

SwitchBlade[®] x908 Generation 2

High Capacity Stackable Layer 3+ Modular Switch

The Allied Telesis SBx908 GEN2 is the ideal solution for the modern enterprise network core. This stackable modular switch also has the capacity to support Smart City and IoT networks.

The SBx908 GEN2 delivers a future-proof network with superior flexibility, coupled with the ability to stack multiple units.

The high-capacity 2.6 Terabit fabric eliminates bottlenecks, effortlessly streams video and ensures all traffic in large networks is delivered reliably. Flexible hot-swappable expansion modules (XEMs) support 10 Gigabit, 40 Gigabit—and 100 Gigabit in the future—to easily expand the SBx908 GEN2 to meet network traffic demands, both now and well into the future.

Smart City and IoT networks

The SBx908 GEN2 has large switching and routing tables to support Smart City networks and the Internet of Things (IoT). It meets the increasing demand for the convergence of multiple services, like video surveillance, public Wi-Fi, information kiosks, environmental information and more.

Powerful network management

The Allied Telesis Autonomous Management Framework™ (AMF) easily meets the increasing management requirements of modern converged networks, by automating many everyday tasks such as configuration management. AMF has powerful centralized management features that allow an entire network to be easily managed, as one single virtual device.

Vista Manager™ EX is an intuitive visualization tool that complements the power of AMF. It allows a user to monitor the network and quickly identify issues before they become major problems.

Secure

The SBx908 GEN2 is packed with advanced security features to protect the network—from the edge to the core.

This includes powerful control over network traffic types and protection against attacks.

AMF ensures secure network management without the overhead of additional complexity.

Resilient

The convergence of network services in the enterprise has led to increasing demand for highly available networks with minimal downtime. Virtual Chassis Stacking (VCStack™), in conjunction with link aggregation, provides a network with no single point of failure and a resilient solution for high-availability applications. The SBx908 GEN2 can form a VCStack of up to four units for enhanced resiliency and simplified device management. Stacks can also be created over long distance fiber links, making it the perfect choice for distributed environments too.

Allied Telesis Ethernet Protection Switched Ring (EPSRing™)—and in the future, G.8032 ERPS—ensure that distributed network segments have high-speed, resilient access to online resources and applications.

Reliable

Designed with reliability in mind, the SBx908 GEN2 guarantees the continual delivery of essential services. Hot-swappable components such as XEMs, fans, and load-sharing Power Supply Units (PSUs) pair with near-hitless online stack reconfiguration, to ensure that maintenance doesn't affect network uptime.

Environmentally friendly

The SBx908 GEN2 supports Energy Efficient Ethernet (EEE), automatically reducing the power consumed by the switch whenever there is no traffic on a port, reducing operating costs.



AlliedWare Plus™
OPERATING SYSTEM

Key Features

- ▶ 2.6 Terabit fabric
- ▶ 40G fiber XEMs
- ▶ 10G fiber and copper XEMs
- ▶ Allied Telesis Autonomous Management Framework™ (AMF)
- ▶ Active Fiber Monitoring
- ▶ Scalable and flexible
- ▶ SDN-ready
- ▶ Large switching and routing tables
- ▶ VCStack two units using 40G ports
- ▶ VCStack over long distance

Coming Soon

- ▶ VCStack stacking for up to four units
- ▶ Support for 100G fiber expansion module (XEM2-1CQ)
- ▶ Stacking over 100G ports (XEM2-1CQ)
- ▶ OpenFlow v1.3
- ▶ G.8032 ERPS for resilient rings
- ▶ Energy Efficient Ethernet (EEE)

VCStack™

AMF™

EPSRing™

ACTIVE
Fiber Monitoring™

Key Features

VCStack™

- ▶ Create a VCStack of up to four units using the XEM2-4QS, for up to 320Gbps stacking bandwidth on each unit. Stacking links are connected in a ring so each device has dual connections to further improve resiliency. VCStack provides a highly available system where network resources are spread out across stacked units, reducing the impact if one of the units fails. Aggregating switch ports on different units across the stack provides excellent network resiliency.

VCStack LD

- ▶ Long-distance stacking allows a VCStack to be created over fiber links to span longer distances, perfect for a distributed network environment.

AMF™

- ▶ AMF is a sophisticated suite of management tools that provide a simplified approach to network management. Common tasks are automated or made so simple that the everyday running of a network can be achieved without the need for highly-trained, and expensive, network engineers. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.
- ▶ The SBx908 GEN2 can operate as the AMF network master, storing firmware and configuration backups for all other network nodes. The AMF master enables auto-provisioning and auto-upgrade by providing appropriate files to new network members.
- ▶ AMF Guestnode allows Allied Telesis wireless access points and further switching products, as well as third party devices such as IP phones and security cameras, to be part of an AMF network.

Large network tables

- ▶ High-capacity 2.6 Terabit fabric and 1,905Mpps packet forwarding provide powerful data transfer capability, supporting large campus networks as well as Smart City and IoT solutions. Large MAC and IP host tables are ready for the increasing number of connected devices found in modern enterprise and city-wide networks.

Virtual Routing and Forwarding (VRF Lite)

- ▶ VRF Lite provides Layer 3 network virtualization by dividing a single switch into multiple independent virtual routing domains. With independent routing domains, IP addresses can overlap without causing conflict, allowing multiple customers to have their own secure virtual network within the same physical infrastructure.

EPSRing™

- ▶ EPSRing allows several switches to form protected rings with 50ms failover—perfect for high performance at the core of Enterprise or Provider Access networks.
- ▶ SuperLoop Protection enables a link between two EPSR nodes to be in separate EPSR domains, improving redundancy and network fault resiliency.

G.8032 Ethernet Ring Protection

- ▶ G.8032 provides standards-based high-speed ring protection, that can be deployed stand-alone, or interoperate with Allied Telesis EPSR.
- ▶ Ethernet Connectivity Fault Monitoring (CFM) proactively monitors links and VLANs, and provides alerts when a fault is detected.

sFlow

- ▶ sFlow is an industry standard technology for monitoring high speed switched networks. It provides complete visibility into network use, enabling performance optimization, usage accounting/billing, and defence against security threats. Sampled packets sent to a collector ensure it always has a real-time view of network traffic.

Quality of Service (QoS)

- ▶ Comprehensive low-latency wire-speed QoS provides flow-based traffic management with full classification, prioritization, traffic shaping and min/max bandwidth profiles. Enjoy boosted network performance and guaranteed delivery of business-critical Ethernet services and applications. Time-critical services like voice and video applications take precedence over non-essential services like file downloads, maintaining responsiveness of Enterprise applications.

Premium Software License

- ▶ By default, the SBx908 GEN2 offers a comprehensive Layer 2 and standard Layer 3 feature set that includes static routing and IPv6 management features. The feature set can easily be elevated to full Layer 3 by applying the premium software license. This adds dynamic routing protocols and Layer 3 multicasting capabilities.

Optical DDM

- ▶ Most modern optical SFP/SFP+/QSFP+ transceivers support Digital Diagnostics Monitoring (DDM) functions according to the specification SFF-8472. This enables real time monitoring of the various parameters of the transceiver, such as optical output power, temperature, laser bias current and transceiver supply voltage. Easy access to this information simplifies diagnosing problems with optical modules and fiber connections.

Active Fiber Monitoring

- ▶ Active Fiber Monitoring prevents eavesdropping on fiber communications by monitoring received optical power. If an intrusion is detected, the link can be automatically shut down, or an operator alert can be sent.

VLAN ACLs

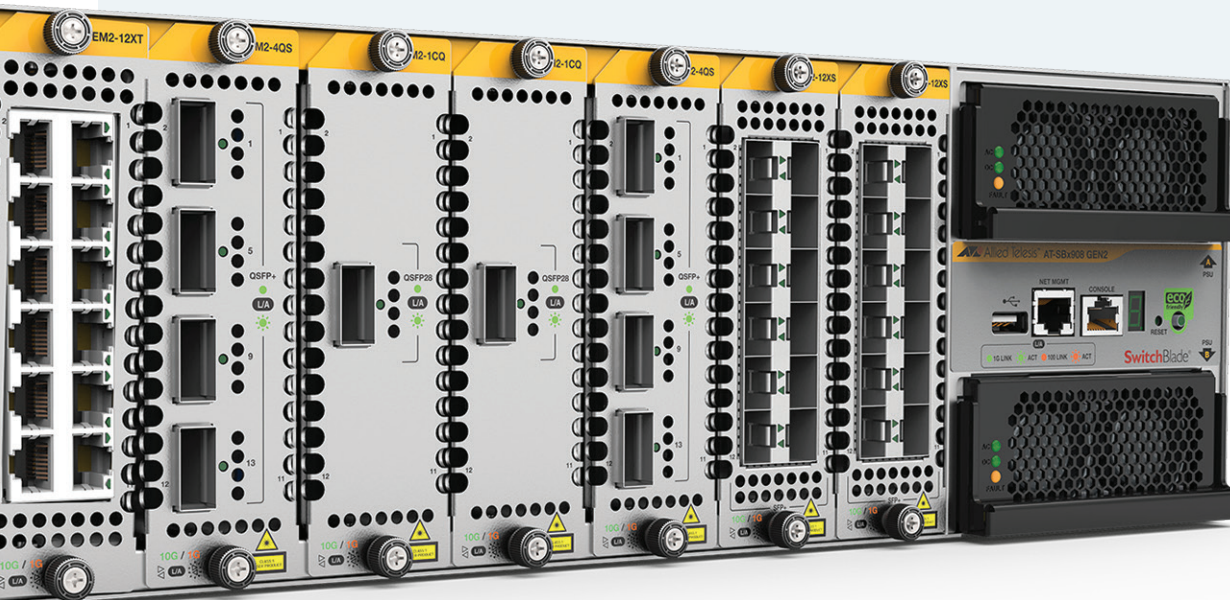
- ▶ Simplify access and traffic control across entire segments of the network. Access Control Lists (ACLs) can be applied to a Virtual LAN (VLAN) as well as a specific port.

TACACS+ Command Authorization

- ▶ Centralize control of which commands may be issued by a specific user of an AlliedWare Plus device. TACACS+ command authorization complements authentication and accounting services for a complete AAA solution.

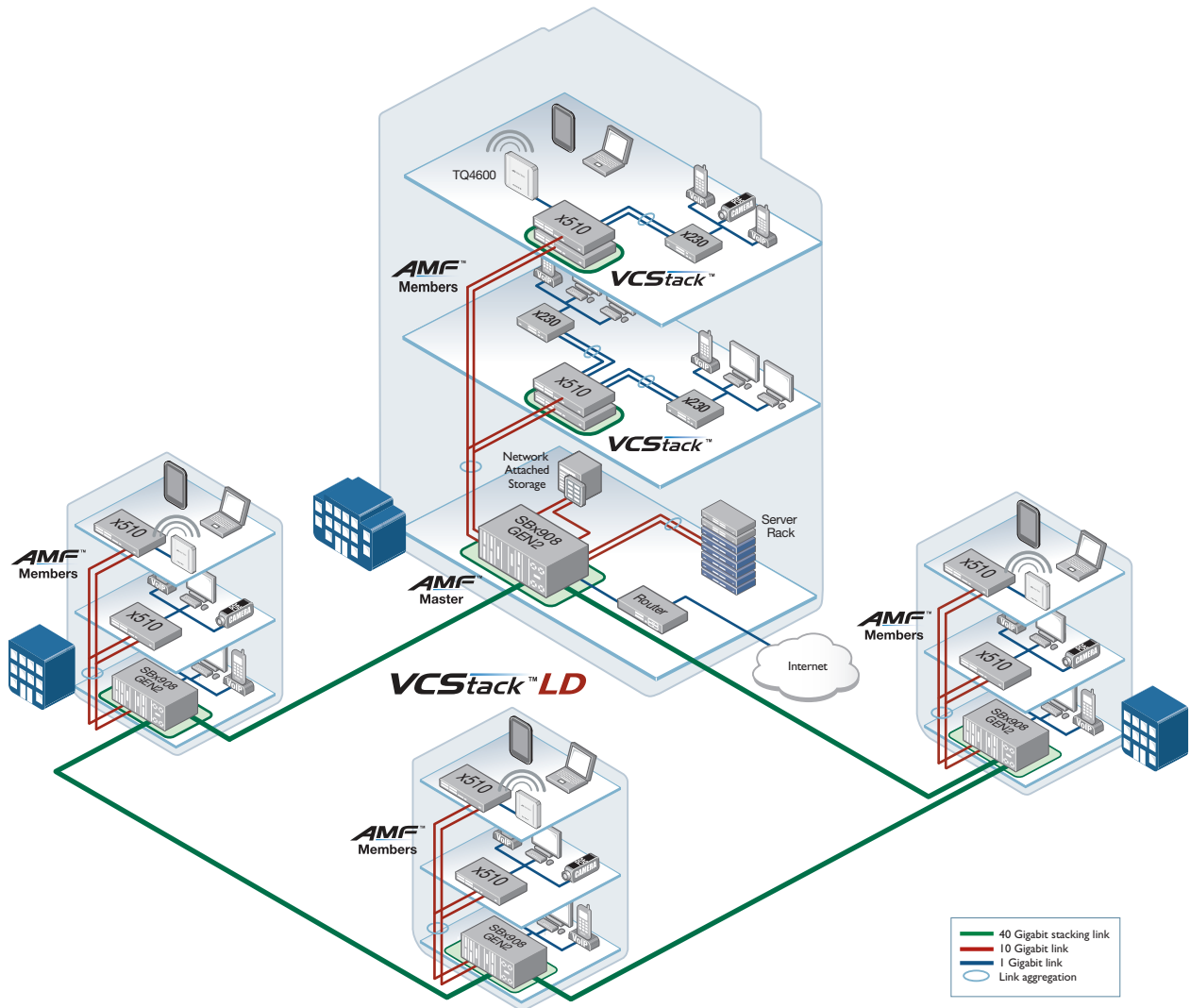
UniDirectional Link Detection

- ▶ UniDirectional Link Detection (UDLD) is useful for monitoring fiber-optic links between two switches that use two single-direction fibers to transmit and receive packets. UDLD prevents traffic from being sent across a bad link by blocking the ports at both ends of the link in the event that either the individual transmitter or receiver for that connection fails.



Key Solutions

Distributed network core



Today's large enterprises demand ready access to online resources and applications, and require a high-performing network that can seamlessly carry multiple converged services. This campus solution uses the SwitchBlade x908 GEN2 and long-distance Virtual Chassis Stacking (Vcstack LD)—ideal for a distributed network core that provides high availability, increased capacity and ease of management.

Using Vcstack at the core of the network allows multiple switches to appear as a single virtual chassis, simplifying management. In normal operation, the full bandwidth of the network is used, ensuring always-available online services. Seamless wireless access, and the convergence

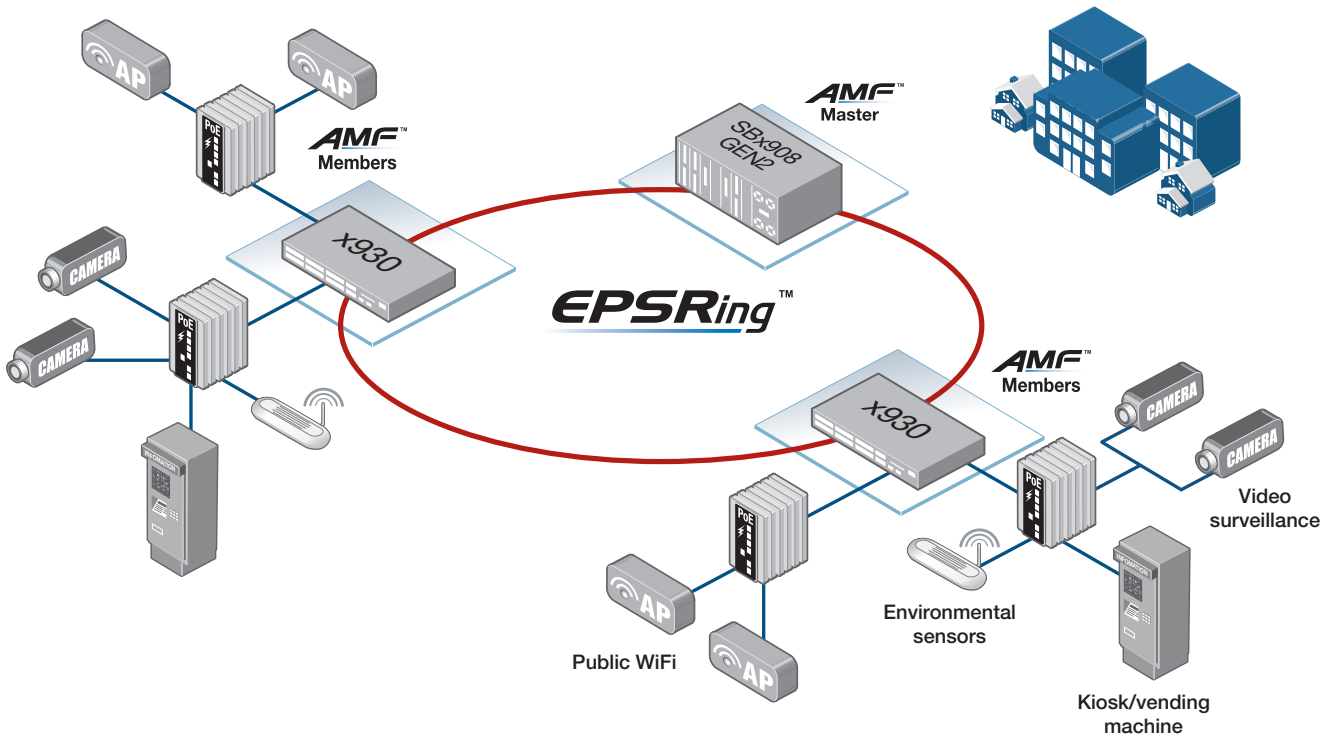
of business data, voice, and video surveillance traffic on the network, are easily supported with this powerful solution.

AMF allows the entire network to be unified for ease of management. The SwitchBlade x908 GEN2 acts as the AMF Master, automatically backing up the entire network, and enabling plug-and-play networking with zero-touch expansion and recovery.

The SwitchBlade x908 GEN2 delivers a protocol-less and Active/Active campus backbone solution, with high performance and flexible scalability.

Key Solutions

Smart City network



All over the world, Smart Cities are looking to increase information availability, security and transport efficiency, whilst reducing pollution and waste. Access to real-time data from a variety of sources gives cities the ability to enhance the quality of their urban services, and increase citizen safety.

The SwitchBlade x908 GEN2 is the ideal network core solution for Smart City and IoT networks. Large switching and routing tables support the many devices that make up modern metropolitan networks, including video surveillance cameras, environmental sensors, information kiosks, public Wi-Fi and many more.

Allied Telesis EPSR creates a high-speed resilient ring that can utilize 10G, 40G or 100G, and provides extremely fast failover between nodes. EPSR enables rings to recover within as little as 50ms, preventing a node or link failure from impacting the delivery of converged data and video traffic.

AMF automates many day-to-day tasks, backs up the entire network, and provides the ability to configure many or all devices city-wide—with a single command.

The SwitchBlade x908 GEN2 and Allied Telesis advanced features support network managers in delivering leading Smart City services.

Specifications

Performance

- ▶ 2.6 Terabit Switching Fabric
- ▶ 1,905Mpps forwarding rate
- ▶ Extensive wirespeed traffic classification for ACLs and QoS
- ▶ Supports 10KB Jumbo frame size for data center and server aggregation applications
- ▶ Wirespeed multicasting
- ▶ 96K MAC address entries
- ▶ Up to 96K host entries
- ▶ Up to 4K multicast entries
- ▶ 4K VLANs
- ▶ 4GB DDR SDRAM
- ▶ Separate packet buffer memory
- ▶ 4GB Flash Memory

Reliability

- ▶ Modular AlliedWare Plus operating system
- ▶ Dual hot swappable PSUs with 1 + 1 redundancy
- ▶ Dual feed support: a separate power circuit can feed each power supply providing extra reliability
- ▶ Hot-swappable expansion modules (XEMs)
- ▶ Hot-swappable fan modules
- ▶ Full environmental monitoring of PSUs, fans, temperature and internal voltages, with SNMP traps to alert network managers in case of any failure

Expandability

- ▶ Eight high speed expansion bays supporting a choice of modules for port flexibility and application versatility
- ▶ Versatile licensing options for additional features

Power Characteristics

- ▶ AC Voltage: 100 to 240V (+/-10% auto ranging)
- ▶ Frequency: 47 to 63Hz
- ▶ DC Voltage: 36 to 72V

Diagnostic Tools

- ▶ Active Fiber Monitoring detects tampering on optical links
- ▶ Built-In Self Test (BIST)
- ▶ Cable fault locator (TDR)
- ▶ Find-me device locator
- ▶ Hardware health monitoring
- ▶ Automatic link flap detection and port shutdown
- ▶ Optical Digital Diagnostic Monitoring (DDM)
- ▶ Ping polling for IPv4 and IPv6
- ▶ Port mirroring
- ▶ TraceRoute for IPv4 and IPv6
- ▶ Uni-Directional Link Detection (UDLD)

IPv4 Features

- ▶ Black hole routing
- ▶ Directed broadcast forwarding
- ▶ DNS relay
- ▶ Equal Cost Multi Path (ECMP) routing
- ▶ Policy-based routing
- ▶ Route maps
- ▶ Route redistribution (OSPF, BGP, RIP)
- ▶ Static unicast and multicast routing for IPv4
- ▶ UDP broadcast helper (IP helper)
- ▶ Up to 64 Virtual Routing and Forwarding (VRF lite) domains (with license)

IPv6 Features

- ▶ DHCPv6 client and relay
- ▶ DNSv6 client and relay
- ▶ IPv4 and IPv6 dual stack
- ▶ IPv6 hardware ACLs
- ▶ Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- ▶ NTPv6 client and server
- ▶ Static unicast and multicast routing for IPv6
- ▶ Log to IPv6 hosts with Syslog v6

Management

- ▶ 7-segment LED provides at-a-glance status and fault information
- ▶ Allied Telesis Management Framework (AMF) enables powerful centralized management and zero-touch device installation and recovery
- ▶ Try AMF for free with the built-in Starter license
- ▶ Console management port on the front panel for ease of access
- ▶ Eco-friendly mode allows ports and LEDs to be disabled to save power
- ▶ Industry-standard CLI with context-sensitive help
- ▶ Out-of-band 10/100/1000T Ethernet management port
- ▶ Powerful CLI scripting engine
- ▶ Comprehensive SNMP MIB support for standards-based device management
- ▶ Built-in text editor
- ▶ Event-based triggers allow user-defined scripts to be executed upon selected system events
- ▶ USB interface allows software release files, configurations and other files to be stored for backup and distribution to other devices

Quality of Service

- ▶ 8 priority queues with a hierarchy of high priority queues for real time traffic, and mixed scheduling, for each switch port
- ▶ Bandwidth limiting (virtual bandwidth) Limit bandwidth per port or per traffic class down to 64kbps
- ▶ Wirespeed traffic classification with low latency essential for VoIP and real-time streaming media applications
- ▶ IPv6 QoS support and IPv6-aware storm protection
- ▶ Policy-based QoS based on VLAN, port, MAC and general packet classifiers
- ▶ Policy-based storm protection
- ▶ Extensive remarking capabilities and taildrop for queue congestion control
- ▶ Queue scheduling options for strict priority, weighted round robin or mixed scheduling
- ▶ IP precedence and DiffServ marking based on layer 2, 3 and 4 headers

Resiliency Features

- ▶ 40G Ethernet ports can be configured as stacking ports
- ▶ Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- ▶ Dynamic link failover (host attach)
- ▶ Ethernet Protection Switched Rings (EPSR) with SuperLoop Protection (SLP) and EPSR enhanced recovery for extra resiliency

- ▶ Long-Distance VcStack over fiber with 40G QSFP+ modules (VcStack LD)
- ▶ Loop protection: loop detection and thrash limiting
- ▶ PVST+ compatibility mode
- ▶ STP root guard
- ▶ VcStack fast failover minimizes network disruption

Security

- ▶ Access Control Lists (ACLs) based on layer 3 and 4 headers
- ▶ Configurable ACLs for management traffic
- ▶ Auth fail and guest VLANs
- ▶ Authentication, Authorisation and Accounting (AAA)
- ▶ Bootloader can be password protected for device security
- ▶ BPDU protection
- ▶ DHCP snooping, IP source guard and Dynamic ARP Inspection (DAI)
- ▶ DoS attack blocking and virus throttling
- ▶ Dynamic VLAN assignment
- ▶ MAC address filtering and MAC address lock-down
- ▶ Network Access and Control (NAC) features manage endpoint security
- ▶ Port-based learn limits (intrusion detection)
- ▶ Private VLANs provide security and port isolation for multiple customers using the same VLAN
- ▶ Secure Copy (SCP)
- ▶ Secure File Transfer Protocol (SFTP) client
- ▶ Strong password security and encryption
- ▶ TACACS+ command authorisation
- ▶ Tri-authentication: MAC-based, web-based and IEEE 802.1x
- ▶ Web-based authentication
- ▶ RADIUS group selection per VLAN or port

Environmental Specifications

- ▶ Operating temperature range: 0°C to 50°C (32°F to 122°F) Derated by 1°C per 305 meters (1,000 ft)
- ▶ Storage temperature range: -25°C to 70°C (-13°F to 158°F)
- ▶ Operating relative humidity range: 5% to 90% non-condensing
- ▶ Storage relative humidity range: 5% to 95% non-condensing
- ▶ Operating altitude: 3,050 meters maximum (10,000 ft)

Electrical Approvals and Compliances

- ▶ EMC: EN55032 class A, FCC class A, VCCI class A
- ▶ Immunity: EN55024, EN61000-3-levels 2 (Harmonics), and 3 (Flicker)

Safety

- ▶ Standards: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950
- ▶ Certification: UL, cUL, TUV

Restrictions on Hazardous Substances (RoHS) Compliance

- ▶ EU RoHS compliant
- ▶ China RoHS compliant

Country of Origin

- ▶ Singapore

SwitchBlade x908 GEN2 | High Capacity Stackable Layer 3+ Modular Switch

Physical Specifications

| PRODUCT | WIDTH | DEPTH | HEIGHT | MOUNTING | WEIGHT | |
|-----------------------|-------------------|-------------------|------------------|----------------|---------------------|--------------------|
| | | | | | UNPACKAGED | PACKAGED |
| SwitchBlade x908 GEN2 | 440 mm (17.32 in) | 480 mm (18.89 in) | 132 mm (5.19 in) | Rack-mount 3RU | 14.32 kg (31.57 lb) | 16.7 kg (36.81 lb) |
| SBxPWRSYS2 | 84 mm (3.30 in) | 170 mm (6.69 in) | 40 mm (1.57 in) | N/A | 1.32 kg (2.91 lb) | 1.9 kg (4.18 lb) |
| XEM2-12XS | 109 mm (4.29 in) | 170 mm (6.69 in) | 40 mm (1.57 in) | N/A | 0.82 kg (1.80 lb) | 1.4 kg (3.08 lb) |
| XEM2-12XT | 109 mm (4.29 in) | 170 mm (6.69 in) | 40 mm (1.57 in) | N/A | 0.82 kg (1.80 lb) | 1.4 kg (3.08 lb) |
| XEM2-4QS | 109 mm (4.29 in) | 170 mm (6.69 in) | 40 mm (1.57 in) | N/A | 0.82 kg (1.80 lb) | 1.4 kg (3.08 lb) |
| XEM2-1CQ | 109 mm (4.29 in) | 170 mm (6.69 in) | 40 mm (1.57 in) | N/A | 0.82 kg (1.80 lb) | 1.4 kg (3.08 lb) |

Latency (microseconds)

| PRODUCT | Latency |
|--------------------|---------|
| XEM2-12XT (1G/10G) | 2.4 µs |
| XEM2-12XS (1G/10G) | 1.9 µs |
| XEM2-4QS (40G) | 0.7 µs |

Message Authentication:

- ▶ HMAC (SHA-1, SHA-2(224, 256, 384, 512))

Random Number Generation:

- ▶ DRBG (Hash, HMAC and Counter)

Non FIPS Approved Algorithms

RNG (AES128/192/256)
DES
MD5

RFC 4291 IPv6 addressing architecture
RFC 4443 Internet Control Message Protocol (ICMPv6)
RFC 4861 Neighbor discovery for IPv6
RFC 4862 IPv6 Stateless Address Auto-Configuration (SLAAC)
RFC 5014 IPv6 socket API for source address selection
RFC 5095 Deprecation of type 0 routing headers in IPv6
RFC 5175 IPv6 Router Advertisement (RA) flags option
RFC 6105 IPv6 Router Advertisement (RA) guard

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.7-2

Authentication

RFC 1321 MD5 Message-Digest algorithm
RFC 1828 IP authentication using keyed MD5

Border Gateway Protocol (BGP)

BGP dynamic capability

BGP outbound route filtering

RFC 1772 Application of the Border Gateway Protocol (BGP) in the Internet
RFC 1997 BGP communities attribute
RFC 2385 Protection of BGP sessions via the TCP MD5 signature option
RFC 2439 BGP route flap damping
RFC 2545 Use of BGP-4 multiprotocol extensions for IPv6 inter-domain routing
RFC 2858 Multiprotocol extensions for BGP-4
RFC 2918 Route refresh capability for BGP-4
RFC 3392 Capabilities advertisement with BGP-4
RFC 3882 Configuring BGP to block Denial-of-Service (DoS) attacks
RFC 4271 Border Gateway Protocol 4 (BGP-4)
RFC 4360 BGP extended communities
RFC 4456 BGP route reflection - an alternative to full mesh iBGP
RFC 4724 BGP graceful restart
RFC 4893 BGP support for four-octet AS number space
RFC 5065 Autonomous system confederations for BGP

Cryptographic Algorithms

FIPS Approved Algorithms

Encryption (Block Ciphers):

- ▶ AES (ECB, CBC, CFB and OFB Modes)
- ▶ 3DES (ECB, CBC, CFB and OFB Modes)

Block Cipher Modes:

- ▶ CCM
- ▶ CMAC
- ▶ GCM
- ▶ XTS

Digital Signatures & Asymmetric Key Generation:

- ▶ DSA
 - ▶ ECDSA
 - ▶ RSA
- Secure Hashing:
- ▶ SHA-1
 - ▶ SHA-2 (SHA-224, SHA-256, SHA-384, SHA-512)

Ethernet Standards

IEEE 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3an10GBASE-T
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3ba40GBASE-X
IEEE 802.3x Flow control - full-duplex operation
IEEE 802.3z 1000BASE-X

IPv4 Features

RFC 768 User Datagram Protocol (UDP)
RFC 791 Internet Protocol (IP)
RFC 792 Internet Control Message Protocol (ICMP)
RFC 793 Transmission Control Protocol (TCP)
RFC 826 Address Resolution Protocol (ARP)
RFC 894 Standard for the transmission of IP datagrams over Ethernet networks
RFC 919 Broadcasting Internet datagrams
RFC 922 Broadcasting Internet datagrams in the presence of subnets
RFC 932 Subnetwork addressing scheme
RFC 950 Internet standard subnetting procedure
RFC 951 Bootstrap Protocol (BootP)
RFC 1027 Proxy ARP
RFC 1035 DNS client
RFC 1042 Standard for the transmission of IP datagrams over IEEE 802 networks
RFC 1071 Computing the Internet checksum
RFC 1122 Internet host requirements
RFC 1191 Path MTU discovery
RFC 1256 ICMP router discovery messages
RFC 1518 An architecture for IP address allocation with CIDR
RFC 1519 Classless Inter-Domain Routing (CIDR)
RFC 1542 Clarifications and extensions for BootP
RFC 1591 Domain Name System (DNS)
RFC 1812 Requirements for IPv4 routers
RFC 1918 IP addressing
RFC 2581 TCP congestion control

IPv6 Features

RFC 1981 Path MTU discovery for IPv6
RFC 2460 IPv6 specification
RFC 2464 Transmission of IPv6 packets over Ethernet networks
RFC 3484 Default address selection for IPv6
RFC 3587 IPv6 global unicast address format
RFC 3596 DNS extensions to support IPv6
RFC 4007 IPv6 scoped address architecture
RFC 4193 Unique local IPv6 unicast addresses
RFC 4213 Transition mechanisms for IPv6 hosts and routers

Management

AMF MIB and SNMP traps

AT Enterprise MIB

Optical DDM MIB

SNMPv1, v2c and v3

IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

RFC 1155 Structure and identification of management information for TCP/IP-based Internets

RFC 1157 Simple Network Management Protocol (SNMP)

RFC 1212 Concise MIB definitions

RFC 1213 MIB for network management of TCP/IP-based Internets: MIB-II

RFC 1215 Convention for defining traps for use with the SNMP

RFC 1227 SNMP MUX protocol and MIB

RFC 1239 Standard MIB

RFC 1724 RIPv2 MIB extension

RFC 2578 Structure of Management Information v2 (SMIv2)

RFC 2579 Textual conventions for SMIv2

RFC 2580 Conformance statements for SMIv2

RFC 2674 Definitions of managed objects for bridges with traffic classes, multicast filtering and VLAN extensions

RFC 2741 Agent extensibility (AgentX) protocol

RFC 2787 Definitions of managed objects for VRRP

RFC 2819 RMON MIB (groups 1,2,3 and 9)

RFC 2863 Interfaces group MIB

RFC 3164 Syslog protocol

RFC 3176 sFlow: a method for monitoring traffic in switched and routed networks

RFC 3411 An architecture for describing SNMP management frameworks

RFC 3412 Message processing and dispatching for the SNMP

RFC 3413 SNMP applications

RFC 3414 User-based Security Model (USM) for SNMPv3

RFC 3415 View-based Access Control Model (VACM) for SNMP

RFC 3416 Version 2 of the protocol operations for the SNMP

RFC 3417 Transport mappings for the SNMP

RFC 3418 MIB for SNMP

RFC 3621 Power over Ethernet (PoE) MIB

RFC 3635 Definitions of managed objects for the Ethernet-like interface types

RFC 3636 IEEE 802.3 MAU MIB

RFC 4022 MIB for the Transmission Control Protocol (TCP)

RFC 4113 MIB for the User Datagram Protocol (UDP)

RFC 4188 Definitions of managed objects for bridges

RFC 4292 IP forwarding table MIB

RFC 4293 MIB for the Internet Protocol (IP)

RFC 4318 Definitions of managed objects for bridges with RSTP

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- RFC 4560 Definitions of managed objects for remote ping, traceroute and lookup operations
- RFC 6527 Definitions of managed objects for VRRPv3

Multicast Support

- Bootstrap Router (BSR) mechanism for PIM-SM
- IGMP query solicitation
- IGMP snooping (IGMPv1, v2 and v3)
- IGMP snooping fast-leave
- IGMP/MLD multicast forwarding (IGMP/MLD proxy)
- MLD snooping (MLDv1 and v2)
- PIM for IPv6
- PIM SSM for IPv6
- RFC 1112 Host extensions for IP multicasting (IGMPv1)
- RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
- RFC 2710 Multicast Listener Discovery (MLD) for IPv6
- RFC 2715 Interoperability rules for multicast routing protocols
- RFC 3306 Unicast-prefix-based IPv6 multicast addresses
- RFC 3376 IGMPv3
- RFC 3810 Multicast Listener Discovery v2 (MLDv2) for IPv6
- RFC 3956 Embedding the Rendezvous Point (RP) address in an IPv6 multicast address
- RFC 3973 PIM Dense Mode (DM)
- RFC 4541 IGMP and MLD snooping switches
- RFC 4601 Protocol Independent Multicast - Sparse Mode (PIM-SM): protocol specification (revised)
- RFC 4604 Using IGMPv3 and MLDv2 for source-specific multicast
- RFC 4607 Source-specific multicast for IP

Open Shortest Path First (OSPF)

- OSPF link-local signaling
- OSPF MD5 authentication
- Out-of-band LSDB resync
- RFC 1245 OSPF protocol analysis
- RFC 1246 Experience with the OSPF protocol
- RFC 1370 Applicability statement for OSPF
- RFC 1765 OSPF database overflow
- RFC 2328 OSPFv2
- RFC 2370 OSPF opaque LSA option
- RFC 2740 OSPFv3 for IPv6
- RFC 3101 OSPF Not-So-Stubby Area (NSSA) option
- RFC 3509 Alternative implementations of OSPF area border routers
- RFC 3623 Graceful OSPF restart
- RFC 3630 Traffic engineering extensions to OSPF
- RFC 4552 Authentication/confidentiality for OSPFv3
- RFC 5329 Traffic engineering extensions to OSPFv3
- RFC 5340 OSPFv3 for IPv6 (partial support)

Quality of Service (QoS)

- IEEE 802.1p Priority tagging
- RFC 2211 Specification of the controlled-load network element service
- RFC 2474 DiffServ precedence for eight queues/port
- RFC 2475 DiffServ architecture
- RFC 2597 DiffServ Assured Forwarding (AF)
- RFC 2697 A single-rate three-color marker
- RFC 2698 A two-rate three-color marker
- RFC 3246 DiffServ Expedited Forwarding (EF)

Resiliency Features

- IEEE 802.1AX Link aggregation (static and LACP)
- IEEE 802.1D MAC bridges
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad Static and dynamic link aggregation
- RFC 5798 Virtual Router Redundancy Protocol version 3 (VRRPv3) for IPv4 and IPv6

Routing Information Protocol (RIP)

- RFC 1058 Routing Information Protocol (RIP)
- RFC 2080 RIPng for IPv6
- RFC 2081 RIPng protocol applicability statement
- RFC 2082 RIP-2 MD5 authentication
- RFC 2453 RIPv2

Security Features

- SSH remote login
- SSLv2 and SSLv3
- TACACS+ accounting and authentication
- IEEE 802.1X authentication protocols (TLS, TTLS, PEAP and MD5)
- IEEE 802.1X multi-suplicant authentication
- IEEE 802.1X port-based network access control
- RFC 2818 HTTP over TLS ("HTTPS")
- RFC 2865 RADIUS authentication
- RFC 2866 RADIUS accounting
- RFC 2868 RADIUS attributes for tunnel protocol support
- RFC 3280 Internet X.509 PKI Certificate and Certificate Revocation List (CRL) profile
- RFC 3546 Transport Layer Security (TLS) extensions
- RFC 3579 RADIUS support for Extensible Authentication Protocol (EAP)
- RFC 3580 IEEE 802.1x RADIUS usage guidelines
- RFC 3748 PPP Extensible Authentication Protocol (EAP)
- RFC 4251 Secure Shell (SSHv2) protocol architecture
- RFC 4252 Secure Shell (SSHv2) authentication protocol
- RFC 4253 Secure Shell (SSHv2) transport layer protocol
- RFC 4254 Secure Shell (SSHv2) connection protocol
- RFC 5246 TLS v1.2

Services

- RFC 854 Telnet protocol specification
- RFC 855 Telnet option specifications
- RFC 857 Telnet echo option
- RFC 858 Telnet suppress go ahead option
- RFC 1091 Telnet terminal-type option

- RFC 1350 Trivial File Transfer Protocol (TFTP)
- RFC 1985 SMTP service extension
- RFC 2049 MIME
- RFC 2131 DHCPv4 (server, relay and client)
- RFC 2132 DHCP options and BootP vendor extensions
- RFC 2616 Hypertext Transfer Protocol - HTTP/1.1
- RFC 2821 Simple Mail Transfer Protocol (SMTP)
- RFC 2822 Internet message format
- RFC 3046 DHCP relay agent information option (DHCP option 82)
- RFC 3315 DHCPv6 (server, relay and client)
- RFC 3633 IPv6 prefix options for DHCPv6
- RFC 3646 DNS configuration options for DHCPv6
- RFC 3993 Subscriber-ID suboption for DHCP relay agent option
- RFC 4330 Simple Network Time Protocol (SNTP) version 4
- RFC 5905 Network Time Protocol (NTP) version 4

VLAN Support

- Generic VLAN Registration Protocol (GVRP)
- IEEE 802.1ad Provider bridges (VLAN stacking, Q-in-Q)
- IEEE 802.1Q Virtual LAN (VLAN) bridges
- IEEE 802.1v VLAN classification by protocol and port
- IEEE 802.3ac VLAN tagging

Voice over IP (VoIP)

- LLDP-MED ANSI/TIA-1057
- Voice VLAN

Feature Licenses

| NAME | DESCRIPTION | INCLUDES | STACK LICENSING |
|--|--|--|--------------------------------|
| AT-FL-GEN2-01 | SwitchBlade x908 GEN2 Advanced Layer 3 license | <ul style="list-style-type: none"> ▶ OSPF¹ (16,000 routes) ▶ BGP4¹ (5,000 routes) ▶ PIMv4-SM, DM and SSM (2,000 entries) ▶ VLAN double tagging (Q-in-Q) ▶ RIPng (5,000 routes) ▶ OSPFv3 (8,000 routes) ▶ BGP4+ (5,000 routes) ▶ MLDv1 and v2 ▶ PIMv6-SM and SSM (1,000 entries) ▶ VRF lite (64 domains) ▶ RADIUS Full ▶ UDLD | ▶ One license per stack member |
| AT-FL-GEN2-AM40-1YR | AMF Master license | ▶ AMF Master 40 nodes for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AM40-5YR | AMF Master license | ▶ AMF Master 40 nodes for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AM80-1YR | AMF Master license | ▶ AMF Master 80 nodes for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AM80-5YR | AMF Master license | ▶ AMF Master 80 nodes for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AM120-1YR | AMF Master license | ▶ AMF Master 120 nodes for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AM120-5YR | AMF Master license | ▶ AMF Master 120 nodes for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AM300-1YR | AMF Master license | ▶ AMF Master 300 nodes for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AM300-5YR | AMF Master license | ▶ AMF Master 300 nodes for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AC10-1YR² | AMF Controller 10 | ▶ AMF Controller for 10 areas for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AC10-5YR² | AMF Controller 10 | ▶ AMF Controller for 10 areas for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AC30-1YR² | AMF Controller 30 | ▶ AMF Controller for 30 areas for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AC30-5YR² | AMF Controller 30 | ▶ AMF Controller for 30 areas for 5 years | ▶ One license per stack |
| AT-FL-GEN2-AC60-1YR² | AMF Controller 60 | ▶ AMF Controller for 60 areas for 1 year | ▶ One license per stack |
| AT-FL-GEN2-AC60-5YR² | AMF Controller 60 | ▶ AMF Controller for 60 areas for 5 years | ▶ One license per stack |

¹ 64 OSPF and BGP routes included in base license

² Only a single license is required per chassis. This is automatically synchronized to the second control card

SwitchBlade x908 GEN2 | High Capacity Stackable Layer 3+ Modular Switch

Ordering Information

AT-SBx908 GEN2

High capacity Layer 3+ modular switch chassis with 8 x high speed expansion bays

AT-SBxPWRSYS2-xx³

Hot-swappable load-sharing power supply⁴

AT-SBxPWRSYS1-80

1200W DC system power supply

AT-FAN08

Hot-swappable fan module

AT-XEM2-12XS

12 x 1G/10G SFP+ ports

AT-XEM2-12XT

12 x 1G/10G RJ45 ports

AT-XEM2-4QS

4 x 40G QSFP+ ports

AT-XEM2-1CQ⁵

1 x 100G QSFP28 port

³Where xx = 10 for AC power supply with US power cord
20 for AC power supply with no power cord
30 for AC power supply with UK power cord
40 for AC power supply with AU power cord
50 for AC power supply with EU power cord

⁴Note that fans are included but NO power supplies ship with the base chassis, they must be ordered separately.

⁵Available 2018

⁶Using Cat 6a/7 cabling

Accessories

SFP Modules

AT-SPSX

1000SX GbE multi-mode 850 nm fiber up to 550 m

AT-SPSX/I

1000SX GbE multi-mode 850 nm fiber up to 550 m industrial temperature

AT-SPEX

1000X GbE multi-mode 1310nm fiber up to 2 km

AT-SPLX10

1000LX GbE single-mode 1310 nm fiber up to 10 km

AT-SPLX10/I

1000LX GbE single-mode 1310 nm fiber up to 10 km industrial temperature

AT-SPBD10-13

1000LX GbE Bi-Di (1310 nm Tx, 1490 nm Rx) fiber up to 10 km

AT-SPBD10-14

1000LX GbE Bi-Di (1490 nm Tx, 1310 nm Rx) fiber up to 10 km

AT-SPLX40

1000LX GbE single-mode 1310 nm fiber up to 40 km

AT-SPZX80

1000ZX GbE single-mode 1550 nm fiber up to 80 km

10GbE SFP+ Modules

AT-SP10SR

10GSR 850 nm short-haul, 300 m with MMF

AT-SP10SR/I

10GSR 850 nm short-haul, 300 m with MMF industrial temperature

AT-SP10LRM

10GLRM 1310 nm short-haul, 220 m with MMF

AT-SP10LR

10GLR 1310 nm medium-haul, 10 km with SMF

AT-SP10LR/I

10GLR 1310 nm medium-haul, 10 km with SMF industrial temperature

AT-SP10LR20/I

10GER 1310nm long-haul, 20 km with SMF industrial temperature

AT-SP10ER40/I

10GER 1310nm long-haul, 40 km with SMF industrial temperature

AT-SP10ZR80/I

10GER 1550nm long-haul, 80 km with SMF industrial temperature

AT-SP10T

10GBase-T 20 m copper⁶

10GbE SFP+ Cables

AT-SP10TW1

1 meter SFP+ direct attach cable

AT-SP10TW3

3 meter SFP+ direct attach cable

AT-SP10TW7

7 meter SFP+ direct attach cable

40G QSFP+ Modules

AT-QSFP1CU

1 meter QSFP+ direct attach stacking cable

AT-QSFP3CU

3 meter QSFP+ direct attach stacking cable

AT-QSFPLR4

40GLR4 1310 nm medium-haul, 10 km with SMF

AT-QSFPSR

40GSR 850nm short-haul up to 150 m with MMF

AT-MTP12-1

1 meter MTP optical cable for AT-QSFPSR

AT-MTP12-5

5 meter MTP optical cable for AT-QSFPSR



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