x600-24 and 48 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.

Enjoy **high performance** - stacking bandwidth is provided separately from the 10-gig uplink ports - enabling a 4-unit stack to have a massive 160 Gigabits of uplink bandwidth with no reduction in stacking backplane throughput.

What's new?

- Power over Ethernet (PoE)
- Link Layer Discovery Protocol - Media Endpoint Discovery (LLDP-MED)
- Voice VLAN

For more information, go to page 3

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 (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.

Control Plane Prioritization (CPP)

Ensure maximum performance and prevent network outages with CPP. CPP prevents the Control Plane from becoming flooded in the event of a network storm or Denial of Service (DoS) attack, ensuring critical network control traffic always reaches its destination.

Thrash Limiting

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

High-performing

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

Wire speed switching

All ports are fully non-blocking, so IPv4 Layer 2 and Layer 3 switching occur at wire speed. This is ideal for high-end server deployments and when aggregating gigabit connections.

Aggregation at Layer 2 and Layer 3

A large L3 route table provides support for thousands of IP interfaces, essential when aggregating complex IP networks.

IPv6

Prepare your network for IPv6, protecting your investment. As well as allowing wire-speed IPv6 unicast traffic routing and forwarding, IPv6 support enables switch management via IPv6 protocols, to tunnel IPv6 traffic over IPv4 networks, and with MLD Snooping, to intelligently manage IPv6 multicast streams.

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.

Easy to manage

Industry standard CLI and Network in a Box.

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 and resilient 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 every computer.
- Centralized Timekeeper ensures your network is always working in full synchronicity.
- Loop Protection guards against accidental wiring mistakes.

Centralising network administration greatly reduces the need for fulltime IT experts, while increasing security and robustness.

What's new in Software Release 5.3.3

Convergence

Modern networks carry far more than just simple data traffic. The convergence of data, voice and video necessitates an end-to-end infrastructure capable of supporting these multiple services. Voice over IP (VoIP) is now a key part of modern Enterprise networks, and the addition of the following features in software release 5.3.3 strengthens Allied Telesis comprehensive solution for today's business customers.

Power over Ethernet (PoE)

This release introduces a PoE-enabled x600 switch, the x600-24Ts-POE. With PoE, you no longer need to provide a separate power connection to the growing list of PoE-enabled media endpoints such as IP phones, security cameras, wireless access points and card readers. PoE reduces your costs, as there is no need to supply electrical wiring to each endpoint, and it gives you greater flexibility with endpoint location.

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. LLDP-MED is an important new feature for simplifying VOIP, security camera and WLAN deployments.

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.

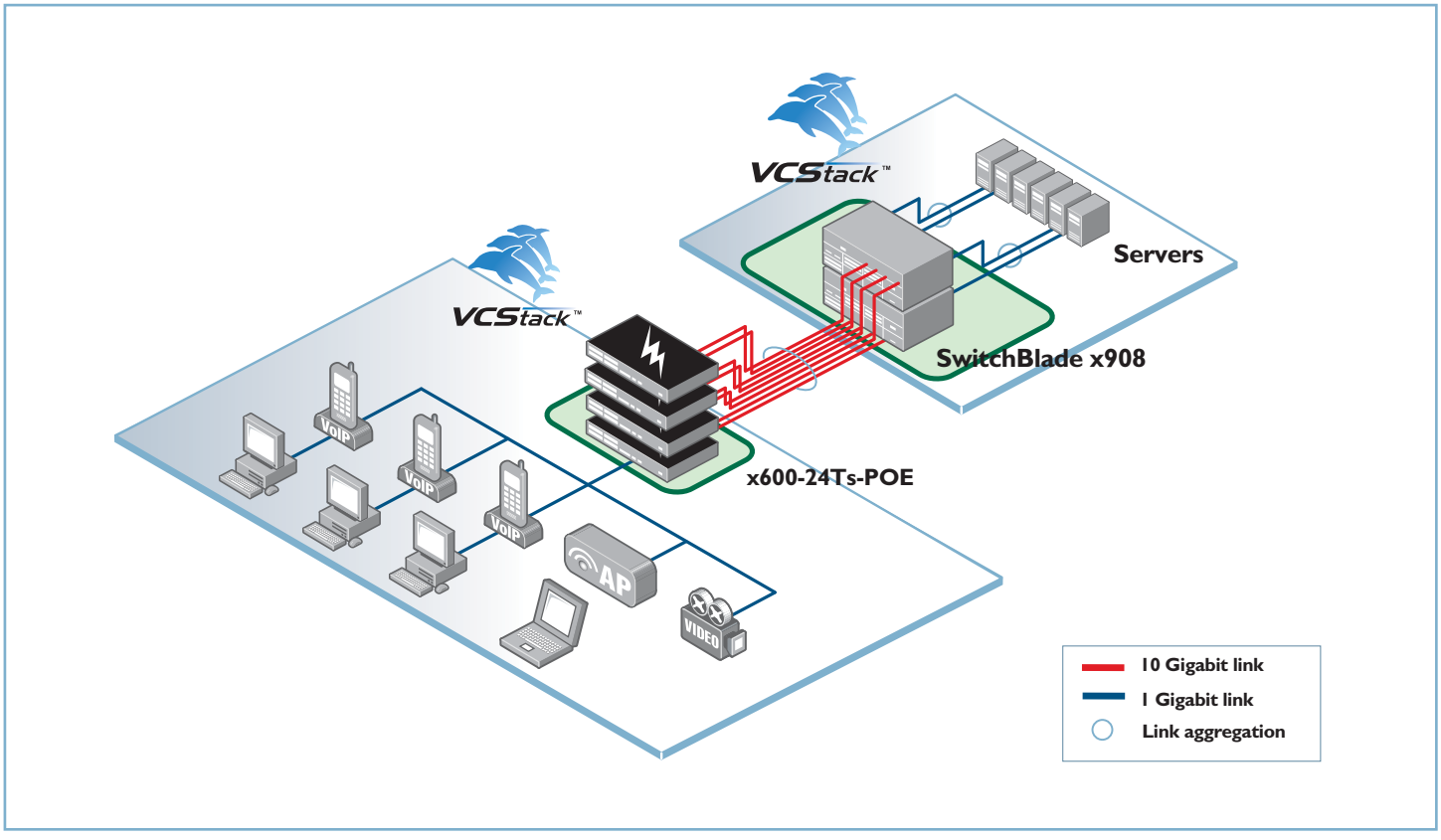

Diagram 1: PoE Provision

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.

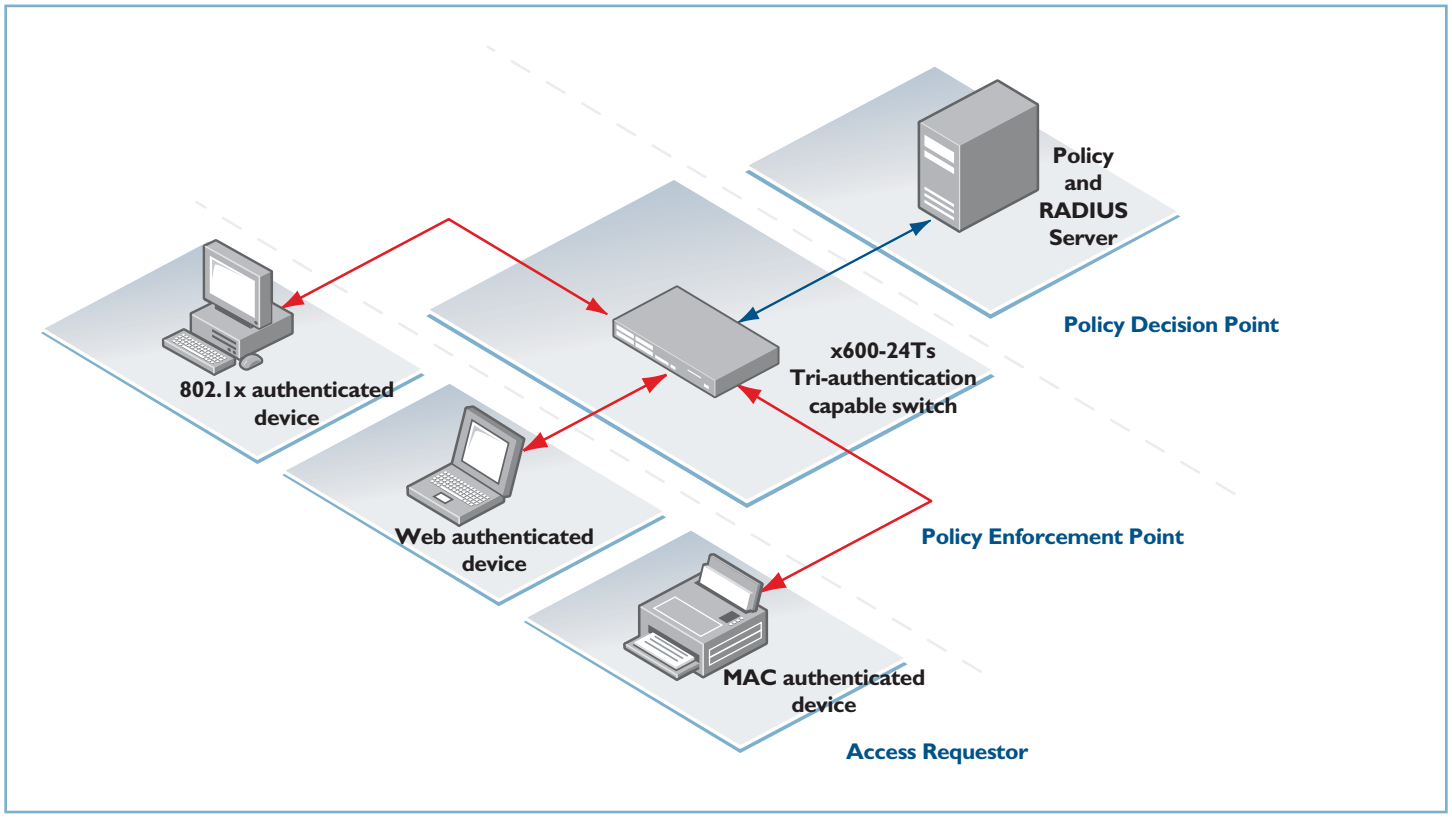

Diagram 2: NAC with Tri-authentication

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.

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.

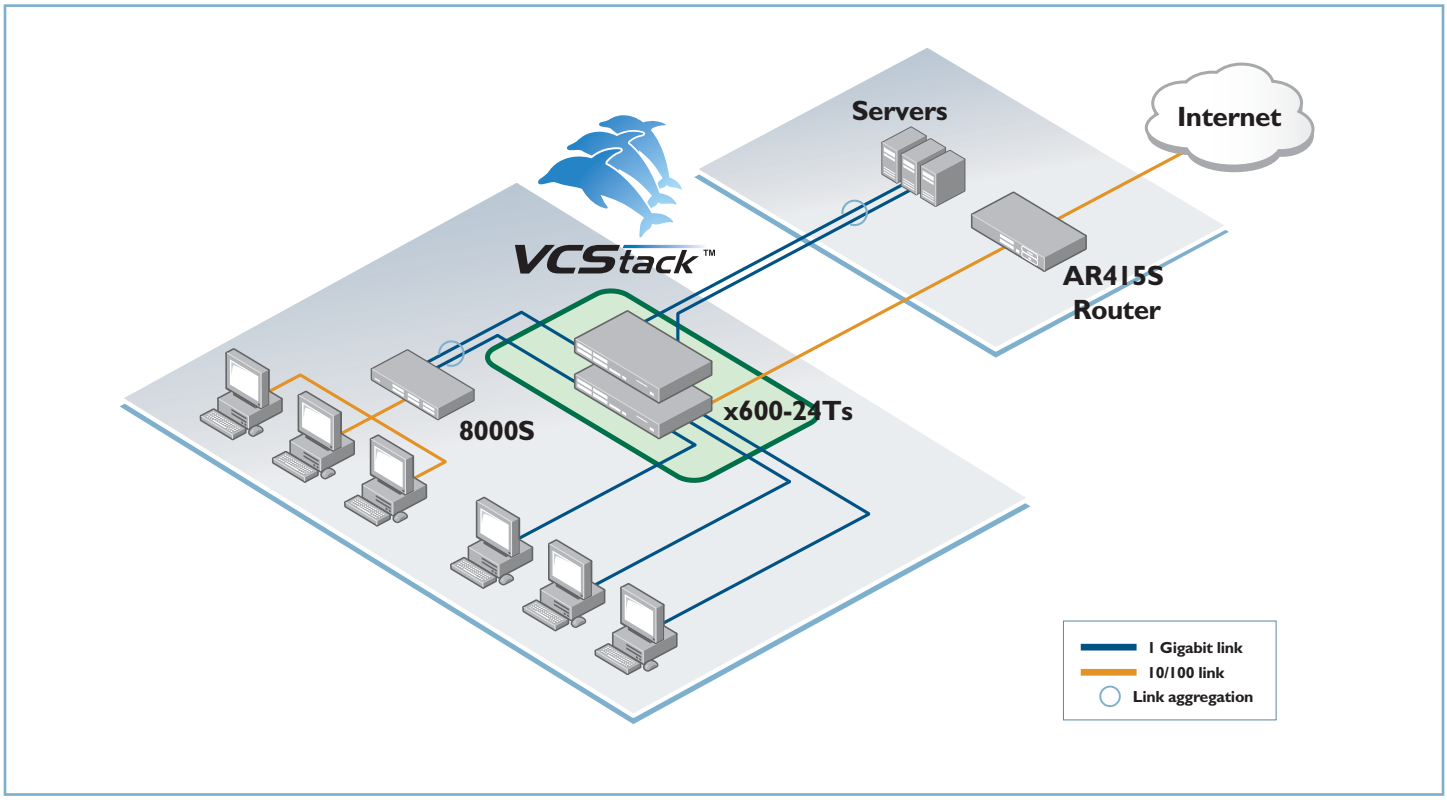

Diagram 3: VCStack - Resilient Network

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.

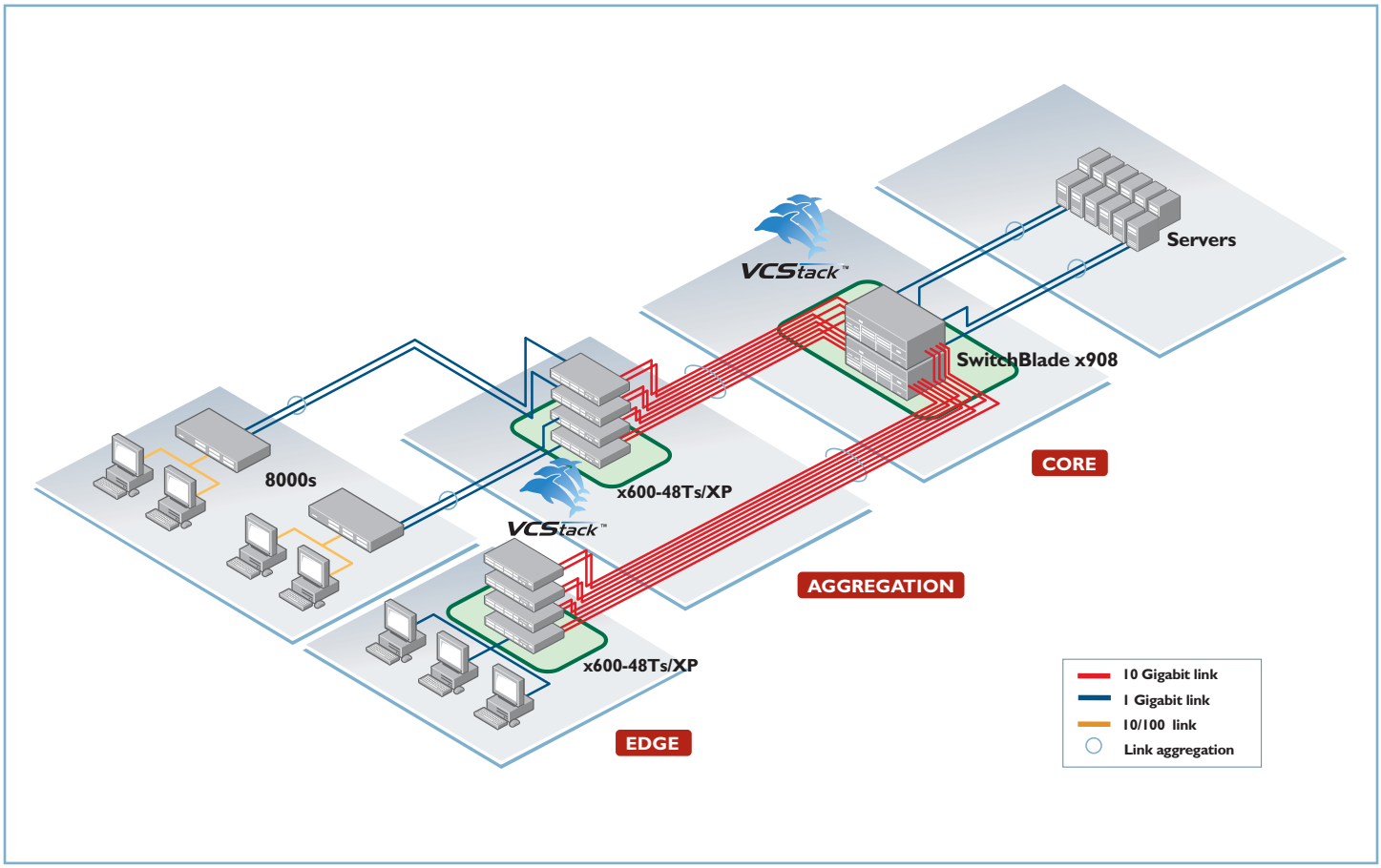

Diagram 4: VCStack - Scalable Port Density

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

The x600 24 and 48 Series:

x600-24Ts
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

x600-24Ts-POE
24 x 10/100/1000BASE-T (RJ-45) copper ports with PoE (802.3af), 15.4 Watts per port
4 x 1000BASE-X SFP combo ports
2 x 24 Gbps on board stacking ports

x600-24Ts/XP
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

x600-48Ts
44 x 10/100/1000BASE-T (RJ-45) copper ports
4 x 1000BASE-X SFP ports
1 x expansion bay for AT-StackXG module

x600-48Ts/XP
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

Performance

- Switching Fabric:
  x600-24Ts - 96 Gbps
  x600-24Ts-POE - 96 Gbps
  x600-24Ts/XP - 136 Gbps
  x600-48Ts - 144 Gbps
  x600-48Ts/XP - 184 Gbps

- Forwarding Rate[1]:
  x600-24Ts - 71.4Mpps
  x600-24Ts-POE - 71.4Mpps
  x600-24Ts/XP - 101.2Mpps
  x600-48Ts - 107.1Mpps
  x600-48Ts/XP - 136.9 Mpps

- 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/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/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 31 Link Aggregation (802.3ad) groups
- Up to 150 VRRP groups
- Up to 16 EPSR domains
- Dynamic Link Failover
- Thrash Limiting
- Loop Detection
- VCStack Resiliency Link
- IGMP Query Solicitation

Routing

- Up to 5K RIP routes
- Up to 8K OSPF 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
- Web-based authentication
- BPDU Protection
- STP Root Guard
- DoS attack blocking
- ACLs
- Local RADIUS server

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

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 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)

Physical Dimensions

Model	Height	Width	Depth	Mounting
x600-24	44mm	440mm	305mm	1RU rack mount
x600-24Ts-POE	44mm	440mm	408mm	1RU rack mount
x600-48	44mm	440mm	305mm	1RU rack mount

Weights

Product	Unpackaged	Packaged
x600-24Ts	4.50 kg	6.10 kg
x600-24Ts-POE	6.90 kg	8.50 kg
x600-24Ts/XP	4.60 kg	6.20 kg
x600-48Ts	4.90 kg	6.50 kg
x600-48Ts/XP	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 5.3.3

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

Diagnostic Tools

BIST (Built-In Self Test)
Ping Polling
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 802.3ae 10 Gigabit Ethernet
IEEE 802.3u 100BASE-T
IEEE 802.3x Flow Control - Full Duplex Operation
IEEE 802.3z Gigabit Ethernet

General Routing

Directed Broadcast Forwarding
ECMP Equal Cost Multi Path 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 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 2463 ICMPv6
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 Conversions 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 4443 Internet Control Message Protocol (ICMPv6)

Management

AT Enterprise MIB
Control Plane Prioritisation
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 Virtual LAN Extensions (VLAN)
RFC 2741 Agent Extensibility (AgentX) Protocol
RFC 2787 Definitions of Managed Objects for VRRP
RFC 2790 Host MIB
RFC 2819 RMON MIB
RFC 2863 Interfaces Group MIB
RFC 3164 Syslog Protocol
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
MLD Snooping (v1 and v2)
RFC 1112 Host extensions for IP multicasting
RFC 2236 Internet Group Management Protocol v2 (IGMPv2)
RFC 2362 PIM-SM
RFC 2715 Interoperability Rules for Multicast Routing Protocols
RFC 3376 IGMPv3
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
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 3101 OSPF Not-So-Stubby Area (NSSA) Option
RFC 3509 Alternative Implementations of OSPF Area Border Routers

Quality of Service

ACLs Access Control Lists
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
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
Dynamic VLAN Assignment
Guest VLAN support (IEEE 802.1x)
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
Roaming Authentication
SSH Remote Login
SSLv2
SSLv3
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 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

SCP Secure Copy
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 NTPv3
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

Private VLANs
IEEE 802.1ad VLAN double tagging (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

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/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
AT-SPLX10	1000BASE-LX GbE single-mode 1310nm 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
AT-SPBD10-13	1000BASE-BX Bi-Di (1310nm Tx, 1490nm Rx) fiber up to 10km
AT-SPBD10-14	1000BASE-BX Bi-Di (1490nm Tx, 1310nm Rx) fiber up to 10km
AT-SPEX	1000BASE-SX multi-mode fiber extender up to 2km

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

Stacking accessories

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

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

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

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

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
AT-FL-RADIUS-FULL	Increase local RADIUS server support limits	• 5000 users • 1000 NAS *Note - 100 users and 24 NAS included with base license.*

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.

USA Headquarters | 19800 North Creek Parkway | Suite 100 | Bothell | WA 98011 | USA | T: +1 800 424 4284 | F: +1 425 481 3895
European Headquarters | Via Motta 24 | 6830 Chiasso | Switzerland | T: +41 91 69769.00 | F: +41 91 69769.11
Asia-Pacific Headquarters | 11 Tai Seng Link | Singapore | 534182 | T: +65 6383 3832 | F: +65 6383 3830

www.alliedtelesis.com