

Tested Solution: Network in a Box

An important component in the success of a small to medium business is knowing how to operate effectively whilst keeping overheads at an appropriate level. It's not about cutting corners and avoiding expenditure at all costs. The key is recognising the right investments to make in the prime foundations of the business – getting the right office location, appointing the right staff, installing the right IT infrastructure, etc. Making good value choices in these areas leads to the optimum use of operating expenditure.

Allied Telesis have created a solution that provides an extremely good value LAN infrastructure proposition to a small business that is growing. The factors that add up to good value in LAN infrastructure are:

- Low entry cost
- Simple expansion in low-cost increments
- Simple management
- High reliability
- Strong security
- Future-proofing

The Allied Telesis **Network in a Box** solution provides all of these factors.

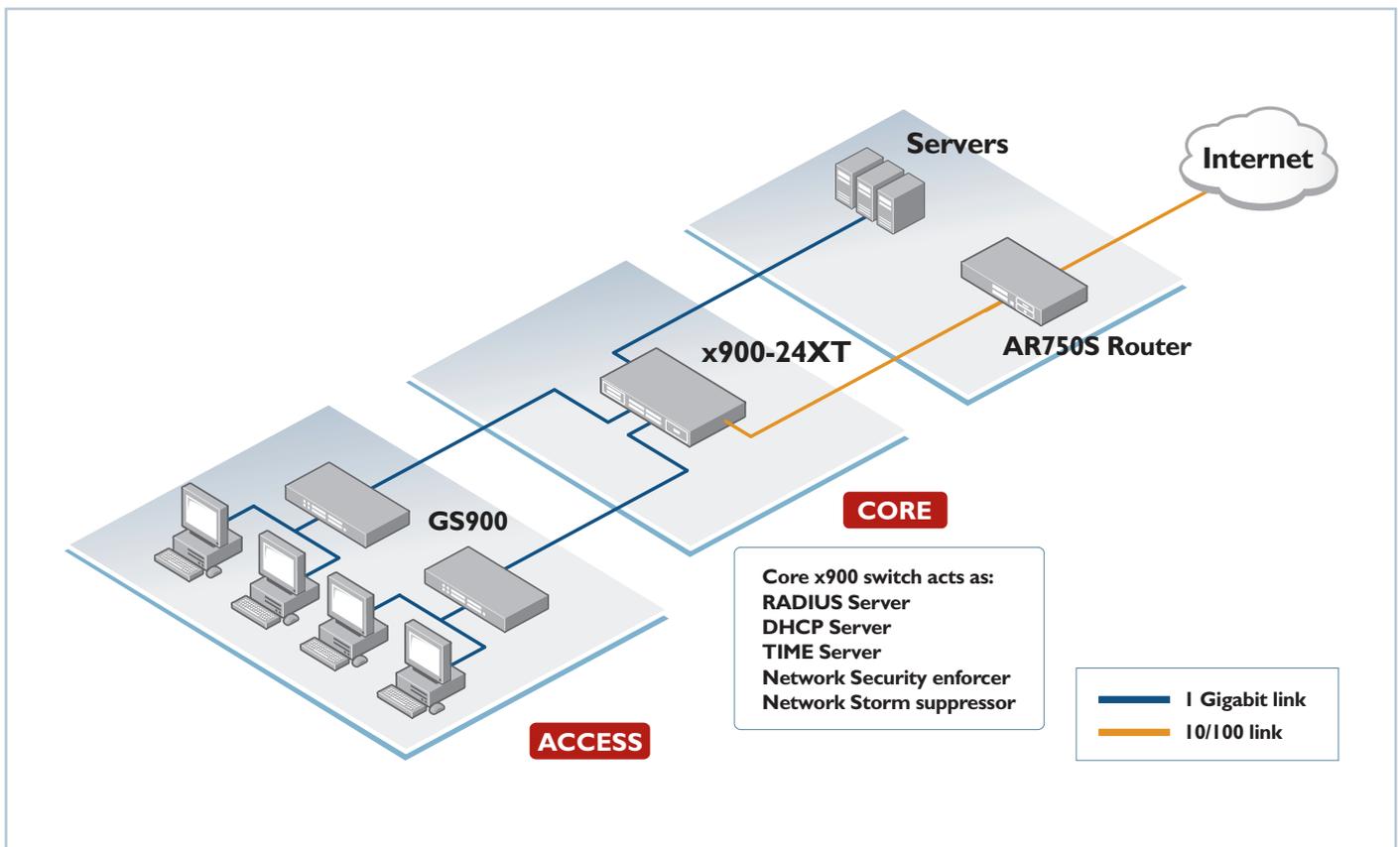


Diagram 1: Network in a Box

Solution overview

At the heart of the solution is a single high-capacity, secure, intelligent switch, which runs the core network services.

Feeding into this switch are low-cost gigabit access switches. These access switches can be added in a pay-as-you-grow fashion. The access switches themselves require no configuration, and attaching new access switches to the central switch requires no reconfiguration of the central switch. Thereby, network expansion is a truly plug-and-play process.

All that is required to add new users to the network is adding their names and passwords to a secure user database.

Core Services

As shown in the diagram on page 1, the central switch is operating multiple services.

DHCP server

The switch controls all the IP address management in the network. It will ensure completely consistent allocation of IP addresses, gateway addresses, DNS addresses to all client PCs. Creation of a sufficiently large address pool in the initial configuration of the switch will mean that this configuration will never need to be touched again as the network grows. As new users are added to the network, they will be allocated new addresses from the pool automatically.

Radius server

The proliferation of highly mobile networking devices, and the importance of data security, make it imperative that all devices connecting to a network be authenticated before gaining access. By far the most popular authentication technology in current use is the 802.1x protocol. 802.1x invariably requires the presence of a Radius server on the network to hold the users' authentication details.

The **Network in a Box** solution integrates the Radius server into the authenticating switch. This integration has multiple benefits:

- -Zero setup time for the Radius server. Simply load the configuration script onto the switch, and the Radius server is running. No time is spent installing and integrating a Radius service onto another server.
- Extremely simple addition of new users. The command interface to the embedded Radius Server is optimized to network user authentication, and so is not cluttered by irrelevant details.
- Guaranteed interoperability with the authenticating switch.
- Guaranteed availability to the authenticating switch. Availability of the RADIUS server is vital in a secure network. Having the RADIUS server embedded in the authenticating switch ensures that the network will not be halted by a connectivity or server problem.

Network Time server

Time synchronisation across a network underlies the smooth operations of all sorts of network applications. Therefore, it is important to have a network time server that is always available to all devices connected to the network.

The Network in a Box solution sets up the central switch as the network time server. Once again, this simplifies the network installation, and eliminates any potential problems that could be caused by server connectivity or server application failures.

Reliability

The primary requirement for keeping network operating expenditure low is that the network be reliable. The Network in a Box solution provides three levels of reliability:

Hardware reliability – Allied Telesis switches have a very low return rate. Quality and reliability are maintained by strict process control from design right through to manufacture and distribution. Additionally, a power feed redundancy option in the central switch provides backup against the most common cause of device outage.

Software reliability – With over 20 years of experience in the Networking market, Allied Telesis know how to develop embedded network software to the highest levels of quality.

Network reliability – the advanced storm control and security features used in this solution guard the network against outages from cabling errors and rogue devices.

Security

By enforcing authentication for all network-connected devices, the network is protected against rogue devices and intruders. A device simply cannot send data beyond the access switch unless it can provide valid authentication credentials.

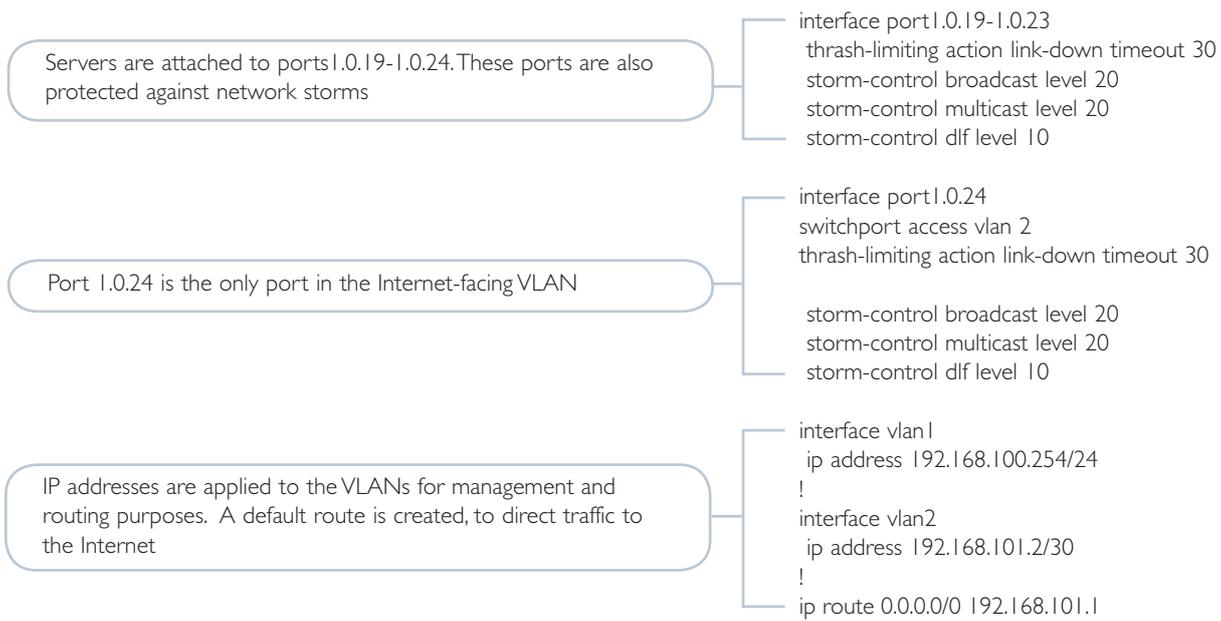
Configuring the central switch for secure management (via SSH) further protects the network against being compromised.

Future-proofing

With IPv6 capable hardware, flexible upgrade options, ever-developing software, this solution provides you with a network that can develop with your needs for many years to come.

Configuration

The switch maintains a detailed log of device and network events	log buffered level errors
A login account is create for management access	username adminuser privilege 15 password 8 \$!\$bjoVec4D\$jwOJGPr7YqoExA0GVasdE0
Remote command-line access is only available by the secure SSH protocol	service ssh no service telnet
Allow read-only SNMP monitoring from one management station	access-list 1 permit 192.168.100.213 snmp-server enable trap auth nsm snmp-server community public 1 snmp-server host 192.168.100.213 version 2c public
Enable the embedded Radius server; configure it to accept internally generated requests, and configure a couple of example users	crypto pki trustpoint local crypto pki enroll local radius-server local server enable nas 127.0.0.1 key awplus-local-radius-server user user1 password user1pass user user2 password user2pass
Enable both 802.1x and web-based authentication. Configure them to direct authentication requests to the embedded Radius server	aaa authentication dot1x default group radius aaa authentication auth-web default group radius radius-server host 127.0.0.1 key awplus-local-radius-server
The embedded DHCP server needs to be configured with an address pool big enough to cover planned network growth	ip dhcp pool NIAB network 192.168.100.0 255.255.255.0 range 192.168.100.1 192.168.100.200 dns-server 129.45.2.89 default-router 192.168.100.254 lease 30 1 1 subnet-mask 255.255.255.0 service dhcp-server
The switch is configured as stratum-2 NTP master:	ntp master 2
Although the network contains no loops, spanning tree is enabled to guard against inadvertent loops	spanning-tree mode rstp spanning-tree errdisable-timeout enable spanning-tree errdisable-timeout interval 30
The network servers and clients are all in the default VLAN. A second VLAN is created for the connection to the Internet	vlan database vlan 2 name Internet vlan 2 state enable
Network clients and access switches are connected to ports 1.0.1-1.0.18. These ports are secured by 802.1x and web-based authentication	interface port1.0.1-1.0.18 auth-web enable dot1x port-control auto auth host-mode multi-supplicant auth max-supplicant 8
The client-connected ports are highly protected against inadvertent network loops. A combination of thrash protection, storm control and BPDU guard will ensure that storms created in one access switch will not propagate through the network	interface port1.0.1-1.0.18 thrash-limiting action link-down timeout 30 storm-control broadcast level 20 storm-control multicast level 20 storm-control dlf level 10 spanning-tree portfast bpdu-guard enable spanning-tree guard root



Further enhancements

The solution implemented by the above configuration provides a reliable, secure, expandable network whilst maintaining configuration simplicity.

The Allied Telesis x900 series switches are feature rich and highly configurable. Specific network requirements can easily be accommodated by adding further elements to the switch configuration. Please contact your Allied Telesis representative to discuss your specialised requirements.

Products

The following Allied Telesis Layer 3 switches, running the Alliedware Plus operating system, will support the configuration detailed in this solution

SwitchBlade® x908

Advanced Layer 3 Modular Switch



SwitchBlade x908

8 x 60Gbps Expansion Bays

x900-12X and 24X Series

Advanced Gigabit Layer 3+ Expandable Switches



x900 Family

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)

About Allied Telesis Inc.

Allied Telesis is a world class leader in delivering IP/Ethernet network solutions to the global market place. 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.

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