2. Switch Serial Number

The switch serial number and corresponding bar code are provided on the serial number label, as shown here.

The serial number label is located as follows:

- Brocade 200E—On the nonport side of the chassis
- Brocade 4100, 4900, and 7500—On the switch ID pull-out tab located inside the chassis on the port side on the left
- Brocade 5000—On the switch ID pull-out tab located on the bottom of the port side of the switch
- Brocade 7600—On the bottom of the chassis
- Brocade 48000 —Inside the chassis next to the power supply bays
- Brocade DCX—Bottom right of the port side.

3. **World Wide Name (WWN)**

   Use the **wwn** command to display the switch WWN.

   If you cannot use the **wwn** command because the switch is inoperable, you can get the WWN from the same place as the serial number, except for the Brocade DCX. For the Brocade DCX, access the numbers on the WWN cards by removing the Brocade logo plate at the top of the non-port side. The WWN is printed on the LED side of both cards.

Important Notes

This section lists information that you should consider before you use this firmware release.

Fabric OS Compatibility

The following table lists the earliest versions of Brocade software supported in this release, that is, the *earliest* supported software versions that interoperate. Brocade recommends using the *latest* software versions to get the greatest benefit from the SAN.

For a list of the effective end-of-life dates for all versions of Fabric OS, visit the following Brocade Web site:

http://www.brocade.com/support/end_of_life.jsp

Supported Products and FOS Interoperability	
Brocade 2000-series switches	Not supported, end of support (December 2007)
SilkWorm 3000, 3200, 3800	v3.2.1c
SilkWorm 12000	v5.0.x
SilkWorm 3014, 3016, 3250, 3850 and Brocade 3900, 24000	v5.1 and higher
Brocade 200E, 4100, 7500, 48000	v5.1.0 and higher
Brocade 4900	v5.2.0 and higher
Brocade 4012, 4016, 4018, 4020, 4024	v5.2.1 and higher
Brocade 5000	v5.2.1 and higher
Brocade 7600	v5.3.0 and higher
Brocade DCX	v6.0.0 and higher
Secure Fabric OS (on any model)	Not Supported in v6.0.0
Mi10k, M6140, ED-6064, ES-3232, ES-4300, ES-4400, ES-4500, ES-4700 (McDATA Fabric Mode and Open Fabric Mode) [1]	M-EOS v9.6.2 [2]

McDATA ED-5000 32-port FC director	Not Supported
Supported Products and FOS Interoperability	
McDATA SANRouters 1620 and 2640	Not Supported
Large Fabric Support	
SilkWorm 12000	v5.0.x
SilkWorm 3014, 3016, 3250, 3850 and Brocade 3900, 24000	v5.1.0 and higher
Brocade 200E, 4100, 7500, 48000	v5.1.0 and higher
Brocade 4900	v5.2.0 and higher
Brocade 4012, 4016, 4018, 4020, 4024	v5.2.1 and higher
Brocade 5000	v5.2.1 and higher
Brocade 7600	v5.3.0 and higher
Brocade DCX	v6.0.0 and higher
Multi-Protocol Router interop	
Brocade 7420	XPath v7.4.1
Brocade 7500 and FR4-18i blade	v5.1.0 and higher

Notes:

[1]Other M-EOS models may participate in a fabric with FOS v6.0.0, but may not be directly attached via E_port to any products running FOS v6.0.0. The McDATA ED-5000 director may not participate in a mixed M-EOS/FOS fabric.

[2]It is highly recommended that M-EOS products operate with the most recent version of M-EOS released and supported for interoperability. M-EOS 9.6.2 is the minimum version of firmware that can be used to interoperate with FOS 6.0.0 or later.

Fabric OS v6.0.0 software is fully qualified and supports the blades for the 48000 noted in the table below.

48000 Blade Support matrix with chassis option 5	
Port blade 16, 32 and 48-port 4Gbit blades (FC4-16, FC4-32, FC4-48), the 16-port 8Gbit blade (FC8-16), and the 6-port 10G FC blade (FC10-6)	Supported with any mix and up to 8 of each. No restrictions around intermix. Also the 4Gbit blade only requires 2 PS, where 8 10G blades will require 4 PS's. The 48000 must run Fabric OS v6.0 or later to support the FC8-16 port blade.

Intelligent blade	Up to a total of 4 Intelligent blades (includes iSCSI, FCIP/FCR and Application blade), FC4-16IP, FR4-18i, and FA4-18 respectively. See below for intermix limitations, exceptions, and a max of each blade.
iSCSI blade (FC4-16IP)	Up to a max of 4 blades
FC-IP/FC Router blade (FR4-18i)	Up to a max of 2 blades of this type. This can be extended under special circumstances but must be approved by Brocade's Product Team. Up to 8 FR4-18i blades can be installed if they are used only for FC Fastwrite or FCIP without routing.
Virtualization/Application Blade (FA4-18)	Up to a max of 2 blades of this type.

Fabric OS v6.0.0 software is fully qualified and supports the blades for the DCX noted in the table below.

DCX Blade Support matrix	
16-, 32- and 48-port 8Gbit port blades (FC8-16, FC8-32, FC8-48) and the 6-port 10G FC blade (FC10-6)	Supported with 6.0 and above with any mix and up to 8 of each. No restrictions around intermix.
Intelligent blade	Up to a total of 8 Intelligent blades. See below for maximum supported limits of each blade.
FC-IP/FC Router blade (FR4-18i)	Up to a max of 4 blades of this type. This can be extended under special circumstances, but must be approved by Brocade's Product Team. Up to 8 FR4-18i blades can be installed if they are used only for FC Fastwrite or FCIP without routing.
Virtualization/Application Blade (FA4-18)	Up to a max of 4 blades of this type.

Note: the iSCSI FC4-16IP blade is not qualified for the DCX in Fabric OS v6.0.0.

Secure Fabric OS

Secure Fabric OS (SFOS) is not compatible with FOS v6.0.0. Customers that wish to use the security features available in SFOS should upgrade to FOS v5.3.x, which includes all SFOS features as part of the base FOS. For environments with SFOS installed on switches that cannot be upgraded to FOS v5.3 or later, FC routing can be used to interoperate with FOS v6.0.0.

FOS Feature Compatibility in Interoperability Modes

Some FOS features are not fully supported when operating in the new connectivity modes. The following table specifies the support of various FOS features when operating in either interopmode 2 (McDATA Fabric Mode) or interopmode 3 (Open Fabric Mode).

FOS Features (supported in interopmode 0)	**Interopmode 2 McDATA Fabric Mode**	**Interopmode 3 Open Fabric Mode**
FOS Hot Code Load (including FCR)	Yes[6]	Yes[6]
Zone Activation Support	Yes	No
Traffic Isolation Zones	No	No
Frame Redirection	No	No
FCR Fabric Binding (route to M-EOS fabric w/ Fabric binding)	Yes	No
Fabric Binding (aka SANtegrity) via SCC policies	Yes[3]	No
DCC policies	No	No
SCC policies	Yes[3]	No
E_Port/Ex_Port Authentication	No	No
ISL Trunking (frame-level)	Yes[1]	No
Dynamic Path Selection (DPS, exchange based routing)	Yes[2]	No
Dynamic Load Sharing (DLS, port based routing)	Yes	Yes
Virtual Channels (VC RDY)	Yes[1]	No
Adaptive Networking: QoS	No	No
Adaptive Networking: Ingress Rate Limiting	No	No
Advanced Performance Monitoring (APM)	No	No
APM: TopTalkers	No	No
Virtual Fabrics using Admin Domains	No	No
Fabric Watch	Yes	Yes
Ports on Demand (POD)	Yes	Yes
NPIV	Yes	Yes
Timer Server function (NTP)	No	No
Broadcast Zoning	No	No
FDMI	No	No
QuickLoop Fabric Assist	No	No
Remote Switch	No	No
Port Mirroring	Yes	Yes
Extended Fabrics	Yes	Yes[4]
Alias Server	No	No
Platform Service	No	No
FCIP (VE_Ports)	Yes	No
IPFC (IP over FC)	Yes[5]	Yes[5]
M-EOS ALPA 0x13 configuration	Yes	Yes
VE to VEX_Port (Routing over FCIP)	No	No
FOS 10Gb to FOS 10Gb ISL	No	No

Notes

1. Only allowed between FOS-based switches
2. DPS is supported outbound from FOS-based switches. (M-EOS can provide reciprocal load balancing using OpenTrunking).
3. SCC policies in interopmodes only supported in conjunction with Fabric Binding
4. Not on FCR
5. Only supported locally within the FOS switch
6. Hot Code Load is supported for FR4-18i blades in a 48000 as the backbone switch

Firmware Upgrades and Downgrades

Upgrading to Fabric OS v6.0.0 is only allowed from Fabric OS v5.3.x. This is a change in policy from prior releases, where "2-level" migrations were supported. The new policy to support only 1-level migration has been implemented to provide more reliable and robust migrations for customers. By having fewer major changes in internal databases, configurations, and subsystems, the system is able to perform the upgrade more efficiently, taking less time and ensuring a truly seamless and non-disruptive process for the fabric. The new 1-release policy also reduces the large number of upgrade/downgrade permutations that must be tested, allowing Brocade to spend more effort ensuring the supported migration paths are thoroughly and completely verified.

SAS version requirements for FA4-18 and 7600:

SAS v3.1.0 is the supported SAS version for FOS v6.0.0.

- When upgrading from FOS v5.3 to v6.0 and SAS 3.0.0 to SAS 3.1.0, first upgrade FOS v5.3 to v6.0 and then upgrade SAS from 3.0.0 to 3.1.0.
- When downgrading from FOS v6.0 to v5.3 and SAS 3.1.0 to SAS 3.0.0, first downgrade SAS from 3.1.0 to 3.0.0 and then downgrade FOS from v6.0 to v5.3.

Note: The Brocade 5000 switch running Fabric OS v5.2.1_NI may upgrade directly to Fabric OS v6.0. The Fabric OS v5.3.x release does not support Native Interoperability.

Only products based on 4G- and 8G-capable ASICs are supported by Fabric OS v6.0. Older products utilizing previous generation 2G ASICs will remain on the FOS v5.x code stream. FOS v5.x is fully compatible in fabrics with FOS v6.0, as well as for routing. The Brocade 12000 is not supported with FOS v5.3.0. The last releases supporting the 12000 are the FOS v5.0.x releases.

Upgrade considerations for meta-SANs or fabrics which contain both EOS and FOS platforms:

- Fibre Channel Routed fabrics (meta-SANs): It is recommended that upgrades be conducted in the following order:
  - Upgrade the backbone FCRs (Brocade 48000) to v6.0.0.
  - Upgrade of edge EOS fabrics/switches to v9.6.2.
  - Upgrade FOS edge switches to v6.0.0
- L2 Interoperability Fabrics: It is recommended that upgrades be conducted in the following order:
  - Upgrade EOS fabrics/switches to v9.6.2.
  - Upgrade FOS switches to v6.0.0
- For routed fabrics, upgrades from prior releases will be non-disruptive if all EX_Ports to M-EOS edge fabrics are attached to Brocade 48000 directors with an FR4-18i blade.

Products that cannot be upgraded to Fabric OS v6.0 or later:
• Brocade 3014, 3016, 3250, 3850, 3900, and 24000.

Products that can be upgraded to Fabric OS v6.0 or later:
• Brocade 4012/4016/4018/4020/4024, 4100, 4900, 5000, 7500, 7600, 200E and 48000.

Scalability of Fabric OS v6.0.0 is increased for the DCX. Due to the increased processing capability from the new CPU in the DCX, fabrics of up to 6000 virtual or physical connections (WWNs logged into a single fabric) and 56 domains (domain support is the same as on previous FOS releases) can be supported. Other products running FOS v6.0 will retain the same fabric limits as FOS v5.3.x for non-routed fabrics (i.e., L2 only, 56 domains and 2560-ports).

Routed scalability limits are noted in the table below.

Fibre Channel Routing Scalability (Tested/Supported Limits)	
Max # edge fabrics per metaSAN	32/48
Max # edge fabrics per chassis	16/48
Max # switches per edge fabric (FOS)	26/26
Max # switches per edge fabric (M-EOS fabric) [1]	16/ 16
Max # WWNs per edge fabric (M-EOS fabric) [1]	800/1500
Max # imported devices per fabric (M-EOS fabric) [1]	300/1000
Max # L2 switches per backbone fabric	12/12
Max # FCR's per backbone fabric	12/12
Max # WWNs per edge fabric (FOS)	1200/1500
Max # WWNs per backbone fabric	512/1024
Max # imported devices per fabric	1000/1000
Max # LSAN device per metaSAN	10000/10000
Max # LSAN zones per metaSAN	3000/3000[2]
Max # devices per LSAN zone	64/64
Max # hops between edge switches	12/12
EX_Ports per FCR (48K)	32/64
EX_Ports per FCR (Neptune)	64/64

Table Notes:

[1]M-EOS fabrics must be running M-EOS 9.6.2 firmware or later.

[2]All BB FCRs with Fabric OS v6.0.0 and above.

Other Notes:

1) IPFC over FCR is only supported for edge to edge.

2) FC Fast Write is only supported for edge to edge.

3) The BB cannot run in interopmode 2 (McDATA Native Interop) or 3 (Open mode). It must be in FOS native mode.

FICON Support

The FC4-48 and FC8-48 Fibre Channel port blades are not supported to connect to System z environments via FICON channels or via FCP zLinux on System z. To attach the Brocade 48000 or DCX to the System z environment, use an FC4-16, FC4-32, FC8-16 or FC8-32 Fibre Channel port blade**.**

Fabric OS

Adaptive Networking/Flow-Based QoS Prioritization:

- When using QoS in a fabric with 4G ports or switches, FOS v6.0 or later must be installed on all products in order to pass QoS info. E_Ports from the DCX to other switches must come up AFTER v6.0 is running on those switches.
- Flow based QoS is NOT supported on 8G blades in the Brocade 48000.
- Any products that are not capable of operating with FOS v6.0 may NOT exist in a fabric with flow based QoS.
- If trunks are used, there should be at least two flows per priority going through the trunk. Otherwise, bandwidth allocation might not be prioritized proportionally.

Traffic Isolation:

- When configuring a TI zone with failover disabled, the user needs to make sure that the E-ports of the TI zone are corresponding to valid paths (use *topologyshow* at the CLI to verify this), otherwise the route might be missing for ports in that TI zone.

FCR Backbone Fabric ID change:

- Disable the switch before modifying the backbone fabric IDs with FC8 blades present on the Brocade DCX or 48000 with an FR4-18i requires the switch to be disabled.
- If there is more than one backbone, the backbone fabric ID must be changed on all but one backbone in order to keep the IDs unique.

FCS Automatic Distribution

- When using the FCS Automatic Distribution feature in Fabric OS v6.0, all switches in the fabric must be running at v6.0 or later. If any switches are running FOS v5.x or earlier, only manual distribution can be used.
- FCS automatic distribution is supported in strict mode and tolerant mode.

Access Gateway Auto Detect mode in M-EOS fabrics

- When in Access Gateway mode, the Automatic Port Configuration policy may not work when attached to M-EOS switches. M-EOS ports should be set to G_port to prevent problems with port type discovery.

New Brocade SFPs

- All 8Gb blades will function only with Brocade branded SFPs. There will be 8Gb and 4Gb Brocade branded SFPs available to customers. Attempts to place non-Brocade branded SFPs in 8Gb blades will cause the blade to display the SFP as invalid (mod_inv). Brocade branded SFPs can be used in other products and will be recognized as Brocade branded SFPs.

DCX ICLs

- When connecting two Brocade DCX chassis, the universal connect of the ICLs is now from upper to lower and they are color coded.

8G-to-4G blade LD links

- When connecting 8G capable long-distance ports to 4G capable long-distance ports, the maximum number of buffers supported is 250.

Others

The following are known issues in this release of Fabric OS.

Areas	Description
Brocade 7500	• Brocade 7500 fans operate at the correct speed, that is, at maximum on bootup. However, this initial speed may trigger an error message that indicates that the speed is too high ("above threshold"). You can disregard this message; the fan speed is adjusted to a nominal speed shortly after bootup. This message is benevolent. The fan speed will be adjusted to a nominal speed shortly after bootup.
Brocade DCX	• Brocade DCX power supplies operate correctly; however, at initial power on, a faulty message may be seen, followed by a healthy message. You can disregard the faulty message; the power supply sensor may initially fail but quickly transitions to a healthy status shortly after power up. • If the power supplies in a DCX are in slots 1 and 3, or 2 and 4, the *switchstatusshow* command will display "Power supplies monitor MARGINAL," even though there is nothing wrong with the power supplies. Reposition the power supply in slot 3 or slot 4 to slot 2. With the power supplies in slots 1 and 2, the command will display the correct status. • When Inter Cassis links are used, some ports may encounter CRC errors, resulting in lower throughput due to ICL cable tolerance.
Brocade 48000	• Before moving the slider UP on a Control Processor blade that is being activated, observe that amber LED is not ON for the active CP for at least 5 seconds and all LEDs are off on new inserted CP. • In a core-edge design, when a fully populated 384-port Brocade 48000 (populated with 8 FC4-48 blades) is an edge switch in a large SAN, it should not be the principal switch. SAN design best practice recommends deploying a high port-count switch in the core as the principal switch to optimize behavior and performance.

Areas	Description
FC4-48 port blade for the Brocade 48000	• Configure command only gives a maximum login per port setting. The command allows over 127, where ports for the FC4-48 blade will honor that value as long as its share areas values are 127 or less. • Before replacing FC4-32 blade with FC4-48 blade, restore ports 16 – 31 of the FC4-32 blade if these ports are used for port swapping. Failure to do so will fault the FC4-48 blade. The only way to restore back to original settings is to add the FC4-32 blade back in to the slot and port swap the ports back to port's default setting. • FC4-48 ports should not belong to the zone or in an administrative domain in which FICON devices are present. • FC4-48 blade does not support loop. Private L_Ports will be shown on these ports in switchShow, but will not participate in the fabric. • The porttest and spinfab commands on any platform will not work on E_Ports connected to a FC4-48 port. • In a core-edge design, making an edge 384-port Brocade 48000 the principal switch causes high CPU utilization and may cause panics. SAN design best practice recommends moving the reduction of fabric stress and ease of management. • *The FC4-48 Fibre Channel port blade is not supported to connect to the System z environments via FICON channels or via FCP zLinux on System z. To use the Brocade 48000 director to attach to the System z environment, please use the FC4-16 or FC4-32 Fibre Channel port blades* • All zones involving the shared ports (domain, port or WWN) of an FC4-48 blade would be treated as session based in "interopmode 2" fabric configuration.
FC10-6 Blade	• In rare instances POST/System verification failures have been observed on the FC10-6.
FA4-18	• If a user wants to move an FA4-18 blade running FOS prior to v5.3.0b from a 48000 to a DCX, it must initially go into slots 1-3 in the DCX. After the blade is auto-leveled to FOS v6.0.0, they can be placed in any slot.
FC4-16IP	• Upon firmware download the FC4-16IP blade does not preserve disabled GE ports in disabled state. If you wish to retain GE ports in a disabled state across firmware download, you must configure them as persistently disabled.

Areas	Description
Fabric OS – CLI commands	• This release does not support underscore (_) as part of the name for dd and ddset in the **iscsicfg** command. • The **slotOff** and **slowOn** commands are now obsolete; use **slotPowerOff** and **slotPowerOn** instead. The **portLogPortShow** command is also now obsolete. • When performing a configdownload, you may receive a message stating "configDownload not permitted." An invalid parameter was passed to the switch. The invalid parameter could be from a switch security policy, such as the password policy, or the NTP server address. This causes a partial configuration to be downloaded onto the switch. For example, when an NTP server address is invalid, configdownload fails and all data processed prior to the NTP server address data had already been saved in the switch and cannot be backed out. To fix the problem, correct the invalid parameter and re-issue the configdownload command.

IPSec for FR4-18i blade and SW7500	• IPSec implementation details:
	  o Pre-shared key
	  o Main mode (IKE negotiation protocol)
	  o Tunnel mode in ESP (Encapsulating Security Payload)
	• IPSec specific statistics not provided
	• No NAT or IPv6 support
	• Jumbo frames will not be supported on secure tunnels.
	• ICMP redirect is not supported for IPSec-enabled tunnels.
	• Only a single secure tunnel will be allowed on a port. Non-secure tunnels will not be allowed on the same port as secure tunnels.
	• Modify operations are not allowed on secure tunnels. To change the configuration of a secure tunnel, you must first delete the tunnel and then recreate it with the desired options.
	• Only a single route is supported on an interface with a secure tunnel.
	• An IPSec tunnel cannot be created using the same local IP address if ipperf is active and using the same local IP address (source IP address).
	• Unidirectional supported throughput is ~104Mbytes/sec and bidirectional supported throughput is ~90Mbytes/sec.
	• An IPSec tunnel takes longer to come online than a non-IPSec tunnel.
	• Fabric OS v6.0.0 does not support IPSec with VLAN Tagging.
	• VLAN tagging support and IPSec support are mutually exclusive on a per tunnel basis.

Areas	Description
IPv6 FCIP Tunnels	• Fabric OS v6.0.0 does not support compression for IPv6 FCIP Tunnels • Fabric OS v6.0.0 does not support IPSec for IPv6 tunnels.
Distance mode	• Distance setting is not persistent. After a configuration uploads and downloads, distance settings will be lost and the desired distance will be shown as 0.
FC Routing	• If a SilkWorm AP7420 is present in the backbone fabric, the command "fosconfig - disable fcr" may take up to 8 minutes to complete. If the AP7420 is replaced by a FR4-18i or Brocade 7500, the command completes immediately. • EX_Port trunking is not enabled by default. • FCR switch does not support an edge fabric with one McDATA switch set to 'never principal'. The EX_Port connected to that edge fabric will not come up. • FCR switch does not support edge fabrics that consist of McDATA switches with 'domain ID offset'. The EX_Port connected to that edge fabric may fail the RDI process and will not come up. EX_Port s come up disabled (failed to init in time) if attached to a Native mode switch running EOS 9.x that has non-default DID offset configured.
Diagnostics	• All offline diagnostics commands should be used only when the switch is disabled. • POST can fail if new SFPs are added during POST. SFPs should only be added while the switch is "online" or if the switch is powered off. • When you use the diagnostic commands **systemVerification** and **diagSetBurnin**, the switch or blade will fault when the burn-in error log is full. Clear the burn-in log before running **systemVerification** or **diagSetBurnin.** • If there are ISLs present on the switch that are not used for routing (due to them having higher linkcosts), disable the links before running **spinfab**.
HA	• If there is an already segmented port and backbone devices are exported to an edge fabric, a build fabric / fabric reconfiguration can occur after running **haFailover.** Ensure that there are no segmented ports before upgrading firmware.
Fabric Merge	• Do not try to merge fabrics with conflicting domain IDs over a VE_Port. Before merging two fabrics over FC-IP with VE_Ports at each end, it is recommended that all domain ID and zoning conflicts are resolved.

Areas	Description
Scalability	• Support for Default Zoning policies have been added to Fabric OS v5.1.0. Typically, when you issue the **cfgDisable** command in a large fabric with thousands of devices, the name server indicates to all hosts that they can communicate with each other. To ensure that all devices in a fabric do not see each other during a **cfgDisable** operation, you can activate a *Default Zone* with policy set to "no access". If Default zoning policies are enabled, all **cfgEnable**/**Disable** commands and zoning changes must be run from a switch in the fabric running Fabric OS v5.1.0 or later. • In large fabrics with more than 1,000 ports, it is recommended that the MS Platform Database is disabled, it is also required that the Platform DB be disabled before downgrading to previous versions of Fabric OS. This can be done using the **msPLMgmtDeactivate** command.
FRU insertion	• FW_FRU_INSERTED message is displayed twice when a power supply FRU is inserted and powered on. There is no functional impact.
System boot	• Not all Fabric OS services are available when the prompt becomes available during boot up. Wait for all the services to come up before using the switch or performing zoning actions.
Performance Monitoring	• If the user tries to save more than 512 monitors using the **perfCfgSave** command, some of the monitors may be lost.
Management – Proxy switches	• If you are using a Fabric OS v4.x switch as an API or SMI-S proxy to manage a switch running v5.1.0 or above, you must be running Fabric OS v4.4.0d, as a minimum requirement.
FC Fast Write	• Only WWN zoning (including normal zones and FC Fast Write zones) is supported for FC Fast Write enabled ports. • Only single device loop port is supported. • NPIV (example Access gateway) port is not supported. • FCR backbone devices are not supported. That is, FC Fast Write should not be enabled on backbone devices. • FCR edge to edge support requires that all ports used to connect the edge fabric be in FC Fast Write mode. The Brocade 7500 or FR4-18i in the edge fabric where the target devices are attached must be connected in FC Fastwrite mode. • FC Fast Write should not be enabled on ports when testing the remote mirror application. • When a very high volume of traffic is being sent by the host, FC Fast Write IOs may time out and frames may be dropped. • Within the context of FC Fast Write, L_Ports are not supported.

Areas	Description
iSCSI	• Enterprise storage array targets may not show up consistently in the disk management window of an iSCSI initiator when the same LUNs are mapped to two different virtual targets (VTs). When the initiator logs in to the VTs, the targets keep disappearing from the disk management window. If the session to one of the VTs is disconnected, the remaining VT appears and stabilizes in the disk management window. • Under certain conditions, hosts on an IP network may not be able to issue a ping command to iSCSI gateway ports in another subnet. You can work around this problem by issuing a ping command from the iSCSI gateway port. The hosts will then be able to successfully issue ping commands to the iSCSI gateway port. • An IP network disconnection lasting five seconds or more may cause COPA failure on the disconnected PC, which in turn may cause a loss of connection to an enterprise storage array • If traffic is run from hosts to certain targets with severe impairment conditions in the IP network for hours at time, throughput to the targets will drop, and may take up to 10 minutes to recover after the impairment condition is removed. Note that this problem is highly intermittent, and is unlikely to be seen in a customer environment. We believe that this issue is the result of host/target interaction, and is not the result of action on the iSCSI gateway. • A Microsoft windows PC host was unable to discover enterprise storage array LUNs. The Microsoft iSCSI initiator is able to discover targets if the software is uninstalled and reinstalled without the MPIO option.
Broadcast Zones	• In Fabric OS v5.3.0, a zone with the name "broadcast" (case-sensitive) is a special zone for setting up recipients of broadcast packets. In Fabric OS versions earlier than v5.3.0, a zone named "broadcast" does not have special significance. Therefore, you must make sure that if a broadcast zone is configured, then the active and standby CPs should be running the same Fabric OS version. Otherwise an HA failover might change the zone configuration. Refer to the *Fabric OS Administrator's Guide* for additional information about broadcast zones.

Fabric OS RFEs Implemented in This Release

RFE Number	Description
3746	Include BB_credit zero counter in *supportshow*.
3402	Add Port Number to Faulty Port Alert in Fabric Watch.
3132	trapReg MIB variable is giving trap recipients details for SNMPv1 alone. It has to be implemented also in SNMPv3.

Documentation Updates

This section provides information on last-minute additions and corrections to the documentation. The most recent Fabric OS V6.0.0 documentation manuals are available on the Brocade Partner Network: *http://partner.brocade.com/*

Brocade Fabric OS Administrator's Guide (Publication Number 53-1000598-01)

On page 48, in the section "Setting the password history policy", change the following sentence:

- The default value is 1, which means the current password cannot be reused.
- Change to: The default value is 2, which means the current password cannot be reused.

On page 351, in the section "Limitations and restrictions of Traffic Isolation," add the following items:

- Two N_Ports that have the same shared area cannot be configured in different TI zones. This limitation does not apply to E_Ports that use the same shared area.
- Ports that are in different TI zones cannot communicate with each other if failover is disabled, even if they are in the same (regular) zone.

On page 358, under the heading "Supported configurations for traffic prioritization," add the following item to the list of configuration rules:

- Traffic prioritization is enforced on the egress ports only, not on the ingress ports.

In chapter 4, Configuring Advanced Security, under the heading on Auth policy restrictions on page 105, the following bullet should be added to the list of bullets:

- Configupload/download will not be supported for the following AUTH attributes: auth type, hash type, group type.

In chapter 10, Using the FC-FC Routing Service, under the heading on Auth policy restrictions on page 105, the last bullet should be change to read:

- FC router interoperating with older FC routers (XPath v7.4.x and Fabric OS v5.1, v5.2, and v5.3).

In chapter 10, Using the FC-FC Routing Service, Table 56 Hardware and firmware compatibility for nonsecure fabrics on page 252, the listing for the Brocade Mi10K switch Brocade M-EOS should include M-EOS 9.6.2.

In chapter 10, Using the FC-FC Routing Service, add the following footnote to Tables 57 and 58 for support on Fabric OS v6.0 with M-EOSc and M-EOSn 9.2

> EOS v9.2.0 is supported during migration to the supported version of EOS v9.6.2. It is recommended that all switches in the edge fabric are running the same level of M-EOS firmware.

Man Pages

The following corrections were made in the *Command Reference Man*ual but not into the man pages. Update the man pages for the following commands as follows:

Portcfg:

"fctrace" should read "ftrace"

–v vlan_id,: in the statement "The following operands are required with VLAN Tagging", the "required" should be replaced with "optional".

fciptunnel modify: -v vlan_id is not an option. The **–p** and/or **-P** are optional.

fciptunnel qosmap: when specifying the *vc_num*, option, either the **–Q** or **–P** or both must be specified.

ficon config/delete -t 1|0: TIN/TUR should read TIN/TIR

ficon config/delete: correct parameter specific arguments as follows:

wrtMaxPipe => -a | --wrtMaxPipe
rdMaxPipe => -b | --rdMaxPipe
wrtMaxDevs =>-c |--wrtMaxDevs
rdMaxDevs => -g |--rdMaxDevs
wrtTimer => -e |--wrtTimer
wrtMaxchains => -n -wrtMaxchains
oxidBase => -o | --oxidBase
dbgFlags => -f | -dbgFlags

portCfgShow

The following statement should be removed from the **–qosmap** option; "In addition, a flag indicate whether VC mapping is currently ON or OFF."

PortCfgQos

--enable: The following statement should be removed: "qos is off by default and must be enabled before rate limits can be set"

--setratelimit: The following statement should be removed: "valid values are from 1 to 8". The valid values at the end of the paragraph are the correct ones.

Closed Defects in Fabric OS v6.0.0a

This section lists defects closed in Fabric OS v6.0.0a. Note that when a workaround to an issue is available, it is provided.

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Defect ID	Technical Severity	Closed Defects in Fabric OS v6.0.0a
DEFECT000206064	High	Summary: In some cases, frame loss is observed during normal FICON I/O. Symptom: After an error free start of I/O, a specific test program (SAK Excite) displayed interface control checks (IFCCs). The IFCCs may be observed after anywhere from a few minutes to a few hours. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206090	High	Summary: TopTalkers counters are inaccurate when enabled on more than one Fx-port at a time. Symptom: If TopTalkers is enabled on more than one Fx-port at the same time, the TopTalkers output is incorrect. Workaround: Enable the TopTalkers feature only on individual Fx-ports. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206381	High	Summary: FICON Emulation Error running to STK/SUN tape drives. Symptom: A FICON emulation error is generated when running FICON emulation tape pipelining to STK/SUN tape drives when read emulation is enabled. Workaround: To clear the XRC CU busy error, disable and re-enable the tunnel. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.0.0a
DEFECT000206628	High	Summary: The Brocade DCX may ASSERT in a specific test scenario while running a particular FICON test program (SAK IRNDUP). Symptom: I/O will stop with an Assert and switch reboot. Probability: Medium Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206684	High	Summary: In interop mode, an F-Port connected into a shared area of a 48-port blade in a Brocade DCX will not show up in the distributed name server. Symptom: If in interop mode, devices logged into a shared area of a 48-port blade in the DCX are not seen by other devices and traffic will not run. Workaround: Move devices out of the shared area into a non-shared area. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206999	High	Summary: 2Gig Channels fail to come online from T-Rexx to a 128-port Brocade 48000. Symptom: Host 2Gig channels (HBAs) on a T-Rexx hang in auto-negotiate state and fail to come online. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206146	Medium	Summary: In some cases where an FCIP address is on a different subnet, a MAC level broadcast is sent instead of the router's MAC. Symptom: The GigE port will only connect to 3 out of every 4 IP addresses in a different subnet. Frames sent to the other IP addresses (1 out of 4) via the gateway are incorrectly sent as broadcast frames (broadcast MAC address instead of the G/W MAC address). This impacts FCIP links on the Brocade 7500 and FR4-18i. Probability: High Risk of Fix: Low Reported in Release: FOS5.2.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.0.0a
DEFECT000206454	Medium	Summary: FIPS related changes required in response to the FIPS audit. Symptom: Third party agency audit resulted in the need for these changes. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0
DEFECT000206547	Medium	Summary: Not able to add 96-bit license after upgrading from Fabric OS v5.3 to v6.0. Symptom: Use of the *licenseadd* command returns an I/O error or an error regarding a corrupted database. Probability: High Risk of Fix: Low Reported in Release: FOS6.0.0