

QUICK REFERENCE GUIDE  
IP NETWORKING

EXTRAORDINARY  
NETWORKS

EXTRAORDINARY  
PARTNERSHIPS

### **CONNECTIVITY YOU CAN COUNT ON**












From enterprise data centers to the service provider core, Brocade® develops extraordinary networking solutions that connect the world's most important information in missioncritical environments. As a result, Brocade end-to-end networking solutions enable today's complex, data-intensive organizations to run in the most efficient manner possible.

Brocade pioneered and continues to lead the Storage Area Network (SAN) market, providing the industry's most reliable, energy-efficient solutions. Brocade recently enhanced its offerings by adding high-performance networking capabilities as part of a complete local, metro-, and wide-area switching, routing, security, and application traffic management portfolio. Delivered directly and through global partners, Brocade networking solutions support the most demanding business requirements such as consolidation, virtualization, and business continuity. In turn, these solutions help today's organizations optimize information connectivity, increase resource utilization, and maximize the business value of their data.


### **A TRADITION OF NETWORKING**

Brocade combines a proven track record of expertise, innovation, and new technology development with standards leadership and strategic partnerships with the world's leading IT companies. The result is the industry's most comprehensive family of reliable, high-performance, and efficient networking solutions that provide a reliable foundation for next-generation IT infrastructures.








**Campus Network Switching and Routing**

NETWORK LAYER	ACCESS							AGGREGATION			CORE	
BROCADE MODEL	IronPoint Mobility Controllers	FastIron Edge Switch	FastIron WS Switch	FastIron LS Switch	FastIron GS Switch	FastIron CX Switch	FastIron Edge X Switch	FastIron Super X Switch	FastIron SX 800/1600 Switch	BigIron RX-4,-8,-16,-32	NetIron MLX-4,-8,-16,-32	
SERIES OVERVIEW												
PART NUMBERS	IP-MC-500, IP-MC-1000, IP-MC-3000, IP-MC-5000	FES2402, FES4802, FES9604	FWS624, FWS624G, FWS624-POE, FWS624G-POE, FWS648, FWS648G, FWS648-POE, FWS648G-POE	FLS624, FLS624-STK, FLS648, FLS648-STK	FGS624P, FGS624P-STK, FGS624P-POE, FGS648P, FGS648P-STK, FGS648P-POE	FCX624S, FCX624S-HPOE, FCX648S, FCX648S-HPOE	FESX424-POE	FI-SX1-4-AC/-DC	FI-SX800-AC/-DC, FI-SX1600-AC/-DC	BI-RX-4-AC/-DC, BI-RX-8-AC/-DC, BI-RX-16-AC/-DC, BI-RX-32-AC/-DC	NI-MLX-4-AC/-DC, NI-MLX-8-AC/-DC, NI-MLX-16-AC/-DC, NI-MLX-32-AC/-DC	
INTERFACE SLOTS	N/A	N/A	N/A	1 (uplink)	1 (uplink)	1 (uplink)	1 (uplink)	8	8, 16	4, 8, 16, 32	4, 8, 16, 32	
MAXIMUM PORTS	<ul style="list-style-type: none"> <li>Up to 20 x 10/100/1000 MbE (RJ45)</li> <li>Up to 10 x 1 GbE (SFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 96 x 10/100 MbE (RJ45)</li> <li>Up to 24 x 10/100 MbE (RJ45) PoE</li> <li>4 x combination (SFP or RJ45)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100 MbE (RJ45)</li> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 2-3 x 10 GbE (XFP)</li> <li>Up to 48 x 10/100/1000 MbE (RJ45) PoE</li> <li>4 x combination (SFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>4 x combination (SFP)</li> <li>Up to 2-3 x 10 GbE (XFP)</li> <li>Stackable up to 384 x 10/100/1000 MbE (RJ45)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>4 x combination (SFP)</li> <li>Up to 2 x 10 GbE (XFP)</li> <li>Stackable up to 384 x 10/100/1000 MbE (RJ45) PoE/Non-PoE</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>4 x combination (SFP)</li> <li>Up to 2 x 10 GbE (XFP)</li> <li>2 x 16 Gbps dedicated stacking ports</li> <li>Stackable up to 384 x 10/100/1000 MbE (RJ45) PoE/Non-PoE</li> </ul>	<ul style="list-style-type: none"> <li>Up to 24 x 10/100/1000 MbE (RJ45)</li> <li>4 x combination (SFP)</li> <li>Up to 2 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 200 x 10/100/100 MbE (RJ45)</li> <li>Up to 200 x 100/100 MbE (SFP)</li> <li>Up to 192 x 10/100/1000 MbE (RJ45) PoE</li> <li>Up to 16 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 400 x 10/100/100 MbE (RJ45)</li> <li>Up to 400 x 100/100 MbE (SFP)</li> <li>Up to 384 x 10/100/1000 MbE (RJ45) PoE</li> <li>Up to 36 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 1.536 x 10/100/1000 MbE (RJ45/RJ21)</li> <li>Up to 1.536 x 100/1000 MbE (SFP)</li> <li>Up to 512 x 10 GbE (XFP/SFP+)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 640 x 10/100/1000 MbE (RJ45)</li> <li>Up to 640 x 100/1000 MbE (SFP)</li> <li>Up to 128 x 10 GbE (XFP)</li> <li>Up to 256 x OC12/48 POS/SDH</li> <li>Up to 64 x OC192 POS/SDH</li> </ul>	
POWER OVER ETHERNET (POE)	No	• 802.3af PoE up to class-3 (15.4W)	• 802.3af PoE up to class-3 (15.4W)	No	• 802.3af PoE up to class-3 (15.4W)	• 802.3af PoE up to class-3 (15.4W) • 802.3af PoE+ up to class-4 (30W)	• 802.3af PoE up to class-3 (15.4W)	• 802.3af PoE up to class-3 (15.4W)	• 802.3af PoE up to class-3 (15.4W)	• 802.3af PoE up to class-3 (15.4W)	No	
HARDWARE FEATURES	<ul style="list-style-type: none"> <li>Up to 20 Gbps Encrypted/Unencrypted wireless switching capacity</li> <li>Redundant power supplies</li> <li>Hot swappable power supplies</li> <li>Up to 1500 Wireless Access Points</li> </ul>	<ul style="list-style-type: none"> <li>Up to 27 Gbps switching capacity</li> <li>Up to 21 MPPS forwarding capacity</li> <li>1+1 redundant power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 96 Gbps switching capacity</li> <li>Up to 72 MPPS forwarding capacity</li> <li>1+1 redundant AC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>1+1 redundant AC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 510 Gbps switching capacity</li> <li>Up to 304 MPPS forwarding capacity</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	<ul style="list-style-type: none"> <li>Up to 1080 Gbps switching capacity</li> <li>Up to 636 MPPS forwarding capacity</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>N+1 redundant AC/DC power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	<ul style="list-style-type: none"> <li>Up to 5.12 Tbps switching capacity</li> <li>Up to 2,284 MPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	<ul style="list-style-type: none"> <li>Up to 7.68 Tbps switching capacity</li> <li>Up to 4 BPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	
MODULES AVAILABLE (INDIVIDUAL)	<ul style="list-style-type: none"> <li>4-port 10/100/1000 MbE RJ45 module</li> <li>2-port 1 GbE SFP wireless module</li> </ul>	N/A	N/A	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> <li>3-port 10 GbE uplink module</li> </ul>	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>24-port RJ45+SFP management module</li> </ul>	N/A			
MODULES AVAILABLE (SHARED)	N/A	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	<ul style="list-style-type: none"> <li>24-port 10/100/1000 MbE RJ45 module</li> <li>24-port 10/100/1000 MbE RJ45 PoE module</li> <li>24-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> </ul>	<ul style="list-style-type: none"> <li>0-port management module</li> <li>8-port RJ45+SFP management module</li> <li>2-port 10 GbE management module</li> <li>Switch fabric module</li> <li>24-port 10/100/1000 MbE RJ45 module</li> <li>24-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>20-port 10/100/1000 MbE RJ45 module</li> <li>48-port 10/100/1000 MbE RJ21 module</li> <li>24-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> <li>4-port 10 GbE XFP module</li> <li>4-port OC12/48 POS/SDH module</li> <li>16-port 10 GbE SFP+ module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>20-port 10/100/1000 MbE RJ45 module</li> <li>20-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> <li>4-port 10 GbE XFP module</li> <li>2-port OC12/48 POS/SDH module</li> <li>8-port OC12/48 POS/SDH module</li> <li>2-port OC192 POS/SDH module</li> </ul>	
HEIGHT	1, 6 RU	1.5-2.5 RU	1 RU	1 RU	1.5 RU	1 RU	1.5 RU	6 RU	6 RU, 14 RU	4, 7, 14, 33 RU	4, 7, 14, 33 RU	
MANAGEMENT MODULES (+REDUNDANCY)	4 (Base) + 1 (Optional)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	
SWITCH FABRIC MODULES (+REDUNDANCY)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2 (Base)	2/2/3/7 (Base) + 1/1/1/1 (Optional)	2/2/3/7 (Base) + 1/1/1/1 (Optional)	
AC POWER SUPPLIES (+REDUNDANCY)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional) PoE requires both power supplies	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional) Full 48-ports PoE requires both power supplies	1 (Base) + 1 (Optional) Full 48-ports PoE requires both power supplies	1 (Base) + 1 (Optional)	System: 1 (Base) + 1 (Optional) PoE: 1 (Base) + 1 (Optional)	System: 1/3 (Base) + 1 (Optional) PoE: 1/3 (Base) + 1 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)	
HOT SWAPPABLE COMPONENTS	SFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies, fan assemblies, Management modules, Interface modules	SFP/XFP transceivers, power supplies, fan assemblies, Switch fabric modules, Management modules, Interface modules	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules	
HARDWARE OPTIONS (INDIVIDUAL)	N/A	N/A	N/A					Mid-mount Rack Kit 8-slot				
HARDWARE OPTIONS (SHARED)	<ul style="list-style-type: none"> <li>1200W AC power supply</li> </ul>	<ul style="list-style-type: none"> <li>220W AC/DC power supply</li> <li>530W AC power supply (PoE)</li> <li>600W AC/DC power supply (PoE)</li> </ul>	<ul style="list-style-type: none"> <li>100W AC power supply</li> <li>530W AC power supply (PoE)</li> <li>External redundant power supply supporting up to 4 non-PoE units simultaneously</li> </ul>	<ul style="list-style-type: none"> <li>120W AC power supply</li> <li>External redundant power supply supporting up to 4 non-PoE units simultaneously</li> </ul>	<ul style="list-style-type: none"> <li>POE DIMM for 24x1 GbE ports</li> <li>600W AC power supply (PoE)</li> </ul>	<ul style="list-style-type: none"> <li>210W AC power supply</li> <li>610W AC power supply (PoE)</li> <li>Rack Mount Kit</li> </ul>	<ul style="list-style-type: none"> <li>PoE DIMM for 24x1 GbE ports</li> <li>600W AC/DC power supply</li> <li>Rack Mount Kit (Extra long ears)</li> </ul>	<ul style="list-style-type: none"> <li>PoE DIMM for 24-port 10/100/100 MbE (RJ45) interface modules</li> <li>1200W SYS power supply</li> <li>1250W POE power supply</li> <li>2500W POE power supply</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC power supply</li> <li>2400W AC/DC power supply</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC power supply</li> <li>2400W AC/DC power supply</li> </ul>		
STANDARD SOFTWARE	<ul style="list-style-type: none"> <li>Single Channel deployment, Virtual Cell, High density AP support, WPA/WPA2, Captive Portal, Plug-and-play AP, QoS for Traffic prioritization for upstream and downstream traffic</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Full Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4+IPv6 including RIPv1/v2, RIPvng, OSPFv2/v3, ISIS, BGP-4, DVMRP, PIM-SM/DM</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 MPLS+IPv4+IPv6 routing including BGP, OSPFv2/v3, ISIS, RIP, RIPvng, VRRP, VRRPE, PIM-SM/SSM/DM, MPLS, LDP, RSVP, VPLS, VLL, MPLS L3VPNs and multi-VRF</li> </ul>
OPTIONAL SOFTWARE UPGRADES	<ul style="list-style-type: none"> <li>Policy enforcement firewall</li> <li>N+1 redundancy</li> <li>Enterprise mesh</li> <li>Air firewall</li> <li>Dual AG</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 routing such as OSPFv2, RIP, PIM, DVMRP -no BGP</li> </ul>	<ul style="list-style-type: none"> <li>Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2</li> </ul>	<ul style="list-style-type: none"> <li>Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2</li> </ul>	<ul style="list-style-type: none"> <li>Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2</li> </ul>	<ul style="list-style-type: none"> <li>Advanced L3 features: BGP</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM</li> <li>Full Layer 3 IPv4+IPv6 upgrade including RIPvng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM</li> <li>Full Layer 3 IPv4+IPv6 upgrade including RIPvng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM</li> <li>Full Layer 3 IPv4+IPv6 upgrade including RIPvng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM</li> <li>Full Layer 3 IPv4+IPv6 upgrade including RIPvng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services</li> </ul>	
OTHER BASE FEATURES	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
TARGET ENVIRONMENT	<ul style="list-style-type: none"> <li>Small to large Campus LAN</li> <li>Wireless Access</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Building management systems</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Building management systems</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> <li>Financial enterprises and trading floors</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> <li>Financial enterprises and trading floors</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> <li>Financial enterprises and trading floors</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> <li>Financial enterprises and trading floors</li> </ul>	<ul style="list-style-type: none"> <li>VoIP</li> <li>Campus LAN</li> <li>Wireless Access</li> <li>Converged edge (voice + video + data)</li> <li>Video surveillance</li> <li>Remote video kiosks</li> <li>Building management systems</li> <li>Financial enterprises and trading floors</li> </ul>	<ul style="list-style-type: none"> <li>Campus LAN</li> <li>VoIP, video and data</li> <li>Campus border routing</li> <li>Enterprise MPLS/VPLS and virtual routing</li> <li>MPLS enabled campus core</li> <li>Financial enterprises and trading floors</li> </ul>	

## Service Provider Network Routing

NETWORK LAYER	ACCESS	AGGREGATION		CORE
BROCADE MODEL	Netron CES Switch	Netron MLX-4,-8,-16,-32	ServerIron ADX	Netron XMR-4,-8,-16,-32
SERIES OVERVIEW				
PART NUMBERS	NI-CES-2024C-AC/-DC, NI-CES-2024F-AC/-DC, NI-CES-2048C-AC/-DC, NI-CES-2048F-AC/-DC, NI-CES-2048CX-AC/-DC, NI-CES-2048FX-AC/-DC	NI-MLX-4-AC/-DC, NI-MLX-8-AC/-DC, NI-MLX-16-AC/-DC, NI-MLX-32-AC/-DC	SI-1016-2, SI-1016-4, SI-1216-4, SI-4000, SI-8000	NI-XMR-4-AC/-DC, NI-XMR-8-AC/-DC, NI-XMR-16-AC/-DC, NI-XMR-32-AC/-DC
INTERFACE SLOTS	1 (uplink)	4, 8, 16, 32	0, 2, 4	4, 8, 16, 32
MAXIMUM PORTS	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 48 x 100/1000 MbE (SFP)</li> <li>4 x combination (SFP or RJ45)</li> <li>Up to 2 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 640 x 10/100/1000 MbE (RJ45)</li> <li>Up to 640 x 100/1000 MbE (SFP)</li> <li>Up to 128 x 10 GbE (XFP)</li> <li>Up to 256 x OC12/48 POS/SDH</li> <li>Up to 64 x OC192 POS/SDH</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 48 x 1 GbE (SFP)</li> <li>Up to 16 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 640 x 10/100/1000 MbE (RJ45)</li> <li>Up to 640 x 100/1000 MbE (SFP)</li> <li>Up to 128 x 10 GbE (XFP)</li> <li>Up to 256 x OC12/48 POS/SDH</li> <li>Up to 64 x OC192 POS/SDH</li> </ul>
HARDWARE FEATURES	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>Low latency</li> <li>Deep packet buffering</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan unit</li> <li>Front-to-back airflow</li> </ul>	<ul style="list-style-type: none"> <li>Up to 7,68 Tbps switching capacity</li> <li>Up to 4 BPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	<ul style="list-style-type: none"> <li>Up to 320 Gbps switching capacity</li> <li>Up to 70 Gbps L4 &amp; L7 switching capacity</li> <li>Up to 16 million L4 transactions/sec</li> <li>Up to 120 million SYN/sec DoS protection</li> <li>Up to 14 million DNS queries/sec</li> <li>M+N redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan unit</li> </ul>	<ul style="list-style-type: none"> <li>Up to 7,68 Tbps switching capacity</li> <li>Up to 4 BPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>
MODULES AVAILABLE (INDIVIDUAL)	N/A			
MODULES AVAILABLE (SHARED)	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>20-port 10/100/1000 MbE RJ45 module</li> <li>20-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> <li>4-port 10 GbE XFP module</li> <li>2-port OC12/48 POS/SDH module</li> <li>4-port OC12/48 POS/SDH module</li> <li>8-port OC12/48 POS/SDH module</li> <li>2-port OC192 POS/SDH module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Application switch module</li> <li>Switch fabric module</li> <li>12-port 10/100/100 MbE RJ45 module</li> <li>12-port 1 GbE SFP module</li> <li>4-port 10 GbE XFP module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>20-port 10/100/1000 MbE RJ45 module</li> <li>20-port 100/1000 SFP module</li> <li>4-port 10 GbE XFP module</li> <li>2-port OC12/48 POS/SDH module</li> <li>4-port OC12/48 POS/SDH module</li> <li>8-port OC12/48 POS/SDH module</li> <li>2-port OC192 POS/SDH module</li> </ul>
HEIGHT	1 RU	4, 7, 14, 33 RU	1, 4, 8 RU	4, 7, 14, 33 RU
MANAGEMENT MODULES (+REDUNDANCY)	N/A	1 (Base) + 1 (Optional)	1 (Base) + 0/1 (Optional)	1 (Base) + 1 (Optional)
SWITCH FABRIC MODULES (+REDUNDANCY)	N/A	2/3/7 (Base) + 1/1/1 (Optional)	1/2 (Base)	2/3/7 (Base) + 1/1/1 (Optional)
AC POWER SUPPLIES (+REDUNDANCY)	1 (Base) + 1 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)	1/1/2 (Base) + 1/1/2 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)
HOT SWAPPABLE COMPONENTS	SFP/XFP transceivers, power supplies, fan assembly	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules	SFP/XFP transceivers, power supplies, fan assemblies, interface modules	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules
HARDWARE OPTIONS (INDIVIDUAL)	Mid-mount rack kit 8-slot		500W AC/DC power supply	
HARDWARE OPTIONS (SHARED)	<ul style="list-style-type: none"> <li>500W AC/DC power supply</li> <li>Rack mount kit (Extra long ears)</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC power supply</li> <li>2400W AC/DC power supply</li> </ul>	1200W AC/DC power supply	<ul style="list-style-type: none"> <li>1200W AC/DC power supply</li> <li>2400W AC/DC power supply</li> </ul>
STANDARD SOFTWARE	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 MPLS +IPv4+IPv6 routing including BGP, OSPFv2/v3, ISIS, RIP, RIPng, VRRP, VRRPE, PIM-SM/SSM/DM, MPLS, LDP, RSVP, VPLS, VLL, MPLS L3VPNs and multi-VRF</li> </ul>	<ul style="list-style-type: none"> <li>Layer 2, Layer 4-7 SLB, and hot-standby HA</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 MPLS +IPv4+IPv6 routing including BGP, OSPFv2/v3, ISIS, RIP, RIPng, VRRP, VRRPE, PIM-SM/SSM/DM, MPLS, LDP, RSVP, VPLS, VLL, MPLS L3VPNs and multi-VRF</li> </ul>
OPTIONAL SOFTWARE UPGRADES	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 upgrade including BGP-4, RIPv1/v2, OSPFv2, DVMRP, PIM</li> <li>Full Metro upgrade including MPLS, VPLS, VLL, PBB</li> </ul>		<ul style="list-style-type: none"> <li>Layer 3 IPv4 including RIPv1/v2, OSPFv2, GSLB, symmetric active-active HA</li> </ul>	
OTHER BASE FEATURES	N/A	N/A	N/A	N/A
TARGET ENVIRONMENT	<ul style="list-style-type: none"> <li>Service Provider/Metro access</li> <li>FTTx applications</li> </ul>	<ul style="list-style-type: none"> <li>Service Provider/Metro aggregation</li> <li>Internet Exchange Provider (IXG)</li> <li>Multiservice Provider Edge (PE)</li> </ul>	<ul style="list-style-type: none"> <li>SP Data Center</li> <li>Application optimization</li> <li>Server load balancing</li> <li>Web acceleration</li> <li>SSL offload</li> <li>Infrastructure applications - DNS/Email</li> </ul>	<ul style="list-style-type: none"> <li>Internet Service Provider (ISP)</li> <li>Service Provider core</li> <li>Multiservice Provider Core (P)</li> </ul>

## Data Center Network Switching and Routing

NETWORK LAYER	ACCESS			AGGREGATION			CORE
BROCADE MODEL	FastIron Edge X Switch	NetIron CES Switch	TurboIron 24X Switch	8000 Switch	ServerIron ADX	BigIron RX-4,-8,-16,-32	NetIron MLX-4,-8,-16,-32
SERIES OVERVIEW							
PART NUMBERS	FESX424, FESX424HF, FESX624, FESX624HF, FESX448, FESX648	NI-CES-2024C-AC/-DC, NI-CES-2024F-AC/-DC, NI-CES-2048C-AC/-DC, NI-CES-2048F-AC/-DC, NI-CES-2048CX-AC/-DC, NI-CES-2048FX-AC/-DC	TI-24X-AC	BR-8000-0000	SI-1016-2, SI-1016-4, SI-1216-4, SI-4000, SI-8000	BI-RX-4-AC/-DC, BI-RX-8-AC/-DC, BI-RX-16-AC/-DC, BI-RX-32-AC/-DC	NI-MLX-4-AC/-DC, NI-MLX-8-AC/-DC, NI-MLX-16-AC/-DC, NI-MLX-32-AC/-DC
INTERFACE SLOTS	1 (uplink)	1 (uplink)	N/A	N/A	0, 2, 4	4, 8, 16, 32	4, 8, 16, 32
MAXIMUM PORTS	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 24 x 100/1000 (SFP)</li> <li>4 x combination (SFP or RJ45)</li> <li>Up to 2 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 48 x 100/1000 MbE (SFP)</li> <li>4 x combination (SFP or RJ45)</li> <li>Up to 2 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>24 x 10 GbE/1 GbE (SFP+/SFP)</li> <li>4 x 10/100/1000 MbE (RJ45)</li> </ul>	<ul style="list-style-type: none"> <li>24 10 GbE ports</li> <li>8 8 Gbps FC ports added with service FCoE upgrade license</li> </ul>	<ul style="list-style-type: none"> <li>Up to 48 x 10/100/1000 MbE (RJ45)</li> <li>Up to 48 x 1 GbE (SFP)</li> <li>Up to 16 x 10 GbE (XFP)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21)</li> <li>Up to 1,536 x 100/1000 MbE (SFP)</li> <li>Up to 512 x 10 GbE (XFP/SFP+)</li> </ul>	<ul style="list-style-type: none"> <li>Up to 640 x 10/100/1000 MbE (RJ45)</li> <li>Up to 640 x 100/1000 MbE (SFP)</li> <li>Up to 128 x 10 GbE (XFP)</li> <li>Up to 256 x OC12/48 POS/SDH</li> <li>Up to 64 x OC192 POS/SDH</li> </ul>
HARDWARE FEATURES	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>Deep packet buffering</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> </ul>	<ul style="list-style-type: none"> <li>Up to 136 Gbps switching capacity</li> <li>Up to 101 MPPS forwarding capacity</li> <li>Low latency</li> <li>Deep packet buffering</li> <li>1+1 redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan unit</li> <li>Front-to-back airflow</li> </ul>	<ul style="list-style-type: none"> <li>Up to 488 Gbps switching capacity</li> <li>Up to 366 MPPS forwarding capacity</li> <li>Ultra-low latency (1500 nSec)</li> <li>1+1 redundant AC power supplies</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan unit</li> <li>Front-to-back airflow</li> </ul>	<ul style="list-style-type: none"> <li>Up to 360mpps forwarding capacity</li> <li>Hot swappable redundant power supplies</li> <li>Hot swappable redundant fan assemblies</li> <li>Hot swappable SFP+ optical modules</li> </ul>	<ul style="list-style-type: none"> <li>Up to 320 Gbps switching capacity</li> <li>Up to 70 Gbps L4 &amp; L7 switching capacity</li> <li>Up to 16 million L4 transactions/sec</li> <li>Up to 120 million SYN/sec DoS protection</li> <li>Up to 14 million DNS queries/sec</li> <li>N+N redundant AC/DC power supplies</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan unit</li> </ul>	<ul style="list-style-type: none"> <li>Up to 5.12 Tbps switching capacity</li> <li>Up to 2,284 MPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>	<ul style="list-style-type: none"> <li>Up to 7.68 Tbps switching capacity</li> <li>Up to 4 BPPS forwarding capacity</li> <li>Front-to-Back airflow</li> <li>Redundant management modules</li> <li>Redundant fabric modules</li> <li>M+N redundant power supplies</li> <li>Hot swappable modules</li> <li>Hot swappable power supplies</li> <li>Hot swappable fan units</li> </ul>
MODULES AVAILABLE (INDIVIDUAL)	N/A	N/A	N/A	N/A	N/A		
MODULES AVAILABLE (SHARED)	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	<ul style="list-style-type: none"> <li>2-port 10 GbE uplink module</li> </ul>	N/A	N/A	<ul style="list-style-type: none"> <li>Management module</li> <li>Application switch module</li> <li>Switch fabric module</li> <li>12-port 10/100/100 MbE RJ45 module</li> <li>12-port 1 GbE SFP module</li> <li>4-port 10 GbE XFP module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>24-port 10/100/1000 MbE RJ45 module</li> <li>48-port 10/100/1000 MbE RJ21 module</li> <li>24-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> <li>4-port 10 GbE XFP module</li> <li>16-port 10 GbE SFP+ module</li> </ul>	<ul style="list-style-type: none"> <li>Management module</li> <li>Switch fabric module</li> <li>20-port 10/100/1000 MbE RJ45 module</li> <li>20-port 100/1000 SFP module</li> <li>2-port 10 GbE XFP module</li> <li>4-port 10 GbE XFP module</li> <li>2-port OC12/48 POS/SDH module</li> <li>4-port OC12/48 POS/SDH module</li> <li>8-port OC12/48 POS/SDH module</li> <li>2-port OC192 POS/SDH module</li> </ul>
HEIGHT	1.5 RU	1 RU	1 RU	1 RU	1, 4, 8 RU	4, 7, 14, 33 RU	4, 7, 14, 33 RU
MANAGEMENT MODULES (+REDUNDANCY)	N/A	N/A	N/A	N/A	1 (Base) + 0/1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)
SWITCH FABRIC MODULES (+REDUNDANCY)	N/A	N/A	N/A	N/A	1/2 (Base)	2/2/3/7 (Base) + 1/1/1/1 (Optional)	2/3/7 (Base) + 1/1/1 (Optional)
AC POWER SUPPLIES (+REDUNDANCY)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	2 hot swappable and redundant modules	1/1/2 (Base) + 1/1/2 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)	1/2/4/4 (Base) + 2/2/4/4 (Optional)
HOT SWAPPABLE COMPONENTS	SFP/XFP transceivers, power supplies	SFP/XFP transceivers, power supplies, fan assembly	SFP/SFP+ transceivers, power supplies, fan assembly	AC power systems, fans and SFP+ optics	SFP/XFP transceivers, power supplies, fan assemblies, interface modules	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules	SFP/XFP transceivers, power supplies, fan assemblies, switch fabric modules, management modules, interface modules
HARDWARE OPTIONS (INDIVIDUAL)		<ul style="list-style-type: none"> <li>Mid-mount rack kit 8-slot</li> </ul>		<ul style="list-style-type: none"> <li>Rack mounting kit</li> </ul>	<ul style="list-style-type: none"> <li>500W AC/DC power supply</li> </ul>		
HARDWARE OPTIONS (SHARED)	<ul style="list-style-type: none"> <li>220W AC/DC power supply</li> <li>600W AC/DC power supply</li> <li>Rack mount kit (Extra long ears)</li> </ul>	<ul style="list-style-type: none"> <li>500W AC/DC power supply</li> <li>Rack mount kit (Extra long ears)</li> </ul>	<ul style="list-style-type: none"> <li>300W AC power supply</li> <li>Rack mount kit (Extra long ears)</li> </ul>	<ul style="list-style-type: none"> <li>FC and FCoE upgrade license</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC power supply</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC Power supply</li> <li>2400W AC/DC Power supply</li> </ul>	<ul style="list-style-type: none"> <li>1200W AC/DC Power supply</li> <li>2400W AC/DC Power supply</li> </ul>
STANDARD SOFTWARE	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> <li>Full Layer 3 IPv4+IPv6 including RIPv1/v2, RIPng, OSPFv2/v3, ISIS, BGP-4, DVMRP, PIM-SM/DM</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Advanced Layer 2 including QoS and comprehensive hardware based port and VLAN based ACL policies</li> </ul>	<ul style="list-style-type: none"> <li>Fabric OF (FOS), Full Layer 2 features set supporting relevant protocols and robust QoS, Security and management</li> </ul>	<ul style="list-style-type: none"> <li>Layer 2, Layer 4-7 SLB, and hot-standby HA</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4+IPv6 including RIPv1/v2, RIPng, OSPFv2/v3, ISIS, BGP-4, DVMRP, PIM-SM/DM</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 MPLS +IPv4+IPv6 routing including BGP, OSPFv2/v3, ISIS, RIP, RIPng, VRRP, VRRPE, PIM-SM/SSM/DM, MPLS, LDP, RSVP, VPLS, VLL, MPLS L3VPNs and multi-VRF</li> </ul>
OPTIONAL SOFTWARE UPGRADES	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 Upgrade including BGP-4, RIPv1/v2, OSPFv2, DVMRP, PIM</li> </ul>	<ul style="list-style-type: none"> <li>Full Layer 3 IPv4 upgrade including BGP-4, RIPv1/v2, OSPFv2, DVMRP, PIM</li> <li>Full Metro upgrade including MPLS, VPLS, VLL, PBB</li> </ul>	N/A	<ul style="list-style-type: none"> <li>FC and FCoE upgrade license</li> </ul>	<ul style="list-style-type: none"> <li>Layer 3 IPv4 including RIPv1/v2, OSPFv2, GSLB, symmetric active-active HA</li> </ul>		
OTHER BASE FEATURES	N/A	N/A	N/A	<ul style="list-style-type: none"> <li>Link aggregation</li> <li>Frame-based trunking</li> </ul>	N/A	N/A	N/A
TARGET ENVIRONMENT	<ul style="list-style-type: none"> <li>Data center</li> <li>Top-of-rack 1 GbE server access</li> <li>Hosting solutions</li> <li>Content delivery networks</li> </ul>	<ul style="list-style-type: none"> <li>Data center</li> <li>Top-of-rack 1 GbE server access</li> <li>Layer 3 virtualization</li> <li>Hosting solutions</li> <li>Content delivery networks</li> </ul>	<ul style="list-style-type: none"> <li>Data center</li> <li>Top-of-rack 10 GbE server access</li> <li>Top-of-rack 1 GbE server access</li> <li>Data center aggregation</li> <li>High-Performance Cluster Computing</li> </ul>	<ul style="list-style-type: none"> <li>Top-of-rack Ethernet and CEE environments</li> <li>Access layer top-of-rack server connectivity</li> <li>Access layer server I/O consolidation (with upgrade license)</li> <li>Virtualized tier 3 and some tier 2 applications</li> </ul>	<ul style="list-style-type: none"> <li>Single or multiple geographically dispersed data centers</li> <li>Application optimization</li> <li>Server load balancing</li> <li>Web acceleration</li> <li>SSL offload</li> <li>Infrastructure applications - DNS/Email</li> </ul>	<ul style="list-style-type: none"> <li>Data center</li> <li>10 GbE server access</li> <li>1 GbE server access</li> <li>10 GbE aggregation</li> <li>High-Performance Cluster Computing</li> </ul>	<ul style="list-style-type: none"> <li>Data center</li> <li>Mid/End-of-row 10 GbE aggregation</li> <li>Layer 3 virtualization</li> <li>High-performance 10 GbE core</li> <li>Data center border routing</li> <li>High-Performance Cluster Computing</li> </ul>

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