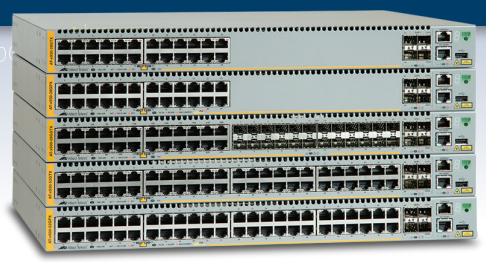
Allied Telesis

x930 Series

Advanced Gigabit Layer 3 Stackable Switches with 10G and 40G Uplinks



The Allied Telesis x930 Series of stackable Gigabit Layer 3 switches provide resiliency, reliability and high performance, making them ideal for distribution and network core solutions.

PoE plus

AlliedWare Plus™ OPERATING SYSTEM

IPv6 READY

Allied Telesis x930 Series switches are a high-performing and feature-rich choice for today's networks. With a choice of 24- and 48-port models with 10 Gigabit and 40 Gigabit uplink ports, plus the power of Allied Telesis Virtual Chassis Stacking (VCStack™) with up to 160Gbps of stacking bandwidth per switch, the x930 Series have the flexibility and performance for key network connectivity.

Powerful network management

The Allied Telesis Management Framework (AMF) meets the increased management requirements of modern converged networks, automating many everyday tasks including configuration management. AMF has powerful centralized management features that manage a complete network as a single virtual device. The network can be expanded with plug-and-play simplicity, and network node recovery is fully zero-touch. AMF Guestnode allows third party devices, such as IP phones and security cameras, to be part of an AMF network.

Network resiliency

The convergence of network services in the enterprise has led to increasing demand for highly available networks with minimal downtime. VCStack, in conjunction with link aggregation, provides a network with no single point of failure and an easy, resilient solution for high availability applications.

The x930 Series can form a VCStack of up to eight units for enhanced resiliency and simplified device management. Stacks can be created over long distance fiber links with VCStack LD (Long Distance), making the x930 Series the perfect choice for distributed environments.

The addition of Ethernet Protection Switched Ring (EPSRing™) resilient ring protocol ensures distributed network segments have high-speed, resilient access to online resources and applications.

Reliable

The x930 Series was designed with reliability in mind, and guarantees continual delivery of essential services. With dual hot-swappable load-sharing power supplies and near-hitless online stack reconfiguration, maintenance may be performed without affecting network uptime.

Secure

Advanced security features protect the network from the edge to the core. The x930 Series offers powerful control over network traffic types, protection against network attacks, secure management options, loop guard to detect cabling mistakes, and tri-authentication for comprehensive end-point access control.

Future-proof

The x930 Series ensures a futureproof network, with superior flexibility coupled with the ability to stack multiple units. All x930 Series models feature 10 Gigabit and the option of 40 Gigabit uplinks ports and a comprehensive IPv6 feature set, to ensure they are ready for future network traffic demands. All x930 Series switches are Software Defined Networking (SDN) ready and are able to support OpenFlow v1.3.

Environmentally friendly

eco friendly

The x930 Series supports Energy Efficient Ethernet (EEE), automatically reducing the power consumed by the switch whenever there is no traffic on a port. This sophisticated feature can significantly reduce operating costs by reducing the power requirements of the switch and any associated cooling equipment.

New / Key Features

- 40G Ethernet uplinks and stacking ports
- 10G copper Ethernet expansion module
- AMF Guestnode
- Active Fiber Monitoring
- OpenFlow for SDN
- Microsoft Network Load Balancing (MS NLB) support
- VLAN Mirroring (RSPAN)

VCStack™ AMF™ EPSRing™ ACTIVE Fiber Monitoring™

Key Features

Allied Telesis Management Framework (AMF)

- Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provide a simplified approach to network management. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.
- Any x930 Series switch can operate as the AMF network master, storing firmware and configuration backups for other network nodes. The AMF master enables auto-provisioning and auto-upgrade by providing appropriate files to new network members. New network devices can be pre-provisioned making installation easy because no on-site configuration is required.
- 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.

VCStack (Virtual Chassis Stacking)

- Create a VCStack of up to eight units with 40Gbps (or 160Gbps with the AT-StackQS model) of 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.

Long-distance Stacking

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

EPSRing (Ethernet Protection Switched Ring)

- EPSRing and 10 Gigabit Ethernet allow several switches to form high-speed protected rings capable of recovery within as little as 50ms. This feature is perfect for high performance and high availability 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.

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.

Optical DDM

- Most modern optical SFP/SFP+/XFP 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.

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.

Power over Ethernet Plus (PoE+)

- With PoE, a separate power connection to media endpoints such as IP phones and wireless access points is not necessary. PoE+ reduces costs and provides even greater flexibility, providing the capability to connect devices requiring more power (up to 30 Watts) such as, tilt and zoom security cameras.

High Reliability

- The x930 series switches feature front to back cooling and dual power supply units (PSUs). The x930 features dual hot-swappable load sharing power supplies for maximum uptime, and the option of either front-to-back or back-to-front cooling. This makes it ideal for use as a top-of-rack data center switch.

VLAN Mirroring (RSPAN)

- VLAN mirroring allows traffic from a port on a remote switch to be analysed locally. Traffic being transmitted or received on the port is duplicated and sent across the network on a special VLAN.

Microsoft Network Load Balancing (MS NLB) Support

- Support for MS NLB, which clusters identical servers together for increased performance through load-sharing.

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 defense against security threats. Sampled packets sent to a collector ensure it always has a real-time view of network traffic.

Dynamic Host Configuration Protocol (DHCP) Snooping

- DHCP servers allocate IP addresses to clients, and the switch keeps a record of addresses issued on each port. IP source guard checks against this DHCP snooping database to ensure only clients with specific IP and/or MAC address can access the network. DHCP snooping can be combined with other features, like dynamic ARP inspection, to increase security in Layer 2 switched environments, and also provides a traceable history, which meets the growing legal requirements placed on service providers.

Premium Software License

- By default, the x930 Series offers a comprehensive Layer 2 and basic 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.

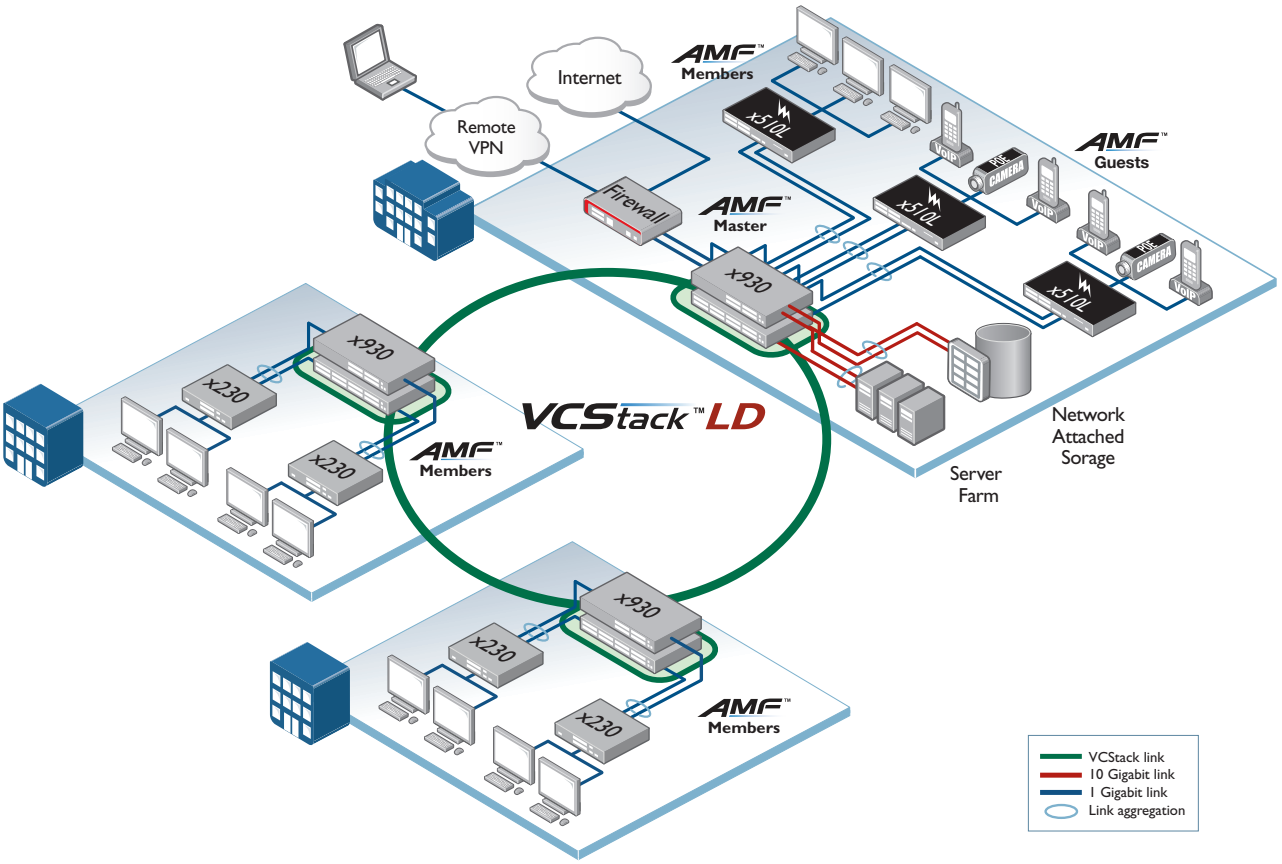
Find Me

- In busy server rooms, comprised of a large number of equipment racks, it can be quite a job finding the correct switch quickly among many similar units. The “find me” feature is a simple visual way to quickly identify the desired physical switch for maintenance or other purposes, by causing its LEDs to flash in a specified pattern.

Software Defined Networking (SDN)

- OpenFlow is a key technology that enables the use of SDN to build smart applications that unlock value and reduce cost.

Key Solutions



Distributed Network Core

Allied Telesis x930 Series switches are ideal for core and distribution solutions, where resiliency and flexibility are required. In the above diagram, long distance Virtual Chassis Stacking (VCStack-LD) is used to create a single virtual unit out of multiple devices. The increased distance provided by fiber stacking connectivity means that members of the virtual chassis do not need to be co-located. Instead, they can be kilometers apart – perfect for a distributed network environment.

When combined with link aggregation to access switches, this provides a solution with no single point of failure that fully utilizes all network bandwidth, and ensures high availability of data for network users.

AMF allows this large distributed network to be managed as a single virtual entity, greatly reducing administration and automating many day to day tasks.

Allied Telesis x930 Series switches support enterprises and their use of business-critical online resources and applications, with a resilient and reliable solution.

Specifications

PRODUCT	10/100/1000T (RJ-45) COPPER PORTS	100/1000X SFP PORTS	1/10 GIGABIT SFP+ PORTS	10 GIGABIT STACKING PORTS	MODULE SLOTS	POE+ ENABLED PORTS	SWITCHING FABRIC	FORWARDING RATE
AT-x930-28GTX	24	-	4 (2 if stacked)	2*	1	-	288Gbps	214.3Mpps
AT-x930-28GPX	24	-	4 (2 if stacked)	2*	1	24	288Gbps	214.3Mpps
AT-x930-28GSTX	24 (combo)	24 (combo)	4 (2 if stacked)	2*	1	-	288Gbps	214.3Mpps
AT-x930-52GTX	48	-	4 (2 if stacked)	2*	1	-	336Gbps	250Mpps
AT-x930-52GPX	48	-	4 (2 if stacked)	2*	1	48	336Gbps	250Mpps

* Stacking ports can be configured as additional 1G/10G Ethernet ports when unit is not stacked, or if StackQS module is used

Performance

- 40Gbps of stacking bandwidth per switch using front panel 10G SFP+ ports
- 160Gbps of stacking bandwidth per switch using optional AT-StackQS expansion module
- Supports 13KB jumbo frames
- Wirespeed multicasting
- 4094 configurable VLANs
- Up to 64K MAC addresses
- Up to 16,000 OSPF routes
- Up to 2,000 IPv4 multicast entries
- Up to 2000 OpenFlow v1.3 entries
- 2GB DDR SDRAM, 256MB flash memory
- Packet buffer memory: AT-x930-28 - 2MB
  AT-x930-52 - 4MB

Reliability

- Modular AlliedWare Plus operating system
- Internal dual hot-swappable PSUs, providing uninterrupted power and extra reliability
- Full environmental monitoring of PSUs, fans, temperature and internal voltages. SNMP traps alert network managers in case of any failure

Expandability

- Stack up to eight units in a VCStack
- Versatile licensing options for additional features

Flexibility and Compatibility

- Gigabit SFP ports on x930-28GSTX will support any combination of Allied Telesis 100Mbps and 1000Mbps SFP modules listed in this document under Ordering Information
- 10G SFP+ ports will support any combination of Allied Telesis 1000Mbps SFP and 10GbE SFP+ modules and direct attach cables listed in this document under Ordering Information
- Port speed and duplex configuration can be set manually or by auto-negotiation
- Front-panel SFP+ stacking ports can be configured as additional 1G/10G Ethernet ports

Diagnostic Tools

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

IPv4 Features

- Black hole routing
- Directed broadcast forwarding
- DNS relay
- Equal Cost Multi Path (ECMP) routing
- Policy-based routing
- Route maps and 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 aware storm protection and QoS
- IPv6 hardware ACLs
- Device management over IPv6 networks with SNMPv6, Telnetv6 and SSHv6
- Log to IPv6 hosts with Syslog v6
- NTPv6 client and server
- Static unicast and multicast routing for IPv6

Management

- Front panel 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 AMF 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
- Web-based Graphical User Interface (GUI)
- Industry-standard CLI with context-sensitive help
- Out-of-band 10/100/1000T Ethernet management port
- Built-in text editor and powerful CLI scripting engine
- Comprehensive SNMP MIB support for standards-based device management
- 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
- 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
- Policy-based QoS based on VLAN, port, MAC and general packet classifiers
- Policy-based storm protection
- Extensive remarking capabilities
- Taildrop for queue congestion control
- Strict priority, weighted round robin or mixed scheduling
- IP precedence and DiffServ marking based on layer 2, 3 and 4 headers

Resiliency Features

- Control Plane Prioritization (CPP) ensures the CPU always has sufficient bandwidth to process network control traffic
- Dynamic link failover (host attach)
- EPSRing (Ethernet Protection Switched Rings) with SuperLoop Protection (SLP) and enhanced recovery for extra resiliency
- Long-Distance stacking (LD-VCStack) using SFP+ or QSFP+ modules
- Loop protection: loop detection and thrash limiting
- PVST+ compatibility mode
- STP root guard
- VCStack fast failover minimizes network disruption

Security Features

- 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)
- Strong password security and encryption
- Tri-authentication: MAC-based, web-based and IEEE 802.1x
- RADIUS group selection per VLAN or port

Environmental Specifications

- Operating temperature range:
  0°C to 50°C (32°F to 122°F) AT-x930-GTX models and AT-x930-28GSTX
  0°C to 45°C (32°F to 113°F) AT-x930-GPX models
  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:
  3,048 meters maximum (10,000 ft)

Electrical Approvals and Compliances

- EMC: EN55022 class A, FCC class A, VCCI class A, ICES-003 class A
- Immunity: EN55024, EN61000-3-levels 2 (Harmonics), and 3 (Flicker) – AC models only

Power Supply Requirements

- AC voltage: 90 to 260V (auto-ranging)
- Frequency: 47 to 63Hz
- DC voltage: 40 to 60VDC (for PWR250-80 PSU only)

Safety

- Standards: UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1, AS/NZS 60950.1
- Certification: UL, cUL

Restrictions on Hazardous Substances (RoHS) Compliance

- EU RoHS compliant
- China RoHS compliant

Country of Origin

- Indonesia

Physical Specifications

PRODUCT	WIDTH	DEPTH	HEIGHT	MOUNTING	WEIGHT	
					UNPACKAGED	PACKAGED
AT-x930-28GTX	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)
AT-x930-28GPX	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)
AT-x930-28GSTX	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)
AT-x930-52GTX	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack-mount	5.1 kg (11.2 lb)	7.1 kg (15.7 lb)
AT-x930-52GPX	440 mm (17.32 in)	420 mm (16.54 in)	44 mm (1.73 in)	Rack-mount	5.2 kg (11.5 lb)	7.2 kg (15.9 lb)
AT-StackQS	141 mm (5.56 in)	96.5 mm (3.80 in)	40.3 mm (1.59 in)	Module	0.2 kg (0.44 lb)	1.2 kg (2.65 lb)
AT-x9EM/XT4	141 mm (5.56 in)	96.5 mm (3.80 in)	40.3 mm (1.59 in)	Module	0.2 kg (0.44 lb)	1.2 kg (2.65 lb)

Power and Noise Characteristics

PRODUCT	NO POE LOAD			FULL POE+ LOAD (PWR800)			FULL POE+ LOAD (PWR1200)		
	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE	MAX POWER CONSUMPTION	MAX HEAT DISSIPATION	NOISE
AT-x930-28GTX	84W	285 BTU/h	39.7 dBA	-	-	-	-	-	-
AT-x930-28GPX	84W	286 BTU/h	44.7 dBA	564W	287 BTU/h	45.8 dBA	808W	301 BTU/h	56.0 dBA
AT-x930-28GSTX	97W	329 BTU/h	39.7 dBA	-	-	-	-	-	-
AT-x930-52GTX	95W	323 BTU/h	39.7 dBA	-	-	-	-	-	-
AT-x930-52GPX	97W	330 BTU/h	44.7 dBA	577W	331 BTU/h	45.8 dBA	880W	341 BTU/h	56.0 dBA

Noise: tested to ISO7779; front bystander position

Latency (microseconds)

PRODUCT	PORT SPEED				
	10MBPS	100MBPS	1GBPS	10GBPS	40GBPS
AT-x930-28GTX/GPX	47.4µs	7.9µs	3.7µs	2.6µs	-
AT-x930-28GSTX	47.4µs	7.6µs (Fiber)	3.6µs (Fiber)	2.6µs	-
AT-x930-52GTX/GPX	47.4µs	7.9µs	3.7µs	2.6µs	-
AT-StackQS	-	-	-	-	2.5µs
AT-x9EM/XT4	-	-	3.7µs	2.6µs	-

Power over Ethernet Power Supply Combinations

PSU INSTALLED	POE POWER AVAILABLE	MAXIMUM POE PORTS SUPPORTED				MAX REDUNDANT POE POWER
		CLASS I (4.0W)	CLASS 2 (7.0W)	CLASS 3 (15.4.W)	CLASS 4 (30W)	
PWR800	380W	48	48	24	12	-
PWR800 + PWR800	740W	48	48	48	24	380W
PWR1200	740W	48	48	48	24	-
PWR1200 + PWR1200	1440W	48	48	48	48	740W

Standards and Protocols

AlliedWare Plus Operating System

Version 5.4.6-1

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 (CAVP Certified*)

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)

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

Ethernet Standards

IEEE 802.1AX Link aggregation (static and LACP)
IEEE 802.2 Logical Link Control (LLC)
IEEE 802.3 Ethernet
IEEE 802.3ab1000BASE-T
IEEE 802.3adStatic and dynamic link aggregation
IEEE 802.3ae10 Gigabit Ethernet
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3at Power over Ethernet plus (PoE+)
IEEE 802.3azEnergy Efficient Ethernet (EEE)
IEEE 802.3ba40 Gigabit Ethernet
IEEE 802.3u 100BASE-X
IEEE 802.3x Flow control - full-duplex operation
IEEE 802.3z 1000BASE-X

IPv4 Standards

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 data grams 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 data grams 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 Standards

RFC 1981	Path MTU discovery for IPv6
RFC 2460	IPv6 specification
RFC 2464	Transmission of IPv6 packets over Ethernet networks
RFC 3056	Connection of IPv6 domains via IPv4 clouds
RFC 3484	Default address selection for IPv6
RFC 3596	DNS extensions to support IPv6
RFC 4007	IPv6 scoped address architecture
RFC 4193	Unique local IPv6 unicast addresses
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

Management

AT Enterprise MIB including AMF MIB and SNMP traps
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 2096	IP forwarding table MIB
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	SNMPv2 MIB for TCP using SMIv2
RFC 4113	SNMPv2 MIB for UDP using SMIv2
RFC 4293	SNMPv2 MIB for IP using SMIv2
RFC 4188	Definitions of managed objects for bridges
RFC 4318	Definitions of managed objects for bridges with RSTP
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-SM and 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
OSPF restart signaling
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

Quality of Service (QoS)

IEEE 802.1p Priority tagging

RFC 2211	Specification of the controlled-load network element service

* Cryptographic Algorithm Validation Program (CAVP) validated by the National Institute of Standards and Technology (NIST)

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

IEEE 802.1D MAC bridges
IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
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

SSH remote login
SSLv2 and SSLv3
TACACS+ accounting and authentication
IEEE 802.1X authentication protocols (TLS, TTLS, PEAP and MD5)
IEEE 802.1X multi-supplicant authentication
IEEE 802.1X port-based network access control
RFC 2818 HTTP over TLS ("HTTPS")
RFC 2865 RADIUS
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

Ordering Information

Switches

AT-x930-28GTX-00
24-port 10/100/1000T stackable switch with 4 SFP+ ports and dual hotswap PSU bays

AT-x930-28GPX-00
24-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and dual hotswap PSU bays

AT-x930-28GSTX-00
24-port 10/100/1000T and 100/1000 SFP stackable switch with 4 SFP+ ports and dual hotswap PSU bays

AT-x930-52GTX-00
48-port 10/100/1000T stackable switch with 4 SFP+ ports and dual hotswap PSU bays

AT-x930-52GPX-00
48-port 10/100/1000T PoE+ stackable switch with 4 SFP+ ports and dual hotswap PSU bays

AT-RKMT-SL01
Sliding rack mount kit

Expansion Module

AT-StackQS
2 x QSFP+ expansion module

StackQS module

AT-x9EM/XT4
4 x 10GBASE-T expansion module

Power Supplies (for all models)

AT-PWR150-xx*
150W system power supply

AT-PWR250-xx*
250W system power supply

AT-PWR250-80*
250W DC system power supply

AT-PWR800-xx*
800W PoE+ power supply

AT-PWR1200-xx*
1200W PoE+ power supply

Fan accessories

AT-FAN09
Spare x930 fan module

AT-FAN09ADP
Spare x930 fan adaptor board

Where xx = 10 for US power cord
20 for no power cord
30 for UK power cord
40 for Australian power cord
50 for European power cord

* Power supplies must be ordered separately

40G QSFP+ Modules

AT-QSFP1CU (use with AT-StackQS module)
1 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

Breakout Cables For 4 x 10G connections

AT-QSFP-4SFP10G-3CU
QSFP to 4 x SFP+ breakout direct attach cable (3 m)

AT-QSFP-4SFP10G-5CU
QSFP to 4 x SFP+ breakout direct attach cable (5 m)

10G SFP+ Modules

(Note that any Allied Telesis 10G SFP+ module can be used for stacking with the front panel 10G ports)

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-SP10TW1
1 meter SFP+ direct attach cable

AT-SP10TW3
3 meter SFP+ direct attach cable

AT-SP10TW7
7 meter SFP+ direct attach cable

100Mbps SFP Modules

100Mbps SFP modules are only compatible with the SFP ports on the AT-x930-28GSTX switch)

AT-SPFX/2
100FX multi-mode 1310 nm fiber up to 2 km

AT-SPFX/15
100FX single-mode 1310 nm fiber up to 15 km

AT-SPFXBD-LC-13
100BX Bi-Di (1310 nm Tx, 1550 nm Rx) fiber up to 10 km

AT-SPFXBD-LC-15
100BX Bi-Di (1550 nm Tx, 1310nm Rx) fiber up to 10 km

1000Mbps SFP Modules

AT-SPTX
1000T 100 m copper

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

AT-SPEX
1000X GbE multi-mode 1310 nm 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

Feature Licenses

NAME	DESCRIPTION	INCLUDES	STACK LICENSING
AT-FL-x930-01	x930 premium license	▶ OSPF[1] (16,000 routes) ▶ BGP4 (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-x930-AM40-1YR	AMF Master license	▶ AMF Master 40 nodes for 1 year	▶ One license per stack
AT-FL-x930-AM40-5YR	AMF Master license	▶ AMF Master 40 nodes for 5 years	▶ One license per stack
AT-FL-x930-AM80-1YR	AMF Master license	▶ AMF Master 80 nodes for 1 year	▶ One license per stack
AT-FL-x930-AM80-5YR	AMF Master license	▶ AMF Master 80 nodes for 5 years	▶ One license per stack
AT-FL-x930-AM120-1YR	AMF Master license	▶ AMF Master 120 nodes for 1 year	▶ One license per stack
AT-FL-x930-AM120-5YR	AMF Master license	▶ AMF Master 120 nodes for 5 years	▶ One license per stack
AT-FL-x930-0F13	OpenFlow license	▶ OpenFlow v1.3 (2,000 entries)	▶ Not supported on a stack

* These modules support dual-rate 1G/10G operation

[1] The standard switch software supports 64 OSPF routes

North America Headquarters | 19800 North Creek Parkway | Suite 100 | Bothell | WA 98011 | USA | T: +1 800 424 4284 | F: +1 425 481 3895
Asia-Pacific Headquarters | 11 Tai Seng Link | Singapore | 534182 | T: +65 6383 3832 | F: +65 6383 3830
EMEA & CSA Operations | Incheonweg 7 | 1437 EK Rozenburg | The Netherlands | T: +31 20 7950020 | F: +31 20 7950021

alliedtelesis.com

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