BROCADE

Brocade Fabric OS v6.1.0a
Release Notes v2.0

April 25, 2008

Document History

Document Title	Summary of Changes	Publication Date
Brocade Fabric OS v6.1.0a Release Notes v1.0	Initial release	April 18, 2008
Brocade Fabric OS v6.1.0a Release Notes v2.0	Added defect 206188 at the beginning of the table of Closed Defects in Fabric OS v6.1.0a, page 20.	April 25, 2008

Contents

Quick Look

If you are already using the most recent version of the Fabric OS v6.1.0 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 v6.1.0 release notes.
- Access Gateway Cascading is now supported.
- Additions to the *Documentation Updates* section noting changes in the *Brocade Fabric OS Administrator's Guide*, the *Brocade Fabric OS MIB Reference* documents and the Access Gateway Administrator's Guide.
- Several changes have been made to the *Other Important Notes and Recommendations* section, including the addition of Licensing Behaviors, changes to Integrated Routing, and the removal of a limitation for Integrated Routing and AG ISL Trunking related to the FC8-48 blade in the DCX. Some limitations related to Port Mirroring and Port Fencing have also been removed.
- Added defect 206188 at the beginning of the table of Closed Defects in Fabric OS v6.1.0a, page 20. This defect was in the pre-GA announcement, but was removed from the release note late in the test process because of a failure on one of the systems testing the defect. Subsequent to the GA, the test group verified that the problem was due to a bad cable.

Overview

Brocade Fabric OS v6.1.0 supports the following new hardware platforms:

- **Brocade 5300: 48 – 80 port 2U switch**
  - 8 Gbit/sec technology
  - Ports On Demand scaling from 48 to 64 or 80 ports
  - Supports Integrated Routing and Adaptive Networking with QoS
  - Two hot-swappable, redundant power supply FRUs
  - Three hot-swappable, redundant fan FRUs
  - EZSwitchSetup support
  - USB Port
  - FICON, FICON Cascading and FICON Control Unit Port ready

- **Brocade 5100: 24 – 40 1U port switch**
  - 8 Gbit/sec technology
  - Ports On Demand scaling from 24 to 32 or 40 ports
  - Supports Integrated Routing and Adaptive Networking with QoS
  - Two hot-swappable, redundant integrated power supply/fan FRUs
  - EZSwitchSetup support
  - USB Port
  - FICON, FICON Cascading and FICON Control Unit Port ready

- **Brocade 300: 8 – 24 port 1U switch**
  - 8 Gbit/sec technology
  - Ports On Demand scaling from 8 to 16 or 24 ports
  - Supports Access Gateway

- Adaptive Networking with QoS
- EZSwitchSetup support
- USB Port

- **Brocade 7500E: 4G Distance Extension product with 2FC and 2GigE ports**

- **Fabric OS v6.1 adds support on the 48000 platform for the following blades:**

  • FC8-32 32-port 8Gbit/sec FC blade
  • FC8-48 48-port 8Gbit/sec FC blade

In addition to support for the new hardware platforms and blades, there are numerous new features in Fabric OS v6.1, including:

- Enhanced connectivity with M-Series products
  - Support for native connectivity modes on all 8G blades and platforms
  - Traffic Isolation Zones in native connectivity modes
  - Frame Redirection support in native connectivity modes
  - FICON CUP Cascading
  - E-port Authentication
  - Enhanced scalability for Interopmode 3 (Open Fabric Mode)– support for 31 domains and 2048 devices
  - SANtegrity Fabric Binding in both Ineropmode 2 and Interopmode 3 including FCR support
- Access Gateway enhancements
  - Support on Brocade 300
  - AG Trunking
  - Advanced Device Security Policy
  - 16-bit routing
  - AG Cascading
- Integrated Routing, providing FCR support on 8G ports and blades
- Traffic Isolation Zones over FCR
- Port mirroring on 8Gbit platforms
- Temporary licenses for optional features
- Buffer credit recovery on all 8G platforms
- FCIP Performance enhancements
- Port Fencing support in Fabric Watch

New Feature Descriptions

Enhanced Connectivity with McDATA Products

- **M-EOS Native Fabric Mode support –** Fabric OS v6.1 supports "interopmode 2" on nearly all 4G and 8G FOS platforms, which allows a FOS-based switch to participate directly in M-EOS fabrics running in **McDATA Fabric Mode**. 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 v6.1 supports "interopmode 3" on nearly all 4G and 8G FOS platforms, 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. M-EOS products in the fabric must be operating with M-EOS v9.6.2 or later. Interopmode 3 scalability limits have also been increased to match those of interopmode 2.

- **Traffic Isolation Zones supported in mixed fabrics in Interopmode 2–** Fabric OS v6.1 allows the Traffic Isolation Zones capability to be used in fabrics with M-Type products. The M-EOS based products can also provide analogous capability through the use of Preferred Path configurations.

- **Frame Redirection --** Fabric OS v6.1 allows Frame Redirection to be used on FOS products that are operating in either of the native connectivity modes (interopmode 2 or 3). This provides even greater flexibility and support for environments that are interested in using the powerful Frame Redirection capability.

Access Gateway Enhancements

- Access Gateway is supported on the **Brocade 300**.

- **Trunking with Access Gateway** enables frame distribution across a set of available paths linking Access Gateway to an adjacent Switch. The adjacent switch to the Access Gateway has to be a Brocade switch running FOS v6.1 or above version of the firmware. This feature also enhances availability by enabling seamless fail-over of traffic from a failed N-port to other ports within a trunk group. Trunking is an optionally licensed feature.

- **Advanced Device Security Policy (ADS)** extends the DCC policy to a switch module in Access Gateway mode. DCC policy support enables a user to restrict N_port logins through an F_port of an Access Gateway. User must provide a list of device Port WWNs for an F_Port in order to enable those devices to login through that F_port. This policy is also supported for NPIV connections on F_ports.

- **16 bit routing** enhances interoperability of Access Gateway with Cisco fabrics. Note that this capability is only applicable to 8G platforms.

- **Access Gateway Cascading** is now supported, allowing an Access Gateway to attach to another Access Gateway. This capability provides more flexibility in configurations, more efficient use of available ports, and additional cable and SFP consolidation.

Integrated Routing

This new licensed capability allows ports in a DCX, 5300, or 5100 to be configured as EX_ports supporting Fibre Channel Routing. This eliminates the need to add an FR4-18i blade or use the 7500 for FCR purposes, and also provides double the bandwidth for each FCR connection (when connected to another 8G-capable port).

Traffic Isolation Zones over FCR

This enhancement enables traffic isolation across EX ports and VEX ports. This benefits applications like Tape Pipelining and Fast Write that traverse VE ports where customers wish to control the exact path and ports that are used.

Port Mirroring
Fabric OS v6.1 adds support for Port Mirroring to 8Gbit ports. The port mirroring feature mirrors traffic in both directions between a source and destination ID pair to a single mirror port. The user may connect a FC analyzer to this mirror port to capture all the mirrored traffic and perform troubleshooting or other analysis.

Temporary Licenses

Fabric OS v6.1 introduces support for temporary licensing of select features. These licenses are intended primarily to allow a customer to activate a feature quickly, in a situation where going through the "regular" license ordering and procurement process may take too much time. These temporary licenses may also facilitate customers who wish to evaluate a feature prior to making a decision to purchase the license. Each temporary license is issued for a 45-day period, beginning when the temp license is issued. A maximum of two 45-day licenses can be generated for a particular feature on a particular product.

In Fabric OS v6.1, the following features will support temporary licenses:

- Fabric (E_port) license
- Extended Fabric license
- Trunking license
- FCIP license
- Performance Monitoring license

Temporary licenses will be available for other optional features in later releases.

Please contact your switch vendor to obtain Temporary Licenses. Temporary licenses will be issued by Brocade.

Buffer Credit Recovery
FOS v6.1 implements credit recovery protocol as described in FC-FS standards. This feature is supported only on E-ports and allows switches to automatically recover buffer credits that were accidentally "lost" over time. Buffer credit recovery prevents link performance degradation that may otherwise occur due to loss of credits over time.

FCIP Performance Enhancements
FOS v6.1 increases committed rate tunnel performance (utilization) when compressibility exceeds 2:1. Previous FOS releases capped FC data rates to 2 times the committed rate of the FCIP tunnel. As a result, as compression ratio increases beyond 2:1, FC throughput remains constant at 2 times the committed rate and the link utilization decreases. FOS v6.1 now monitors compressibility, adjusts to more compressible data, and works to fill the FCIP tunnel to the committed rate.

Port Fencing
FOS v6.1 includes new Port Fencing capabilities that can automatically isolate a port that is behaving outside the bounds of a normal, expected operation. This enhances overall stability of the fabric in the event of an isolated event that could otherwise cause a major disruption if left unattended. The Port Fencing capability is included as part of the optionally licensed Fabric Watch feature.

Other
- FOS v6.1 includes enhancements to LDAP allowing Active Directory server roles to be mapped to the various switch roles.

- Optional –m parameter for slotshow command to display Model Names for each blade installed in a DCX or 48k chassis.
- Many automatic page breaks in CLI output for commands have been removed to better facilitate scripting.
- RASLOG entry when a switch detects a duplicate WWN has logged in.

Optionally Licensed Software

Optionally licensed features include:

- Brocade Ports on Demand — Allows customers to instantly scale the fabric by provisioning additional ports via license key upgrade (applies to select models of switches).
- Brocade Extended Fabrics — Provides up to 500km of switches 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. Also includes Access Gateway ISL Trunking on those products that support Access Gateway deployment.
- 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 TopTalkers feature.
- High Performance Extension over FCIP/FC (formerly known as "FC-IP Services") (For the FR4-18i blade and Brocade 7500) — This license key also includes the FC-Fastwrite feature and IPsec capabilities.
- Brocade Fabric Watch — Monitors mission-critical switch operations. Fabric Watch now includes new Port Fencing capabilities.
- FICON Management Server — Also known as "CUP" (Control Unit Port), enables host-control of switches in Mainframe environments.
- 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)
- Enhanced Group Management — This license, available only on the DCX and new 8G platforms, enables full management of the device in a datacenter fabric with deeper element management functionality and greater management task aggregation throughout the environment.
- Adaptive Networking — Adaptive Networking provides a rich framework of capability allowing a user to ensure high priority connections 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, and are fully available on all 8G platforms.
- Integrated Routing — This new licensed capability, introduced in Fabric OS v6.1, allows ports in a DCX, 5300, or 5100 to be configured as EX_ports supporting Fibre Channel Routing. This eliminates the need to add an FR4-18i blade or use the 7500 for FCR purposes, and also provides double the bandwidth for each FCR connection (when connected to another 8G-capable port).
- 7500E Upgrade (For the Brocade 7500E only) — This license allows customers to upgrade a 4-

port (2 FC ports and 2 GE ports) 7500E base to a full 18-port (16 FC ports and 2 GE ports) 7500 configuration and feature capability. The upgraded 7500E includes the complete High Performance Extension license feature set.

Some models offer bundles that include 2 or more optionally licensed features. These bundles are defined for each unique product, and are outside the scope of this release note document.

Previously Licensed Software Now Part of Base FOS

The following capabilities are included as part of the base FOS capability and no additional purchase or licensing is necessary:

- Advanced Zoning and WebTools licenses are no longer necessary beginning with FOS v6.1. These features are automatically enabled on all products running FOS v6.1 or later.

Supported Switches

Fabric OS v6.1 supports the Brocade 200E, 300, 4012/4016/4018/4020/4024/4424, 4100, 4900, 5000, 5100, 5300, 7500, 7600, 48000, and DCX. All supported products are qualified for Native Connectivity in interopmodes 2 and 3 for deployment in M-EOS fabrics with the exception of the Brocade 4100.

Access Gateway is also supported by Fabric OS v6.1.0, and is supported on the following switches: the Brocade 200E, 300, 4012, 4016, 4018, 4020, 4024 and 4424.

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 is 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 7500/7500E—On the switch ID pull-out tab located inside the chassis on the port side on the left
   - Brocade 300, 5000, 5100, and 5300—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 contains 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)
Brocade 3000, 3200, 3800	v3.2.1c
Silkworm 3014, 3016, 3250, 3850 and Brocade 3900, 4100, 24000, 7500, 4012, 200E, 48000	v5.1 and higher
Silkworm 12000	v5.0.x
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 4424	v5.3.0_emb and higher
Brocade 7600	v5.3.0 and higher
Brocade DCX	v6.0.0 and higher
Secure Fabric OS (on any model)	Not Supported
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
Multi-Protocol Router interop	
Brocade 7420	XPath v7.4.1
Brocade 7500 and FR4-18i blade	v5.1.0 and higher
McDATA SANRouters 1620 and 2640	Not Supported

Notes:

[1]Other M-EOS models may participate in a fabric with FOS v6.1.0, but may not be directly attached via E_port to any products running FOS v6.1.0. 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 6.1.0 or later. M-EOS 9.7 or later is recommended for optimum fabric performance in a mixed FOS and M-EOS fabric.

Fabric OS v6.1.0 software is fully qualified and supports the blades for the 48000 platform noted in the table below.

48000 Blade Support Matrix	
Port blade 16, 32 and 48-port 4Gbit blades (FC4-16, FC4-32, FC4-48), 16, 32 and 48-port 8Gbit blade (FC8-16, FC8-32, FC8-48), and the 6-port 10G FC blade (FC10-6)	Supported with any mix and up to 8 of each. No restrictions around intermix. The 48000 must run Fabric OS v6.0 or later to support the FC8-16 port blade and Fabric OS v6.1 or later to support the FC8-32 and FC8-48 port blades.
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 maximum of 4 blades of this type
FC-IP/FC Router blade (FR4-18i)	Up to a maximum 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 maximum of 2 blades of this type.

Fabric OS v6.1.0 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 FOS v6.0 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 maximum 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 maximum of 4 blades of this type.

Note: the iSCSI FC4-16IP blade is not qualified for the DCX.

Power Supply Requirements for Blades in 48k and DCX Chassis

Blades	Type of blade	48K	DCX	Comments
FC 4-16, FC 4-32, FC 4-48, FC 8-16, FC 8-32	Port Blade	2 Power Supplies	2 Power Supplies	• Distribute the Power Supplies evenly to 2 different AC connections for redundancy • Power Supplies must be 220V • Blades must meet minimum FOS levels to operate in 48K/DCX chassis (e.g. FC8-32 is not supported in 48K with FOS 6.0.x)
FC10-6, FC 8-48	Port Blade	4 Power Supplies	2 Power Supplies	
FR4-18i, FC4-16IP, FA4-18	Intelligent Blade	4 Power Supplies	2 Power Supplies	

Note: the iSCSI FC4-16IP blade is not qualified for the DCX.

Secure Fabric OS

Secure Fabric OS (SFOS) is not compatible with FOS v6.1. Customers that wish to use the security features available in SFOS should upgrade to FOS v5.3 or later version, 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 version, FC routing can be used to interoperate with FOS v6.1.

FOS Feature Compatibility in Native Connectivity Modes

Some FOS features are not fully supported when operating in the native connectivity modes for deployment with M-EOS based products. All Brocade models that are supported by Fabric OS v6.1.0 support both intermode 2 and 3 with the exception of the Brocade 4100.

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) with Fabric OS v6.1.

FOS Features (supported in interopmode 0)	**FOS v6.1**	
IM = Interopmode	**IM 2**	**IM 3**
L2 FOS Hot Code Load	Yes	Yes
FOS Hot Code Load with FCR	Yes	Yes
Zone Activation Support	Yes	No
Traffic Isolation Zones[1]	Yes	No
Frame Redirection (devices attached to FOS)[1]	Yes	No
Frame Redirection (devices attached to M-EOS)	No	No
FCR Fabric Binding (route to M-EOS fabric with Fabric binding)	Yes	Yes
L2 Fabric Binding	Yes	No*
DCC policies	No	No
SCC policies	Yes[4]	No*
E/Ex_Port Authentication	Yes	Yes
ISL Trunking (frame-level)	Yes[2]	Yes[2]
Dynamic Path Selection (DPS, exchange based routing)	Yes[3]	Yes[3]
Dynamic Load Sharing (DLS, port based routing)	Yes	Yes
Virtual Channels (VC RDY)	Yes[2]	Yes[2]

FICON Management Server (Cascading)	Yes	No*
FICON MIHPTO	Yes	No*
Full Scalability (to maximum M-EOS fabric limits)	Yes	Yes
Adaptive Networking: QoS	No	No
Adaptive Networking: Ingress Rate Limiting	No*	No*
Advanced Performance Monitoring (APM)	No*	No*
APM: TopTalkers	No*	No*
Admin Domains/Virtual Fabrics	No	No
Secure Fabric OS[6]	N/A	N/A
Fabric Watch	Yes	Yes
Ports on Demand (POD)	Yes	Yes
NPIV	Yes	Yes
Timer Server function (NTP)	No	No
Open E_Port[7]	N/A	N/A
Broadcast Zoning	No	No
FDMI	No	No
Remote Switch	No	No
Port Mirroring (8G port mirroring supported in FOS v6.1+)	Yes	Yes
Extended Fabrics	Yes	Yes[8]
Alias Server	No	No
Platform Service	No	No
FCIP (VE_Ports)	Yes	Yes
IPFC (IP over FC)	Yes[9]	Yes[9]
M-EOS ALPA 0x13 configuration	Yes	Yes
VE to VEX Port	Yes	Yes
Integrated Routing	Yes	Yes
Domain Offset Support	No	No
Masterless F_PORT Trunking (AG connect to FOS switches only)	Yes	Yes
FC10-6-to-FC10-6 ISL	Yes	Yes
RASLOG Events on duplicate WWNs	Yes	Yes

* indicates the feature is available but not officially tested or supported

1. Feature requires M-EOS 9.7 or later.
2. Only allowed between FOS-based switches
3. DPS is supported outbound from FOS-based switches. (M-EOS can provide reciprocal load balancing using OpenTrunking).
4. SCC policies only supported in conjunction with L2 Fabric Binding support
5. Fabric restriction (refer to FOS v5.2.1_NI release notes)
6. Not supported in FOS 6.0 or later
7. Mode 3 only qualified with M-EOS switches
8. Not on FCR
9. Only supported locally within the FOS switch

Note: FICON Cascaded CUP qualified only on select platforms.

Firmware Upgrades and Downgrades

Upgrading to Fabric OS v6.1.0 is only allowed from Fabric OS v6.0.0 or later. This policy to support only one-level migration, which began with FOS v6.0.0, provides 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 one-release migration 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.

Only products based on 4G and 8G capable ASICs are supported by Fabric OS v6.1. 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 v6.1, as well as for routing. The Brocade 12000 is not supported with FOS v5.3.0; it remains supported only on FOS v5.0.x releases.

All products supported by Fabric OS v6.0 can be upgraded to Fabric OS v6.1.

Products that can be upgraded to Fabric OS v6.1:

- 4012/4016/4018/4020/4024/4424, 4100, 4900, 5000, 7500, 7600, 200E, 48000, and DCX.

Scalability

All scalability limits are subject to change. Limits may be increased once further testing has been completed, even after the release of Fabric OS. For the most current scalability limits for Fabric OS, refer to the *FOS Scalability Matrix* document.

Scalability limits for Fabric OS v6.1.0 are essentially the same as those limits supported by FOS v6.0. 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 on DCX and 5300. Other products running FOS v6.1 will retain the same fabric limits as FOS 5.3.x for non-routed fabrics (i.e., L2 only, 56 domains and 2560-ports).

When operating in Native Connectivity modes (interopmode 2 or 3), different scalability limits are supported. For both interopmode 2 and 3, fabrics of up to 2048 virtual or physical connections (WWNs logged into a single fabric) and 31 domains are supported. This is an increase from FOS 6.0 for intermode 3, which only supported up to 800 connections and 15 domains in a fabric.

Supported FCR scalability limits have increased in a few areas, and some new limits are included to reflect the new Integrated Routing support. Supported limits are noted in the following table (new additions and changes since FOS 6.0 are noted in **bold**).

Routed scalability limits are noted in the table below.

Fibre Channel Routing Scalability (Tested/Supported Limits)	
Max # edge fabrics per metaSAN	**48/**48
Max # edge fabrics per chassis	16/**16 (7500 & FR4-18i in 48k or DCX)** **24/32 (5100 & 5300)** **24/48 (DCX)**
Max # switches per edge fabric (FOS)	26/26

Fibre Channel Routing Scalability (Tested/Supported Limits)	
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/DCX with FR4-18i)	32/**32**
EX_Ports per FCR (DCX with Integrated Routing)	64/64
EX_Ports per chassis with Integrated Routing (DCX/5300/5100)	**128/80/40 / 128/80/40**

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. For M-EOS edge fabrics prior to v9.6 the limit is 1024 zones. For M-EOS edge fabrics operating with 9.6.x or later, the limit is 2048 zones.

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

4) All limits apply to Integrated Routing as well as FCR on 7500/FR4-18i unless otherwise noted.

FICON Support

FOS v6.1.0 provides full FICON CUP support in FOS/MEOS mixed fabrics operating in Interop Mode 2. This support is available in fabrics with DCX, 5300, 5100, 6140 and Mi10k.

FOS v6.1.0 also adds support for configuring the MIHPTO (Missing Interrupt Handler Primary Timeout) value.

FOS v6.1.0 includes enhanced CUP statistics counters comparable to those supported in M-EOS.

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**.**

Other Important Notes and Recommendations

Licensing Behavior:

- When upgrading a switch to Fabric OS v6.1, some licenses may display as "Unknown." This is due to changes in licensing requirements for some features that no longer require a license key.
- When upgrading a Brocade 48000 that has the FCIP license installed, the *licenseshow* output may falsely indicate that Integrated Routing is available.

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 6.0 is running on those switches.
- Flow based QoS is NOT supported on FC8 blades in the Brocade 48000.
- Any products that are not capable of operating with FOS 6.0 may NOT exist in a fabric with Flow based QoS. Major problems will occur if previous generation 2G products exist in the fabric.

FCR Backbone Fabric ID change:

- With FC8 blades, the switch must be disabled to change the backbone fabric ID
- With routing and dual backbone fabrics, the backbone fabric ID must be changed to keep the IDs unique.

Integrated Routing

- To allow Hot Code Load on a Brocade 5100 when using Integrated Routing, the edge switch connected to the 5100 must be running Fabric OS v6.1.0 code.
- The Brocade 5100 does not support Hot Code Load from FOS 6.1.0 to 6.1.0x in a dual backbone configuration with a routed connection to an M-EOS product.

FCS Automatic Distribution

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

- FOS v6.0 or later will only allow FCS automatic distribution when in strict mode, requiring only switches with FOS v6.0 or later.

Access Gateway

- 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.

10G Interoperability

- 10G interop between FC10-6 and McDATA blades is not supported due to a HW limitation, however the FC10-6 is supported in a chassis running in Interopmode 2 or 3 (FC10-6 to FC10-6 connections only). An FC10-6 blade will not synchronize with a McDATA 10G blade but will not negatively impact the system.

Traffic Isolation over FCR

- All switches and Fibre Channel Routers both in edge and backbone fabrics must be running FOS v6.1.0 in order to support this feature.
- It is essential to have "fail-over" policy ENABLED in all edge fabrics that are part of the traffic isolation zones, in order for the proper functioning of Traffic Isolation over FCR.

FICON CUP Cascading

- All switches must be running FOS v6.1.0 in order to support this feature

Port Fencing

- Port Fencing is only supported on E_Port and F_Port classes. Port Fencing is available with the optional Fabric Watch license.

Documentation Updates

This section provides information on last-minute additions and corrections to the documentation. The most recent Fabric OS v6.1.0 documentation manuals are available on the Brocade Partner Network: *http://partner.brocade.com/*

Brocade Fabric OS MIB Reference (Publication Number 53-1000602-02

On page 547, in chapter 5, add the following information to section swSensorTable 1.3.6.1.4.1.1588.2.1.1.1.1.22

Platform	Temp	Fans	Power Supply	swNumSensors / connUnitNumSensors
Brocade 5000	4	2	2	8

Brocade Fabric OS Administrator's Guide (Publication Number 53-1000598-03

On page 425, in the Administering Extended Fabrics chapter, add the following switches to table 95.

Switch blade model	ASIC	Total ports in a switch or blade	Total buffers / per number of ports	Reserved buffers for ports
4012	Golden Eye	12	272/12	8

4016	Golden Eye	16	272/16	8
4018	Golden Eye	18	272/18	8
4020	Golden Eye	20	272/20	8
4024	Golden Eye	24	272/24	8

On page 467 in chapter 20, Configuring and Monitoring FCIP Extension Services, under the heading Constraints for FC Fastwrite, add the following to the list:

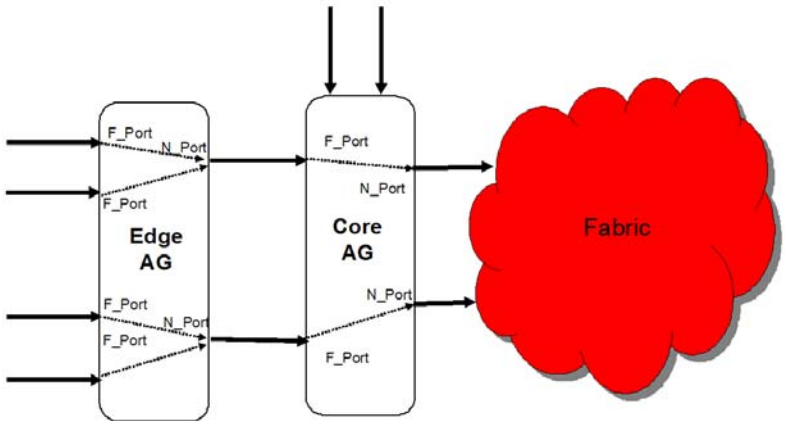
- Connecting E_Ports to ports already configured for FC Fastwrite is not supported.

Access Gateway Administrator's Guide (Publication Number 53-1000605-02)

On page 41 in chapter 3, after the section, Re-joining switches to a fabric, add the following:

Cascaded Fabrics

A cascaded fabric is when you connect two Access Gateways (AG) switches linking one end as an N_Port and the other end as an F_Port. The AG switch that is directly connected to the fabric is referred to as the Core AG. The AG that is connected to the device is referred to as the Edge AG. The following figure describes a cascaded Access Gateway.



Ports are connected between the two AG switches, which are connected to each other. Cascaded AG connections between devices increase the network use because it provides higher over-subscription while allowing you to consolidate the number of ports going to the main fabric. There is no license requirement to use this feature.

Configuration restrictions with cascaded Access Gateway switches

- You must enable the Port Grouping (PG) policy on both the Edge and Core AG switches.
- Only one level of cascading is supported. Note that several Edge AGs can connect into a single Core AG to support higher consolidation ratios.
- AG Trunking between the Edge and Core AG switches is not supported.
- It is recommended that the Advanced Security Policy (ADS) be used on the AG F_ports directly connected to the servers.

Closed Defects in Fabric OS v6.1.0a

This section lists defects closed in Fabric OS v6.1.0a. Note that when a workaround to an issue is available, it is provided.

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000206188	High	Summary: During storage failover/failback test with IP over FC, traffic stops and fails to recover in single and dual backbone configurations. Symptom: IP over FC traffic across FCR stops and does not recover. Workaround: Disable and enable both IP-over-FC devices. Feature: FCR Function: FCR Daemon Risk of Fix: Low Probability: Low Reported in Release: FOS6.0.0
DEFECT000208573	High	Summary: Under rare conditions, fabric mode TopTalker monitor does not display correct flow values. Symptom: Fabric mode TT monitor counters show 0 when traffic is running thru the switch. Feature: Fabric Infrastructure Function: Advanced Performance Monitor Risk of Fix: Low Probability: Medium Reported in Release: FOS6.1.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000208578	High	Summary: Attempting to configure port mirroring on a director with both 4G and 8G blades may result in a software Verify error. Symptom: When configuring a port mirror, a software verify error may be seen. Feature: Platform Services Function: C2 ASIC driver Risk of Fix: Low Probability: Low Reported in Release: FOS6.1.0
DEFECT000209343	High	Summary: After repeatedly running bladedisable/enable on one FC8-48 blade for 6 hours, a Brocade DCX panics. Symptom: May see DCX panic with "ASSERT - Failed expression: vfid <= ((0x709000-0x708000)/4), file = /../asic/condor2/c2_vf.c, line = 193, ... Workaround: After the switch comes back up, reboot the switch. Feature: DCX Platform Services Function: ASIC Driver Risk of Fix: Low Probability: Low Reported in Release: FOS6.1.0
DEFECT000210703	High	Summary: FCR matrix settings may not persist after hafailover on a Brocade 48000. Symptom: FCR matrix settings may not persist after hafailover on dual CP systems. Feature: FCR Function: FCR HA Risk of Fix: Low Probability: Low Reported in Release: FOS6.1.0
DEFECT000211609	High	Summary: When disabling/enabling a port, port fencing disables the port because the allowable number of invalid transmission words is exceeded. Symptom: Port is disabled because of invalid transmission words that occurred when the port was offline. Feature: Fabric Infrastructure Function: Fabric Watch Risk of Fix: Low Probability: High Reported in Release: FOS6.1.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000211624	High	Summary: In larger fabrics, Ex-ports toggled offline/online during HCL (hareboot) of a Brocade 5100 or 5300. Symptom: During non-disruptive firmwaredownload, Ex-ports may toggle, causing traffic disruption. Feature: FCR Function: C2_EX Risk of Fix: Low Probability: Medium Reported in Release: FOS6.1.0
DEFECT000211697	High	Summary: ag --show on a Brocade 300 shows incorrect edge switch IP address after a slave port is swapped with an N-port outside of the trunk group. Symptom: "ag --show" on a Brocade 300 shows incorrect edge switch IP address. Workaround: Reboot the switch: ag --show cli will show the correct output. Feature: Access Gateway Services Function: CLI Risk of Fix: Medium Probability: High Reported in Release: FOS6.1.0
DEFECT000212267	High	Summary: Under rare conditions, a Brocade DCX panics during SAK IRNDUP when the software watchdog detects an unexpected termination of the FICON CUP daemon (ficud). Symptom: Interface Control Checks. Feature: FC Services Function: FICON Risk of Fix: Low Probability: Medium Reported in Release: FOS6.1.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000212379	High	Summary: Configuration Download fails for Fabric Watch parameter changes in NI mode. Symptom: FW parameter changes in NI mode require a switchdisable. Workaround: Switchdisable, then configure the FW parameters. Feature: Native Interop Function: Other Risk of Fix: Low Probability: High Reported in Release: FOS6.1.0
DEFECT000205596	Medium	Summary: Port Based Routing with DLS ON does not immediately balance the load when adding an ISL. Symptom: New ISL is not utilized, but the routes are recovered after the CPU cycles. Feature: DCX Platform Services Function: Routing Risk of Fix: High Probability: Low Reported in Release: FOS6.0.0
DEFECT000211313	Medium	Summary: Ex-port fails to come online after downgrading firmware from FOS v6.x to v5.3 under certain conditions. Symptom: This will happen if there is no Ex-port on the switch before downloading. Feature: FOS Software Function: FCR Risk of Fix: Low Probability: Low Service Request # : 301927 Reported in Release: FOS5.3.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000211900	Medium	Summary: Warnings of excessive high temperature could be seen on some 5100 switches. Symptom: Excessive high temperature warnings could be seen on some 5100 switches. Could also see switch status change to marginal: ...WARNING, Brocade5100, High temperature (36 C), fan speed increasing per environmental specifications. Workaround: Increase cooling or relocate switch to cooler location. Be sure switch is installed with proper spacing above and below the switch. Feature: System Controls/EM Function: Brocade 5100 Risk of Fix: Low Probability: Low Reported in Release: FOS6.1.0
DEFECT000212509	Medium	Summary: After hareboot, "Probing failed" on F-port messages may be seen on the Brocade 300, 5100, and 5300. Symptom: Some device ports will not be able to complete login to the switch after a firmware upgrade. Feature: Brocade 5300 Platform Services Function: ASIC Port Risk of Fix: Low Probability: High Reported in Release: FOS6.1.0
DEFECT000213198	Medium	Summary: Fastwrite performance issue with a particular FCIP ex-port configuration. Symptom: Unable to reap performance benefits with fastwrite on an FCIP ex-port configuration. Workaround: Disable FCR routing and Ex-ports and merge the fabric into one large fabric. Feature: FCIP Function: FCIP Performance Risk of Fix: Low Reported in Release: FOS6.0.0

Defect ID	Technical Severity	Closed Defects in Fabric OS v6.1.0a
DEFECT000213344	Medium	Summary: Under rare conditions, ISL may get stuck at G-Port on the Brocade 300 and 5300 switches. Symptom: Port state shown as G-port. Feature: Platform Services Function: ASIC Driver Risk of Fix: Low Probability: Low Reported in Release: FOS6.1.0
DEFECT000213729	Medium	Summary: Launching Switch Throughput graph in Performance monitor for Brocade 300, 5100 and 5300: the values in X-axis are shown only for 4.0G/sec. Symptom: Throughput graph will not display 8G/sec values. Feature: WebMgmt Function: Performance Monitor Risk of Fix: Low Probability: High Reported in Release: FOS6.1.1
DEFECT000216814	Medium	Summary: On a Brocade 5300, the system status LED does not flash amber/green when a power supply is faulted. Symptom: Instead of flashing amber/green, it remains a steady green. Feature: System Controls/EM Function: Brocade 5300 Risk of Fix: Low Probability: High Service Request # : 312559 Reported in Release: FOS6.1.0