Summit X670 Series*

Highlights

The Summit® X670 series switches are purpose-built top-of-rack switches designed to support emerging 10 Gigabit Ethernet-enabled servers in enterprise and cloud data centers. Summit X670 helps optimize new server deployments with its optional, future-proofing 40 GbE uplink support while providing seamless support from existing Gigabit Ethernet-based servers to 10 GbE-based high-performance servers to start the transition to the new virtualized environment.

Overview

The Summit X670 series is available in two models: Summit X670V and Summit X670. Summit X670V provides high density for 10 Gigabit Ethernet switching in a small 1RU form factor. The switch supports up to 64 ports in one system and 448 ports in a stacked system using high-speed SummitStack-V160, which provides 160 Gbps throughput and distributed forwarding. The Summit X670 model provides up to 48 ports in one system and up to 352 ports in a stacked system using SummitStack-V longer distance stacking technology (up to 40 km with 10GBASE-ER SFP+) .

With its versatile design, the Summit X670 series provides high density Layer 2/3 switching with low latency cut-through switching, and IPv4 and IPv6 unicast and multicast routing to enable enterprise aggregation and core backbone deployment in AC-powered and DC-powered environments.

Summit X670 series simplifies network operation with the ExtremeXOS® modular operating system (OS), which is used amongst all Extreme Networks® Summit and BlackDiamond® Ethernet switches. The high availability ExtremeXOS operating system provides simplicity and ease of operation through the use of one OS everywhere in the network.

10 Gigabit Ethernet Switching

The Summit X670 model offers 48-port 10 Gigabit Ethernet non-blocking switching with 10GBASE-X SFP+ interfaces. Summit X670 is capable of Layer 2 and Layer 3 forwarding at up to 714 million packets per second forwarding rate in a small 1RU form factor, enabling next-generation high-performance server deployment in data centers. Both models support SummitStack-V high-speed, longer distance stacking.

SummitStack-V–Flexible Stacking Over 10 Gigabit Ethernet

SummitStack-V capability utilizes 10 GbE ports as stacking ports, enabling the use of standard cabling and optics technologies used for 10 GbE such as XFP, SFP+, 10GBASE-T and XENPAK. SummitStack-V provides long-distance stacking connectivity of up to 40 km while reducing the cable complexity of implementing a stacking solution. SummitStack-V enabled 10 GbE ports must be physically direct-connected. SummitStack-V is compatible with Summit X450e, X450a, X460, X480, X650 and X670 switches running the same version of ExtremeXOS.

Make Your Network Mobile

40 Gigabit Ethernet Uplinks and High-Speed 160 Gbps Stacking

The Summit X670V model can support an additional four QSFP+ ports of 40 GbE with the optional VIM4-40G4X module. With this option, you can maximize the number of interfaces for servers up to 48 ports while using the dedicated four-port 40 GbE module for uplink connectivity. The optional VIM4-40G4X provides 160 Gbps aggregated bandwidth to the backbone. Each 40 Gigabit Ethernet port can be independently configured as 40 Gigabit Ethernet or 4 x 10 Gigabit Ethernet; thus with the VIM4-40G4X module, Summit X670V can support up to 64 ports of 10 Gigabit Ethernet in a 1RU form factor and is capable of Layer 2 and Layer 3 forwarding at up to 952 million packets per second forwarding rate. This configuration provides 3:1 oversubscription from front ports (total 480 Gbps bandwidth) to uplink ports (total 160 Gbps bandwidth) and maximizes server port density.

Summit X670V together with VIM4-40G4X provides high speed stacking running at 160Gbps through the SummitStack-V160 technology. SummitStack-V160 can be enabled on two 40 Gigabit Ethernet QSFP+ ports on the VIM4-40G4X, using half of the module's four ports as stacking interfaces. SummitStack-V160 is compatible with SummitStack-V80, which is available for Summit X460 and Summit X480 series switches.

Low Latency Switching for High-Frequency Trading and Cluster Computing

Summit X670 provides sub-microsecond latency and supports cut-through switching to help optimize the high frequency trading application as well as latency sensitive cluster computing.

Green Design

The Summit X670 series is designed to be environmentally green. System power consumption is very low at both high-load and idle situations through the power-efficient hardware design. The power supplies are also highly efficient, which minimizes the loss of power and unnecessary heat generated by the power supply. Summit X670 series switches can be used in AC or DC powered environments.

Supports Virtualized Data Centers

With the optional feature pack, Summit X670 switches can also support Direct Attach™ (VEPA), which eliminates the virtual switch layer, simplifying the network and improving performance. Direct Attach enables data center simplification by reducing network tiers from 4 or 5 tiers to just 3 or 2 tiers, depending on the size of the data center.

To further enhance data center operations, Summit X670 switches support XNV™ (ExtremeXOS Network Virtualization), which is natively supported in the ExtremeXOS operating system and is a licensable feature pack for Ridgeline™, a network and service management application, sold separately. XNV provides insight, control and automation for virtualized data centers.

Summit X670 switches also support Priority-based Flow Control (PFC, or IEEE 802.1Qbb), which allows network traffic to be controlled independently based on Class of Service. PFC allows network traffic that requires lossless throughput to be prioritized, while other traffic types that do not require or perform better without PFC can continue as normal.

DCB Support with Enterprise Core Class Scalability

The Summit X670 series supports Data Center Bridging features such as Priority Flow Control (PFC), Enhanced Transmission Selection (ETS) and Data Center Bridging eXchange (DCBX) for data center convergence. At the same time, the Summit X670 series offers more cost-effective 10 Gigabit Ethernet switches, for both small-sized core backbone and traditional three-tier network architectures. Summit X670 series can support 10 Gigabit Ethernet campus aggregation with its core class routing and switching scalability. The Summit X670 series can support up to 16,000 IPv6 longest prefix matching routing tables, 6,000 IP ARP entries and 3,000 IP multicast group entries.
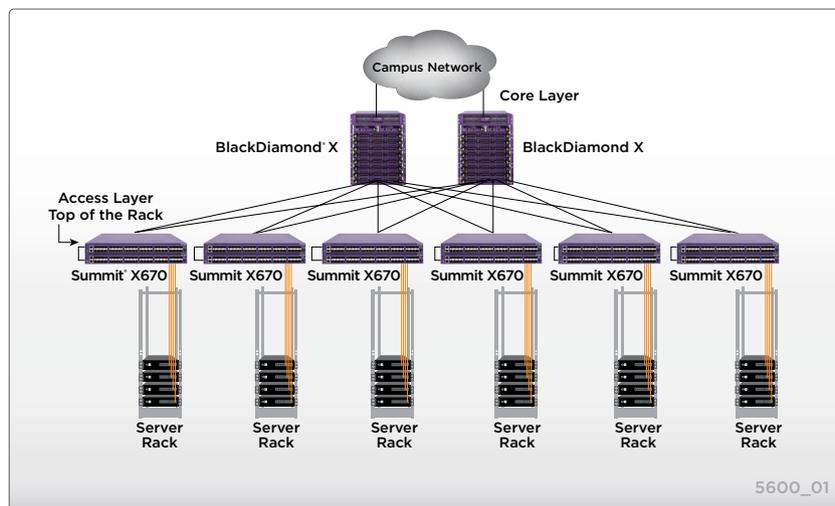

Figure 1: Top of Rack Switch for Servers in the Enterprise Data Center

One Operating System

Extreme Networks simplifies network operation by offering one common OS – ExtremeXOS – throughout the BlackDiamond and Summit switchIng portfolio. From 10/100 Mbps switching products such as Summit X150 and Summit X250e to the multi-10 gigabit core backbone BlackDiamond modular chassis switches, all switches can run the same version of the OS, which helps deploy, operate and maintain your entire network and reduce operating costs.

10 Gigabit Ethernet SFP+

The Summit X670 series supports SFP+ optics, which can support passive copper cable for up to 10 meters for Summit X670V and up to 3 meters for Summit X670. The switches also support fiber-optical cable installation with SFP+ transceivers such as 10GBASE-SR, LR, LRM, and ER. Summit X670 SFP+ ports support dual interface speeds of Gigabit Ethernet and 10 GbE. SFP+ ports can accept both gigabit SFP and 10 gigabit SFP, and depending upon the pluggable optics you choose, SFP+ can work in both modes.

40 Gigabit Ethernet QSFP+

The Summit X670V model provides a VIM4 slot for the optional VIM4-40G4X module. The VIM4-40G4X module supports four QSFP+ optics, and supports up to four ports of 40 GbE. 40 GbE QSFP+ ports can accept QSFP+ passive and active cables, as well as QSFP+ transceivers. Each 40 GbE port can be configured as a 40 GbE port or as four 10 GbE ports. The 10 GbE port mode can be supported by a 40GBASE-SR4 QSFP+ transceiver and fan-out optical cables, and is compatible with the 10GBASE-SR optical interface for distances up to 100 meters.

Low Power Consumption with Optimized Cooling Options

The Summit X670 series consumes very low power and provides optimized cooling options. Most servers installed in a standard 19-inch rack system flow air from front to back to maximize cooling performance. Compared to side-to-side air flow, front-to-back air flow provides more effective cooling throughout the rack system in the data center. The Summit X670 series has

2+1 hot swappable fan tray offering effective front-to-back air flow, or back-to-front air flow. Back-to-front air flow allows placement of 10 Gigabit Ethernet SFP+ ports in the back side of the rack and reduces distance between switches and servers for 10GBASE-CR SFP+ passive copper cable installations.

Modular Operating System for Non-Stop Operation

Preemptive Multitasking and Protected Memory

Summit X670 series switches allow each of many applications—such as Open Shortest Path First (OSPF) and Spanning Tree Protocol (STP)—to run as separate OS processes that are protected from each other. This drives increased system integrity and inherently protects against DoS attacks.

Process Monitoring and Restart

ExtremeXOS increases network availability using process monitoring and restart. Each independent OS process is monitored in real time. If a process becomes unresponsive or stops running, it can be automatically restarted.

Loadable Software Modules

The modular design of the ExtremeXOS OS allows the upgrading of individual software modules, should this be necessary, leading to higher availability in the network.

High Availability Network Protocols

Ethernet Automatic Protection Switching (EAPS)

EAPS allows the IP network to provide the level of resiliency and uptime that users expect from their traditional voice network. EAPS is more adaptable than Spanning Tree or Rapid Spanning Tree protocols and offers sub-second (less than 50 milliseconds) recovery that delivers consistent failover regardless of the number of VLANs, network nodes or network topology. Since EAPS allows the network to recover almost transparently, Voice-over-IP (VoIP) calls will not drop and digital video feeds will not freeze or pixelize in most situations.
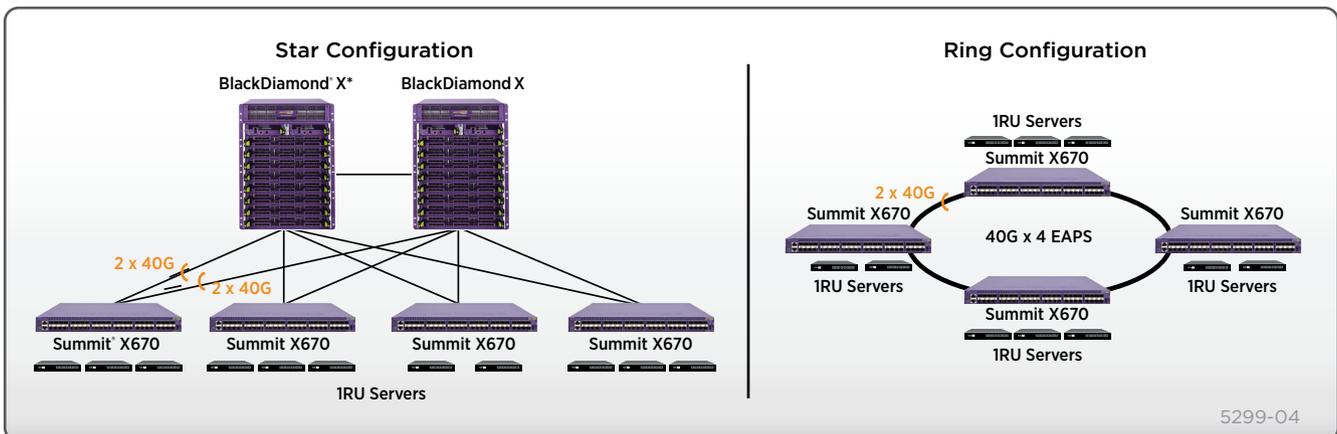

Figure 2: Summit X670 High Speed Uplink Option

*Future availability.

Spanning Tree/Rapid Spanning Tree Protocols

Summit X670 supports Spanning Tree (802.1D), Per VLAN Spanning Tree (PVST+), Rapid Spanning Tree (802.1w) and Multiple Instances of Spanning Tree (802.1s) protocols for Layer 2 resiliency.

Software-Enhanced Availability

Software-enhanced availability allows users to remain connected to the network even if part of the network infrastructure is down. Summit X670 continuously checks for problems in the uplink connections using advanced Layer 3 protocols such as OSPF, VRRP and Extreme Standby Router Protocol™ (ESRP, supported in Layer 2 or Layer 3), and dynamically routes traffic around the problem.

Equal Cost Multipath

Equal Cost Multipath (ECMP) routing allows uplinks to be load balanced for performance and cost savings while also supporting redundant failover. If an uplink fails, traffic is automatically routed to the remaining uplinks and connectivity is maintained.

Link Aggregation (802.3ad)

Link aggregation allows trunking of up to eight links on a single logical connection, for up to 80 Gbps of redundant bandwidth per logical connection.

Multi-Switch LAG (M-LAG)

M-LAG can address bandwidth limitations and improve network resiliency, in part by routing network traffic around bottlenecks, reducing the risks of a single point of failure, and allowing load balancing across multiple switches.

Hardware Redundancy

Summit X670 series switches support a dual redundant AC/DC power supply to provide high availability. The power supply can be hot-swapped and replaced should it fail. Summit X670 also supports N+1 redundant hot-swappable fan trays.

Robust IP and MAC Security Framework

Media Access Control (MAC) Lockdown

MAC security allows the lockdown of a port to a given MAC address and limiting the number of MAC addresses on a port. This capability can be used to dedicate ports to specific hosts or devices such as VoIP phones or printers and avoid abuse of the port—a capability that can be especially useful in environments such as hotels. In addition, an aging timer can be configured for the MAC lockdown, protecting the network from the effects of attacks using (often rapidly) changing MAC addresses.

IP Security

ExtremeXOS IP security framework helps protect the network infrastructure, network services such as DHCP and DNS and host computers from spoofing and man-in-the-middle attacks. It also protects the network from statically configured and/or spoofed IP addresses and builds an external trusted database of MAC/IP/port bindings providing the traffic's source from a specific address for immediate defense.

Identity Management

Identity Manager allows network managers to track users who access their network. User identity is captured based on NetLogin authentication, LLDP discovery and Kerberos snooping. ExtremeXOS uses the information to then report on the MAC, VLAN, computer hostname, and port location of the user. Further, Identity Manager can create both roles and policies, and then bind them together to create role-based profiles based on organizational structure or other logical groupings, and apply them across multiple users to allow appropriate access to network resources. In addition, support for Wide Key ACLs further improves security by going beyond the typical source/destination and MAC address as identification criteria access mechanism to provide filtering capabilities.
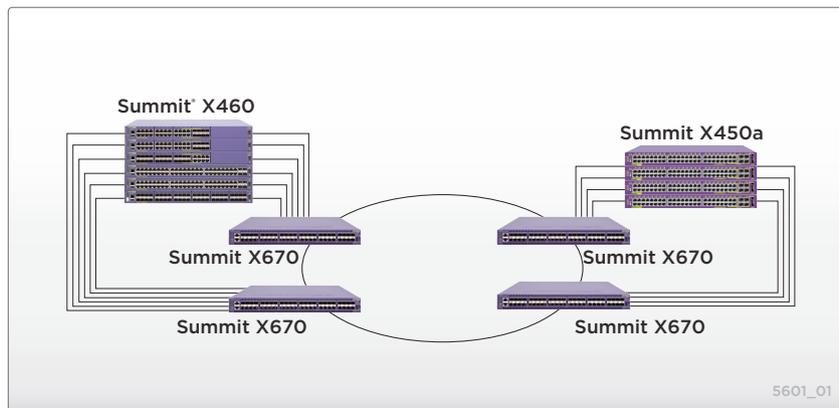

Figure 3: High-Performance 10 Gigabit Core Switch for a Small Network and Aggregation Switch in a Traditional Three-Tiered Network

Threat Detection and Response

CLEAR-Flow Security Rules Engine

CLEAR-Flow Security Rules Engine provides first-order threat detection and mitigation, and mirrors traffic to security appliances for further analysis of suspicious traffic in the network.

sFlow

Summit X670 series supports hardware-based sFlow® sampling that provides the ability to sample application-level traffic flows on all interfaces simultaneously.

Port Mirroring

To allow threat detection and prevention, Summit X670 supports many-to-one and one-to-many port mirroring. This allows the mirroring of traffic to an external network appliance such as an intrusion detection device for trend analysis or for utilization by a network administrator for diagnostic purposes. Port mirroring can also be enabled across switches in a stack.

Line-Rate Ingress and Egress ACLs

ACLs are one of the most powerful components used in controlling network resource utilization as well as in protecting the network. Summit X670 series supports up to 2,048 ingress ACLs and 1,024 egress ACLs per system based on Layer 2-, 3- or 4-header information such as the MAC or IP source/destination address. ACLs are used for filtering the traffic, as well as classifying the traffic flow to control bandwidth, priority, mirroring, and policy-based routing/switching.

Denial of Service Protection

Summit X670 series effectively handles Denial of Service (DoS) attacks. If the switch detects an unusually large number of packets in the CPU input queue, it assembles ACLs that automatically stop these packets from reaching the CPU. After a period of time these ACLs are removed, and reinstalled if the attack continues. ASIC-based LPM routing eliminates the need for control plane software to learn new flows, allowing more network resilience against DoS attacks.

Secure and Comprehensive Network Management

As the network becomes a foundation of the enterprise application, network management becomes an important piece of the solution. Summit X670 supports comprehensive network management through Command Line Interface (CLI), SNMP v1, v2c, v3, and ExtremeXOS ScreenPlay™ embedded XML-based Web user interface. With a variety of management options and consistency across other Extreme Networks modular and stackable switches, Summit X670 series switches provide ease of management for demanding converged applications.

Extreme Networks has developed tools that simplify and help in efficiently managing your network. Ridgeline network and service management provides fault, configuration, accounting, performance and security functions, allowing more effective management of Extreme Networks products, solutions and third-party devices in a converged network.

Summit X670V

Technical Specifications

ExtremeXOS 12.6 Supported Protocols

Switching

- 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-rstpmib-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
- Multi-switch Link Aggregation Groups (M-LAG)
- 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 Management 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 SNMPv2c, 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
- Stacking – SummitStack-V, SummitStack-V160** (Summit X670V only. Compatible with SummitStack-V80)

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
  - IP Options Attack
- Host Attack Protection
  - Teardrop, boink, opentear, jolt2, newtear, nestea, syndrop, smurf, fraggle, papasmurf, synk4, raped, winfreeze, ping –f, ping of death, pepsi5, Latierra, Winnuke, Simping, Sping, Ascend, Stream, Land, Octopus

Security, Router Protection

- 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

- CLEAR-Flow, threshold-based alerts and actions (*in non-SummitStack configuration only*)
- Identity Manager
- Motion Detection

IPv4 Host Services

- 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 Services

- RFC 1812 Requirements for IP Version 4 Routers
- RFC 1519 CIDR

**Future availability.

Technical Specifications

IPv4 Router Services (cont.)
- 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
- RFC 3768 VRRPv2
- 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-dvmrp-v3-11

IPv6 Host Services
- RFC 3587, Global Unicast Address Format
- Ping over IPv6 transport
- Traceroute over IPv6 transport
- RFC 5095, Internet Protocol, Version 6 (IPv6) Specification
- RFC 4861, Neighbor Discovery for IP Version 6, (IPv6)
- RFC 2463, Internet Control Message Protocol (ICMPv6) for the IPv6 Specification
- RFC 2464, Transmission of IPv6 Packets over Ethernet Networks
- RFC 2465, IPv6 MIB, General Group and Textual Conventions
- RFC 2466, MIB for ICMPv6
- RFC 2462, IPv6 Stateless Address Auto Configuration – Host Requirements
- RFC 1981, Path MTU Discovery for IPv6, August 1996 – Host Requirements
- RFC 3513, Internet Protocol Version 6 (IPv6) Addressing Architecture
- Telnet server over IPv6 transport
- SSH-2 server over IPv6 transport

IPv6 Interworking and Migration
- RFC 2893, Configured Tunnels
- RFC 3056, 6to4

IPv6 Router Services
- RFC 2462, IPv6 Stateless Address Auto Configuration – Router Requirements
- RFC 1981, Path MTU Discovery for IPv6, August 1996 – Router Requirements
- RFC 2710, IPv6 Multicast Listener Discovery v1 (MLDv1) Protocol
- Static Unicast routes for IPv6

- RFC 2080, RIPng
- RFC 2740 OSPF v3 (edge mode)
- Static ECMP

Core Protocols for Layer 2, IPv4 and IPv6
Requires Core License

- 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
- 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 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
- RFC 4893 BGP Support for Four-Octet AS Number Space
- 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
- Draft-ietf-isis-restart-02 Restart Signaling for IS-IS
- Draft-ietf-isis-ipv6-06 Routing IPv6 with IS-IS
- 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

Traffic Engineering
- RFC 3784 IS-IS Externs for Traffic Engineering (wide metrics only)

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

MPLS and VPN Services

Multi-Protocol Label Switching (MPLS)
Requires MPLS 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)
- draft-ietf-bfd-base-09.txt Bidirectional Forwarding Detection

Layer 2 VPNs
Requires MPLS 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)
- 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 MIB
- RFC 5603 Ethernet Pseudowire (PW) MIB
- draft-ietf-l2vpn-vpls-mib-02.txt Virtual Private LAN Services (VPLS) MIB

Data Center
- Direct Attach (IEEE 802 VEPA) (Supported in a feature pack)
- Priority Flow Control (IEEE 802.1Qbb)
- XNV (ExtremeXOS Network Virtualization)

Technical Specifications

Summit X670

General Specifications

Performance
- 1280 Gbps switch bandwidth, 952 Mpps forwarding rate (Summit X670V-48x with VIM4-40G4X)
- 960 Gbps switch bandwidth, 714 Mpps forwarding rate (Summit X670-48x)
- 9216 Byte maximum packet size (Jumbo Frame)
- Store-and-Forward and Cut-Through switching support
- Less than 1 micro second latency (64-byte packet)
- 128 load sharing trunks, up to 8 members per trunk
- 4,094 VLANs (Port, Protocol, IEEE 802.1Q)
- 2,048 ingress and 1,024 egress ACL rules per switch

Forwarding Tables
- Layer 2/MAC Addresses: 128K
- IPv4 Host Addresses: 6K
- IPv4 LPM Entries: 16K
- IPv6 Host Addresses: 3K
- IPv6 LPM Entries: 8K

CPU, Memory
- 64-bit MIPS Processor, 1GHz clock
- 1GB ECC SDRAM
- 1GB Compact Flash

QoS, Rate Limiting
- 2,048 ingress bandwidth meters
- Ingress and egress bandwidth policing/rate limiting per flow/ACL
- 8 QoS egress queues/port
- Egress bandwidth rate shaping per egress queue and per port
- Rate Limiting Granularity: 8 Kbps – 1Mbps

LED Indicators
- Per port status LED including power status
- System Status LEDs: management, fan and power
- Motion Detection LED

External Ports
- 48 port 10GBASE-X SFP+ (1G/10G dual speed)
- One RJ-45 RS-232c Serial port (control port)
- One 10/100/1000BASE-T out-of-band management port

External Ports with VIM4-40G4X (Summit X670V-48x only)
- 48 port 10GBASE-X SFP+ (1G/10G dual speed)
- 4 port 40GBASE-X QSFP+ (10G/40G dual speed)
- One RJ-45 RS-232c Serial port (control port)
- One 10/100/1000BASE-T out-of-band management port

Power Supply Support
- Summit 450W AC PSU
- Summit 450W DC PSU

Physical Specifications

Summit X670
- Height: 1.73 Inches/4.4 cm
- Width: 17.4 Inches/44.1 cm
- Depth: 19.25 Inches/48.9 cm
- Weight:
  - 16.0 lbs/7.3 kg (Summit X670V-48x: w/o PSU, VIM4-40G4X)
  - 15.3 lbs/7.0 kg (Summit X670-48x: w/o PSU)

VIM4-40G4X
- Height: 1.6 Inches/4.1 cm
- Width: 4.1 Inches/10.3 cm
- Depth: 6.5 Inches/16.6 cm
- Weight: 0.99 lbs/0.45 kg

Summit X670 Fan Module
- Height: 1.65 Inches/4.2 cm
- Width: 1.65 Inches/4.2 cm
- Depth: 3.98 Inches/10.1 cm
- Weight: 0.357 lbs/0.162 kg

Operating Specifications
- Operating Temperature Range: 0° C to 45° C (32° F to 113° F)
- Operating Humidity: 10% to 95% relative humidity, non-condensing
- Operating Altitude: 0-3,000 meters (9,850 feet)
- Operational Shock (Half Sine): 30 m/s2 (3 g), 11ms, 60 Shocks
- Operational Random Vibration: 3-500 MHz @ 1.5g rms

Storage & Transportation Conditions (Packaged)
- Transportation Temperature: -40° C to 70° C (-40° F to 158° F)
- Storage and Transportation Humidity: 10% to 95% RH, non-condensing
- Packaged Shock (Half Sine): 180 m/s2 (18 g), 6ms, 600 shocks
- Packaged Sine Vibration: 5-62 Hz @ Velocity 5mm/s, 62-500 Hz @ 0.2G
- Packaged Random Vibration: 5-20 Hz @ 1.0 ASD w/-3dB/oct. from 20-200 Hz
- 14 drops min on sides & corners @ 42" (<15 kg box)

Acoustic Noise
- Summit X670-48x (FB): 54.3 dB(A) – 69.6dB(A)
- Summit X670V-48x (FB): 56.6 dB(A) – 68.8dB(A)

Power
Measured power consumption with direct attach passive copper cables.

	PSU Type	100% Traffic	30% Traffic
Summit X670-48x	AC	107W	99W
	DC	101W	93W
Summit X670V-48x	AC	170W	162W
	DC	159W	150W
Summit X670V-48x with VIM4-40G4X	AC	199W	190W
	DC	190W	181W

Technical Specifications

Summit 450W AC PSU

Physical Specifications

- Height: 1.57 inches (4.0 cm)
- Width: 3.07 inches (7.8 cm)
- Depth: 13.31 Inches (33.8 cm)
- Weight 3.64 lb (1.65 kg)

Power Specifications

- Voltage input range 90 to 264 V
- Nominal input ratings 100 to 240 V, 50 to 60 Hz, 8 A
- Nominal input current at full loads
   – 12 A @ 90 V (low-line)
   – 5 A @ 230 V (high-line)
- Line frequency range 47 to 63 Hz
- Maximum inrush current 15 A
- Output 12 V, 37 A max, 450 Watts 3.3 V, 3 A max, 9.9 Watts
- Maximum continuous DC output shall not exceed 450 Watts
- Power supply input socket IEC 320 C14
- Power cord input plug IEC 320 C13
- Power supply cord gauge 18 AWG (0.75 mm2) up to 6 feet or 2 meters or 16 AWG (1.0 mm2) over 6 feet
- Efficiency 84% typical at full load, high line

Summit 450W DC PSU

Physical Specifications

- Height: 1.57 inches (4.0 cm)
- Width: 3.07 inches (7.8 cm)
- Depth: 13.31 Inches (33.8 cm)
- Weight 2.58 lb (1.17 kg)

Power Specifications

- Nominal Input -48 to -60 VDC, 24 A
- DC Voltage Input Range -35 to -75 V
- Inrush Current 21A peak
- Minimum wire size 14 AWG (1.5 mm2) copper stranded
- DC Output 12 V , 37 A/3.3 V, 3 A
- DC Output Power (W) 450 W

Power: Summit X670V-48x

[AC PSU]

- Nominal Input Ratings: 100 – 240V, 50/60Hz, 3.75A
- Input Current: 3.0A @ 100V~ (lowline) 1.2A @ 240V~ (highline)
- Heat Dissipation: 300W (1,024 BTU/h)
- Power Consumption: 300W (1,024 BTU/h)

[DC PSU]

- Nominal Input Ratings: 48 – 60V, 7.5A
- Input Current: 5.75A @ 48V~ (lowline) 4.6A @ 60V~ (highline)
- Heat Dissipation: 280W (956 BTH/h)
- Power Consumption: 280W (956 BTH/h)

Power: Summit X670V-48x with VIM4-40G4X

[AC PSU]

- Nominal Input Ratings: 100 – 240V~, 50/60Hz, 3.75A
- Input Current: 3.4A @ 100V~ (lowline) 1.4A @ 240V~ (highline)

- Heat Dissipation: 340W (1161 BTU/h)
- Power Consumption: 340W (1161 BTU/h)

[DC PSU]

- Nominal Input Ratings: 48 – 60V, 7.5A
- Input Current: 6.85A @ 48V~ (lowline) 5.45A @ 60V~ (highline)
- Heat Dissipation: 330W (1126 BTH/h)
- Power Consumption: 330W (1126 BTH/h)

Power: Summit X670-48x

[AC PSU]

- Nominal Input Ratings: 100 – 240V~, 50/60Hz, 2.5A
- Input Current: 2.25A @ 100V~ (lowline) 0.9A @ 240V~ (highline)
- Heat Dissipation: 225W (768 BTU/h)
- Power Consumption: 225W (768 BTU/h)

[DC PSU]

- Nominal Input Ratings: 48 – 60V, 5A
- Input Current: 4.25A @ 48V~ (lowline) 3.35A @ 60V~ (highline)
- Heat Dissipation: 210W (717 BTH/h)
- Power Consumption: 210W (717 BTH/h)

All Summit X670 Series Switches

Regulatory/Safety

North American Safety of ITE

- UL 60950-1 1st Ed., Listed Device (U.S.)
- CSA 22.2#60950-1-03 1st Ed. (Canada)
- Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
- CDRH Letter of Approval (U.S. FDA Approval)

European Safety of ITE

- EN60950-1:2006
- EN 60825-1+A2:2001 (Lasers Safety)
- TUV-R GS Mark by German Notified Body
- 2006/95/EC Low Voltage Directive

International Safety of ITE

- CB Report & Certificate per IEC 60950-1:2006 + National Differences
- AS/NZS 60950-1 (Australia/New Zealand)

EMI/EMC Standards

North America EMC for ITE

- FCC CFR 47 part 15 Class A (U.S.A.)
- ICES-003 Class A (Canada)

European EMC Standards

- EN 55022:2006 Class A
- EN 55024:A2-2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11
- EN 61000-3-2,8-2006 (Harmonics)
- EN 61000-3-3 1995+A2:2005 (Flicker)
- ETSI EN 300 386 v1.3.3, 2005-04 (EMC Telecommunications)
- 2004/108/EC EMC Directive

International EMC Certifications

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

Country Specific

- VCCI Class A (Japan Emissions)
- ACMA (C-Tick) (Australia Emissions)
- CCC Mark
- KCC Mark EMC Approval (Korea)

Telecom Standards

- EN/ETSI 300 386:2001 (EMC Telecommunications)
- EN/ETSI 300 019 (Environmental for Telecommunications)
- MEF9 and MEF14 certified for EPL, EVPL and ELAN
- NEBS Level 3 compliant to portions of GR-1089 Issue 4 & GR-63 Issue 3 as defined in SR3580 with exception to filter requirement

IEEE 802.3 Media Access Standards

- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3ba 40GBASE-X

Environmental Standards

- EN/ETSI 300 019-2-1 v2.1.2 (2000-09) – Class 1.2 Storage
- EN/ETSI 300 019-2-2 v2.1.2 (1999-09) – Class 2.3 Transportation
- EN/ETSI 300 019-2-3 v2.1.2 (2003-04) – Class 3.1e Operational
- EN/ETSI 300 753 (1997-10) – Acoustic Noise
- ASTM D3580 Random Vibration Unpackaged 1.5G

Warranty

- Ltd. 1-year on Hardware
- 90-days on Software
- For warranty details, visit www.extremenetworks.com/go/warranty

Ordering Information

Part Number	Description
17101	Summit X670V-48x-FB
17102*	Summit X670V-48x-BF
17103	Summit X670-48x-FB
17104*	Summit X670-48x-BF
17131	Summit X670 Series Core License
17133	Summit X670 MPLS Feature Pack
11011	Direct Attach Feature Pack
17122	VIM4-40G4X, 4 40GBASE-X QSFP+ ports module for Summit X670V
10917	450W AC Power Supply module for Summit switches, Front-to-Back airflow
10918	450W DC Power Supply module for Summit switches, Front-to-Back airflow
17111	Fan module for Summit X670 series switches, Front-to-Back airflow, spare
17112*	Fan module for Summit X670 series switches, Back-to-Front airflow, spare
10051	1000BASE-SX SFP, LC Connector
10052	1000BASE-LX SFP, LC Connector
10053	1000BASE-ZX SFP, Extra Long Distance SMF 70 km/21 dB Budget, LC Connector
10064	1000BASE-LX100 SFP, Extra Long Distance SMF 100 km/30dB Budget, LC Connector
10065	10/100/1000BASE-T SFP module, Category 5 cable 100m link, RJ45-connector
10301	10GBASE-SR SFP+, 850nm, LC Connector, transmission length of up to 300m on MMF
10302	10GBASE-LR SFP+, 1310nm, LC Connector, transmission length of up to 10km on SMF
10309	10GBASE-ER SFP+, 1550nm, LC Connector, transmission length of up to 40km on SMF
10303**	10 Gigabit Ethernet SFP+ module, 1310nm, legacy MMF 220m link, LC connector
10304	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 1m
10305	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 3m
10306	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 5m
10307	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 10m
10311*	40 Gigabit Ethernet QSFP+ passive copper cable assembly, 0.5m length
10312	40 Gigabit Ethernet QSFP+ passive copper cable assembly, 1m length
10313*	40 Gigabit Ethernet QSFP+ passive copper cable assembly, 3m length
10314*	40 Gigabit Ethernet QSFP+ active optical cable assembly, 5m length
10315	40 Gigabit Ethernet QSFP+ active optical cable assembly, 10m length
10316*	40 Gigabit Ethernet QSFP+ active optical cable assembly, 20m length
10318	40 Gigabit Ethernet QSFP+ active optical cable assembly, 100m length
10319	40 Gigabit Ethernet QSFP+ SR4 optical module, MPO connector, 100m link length

*Future availability.

**Not supported for Summit X670-48x (PN 17103, 17104)

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