Allied Telesis™

Provisioning

FEATURE OVERVIEW AND CONFIGURATION GUIDE

Introduction

Many of the products which run AlliedWare Plus™ are not fixed in their physical configuration.

For example, a VCStack™ of x-series switches can have switches added to or removed from the stack. Similarly, modular switches like the x900, x908, x8100 can have interface cards inserted or removed.

In this case, it is convenient to be able to create configuration for interfaces, or stack members that are not currently present. This enables the network administrator to:

1. Pre-configure interfaces that have not been installed yet, so that the configuration is ready to go when the interfaces are installed (or the relevant stack member is added to the stack).

2. See the configuration that was present on interfaces or stack members that are currently hot-swapped out.

3. Be confident that when they hot-swap in replacement interface cards or stack members, then the previous configuration has been correctly remembered, and will be re-applied as new hardware is added.

The process of saving configuration for pieces of hardware that are not currently present is called **provisioning**.

This guide describes the operation of provisioning under AlliedWare Plus.

AlliedWare Plus™
OPERATING SYSTEM

Contents

Products and software version that apply to this guide

This guide applies to all AlliedWare Plus™ products, running version **5.4.4** or later.

Feature support may change in later software versions. For the latest information, see the following documents:

- The product's Datasheet
- The AlliedWare Plus Datasheet
- The product's Command Reference

These documents are available from the above links on our website at alliedtelesis.com

x900 Series and SBx908: Switch Bay Provisioning for XEMs

Switch bay provisioning enables the pre-configuration of interfaces on hardware that is not yet physically present. This enables ports belonging to a XEM bay, or stack member, to be configured in advance, ready for device hot-insertion at a later time.

Provisioning enables a network administrator to pre-configure a vacant XEM bay on a switch, ready to be hot-swapped in at a later time. Later, when the XEM is physically added, its configuration is automatically applied with the minimum network disruption. Provisioning is ON by default, and cannot be disabled.

Provisioned capacity can be applied by either of the following actions:

- Applying the appropriate provisioning command
- Installing, then removing a provisionable XEM from its bay

Provisioned board classes

Provisioning introduces the concept of defined board classes. Each board class is assigned a **class** and an appropriate **port count.** Presently no further definitions have been made for additional features such as media type, or PoE capability. This structure simplifies configuration. For example:

- A single class is required to provision a XEM bay for either the XEM-12s, XEM12-T, or the XEM-12T/PoE modules.

The following Board Classes are defined:

Table 1: Provisioned Board Classes

BOARD CLASSES	
CLASS	PORT COUNT
XEM-1	1
XEM-2	2
XEM-12	12

Applying hardware provisioning

As previously mentioned, provisioning is the pre-configuration of vacant XEM bay ready for device insertion at a later time.

Without provisioning

On software versions prior to version 5.3.4, trying to configure port within a vacant XEM bay will result in the following error message:

```
awplus(config)# interface port2.1.1
% Can't find interface port2.1.1
```

With provisioning you can configure XEMs and their ports that are not presently installed, ready for future connection:

The following example sets the port speed of **port2.1.1** to be 1000 kbps:

```
awplus(config)# interface port2.1.1
awplus(config-if)# speed 1000
```

You can apply provisional configuration to all interface related commands. However, you cannot apply provisioning where it changes the network topology.

The following example creates a provisioned configuration that shows the association of ports with a VLAN:

```
awplus# configure terminal
awplus(config)# vlan database
awplus(config-vlan)# vlan 12 state enable
awplus(config-vlan)# exit
awplus(config)# interface port2.1.1
awplus(config-if)# switchport mode access
awplus(config-if)# switchport access vlan 12
awplus(config)# exit
awplus(config)# interface port2.1.2-port2.1.26
awplus(config)# switchport mode access
```

Removing or changing XEM bay provisioning

You cannot un-provision currently installed hardware. Provisioning changes will only be retained if the configuration is saved prior to rebooting.

Displaying provisioned configurations

The major difference associated with provisioning is that interface configurations will still exist in the config files and will appear in show commands, even though a device itself may not be physically installed. Provisioning could result from device capability that has been preconfigured for future installation, or could result from the removal of an installed device.

The **show running-config command** includes switch commands for existing hardware, plus all non existent, but provisioned, hardware. The following example output of the **show running-config command** illustrates how provisioned and existing hardware is displayed.

Figure 1: Sample display of existing and provisioned show output

```
awplus#show running-config
.
.
switch 1 provision x908
switch 1 bay 1 provision xem-12
switch 1 bay 2 provision xem-12
switch 1 bay 3 provision xem-12
switch 1 bay 5 provision xem-12
switch 1 bay 7 provision xem-1
switch 1 bay 8 provision xem-1
switch 2 provision x908
switch 2 bay 1 provision xem-12
switch 2 bay 2 provision xem-12
switch 2 bay 3 provision xem-1
switch 2 bay 8 provision xem-1
!
interface port1.1.1-1.1.12
 switchport
 switchport mode access
!
interface port1.2.1-1.2.12
 switchport
 switchport mode access
!
interface port1.3.1-1.3.12
 switchport
 switchport mode access
.
.
.end
```

Displaying provisioned hardware status

The status, **present** or **provisioned**, appears in monitoring commands, such as the **show interface brief**. The following sample output from this command shows the provisioning status of two configured stack members.

Figure 2: Sample display showing hardware provisioning status

```
Interface              Status          Protocol    Status
port1.1.1              admin up        running     present
port1.1.2              admin up        down        present
.
.
port2.8.1              admin up        down        provisioned
```

A more detailed inspection of the provisioned port 2.8.1 is shown below. Note that the MAC address of 0000.0000.0000, which is a placeholder value for all provisioned ports. Also note that although the port is in the link DOWN state its administrative state of UP PROVISIONED means that it can be further configured. For example, it can be associated with a VLAN, or added to a link aggregation group.

Figure 3: Sample display showing provisioning status of a specific port

```
Interface port2.8.1
  Scope: both
  Link is DOWN, administrative state is UP PROVISIONED
  Thrash-limiting
    Status Unknown, Action learn-disable, Timeout 1(s)
  Hardware is Ethernet, address is 0000.0000.0000
  index 6801 metric 1 mtu 1500 mru 1522
  <BROADCAST,MULTICAST>
  SNMP link-status traps: Disabled
    input packets 0, bytes 0, dropped 0, multicast packets 0
    output packets 0, bytes 0, multicast packets 0 broadcast pks0
```

Provisioning and change management

A benefit of provisioning is that configuration settings are no longer dependent on the existence of hardware devices. When a device is removed, all the interfaces for that device are shutdown and its provisioning status is set. This means that you can add or remove physical hardware without affecting your network configuration. Of course when ports go down (i.e. are physically removed) there will be other changes to network configuration, as protocols may re-converge or routes may be removed.

XEMs within a switch, can be hot-swapped without the need for re-configuration.

The configuration of a newly inserted device that matches the provisioned board-class is achieved on a best-effort basis. For example inserting a non-POE switch into a stack member location configured for PoE will result in the failure of the PoE configuration commands.

Take care that your provisioned configurations match the type of hardware that you plan to install. For example, the XEM-12 configuration shown below has the port speed set for one of its ports:

awplus(config)# switch 2 bay 4 provision xem-12

awplus(config)# interface port2.4.1

awplus(config-if)# speed 10

This will be fine if a XEM-12T is installed; however installing a XEM-12S (a device that cannot run its ports at 10 Mbps) would result in an error condition.

Possible hardware provisioning conflicts

Conflicting provisioning configurations can occur where there is a mismatch between the XEM or switch type that is provisionally configured, and the device that is physically added.

If a XEM-1XP is inserted into a bay provisioned for a XEM-12T, there would be a mismatch between the board-class of the XEM inserted, and the board-class provisioned. In this situation, the provisioned configuration would not be applied, instead the switch would apply its default configuration to the new XEM.

Where conflicting hardware is installed, and then corrected, the result is dependent on whether or not the configuration is saved. The following example describes the two possibilities that this situation presents:

1. A bay provisioned for a XEM-12T is fitted with a XEM-1XP. On realizing the mistake, it is then replaced with a XEM-12T.

   - In this situation, when the XEM-1XP is fitted, the provisioned configuration will have been replaced with the default configuration. However, when the XEM-12T is installed, its previous (provisioned) configuration will return, as desired. This is because the provisioned configuration is part of the switch configuration.

2. A bay provisioned for a XEM-12T is fitted with a XEM-1XP and the configuration is saved. On realizing the mistake, it is then replaced with a XEM-12T.

   - In this situation, the provisioned configuration will have been replaced with the default configuration for the XEM-1XP. As this new configuration is saved, when the XEM-12T is installed, a default configuration will be applied.

Provisioning and software version aspects

When upgrading to version 5.3.4 or later, the provisioning commands will automatically be added to the running configuration of the switch—all other configuration will remain unchanged.

When downgrading from 5.3.4 (for example from 5.3.4 back to 5.3.3), error messages will result if the configuration has been saved using the 5.3.4 version software. This is because the provisioning commands in the configuration file will be unknown to the 5.3.3 version software.

If the configuration has not been saved with the version 5.3.4 software release, then downgrading will not result in error messages. This is because the saved configuration will not contain provisioning commands. All other commands will be unaffected, and the switch will operate as previously.

SBx8100 Series: Chassis Card Provisioning

Switch slot provisioning enables you to pre-configure a vacant slot on a switch, ready for line card hot-insertion at a later time. When the line card is physically added, its configuration is automatically applied with the minimum network disruption. Provisioning is on by default, and cannot be disabled.

Provisioned capacity can be applied by either of the following actions:

- applying the appropriate provisioning command

- installing, then removing a provisionable card from its slot

Provisioned board classes

Provisioning introduces the concept of defined board classes. Each board class is assigned a **class** and an appropriate **port count.** The following board classes are defined:

Table 2: Provisioned Board Classes

BOARD CLASSES		
CLASS	PORT COUNT	SPEED
GE24	24	1 Gbps
GE40	40	1 Gbps
XE6	6	10 Gbps
XE16	16	10 Gbps

Note: On the SBx8112, slots 5 and 6 accept Control Fabric Cards only. On the SBx8106 slot 6 can accept line cards. SBx81CFC400 cards cannot be provisioned.

Configure slot provisioning

The procedure to configure switch slot provisioning is described in the following table.

Table 3: Configuration procedure for slot provisioning

Provision ports for a card	
`awplus#` `configure terminal`	Enter Configuration mode.

`awplus(config)#`
`switch <stack-ID> card <card-ID>`
`provision{CFC960|GE24|GE40|XE6}`
	Specify the chassis slot position to provision and specify the line card type.
	On a stack, you cannot provision a CFC960 because the SPF+ ports are reserved as stacking ports, not network ports. On a standalone switch, you can provision a CFC960, because its SFP+ ports are network ports.

`awplus(config)#` `<other-commands>`	Enter other commands as desired, for example to configure the interface.
Alter the type of card provisioned	
`awplus#` `configure terminal`	Enter Configuration mode.

`awplus(config)#`
`switch <stack-ID> card <card-ID>`
`reprovision{CFC960|GE24|GE40|XE6}`
	Specify the chassis slot position to reprovision and specify the line card type.

`awplus(config)#` `<other-commands>`	Enter other commands as desired, for example to configure the interface.
Delete ports provisioned for a card	
`awplus#` `configure terminal`	Enter Configuration mode.

`awplus(config)#`
`no switch <chassis-ID> card <card-`
`ID> provision`
	Specify the chassis slot position that a previously configured line card provision will be removed from.

Check the configuration	
`awplus#` `show provisioning`	Display summary information about the provisioning status of all installed or provisioned hardware.
`awplus#` `show card`	Display summary information about current and provisioned line cards in the chassis.

Removing or changing card provisioning

You cannot un-provision currently installed hardware. Provisioning changes are only retained if the configuration is saved prior to rebooting.

Displaying provisioned configurations

Interface configurations will still exist in the config files and will appear in show commands, even though a line card itself may not be physically installed. Provisioning could result from line card capability that has been preconfigured for future installation, or could result from the removal of an installed line card.

The **show running-config** output includes switch commands for existing hardware, plus all non existent, but provisioned, hardware.

The following example output illustrates how provisioned and existing hardware is displayed.

Figure 4: Sample running-config output for existing and provisioned hardware

```
awplus#show running-config

!
switch 1 card 1 provision ge24
switch 1 card 2 provision ge24
switch 1 card 4 provision ge24
switch 1 card 7 provision xe6
switch 1 card 8 provision xe6
switch 1 card 9 provision ge24
switch 1 card 10 provision ge24
switch 1 card 11 provision xe6
switch 1 card 12 provision xe6
!
interface port1.1.1-1.1.24
 switchport
 switchport mode access
!
interface port1.2.1-1.2.24
 switchport
 switchport mode access
!
interface port1.4.1-1.4.24
 switchport
 switchport mode access.
.
.end
```

Displaying provisioned hardware status

The **show provisioning** command will display what hardware is present in the system and what hardware is provisioned. Provisioned ports will also appear in the **show interface brief** command as 'provisioned' as shown in the following sample output.

Figure 5: Sample display showing hardware provisioning status

```
awplus#show interface brief

Interface              Status         Protocol
port1.1.1              admin up       running
port1.1.2              admin up       down
.
.
port1.8.1              admin up       provisioned
port1.8.2              admin up       provisioned
.
```

More detail of a provisioned port can be displayed using the **show interface** command.

Figure 6: Sample display showing interface details of a provisioned port

```
awplus#show interface port1.8.1


Interface port1.8.1
  Scope: both
  Link is DOWN, administrative state is UP
  Thrash-limiting
    Status Unknown, Action learn-disable, Timeout 1(s)
  Hardware is Provisioned, address is 0000.0000.0000
  index 12001 metric 1 mru 1500
  configured duplex auto, configured speed auto, configured polarity
auto
  <BROADCAST,MULTICAST>
  SNMP link-status traps: Disabled
    input packets 0, bytes 0, dropped 0, multicast packets 0
    output packets 0, bytes 0, multicast packets 0 broadcast packets 0
  Time since last state change:3 days 16:17:12
```

Provisioning and change management

A benefit of provisioning is that configuration settings are no longer dependent on the existence of hardware devices. When a line card is removed, all the interfaces for that line card are shutdown and its provisioning status is set. This means that you can add or remove physical hardware without affecting your network configuration. Of course, when ports go down (i.e. are physically removed) there will be other changes to network configuration, as protocols may re-converge or routes may be removed.

The configuration of a newly inserted line card that matches the provisioned board-class is achieved on a best-effort basis. Take care that your provisioned configurations match with the type of line card that you plan to install. For example, the line card configuration shown below has the port speed set for one of its ports:

```
awplus(config)# switch 1 card 2 provision GE40
awplus(config)# interface port1.2.1
awplus(config-if)# speed 10000
```

Although provisioning will accept this configuration, it will be rejected when the hardware is inserted because the configured port speed is greater than what the line card is physically capable of.

Possible hardware provisioning conflicts

Conflicting provisioning configurations can occur where there is a mismatch between the line card type that is provisionally configured, and the line card type that is physically added.

If a 6 x 10G port line card is inserted into a slot provisioned for a 24 x 1G port line card, there would be a mismatch between the board-class of the line card inserted and the board-class provisioned. In this situation, the provisioned configuration would not be applied, instead the switch would apply its default configuration to the new line card.

Where conflicting hardware is installed, and then corrected, the result is dependent on whether or not the configuration is saved. The following example describes the two possibilities that this situation presents:

1. A slot provisioned for a 6 x 10G port line card is fitted with a 24 x 1G port line card. On realizing the mistake, it is then replaced with a 6 x 10G port line card.

   - In this situation, when the 24 x 1G port line card is fitted, the provisioned configuration will have been replaced with the default configuration. However, when the 6 x 10G port line card is installed, its previous (provisioned) configuration will return, as desired. This is because the provisioned configuration is part of the switch configuration.

2. A slot provisioned for a 6 x 10G port line card is fitted with a 24 x 1G port line card and the configuration is saved. On realizing the mistake, it is then replaced with a 6 x 10G port line card.

   - In this situation, the provisioned configuration will have been replaced with the default configuration for the 24 x 1G port line card. As this new configuration is saved, when the 6 x 10G port line card is installed, a default configuration is applied.