

# BROCADE FR4-18i SAN EXTENSION BLADE



## DATA CENTER

## An Integrated Platform for Consolidation, Global Data Mobility, and Business Continuity

### HIGHLIGHTS

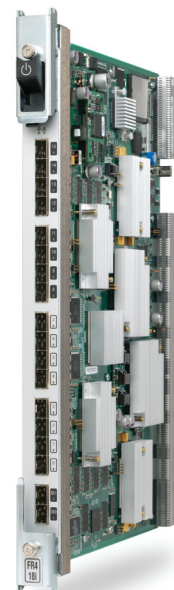
- Provides an enterprise building block for consolidation, global data mobility, and business continuity solutions that improve efficiency and cost savings
- Integrates with the Brocade 48000 Director and Brocade DCX Backbone family, enabling new levels of SAN scalability, performance, and investment protection
- Optimizes application performance with features such as Fast Write, Brocade Accelerator for FICON (including Emulation and Read/Write Tape Pipelining), and hardware-based compression
- Maximizes bandwidth utilization with Committed Rate, traffic isolation, trunking, and network load balancing
- Combines FCIP extension with Fibre Channel switching and routing to provide local and remote storage and SAN connectivity while isolating SAN fabrics and IP WAN networks
- Enables secure connections across IP WANs through IPSec encryption
- Simplifies interconnection and support for Brocade FOS and M-EOS SAN environments

Many of today's IT organizations have already implemented multiple Storage Area Networks (SANs) to support specific applications, projects, and sites throughout their enterprise. Now they are seeking ways to leverage those SANs for greater efficiency, improved data access, and new business continuity requirements.

With the Brocade® FR4-18i SAN Extension Blade, these organizations can now interconnect and extend their SANs for greater resource utilization, scalability, and data protection. By providing this advanced level of connectivity without the associated risk and complexity of physically merging SAN islands into a single large fabric, the Brocade FR4-18i supports strategic business initiatives such as disaster recovery, data migration, new data center infrastructures, and ongoing technology upgrades.

The Brocade FR4-18i, integrating into either the Brocade 48000 Director or the Brocade DCX® Backbone family, combines Fibre Channel switching and routing capabilities with powerful hardware-assisted traffic forwarding for Fibre Channel over IP (FCIP). The blade features 16 4 Gbit/sec Fibre Channel ports and two 1 Gigabit Ethernet ports—delivering high performance to run storage applications up to line-rate

speed with either protocol. By integrating these services in a single platform, the Brocade FR4-18i offers a wide range of benefits for storage and SAN connectivity, including SAN scaling, long-distance extension, greater resource sharing (either locally or across geographical areas), and simplified management.



# BROCADE

## PERFORMANCE-OPTIMIZED SAN EXTENSION

One of the key advantages of the Brocade FR4-18i is its ability to extend the benefits of existing SAN infrastructures across the enterprise. Combined with Fibre Channel routing, SAN extension enhances resource sharing and data movement between departmental SANs or local data centers while isolating SANs from IP WANs to minimize risk and potential disruption.

The Brocade FR4-18i blade provides the industry's most robust solution for open systems and FICON® SAN extension over IP WANs. For SAN extension over IP WANs, the Brocade FR4-18i provides unique bandwidth-maximizing FCIP features to optimize performance and protect data:

- Hardware-based compression and IPsec encryption
- Extensive port buffering
- Line-rate Gigabit Ethernet performance with support for jumbo frames
- Scalable fan-in of multiple distant SANs
- Write acceleration (Fast Write for FCIP) capabilities for synchronous applications
- Tape acceleration (Tape Pipelining) for maximizing performance over high latencies
- Committed Rate and traffic isolation to optimize bandwidth
- Trunking and network load balancing to maximize throughput
- Storage-optimized TCP for maximum network resiliency
- IPv6 support
- Extended WAN statistics and analysis tools for bandwidth, latency, and packet loss
- Eight virtual FCIP tunnels per port, each with its own unique traffic-shaping/Committed Rate and QoS capabilities, for maximum scalability and utilization of WAN resources

In addition, the optional Brocade Accelerator for FICON provides Emulation for IBM z/OS Global Mirror (formerly called eXtended Remote Copy) and Tape Pipelining for extended virtual and physical tape drives—delivering unprecedented read and write performance across virtually unlimited distances.

For SAN extension over native Fibre Channel, the Brocade FR4-18i utilizes Brocade Extended Fabrics. SAN extension can reach up to 100 kilometers at 4 Gbit/sec Fibre Channel speeds, 250 kilometers at 2 Gbit/sec speeds, and more than 500 kilometers at 1 Gbit/sec speeds. To maximize performance and utilization across native Fibre Channel links, the Brocade FR4-18i provides Fast Write acceleration and QoS.

These unique capabilities improve data protection, streamline backup and recovery over distance, and provide unprecedented flexibility—enabling mainframe storage resources to be located anywhere in the world. Working in conjunction with Brocade storage-optimized TCP, data compression, and IPsec encryption, the Brocade FR4-18i and Brocade Accelerator for FICON provide a high-performance, highly reliable, and secure distance-connectivity solution for strategic initiatives such as business continuity, site mirroring, replication, and data migration (see Figure 1).

## FIBRE CHANNEL ROUTING FOR ENHANCED OPERATIONAL EFFICIENCY

Featuring a hierarchical Fibre Channel routing architecture for improved scalability and fault isolation, the Brocade FR4-18i helps maximize the value of existing SAN investments while streamlining new SAN implementations. During deployment, organizations can easily interconnect individual SANs using their current addressing schemes. This approach helps minimize downtime and risk while lowering overall management costs.

Although the SANs are physically connected, organizations can control which devices are shared to ensure the appropriate level of SAN fabric isolation. As a result, the Brocade FR4-18i supports faster, easier topology changes that enable organizations to take advantage of new solutions that reduce costs or increase productivity. Moreover, simplified device sharing helps overcome the logistical challenges and organizational boundaries that often exist among departmental SANs.

By providing such a highly scalable approach for extending SAN infrastructures, the Brocade FR4-18i supports key business objectives such as:

- Migrating to new SAN architectures
- Extending the capabilities of current SAN architectures
- Consolidating data centers and rebalancing storage resources
- Migrating from test to production networks
- Moving equipment on and off lease

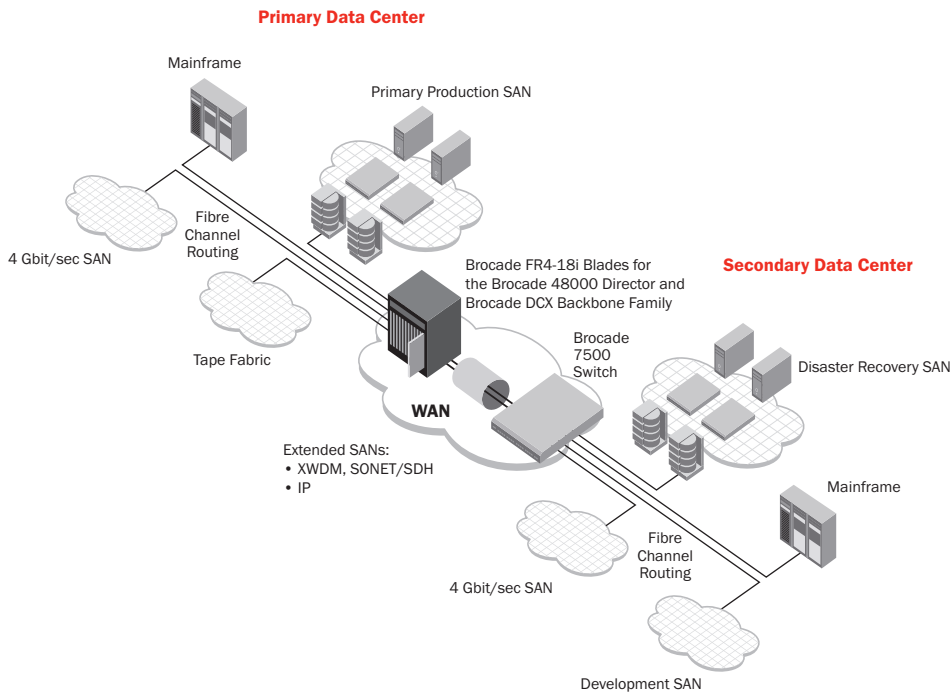
## INTEGRATED ARCHITECTURE AND MANAGEMENT

The Brocade FR4-18i is administered through management tools such as Brocade Data Center Fabric Manager (DCFM™) and Brocade Fabric Manager. Running the same Brocade Fabric OS® (FOS) as other Brocade switching platforms, the Brocade FR4-18i connects Brocade SANs of all types and supports Virtual Fabrics when installed in the Brocade DCX Backbone family of products. Its FCIP trunking behavior operates in the same manner as E\_Port functionality, simplifying configuration and management.

As data center fabrics evolve to support increased data growth and business continuity requirements, the Brocade FR4-18i will continue to provide extension capabilities for protecting data between data centers. These capabilities include emerging technologies such as FCoE, where new servers and storage connecting to the data center fabric will be able to leverage extension services to access resources at remote sites.

## MAXIMIZING SAN INVESTMENTS

To help optimize technology investments, Brocade and its partners offer complete solutions that include education, support, and services. For more information, contact a Brocade sales partner or visit [www.brocade.com](http://www.brocade.com).



**Figure 1.**

The Brocade FR4-18i utilizes high-performance Fibre Channel routing and FCIP to enable powerful consolidation and business continuity solutions for the enterprise.

## BROCADE FR4-18i SPECIFICATIONS

Systems Architecture		Classes of service	Class 2 and 3
Ports	18 ports: 16 Fibre Channel (E, F, FL, EX) ports and 2 Gigabit Ethernet (VE, VEX) ports	Port types	FL_Port, F_Port, EX_Port, and E_Port; self-discovery based on switch type (U_Port); Gigabit Ethernet for VE and VEX
Performance	<u>Fibre Channel</u> : 1.063, 2.125, and 4.250 Gbit/sec line speed, full duplex; auto-sensing of 1, 2, and 4 Gbit/sec port speeds; optionally programmable to fixed port speed; speed matching between 1, 2, and 4 Gbit/sec ports <u>Ethernet</u> : 1.25 Gbit/sec	Media types	Hot-pluggable, industry-standard Small Form-factor Pluggable (SFP), LC connector <u>Fibre Channel and Gigabit Ethernet ports</u> : Short-Wavelength Laser (SWL) up to 500 meters (1640 feet) <u>Fibre Channel ports only</u> : Long-Wavelength Laser (LWL) up to 10 km (6.2 mi); Extended Long-Wavelength Laser (ELWL) up to 80 km (49.6 mi); CWDM SFPs (8 lambdas) <u>Gigabit Ethernet ports only</u> : RJ-45 Copper SFP Distance depends on fiber-optic cable and port speed
Fibre Channel aggregate bandwidth	128 Gbit/sec (16 × 8 Gbit/sec data rate)		
IP WAN aggregate bandwidth	Two Gigabit Ethernet ports each supporting eight FCIP tunnels up to 1 Gbit/sec for an aggregate bandwidth of 2 Gbit/sec		
Fabric latency	< 8 microseconds (FC-to-FC routed traffic) 30 microseconds (FCIP)		
Maximum frame size	2112-byte payload for Fibre Channel, 2250-byte payload for Gigabit Ethernet, 2048-byte payload for Fibre Channel routed networks		

**BROCADE FR4-18i SPECIFICATIONS (CONTINUED)**

Fabric services	Simple Name Server, Registered State Change Notification (RSCN), Brocade FC-FC Routing Service, Brocade Advanced Zoning, Brocade Web Tools, FCIP Tunneling Service, Brocade Advanced ISL Trunking, Brocade Accelerator for FICON, Advanced Performance Monitoring, Traffic Isolation, Brocade Advanced Zoning (default zoning, port/WWN zoning, broadcast zoning), Dynamic Path Selection (DPS), Extended Fabrics, Fabric Watch, FDMI, Frame Redirection, FSPF, IPoFC, Management Server, N_Port Trunking, NPIV, NTP v3, Port Fencing, Reliable Commit Service (RCS), Simple Name Server (SNS), and Virtual Fabrics (Logical Switch, Logical Fabric) when installed in the Brocade DCX Backbone family of products
FIPS certification	FIPS 140-2 Level 2-compliant package available
Systems supported	Brocade DCX Backbone family and Brocade 48000 Director

**Management**

Supported management software	Telnet, SSH, HTTP, SNMP v1/v3 (FE MIB, FC Management MIB), Auditing, Syslog, Brocade Advanced Web Tools, Brocade Fabric Watch, Brocade Data Center Fabric Manager (DCFM) Enterprise (Brocade DCX, DCX-4S) or DCFM Professional (Brocade DCX-4S only), Brocade Fabric Manager (optional, FOS environments only), Brocade EFCM 9.x (optional), command line interface, Administrative Domains, trial licenses for add-on capabilities, third-party applications utilizing the Brocade SMI-S Agent
Security	DH-CHAP (between switches and end devices), FIPS 140-2 L2-compliant, HTTPS, IPsec, IP filtering, LDAP, Port Binding, RADIUS, Role-Based Access Control (RBAC), Secure Copy (SCP), Secure RPC, SSH v2, SSL, Switch Binding, Trusted Switch

**Mechanical**

Size	Width: 1.41 in (3.60 cm) Height: 16.56 in (42.06 cm) Depth: 11.77 in (29.89 cm) Occupies one slot in a Brocade 48000 Director chassis
System weight	3.4 kg (7.4 lb), no SFPs

**Environmental**

	<b>Operating</b>	<b>Non-Operating</b>
Temperature	10° to 40°C	25°C to 70°C
Humidity	5 to 85%, non-condensing	0 to 93%, non-condensing
Altitude	3 km	3 km
Shock	20 G, 11 ms, half-sine	33 G, 11 ms, half-sine
Vibration	5 G (0–3000Hz)	10 G (0–5000Hz)

For information about supported SAN standards, visit [www.brocade.com/sanstandards](http://www.brocade.com/sanstandards)

For information about hardware regulatory compliance, visit [www.brocade.com/regulatorycompliance](http://www.brocade.com/regulatorycompliance)

For information about switch and device interoperability, visit [www.brocade.com/interoperability](http://www.brocade.com/interoperability)

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