Allied Telesis™

x600 Series

Intelligent Gigabit Layer 3+ Switches

The x600 Layer 3+ switches offer an impressive set of features in a high-value package.

Network Access Control (NAC) assures **security**, giving you unprecedented control over user access to the network to mitigate threats to network infrastructure. 802.1x port-based authentication, in partnership with standards-compliant dynamic VLAN assignment, assesses a user's network security adherence and either grants authentication or offers remediation.

The x600 family is **scalable**, with an extensive range of port-density and uplink-connectivity options. With a choice of 24-port and 48-port versions, plus the ability to stack up to 4 units, the x600 family can connect anything from a small workgroup right up to a large business. The choice of 1 Gigabit or 10 Gigabit uplink ports allows you to tailor the uplink bandwidth to suit your network application.

Virtual Chassis Stacking (VCStack™) provides excellent **resiliency**. You can create a single "virtual chassis" from up to four physical switches. If one stacked switch fails, traffic routes seamlessly to another, preventing network disruption. VCStack delivers a resilient solution at a fraction of the cost of a full chassis-based system, and you can manage the stack as a single network node, greatly simplifying your management tasks.

Power over Ethernet (PoE) provides flexible placement of PoE enabled endpoints, without the need for a separate power source. PoE+ supports an even greater range of devices, with up to 30 Watts available.

What's new?

- Open Shortest Path First (OSPFv3)
- Power over Ethernet plus (PoE+)
- TACACS+ Authentication

For more information, go to page 3

RoHS READY

2002/95/EC **RoHS** COMPLIANT

AlliedWare Plus™ OPERATING SYSTEM

Key Features

Secure - Advanced security features protect your network - from the edge to the core. Network Access Control (NAC) gives unprecedented control over user access to your network

Scalable - Enjoy the choice of 24 port and 48 port options, coupled with the ability to stack up to 4 units, as well as an extensive range of port density and uplink connectivity options.

Resilient - VCStack provides fast failover for uninterrupted network service. Sophisticated high availability features ensure traffic flow continues even during outages.

High-performing - Non-blocking architecture and superior QoS ensure wire-speed delivery of all your critical IPv4 and IPv6 traffic.

Easy to manage - The industry standard CLI reduces training needs, and each VCStack appears as one virtual chassis with a single IP address to simplify management. 'Network in a Box' simplifies administration. Plus, the GUI allows easy management control.

Secure
Advanced security features protect your network - from the edge to the core.

Network Access Control (NAC)
NAC allows for unprecedented control over user access to the network, in order to mitigate threats to network infrastructure. The x600 switches use 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment, to asses a user's adherence to network security policies and either grant authentication or offer remediation.

Furthermore, if multiple users share a port then multi-authentication can be used. Different users on the same port can be assigned into different VLANs, and so given different levels of network access. Additionally, a Guest VLAN can be configured to provide a catch-all for users who aren't authenticated.

Tri-authentication
Authentication options on the x600 also include alternatives to 802.1x port-based authentication, such as web authentication to enable guest access, and MAC authentication for end points that do not have an 802.1x supplicant. All three authentication methods - 802.1x, MAC-based and Web-based, can be enabled simultaneously on the same port. This is called tri-authentication.

Local RADIUS server
As well as supporting a RADIUS client for remote authentication, the x600 Layer 3+switches have a built in RADIUS server for local authentication.

Further security features
The x600 switches also support a number of features to combat LAN-based attacks - BPDU Guard, STP Root Guard, DOS attack blocking and ACLs.

Scalable
An extensive range of port-density and uplink-connectivity options.

The choice of 24-port and 48-port versions, coupled with the ability to stack up to 4 units, means this one switch family can connect anything from a small workgroup right up to a large business.

The choice of 1 Gigabit or 10 Gigabit uplink ports lets you tailor the uplink bandwidth to suit your network application. Stacking bandwidth is provided separately from the 10 Gigabit uplink ports - so a 4-unit stack can have a massive 160 Gbps of uplink bandwidth.

Hotswappable XFPs provide high-speed, high-capacity fiber uplinks, with up to 40Gbps uplink capacity from each switch to the network core.

The flexibility of the x600 family, coupled with the ability to stack multiple units, ensures a future-proof network.

Resilient
VCStack provides fast failover for uninterrupted network service. High availability features ensure traffic flow continues even during outages.

VCStack
Create a VCStack with up to four units. 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.

Ethernet Protected Switched Rings (EPSR)
EPSR and 10 Gigabit Ethernet allow several x600 switches to form a high-speed protected ring capable of recovery within as little as 50ms. This feature is perfect for high performance and high availability in enterprise networks.

Thrash Limiting
Monitoring excessive MAC learning events enables early detection of storms, allowing the switch to shut down the storm before it spreads.

High-performing
Non-blocking architecture and superior QoS ensure wire-speed delivery of all your critical IPv4 and IPv6 traffic.

Industry-leading 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 take precedence over non-essential services like file downloads, maintaining responsiveness of Enterprise applications.

Convergence
Key features that support the convergence of data, voice and video.

Power over Ethernet (PoE)
With the x600-24Ts-POE and POE+, you don't have to provide a separate power connection to media endpoints such as IP phones and wireless access points. PoE+ provides even greater flexibility, as is capable of connecting devices that require more power (up to 30Watts), for example tilt and zoom security cameras.

Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP - MED)
LLDP-MED extends LLDP's basic network endpoint discovery and management functions. LLDP-MED allows for media endpoint specific messages, providing detailed information on power requirements, network policy, location discovery (for Emergency Call Services) and inventory.

Voice VLAN
Voice VLAN automatically separates voice and data traffic into two different VLANS. This automatic separation places delay-sensitive traffic into a voice-dedicated VLAN, which simplifies QoS configurations.

Easy to manage
The x600 Layer 3+ switches run the advanced AlliedWare Plus™ Layer 3 Fully Featured Operating System, delivering a rich feature set and an industry-standard CLI. In addition to the CLI, the x600 switches feature a comprehensive GUI for easy access to monitoring and configuration.

Network in a Box
Network in a Box simplifies administration by integrating several network services into the x600 switch:

- Radius Server checks the identity of users to keep the network safe and free from uninvited 'guests'.
- Storm Control ensures a robust network by managing the amount of traffic allowed on the network, and dealing with any unexpected surges.
- DHCP server automates the distribution of network addresses to PCs.
- Centralized Timekeeper ensures your network is always working in full synchronicity.
- Loop Protection guards against accidental wiring mistakes.

sFlow
sFlow is an industry standard technology for monitoring high speed switched networks. It gives 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.

What's new

Open Shortest Path First (OSPFv3)

OSPF is a scalable and adaptive routing protocol for IP networks. The addition of OSPFv3 adds support for IPv6 and further strengthens the Allied Telesis focus on next generation networking.

Power over Ethernet plus (PoE+)

With PoE, you don't have to provide a separate power connection to media endpoints such as IP phones and wireless access points. PoE+ provides even greater flexibility, as is capable of connecting devices that require more power (up to 30Watts), for example tilt and zoom security cameras.

Terminal Access Controller Access-Control System Plus (TACACS+) Authentication

TACACS+ provides access control for network users from a centralised server. Authentication is carried out via communication between the local switch and a TACACS+ server to check the credentials of users seeking network access.
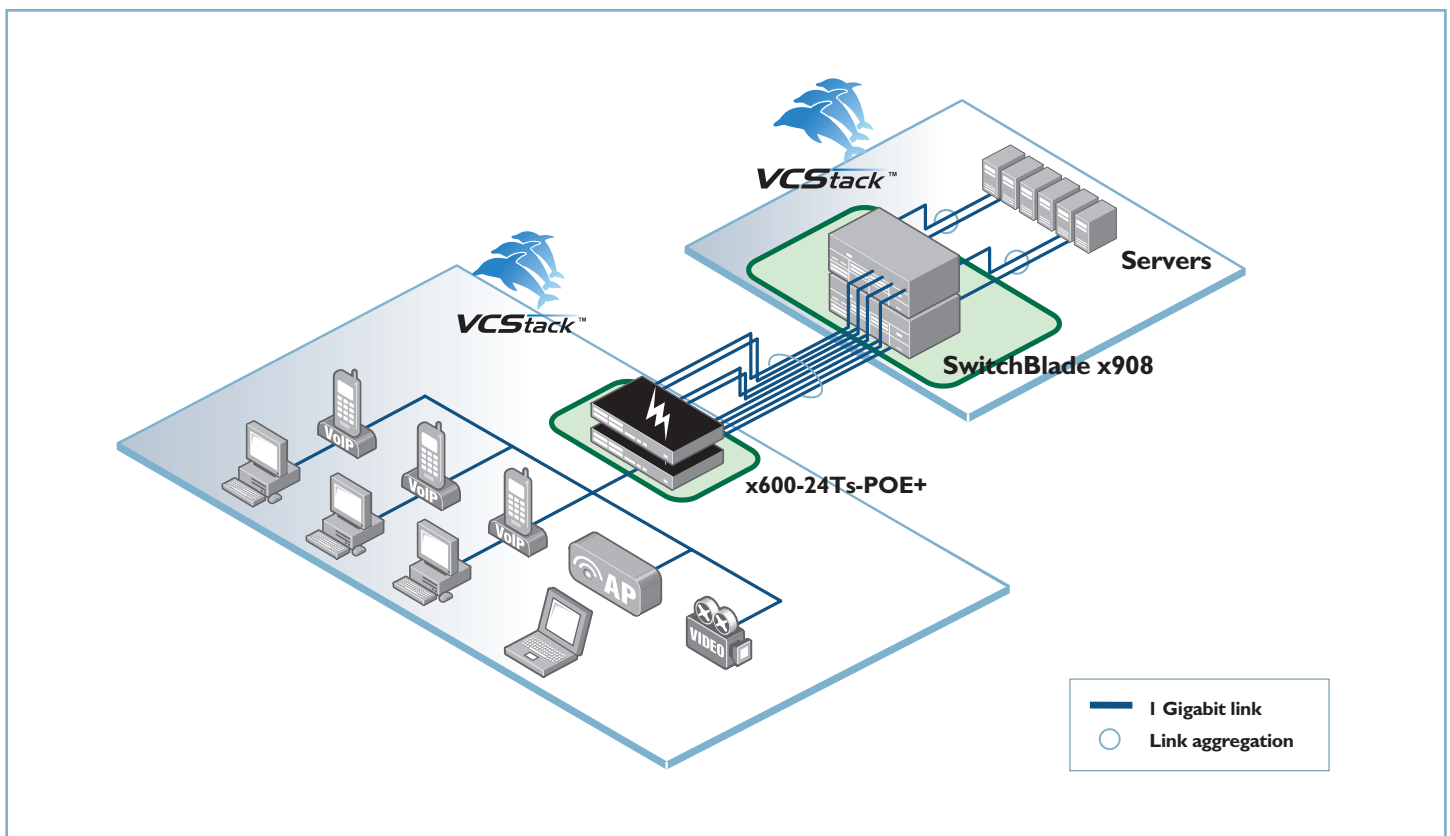

Diagram 1: PoE+ Provision

Key Solution - Network Access Control (NAC)

One of the major security issues facing enterprise networks is how to prevent internal breaches and malicious software infiltration. Internal defence requires significant involvement with individual network devices, which is costly and time consuming. NAC lowers this overhead and provides an effective solution to internal network security.

NAC automates network security policy management, allowing you to easily control network access and manage network security. NAC uses 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment, to assess a user's adherence to network security policies and either grant authentication or offer remediation. Allied Telesis NAC also supports alternatives to 802.1x port-based authentication, such as web authentication to enable guest access, and MAC authentication for end points that do not have an 802.1x supplicant.

This 'Tri-Authentication', shown in **Diagram 2** below, provides a way for the network to successfully manage authentication of all devices.

Allied Telesis is also a partner with Microsoft, supporting Microsoft Network Access Protection (NAP) technology. Allied Telesis is committed to providing secure networks, and interoperability with Microsoft's network access control solution is an important component of an already comprehensive security set. The Allied Telesis NAC solution also interoperates with many other third party NAC solutions.
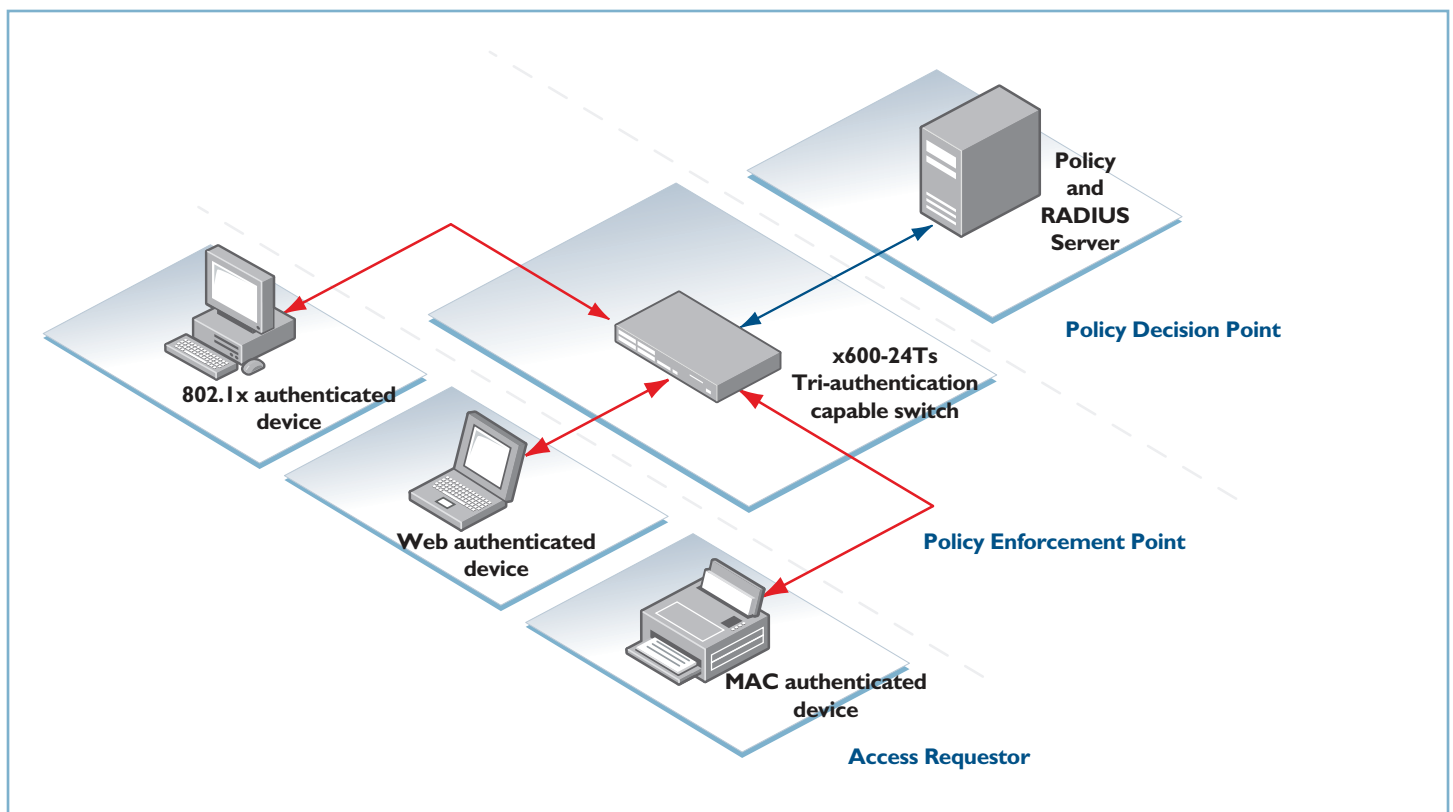

Diagram 2: NAC with Tri-authentication

Key Solution - Virtual Chassis Stacking (VCStack)

VCStack - Resiliency and Stability

Today's modern Enterprise business relies on Information Technology resources and applications to access business-critical information, and for day-to-day work. A high-availability infrastructure is now of paramount importance. The Allied Telesis x600 series switches provide the ideal solution with VCStack.

Using VCStack in your network allows multiple switches to appear as a single virtual chassis. In normal operation, this virtual chassis acts as a single switch, simplifying management.

Diagram 3 shows link aggregation between the core VCStack and the edge switches. With link aggregation across ports on different virtual chassis members, there is no perceptible disruption in the case of a link failure, and the full bandwidth of the network is available. Fast Failover ensures absolutely minimal network downtime in the event of a problem.

VCStack and link aggregation provide a solution where network resources are spread across the virtual chassis members, ensuring device and path resiliency. Virtualization of the network core ensures access to information when you need it.
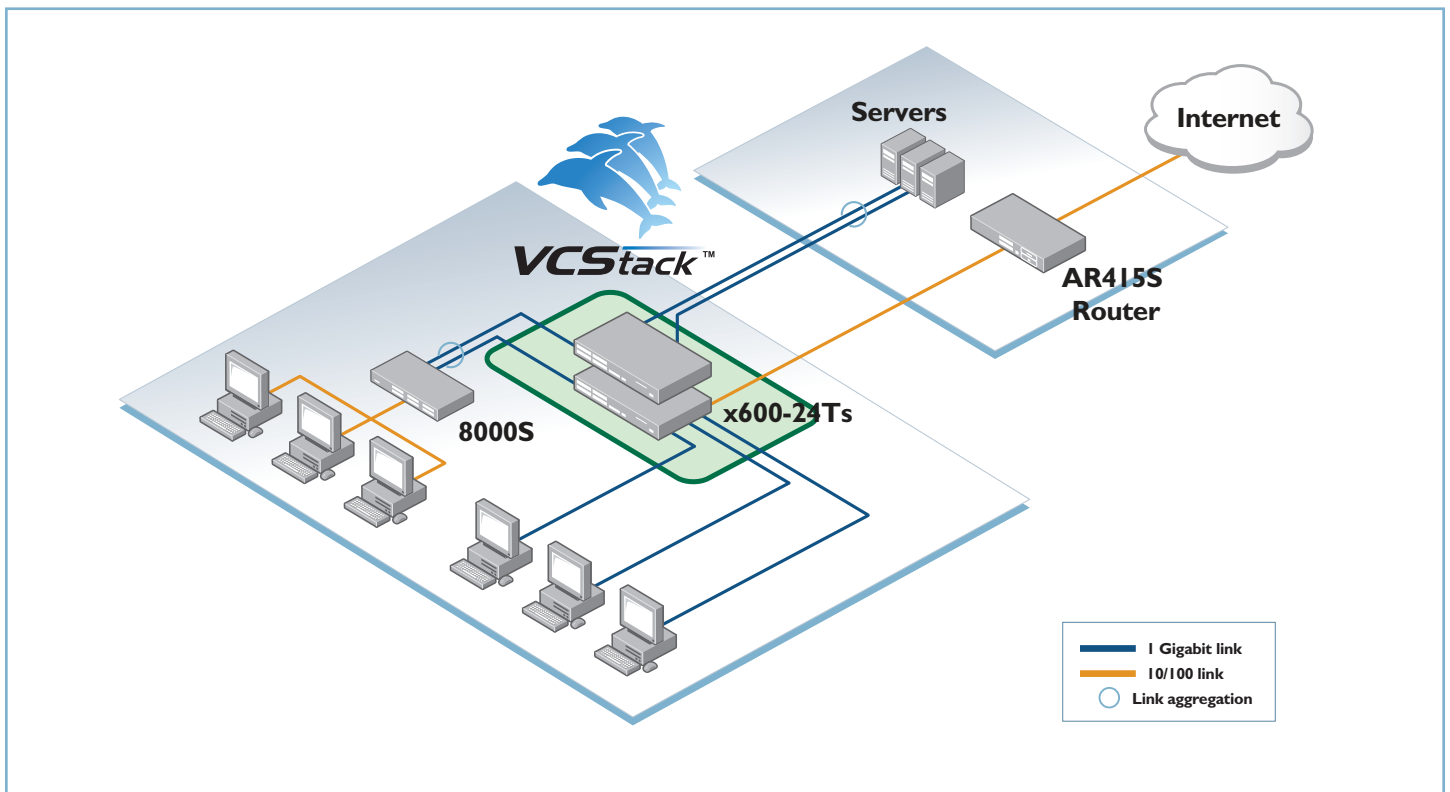

Diagram 3: VCStack - Resilient Network

x600 SERIES | Intelligent Gigabit Layer 3+ Switches

The x600 family provides an extensive range of port-density and uplink-connectivity options when used as aggregation layer switches, or Gigabit to the desktop edge switches. This scalable switch family can connect anything from a small workgroup right up to a large business.

Diagram 4 shows four x600-48Ts/XP switches connected as a virtual chassis for maximum Gigabit to the desktop or aggregation layer port density. With the stacking bandwidth provided quite separately from the 10 Gigabit uplink ports, this solution provides a massive 160 Gigabits of uplink bandwidth to the network core, while the stacking backplane throughput is completely unaffected for maximum performance.
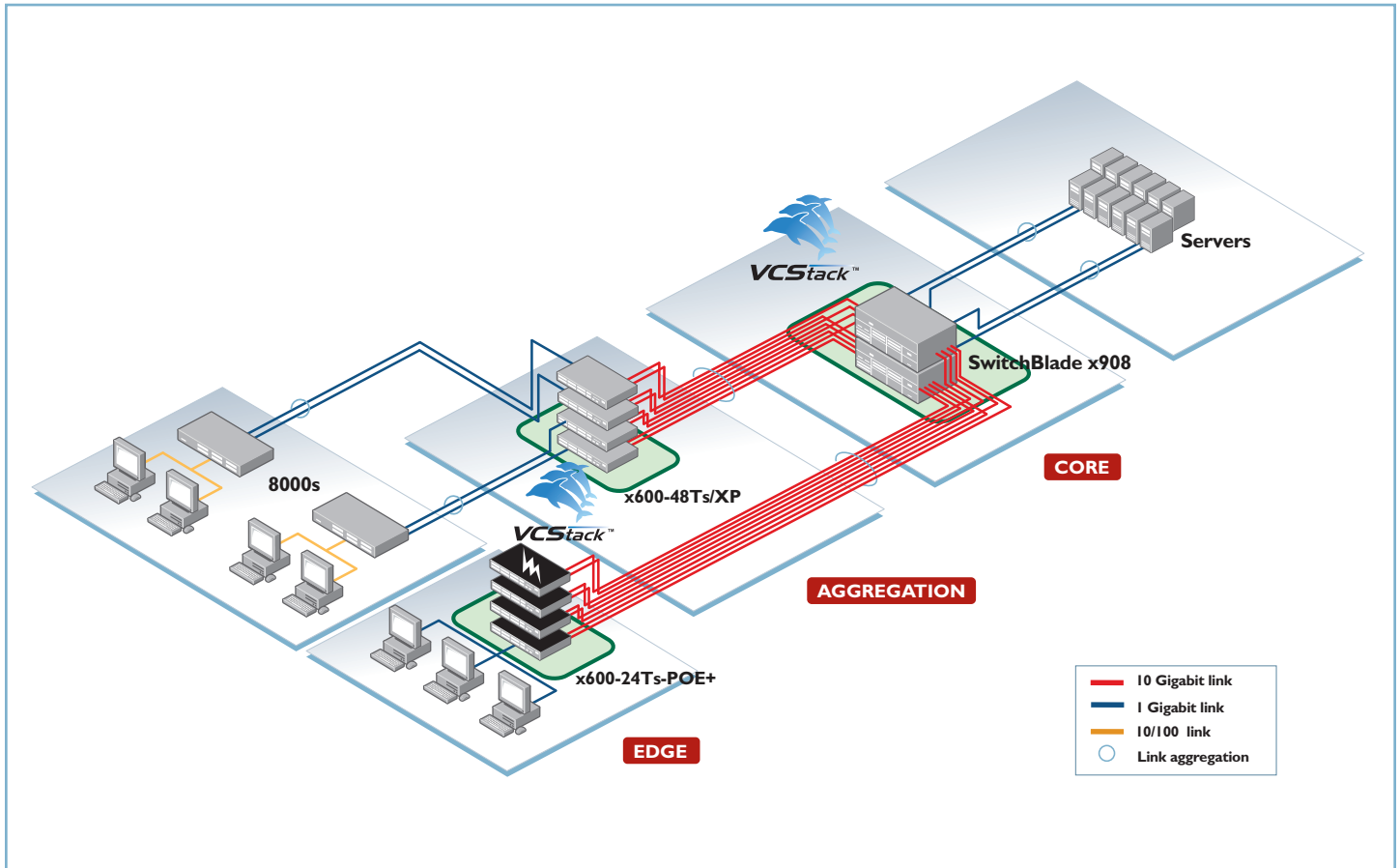

Diagram 4: VCStack - Scalable Port Density

Whether used to provide a virtual network core, or to maximize port density, the x600 family switches together with VCStack provide resiliency, scalability and ease of management. VCStack makes networking reliable and simple.

x600 SERIES | Intelligent Gigabit Layer 3+ Switches

The x600 24 and 48 Series:

Switch	10/100/1000BASE-T (RJ-45) copper ports	1000 BASE-X SFP ports	1000BASE-X SFP combo ports	10Gigabit XFP ports	Max PoE/PoE+ ports	Switching Fabric	Forwarding Rate
x600-24Ts	24	-	4	-	-	96 Gbps	71.4 Mpps
x600-24Ts-POE	24	-	4	-	24 PoE	96 Gbps	71.4 Mpps
x600-24Ts-POE+	24	-	4	-	24 PoE/12 PoE+	96 Gbps	71.4 Mpps
x600-24Ts/XP	24	-	4	2	-	136 Gbps	101.2 Mpps
x600-48Ts	44	4	-	-	-	144 Gbps	107.1 Mpps
x600-48Ts/XP	44	4	-	2	-	184 Gbps	136.9 Mpps

Performance

- 48 Gbps of stacking bandwidth
- Extensive wire-speed traffic classification for ACLs and QoS
- Supports 9KB Jumbo frames
- Wire-speed multicasting
- Up to 16K MAC addresses
- 4K VLANs
- 4K Layer 3 interfaces
- 512MB DDR SDRAM
- 64MB Flash Memory
- Packet Buffer Memory
    - x600-24T - 2MB
    - x600-48T - 4MB

Reliability

- MTBF
    - x600-24Ts - 130,000 hours
    - x600-24Ts-POE - 90,000 hours
    - x600-24Ts-POE+ - 90,000 hours
    - x600-24Ts/XP - 130,000 hours
    - x600-48Ts - 80,000 hours
    - x600-48Ts/XP - 80,000 hours

1 Including Stacking ports

- Modular AlliedWare Plus operating system
- Redundant Power Supply available to load share with internal power supply 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

Power Characteristics

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

Power Consumption

x600-24Ts
  87 Watts (297 BTU/hr)
x600-24Ts-POE
  Without PoE load 78 Watts (268 BTU/hr)
  With 15.4 Watts per port PoE load 462 Watts (1,579 BTU/hr)

x600-24Ts-POE+
  Without PoE load 78 Watts (268 BTU/hr)
  With 15.4 Watts per port PoE load 462 Watts (1,579 BTU/hr)
x600-24Ts/XP
  87 Watts (297 BTU/hr)
x600-48Ts
  112 Watts (382 BTU/hr)
x600-48Ts/XP
  112 Watts (382 BTU/hr)

Environmental Specifications

- Operating Temperature Range: 0°C to 40°C (32°F to 104°F). Derated by 1°C per 305 Meters (1000ft)
- 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 (10,000ft)

Expandability

- 1 expansion bay for AT-StackXG module supporting 2 high speed 24Gbps stacking ports (on non PoE models)
- IPv6 routing license option
- Advanced L3 license option

Flexibility and compatibility

- Gigabit SFP ports will support any combination of 1000BASE-T or1000BASE-X SFPs, 1000BASE-SX, 1000BASE-LX, or 1000BASE-ZX SFPs

Resiliency

- STP, RSTP, MSTP (802.1s)
- Up to 128 Link Aggregation (802.3ad) groups
- Up to 150 VRRP groups
- Up to 16 EPSR domains
- Dynamic Link Failover
- Thrash Limiting
- Loop Detection
- VCStack Fast Failover

Routing

- Up to 5K RIP routes
- Up to 8K OSPF routes (with license)
- Up to 4K OSPFv3 routes (with license)
- Up to 5K BGP routes (with license)
- Up to 5K RIPng routes (with license)
- Route Maps

VLAN support

- Supports 4096 VLANs
- VLAN Double Tagging

Security

- Private VLANs, providing security and port isolation of multiple customers using the same VLAN
- Dynamic VLAN assignment
- NAC
- 802.1x support, with multi-supplicant
- MAC-based authentication
- DHCP Snooping
- Web-based authentication
- BPDU Protection
- STP Root Guard
- Strong Passwords
- DoS attack blocking
- ACLs
- Local RADIUS server
- TACACS+ Authentication

Quality of Service

- Policy based QoS features
- Highly configurable traffic classification
- Extensive remarking capabilities
- Control plane traffic prioritization
- Mixed scheduling
- 8 QoS queues per port
- Two-rate three-color (green, yellow, red) bandwidth metering, with burst sizes for improved TCP-IP bandwidth limiting performance and bandwidth resolution down to 64Kbps
- Low switching latency essential for Voice over IP (VoIP) and real-time streaming media applications

x600 SERIES | Intelligent Gigabit Layer 3+ Switches

Management

- The GUI simplifies network performance monitoring and network event trouble shooting.
- The AlliedWare Plus™ Operating System's rich Layer 3 feature set and industry-standard CLI provide you with even greater robustness and ease of management.
- Console management port on the front panel for ease of access
- An SD/SDHC memory card socket on the front panel, allowing software release files, configurations and other files to be stored for backup and distribution to other switches
- Port mirroring
- SSH and SNMPv3 for secure management
- RADIUS Authentication
- RMON (4 groups)
- Broadcast Forwarding to allow the switch broadcast packets to reach across subnets.
- IP Helper enables broadcasts from clients in different subnets to be relayed to their destination, instead of being blocked at the switch.
- Policy Based Routing (PBR)
- Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP-MED)
- sFlow

Physical Properties

Model	Height	Width	Depth	Mounting	Unpackaged Weight	Packaged Weight
x600-24Ts	44mm	440mm	305mm	1RU rack mount	4.50 kg	6.10 kg
x600-24Ts-POE	44mm	440mm	408mm	1RU rack mount	6.90 kg	8.50 kg
x600-24Ts-POE+	44mm	440mm	408mm	1RU rack mount	6.90 kg	8.50 kg
x600-24Ts/XP	44mm	440mm	305mm	1RU rack mount	4.60 kg	6.20 kg
x600-48Ts	44mm	440mm	305mm	1RU rack mount	4.90 kg	6.50 kg
x600-48Ts/XP	44mm	440mm	305mm	1RU rack mount	4.90 kg	6.50 kg

Acoustic Noise

Product	Tested to ISO 7779; front bystander position
x600-24	45.8 dB
x600-24Ts-POE	48.1 dB
x600-48	46.8 dB

Electrical Approvals and Compliances

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

Safety

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

Certification: UL, cUL, TUV

Restrictions on Hazardous Substances (RoHS) Compliance

EU RoHS Compliant

Country of Origin

China

Standards and Protocols
AlliedWare Plus™ Operating System Version 5.4.1

Authentication
RFC 1321   MD5 Message-Digest Algorithm
RFC 1828   IP Authentication using Keyed MD5

Border Gateway Protocol (BGP)
BGP Dynamic Capability
BGP Graceful Restart
BGP Outbound Route Filtering
Extended Communities Attribute
RFC 1771   Border Gateway Protocol 4 (BGP-4)
RFC 1772   Application of the Border Gateway Protocol 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 2796   BGP Route Reflection - An Alternative to Full Mesh IBGP
RFC 2858   Multiprotocol Extensions for BGP-4
RFC 2918   Route Refresh Capability for BGP-4
RFC 3065   Autonomous System Confederations for BGP
RFC 3107   Carrying Label Information in BGP-4
RFC 3392   Capabilities Advertisement with BGP-4
RFC 4893   BGP support for Four-octet AS Number Space

Diagnostic Tools
Built-In Self Test (BIST)
Ping Polling
Port Mirroring
Trace Route

Encryption
FIPS 180-1   Secure Hash Standard (SHA-1)
FIPS 186   Digital Signature Standard (RSA)
FIPS 46-3   Data Encryption Standard (DES & 3DES)

Ethernet
IEEE 802.2 Logical Link Control
IEEE 802.3 Ethernet CSMA/CD
IEEE 802.3ab 1000BASE-T
IEEE 802.3ad Link Aggregation (static & LACP-based dynamic)
IEEE 802.3af Power over Ethernet (PoE)
IEEE 802.3at Power over Ethernet (PoE+)
IEEE 802.3ae 10 Gigabit Ethernet
IEEE 802.3u 100BASE-T
IEEE 802.3x Flow Control - Full Duplex Operation
IEEE 802.3z Gigabit Ethernet

General Routing
Black Hole Routing
Directed Broadcast Forwarding
DNS Relay
Equal Cost Multi Path (ECMP) routing
Policy-based Routing
UDP Broadcast Helper
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 903   Reverse ARP
RFC 919   Broadcasting Internet Datagrams
RFC 922   Broadcasting Internet Datagrams in the presence of subnets
RFC 925   Multi-LAN ARP
RFC 932   Subnetwork addressing scheme
RFC 950   Internet Standard Subnetting Procedure
RFC 951   Bootstrap Protocol (BootP) relay and server
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 & Extensions for the Bootstrap Protocol
RFC 1591   Domain Name System (DNS)
RFC 1700   Assigned Numbers
RFC 1812   Requirements for IPv4 Routers
RFC 1918   IP Addressing
RFC 2131   DHCP for IPv4
RFC 2132   DHCP Options and BOOTP Vendor Extensions
RFC 2581   TCP Congestion Control
RFC 3046   DHCP Relay Agent Information Option (DHCP Option 82)
RFC 3232   Assigned Numbers
RFC 3993   Subscriber-ID Suboption for DHCP Relay Agent Option

IPv6 Features
6to4 Tunnelling
IPv4 and IPv6 Dual Stack
IPv6 Management via Ping, TraceRoute, Telnet and SSH
Static Unicast Routes for IPv6
RFC 1886   DNS Extensions to support IPv6
RFC 1887   An Architecture for IPv6 Unicast Address Allocation
RFC 1981   Path MTU Discovery for IPv6
RFC 2460   IPv6 specification
RFC 2461   Neighbour Discovery for IPv6
RFC 2462   IPv6 Stateless Address Autoconfiguration
RFC 2464   Transmission of IPv6 Packets over Ethernet Networks
RFC 2526   Reserved IPv6 Subnet Anycast Addresses
RFC 2553   Basic Socket Interface Extensions for IPv6
RFC 2711   IPv6 Router Alert Option
RFC 2851   Textual Conventions for Internet Work Addresses
RFC 2893   Transition Mechanisms for IPv6 Hosts and Routers
RFC 3056   Connection of IPv6 Domains via IPv4 Clouds
RFC 3484   Default Address Selection for IPv6
RFC 3513   IPv6 Addressing Architecture
RFC 3587   IPv6 Global Unicast Address Format
RFC 3596   DNS Extensions to support IPv6
RFC 4443   Internet Control Message Protocol (ICMPv6)

Management
AT Enterprise MIB
SNMP Traps
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 1493   Bridge MIB
RFC 2011   SNMPv2 MIB for IP using SMIv2
RFC 2012   SNMPv2 MIB for TCP using SMIv2
RFC 2013   SNMPv2 MIB for UDP using SMIv2
RFC 2096   IP Forwarding Table MIB
RFC 2574   User-based Security Model (USM) for SNMPv3
RFC 2575   View-based Access Control Model (VACM) for SNMP
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 3412   Message Processing and Dispatching for the SNMP
RFC 3413   SNMP Applications
RFC 3418   MIB for SNMP
RFC 3621   PoE MIB
RFC 3635   Definitions of Managed Objects for the Ethernet-like Interface Types
RFC 3636   IEEE 802.3 MAU MIB
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

Multicast Support
Bootstrap Router for PIM-SM
IGMP Fast Leave
IGMP Proxy
IGMP Query Solicitation
IGMP Snooping
RFC 1112   Host extensions for IP multicasting
RFC 2236   Internet Group Management Protocol v2 (IGMPv2)
RFC 2362   PIM-SM
RFC 2710   Multicast Listener Discovery (MLD) snooping
RFC 2715   Interoperability Rules for Multicast Routing Protocols
RFC 3376   IGMPv3
RFC 3810   Multicast Listener Discovery v2 (MLDv2) snooping
RFC 3973   PIM-DM
RFC 4541   IGMP & MLD snooping switches

Open Shortest Path First (OSPF)

Graceful OSPF Restart
OSPF Link-local Signaling
OSPF MD5 Authentication
OSPF Restart Signaling
OSPF TE Extensions
OSPFv3 TE Extensions
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

Quality of Service

Access Control Lists (ACLs)
IEEE 802.1p Priority Tagging
RFC 2211   Specification of the Controlled-Load Network Element Service
RFC 2474   DiffServ Precedence for 8 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

Dynamic Link Failover
Ethernet Protection Switched Rings (EPSR)
Loop Protection - Loop Detection
Loop Protection - Thrash Limiting
PVST+ compatible
STP Root Guard
IEEE 802.1D Spanning Tree Protocol (STP) - MAC Bridges
IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)

IEEE 802.1t - 2001 802.1D maintenance
IEEE 802.1w - 2001 Rapid Spanning Tree Protocol (RSTP)
RFC 3768   Virtual Router Redundancy Protocol (VRRP)

Routing Protocols

Route Maps
Route Redistribution (OSPF, BGP, 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

BPDU Protection
Configurable Guest and Auth Fail VLANs
DHCP Snooping
DoS Attack Blocking and Virus Throttling
Dynamic VLAN Assignment
IEEE 802.1x Port Based Network Access Control
IEEE 802.1x Authentication protocols (TLS, TTLS, PEAP & MD5)
IEEE 802.1x Multi Supplicant authentication
MAC-based authentication
Port Security
Private VLANS
Roaming Authentication
SSH Remote Login
SSLv2
SSLv3
Strong Password Security
TACACS+ Authentication
Web-based Authentication
RFC 2246   TLS Protocol v1.0
RFC 2865   RADIUS
RFC 2866   RADIUS Accounting
RFC 2868   RADIUS Attributes for Tunnel Protocol Support
RFC 3546   Transport Layer Security (TLS) Extensions
RFC 3579   RADIUS Support for Extensible Authentication Protocol (EAP)
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

Services

Secure Copy (SCP)
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 1305   NTPv4
RFC 1350   Trivial File Transfer Protocol (TFTP)
RFC 1985   SMTP Service Extension
RFC 2049   MIME
RFC 2554   SMTP Service Extension for Authentication
RFC 2616   Hypertext Transfer Protocol - HTTP/1.1
RFC 2821   Simple Mail Transfer Protocol (SMTP)
RFC 2822   Internet Message Format

User Interface Features

Event-based Triggers
Graphical User Interface (GUI)
Industry-standard CLI with built-in Help
Powerful CLI scripting tool

VLAN Support

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

VoIP Support

LLDP-MED   ANSI/TIA-1057
Voice VLAN

Ordering Information

Stacking accessories

Module	Specifics
AT-StackXG-00	Stacking module with one AT-StackXG/0.5-00 cable included. (not required for x600-24Ts-PoE or PoE+)
AT-StackXG/0.5-00	0.5 meter cable for stacking
AT-StackXG/1-00	1 meter cable for stacking

x600 SERIES | Intelligent Gigabit Layer 3+ Switches

Product	Description
AT-x600-24Ts	Intelligent Gigabit Layer 3+ Switch 24 x 10/100/1000BASE-T (RJ-45) copper ports 4 x 1000BASE-X SFP combo ports 1 x expansion bay for AT-StackXG module
AT-x600-24Ts-POE	Intelligent Gigabit Layer 3+ Switch 24 x 10/100/1000BASE-T (RJ-45) copper ports with Power over Ethernet (802.3af) 4 x 1000BASE-X SFP combo ports 2 x 24 Gbps on-board stacking ports
AT-x600-24Ts-POE+	Intelligent Gigabit Layer 3+ Switch 24 x 10/100/1000BASE-T (RJ-45) copper ports with Power over Ethernet plus (802.3at) 4 x 1000BASE-X SFP combo ports 2 x 24 Gbps on-board stacking ports
AT-x600-24Ts/XP	Intelligent Gigabit Layer 3+ Switch 24 x 10/100/1000BASE-T (RJ-45) copper ports 4 x 1000BASE-X SFP combo ports 2 x XFP ports 1 x expansion bay for AT-StackXG module
AT-x600-48Ts	Intelligent Gigabit Layer 3+ Switch 44 x 10/100/1000BASE-T (RJ-45) copper ports 4 x 1000BASE-X SFP ports 1 x expansion bay for AT-StackXG module
AT-x600-48Ts/XP	Intelligent Gigabit Layer 3+ Switch 44 x 10/100/1000BASE-T (RJ-45) copper ports 4 x 1000BASE-X SFP ports 2 x XFP ports 1 x expansion bay for AT-StackXG module

SFP Modules

Module	Description
AT-SPTX	1000BASE-T 100m Copper
AT-SPSX	1000BASE-SX GbE multi-mode 850nm fiber up to 550m
AT-SPSX/I	1000BASE-SX GbE multi-mode 850nm fiber up to 550m Industrial
AT-SPEX	1000BASE-X GbE multi-mode 1310nm fiber up to 2km
AT-SPLX10	1000BASE-LX GbE single-mode 1310nm fiber up to 10km
AT-SPLX10/I	1000BASE-LX GbE single-mode 1310nm fiber up to 10km Industrial
AT-SPBD10-13	1000BASE-LX GbE Bi-Di (1310nm Tx, 1490nm Rx) fiber up to 10km
AT-SPBD10-14	1000BASE-LX GbE Bi-Di (1490nm Tx, 1310nm Rx) fiber up to 10km
AT-SPLX40	1000BASE-LX GbE single-mode 1310nm fiber up to 40km
AT-SPZX80	1000BASE-ZX GbE single-mode 1550nm fiber up to 80km

10GbE XFP Modules

Module	Description	Specifics
AT-XPSR	10GBASE-SR	850nm Short-haul, 300m with MMF
AT-XPLR	10GBASE-LR	1310nm Medium-haul, 10km with SMF
AT-XPER40	10GBASE-ER	1550nm Long-haul, 40km with SMF

Redundant Power Supplies For Non PoE Models

Module	Specifics
AT-RPS3204-xx	Chassis for up to 4 redundant power supplies (Chassis includes one power supply and one cable)
AT-PWR3202	Additional 200w redundant power supply with RPS cable

For AT-x600-24Ts-POE

Module	Specifics
AT-RPS3104-xx	Chassis for up to 4 redundant power supplies (Chassis includes one power supply and one cable)
AT-PWR3101	Additional 450w redundant power supply with RPS cable

Where xx = 10 for US power cord
20 for no power cord
30 for UK power cord
40 for Asia/Pacific power cord
50 for EU power cord

Feature licenses

Name	Description	Includes
AT-FL-X600-01	x600 Advanced Layer 3 license	• OSPF[2] • PIM-SM • PIM-DM • BGP4 • VLAN Double Tagging (Q in Q)
AT-FL-X600-02	x600 IPv6 Pack	• IPv6 Management • IPv6 Static Routes • IPv6 Unicast Forwarding • RIPng • MLD Snooping • OSPFv3
AT-FL-RADIUS-FULL	Increase local RADIUS server support limits[3]	• 5000 users • 1000 NAS

About Allied Telesis

Allied Telesis is part of the Allied Telesis Group. Founded in 1987, the company is a global provider of secure Ethernet/IP access solutions and an industry leader in the deployment of IP Triple Play networks over copper and fiber access infrastructure. Our POTS-to-10G iMAP integrated Multiservice Access Platform and iMG intelligent Multiservice Gateways, in conjunction with advanced switching, routing and WDM-based transport solutions, enable public and private network operators and service providers of all sizes to deploy scalable, carrier-grade networks for the cost-effective delivery of packet-based voice, video and data services. Visit us online at www.alliedtelesis.com.

Service and Support

Allied Telesis provides value-added support services for its customers under its Net.Cover programs. For more information on Net.Cover support programs available in your area, contact your Allied Telesis sales representative or visit our website.

RoHS

Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

2 The standard switch software supports 64 OSPF routes. The Advanced Layer 3 license supports 8K OSPF routes.

3 100 users and 24 NAS can be stored in local RADIUS database with base software.

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