x900 Gigabit Series

Advanced Gigabit Layer 3+ Expandable Switches

The x900 Layer 3+ switches have high-speed 60Gbps expansion bays which provide a high level of port flexibility and application versatility, unmatched by any other 1RU Gigabit Ethernet switch on the market.

VCStack™ provides excellent **resiliency** by allowing you to create a single "virtual chassis" from two physical devices. VCStack delivers a resilient core at a fraction of the cost of a full chassis-based system, and it allows you to manage the stack as a single node on the network, greatly simplifying your management tasks.

The x900 Layer 3+ switches utilize a sophisticated, **highly modular design**, allowing growth in response to network demands. There is a comprehensive range of hot-swappable copper and fiber expansion modules (XEMs) available, from 10/100/1000Mbps to 10 Gigabit Ethernet (10GbE). Dual redundant Power Supply Units (PSUs) are also hot-swappable, adding to the impressive list of high-availability features.

The x900 Layer 3+ switches run the advanced **AlliedWare Plus™ Layer 3 Fully Featured Operating System** delivering a rich feature set and an industry-standard CLI. AlliedWare Plus is Allied Telesis' next generation operating system, providing advanced IPv4 and IPv6 features and even greater robustness and ease of management.

What's new?

- XEM-2XS
- Virtual Routing and Forwarding (VRF) Lite
- Open Shortest Path First (OSPFv3)
- TACACS+ Authentication

For more information, go to page 3

Key Features

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

Scalable - Add more XEMs as your network grows. Create a VCStack to increase port density and resiliency without increasing management complexity.

Reliable - Hot-swappable XEMs, redundant hot-swappable PSUs ensure no network interruptions during maintenance or reconfiguration.

High-performing - Non-blocking architecture and superior QoS ensure wire-speed delivery of all your critical IPv4 and IPv6 traffic. The x900 family is 'IPv6 Ready' phase 2 certified.

Easy to manage - The industry standard CLI reduces training requirements, and each VCStack appears as one virtual chassis with a single IP address to simplify management.

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.

Resilient

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

VCStack

VCStack delivers a resilient core at a fraction of the cost of a full chassis-based system. You can create a single "virtual chassis" from two physical devices. VCStack provides a highly available system where network resources are spread out across stacked units, reducing the impact should one of the stacked units fail. You can aggregate switch ports on different units, for excellent high availability.

Control Plane Prioritization (CPP)

Ensure maximal 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.

Scalable

Add more XEMs as your network grows. Add more devices to a VCStack to increase port density and resiliency without increasing management complexity.

Our high speed XEMs provide both copper and fiber connectivity, delivering the ultimate in flexibility. XEM options are:

- AT-XEM-1XP - 1 x 10GbE (XFP) port
- AT-XEM-2XP - 2 x 10GbE (XFP) ports
- AT-XEM-2XS - 2 x 10GbE (SFP+) ports
- AT-XEM-2XT - 2 x 10GbE (RJ-45) ports
- AT-XEM-12S - 12 x 100/1000BASE-X SFP ports
- AT-XEM-12T - 12 x 10/100/1000BASE-T (RJ-45) ports
- AT-XEM-STK - 2 x high speed stacking ports

All XEMs provide non-blocking performance. XEMs are ideal for aggregating gigabit to the desktop or for gigabit uplinks from Fast Ethernet switches.

Reliable

Hot-swappable XEMs, redundant hot-swappable PSUs and replaceable fans ensure no network interruptions during maintenance or reconfiguration.

10GbE expansion modules and hotswappable XFPs provide high-speed, high-capacity fiber uplinks, with the option of either 10Gbps or 20Gbps uplink capacity to the network core.

The x900 Layer 3+ switches operate with one PSU - installing a second PSU provides redundancy. Internal PSUs eliminate the need for an external Redundant Power Supply (RPS) that occupies valuable rack space. Built-in redundancy guarantees the continued delivery of essential services. The x900 switches also feature front-to-back cooling, maximising their reliability.

High-performing

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

Ethernet Protected Switched Rings (EPSRing™)

EPSR and 10 GbE modules allow several x900-24X switches to form a protected ring with 50ms failover. This feature is perfect for high performance at the core of enterprise or provider access networks.

Wire speed switching

The x900 Layer 3+ switches have fully non-blocking switching on all ports, so IPv4 Layer 2 switching and Layer 3 routing 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.

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 applications take precedence over non-essential services like file downloads, maintaining responsiveness of Enterprise applications. Unmatched QoS accuracy is achieved with a bandwidth limit resolution down to 1Kbps, which is ideal for precise control of Enterprise desktop-based VoIP applications.

Easy to manage

The industry standard CLI reduces training requirements, and each VCStack appears as one virtual chassis with a single IP address to simplify management.

The x900 Layer 3+ switches run the advanced AlliedWare Plus™ Layer 3 Fully Featured Operating System delivering a rich feature set and an industry-standard CLI. Using VCStack allows stacked devices to appear as a single node on the network, greatly simplifying your management.

Administrators can choose from a range of secure remote management options including SNMPv3 and SSH.

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.

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 x900 Layer 3+ switches support NAC by using 802.1x port-based authentication in partnership with standards-compliant dynamic VLAN assignment to enable a user's adherence to the network's security policies to be assessed and authentication either granted or remediation offered.

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. Furthermore, if multiple users share a port then multi-authentication can be used and a Guest VLAN (also known as Default VLAN) can be configured to provide a catch-all for users without an 802.1x supplicant. As well as supporting a RADIUS client for remote authentication, the x900 Layer 3+ switches have a built-in RADIUS server for local authentication.

Additional security features include a full RADIUS client and server implementation for remote and local user authentication, Private VLANs to provide port isolation when multiple customer use the same VLAN, and STP Root Guard to protect against an unauthorised device becoming the STP Root Bridge.

What's new?

XEM-2XS

High speed SFP+ expansion module providing non-blocking 10GBE connectivity.

Virtual Routing and Forwarding (VRF) Lite

VRF-Lite provides Layer 3 network virtualization by dividing a single router 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.

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.

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.

Key Solution - Virtual Chassis Stacking (VCStack)

VCStack - Resiliency and Stability

Today's enterprises rely 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, starting with a resilient network core. The Allied Telesis expandable x900 series switches provide the ideal solution - without the expense of a full chassis. With the benefits of high availability, increased capacity and ease of management, VCStack makes networking reliable and simple.

Using Virtual Chassis Stacking (VCStack) at the core of 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. The diagram below 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.

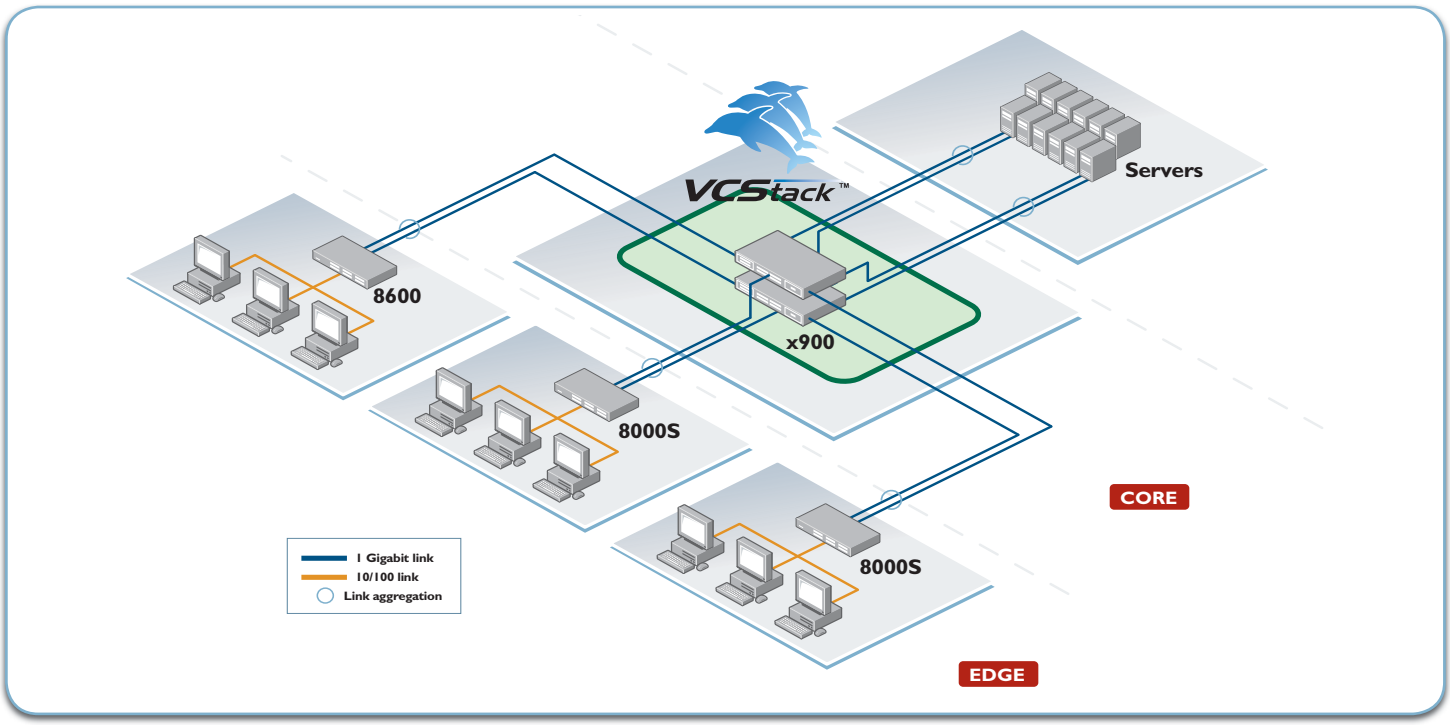

Diagram 1: Resilient Core

Key Solution - Ethernet Protection Switching Ring (EPSR)

EPSR - Resiliency and Fault Tolerance

The increased convergence of services and applications in the enterprise has led to increasing demand for highly available networks with minimal downtime. High bandwidth is also required for the multiple applications simultaneously using the network. Real-time applications like surveillance, video streaming and voice over IP (VoIP) are used right alongside data and Internet access.

When you want a high-performing, resilient network for your enterprise core, using EPSR with the Allied Telesis SwitchBlade x908 and x900 series switches provides the ideal solution. EPSR creates a high-speed resilient ring that can utilize today's maximum Ethernet standard of 10Gbps, and provide extremely fast failover between nodes. EPSR enables rings to recover within as little as 50ms, preventing a node or link failure from affecting customer experience, even with demanding applications such as IP telephony and video monitoring.

The below diagram shows a corporate network based on a central EPSR ring. The inclusion of Allied Telesis Virtual Chassis Stacking (VCStack) technology at the core of the network adds a further layer of resiliency, increasing the availability of critical resources.

Now that technology has made high-availability and high-bandwidth so accessible; corporate business, education providers and other enterprise network users can enjoy the benefits that EPSR has to offer. By ensuring always-available online applications and resources, this advanced self-healing network technology meets the insatiable demand for information at the fingertips.

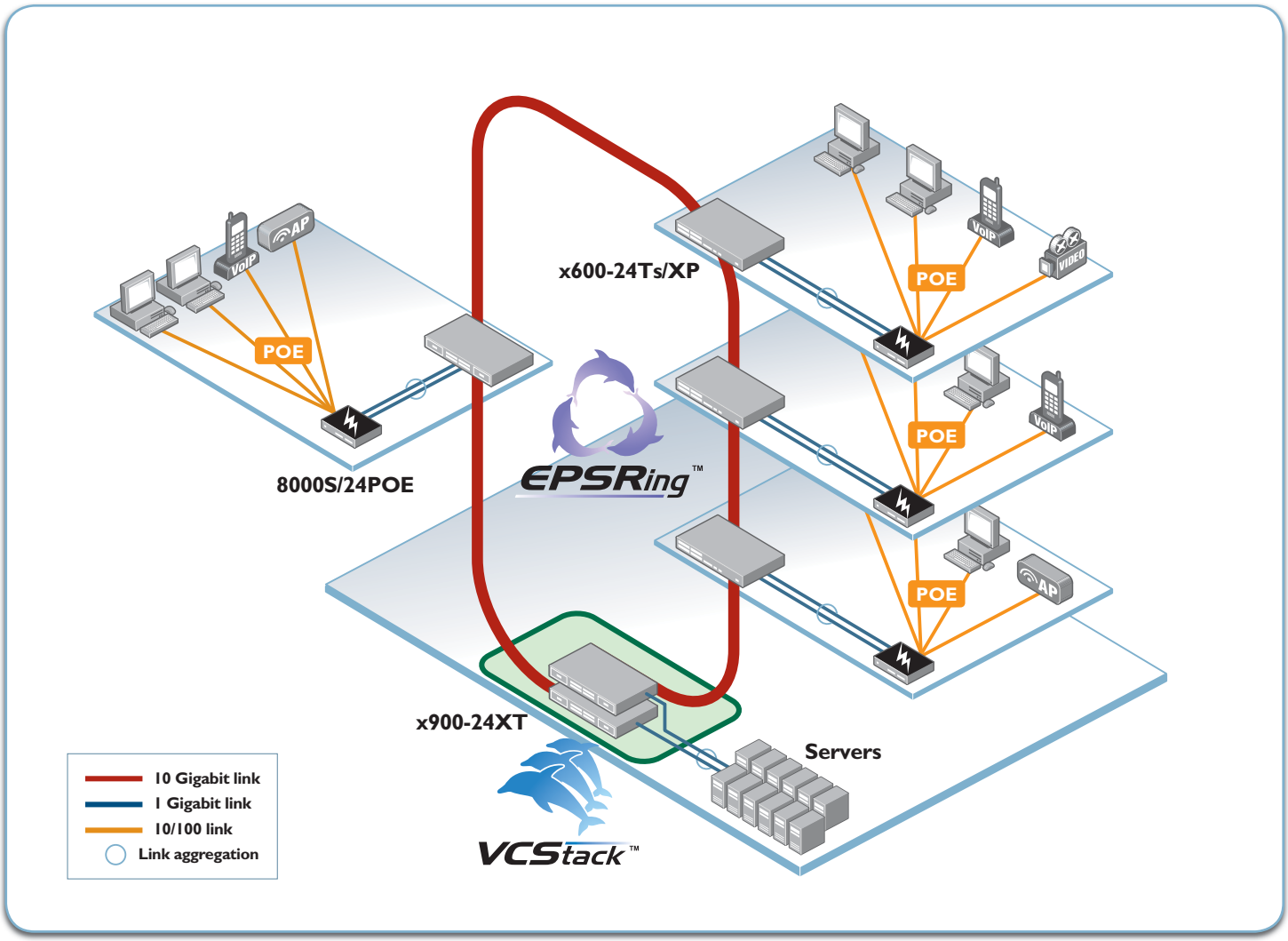

Diagram 2: Corporate EPSR network

The x900 Gigabit Series:

x900-24XT

2 x 60Gbps expansion bays
24 x 10/100/1000BASE-T (RJ-45) copper ports

x900-24XT-N

NEBS Compliant[1]
2 x 60Gbps expansion bays
24 x 10/100/1000BASE-T (RJ-45) copper ports

x900-24XS

2 x 60Gbps expansion bays
24 x 100/1000BASE-X SFP ports

x900-12XT/S

1 x 60Gbps expansion bay
12 x combo ports (10/100/1000BASE-T copper or SFP)

Performance

- Forwarding Rate:
  x900-24X: 110.1Mpps[2]
  x900-12XT/S: 62.5Mpps[3]
- Switching Fabric:
  x900-24X: 168Gbps
  x900-12XT/S: 84Gbps
- Extensive wire-speed traffic classification for ACLs and QoS
- Supports 10KB Jumbo frame size for data center and server aggregation applications
- Wire-speed multicasting
- Up to 256K IPv4 routes
- Up to 16K MAC addresses
- Up to 4K layer 2 multicast groups
- 4K layer 3 interfaces
- Up to 1K layer 3 IPv4 multicast groups
- 4K VLANs
- 512MB DDR SDRAM
- Separate packet buffer memory
- 64MB Flash Memory

Reliability

- MTBF:

x900-24X

With 1 PSU and 1 fan module: 93,700 hours
With 2 PSUs: 249,400 hours (calculated using Telcordia SR-332 (Issue1, May 2001) at 25°C ambient operating temperature)

x900-12XT/S - 103,000 hours

- Modular AlliedWare Plus operating system
- The x900-24X switches feature dual hot swappable PSUs with 1 + 1 redundancy
- Dual feed support - a separate power circuit can feed each power supply providing extra reliability
- Hot-swappable XEMs
- Full environmental monitoring of PSUs, fans, temperature and internal voltages, with SNMP traps to alert network managers in case of failure

1 NEBS (Network Equipment Building System) is a series of safety and conformance standards applied to telecommunications equipment in North America.
2 With one XEM-2XP and one stacking module installed
3 With one stacking module installed.

Power Characteristics

- AC Voltage: 100 to 240V (+/-10% auto ranging)
- Frequency: 47 to 63Hz
- DC Voltage: : 40 to 60V

Power Consumption

x900-24X

With 1 PSU and 1 fan module:
110 Watts (375 BTU/hr)
With 2 PSUs and 2 XEM-1XP modules:
191 Watts (652 BTU/hr)

x900-12XT/S

With 1 XEM-12: 104 Watts (355 BTU/hr)
With no XEM: 68 Watts (232 BTU/hr)

Environmental Specifications

- Operating Temperature Range:
  x900-24X 0°C to 40°C (32°F to 104°F)
  x900-12XT/S 0°C to 50°C (32°F to 122°F)
  Derated by 1°C per 305 Meters (1000ft)
- Storage Temperature Range: -30°C to 70°C (-13°F to 158°F)
- Operating Relative Humidity Range: 5% to 80% non-condensing
- Storage Relative Humidity Range: 5% to 95% non-condensing
- Altitude: 3,050 Meters max (10,000ft)

Expandability

- 2 high speed 60Gbps expansion bays
- IPv6 routing License option
- Advanced Layer 3 license option

Flexibility and compatibility

- 60Gbps expansion bays supporting a choice of modules, including 1x 10GbE, 2 x 10GbE, 12 x 1GbE (SFP), and 12 x 1GbE (RJ45) for port flexibility and application versatility
- XEM modules are compatible with the SwitchBlade x908 Layer 3 modular switch
- Gigabit SFP ports will support any combination of 10/100/1000BASE-T, 100BASE-X, or 1000BASE-X SFPs 100BASE-FX, 100BASE-BX, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX or 1000BASE-ZX CWDM SFPs

Resiliency

- STP, RSTP, MSTP (802.1s)
- Up to 31Link Aggregation (802.3ad) groups
- Up to 255 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 15K OSPF routes (with license)
- Up to 8K OSPFv3 routes (with license)
- Up to 5K BGP routes (with license)
- Up to 5K RIPng routes (with license)
- Route Maps
- VRF-Lite (with license)

VLAN support

- Supports 4096 VLANs
- Supports 4096 IP interfaces
- VLAN Double Tagging

Security

- Private VLANs, providing security and port isolation of multiple customers using the same VLAN
- 802.1x support (including multi-supplicant)
- MAC-based Authentication
- Web-based Authentication
- Dynamic VLAN Assignment
- DHCP Snooping
- Strong Passwords
- NAC
- BPDU Protection
- STP Root Guard
- Local RADIUS server
- TACACS+ Authentication

Quality of Service

- Policy based QoS features
- Highly configurable traffic classification
- Extensive remarking capabilities, to fit in with any network's QoS scheme
- Control plane traffic prioritization
- Mixed scheduling, to support complex traffic queuing requirements
- 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 1Kbps
- Low switching latency essential for Voice over IP (VoIP) and real-time streaming media applications

Management

- GUI
- Out of band 10/100/1000 Ethernet management port and console management port, both 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
- Local RADIUS database and 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
- sFlow

Physical Dimensions

Model	Height	Width	Depth	Mounting
x900-24X	44.5mm	440mm	440mm	1RU
x900-12XT/S	44.5mm	440mm	350mm	1RU
XEM	45mm	109mm	253mm	n/a
PSU	40mm	84mm	299mm	n/a

Weights

Product	Configuration	Weight
x900-24X	With 1 PSU and 1 fan module, unpackaged	7.3 kg
	With 1 PSU and 1 fan module, packaged	8.8 kg
	With 2 PSUs and 2 XEM-1XP modules, unpackaged	9.3 kg
	With 2 PSUs and 2 XEM-1XP modules, packaged	10.8 kg
x900-12XT/S	No XEM, unpackaged	5.3 kg
	No XEM, packaged	7.9 kg
	With XEM-1XP, unpackaged	6 kg
	With XEM-1XP, packaged	8.6 kg
AT-PWR01	AC, unpackaged	1 kg
	AC, packaged	1.8 kg
	DC, unpackaged	1 kg
	DC, packaged	1.5 kg
AT-FAN01	Unpackaged	0.6 kg
	Packaged	1.4 kg
XEM	Unpackaged	0.82 kg
	Packaged	1.4 kg
PSU	Unpackaged	1.32 kg
	Packaged with 1 cable	1.9 kg

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
NEBS: GR63, GR1089 level 3. x900-24XT-N and XEM-12S

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

Singapore

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 802.3ae 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
VRF-Lite
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 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 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

Control Plane Prioritisation (CPP)
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
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
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

Product	Description
AT-x900-24XT-xx	Advanced Gigabit Layer 3+ Expandable Switch 2 x High Speed Expansion Bays + 24 x 10/100/1000BASE-T (RJ-45) ports 1 PWR01-xx PSU
AT-x900-24XT-N-85	NEBS Compliant Advanced Gigabit Layer 3+ Expandable Switch 2 x High Speed Expansion Bays + 24 x 10/100/1000BASE-T (RJ-45) ports 1 DC PWR01-80 PSU
AT-x900-24XS-xx	Advanced Gigabit Layer 3+ Expandable Switch 2 x High Speed Expansion Bays + 24 x 100/1000BASE-X SFP ports 1 PWR01-xx PSU
AT-x900-12XT/S-yy	Advanced Gigabit Layer 3+ Expandable Switch 1 x High Speed Expansion Bay + 12 x combo ports (10/100/1000BASE-T copper or SFP) 1 fixed AC PSU
AT-PWR01-xx	Hot-swappable load-sharing power supply
AT-FAN01	Fan only module
AT-XEM-1XP	1 x 10GbE (XFP) port
AT-XEM-2XP	2 x 10GbE (XFP) ports
AT-XEM-2XS	2 x 10GbE (SFP+) ports
AT-XEM-2XT	2 x 10GbE (RJ-45) ports
AT-XEM-12S	NEBS compliant 12 x 100/1000BASE-X SFP ports
AT-XEM-12T	12 x 10/100/1000BASE-T (RJ-45) ports
AT-XEM-STK (Stacking cables sold separately)	2 x High Speed stacking ports
AT-XEM-STK-CBL0.5	Half meter stacking cable
AT-XEM-STK-CBL2.0	Two meter stacking cable

Where xx = 20 for no power cord
60 for all power cords
80 for 48VDC power supply

Where yy = 20 for no power cord
60 for all power cords

10GbE SFP+ Modules

For use with XEM-2XS

Module	Description
AT-SP10SR	10GSR 850nm short-haul 300m with MMF
AT-SP10LR	10GLR 1310nm medium-haul 10km with SMF
Cable	**Description**
AT-SP10TW1	1 meter SFP+ direct attach cable
AT-SP10TW3	3 meter SFP+ direct attach cable
AT-SP10TW7	7 meter SFP+ direct attach cable

SFP Modules

Module	Description
AT-SPFX/2	100BASE-FX multi-mode 1310nm fiber up to 2km
AT-SPFX/15	100BASE-FX single-mode 1310nm fiber up to 15km
AT-SPFX/40	100BASE-FX single-mode 1310nm fiber up to 40km
AT-SPFXBD-LC-13	100BASE-BX Bi-Di (1310nm Tx, 1550nm Rx) fiber up to 15km
AT-SPFXBD-LC-15	100BASE-BX Bi-Di (1550nm Tx, 1310nm Rx) fiber up to 15km
AT-SPTX[1]	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

For use with XEM-1XP and XEM-2XP

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

Feature licenses

Name	Description	Includes
AT-FL-X900-01	x900 Advanced Layer 3 license	• OSPF[2] • BGP4 • PIMv4 • VLAN double tagging (Q in Q) • VRF Lite
AT-FL-X900-02	x900 IPv6 Pack	• IPv6 Static Routes • IPv6 Management • Ipv6 Unicart 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.

1 The AT-SPTX is not supported on the x900-12XT/S.

2 64 OSPF routes included in base software.

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

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