Building Resilient Networks
Product Combinations and Design Options
The Allied Telesis Resilient Network Solution for small and medium enterprises is created by the innovative combination of VCStack™ and Link Aggregation. The advantages of this solution are presented in the "Resilient Networking with VCStack" technology solution, and an example configuration is detailed in the "VCStack Tested Solution". Both of these documents are available on the Allied Telesis website: http://www.alliedtelesis.com/resources/literature/literature.aspx?id=5

This solution is not tied to a particular set of products, or to a specific connectivity design. The flexibility of the solution, and the integrated nature of the Allied Telesis product range, mean that the solution can be realised in multiple incarnations to meet different price points and performance requirements.

A number of factors must be considered when deciding upon a network design and the products with which to realise that design:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Option 1</th>
<th>vs</th>
<th>Option 2</th>
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<tr>
<td>Gigabit to the desktop</td>
<td>vs 10/100 to the desktop</td>
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<tr>
<td>PoE</td>
<td>vs non-PoE</td>
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<tr>
<td>Copper</td>
<td>vs Fibre</td>
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<td>Non-blocking</td>
<td>vs Blocking Ratio</td>
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<td>L3 at the edge</td>
<td>vs L3 only in the core</td>
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<td>Intelligence right to the edge</td>
<td>vs Intelligence to the aggregation layer</td>
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<td>Dual PSU on core units</td>
<td>vs Single PSU on core units</td>
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<tr>
<td>High speed core stacking</td>
<td>vs Medium speed core stacking</td>
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The Allied Telesis LAN switch product range has been designed to offer options that allow multiple combinations of all these factors. As a network architect, you are not locked into a narrow set of options. You have the flexibility to create a network design that fits your needs, instead of being restricted by arbitrary vendor-imposed constraints.
A flavour of the full range of available possibilities can be gained by sampling a set of design options.

**Option 1: High performance gigabit to the desktop**

**Product combination:**
AT-9424Ts/XP at the access layer; AT-SBx908 virtual chassis core.

**Connectivity:**
Aggregated pairs of 10 gigabit links from Access to Core.

**Features:**
- Almost entirely non-blocking
- Gigabit to the desktop
- Configurable as L3 at the edge or L3 at the core

**Applications:**
- Data Centre
- Hospital
- Enterprise with high LAN bandwidth requirements

- Strong Security at the edge
- High speed core (160Gbps stacking bandwidth)
- High resiliency core with 2xPSU per core switch
- Pay-as-you-grow by sliding new 10-gig modules into core when required
**Option 2: Cost effective gigabit to the desktop**

**Product combination:**
AT-8000GS/24 at the access layer; AT-SBx908 virtual chassis core.

**Connectivity:**
Aggregated quads of 1-gigabit links from Access to Core.

**Features:**
- 5-to-1 blocking ratio.
- Gigabit to the desktop.
- Strong security at the edge.
- PoE option.
- High speed core (160Gbps stacking bandwidth).
- High resiliency core with 2xPSU per core switch.
- Pay-as-you-grow by sliding new 12 x 1-gig modules into core when required.

**Applications:**
- Enterprise with medium LAN bandwidth requirements.
- Tertiary education department.
- Public administration offices.
Option 3: High density gigabit to the desktop

Product combination:
AT-8000GS/48 at the access layer; AT-x900-12XT/S virtual chassis core.

Connectivity:
Aggregated sets of 8 x 1-gigabit links from Access to Core.

Features:
- Extremely good price per port
- 24-to-1 blocking ratio
- Gigabit to the desktop

Applications:
- Call centre
- Retail
- Transport hub (Airport, Railway station and so on)

- Strong Security at the edge
- Medium speed core (30Gbps stacking bandwidth)
- High resiliency core with 2xPSU per core switch
- Edge and core resiliency
Option 4: Fibre to the desktop

**Product combination:**
AT-x900-48FS at the access layer, AT-x900-24XS virtual chassis core.

**Connectivity:**
Aggregated sets of 4 x 1-gigabit links from Access to Core.

**Features:**
- High-security fully-fibre network
- Almost completely non-blocking
- Strong security and high intelligence (OSPF, PIM etc.) at the edge
- Configurable as L3 at the edge or L3 at the core
- Industry-leading QoS from End to End
- High resiliency core with 2xPSU per core switch

**Applications:**
- High security operation centre
- Military
Option 5: L3 PoE at the edge

Product combination:
AT-8624PoE at the access layer, AT-x900-24XT virtual chassis core.

Connectivity:
Aggregated sets of 2 x 1-gigabit links from Access to Core.

Features:
- Almost completely non-blocking
- Strong security and high intelligence (OSPF, PIM etc) at the edge
- Configurable as L3 at the edge or L3 at the core
- Power over Ethernet (PoE)
- High resiliency core with 2 power supplies per core switch
- Highly configurable, cost-effective PoE network

Applications:
- PoE surveillance camera installation
Option 6: Extremely cost-effective networking

Product combination:
AT-GS950/16 at the access layer; AT-8000GS/24 at the aggregation layer; AT-x900-12XT/S virtual chassis core.

Connectivity:
Single gigabit links from Access to Aggregation. Aggregated sets of 2 x 1-gigabit links from Aggregation to Core.

Features:
- Secure, resilient, manageable, intelligent, future-proof network at a very good price. Good value without sacrificing network quality.
- Strong security close to the edge
- Resilient Aggregation-Core design
- Configurable QoS, Multicasting, etc
- Fully gigabit
- Simple to expand and upgrade
- PoE options available

Applications:
- Primary, Secondary educational institutions
- Cost-conscious public or private sector operations
Summary:
The 6 examples above have just scratched the surface of the full set of possible product and connectivity configurations in which the Allied Telesis Resilient Network Solution can be deployed. They demonstrate, though, the broad range of applications which the Allied Telesis Enterprise switch range can support with cost-effective, secure, flexible LAN installations.

Allied Telesis provides the products and solution framework within which you can build the network you really need.

Virtual Chassis Stacking products
The following Allied Telesis products support Virtual Chassis Stacking:

SwitchBlade® x908
- Advanced Layer 3 Modular Switch
- 8 x 60Gbps expansion bays

The Allied Telesis SwitchBlade® x908 industry leading modular switch incorporates eight high speed 60Gbps expansion bays, delivering a new generation of high performance. The SwitchBlade x908 provides scalable and versatile switching solutions for today’s Enterprise networks.

Stacking between two units is supported via fixed stacking connectors on the rear of the chassis, providing 160Gbps of stacking bandwidth. Stacking of more than two units is via expansion modules (XEMs) on the front panel.

x900-12X and 24X Series
Advanced Gigabit Layer 3+ Expandable Switches

x900-24XT
- 2 x 60Gbps expansion bays
- 24 x 10/100/1000BASE-T (RJ-45) copper ports

x900-24XT-N
NEBS Compliant
- 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)

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x900-12XT/S
- 1 x 60Gbps expansion bay
- 12 x combo ports (10/100/1000BASE-T copper or SFP)
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. The expansion modules can be used in a variety of configurations to provide tailored solutions that meet wide-ranging physical networking requirements.

Multiple units can form a Virtual Chassis Stack with the XEM-STK expansion module.

**Access and Aggregation layer products**

The following Allied Telesis switch products are shown at the Access and Aggregation layers in the various design options discussed.

**AT-9400 Series**

Gigabit Ethernet Layer 3 Switches

**AT-9424T**

- Layer 3 managed switch with 20 x 10/100/1000Base-T ports
- 4 x 10/100/1000 / SFP combo ports

**AT-9424Ts**

- Layer 3 stackable switch with 20 x 10/100/1000Base-T ports
- 4 x 10/100/1000 / SFP combo ports plus 2 x XFP bays

**AT-9448Ts/XP**

- Layer 3 stackable switch with 48 x 10/100/1000Base-T ports
- 2 x XFP bays

**AT-9448Ts**

- Layer 3 switch with 48 x 10/100/1000Base-T ports
- 4 x SFP bays

**AT-9408LC/SP**

- Layer 2+ switch with 8-port 1000Base-SX (LC connectors)
- 4 x SFPs plus memory flash card slot

**AT-8000GS Series**

Managed stackable Gigabit Ethernet edge switches

**AT-8000GS/24**

- 24 x 10/100/1000T ports
- 4 x standby SFP bays (unpopulated)

**AT-8000GS/24POE**

- 24 x 10/100/1000T ports, Power over Ethernet
- 4 x standby SFP bays (unpopulated)
AT-8000GS/48
■ 48 x 10/100/1000T ports
■ 4 x standby SFP bays (unpopulated)

AT-8860 Series
Layer 3 Fast Ethernet Switches

AT-8624T/2M
■ 24 x 10/100BASE-T ports
■ 2 x Uplink Module Bays

AT-8648T/2SP
■ 48 x 10/100BASE-T ports
■ 2 x SFP ports in combo with 2 x 10/100/1000T uplink ports (RJ-45)

AT-8624POE
■ 24 x 10/100BASE-T ports with PoE
■ 2 x Uplink Module Bays

AT-GS950 Series
Gigabit WebSmart switches

AT-GS950/8
■ 8 x 10/100/1000T ports
■ 2 x SFP combo ports

AT-GS950/16
■ 16 x 10/100/1000T ports
■ 2 x SFP combo ports

AT-GS950/24
■ 24 x 10/100/1000T ports
■ 2 x SFP combo ports

AT-GS950/48
■ 48 x 10/100/1000T ports
■ 4 x SFP combo ports
About Allied Telesis Inc.

Allied Telesis is a world class leader in delivering IP/Ethernet network solutions to the global marketplace. We create innovative, standards-based IP networks that seamlessly connect you with voice, video and data services.

Enterprise customers can build complete end-to-end networking solutions through a single vendor, with core to edge technologies ranging from powerful 10 Gigabit Layer 3 switches right through to media converters.

Allied Telesis also offer a wide range of access, aggregation and backbone solutions for Service Providers. Our products range from industry leading media gateways which allow voice, video and data services to be delivered to the home and business, right through to high-end chassis-based platforms providing significant network infrastructure.

Allied Telesis’ flexible service and support programs are tailored to meet a wide range of needs, and are designed to protect your Allied Telesis investment well into the future.

Visit us online at www.alliedtelesis.com