

IBM PRODUCT REFERENCE GUIDE



Evolving to the Data Center of the Future with IBM Systems and Brocade Data Center Fabric (DCF)

TRANSFORMING YOUR INFORMATION INFRASTRUCTURE FOR BUSINESS ADVANTAGE

Enterprise data center worldwide leaders, IBM Systems and Brocade are teaming to create the data center of the future which enables you to:

Innovate for business advantage to help accelerate your growth and to improve your competitive position:

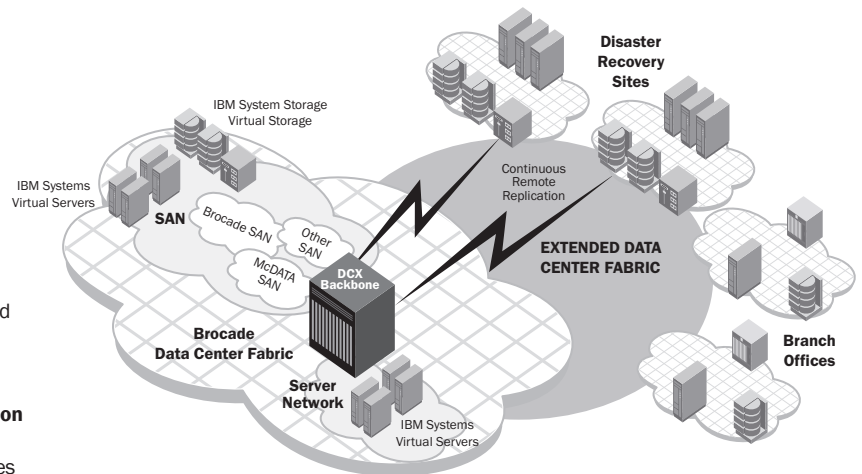
- Industry-leading technology with new levels of performance
- Reduced Total Cost of Ownership (TCO)
- Infrastructure investment protection while integrating new technologies

Manage information growth, complexity and risk to respond more effectively to business change:







- Infrastructure flexibility with scalability and openness
- Unified management framework to manage consolidated and virtualized resources
- Infrastructure resiliency, high availability and security

Go green and save to improve the return on your information infrastructure investments:

- Consolidating server, storage and data center fabric resources
- Virtualizing servers, storage and data center fabric resources
- Providing tiered storage to match storage investments to the business value of data
- Improving energy efficiency of server, storage and fabric resources



8 Gbps FIBRE CHANNEL HOST BUS ADAPTERS FOR IBM® SYSTEM X™ 10 Gbps CEE CONVERGED NETWORK ADAPTER FOR IBM SYSTEM X

| | FIBRE CHANNEL HBA'S | | | | CEE CNA | |
|---------------|---|---|---|---|---|--|
| | Brocade 4 Gbps FC Single-port HBA for IBM System X | Brocade 4 Gbps FC Dual-port HBA for IBM System X | Brocade 8 Gbps FC Single-Port HBA for IBM System X | Brocade 8 Gbps FC Dual-Port HBA for IBM System X | Brocade 10GbCNA for IBM System X | Brocade CNA for IBM BladeCenter |
| |  |  |  |  |  |  |
| BROCADE MODEL | Brocade 415 FC (Single-Port) HBA | Brocade 425 FC (Dual-Port) HBA | Brocade 815 FC (Single-Port) HBA | Brocade 825 FC (Dual-Port) HBA | Brocade 1020 (Dual-Port) CNA | Brocade 1007 (Dual Port) CNA Mezzanine Adapter |
| PART NUMBERS | 59Y1987 | 59Y1993 | 46M6049 | 46M6050 | 42C1820 | 81Y1650 |
| SPEED | 4/2/1 Gbps | | 8/4/2 Gbps | | 10 Gbps | |
| IOPS | Up to 500K Per Port (Max) | | | | | |
| BUS TYPE | PCIe 2.0 x 8 | | | | | Mezzanine Cffh |
| MEDIA | SFP + Optics | | | | 10 GbE SFP+ SR Optics (49Y4216) | |
| OS SUPPORTED | Windows, Linux, Solaris, VMWare | | | | Windows, Linux, VMWare | |

The Brocade 8 Gbps fibre channel (FC) host bus adapters (HBAs) for IBM System x are part of a family of high-performance 8 Gbps HBA solutions. These HBAs deliver exceptional performance, enabling small and medium businesses to experience unsurpassed robustness and reliability for a wide spectrum of servers, storage, and SANs.







The Brocade End-to-end Advantage:







Augmenting the industry-leading performance of the Brocade DCX Backbone platform, the innovative Brocade 8 Gbps FC HBAs utilize an industry-first integration of important adapter functions such as virtual channels into high-performance hardware and offer these benefits:

- End-to-end SAN solutions using 8 Gbps PCIe HBA technology for System x servers
- High-performance, highly available SANs
- Easy setup and integration into existing SAN configurations



IBM Storage Area Networks (SAN) Solutions

| | DATA CENTER BACKBONE | | ENTERPRISE DIRECTOR | 8 Gbps SWITCHES | | |
|--|---|---|---|--|---|--|
| | IBM System Storage SAN768B | IBM System Storage SAN384B | IBM TotalStorage SAN256B | IBM System Storage SAN24B-4 Express | IBM System Storage SAN40B-4 | IBM Sys |
| |  |  |  |  |  |  |
| BROCADE MODEL | Brocade DCX Backbone | Brocade DCX-4S Backbone | Brocade 48000 Director | Brocade 300 Switch | Brocade 5100 Switch | E |
| PART NUMBERS | 2499-384 | 2499-192 | 2109-M48 | 249824E | 2498-B40 | |
| PORTS | Up to 384 (single-chassis) or 768 (dual-chassis) end user ports Ports on Demand by blades | Up to 192 (single-chassis) or 384 (dual-chassis) end user ports Ports on Demand by blades | Expandable to 384 Ports Ports on Demand - By Blade | 8, 16, 24 | 24, 32, 40 | |
| SPEED AND PROTOCOL | 10/8/4/2/1 Gbps FC, FCR, 1/10 GigE FCIP 10 GigE/CEE/FCoE | 10/8/4/2/1 Gbps FC, FCR, 1/10 GigE FCIP 10 GigE/CEE/FCoE | 10/8/4/2/1 Gbps FC, FCR GigE FCIP, iSCSI | 8/4/2/1 Gbps FC | 8/4/2/1 Gbps FC, FCR | 8, |
| HEIGHT | 14U | 8+1 U | 14U | 1U | 1U | |
| EXPANDABILITY | 16-Port 8 Gbps FC Blade (FC 3816) 32-Port 8 Gbps FC Blade (FC 3832) 48-Port 8 Gbps FC Blade (FC 3848) FC Routing Blade (FC 3850) 10 Gbps FC Blade (FC 3870) 10 GbE/CEE/FCoE Blade (FC 3880) 1/10 GigE FCIP Blade (FC3890) | 16-Port 8 Gbps FC Blade (FC 3816) 32-Port 8 Gbps FC Blade (FC 3832) 48-Port 8 Gbps FC Blade (FC 3848) FC Routing Blade (FC 3850) 10 Gbps FC Blade (FC 3870) 10 GbE/CEE/FCoE Blade (FC 3880) 1/10 GigE FCIP Blade (FC3890) | 16-Port 4 Gbps FC Blade (FC 3416) 32-Port 4 Gbps FC Blade (FC 3432) 48-Port 4 Gbps FC Blade (FC 3448) FC Routing Blade (FC 3450) iSCSI Blade (FC 3460) 10 Gbps FC Blade (FC 3470) 16-Port 8 Gbps FC Blade (FC 3816) 32-Port 8 Gbps FC Blade (FC 3832) 48-Port 8 Gbps FC Blade (FC 3848) | Ports on Demand - 8 ports (FC 7200 / 45W0502) | Ports on Demand - 8 Ports (FC 7400 / 45W0524) | Ports on Demr |
| FICON SUPPORT | Yes | Yes | Yes | No | Yes | |
| HOT CODE ACTIVATION | Yes | Yes | Yes | Yes | Yes | |
| HARDWARE FEATURES | Hot-Swappable Blades (CP Core and Port) 2 Hot-Swappable Power Supplies (Base) 2 Additional Power Supplies (FC 7880) 3 Hot-Swappable, Redundant Blowers Rack-Mount Kit Included Requires IBM 2109-C36 Cabinet | Hot-swappable Blades (CP Core, and Port) 2 Hot-swappable Redundant Power Supplies 2 Hot-swappable Redundant Blowers Rack-Mount Shelf/Exhaust Included Requires IBM 2109-C36 Cabinet - Throughput of 3 Tbit/sec per Chassis - Locally Switch Ports 700 ns - Blade-to-Blade Latency 2.1 usec | Hot-Swappable Blades (CP and Port) 2 Hot-Swappable Power Supplies (Base) 2 Additional Power Supplies (FC 7840) Required for: - FC Routing Blade - iSCSI Blade - 10 Gbps FC Blade - 8 Gbps, 48-Port FC Blade 3 Hot-Swappable, Redundant Blowers Rack-Mount Kit Included Requires IBM 2109-C36 Cabinet | Single Fixed Power Supply Fixed Redundant Fans Single Switch FRU Rack-Mount Rails Included | 2 Hot-Swappable, Redundant Integrated Power Supplies and Fans Rack-Mount Rails Included | 2 Hot-Swapp 3 Hot-Swapp Rack-Mount I |
| STANDARD SOFTWARE | Web Tools Advanced Zoning Enhanced Group Management Full Fabric Enterprise Bundle Includes: - Fabric Watch - ISL Trunking - Advanced Performance Monitoring - Extended Fabrics - Adaptive Networking | Web Tools Advanced Zoning Enhanced Group Management Full Fabric Fabric Watch ISL Trunking Advanced Performance Monitoring Adaptive Networking | Web Tools Advanced Zoning Full Fabric Fabric Watch ISL Trunking Advanced Performance Monitoring | Web Tools Advanced Zoning Full Fabric (2498-B24 AAS model only) Enhanced Group Management (EGM) (2498-B24 AAS model only) | Web Tools Advanced Zoning Full Fabric Fabric Watch Enhanced Group Management | Web Tools Advanced Zo Full Fabric Fabric Watch Enhanced Gr |
| OPTIONAL SOFTWARE UPGRADE BUNDLES | N/A | N/A | N/A | B24 Enterprise Package (FC 7201 / 45W0503) Includes: - (2) 8-Port Activations (FC 7200 / 45W0502) - Fabric Watch - Advanced Performance Monitoring - ISL Trunking - Adaptive Networking | B45 Enterprise Package (FC 7401 / 45W0525) Includes: - (2) 8-Port Activations (FC 7400 / 45W0524) - Fabric Watch - Advanced Performance Monitoring - ISL Trunking - Adaptive Networking | B80 Enterpris - (2) 16-Port - Advanced P - ISL Trunking - Adaptive Ne |
| OPTIONAL SOFTWARE UPGRADES | <ul style="list-style-type: none"> ICL License for Single Switch (FC 7885) Order With FC 7870 (2) ICL Cables Half Bandwidth ICL license (FC 7882) FICON With CUP Activation (FC 7886) High-Performance FCIP/FC Extension (FC 7887) Includes: - IPsec - FCIP and FC FastWrite - Requires FC 3850 FICON Accelerator (FC 7888) Includes: - FICON XRC Emulation - FICON Tape Pipelining - Requires FC 3850 & FC 7887 Integrated Routing (FC 7889) Advance Extension license (FC 7891) 10 GbE FCIP Activation (FC 7892) | <ul style="list-style-type: none"> ICL License for Single Switch (FC 7883) Order With FC 7870 (2) ICL Cables FICON With CUP Activation (FC 7886) High-Performance FCIP/FC Extension (FC 7887) Includes: - IPsec - FCIP and FC FastWrite - Requires FC 3850 FICON Accelerator (FC 7888) Includes: - FICON XRC Emulation - FICON Tape Pipelining - Requires FC 3850 & FC 7887 Integrated Routing (FC 7889) Advance Extension license (FC 7891) 10 GbE FCIP Activation (FC 7892) Extended Fabrics (FC 7803) | <ul style="list-style-type: none"> Extended Fabrics (FC 7803) FCIP Activation (FC 7827) Includes: - IPsec - FCIP and FC FastWrite - requires FC 3450 FICON With CUP Activation (FC 7831) FICON Accelerator (FC 7838) Includes: - FICON XRC Emulation - FICON Tape Pipelining - Requires FC 3450 & FC 7827 | <ul style="list-style-type: none"> Fabric Watch (FC 7202 / 45W0504) Extended Fabrics (FC 7203 / 45W0505) Advanced Performance Monitoring (FC 7204 / 45W0508) ISL Trunking (FC 7205 / 45W0509) Adaptive Networking (FC 7206 / 45W0510) EGM (45W0630 - 249824E model only) Full Fabric (45W0512 - 249824E model only) | <ul style="list-style-type: none"> Extended Fabrics (FC 7403 / 45W0526) Advanced Performance Monitoring (FC 7404 / 45W0527) ISL Trunking (FC 7405 / 45W0528) Adaptive Networking (FC 7406 / 45W0529) Integrated Routing (FC 7407 / 45W1063) FICON w/ CUP Activation (FC 7409 / 45W0531) | <ul style="list-style-type: none"> Extended Fat Advanced Per ISL Trunking (Adaptive Net FICON With C |
| OTHER BASE FEATURES | Dynamic Path Selection NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series Virtual Fabrics | Dynamic Path Selection NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series Virtual Fabrics | Dynamic Path Selection NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series | Access Gateway Dynamic Path Selection EZ Switch Setup Wizard NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series | Dynamic Path Selection EZ Switch Setup Wizard NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series Virtual Fabrics | Dynamic Path Selection EZ Switch Setup Wizard NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series Virtual Fabric |
| FABRIC OS SUPPORTED | Fabric OS 6.1.x or later | Fabric OS 6.2.x or later | Fabric OS 6.1.x | Fabric OS 6.1.x | Fabric OS 6.1.x | |
| CUSTOMER PROFILE | <ul style="list-style-type: none"> Large, Mission-Critical SAN Enterprise Consolidation Long-Distance Business Continuity Multiple SAN Islands | <ul style="list-style-type: none"> Large and mid-sized Mission-critical SAN Enterprise Consolidation Long-Distance Business Continuity Multiple SAN Islands | <ul style="list-style-type: none"> Large, Mission-Critical SAN Enterprise Consolidation Long-Distance Business Continuity Multiple SAN Islands | <ul style="list-style-type: none"> SMB SAN Cost-Sensitive DAS to SAN Migration | <ul style="list-style-type: none"> Workgroup Midsize SAN High Availability DAS to SAN Migration | <ul style="list-style-type: none"> Workgroup Midsize to E High Availab Consolidatic |
| TARGET ENVIRONMENT | <ul style="list-style-type: none"> Enterprise Backbone (Up to 896 Ports in Dual-Chassis Systems) (768 Fibre Channel Ports and 128 ICL Ports) FICON | <ul style="list-style-type: none"> Excellent Core Backbone for Medium Enterprise Excellent Edge Backbone for Large Enterprise FICON | <ul style="list-style-type: none"> Enterprise Core Director (up to 384 Ports) FICON | <ul style="list-style-type: none"> Entry Workgroup Department Edge | <ul style="list-style-type: none"> Department Workgroup High-Performance Edge FICON | <ul style="list-style-type: none"> Edge Switch Small Core Remote Site FICON |

| | EXTENSION/ROUTING | SAN SWITCH MODULE | | FCoCEE CONVERGENCE | |
|---|--|--|--|--|---|
| System Storage SAN80B-4 | IBM System Storage SAN06B-R Multiprotocol Router | Brocade 4Gb SAN Switch Module for IBM BladeCenter | Brocade 8Gb SAN Switch Module for IBM BladeCenter | IBM Converged Switch B32 | Brocade Converged Switch Module for IBM BladeCenter |
|  |  |  |  |  |  |
| Brocade 5300 Switch | Brocade Extension Switch 7800 | Brocade 4020 Switch Module | Brocade 5470 Switch Module | Brocade 8000 Converged Switch | BR 8740 High Speed Switch Module |
| 2498-B80 | 2498-R06 | 321812 (20-port), 32R1813 (10-port) | 42C1828 (Enterprise 20-port), 44X1920 (20-port), 44X1921 (10-port) | 3758-L32 | 69Y1909 |
| 48, 64, 80 | 4 FC and 2 GigE FCIP (Can be upgraded to 16 FC and 6 GigE FCIP ports with FC#7732) | Up to (20) 4 Gbps Fibre Channel ports (14 internal server ports and 6 external fabric ports) | Up to (20) 8 Gbps Fibre Channel ports (14 internal server ports and 6 external fabric ports) | 24 CEE 8 FC ports can be activated with (FC#7408) | Up to 22 10GbE ports (8 ports are External) and 8 Gbps External FC ports |
| 4/2/1 Gbps FC, FCR | 8/4/2/1 Gbps FC, FCR, GigE FCIP | 4/2/1 Gbps FC | 8/4/2/1 Gbps FC | 10 Gbps CEE 8/4/2/1 Gbps FC | 10 GbE ports & 8/4/2 Gbps FC ports |
| 2U | 1U | Custom | Custom | 1U | Custom |
| Standard - 16 Ports (FC 7800) | Upgradable to full hardware capabilities with FC#7732. Increasing to 16 FC ports and 6 GigE FCIP ports. | 10-port model (32R1813) includes 10 Dynamic Ports On Demand that dynamically activates the first 10 ports that come on-line (manual configuration also possible) To Upgrade to Full 20-Port Version, Order: 10-Port Upgrade for 32R1813 (32R1822) | 10-port model (44X1921) includes 10 Dynamic Ports On Demand that dynamically activates the first 10 ports that come on-line (manual configuration also possible) To activate remaining 10 ports on 44X1921, order: 10-Port POD (32R1822) | 24 CEE 8 FC ports with activation (FC#7408) | Dynamic Ports on Demand (69Y1917); Activates additional 14 ports on 69Y1909 |
| Yes | Yes (Requires FC 7733) | No | No | No | No |
| Yes | Yes | Yes | Yes | No | Yes |
| Swappable Power Supplies Swappable Redundant Fans Rack Mount Rails Included | 2 Hot-Swappable Power Supplies 2 Hot-Swappable Redundant Fans Rack Mount Rails Included | Designed for IBM BladeCenter, hot pluggable with no additional fans or power supplies Supported on BladeCenter S, E, H, T, and HT chassis and Multi-Switch Interconnect Modules | Designed for IBM BladeCenter, hot pluggable with no additional fans or power supplies Supported on BladeCenter E, H, T, and HT chassis and Multi-Switch Interconnect Modules Compatible with BladeCenter Open Fabric Manager | 2 Hot-Swappable Power Supplies 3 Hot-Swappable Fans Rack-Mount Rails Included Mid-Mount Rack Kit Optional (FC 5910 / 45W2424) | - Designed for IBM highspeed BladeCenter, hot pluggable with no additional fans or power supplies - Compatible with BladeCenter Open Fabric Manager, fully integrated into IBM System Director and Tivoli - High performance low latency switching |
| Group Management | Enhanced Group Management | Web Tools Advanced Zoning Full Fabric | - Web Tools - Advanced Zoning - Full Fabric - Enhanced Group Management Enterprise 20-port model (42C1828) also includes: - ISL Trunking - Adaptive Networking - Advanced Performance Monitoring - Fabric Watch - Extended Fabrics - Server Application Optimization | Web Tools Advanced Zoning Full Fabric Fabric Watch Enhanced Group Management | - FCF and Layer-2 Networking - Enhanced Group Management - Access Gateway |
| Enterprise Package (FC 7801) Includes: Advanced Performance Monitoring Advanced Networking Fabric Watch | Enterprise Package (FC 7731) - Advanced Performance Monitor (FC 7734) - Trunking Activation (FC 7735) - Adaptive Networking (FC 7736) - Fabric Watch (FC 7740) | Performance Bundle (APM & Trunking) (26K5605) | N/A | N/A | - DPoD upgrade Kit (69Y1917, FC: 2425) - 10GbE SFP+ Optical module (49Y4216, FC: 0069) - 8 Gbps SFP+ Optical Module (44X1962, FC: 5084) |
| Advanced Performance Monitoring (FC 7803) Advanced Performance Monitoring (FC 7804) FC 7805 Advanced Networking (FC 7806) Trunking Activation (FC 7807) CUP Activation (FC 7809) | Port Activation (FC 7732) Advanced Extension (FC 7733) - FCIP Trunking and Adaptive Rate Limiting Advanced Performance Monitor (FC 7734) Trunking Activation (FC 7735) Adaptive Networking (FC 7736) FICON with CUP Activation (FC 7737) - Requires Advanced Extension (FC 7733) Integrated Routing (FC 7739) Fabric Watch (FC 7740) Extended Fabric (FC 7742) | 10-Port POD (32R1822) ISL Trunking (26K5607) Advanced Performance Monitoring (45W0508) Extended Fabrics (F45W0504) Fabric Watch (45W0504) | 10-Port POD (32R1822) ISL Trunking (26K5607) Advanced Performance Monitoring (45W0508) Extended Fabrics (45W0505) Fabric Watch (45W0504) Adaptive Networking (45W0510) Server Application Optimization (TBD) | Advanced Performance Monitoring (FC 7404 / 45W0527) ISL Trunking (FC 7405 / 45W0528) Upgrade FC & FCoE (FC 7408) | - Fabric Watch (45W0255, FC: 4398) - Advanced Performance Monitoring (45W0257, FC: 4248) - ISL Trunking (26K5607, FC: 4247) |
| Dynamic Path Selection Wizard | Dynamic Path Selection Fast Write Over FCIP Storage Optimized TCP FC Routing for Remote-Fault Isolation Hardware-Based Data Compression NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series | Access Gateway Dynamic Path Selection Dynamic Ports On Demand (DPoD) NPIV Security Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series | Access Gateway Dynamic Path Selection Dynamic Ports On Demand (DPoD) NPIV Security (ACLs) Advanced Diagnostic Tools Port Fencing Buffer Credit Recovery Traffic Isolation Zones Interopmode 2&3 for Connection to M-Series | FC: Dynamic Path Selection, NPIV, Advanced Diagnostic Tools, Buffer Credit Recovery Ethernet: STP (802.1d)/MSTP (802.1s)/RSTP (802.1w), VLAN tagging (802.1q), Link Aggregation Control Protocol (802.3ad), ACLs (VLAN, MAC, & port-based), 8-priority QoS, 4k VLANs, 9048-byte jumbo frames, Pause Frames (802.3x), Port-based ACLs (PACLs), CoS trust: IEEE 802.1p CEE: Data Center Bridging eXchange (DCBX), Priority-based Flow Control (PFC) - 802.1Qbb, Enhanced Transmission Selection (ETS) - 802.1Qaz, enhanced frame-based trunking | Rich set of Layer-2 features like STP, RSTP, MSTP, LACP, ARP and Layer 3 functions like Static Routes and IGMP snooping. Support for VLAN and VLAN Encapsulation. Advanced DCB (a.k.a CEE) functions that includes PFC, ETS and DCBX. Complemented by full FC Fabric features on external FC ports like SANS, RSCN, DPS, ISL Trunking, Access Gateway. Flexible Mgmt via embedded CLI, WebTools GUI, DCFM, IBM System Director, and Tivoli. |
| Fabric OS 6.1.x | Fabric OS 6.3.x or later | Fabric OS 6.1.x | Fabric OS 6.2.0_bc | V6.3.0b | FOS v6.3.1_cee |
| Enterprise SAN Scalability Performance | • Multiple Sites • Multiple SAN Islands • Multiple SAN Vendors • Consolidation | • Multiple Sites • Multiple SAN Islands • Multiple SAN Vendors • Consolidation | • Midsize to Enterprise SAN • Multiple Sites and SAN Islands • Multiple SAN Vendors | • Midsize to Enterprise SAN • Server rack connectivity (10 GbE) • FCoCEE Convergence | • Consolidation/Convergence • Existing or new Data Center • Customers looking for best TCO • Mixed SAN and 10GE networks |
| Scale to Large Core Switch Switch | • Business Continuity • Consolidation • ILM | • Server Consolidation • Business Agility • Native McData Fabrics connectivity • Server/Storage Virtualization • Business Continuity | • Server and Storage Consolidation • Application and Server Virtualization • IT Simplification and Automation | • Data Center Top of Rack | • Server Consolidation • Building NextGen 10GE fabric • Mixed FC and IP networks • Application and Server Virtualization • Highspeed Networks, HPC |