

# BlackDiamond 20800 Series



*The BlackDiamond® 20800 Ethernet Transport switches enable carriers to meet the explosive traffic demand driven by residential, business Ethernet, mobile backhaul, and wholesale Ethernet services.*

## Benefits

### Get Ahead of Your Customers' Ever-Growing Bandwidth Demands

- High system capacity with industry-leading 10 GbE port density
- System architecture designed for future 100 GbE upgrades
- Long service life with future fabric upgrade to 5 Tbps

### Increase Revenue with Scalable Switch Resources

- Hardware-based Hierarchical QoS (H-QoS) scales to hundreds of thousands of subscribers and applications
- Multicast scaling to tens of thousands of streams with dedicated multicast priority queues
- vMAN service multiplexing and cross connect for efficient network-to-network interfaces

### Drive Profitability with Simplified Deployment and Operations

- Layer 2 scaling options avoid the complexity and expense of Layer 3 MPLS in the metro
- Single operating system for the entire Ethernet Transport network reduces OPEX

*Extreme Networks BlackDiamond 20800 series Ethernet Transport switches provide a more affordable, easier to operate, and flexible Next Generation Network.*

The Carrier Ethernet market is growing tremendously, fueled by the growing acceptance of Ethernet as the answer to the industry's bandwidth scalability issues. The disparity between carriers' revenue streams and the amount of bandwidth consumed by each new service is causing carriers to seek more cost-effective options to reduce OPEX and CAPEX. Designed from the ground up for this new carrier reality, the Extreme Networks® BlackDiamond 20800 series switches allow carriers to compete effectively while satisfying their customers' needs and expectations.

BlackDiamond 20800 series switches enable a single Carrier Ethernet Transport network to deliver residential, business, mobile backhaul, and wholesale Ethernet services. Residential services include triple-play services, IPTV, tiered Internet access, and more. Business services include standard E-Line and E-LAN to connect multiple sites, plus tiered Internet access and VoIP with hierarchical bandwidth controls to individual businesses. Mobile backhaul services deliver the bandwidth needed for multimedia devices running on 3G wireless networks. Wholesale Ethernet services allow global carriers to provide end-to-end services across disparate locations and service areas.

## Target Applications

- Aggregating residential triple-play, business Ethernet and mobile backhaul services on a common platform
- Prioritized VPN, Internet access, Voice-over-IP (VoIP) and other applications over E-Line or multi-point E-LAN connections to business subscribers
- High-bandwidth mobile backhaul with the scale to support bandwidth and roaming for thousands of simultaneous customer connections
- Wholesale Ethernet access services for global carriers providing end-to-end services to their subscribers



## Superior Bandwidth Capacity

Carriers can be prepared to stay atop competition and enhance customer satisfaction with high-performance systems designed to help meet the bandwidth needs of today and tomorrow.

### The Industry's Highest Port Density

With 64 line-rate 10 GbE ports available in a single chassis and 192 per rack, the BlackDiamond 20808 switch offers the highest system capacity in the market both in terms of performance and port count. These high performance switches can deliver more services to more subscribers, resulting in a network with fewer elements that costs less to operate.

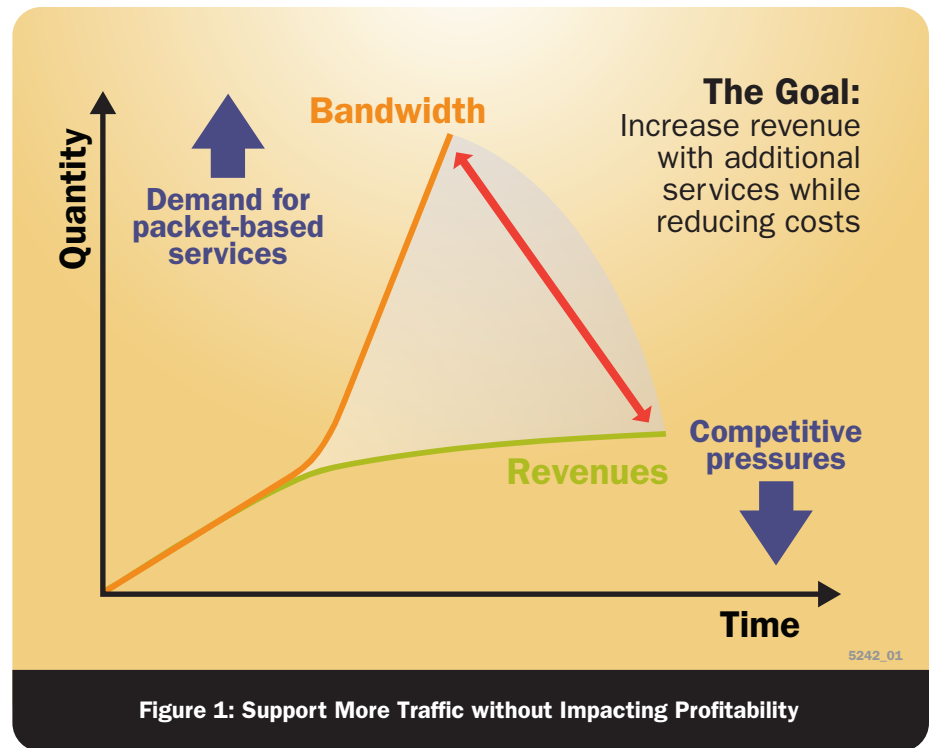
### Flexible Design to Meet Growing Bandwidth Needs

Business subscribers are deploying increasingly complex applications to maximize business productivity. On the residential side, the demand for triple-play services and the growth of telecommuting and home-based businesses spur the need for even more bandwidth. Wireless service providers must accommodate growing subscriber bases as well as a surge in voice and data service usage. Global carriers increasingly need the ability to serve their customers with end-to-end services across disparate locations and service areas. The BlackDiamond 20800 switches provide a future-proof design, with 120 Gbps per slot capacity that enables future 100 GbE I/O modules, to support today's bandwidth and service demands as well as future needs.

### Long Service Life

To maximize return on investment, the service lifespan of a Carrier Ethernet Transport infrastructure is of critical importance to carriers.

The BlackDiamond 20808 switch has been designed to ensure a straightforward path to upgrade the switch fabric up to 5 Tbps to support revenue-generating services now and in the future. The BlackDiamond 20804 switch fabric provides 1 Tbps capacity to support aggregation applications. In addition, the BlackDiamond 20800 series design includes backward compatibility of existing modules to further ensure investment protection for carriers.

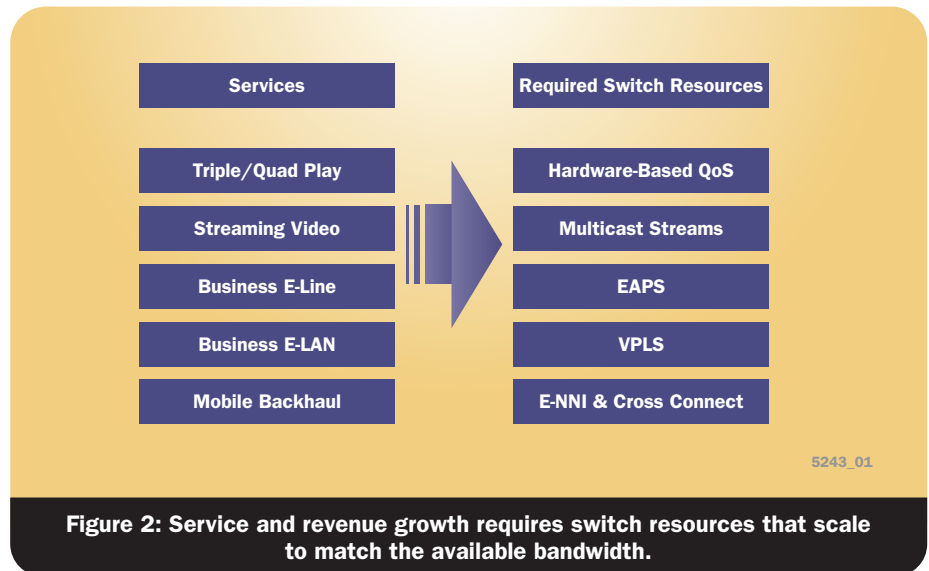


## Scalable Switch Resources

With rich resources that scale, carriers can achieve revenue growth by delivering compelling new services such as streaming video, business E-LAN and E-Line, and mobile backhaul services to both consumers and business subscribers across a large geographical base, as well as wholesale services for global carriers, all on a single platform.

### Powerful Hierarchical QoS Engine

The extraordinary performance and bandwidth capacity of the BlackDiamond 20800 switches is also backed by a powerful hardware-based H-QoS engine. The H-QoS engine allows carriers to run hundreds of thousands of applications with varying service requirements on the same system. Bandwidth can be controlled on a per-service, per-subscriber, and per-port basis. This superior traffic granularity is achieved with up to 64,000 ingress rate limiters and up to 32,000 egress traffic schedulers on each I/O module, allowing carriers to deliver triple-play services to a substantially large base of residential, business and mobile subscribers.



### Advanced Multicast Scaling

BlackDiamond 20800 series switches deliver outstanding multicast performance with dedicated priority queues to support tens of thousands of multicast streams delivered to corporate recipients or residences simultaneously. Multicast traffic is replicated using multiple references to a packet's memory, which avoids multiple packet copies to provide efficient delivery of financial data or video streams, for example.

### Efficient Network-to-Network Interfaces

End-to-end QoS provisioning is important in providing quality services to business enterprise customers whose workgroups are located across multiple carrier boundaries. Network-to-Network Interfaces (NNI) and Ethernet cross-connect capabilities combined with Hierarchical QoS on the BlackDiamond 20800 series allow provider and application peering, so carriers can extend their Service Level Agreements outside their geographic footprint. Traffic to and from each peer can be controlled on a per-VLAN and per-class-of-service basis. For wireless and wholesaling carriers, an Ethernet NNI also provides a cost-effective Ethernet solution that can significantly reduce bandwidth leasing costs.

### Economical Expansion

By utilizing vMAN technologies, carriers can easily scale their networks to support significant subscriber density without the need to operate and maintain complex legacy equipment. Ethernet Automatic Protection Switching (EAPS) adds sub-50ms resiliency, providing seamless failover in the event of a network link outage. This ring-based technology fits with the operational model familiar to most carrier transport groups.

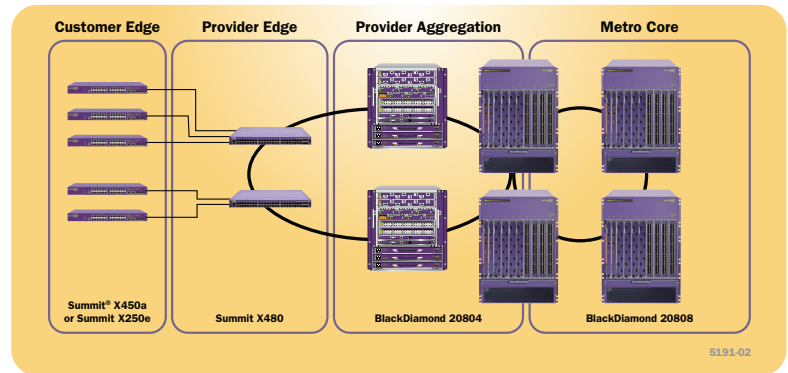
### Reduced Operational and Management Costs

A single modular operating system, ExtremeXOS®, across the Carrier Ethernet Transport network from edge to core reduces costs and simplifies maintenance, operations and upgrades.

## Target Applications

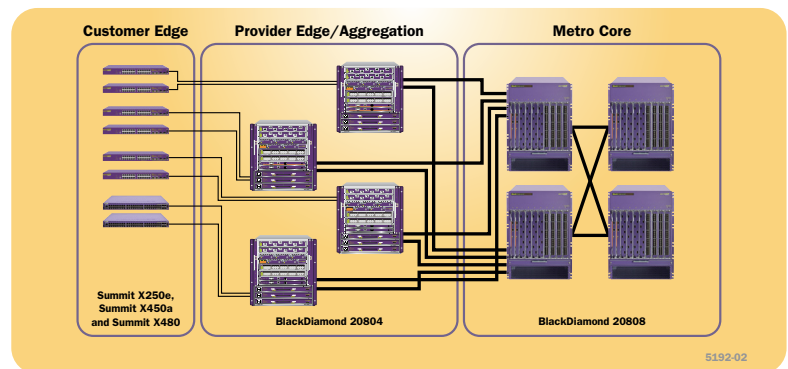
### Application 1: Mixed Business, Residential and Wireless Backhaul Service in Suburban or Rural Geographies

The following configuration highlights the typical deployment in suburban or rural geographies where fewer subscribers are aggregated at each node. In this application multiple 1 GbE or 10 GbE rings are used to cover large areas. There are typically fewer ports facing the customer edge, and only moderate bandwidth demands at the provider edge.



### Application 2: Mixed Business, Residential and Wireless Backhaul Service in High-Density Urban Geographies

The following configuration highlights the typical deployment in urban areas with a high Point of Presence (POP) concentration and many subscribers being aggregated close to the provider edge. There are typically many ports facing the customer edge, and the high bandwidth demands at the provider edge make the most of these redundant 10 GbE hub-and-spoke deployments rather than Ethernet Automatic Protection Switching (EAPS) rings. These topologies will likely migrate to a 100 GbE provider aggregation and metro core in the future.



## Technical Specifications

### ExtremeXOS 12.4 Supported Protocols

#### Switching

- RFC 3619 Ethernet Automatic Protection Switching (EAPS) and EAPsv2
- IEEE 802.1D – 1998 Spanning Tree Protocol (STP)
- IEEE 802.1D – 2004 Spanning Tree Protocol (STP and RSTP)
- IEEE 802.1w – 2001 Rapid Reconfiguration for STP, RSTP
- IEEE 802.1Q – 2003 (formerly IEEE 802.1s) Multiple Instances of STP, MSTP
- EMISTP, Extreme Multiple Instances of Spanning Tree Protocol
- PVST+, Per VLAN STP (802.1Q interoperable)
- Draft-ietf-bridge-rstpmb-03.txt – Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol
- Extreme Standby Router Protocol™ (ESRP)
- IEEE 802.1Q – 1998 Virtual Bridged Local Area Networks
- IEEE 802.3ad Static load sharing configuration and LACP based dynamic configuration
- Software Redundant Ports
- IEEE 802.1AB – LLDP Link Layer Discovery Protocol
- LLDP Media Endpoint Discovery (LLDP-MED), ANSI/TIA-1057, draft 08
- Extreme Discovery Protocol (EDP)
- Extreme Loop Recovery Protocol (ELRP)
- Extreme Link State Monitoring (ELSM)
- IEEE 802.1ag L2 Ping and traceroute, Connectivity Fault Management
- ITU-T Y.1731 Frame delay measurements

#### Management and Traffic Analysis

- RFC 2030 SNTP, Simple Network Time Protocol v4
- RFC 854 Telnet client and server
- RFC 783 TFTP Protocol (revision 2)
- RFC 951, 1542 BootP
- RFC 2131 BOOTP/DHCP relay agent and DHCP server
- RFC 1591 DNS (client operation)
- RFC 1155 Structure of Mgmt Information (SMIv1)
- RFC 1157 SNMPv1
- RFC 1212, RFC 1213, RFC 1215 MIB-II, Ethernet-Like MIB & TRAPS
- RFC 1573 Evolution of Interface
- RFC 1650 Ethernet-Like MIB (update of RFC 1213 for SNMPv2)
- RFC 1901, 1905 – 1908 SNMP v2c, SMIv2 and Revised MIB-II
- RFC 2576 Coexistence between SNMP Version 1, Version 2 and Version 3
- RFC 2578 – 2580 SMIv2 (update to RFC 1902 – 1903)
- RFC 3410 – 3415 SNMPv3, user based security, encryption and authentication
- RFC 3826 – The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model
- RFC 1757 RMON 4 groups: Stats, History, Alarms and Events
- RFC 2021 RMON2 (probe configuration)
- RFC 2613 SMON MIB
- RFC 2925 Ping/Traceroute MIB

- RFC 2668 802.3 MAU MIB
- draft-ietf-hubmib-mau-mib-v3-02.txt
- RFC 1643 Ethernet MIB
- RFC 1493 Bridge MIB
- RFC 2096 IPv4 Forwarding Table MIB
- RFC 2737 Entity MIB v2
- RFC 2233 Interface MIB
- RFC 3621 PoE-MIB (PoE switches only)
- IEEE 802.1ag MIB
- Secure Shell (SSH-2) client and server
- Secure Copy (SCP-2) client and server
- Secure FTP (SFTP) server
- sFlow® version 5
- Configuration logging
- Multiple Images, Multiple Configs
- RFC 3164 BSD Syslog Protocol with Multiple Syslog Servers
  - 999 Local Messages (criticals stored across reboots)
- Extreme Networks vendor MIBs (includes FDB, PoE, CPU, Memory MIBs)
- XML APIs over Telnet/SSH and HTTP/HTTPS
- Web-based device management interface – ExtremeXOS ScreenPlay™
- IP Route Compression

#### Security, Switch and Network Protection

- Secure Shell (SSH-2), Secure Copy (SCP-2) and SFTP client/server with encryption/authentication (requires export controlled encryption module)
- SNMPv3 user based security, with encryption/authentication (see above)
- RFC 1492 TACACS+
- RFC 2138 RADIUS Authentication
- RFC 2139 RADIUS Accounting
- RFC 3579 RADIUS EAP support for 802.1x
- RADIUS Per-command Authentication
- Access Profiles on All Routing Protocols
- Access Policies for Telnet/SSH-2/SCP-2
- Network Login – 802.1x, Web and MAC-based mechanisms
- IEEE 802.1x – 2001 Port-Based Network Access Control for Network Login
- Multiple supplicants with multiple VLANs for Network Login (all modes)
- Fallback to local authentication database (MAC and Web-based methods)
- Guest VLAN for 802.1x
- RFC 1866 HTML – used for Web-based Network Login and ExtremeXOS ScreenPlay
- SSL/TLS transport – used for Web-based Network Login and ExtremeXOS ScreenPlay (requires export controlled encryption module)
- MAC Security – Lockdown and Limit
- IP Security – RFC 3046 DHCP Option 82 with port and VLAN ID
- IP Security – Trusted DHCP Server
- Layer 2/3/4 Access Control Lists (ACLs)
- RFC 2267 Network Ingress Filtering
- RPF (Unicast Reverse Path Forwarding) Control via ACLs
- Wire-speed ACLs
- Rate Limiting/Shaping by ACLs
- IP Broadcast Forwarding Control
- ICMP and IP-Option Response Control
- SYN attack protection
- CPU DoS Protection with traffic rate-limiting to management CPU

- Robust against common Network Attacks:
  - CERT (<http://www.cert.org>)
  - CA-2003-04: “SQL Slammer”
  - CA-2002-36: “SSHredder”
  - CA-2002-03: SNMP vulnerabilities
  - CA-98-13: tcp-denial-of-service
  - CA-98.01: smurf
  - CA-97.28:Teardrop\_Land -Teardrop and “LAND” attack
  - CA-96.26: ping
  - CA-96.21: tcp\_syn\_flooding
  - CA-96.01: UDP\_service\_denial
  - CA-95.01: IP\_Spoofing\_Attacks\_and\_Hijacked\_Terminal\_Connections
- Host Attacks
  - Teardrop, boink, opentear, jolt2, newtear, nstear, syndrop, smurf, fraggle, papasmurf, synk4, raped, winfreeze, ping -f, ping of death, pepsif5, Latierra, Winnuke, Simping, Sping, Ascend, Stream, Land, Octopus

#### Security, Router Protection

*Requires Edge License or above*

- IP Security – DHCP enforcement via Disable ARP Learning
- IP Security – Gratuitous ARP Protection
- IP Security – DHCP Secured ARP/ARP Validation
- Routing protocol MD5 authentication

#### Security Detection and Protection

*In Core and Aggregation Products only*

- CLEAR-Flow, threshold-based alerts and actions

#### IPv4 Host Requirements

- RFC 1122 Host Requirements
- RFC 768 UDP
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 894 IP over Ethernet
- RFC 1027 Proxy ARP
- RFC 2068 HTTP server
- IGMP v1/v2/v3 Snooping with Configurable Router Registration Forwarding
- IGMP Filters
- PIM Snooping
- Static IGMP Membership
- Multicast VLAN Registration (MVR)

#### IPv4 Router Requirements

*Requires Advanced Edge License or above*

- RFC 1812 Requirements for IP Version 4 Routers
- RFC 1519 CIDR
- RFC 1256 IPv4 ICMP Router Discovery (IRDP)
- Static Unicast Routes
- Static Multicast Routes
- RFC 1058 RIP v1
- RFC 2453 RIP v2
- Static ECMP
- RFC 1112 IGMP v1
- RFC 2236 IGMP v2
- RFC 3376 IGMP v3
- RFC 2933 IGMP MIB
- RFC 2096 IPv4 Forwarding Table MIB
- RFC 1724 RIPv2 MIB

## Technical Specifications

### IPv4 Router Requirements continued

Requires Advanced Edge License or above

- RFC 2338 VRRP
- RFC 2787 VRRP MIB
- RFC 2328 OSPF v2 (Edge-mode)
- OSPF ECMP
- OSPF MD5 Authentication
- RFC 1587 OSPF NSSA Option
- RFC 1765 OSPF Database Overflow
- RFC 2370 OSPF Opaque LSA Option
- RFC 3623 OSPF Graceful Restart
- RFC 1850 OSPFv2 MIB
- RFC 2362 PIM-SM (Edge-mode)
- RFC 2934 PIM MIB
- RFC 3569, draft-ietf-ssm-arch-06.txt PIM-SSM PIM Source Specific Multicast
- draft-ietf-pim-mib-v2-o1.txt
- Mtrace, a "traceroute" facility for IP Multicast: draft-ietf-idmr-traceroute-ipm-07
- Mrinfo, the multicast router information tool based on Appendix-B of draft-ietf-idmr-dvmp-rp-v3-11

### Core Protocols for Layer 2, IPv4 and IPv6

Requires Core License or above

- EAPsv2 Shared Ports – multiple interconnections between rings
- PIM-DM Draft IETF PIM Dense Mode draft-ietf-idmr-pim-dm-05.txt, draft-ietf-pim-dm-new-v2-04.txt
- RFC 3618 Multicast Source Discovery Protocol (MSDP)
- RFC 3446 Anycast RP using PIM and MSDP
- RFC 2740 OSPFv3, OSPF for IPv6 – *Current support on Summit series with Core License or above, BlackDiamond 8800 series, BlackDiamond 10808 series, and BlackDiamond 12800 series*
- RFC 1771 Border Gateway Protocol 4
- RFC 1965 Autonomous System Confederations for BGP
- RFC 2796 BGP Route Reflection (supersedes RFC 1966)
- RFC 1997 BGP Communities Attribute
- RFC 1745 BGP4/IDRP for IP-OSPF Interaction
- RFC 2385 TCP MD5 Authentication for BGPv4
- RFC 2439 BGP Route Flap Damping
- RFC 2918 Route Refresh Capability for BGP-4
- RFC 3392 Capabilities Advertisement with BGP-4
- RFC 4360 BGP Extended Communities Attribute
- RFC 4486 Subcodes for BGP Cease Notification message
- draft-ietf-idr-restart-10.txt Graceful Restart Mechanism for BGP
- RFC 4760 Multiprotocol extensions for BGP-4
- RFC 1657 BGP-4 MIB
- Draft-ietf-idr-bgp4-mibv2-02.txt – Enhanced BGP-4 MIB
- RFC 1195 Use of OSI IS-IS for Routing in TCP/IP and Dual Environments (TCP/IP transport only)
- RFC 2763 Dynamic Hostname Exchange Mechanism for IS-IS
- RFC 2966 Domain-wide Prefix Distribution with Two-Level IS-IS
- RFC 2973 IS-IS Mesh Groups

- RFC 3373 Three-way Handshake for IS-IS Point-to-Point Adjacencies
- RFC 3784 IS-IS Externs for Traffic Engineering (wide metrics only)
- Draft-ietf-isis-restart-02 Restart Signaling for IS-IS
- Draft-ietf-isis-ipv6-06 Routing IPv6 with IS-IS – *Current support on Summit series with Core License or above, BlackDiamond 8800 series, BlackDiamond 10808 series, and BlackDiamond 12800 series*
- Draft-ietf-isis-wg-multi-topology-11 Multi Topology (MT) Routing in IS-IS

### QoS and VLAN Services

#### Quality of Service and Policies

- IEEE 802.1D – 1998 (802.1p) Packet Priority
- RFC 2474 DiffServ Precedence, including 8 queues/port
- RFC 2598 DiffServ Expedited Forwarding (EF)
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2475 DiffServ Core and Edge Router Functions

#### VLAN Services: VLANs, vMANs

- IEEE 802.1Q VLAN Tagging
- IEEE 802.1v: VLAN classification by Protocol and Port
- Port-based VLANs
- Protocol-based VLANs
- MAC-based VLANs
- Multiple STP domains per VLAN
- Upstream Forwarding Only/Disable Flooding
- RFC 5517 Private VLANs
- VLAN Translation
- IEEE 802.1ad Provider Bridge Network, virtual MANs (vMANs)
- vMAN Ethertype Translation/Secondary vMAN Ethertype
- Multicast Support for PVLAN
- Multicast Support for VLAN Aggregation
- VLAN Aggregation (Requires Advanced Edge License or above)

#### MAC-in-MAC (PBB)

Requires MPLS-PBB Feature Pack License

- IEEE 802.1ah/D1.2 Provider Backbone Bridges (PBB)/MAC-in-MAC

### MPLS and VPN Services

#### Multi-Protocol Label Switching (MPLS)

Requires MPLS-PBB Feature Pack License

- RFC 2961 RSVP Refresh Overhead Reduction Extensions
- RFC 3031 Multiprotocol Label Switching Architecture
- RFC 3032 MPLS Label Stack Encoding
- RFC 3036 Label Distribution Protocol (LDP)
- RFC 3209 RSVP-TE: Extensions to RSVP for LSP Tunnels
- RFC 3630 Traffic Engineering Extensions to OSPFv2
- RFC 3811 Definitions of Textual Conventions (TCs) for Multiprotocol Label Switching (MPLS) Management
- RFC 3812 Multiprotocol Label Switching (MPLS) Traffic Engineering (TE) Management Information Base (MIB)
- RFC 3813 Multiprotocol Label Switching (MPLS) Label Switching Router (LSR)

- Management Information Base (MIB)
- RFC 3815 Definitions of Managed Objects for the Multiprotocol Label Switching (MPLS), Label Distribution Protocol (LDP)
- RFC 4090 Fast Re-route Extensions to RSVP-TE for LSP (Detour Paths)
- RFC 4379 Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures (LSP Ping)

#### Layer 2 VPNs

Requires MPLS-PBB Feature Pack License

- RFC 4447 Pseudowire Setup and Maintenance Using the Label Distribution Protocol (LDP)
- RFC 4448 Encapsulation Methods for Transport of Ethernet over MPLS Networks
- RFC 4762 Virtual Private LAN Services (VPLS) using Label Distribution Protocol (LDP) Signaling
- RFC 5085 Pseudowire Virtual Circuit Connectivity Verification (VCCV)
- draft-ietf-bfd-base-09.txt Bidirectional Forwarding Detection
- RFC 5542 Definitions of Textual Conventions for Pseudowire (PW) Management
- RFC 5601 Pseudowire (PW) Management Information Base (MIB)
- RFC 5602 Pseudowire (PW) over MPLS PSN Management Information Base (MIB)
- RFC 5603 Ethernet Pseudowire (PW) Management Information Base (MIB)
- draft-ietf-l2vpn-vpls-mib-02.txt Virtual Private LAN Services (VPLS) Management Information Base

## General Specifications

### BlackDiamond 20808 Chassis

- Total Slots: 10
- I/O Slots: 8
- Management Slots: 2
- Line Card Orientation: Vertical
- Fabric Slots: 5 (N+1), rear of chassis
- Power Supply Slots: 5 (rear)
- Height: 14.5 RU, 3 in a 7-foot (2.134m) rack
- Depth: 28 inches (71.1 cm)
- CPU Redundancy: 1:1
- Fabric Redundancy: N+1
- PSU Redundancy: N+1
- Air Flow: Front to back
- Fabric Capacity: 2 Tbps
- Bandwidth per Slot: 120 Gbps
- Packet Switching Capacity: ~1Bpps
- Maximum 10G Ports: 64
- Maximum 1G Ports: 320

### BlackDiamond 20808 Switching Capacity and Fabric Modules

- 2Tbps total switching capacity
- XFM-1: Cross Bar Fabric Module 1

### BlackDiamond 20804 Chassis

- Total Slots: 6
- I/O Slots: 4
- Management Slots: 2
- Line Card Orientation: Horizontal
- Fabric Slots: 5 (N+1), front of chassis
- Power Supply Slots: 3 (front)
- Height: 10.9 RU, 4 in a 7-foot (2.134m) rack
- Depth: 22.96 inches (58.3 cm)
- CPU Redundancy: 1:1

## Technical Specifications

- Fabric Redundancy: N+1
- PSU Redundancy: N+1
- Air Flow: Right-to-left
- Fabric Capacity: 1 Tbps
- Bandwidth per Slot: 120 Gbps
- Packet Switching Capacity: ~1Bpps
- Maximum 10G Ports: 32
- Maximum 1G Ports: 160

### BlackDiamond 20804 Switching Capacity and Fabric Modules

- 1Tbps total switching capacity
- XFM-2: Cross Bar Fabric Module 2

### Management and I/O Modules

- MM-Base: Management Module Base (supports up to 2M MAC/Routes)
- XM-8XB: 8-port 10 Gigabit module Base (supports up to 400K MAC / 512K Routes). Requires XFP modules
- GM-40XB: 40-port Gigabit Ethernet module Base (supports up to 400K MAC / 512K Routes). Requires SFP modules

### Power Supply Options

- Both AC and DC power supplies are available
  - AC power supplies can run from 180-264 VAC, and deliver 2400W
  - 48V DC power supplies can run from 40-72 VDC and deliver 1900W of power
- Power Supply: 7 lb (3.2 kg)

### Industry-leading Scalability

- Up to 20,000 multicast streams
- Up to 64,000 ingress rate limiters
- Up to 32,000 egress traffic schedulers
- Up to 256,000 virtual output queues

## Physical Specifications

### Dimensions

**BlackDiamond 20808 Chassis:**  
25.33" high x 17.58" wide x 28" deep  
(64.34 cm x 44.65 cm x 71.12 cm)

**BlackDiamond 20804 Chassis:**  
19.22" high x 17.55" wide x 22.96" deep (48.82 cm x 44.58 cm x 58.32 cm)

**MSM Module Dimensions:**  
1.22" high x 14.1" wide x 22.3" deep inclusive of ejectors (3.1 cm x 35.81 cm x 56.64 cm)

**I/O Module Dimensions:**  
1.77" high x 14.1" wide x 22.3" deep inclusive of ejectors (4.5 cm x 35.81 cm x 56.64 cm)

**XFM-1 Dimensions:**  
1.77" high x 17.23" wide x 7.66" deep inclusive of ejectors (4.5 cm x 43.76 cm x 19.46 cm)

**XFM-2 Dimensions:**  
1.32" high x 4.38" wide x 22.28" deep inclusive of ejectors (3.35 cm x 11.13 cm x 56.59 cm)

### Weight

**BlackDiamond 20808 Empty Chassis (Shipping Configuration):** 165 lb (74.84 kg)

**BlackDiamond 20804 Empty Chassis (Shipping Configuration):** 126 lb (57.15 kg)

**Power Supply:** 7 lb (3.2 kg)  
**MM-Base:** 9.5 lb (4.31 kg)  
**XM-8XB:** 17.5 lb (7.9 kg)  
**GM-40XB:** 11.75 lb (5.33 kg)  
**GM-40XA:** 11.75 lb (5.33 kg)  
**XFM-1:** 4.25 lb (1.93 kg)  
**XM-2HR:** 7.5 lb (3.4 kg)

### Power

**Power Dissipation:**  
**MM:** 110W, 48V, 2.29A  
**XM-8XB:** 462W, 48V, 9.625A  
**GM-40XB:** 238W, 48V, 4.95A  
**XFM-1:** 86W, 48V, 1.79A  
**XFM-2:** 43W, 48V, 0.90A  
**BlackDiamond 20808 Chassis with Fan Trays:** 440W, 48V, 9.17A (Heat Dissipation 1501 BTU)  
**BlackDiamond 20804 Chassis with Fan Trays:** 374W, 48V, 7.79A (Heat Dissipation 1276 BTU)

## Operating Specifications

### Operational Environment

**Temperature Range:** 0° to 40° C  
(32° F to 104° F)  
**Relative Humidity:** 10 - 90% RH  
**Altitude:** 0 – 3000 meters (10,000 ft)  
**Shock:** 30 m/s<sup>2</sup> (3g), 11ms  
**Random Vibration:** 5 – 500 Hz @ 1.5 Grms

### Storage and Transportation Environment

**Temperature Range:** -40° C to +70° C  
(-40° F to 158° F)  
**Relative Humidity:** 10 – 93% RH  
**Shock:** 180 m/s<sup>2</sup> (18.g), 6ms  
**Sinusoidal Vibration:** 5 – 62 Hz @ Velocity 5mm/s, 62 – 500 Hz @ .2G  
**Random Vibration:** 5 – 20 Hz @ 1.0 ASD w/-3dB/oct. from 20-200 Hz  
**Drop:** 39.4"

## Regulatory/Safety

### North American Safety of ITE

- UL 60950-1:2007 2nd Ed., Listed Device (U.S.)
- cUL to CSA 22.2#60950-1-07 2nd Ed. (Canada)
- Complies with FCC 21CFR Chapter1, Subchapter J (U.S. Laser Safety)
- CDRH Letter of Approval (U.S. FDA Approval)

### European Safety of ITE

- 2006/95/EC Low Voltage Directive
- GS Mark, DEMKO, EN 60950-1:2007 2nd Ed
- EN 60825-1+A2:2001 (Lasers Safety)

### International Safety of ITE

- CB scheme: IEC 60950-1; 2005 2nd Ed.+National Differences

## EMI/EMC Standards

### North America EMC for ITE

- FCC CFR 47 part 15 Class A (USA)
- ICES-003 issue 4, Class A (Canada)

## European EMC Standards (CE Marking)

- 2004/108/EC EMC Directive
- EN 55022 2006 Class A (Emissions)
- EN 55024 A2:2003 (Immunity)
- EN61000-3-2 8:2006 (Harmonics)
- EN61000-3-3 1995+A3:2006 (Flicker)
- ETSI EN 300 386: v1.4.1, 2008-02 (EMC Télécommunications)

## International EMC Certifications

- CISPR 22:2006 Ed 5.2, Class A (International Emissions)
- CISPR 24 A2:2003 (International Immunity)
- IEC/EN 61000-4-2:2001 Electrostatic Discharge, 8kV Contact, 15kV Air, Criteria A
- IEC/EN 61000-4-3:2006 Radiated Immunity 10V/m, 30 to 2GHz, Criteria A
- IEC/EN 61000-4-4:2005 Transient Burst, 1kV, Power & I/O ports, Criteria A
- IEC/EN 61000-4-5:2005 Surge, 2kV L-L, 4kV L-G, Level 4, Criteria A
- IEC/EN 61000-4-6:2007 Conducted Immunity, 0.15-80MHz, 10V/m unmod. RMS, Criteria A
- IEC/EN 61000-4-8 1993+A1:2001 Magnetic Field, Criteria A
- IEC/EN 61000-4-11 2004 Power Dips & Interruptions, >30%, 25 periods, Criteria A

## Country Specific

- VCCI Class A (Japan)
- ACMA (C-Tick) via CISPR22:2006 (Australia & New Zealand)
- BSMI, CNS 13438:1997, Class A (Taiwan)
- KCC Mark, KN22, KN24 (Korea)

## Environmental

- EN 300 019-2-3 v2.2.2 (2003-04), Stationary Use, Class 3.1e
- EN 300 019-2-2 v2.1.2 (1999-09), Public Transportation, Class 2.3
- EN 300 019-2-1 v2.1.2 (2000-09), Storage, Class 1.2

## Warranty

- Ltd. 1-year on Hardware
- 90-days on Software
- For warranty details, visit [www.extremenetworks.com/go/warranty](http://www.extremenetworks.com/go/warranty)

## Ordering Information

Part Number	Name	Description
<b>Chassis</b>		
68020	BlackDiamond 20808 10-slot Chassis	BlackDiamond 20808 10-slot Chassis (Includes Fan Tray and Blank Front Panels)
68040	BlackDiamond 20804 6-slot Chassis	BlackDiamond 20804 6-slot Chassis (Includes Fan Tray and Blank Front Panels)
<b>Power Supplies</b>		
68051	BlackDiamond 20800 2400W/220VAC PSU	BlackDiamond 20800 2400W 220 VAC PSU (Note: AC power cords are sold separately)
68052	BlackDiamond 20800 1900W/-48VDC PSU	BlackDiamond 20800 1900W -48VDC PSU (Note: DC power cards are sold separately)
<b>Management and Switching Modules</b>		
68023	BlackDiamond 20800 MM Basic	BlackDiamond 20800 Management Module Basic
68021	BlackDiamond 20808 XFM-1	BlackDiamond 20808 Cross Bar Switch Fabric Module1
68031	BlackDiamond 20804 XFM-2	BlackDiamond 20804 Cross Bar Switch Fabric Module2
<b>I/O</b>		
68024	BlackDiamond 20800 XM-8XB	BlackDiamond 20800 I/O Blade 8-port 10G BASE-X XFP Module with basic configuration
68025	BlackDiamond 20800 GM-40XB	BlackDiamond 20800 I/O Blade 40-port Gig-E Fiber with basic configuration
<b>Software and Upgrades</b>		
68070	BlackDiamond 20800 MPLS-PBB Feature Pack	BlackDiamond 20800 ExtremeXOS MPLS-PBB Feature Pack
68071	BlackDiamond 20800 H-QoS Feature Pack	BlackDiamond 20800 Hierarchical QoS Feature Pack
<b>Accessories and Spares</b>		
68041	Spare BlackDiamond 20808 Fan Tray	BlackDiamond 20808 Spare Fan Tray
68042	Spare BlackDiamond 20808 Mid Mount Kit	BlackDiamond 20808 Spare Mid Mount Kit
68043	Spare BlackDiamond 20800 IOB Blank Panel	BlackDiamond 20800 Spare IOB Blank Panel
68044	Spare BlackDiamond 20800 MM Blank Panel	BlackDiamond 20800 Spare MM Blank Panel
68045	Spare BlackDiamond 20808 XFM-1 Blank Panel	BlackDiamond 20808 Spare XFM-1 Blank Panel
68046	Spare BlackDiamond 20800 PSU Blank Panel	BlackDiamond 20800 Spare PSU Blank Panel
68047	Spare BlackDiamond 20808 Air Filter Kit	BlackDiamond 20808 Spare Air Filter Kit
68049	Spare BlackDiamond 20800 Air Baffle Kit	BlackDiamond 20800 Spare Air Baffle Kit
68064	Spare BlackDiamond 20808 PSU Retention Kit	BlackDiamond 20808 Spare PSU Retention Kit
<b>10G XFPs</b>		
10121	SR XFP	10GBASE-SR XFP, LC Connector, up to 300m reach over 50/125 μm MMF
10122	LR XFP	10GBASE-LR XFP, LC Connector, transmission length of up to 10 km on SMF
10124	ER XFP	10GBASE-ER XFP, LC Connector, transmission length of up to 40 km on SMF
10125	ZR XFP	10GBASE-ZR XFP, LC Connector, transmission length of up to 80 km on SMF



**1G SFP Optics**

10051	SX SFP	SFP, 1000BASE SX, LC connector, 550 m transmission with 10/125 µm MMF and 275 m transmission with 62.5/125 µm MMF
10052	LX SFP	SFP, 1000BASE LX, LC connector, 10 km transmission with SMF
10053	ZX SFP	SFP, extra long distance SMF 80 km/21 dB budget, LC connector
10056	1000BASE-BX-U SFP	SFP, 1000BASE-BX-U, LC connector, 10 km transmission with SMF (1490-nm TX/1310-nm RX wavelength)
10057	1000BASE-BX-D SFP	SFP, 1000BASE-BX-D, LC connector, 10 km transmission with SMF (1310-nm TX/1490-nm RX wavelength)
10060	100 FX/1000 LX SFP	SFP, dual-speed 100 FX/1000 LX, LC connector
10063	100 FX SFP	SFP 100FX 2km transmission with MMF LC connector
10064	LX100 SFP	SFP, extra long distance SMF 100 km/30 dB budget, LC connector
10065	10/100/1000 BASE-T SFP	10/100/1000 BASE-T copper SFP, 100 m over Category 5 cable, RJ-45 connector



**Corporate  
and North America**  
Extreme Networks, Inc.  
3585 Monroe Street  
Santa Clara, CA 95051 USA  
Phone +1 408 579 2800

**Europe, Middle East, Africa  
and South America**  
Phone +31 30 800 5100

**Asia Pacific**  
Phone +65 6836 5437

**Japan**  
Phone +81 3 5842 4011