®

BROCADE

QUICK REFERENCE GUIDE
IP NETWORKING

EXTRAORDINARY
PARTNERSHIPS

EXTRAORDINARY
NETWORKS

Campus Network Switching and Routing

NETWORK LAYER									AGGREGATION		CORE
BROCADE® MODEL	AirDefense WLAN Security Appliances	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	SV-1250-P-1, SV-3650-P-1, SV-4250-P-1	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-F, 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	• 1-2 RJ45 NIC connectors for 10/100/1000 Mb connections • Stacked PS/2 ports for keyboard and mouse • Video Connector	• Up to 96 x 10/100 MbE (RJ45) • Up to 24 x 10/100 MbE (RJ45) PoE • 4 x combination (SFP or RJ45)	• Up to 48 x 10/100 MbE (RJ45) • Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 10/100 MbE (RJ45) PoE • Up to 48 x 10/100/1000 MbE (RJ45) PoE • 4 x combination (SFP)	• Up to 48 x 10/100/1000 MbE (RJ45) • 4 x combination (SFP) • Up to 2-3 x 10 GbE (XFP) • Stackable up to 384 x 10/100/1000 MbE (RJ45)	• Up to 48 x 10/100/1000 MbE (RJ45) • 4 x combination (SFP) • Up to 2 x 10 GbE (XFP) • Stackable up to 384 x 10/100/1000 MbE (RJ45) PoE/Non-PoE	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 24 X 100/1000 SFP Ports on the second line • 4 x combination (SFP) • Up to 2 x 10 GbE (XFP) • 2 x 16 Gbps dedicated stacking ports • Stackable up to 384 x 10/100/1000 MbE (RJ45) PoE/Non-PoE	• Up to 24 x 10/100/1000 MbE (RJ45) • 4 x combination (SFP) • Up to 2 x 10 GbE (XFP)	• Up to 200 x 10/100 MbE (RJ45) • Up to 200 x 100/100 MbE (SFP) • Up to 192 x 10/100/1000 MbE (RJ45) PoE • Up to 16 x 10 GbE (XFP)	• Up to 400 x 10/100/1000 MbE (RJ45) • Up to 400 x 100/1000 MbE (SFP) • Up to 384 x 10/100/1000 MbE (RJ45) PoE • Up to 36 x 10 GbE (XFP)	• Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21) • Up to 1,536 x 100/1000 MbE (SFP) • Up to 768 x 10/1000 MbE (SFP) • Up to 512 x 10 GbE (XFP/SFP+)	• Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21) • Up to 640 x 100/1000 MbE (SFP) • Up to 256 x 10 GbE (XFP/SFP+) • Up to 256 x OC12/48 POS/SDH • Up to 64 x OC192 POS/SDH
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) • 802.3at 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)	No	No
HARDWARE FEATURES	• Active/Backup Clustering • Intel Pentium 4 3.4 GHz, Intel 2.13GHz Core2 Duo, or Intel 2.33GHz Xeon 5140 • 1-8 MB RAM • 250 GB-1 TB Disk Storage	• Up to 27 Gbps switching capacity • Up to 21 MPPS forwarding capacity • 1+1 redundant power supplies • Hot swappable power supplies	• Up to 96 Gbps switching capacity • Up to 72 MPPS forwarding capacity • 1+1 redundant AC power supplies • Hot swappable power supplies	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • 1+1 redundant AC power supplies • Hot swappable power supplies	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • 1+1 redundant AC/DC power supplies • Hot swappable power supplies	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • 1+1 redundant AC/DC power supplies • Hot swappable power supplies	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • 1+1 redundant AC/DC power supplies • Hot swappable power supplies	• Up to 510 Gbps switching capacity • Up to 304 MPPS forwarding capacity • 1+1 redundant AC/DC power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units	• Up to 1080 Gbps switching capacity • Up to 636 MPPS forwarding capacity • Redundant management modules • Redundant fabric modules • N+1 redundant AC/DC power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units	• Up to 5.12 Tbps switching capacity • Up to 2,284 MPPS forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units	• Up to 7.68 Tbps switching capacity • Up to 4 BPPS forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units
MODULES AVAILABLE (INDIVIDUAL)	N/A	N/A	N/A	• 2-port 10 GbE uplink module • 3-port 10 GbE uplink module	N/A	N/A	N/A	• 24-port RJ45+SFP management module	N/A		
MODULES AVAILABLE (SHARED)	N/A	N/A	N/A	N/A	• 2-port 10 GbE uplink module	• 2-port 10 GbE uplink module	• 2-port 10 GbE uplink module	• 24-port 10/100/1000 MbE RJ45 module • 24-port 10/100/1000 MbE RJ45 PoE module • 24-port 100/1000 SFP module • 2-port 10 GbE XFP module	• 0-port management module • 8-port RJ45+SFP management module • 2-port 10 GbE management module • Switch fabric module • 24-port 10/100/1000 MbE RJ45 module • 24-port 10/100/1000 MbE RJ21 module • 24-port 10/100/1000 MbE RJ45 PoE module • 24-port 100/1000 SFP module • 2-port 10 GbE XFP module	• Management module • Switch fabric module • 24-port 10/100/1000 MbE RJ45 module • 48-port 100/1000 MbE RJ45 module • 24-port 100/1000 SFP module • 2-port 10 GbE XFP module • 4-port 10 GbE XFP module • 2-port OC12/48 POS/SDH module • 4-port OC12/48 POS/SDH module • 4-port 10 GbE XFP module • 16-port 10 GbE SFP+ module	• Management module • Switch fabric module • 20-port 10/100/1000 MbE RJ45 module • 20-port 100/1000 SFP module • 2-port 10 GbE XFP module • 4-port 10 GbE XFP module • 2-port OC12/48 POS/SDH module • 4-port OC12/48 POS/SDH module • 8-port OC12/48 POS/SDH module • 2-port OC192 POS/SDH module
HEIGHT	1, 2 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)	N/A	N/A	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	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	System: 1 (Base) + 1 (Optional) PoE: 1 (Base) + 1 (Optional)	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) 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: 1/3 (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	Power supply	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)	500W Power supply	• 220W AC/DC power supply • 600W AC/DC power supply (PoE)	• 100W AC power supply • 530W AC power supply (PoE) • External redundant power supply supporting up to 4 non-PoE units simultaneously	• 120W AC power supply • External redundant power supply supporting up to 4 non-PoE units simultaneously	• POE DIMM for 24x1 GbE ports • 600W AC power supply (PoE)	• 210W AC power supply • 610W AC power supply (PoE) • Rack Mount Kit	• PoE DIMM for 24x1 GbE ports • 600W AC/DC power supply • Rack Mount Kit (Extra long ears)	• PoE DIMM for 24-port 10/100/100 MbE (RJ45) interface modules • 1200W SYS power supply • 1250W POE power supply • 2500W POE power supply	• 1200W AC/DC power supply • 2400W AC/DC power supply	• 1200W AC/DC power supply • 2400W AC/DC power supply	
STANDARD SOFTWARE	• Collaborative intelligence with secure sensors for monitoring all 802.11 (a/b/g/n) wireless traffic in real time for the highest level of security, rogue mitigation and policy enforcement	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Full Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies, IP4 routing - RIPv1/v2, OSPFv2, VRRP, VRRPE, DVMRP, PIM	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Full Layer 3 IPv4+IPv6 including RIPv1/v2, RIPng, OSPFv2/v3, ISIS, BGP-4, DVMRP, PIM-SM/DM	• 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	
OPTIONAL SOFTWARE UPGRADES	• For policy compliance, robust performance monitoring and troubleshooting, RF analysis, advanced forensics, and wireless vulnerability assessment	• Full Layer 3 IPv4 routing such as OSPFv2, RIP, PIM, DVMRP - no BGP	• Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2	• Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2	• Edge Layer 3 including all functions in Base Layer 3 plus RIPv1/v2, OSPFv2	• Advanced L3 features: BGP	• Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM • Full Layer 3 IPv4+IPv6 upgrade including RIPng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services	• Full Layer 3 IPv4 Upgrade including BGP-4, OSPFv2, RIPv1/v2, VRRP, VRRPE, DVMRP, PIM-SM and PIM-DM • Full Layer 3 IPv4+IPv6 upgrade including RIPng, OSPFv3, IPv6 static routes, 6-to-4 static tunneling. This upgrade also includes Full L3 IPv4 services		
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	• Branch to Campus to Enterprise-level WLAN deployments	• VoIP • Campus LAN • Wireless Access • Building management systems	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Building management systems	• VoIP • Campus LAN • Wireless Access • Building management systems	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Video surveillance • Remote video kiosks • Building management systems	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Video surveillance • Remote video kiosks • Building management systems	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Video surveillance • Remote video kiosks • Building management systems • Financial enterprises and trading floors	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Video surveillance • Remote video kiosks • Building management systems • Financial enterprises and trading floors	• VoIP • Campus LAN • Wireless Access • Converged edge (voice + video + data) • Video surveillance • Remote video kiosks • Building management systems • Financial enterprises and trading floors	• VoIP • Campus LAN • 10 GbE aggregation • Financial enterprises and trading floors	• Campus LAN • Voice, video and data • Campus border routing • Enterprise MPLS/VPLS and virtual routing • MPLS enabled campus core • Financial enterprises and trading floors

Data Center Network Switching and Routing

NETWORK LAYER	ACCESS				AGGREGATION		CORE
BROCADE MODEL	**FCX 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	FCX624, FCX648	NI-CES-2024C-AC/-DC, NI-CES-2024F-AC/-DC, NI-CES-2048C-AC/-DC, NI-CES-2048F-AC/-DC, NI-CES-2048F-AC/-DC, NI-CES-2048CX-AC/-DC, NI-CES-2048FX-AC/-DC	TI-24X-AC	BR-8000-0000	SI-1008-1, SI-1016-2, SI-1016-4, SI-1216-4, SI-4000, SI-10000	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	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 4 x 10 GbE (SFP+)	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 100/1000 MbE (SFP) • 4 x combination (SFP or RJ45) • Up to 2 x 10 GbE (XFP)	• 24 x 10 GbE/1 GbE (SFP+/SFP) • 4 x 10/100/1000 MbE (RJ45)	• 24 10 GbE ports (DCB) • 8 8 Gbps FC ports added with service FCoE upgrade license	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 1 GbE (SFP) • Up to 16 x 10 GbE (XFP)	• Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21) • Up to 768 x 100/1000 MbE (SFP) • Up to 512 x 10 GbE (XFP/SFP+)	• Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21) • Up to 640 x 100/1000 MbE (SFP) • Up to 256 x 10 GbE (XFP/SFP+) • Up to 256 x OC12/48 POS/SDH • Up to 64 x OC192 POS/SDH
HARDWARE FEATURES	• Up to 176 Gbps switching capacity • Up to 132 Mpps forwarding capacity • 1+1 redundant AC power supplies • Hot swappable power supplies	• Up to 136 Gbps switching capacity • Up to 101 Mpps forwarding capacity • Low latency • Deep packet buffering • 1+1 redundant AC/DC power supplies • Hot swappable power supplies • Hot swappable fan unit • Front-to-back airflow	• Up to 488 Gbps switching capacity • Up to 366 Mpps forwarding capacity • Ultra-low latency (1500 nSec) • 1+1 redundant AC power supplies • Hot swappable power supplies • Hot swappable fan unit • Front-to-Back airflow	• Up to 360 Mpps forwarding capacity • Hot swappable redundant power supplies • Hot swappable redundant fan assemblies • Hot swappable SFP+ optical modules	• Up to 320 Gbps switching capacity • Up to 70 Gbps L4 & L7 switching capacity • Up to 16 million L4 transactions/sec • Up to 120 million SYN/sec DoS protection • Up to 14 million DNS queries/sec • Up to 230,000 SSL transactions/sec • N+N redundant AC/DC power supplies • Hot swappable power supplies • Hot swappable fan unit	• Up to 5.12 Tbps switching capacity • Up to 2,284 Mpps forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units	• Up to 7.68 Tbps switching capacity • Up to 4 BPPS forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units
MODULES AVAILABLE (INDIVIDUAL)	N/A	N/A	N/A	N/A	N/A		
MODULES AVAILABLE (SHARED)	• 4-port 10 GbE SFP+ uplink module • 4-port 1 GbE SFP uplink module	• 2-port 10 GbE uplink module	N/A	N/A	• Management module • Application switch module • Switch fabric module • 12-port 10/100/1000 MbE RJ45 module • 12-port 1 GbE SFP module • 4-port 10 GbE XFP module • SSL Application Expansion Module	• Management module • Switch fabric module • 24-port 10/100/1000 MbE RJ45 module • 48-port 10/100/1000 MbE RJ21 module • 24-port 100/1000 SFP module • 2-port 10 GbE XFP module • 4-port 10 GbE XFP module • 16-port 10 GbE SFP+ module	• Management module • Switch fabric module • 20-port 10/100/1000 MbE RJ45 module • 20-port 100/1000 SFP module • 2-port 10 GbE XFP module • 4-port 10 GbE XFP module • 2-port OC12/48 POS/SDH module • 4-port OC12/48 POS/SDH module • 8-port OC12/48 POS/SDH module • 2-port OC192 POS/SDH module
HEIGHT	1 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)	2/2/3/7 (Base) + 1/1/1/1 (Optional)
AC POWER SUPPLIES (+REDUNDANCY)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	1 (Base) + 1 (Optional)	2 hot swappable and redundant power supplies	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/SFP+ 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)		• Mid-mount rack kit 8-slot		• Rack mounting kit	• 500W AC/DC power supply	• 500W AC/DC power supply	• 500W AC/DC power supply
HARDWARE OPTIONS (SHARED)	• 210W AC power supply • Rack mount kit (Extra long ears)	• 500W AC/DC power supply • Rack mount kit (Extra long ears)	• 300W AC power supply • Rack mount kit (Extra long ears)	• FC and FCoE upgrade license	• 1200W AC/DC power supply	• 1200W AC/DC Power supply • 2400W AC/DC Power supply	• 1200W AC/DC Power supply • 2400W AC/DC Power supply
STANDARD SOFTWARE	• Advanced Layer 2 and enterprise Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• Advanced Layer 2 and Layer 3 including QoS, 802.1x, and comprehensive hardware based port and VLAN based ACL policies	• Fabric OS® (FOS), Full Layer 2 features set supporting relevant protocols and robust QoS, Security and management	• Layer 2, Layer 4-7 SLB, and hot-standby HA	• Full Layer 3 IPv4+IPv6 including RIPv1/v2, RIPng, OSPFv2/v3, ISIS, BGP-4, DVMRP, PIM-SM/DM	• 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
OPTIONAL SOFTWARE UPGRADES	• Advance Layer 3 licence that includes BGP	• Full Layer 3 IPv4 upgrade including BGP-4, RIPv1/v2, OSPFv2, DVMRP, PIM • Full Metro upgrade including MPLS, VPLS, VLL, PBB	N/A	• FC and FCoE upgrade license	• Layer 3 IPv4 including RIPv1/v2, OSPFv2, GSLB, symmetric active-active HA		
OTHER BASE FEATURES	• Reversible front-to-back airflow • Horizontal stacking (IronStack technology)	N/A	• Front-to-Back airflow	• Link aggregation • Frame-based trunking	N/A	N/A	N/A
TARGET ENVIRONMENT	• Data center • Top-of-Rack 1 GbE server access • iSCSI storage applications • High-Performance Computing	• Data center • Top-of-Rack 1 GbE server access • Layer 3 virtualization • Hosting solutions • Content delivery networks	• Data center • Top-of-Rack 10 GbE server access • Top-of-Rack 1 GbE server access • Data center aggregation • High-Performance Cluster Computing	• Top-of-Rack Ethernet and DCB environments • Access layer top-of-rack server connectivity • Access layer server I/O consolidation (with upgrade license)	• Single or multiple geographically dispersed data centers • Application optimization • Server load balancing • Web acceleration • DoS attack protection • SSL acceleration • Infrastructure applications - FWLB, TCS, DNS	• Data center • 10 GbE server access • 1 GbE server access • 10 GbE aggregation • High-Performance Cluster Computing	• Data center • Mid/End-of-row 10 GbE aggregation • Layer 3 virtualization • High-performance 10 GbE core • Data center border routing • High-Performance Cluster Computing • 1 GbE veritual top-of-rack

NETWORK LAYER	Brocade Mobility 7131	Brocade Mobility 5181
BROCADE MODEL	**Brocade Mobility 7131**	**Brocade Mobility 5181**
SERIES OVERVIEW		
PRODUCT OVERVIEW	The Brocade Mobility 7131 is the industry's first high performance 802.11a/b/g/n Adaptive Services Access Point that cost-effectively delivers secure and resilient network services and enables high performance mobility applications in a Wireless Enterprise. The Brocade Mobility 7131 in a stand-alone or switch-managed adaptive mode provides 24x7 dedicated Wireless IPS sensing, high speed client access for data, voice and video and mesh networking. This integrated network-in-a-box delivers gap-free security services, unmatched reliability and high performance at the industry's lowest TCO	Brocade Mobility 5181 outdoor 802.11a/b/g Adaptive Access Point delivers enterprise class wireless networking in harsh environments. Support of mesh networking enables rapid and inexpensive deployment in difficult-to-cable area
GENERAL SPECIFICATIONS	• 802.11a/b/g/n; DSSS and ODFM • Tri, Dual and Single Radio options • 802.3af (PoE) and 802.3at (PoE+) Support • Mesh networking • Adaptive AP support (enables adoption of Brocade Mobility a Adaptive AP Access Points) • Plenum-rated housing • Up to 127 devices supported • -4°F to 122°F/-20°C to 50°C	• 802.11a/b/g; DSSS and ODFM • Dual and Single Radio options • 802.3af Power-over-Ethernet (PoE) Mesh networking • Adaptive AP support (enables adoption of Brocade Mobility Adaptive AP Access Points) • Plenum-rated housing; IP56; NEMA 4X • Up to 127 devices supported • 22°F to 131°F/-30°C to 55°C • Wall; pole
GAP-FREE SECURITY		
24X7 WIRELESS IPS SENSING	Supports gap-free detection and security with 24x7 dual band WIPS sensing and concurrent client access	Supports gap-free detection and security with 24x7 dual band WIPS sensing and concurrent client access
AUTHENTICATION	Pre-shared keys (PSK); 802.1x/EAP - transport layer security (TLS); tunneled transport layer security (TTLS); protected EAP (PEAP)	Pre-shared keys (PSK); 802.1x/EAP - transport layer security (TLS); tunneled transport layer security (TTLS); protected EAP (PEAP)
ENCRYPTION	WEP 40M28 (RC4); WPA-TKIP; WPA2-CCMP (AES); 802.11i WPA2	WEP 40M28 (RC4); WPA-TKIP; WPA2-CCMP (AES); 802.11i WPA2
GUEST ACCESS	Secure Guest Access with onboard or external RADIUS authentication	Secure Guest Access with onboard or external RADIUS authentication
IPSEC VPN	Supports DES, 3DES, AES-128 and AES-256 encryption; supports site-to-site VPN capabilities	Supports DES, 3DES, AES-128 and AES-256 encryption; supports site-to-site VPN capabilities
STATEFUL FIREWALL	Stateful Layer 3 packet inspection; Stateful L2-L7 wireless firewall available in Adaptive AP mode; Access Control Lists	Stateful Layer 3 packet inspection; Stateful L2-L7 wireless firewall available in Adaptive AP mode; Access Control Lists
PCI	Out-of-the-box PCI capable	Out-of-the-box PCI capable
UNMATCHED RELIABILITY		
FAILOVER ADAPTIVE NETWORK SERVICES AT THE EDGE	Layer 3 routing; 802.1Q VLAN trunking and tagging; AAA Server; DHCP services; Dyn DNS; PPPoE	Layer 3 routing; 802.1Q VLAN trunking and tagging; AAA Server; DHCP services; Dyn DNS; PPPoE
QoS	Voice prioritization; WMM; WMM uAPSD; 802.1p; DiffServ/TOS	Voice prioritization; WMM; WMM uAPSD; 802.1p; DiffServ/TOS
MESH NETWORKING	Stand-alone mesh; Adaptive mesh; self-healing mesh failover; Layer 2 wired to Mesh failover	Stand-alone mesh; Adaptive mesh; self-healing mesh failover; Layer 2 wired to Mesh failover
ADAPTIVE AP WITH SITE SURVIVABILITY	Full featured Access Point for local or remote edge deployments is centrally managed by switch with Remote Site Survivability options and full network and security services at the edge	Full featured Access Point for local or remote edge deployments is centrally managed by switch with Remote Site Survivability options and full network and security services at the edge
WAN CONNECTIVITY/ FAILOVER	Dual Gigabit Ethernet for LAN/WAN connectivity and WAN failover options	Dual Gigabit Ethernet for LAN/WAN connectivity and WAN failover options
3G WAN BACKHAUL	3G cellular backhaul extensibility options	N/A
BEST RETURN ON INVESTMENT (ROI) — AND LOWEST TOTAL COST OF OWNERSHIP (TCO)		
INTEGRATED NETWORK SERVICES W/NETWORK-IN-A-BOX	Routing, security and network services integration eliminates point products and appliances, saving significant capex and opex	Routing, security and network services integration eliminates point products and appliances, saving significant capex and opex
802.3AF DUAL RADIO HIGH PERFORMANCE	Leveraging of cost-effective PoE infrastructure for scalable client access	Leveraging of cost-effective PoE infrastructure for scalable client access
MESH NETWORKING	Eliminates cost of cabling in hard-to-cable areas	Eliminates cost of cabling in hard-to-cable areas
EASY TO PROVISION AND DEPLOY	Takes 75% less time to configure than comparable enterprise AP offerings in the market, reducing deployment and management overhead	Takes 75% less time to configure than comparable enterprise AP offerings in the market, reducing deployment and management overhead

Service Provider Network Routing

NETWORK LAYER	WLAN Controllers	
BROCADE MODEL	**Brocade Mobility RFS6000**	**Brocade Mobility RFS7000**
SERIES OVERVIEW		
PRODUCT OVERVIEW	Brocade Mobility RFS6000 provides a single platform capable of delivering carrier-grade wireless voice and data inside and outside the enterprise for medium to large organizations with 2,000-20,000 users. Improve operational efficiency and reduce the cost of mobility with a powerful comprehensive feature set including Adaptive AP that delivers unmatched performance, security, resiliency and scalability. Brocade Mobility RFS6000 supports Wi-Fi, RFID, seamless roaming, next generation self-healing, 3G/4G wireless broadband backhaul, gap-free layered security, rich locationing services, 802.11n with Mesh, centralized management and more.	The RFS7000 delivers unmatched performance, security, resiliency, scalability, and manageability for the large wireless enterprise or campus, providing a single platform capable of delivering carrier-grade wireless voice and data for 8,000-96,000 users. Brocade Mobility RFS7000's architecture improves operational efficiency and reduces the cost of mobility with a powerful comprehensive feature set that includes Adaptive AP, Wi-Fi, RFID, seamless roaming, next generation self-healing, gap-free layered security, rich locationing services, 802.11n with Mesh, centralized management and more.
GENERAL CHARACTERISTICS	• Supports up to 48 Brocade Mobility 300 802.11a/b/g dual radio access points per switch; 576 per cluster • Supports up to 256 802.11a/b/g/n Adaptive Access Points (Brocade Mobility 5181/7131) and 3,072 per cluster • Supports up to 32 WLANs • Supports up to 2,000 users per switch; 20,000 users per cluster • ExpressCardTM slot for redundant broadband wireless connection & PoE+ Switching • PCI/HIPAA/SOX capable out-of-the-box	• Supports up to 256 AP300 802.11a/b/g dual radio access points per switch and 3,072 per cluster • Supports up to 1,024 802.11a/b/g/n Adaptive Access Points (Brocade Mobility 5181/7131) and 12,000+ per cluster • Supports up to 256 WLANs • Supports up to 8,000 users per switch; 96,000 users per cluster • PCI/HIPAA/SOX capable out-of-the-box
GAP-FREE SECURITY		
AUTHENTICATION	Access Control Lists (ACLS); pre-shared keys (PSK); 802.1x/EAP--transport layer security (TLS), tunneled transport layer security (TTLS), protected EAP (PEAP); Kerberos Integrated AAA/RADIUS Server with native support for EAP-TTLS, EAP-PEAP (includes a built in user name/password database; supports LDAP) and EAP-SIM	Access Control Lists (ACLS); pre-shared keys (PSK); 802.1x/EAP--transport layer security (TLS), tunneled transport layer security (TTLS), protected EAP (PEAP); Kerberos Integrated AAA/RADIUS Server with native support for EAP-TTLS, EAP-PEAP (includes a built in user name/password database; supports LDAP) and EAP-SIM
ENCRYPTION	WEP 40M28 (RC4); KeyGuard; WPA-TKIP; WPA2-CCMP (AES); 802.11i WPA2	WEP 40M28 (RC4); KeyGuard; WPA-TKIP; WPA2-CCMP (AES); 802.11i WPA2
IDS/IPS	Multi-mode rogue AP detection; Rogue AP Containment; 802.11n Rogue Detection; Ad-Hoc Network Detection; Denial of Service protection against wireless attacks; client blacklisting; Anomaly Analysis Engine;	Multi-mode rogue AP detection; Rogue AP Containment; 802.11n Rogue Detection; Ad-Hoc Network Detection; Denial of Service protection against wireless attacks; client blacklisting; Anomaly Analysis Engine;
GUEST ACCESS	Secure Guest Access with Brocade Mobility 300 as well as Adaptive APs	Secure Guest Access with Brocade Mobility 300 as well as Adaptive APs
24X7 MONITORING FOR PREMIUM SECURITY	Supported on Brocade Mobility 300, Adaptive Brocade Mobility 5181 and Brocade Mobility 7131 APs	Supported on Brocade Mobility 300, Adaptive Brocade Mobility 5181 and Brocade Mobility 7131 APs
IPSEC VPN	Supports DES, 3DES, AES-128 and AES-256 encryption; supports site-to-site and client-to-site VPN capabilities	Supports DES, 3DES, AES-128 and AES-256 encryption; supports site-to-site and client-to-site VPN capabilities
NAC SUPPORT	NAC support with third party systems from Microsoft and Symantec	NAC support with third party systems from Microsoft and Symantec
ROLE-BASED WIRED/WIRELESS FIREWALL	Identity based Stateful L2-L7 firewall provides protection against DHCP spoofing and ARP cache poisoning	Identity based Stateful L2-L7 firewall provides protection against DHCP spoofing and ARP cache poisoning
GEOFENCING	Location based access provides physical security as an additional parameter to network security	Location based access provides physical security as an additional parameter to network security
VALUE ADDS	Pre-emptive roaming; fast roaming with opportunistic channel scan; load balancing; Power Save Polling (PSP); Virtual AP and location-based access control	Pre-emptive roaming; fast roaming with opportunistic channel scan; load balancing; Power Save Polling (PSP); Virtual AP and location-based access control
UNMATCHED RELIABILITY		
QoS	Voice prioritization; wireless bandwidth management and user bandwidth contracts; WMM AC; SpectraLink Voice Prioritization; SIP CAC	Voice prioritization; wireless bandwidth management and user bandwidth contracts; WMM AC; SpectraLink Voice Prioritization; SIP CAC
HIGH AVAILABILITY NETWORKS AND CLUSTERING	Supports Active-Active and Active-Standby configurations. Ensures high availability networks with single console management that provides multiple levels of redundancy, increased scalability and failover capabilities. Multi-platform license sharing enables deployment of cost-effective networks.	Supports Active-Active and Active-Standby configurations. Ensures high availability networks with single console management that provides multiple levels of redundancy, increased scalability and failover capabilities. Multi-platform license sharing enables deployment of cost-effective networks.
SMART RF	Next generation self-healing: enables the WLAN to automatically and intelligently adapt to changes in the RF environment to eliminate unforeseen gaps in coverage.	Next generation self-healing: enables the WLAN to automatically and intelligently adapt to changes in the RF environment to eliminate unforeseen gaps in coverage.
WAN BACKHAUL	3G cellular backhaul extensibility options	3G cellular backhaul extensibility options
ADAPTIVE AP WITH SITE SURVIVABILITY AND MESH	Brocade Mobility Independent Mesh Access Points (5181 a/b/g and 7131 a/b/g/n) can be deployed at remote locations yet centrally managed in the Network Operations Center (NOC) using a single switch or a cluster for scalability). An IPSec VPN tunnel secures all traffic between the access points and the wireless switch. Remote Site Survivability (RSS) mesh access points deliver secure uninterrupted wireless service — providing unparalleled resiliency that survives a WAN link outage.	Brocade Mobility Independent Mesh Access Points (5181 a/b/g and 7131 a/b/g/n) can be deployed at remote locations yet centrally managed in the Network Operations Center (NOC) using a single switch or a cluster for scalability). An IPSec VPN tunnel secures all traffic between the access points and the wireless switch. Remote Site Survivability (RSS) mesh access points deliver secure uninterrupted wireless service — providing unparalleled resiliency that survives a WAN link outage.
LOAD BALANCING AND AP STEERING	Clustering enables not only a high level of redundancy, but also provides a load balanced network for large deployments	Clustering enables not only a high level of redundancy, but also provides a load balanced network for large deployments
BEST RETURN ON INVESTMENT (ROI) — AND LOWEST TOTAL COST OF OWNERSHIP (TCO)		
INTEGRATED NETWORK SERVICES	PoE switching, AAA server, DHCP server, NAT, Wired and Wireless firewall — all built-in at no additional cost	PoE switching, AAA server, DHCP server, NAT, Wired and Wireless firewall — all built-in at no additional cost
EASE OF INSTALLATION	Plug-and-play deployments for L2 and L3 save installation time and ongoing maintenance costs	Plug-and-play deployments for L2 and L3 save installation time and ongoing maintenance costs
SMART LICENSE SHARING	Clustering capabilities allow for virtual license sharing among controllers to provide highly scalable high availability networks	Clustering capabilities allow for virtual license sharing among controllers to provide highly scalable high availability networks

Service Provider Network Routing

NETWORK LAYER	ACCESS		AGGREGATION		CORE
BROCADE MODEL	**Brocade NetIron CER 2000**	**NetIron CES Switch**	**NetIron MLX-4,-8,-16,-32**	**ServerIron ADX**	**NetIron XMR-4,-8,-16,-32**
SERIES OVERVIEW					
PART NUMBERS	NI-CER-2024C-AC, NI-CER-2024C-ADVPREM-AC NI-CER-2024C-DC, NI-CER-2024C-ADVPREM-DC NI-CER-2024F-AC, NI-CER-2024F-ADVPREM-AC NI-CER-2024F-DC, NI-CER-2024F-ADVPREM-DC NI-CER-2048C-AC, NI-CER-2048C-ADVPREM-AC NI-CER-2048C-DC, NI-CER-2048C-ADVPREM-DC NI-CER-2048F-AC, NI-CER-2048F-ADVPREM-AC NI-CER-2048F-DC, NI-CER-2048F-ADVPREM-DC NI-CER-2048CX-AC, NI-CER-2048CX-ADVPREM-AC NI-CER-2048CX-DC, NI-CER-2048CX-ADVPREM-DC NI-CER-2048FX-AC, NI-CER-2048FX-ADVPREM-AC NI-CER-2048FX-DC, NI-CER-2048FX-ADVPREM-DC NI-CER-2024-2X10G, NI-CER-2024-ADVU NI-CER-2048-ADVU	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-1008-1, SI-1016-2, SI-1016-4, SI-1216-4, SI-4000, SI-10000	NI-XMR-4-AC/-DC, NI-XMR-8-AC/-DC, NI-XMR-16-AC/-DC, NI-XMR-32-AC/-DC
INTERFACE SLOTS	1 10 GbE uplink slot	1 (uplink)	4, 8, 16, 32	0, 2, 4	4, 8, 16, 32
MAXIMUM PORTS	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 100/1000 MbE (SFP) • 4 x combination (SFP or RJ45) • Up to 2 x 10 GbE (XFP)	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 100/1000 MbE (SFP) • 4 x combination (SFP or RJ45) • Up to 2 x 10 GbE (XFP)	• Up to 1,536 x 10/100/1000 MbE (RJ45/RJ21) • Up to 640 x 100/1000 MbE (SFP) • Up to 256 x 10 GbE (XFP/SFP+) • Up to 256 x OC12/48 POS/SDH • Up to 64 x OC192 POS/SDH	• Up to 48 x 10/100/1000 MbE (RJ45) • Up to 48 x 1 GbE (SFP) • Up to 16 x 10 GbE (XFP)	• Up to 640 x 10/100/1000 MbE (RJ45) • Up to 640 x 100/1000 MbE (SFP) • Up to 128 x 10 GbE (XFP) • Up to 256 x OC12/48 POS/SDH • Up to 64 x OC192 POS/SDH
HARDWARE FEATURES	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • Up to 512K Ipv4 FIB entries • Low latency • Deep packet buffering • 1+1 redundant AC/DC power supplies • Hot swappable power supplies • Hot swappable fan unit • Front-to-back airflow	• Up to 136 Gbps switching capacity • Up to 101 MPPS forwarding capacity • Low latency • Deep packet buffering • 1+1 redundant AC/DC power supplies • Hot swappable power supplies • Hot swappable fan unit • Front-to-back airflow	• Up to 7.68 Tbps switching capacity • Up to 4 BPPS forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units	• Up to 320 Gbps switching capacity • Up to 70 Gbps L4 & L7 switching capacity • Up to 16 million L4 transactions/sec • Up to 120 million SYN/sec DoS protection • Up to 14 million DNS queries/sec • Up to 230,000 SSL transactions/sec • N+N redundant AC/DC power supplies • Hot swappable power supplies • Hot swappable fan unit	• Up to 7.68 Tbps switching capacity • Up to 4 BPPS forwarding capacity • Front-to-Back airflow • Redundant management modules • Redundant fabric modules • M+N redundant power supplies • Hot swappable modules • Hot swappable power supplies • Hot swappable fan units
MODULES AVAILABLE (INDIVIDUAL)	N/A	N/A			
MODULES AVAILABLE (SHARED)	• 2-port 10 GbE uplink module	• 2-port 10 GbE uplink module	• Management module • Switch fabric module • 20-port 10/100/1000 MbE RJ45 module • 20-port 100/1000 SFP module • 2-port 10 GbE XFP module • 4-port 10 GbE XFP module • 2-port OC12/48 POS/SDH module • 4-port OC12/48 POS/SDH module • 8-port OC12/48 POS/SDH module • 2-port OC192 POS/SDH module • 8 port 10 GbE -"M" SFP+ module • 8 port 10 GbE -"D" SFP+ module	• Management module • Application switch module • Switch fabric module • 12-port 10/100/1000 MbE RJ45 module • 12-port 1 GbE SFP module • 4-port 10 GbE XFP module • SSL Application Expansion Module	• Management module • Switch fabric module • 20-port 10/100/1000 MbE RJ45 module • 20-port 100/1000 SFP module • 4-port 10 GbE XFP module • 2-port OC12/48 POS/SDH module • 4-port OC12/48 POS/SDH module • 8-port OC12/48 POS/SDH module • 2-port OC192 POS/SDH module
HEIGHT	1 RU	1 RU	4, 7, 14, 33 RU	1, 4, 8 RU	4, 7, 14, 33 RU
MANAGEMENT MODULES (+REDUNDANCY)	N/A	N/A	1 (Base) + 1 (Optional)	1 (Base) + 0/1 (Optional)	1 (Base) + 1 (Optional)
SWITCH FABRIC MODULES (+REDUNDANCY)	N/A	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 (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 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	Mid-mount rack kit 8-slot		• 500W AC/DC power supply	
HARDWARE OPTIONS (SHARED)	• 500W AC/DC power supply • Rack mount kit (Extra long ears)	• 500W AC/DC power supply • Rack mount kit (Extra long ears)	• 1200W AC/DC power supply • 2400W AC/DC power supply	• 1200W AC/DC power supply	• 1200W AC/DC power supply • 2400W AC/DC power supply
STANDARD SOFTWARE	• Advanced Layer 2 and 3 functions: • Full Layer 3, including RIP, OSPF, IS-IS, and BGP • Virtual routing in non-MPLS environments via Multi-VRF • All classic Layer 2 capabilities • QoS and ACLs • Management via SNMP/CLI	• Advanced Layer 2 and Base Layer 3 including edge security, 802.1x, QoS and comprehensive hardware based port and VLAN based ACL policies	• 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	• Layer 2, Layer 4-7 SLB, and hot-standby HA	• 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
OPTIONAL SOFTWARE UPGRADES	• All functions in BASE plus: • Multi-Protocol Label Switching (MPLS) • Layer 2 VPNs using VPLS and VLLs • Provider Bridges (IEEE 802.1ad) • Provider Backbone Bridges (IEEE 802.1ah) • Connectivity Fault Management (IEEE 802.1ag) and Service OAM • Ethernet Service Instance (ESI) framework	• Full Layer 3 IPv4 upgrade including BGP-4, RIPv1/v2, OSPFv2, DVMRP, PIM • Full Metro upgrade including MPLS, VPLS, VLL, PBB			• Layer 3 IPv4 including RIPv1/v2, OSPFv2, GSLB, symmetric active-active HA
OTHER BASE FEATURES	N/A	N/A	N/A	N/A	N/A
TARGET ENVIRONMENT	• Service Provider Metro access/aggregation • Enterprise WAN gateway • Service Provider managed router • BGP router reflector	• Service Provider/Metro access • FTTx applications	• Service Provider/Metro aggregation • Internet Exchange Provider (IXG) • Multiservice Provider Edge (PE)	• SP Data Centers • Application optimization • Server load balancing • Web acceleration • DoS attack protection • SSL acceleration • Infrastructure applications - FWLB, TCS, DNS	• Internet Service Provider (ISP) • Service Provider core • Multiservice Provider Core (P)

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