New and Enhanced Features in AlliedWare Plus 5.4.4 Major and Minor Versions
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# AlliedWare Plus Version 5.4.4-4.11

For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series and x210 Series Switches

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Introduction

This section of this release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-4.11 since version 5.4.4-3.5.

Version 5.4.4-4.11 was released in August 2015. File details for this version are listed in Table 1 below.

Caution: Software version 5.4.4-4.11 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- “Licensing this Software Version on an SBx908 Switch” on page 11
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 13.

Table 1: Switch models and software file names

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<th>Models</th>
<th>Series</th>
<th>Software File</th>
<th>GUI File</th>
</tr>
</thead>
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<tr>
<td>x210-9GT</td>
<td>x210</td>
<td>x210-5.4.4-4.11.rel</td>
<td>x210-gui_544_08.jar</td>
</tr>
<tr>
<td>x210-16GT</td>
<td>x210</td>
<td>x210-5.4.4-4.11.rel</td>
<td>x210-gui_544_08.jar</td>
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<tr>
<td>x210-24GT</td>
<td>x210</td>
<td>x210-5.4.4-4.11.rel</td>
<td>x210-gui_544_08.jar</td>
</tr>
<tr>
<td>x230-10GP</td>
<td>x230</td>
<td>x230-5.4.4-4.11.rel</td>
<td>x230-gui_544_03.jar</td>
</tr>
<tr>
<td>x230-18GP</td>
<td>x230</td>
<td>x230-5.4.4-4.11.rel</td>
<td>x230-gui_544_03.jar</td>
</tr>
<tr>
<td>x310-26FT</td>
<td>x310</td>
<td>x310-5.4.4-4.11.rel</td>
<td>x310-gui_544_08.jar</td>
</tr>
<tr>
<td>x310-30FT</td>
<td>x310</td>
<td>x310-5.4.4-4.11.rel</td>
<td>x310-gui_544_08.jar</td>
</tr>
<tr>
<td>x310-26FP</td>
<td>x310</td>
<td>x310-5.4.4-4.11.rel</td>
<td>x310-gui_544_08.jar</td>
</tr>
<tr>
<td>x310-30FP</td>
<td>x310</td>
<td>x310-5.4.4-4.11.rel</td>
<td>x310-gui_544_08.jar</td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>IX5</td>
<td>IX5-5.4.4-4.11.rel</td>
<td>IX5-gui_544_09.jar</td>
</tr>
<tr>
<td>x510-28GTX</td>
<td>x510</td>
<td>x510-5.4.4-4.11.rel</td>
<td>x510-gui_544_17.jar</td>
</tr>
<tr>
<td>x510-52GTX</td>
<td>x510</td>
<td>x510-5.4.4-4.11.rel</td>
<td>x510-gui_544_17.jar</td>
</tr>
<tr>
<td>x510-28GPX</td>
<td>x510</td>
<td>x510-5.4.4-4.11.rel</td>
<td>x510-gui_544_17.jar</td>
</tr>
<tr>
<td>x510-52GPX</td>
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<td>x510-5.4.4-4.11.rel</td>
<td>x510-gui_544_17.jar</td>
</tr>
<tr>
<td>x510-28GSX</td>
<td>x510</td>
<td>x510-5.4.4-4.11.rel</td>
<td>x510-gui_544_17.jar</td>
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<tr>
<td>x510DP-52GTX</td>
<td>x510</td>
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<td>x610-24Ts</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-24Ts-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-24Ts/X</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-24Ts/X-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-48Ts</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-48Ts-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-48Ts/X</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x610-48Ts/X-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-4.11.rel</td>
<td>x610-gui_544_07.jar</td>
</tr>
<tr>
<td>x900-12XT/S</td>
<td>x900</td>
<td>x900-5.4.4-4.11.rel</td>
<td>x900-gui_544_10.jar</td>
</tr>
<tr>
<td>x900-24XS</td>
<td>x900</td>
<td>x900-5.4.4-4.11.rel</td>
<td>x900-gui_544_10.jar</td>
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<tr>
<td>x900-24XT</td>
<td>x900</td>
<td>x900-5.4.4-4.11.rel</td>
<td>x900-gui_544_10.jar</td>
</tr>
<tr>
<td>SwitchBlade x908</td>
<td>SBx908</td>
<td>SBx908-5.4.4-4.11.rel</td>
<td>SBx908-gui_544_10.jar</td>
</tr>
<tr>
<td>SwitchBlade x8106</td>
<td>SBx8100</td>
<td>SBx81CFC400-5.4.4-4.11.rel</td>
<td>SBx81CFC400_gui_544_09.jar</td>
</tr>
<tr>
<td>SwitchBlade x8112</td>
<td>SBx8110</td>
<td>SBx81CFC960-5.4.4-4.11.rel</td>
<td>SBx81CFC960_gui_544_05.jar</td>
</tr>
</tbody>
</table>
Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.
New Features and Enhancements

Software version 5.4.4-4.11 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-3.5.

This section summarizes the new features in 5.4.4-4.11. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Dynamic changes to policy-map content

Previously, on the x900 and SwitchBlade x908 switches, QoS commands could not dynamically change class-maps or policy-maps that were attached to interfaces.

With this enhancement, it is now possible for policy-maps that are already applied to interfaces to be changed or updated dynamically.

Filtering traffic on VLANs (per-VLAN ACLs)

Product support

This minor version supports per-VLAN ACLs on SBx908 and x900 Series switches.

Overview

With this enhancement, you can now filter traffic as it ingresses VLANs, by attaching ACLs to VLANs.

To do this, first create your ACLs, then apply the ACLs to a VLAN access-map, and then apply the map to the desired VLANs. The following example shows the commands to use.

Example

To deny all packets on VLAN 48 and 49, use the following steps.

1. Create VLANs 48 and 49, if they do not already exist.
   ```
   awplus(config)# vlan database
   awplus(config-vlan)# vlan 48
   awplus(config-vlan)# vlan 49
   ```

2. Create an ACL to block packets from any source MAC address and any destination MAC address
   ```
   awplus(config)# access-list 4000 deny any any
   ```

3. Create a VLAN access-map called (for example) “deny_all” and match this ACL
   ```
   awplus(config)# vlan access-map deny_all
   awplus(config-vlan-access-map)# match access-group 4000
   awplus(config-vlan-access-map)# exit
   ```
4. Apply this ACL by applying the access map to VLAN 48 and 49

```
awplus(config)# vlan filter deny_all vlan-list 48-49 input
```

**Rule precedence**

On x900 Series and SwitchBlade x908 switches, the switches match against ACLs in the following order on ingress:

![Rule precedence diagram](image)

Rule matching stops as soon as a rule permits a packet. The switch will only check VLAN ACLs if port ACLs do not match the packet.

**Number of rules**

A VLAN ACL uses one ACL rule per VLAN it is filtering, per port it is applied to.

The maximum number of ACL rules available depends on the switch model and port type. To see the available number of ACLs, use the `show platform classifier statistics utilization brief` command.

For more information about ACL limits, see the [ACL Feature Overview and Configuration Guide](alliedtelesis.com). This guide is available on our website at alliedtelesis.com.

**New commands**

This enhancement has four new commands:

- `vlan access-map`
- `vlan filter`
- `show vlan access-map`
- `show vlan filter`
**vlan access-map**

Use this command to create a VLAN access-map, which contains a series of ACLs to match against. You can use any IPv4 or IPv6 hardware ACLs.

**Syntax**

```
vlan access-map <access-map-name>
no vlan access-map <access-map-name>
```

**Mode**

Global Configuration

**Example**

To create a VLAN access-map called `deny_all` and match the ACL numbered 4000, use the following commands:

```
awplus(config)# vlan access-map deny_all
awplus(config-vlan-access-map)# match access-group 4000
```

**vlan filter**

Use this command to apply a VLAN access-map to a list of VLANs. The switch uses the ACL settings in the access-map to filter traffic ingressing those VLANs.

Use the `no` version of this command to remove the access-map filter from the listed VLANs.

**Syntax**

```
vlan filter <access-map-name> vlan-list <vlan-list> input
no vlan filter <access-map-name> vlan-list <vlan-list> input
```

**Mode**

Global Configuration

**Example**

To apply the VLAN access-map called `deny_all` to VLANs 48 and 49, use the following command:

```
awplus(config)# vlan filter deny_all vlan-list 48-49 input
```
show vlan access-map

Use this command to display information about the configured VLAN access-maps. VLAN access-maps contain a series of ACLs and enable you to filter traffic ingressing specified VLANs.

**Syntax**

```
show vlan access-map [<access-map-name>]
```

**Mode**

Privileged Exec

**Example**

To display the ACLs in all access-maps, use the following command:

```
awplus# show vlan access-map
```

**Output**

Example output from **show vlan access-map**

```
awplus#show vlan access-map
Vlan access map : deny_all
Hardware MAC access list 4000
  10 deny any any
Vlan access map : ip_range
Hardware IP access list 3000
  10 deny ip 192.168.1.1/24 any
```

**Example**

To display the ACLs in the access-map named **ip_range**, use the following command:

```
awplus# show vlan access-map ip_range
```

**Output**

Example output from **show vlan access-map** for a specified access-map

```
awplus#show vlan access-map ip_range
Vlan access map : ip_range
Hardware IP access list 3000
  10 deny ip 192.168.1.1/24 any
```
show vlan filter

Use this command to display information about the configured VLAN filters. VLAN filters apply access-maps (and therefore ACLs) to VLANs. This enables you to filter traffic ingressing specified VLANs.

**Syntax**  
show vlan filter [<access-map-name>]

**Parameter**  
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;access-map-name&gt;</td>
<td>The name of the access-map. The command output displays only the filters that use that access-map.</td>
</tr>
</tbody>
</table>

**Mode**  
Privileged Exec

**Example**  
To display information about the filter that uses the access-map named deny_all, use the following command:

```
awplus# show vlan filter deny_all
```

**Output**  
Example output from `show vlan filter` for the access-map named `deny_all`

```
awplus# show vlan filter deny_all
Vlan filter : deny_all
    direction : ingress
    vlan list : 48-49
    access map : deny_all
Hardware MAC access list 4000
    10 deny any any
```
Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:
- “Licensing this Software Version on an SBx908 Switch” on page 11
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 13.

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the `reboot rolling` command, you can reduce downtime when upgrading a VCStack.

You can use the `reboot rolling` command to upgrade to 5.4.4-4.11 from any 5.4.4-1.x version or later. The following table shows the process for using it to update from earlier versions.

<table>
<thead>
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<th>Upgrading from</th>
<th>How to upgrade using the reboot rolling command</th>
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</thead>
<tbody>
<tr>
<td>5.4.4-0.x</td>
<td>First upgrade to 5.4.4-1.x, then to 5.4.4-4.x.</td>
</tr>
<tr>
<td>5.4.3-x.x</td>
<td>First upgrade to any 5.4.4-0.x version, then to 5.4.4-1.x, then to 5.4.4-4.x.</td>
</tr>
</tbody>
</table>

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

<table>
<thead>
<tr>
<th>If the existing VCStack is running ...</th>
<th>then a new member can join the VCStack if it is running ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>any 5.4.4-0.x version</td>
<td>any 5.4.4-0.x version</td>
</tr>
<tr>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
</tr>
<tr>
<td>5.4.4-2.3 - 5.4.4-2.4</td>
<td>5.4.4-2.3 - 5.4.4-2.4</td>
</tr>
<tr>
<td>5.4.4-3.5 - 5.4.4-3.10</td>
<td>5.4.4-2.3 - 5.4.4-2.4 or 5.4.4-3.5 - 5.4.4-3.10</td>
</tr>
<tr>
<td>5.4.4-4.11</td>
<td>5.4.4-2.3 - 5.4.4-2.4, 5.4.4-3.5 - 5.4.4-3.10, or 5.4.4-4.11</td>
</tr>
</tbody>
</table>
Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

**ISSU (In-Service Software Upgrade)**

**This version does not support ISSU:** You cannot use ISSU to upgrade to this minor software version.

**AMF software version compatibility**

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with:

- x210 Series switches running version 5.4.4-1.2 (but not earlier versions)
- other AlliedWare Plus switches running version 5.4.3-2.6 and later, or any 5.4.4-x.x version.

**Upgrading all switches in an AMF network**

**This version supports upgrades across AMF networks.** There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

For x210 Series switches, you can use these methods to upgrade to this version from 5.4.4-1.2, but not from earlier versions.

For other switches, you can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-x.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).

2. Decide which AMF upgrade method is most suitable.

3. Initiate the AMF network upgrade using the selected method. To do this:
   
   a. create a working-set of the switches you want to upgrade
   
   b. enter the command `atmf reboot-rolling <location>` or `atmf distribute-firmware <location>` where `<location>` is the location of the .rel files.
   
   c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.
Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch. Switches may have several MAC addresses. Use the `show system mac license` command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the `license certificate` command to apply a release license to your switch. Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IM[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required. Would you like to continue? (y/n): y
11:58:14 awplus IM[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked switch, use the command `show license member` or `show license brief member` to confirm release license application.
From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```plaintext
awplus# show license
OEM Territory : ATI USA
Software Licenses

<table>
<thead>
<tr>
<th>Index</th>
<th>License name</th>
<th>Customer name</th>
<th>Quantity of licenses</th>
<th>Type of license</th>
<th>License issue date</th>
<th>License expiry date</th>
<th>Features included</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base License</td>
<td>ABC Consulting</td>
<td>1</td>
<td>Full</td>
<td>10-Jul-2014</td>
<td>N/A</td>
<td>EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64, RADIUS-100, RIP, VRRP</td>
</tr>
<tr>
<td>2</td>
<td>5.4.4-rl</td>
<td>ABC Consulting</td>
<td>-</td>
<td>Full</td>
<td>10-Jul-2014</td>
<td>N/A</td>
<td>5.4.4</td>
</tr>
</tbody>
</table>
```
Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the **license certificate** command, then validated with the **show license** or **show license brief** commands. Follow these steps:

- Obtain the MAC address for a control card
- Obtain a release license for a control card
- Apply a release license on a control card
- Confirm release license application

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the **license certificate** command on the stack master will automatically apply the release licenses to all the control cards within the stack.

**Step 1: Obtain the MAC address for a control card**

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the **show system mac license** command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card          MAC Address
--------------
1.5            eccd.6d9e.3312
1.6            eccd.6db3.58e7
Chassis MAC Address eccd.6d7b.3bc2
```

**Step 2: Obtain a release license for a control card**

Contact your authorized Allied Telesis support center to obtain a release license.

**Step 3: Apply a release license on a control card**

Use the **license certificate** command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.
Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

**Step 4: Confirm release license application**

On a stand-alone chassis, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked chassis, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
GEM Territory : ATI USA
Software Licenses
-----------------------------------------------
Index                         : 1
License name                  : Base License
Customer name                 : ABC Consulting
Quantity of licenses          : 1
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Features included             : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100 Virtual-MAC, VRRP

Index                         : 2
License name                  : 5.4.4-rl
Customer name                 : ABC Consulting
Quantity of licenses          : -
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Release                       : 5.4.4
```
Installing this Software Version

**Caution:** Software version 5.4.4-4.11 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see “Licensing this Software Version on an SBx908 Switch” on page 11 and “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 13.

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.

2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:
   
   `awplus# show file systems`

   To list files, use the command:
   
   `awplus# dir`

   To delete files, use the command:
   
   `awplus# del <filename>`

   You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.
   
   `awplus# copy tftp flash`

   Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:
   
   `awplus# configure terminal`

   Then set the switch to reboot with the new software version:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210 Series</td>
<td><code>awplus(config)# boot system x210-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>x230 Series</td>
<td><code>awplus(config)# boot system x230-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>x310 Series</td>
<td><code>awplus(config)# boot system x310-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td><code>awplus(config)# boot system IX5-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>x510 Series</td>
<td><code>awplus (config)#boot system x510-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>x610 Series</td>
<td><code>awplus(config)# boot system x610-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>x900 Series</td>
<td><code>awplus(config)# boot system x900-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>SBx908</td>
<td><code>awplus(config)# boot system SBx908-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC400</td>
<td><code>awplus(config)# boot system SBx81CFC400-5.4.4-4.11.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC960</td>
<td><code>awplus(config)# boot system SBx81CFC960-5.4.4-4.11.rel</code></td>
</tr>
</tbody>
</table>
Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)# exit
awplus# show boot
```

5. Reboot using the new software version.

```
awplus# reload
```
Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (.jar) gives the earliest version of the software file (.rel) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- **PC Platform:**
  - Windows XP SP2 and up / Windows Vista SP1 and up

- **Browser:** (must support Java Runtime Environment (JRE) version 6)
  - Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (.jar extension) onto your TFTP server, SD card or USB storage device.

2. Connect to the switch's management port, then log into the switch.

3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.
   - To see the memory usage, use the command:
     
     awplus# show file systems
   - To list files, use the command:
     
     awplus# dir
   - To delete files, use the command:
     
     awplus# del <filename>
   - You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:

   awplus# configure terminal
   awplus(config)# interface vlan1
   awplus(config-if)# ip address <address>/<prefix-length>

   Where <address> is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:

   awplus(config-if)# ip address 192.168.2.6/24

5. If required, **configure a default gateway for the switch.**

   awplus(config-if)# exit
   awplus(config)# ip route 0.0.0.0/0 <gateway-address>

   Where <gateway-address> is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.
6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

   **TFTP server:** Use the command:
   ```bash
   awplus# copy tftp://<server-address>/<filename.jar> flash:
   ```
   
   **SD card:** use the command:
   ```bash
   awplus# copy card:/<filename.jar> flash:
   ```
   
   **USB storage device:** use the command:
   ```bash
   awplus# copy usb:/<filename.jar> flash:
   ```
   
   where `<server-address>` is the IP address of the TFTP server, and where `<filename.jar>` is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:
   ```bash
   awplus# configure terminal
   awplus(config)# service http
   ```
   
   The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.
   ```bash
   awplus(config)# username <username> privilege 15 password <password>
   ```
   
   You can create multiple users to log into the GUI. For information about the `username` command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser
   On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.
   
   Next, click on the 'Security' tab. Ensure the 'Enable Java content in the browser' checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List
    Click on the 'Edit Site List' button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the 'Exception Site List' dialog, enter the IP address you configured in Step 4, with a http:// prefix.
    
    After entering the URL click the Add button then click OK.

11. Log into the GUI.
    Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.
AlliedWare Plus Version 5.4.4-3.5
For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series and x210 Series Switches

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Introduction

This section of this release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-3.5 since version 5.4.4-2.3. For more information, see the Software Reference for your switch. Software file details for this version are listed in Table 2 below.

Caution: Software version 5.4.4-3.5 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

■ “Licensing this Software Version on an SBx908 Switch” on page 27 and
■ “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 29.

Table 2: Switch models and software file names

<table>
<thead>
<tr>
<th>Models</th>
<th>Series</th>
<th>Software File</th>
<th>GUI File</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210-9GT</td>
<td>x210</td>
<td>x210-5.4.4-3.5.rel</td>
<td>x210-gui_544_08.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x210-16GT</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>x210-24GT</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x230-10GP</td>
<td>x230</td>
<td>x230-5.4.4-3.5.rel</td>
<td>x230-gui_544_02.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x230-18GP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x310-26FT</td>
<td>x310</td>
<td>x310-5.4.4-3.5.rel</td>
<td>x310-gui_544_06.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x310-50FT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x310-26FP</td>
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<td>x310-50FP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>IX5</td>
<td>IX5-5.4.4-3.5.rel</td>
<td>IX5-gui_544_09.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x510-28GTX</td>
<td>x510</td>
<td>x510-5.4.4-3.5.rel</td>
<td>x510-gui_544_10.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x510-52GTX</td>
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<tr>
<td>x510-28GFX</td>
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<tr>
<td>x510-52GFX</td>
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<tr>
<td>x510-28GSX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x510DP-52GTX</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>x610-24Ts</td>
<td>x610</td>
<td>x610-5.4.4-3.5.rel</td>
<td>x610-gui_544_07.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x610-24Ts-PoE+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-24Ts/X</td>
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</tr>
<tr>
<td>x610-24Ts/X-PoE+</td>
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<td></td>
<td></td>
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</tr>
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<td>x610-48Ts</td>
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<tr>
<td>x610-48Ts-PoE+</td>
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</tr>
<tr>
<td>x610-48Ts/X</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>x610-48Ts/X-PoE+</td>
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<tr>
<td>x900-12XT/S</td>
<td>x900</td>
<td>x900-5.4.4-3.5.rel</td>
<td>x900-gui_544_07.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>x900-24XS</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>x900-24XT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SwitchBlade x908</td>
<td>SBx908</td>
<td>SBx908-5.4.4-3.5.rel</td>
<td>x900-gui_544_07.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>SwitchBlade x8106</td>
<td>SBx8100</td>
<td>SBx81CFC400-5.4.4-3.5.rel</td>
<td>SBx81CFC400_gui_544_09.jar</td>
<td>11/2014</td>
</tr>
<tr>
<td>SwitchBlade x8112</td>
<td>SBx8112</td>
<td>SBx81CFC960-5.4.4-3.5.rel</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>
Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.
New Features and Enhancements

Software version 5.4.4-3.5 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-1.1.

This section summarizes the new features in 5.4.4-3.5. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Enhancements to Processing of Next Hop Updates

On SBx8100, SBx908 and x900 series switches, next hop updates are now processed more efficiently. If your network is designed so that a very large number of routes have the same next hop, this may improve the responsiveness of time-sensitive protocols such as EPSR and STP.

Login Security Enhancements

This software version includes several enhancements to the switch's login security settings.

As indicated below, some of these enhancements are only available when the switch is "locked down" at security level 3. This security level is a bootloader security setting. To set it, type Ctrl-B during boot-up to enter the bootloader, then type "s" at the bootloader menu.

The bootloader security settings are available on SBx8100, SBx908, x900, x610, x310 and x230 Series switches.

"Last login" message

At login, the switch now displays:

- a "Last login" message, indicating when that user last logged in, and
- if the switch's bootloader is set to security level 3, a "Failed login" message if there have been any failed login attempts for that user.

These messages are displayed for logins via the console, Telnet or SSH.

The console output looks like this:

```
x510-D login: aa
Password:
Last login: Mon Oct 13 14:07:32 NZST 2014 on ttyS0
Last failed login: Mon Oct 13 15:21:07 NZST 2014 on ttyS0
There were 2 failed login attempts since the last successful login.

AlliedWare Plus (TM) 5.4.4 10/13/14 12:59:36
```
Logging of attempts to set release files

When a user attempts to set a primary or backup release file (using the \texttt{boot system} command), the switch now sends a failure or success message to the logging system. The error message has a log severity level of “warning” and the success message has a severity level of “notice”.

Delay between password attempts

On a switch whose bootloader is set to security level 3, a 4 second gap is now required between attempts to re-enter a password. This applies for console, Telnet and SSH logins, and for both local and RADIUS users.

Configurable number of login attempts by SSH

You can now specify the maximum number of SSH authentication attempts that the switch will allow. The default is 6 attempts. To change this, use the new command:

\begin{verbatim}
awplus(config)#ssh server max-auth-tries <1-32>
\end{verbatim}

VRRPv3 Secondary IPv6 Address

VRRPv3 now allows users to specify a secondary IPv6 address on an IPv6 VRRP instance. This enables you to specify a globally-routable address as the default gateway address for all the hosts on a VLAN.

To do this, use the new \texttt{secondary} parameter in the following command:

\textbf{Syntax}

\begin{verbatim}
virtual-ipv6 <ipv6-address> [master|backup] [primary|secondary]
\end{verbatim}

\begin{verbatim}
no virtual-ipv6
\end{verbatim}

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;ipv6-address&gt;</td>
<td>The IPv6 address of the virtual router, entered in hexadecimal, in the format X:X::X.X. This is an IPv6 link-local address.</td>
</tr>
<tr>
<td>master</td>
<td>Sets the default state of the VRRPv3 router within the Virtual Router as master. For master, the router must own the Virtual IP address.</td>
</tr>
<tr>
<td>backup</td>
<td>Sets the default state of the VRRPv3 router within the Virtual Router as backup.</td>
</tr>
<tr>
<td>primary</td>
<td>Sets the specified address as the primary IPv6 address. The primary address must be a link-local IPv6 address.</td>
</tr>
<tr>
<td>secondary</td>
<td>Sets the specified address as the secondary IPv6 address. Normally this would be a globally-routable IPv6 address.</td>
</tr>
</tbody>
</table>

\textbf{Mode} Router Configuration
Web Authentication Unmatched Proxy Setting Detection

By default, AlliedWare Plus Web Authentication intercepts the supplicant’s initial TCP port 80 connection to a web page and sends it the Web Authentication login page. You can also specify any additional TCP port numbers that the web authentication server is to intercept by using the `auth-web-server intercept-port` command. In this way, Web Authentication can intercept packets going to a proxy server by adding the port number of the proxy server.

However, when the web authentication switch is in a guest network, the switch does not know the proxy server’s port number in the supplicant’s proxy setting. To overcome this limitation, you can now use the new `any` option in the `auth-web-server intercept-port` command to intercept all TCP packets:

```
awplus(config)#auth-web-server intercept-port any
```
Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0 onwards, AlliedWare Plus software releases need to be licensed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:

- “Licensing this Software Version on an SBx908 Switch” on page 27 and
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 29.

Upgrading a VCStack

**This software version supports VCStack “reboot rolling” upgrades.** With the **reboot rolling** command, you can reduce downtime when upgrading a VCStack.

You can use the **reboot rolling** command to upgrade to 5.4.4-3.5 from any 5.4.4-1.x version. The following table shows the process for using it to update from earlier versions.

<table>
<thead>
<tr>
<th>Upgrading from</th>
<th>How to upgrade using the reboot rolling command</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.4-0.x</td>
<td>First upgrade to 5.4.4-1.x, then to 5.4.4-2.x.</td>
</tr>
<tr>
<td>5.4.3-*x</td>
<td>First upgrade to any 5.4.4-0.x version, then to 5.4.4-1.x, then to 5.4.4-2.x.</td>
</tr>
</tbody>
</table>

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

<table>
<thead>
<tr>
<th>If the existing VCStack is running ...</th>
<th>then a new member can join the VCStack if it is running ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>any 5.4.4-0.x version</td>
<td>any 5.4.4-0.x version</td>
</tr>
<tr>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
</tr>
<tr>
<td>5.4.4-2.3 or 5.4.4-2.4</td>
<td>5.4.4-2.3 or 5.4.4-2.4</td>
</tr>
<tr>
<td>5.4.4-3.5</td>
<td>5.4.4-2.3, 5.4.4-2.4 or 5.4.4-3.5</td>
</tr>
</tbody>
</table>

Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.
ISSU (In-Service Software Upgrade)

This version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with:

- x210 Series switches running version 5.4.4-1.2 (but not earlier versions)
- other AlliedWare Plus switches running version 5.4.3-2.6 and later or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

For x210 Series switches, you can use these methods to upgrade to this version from 5.4.4-1.2, but not from earlier versions.

For other switches, you can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-x.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).

2. Decide which AMF upgrade method is most suitable.

3. Initiate the AMF network upgrade using the selected method. To do this:
   a. create a working-set of the switches you want to upgrade
   b. enter the command `atmf reboot-rolling <location>` or `atmf distribute-firmware <location>` where `<location>` is the location of the .rel files.
   c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.
Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the license certificate command, then validated with the show license or show license brief commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the show system mac license command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the license certificate command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands show license or show license brief to confirm release license application.

On a stacked switch, use the command show license member or show license brief member to confirm release license application.
From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```plaintext
awplus# show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index                         : 1
License name                  : Base License
Customer name                 : ABC Consulting
Quantity of licenses          : 1
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Features included             : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64,
                               RADIUS-100, RIP, VRRP

Index                         : 2
License name                  : 5.4.4-rl
Customer name                 : ABC Consulting
Quantity of licenses          : -
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Release                       : 5.4.4
```
Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- **Obtain the MAC address for a control card**
- **Obtain a release license for a control card**
- **Apply a release license on a control card**
- **Confirm release license application**

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the `license certificate` command on the stack master will automatically apply the release licenses to all the control cards within the stack.

**Step 1: Obtain the MAC address for a control card**

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the `show system mac license` command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:
Card                  MAC Address
-----------------------
1.5                    eccd.6d9e.3312
1.6                    eccd.6db3.58e7
Chassis MAC Address eccd.6d7b.3bc2
```

**Step 2: Obtain a release license for a control card**

Contact your authorized Allied Telesis support center to obtain a release license.

**Step 3: Apply a release license on a control card**

Use the `license certificate` command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.
Entering a valid release license changes the console message displayed about licensing:

11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.

Stack member 1 installed 1 license
1 license installed.

**Step 4: Confirm release license application**

On a stand-alone chassis, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked chassis, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index                  License name                  Customer name     Quantity of licenses
1                      Base License                  ABC Consulting     1
Type of license        Full                         License issue date: 10-Jul-2014
License expiry date    N/A                         Features included
                       IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                       Virtual-MAC, VRRP

Index                  License name
2                      5.4.4-rl
Customer name          ABC Consulting
Quantity of licenses   -
Type of license        Full
License issue date     10-Jul-2014
License expiry date    N/A
Release                5.4.4
```
Installing this Software Version

**Caution:** Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see “Licensing this Software Version on an SBx908 Switch” on page 27 and “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 29.

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.

2. If necessary, delete or move files to create space in the switch’s Flash memory for the new file. To see the memory usage, use the command:
   
   ```
   awplus# show file systems
   ```

   To list files, use the command:
   
   ```
   awplus# dir
   ```

   To delete files, use the command:
   
   ```
   awplus# del <filename>
   ```

   You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.
   
   ```
   awplus# copy tftp flash
   ```

   Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:
   
   ```
   awplus# configure terminal
   ```

   Then set the switch to reboot with the new software version:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210 Series</td>
<td>awplus(config)# boot system x210-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>x230 Series</td>
<td>awplus(config)# boot system x230-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>x310 Series</td>
<td>awplus(config)# boot system x310-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>awplus(config)# boot system IX5-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>x510 Series</td>
<td>awplus (config)#boot system x510-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>x610 Series</td>
<td>awplus(config)# boot system x610-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>x900 Series</td>
<td>awplus(config)# boot system x900-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>SBx908</td>
<td>awplus(config)# boot system SBx908-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>SBx8100 with CFC400</td>
<td>awplus(config)# boot system SBx81CFC400-5.4.4-3.5.rel</td>
</tr>
<tr>
<td>SBx8100 with CFC960</td>
<td>awplus(config)# boot system SBx81CFC960-5.4.4-3.5.rel</td>
</tr>
</tbody>
</table>
Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus(config)# exit
awplus# show boot
```

5. Reboot using the new software version.

```
awplus# reload
```
Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (.jar) gives the earliest version of the software file (.rel) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- **PC Platform:**
  - Windows XP SP2 and up / Windows Vista SP1 and up

- **Browser:** (must support Java Runtime Environment (JRE) version 6)
  - Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (.jar extension) onto your TFTP server, SD card or USB storage device.

2. Connect to the switch's management port, then log into the switch.

3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.
   - To see the memory usage, use the command:
     ```
     awplus# show file systems
     ```
   - To list files, use the command:
     ```
     awplus# dir
     ```
   - To delete files, use the command:
     ```
     awplus# del <filename>
     ```
     *You cannot delete the current boot file.*

4. Assign an IP address for connecting to the GUI. Use the commands:
   ```
   awplus# configure terminal
   awplus(config)# interface vlan1
   awplus(config-if)# ip address <address>/<prefix-length>
   ```
   Where `<address>` is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:
   ```
   awplus(config-if)# ip address 192.168.2.6/24
   ```

5. If required, configure a default gateway for the switch.
   ```
   awplus(config-if)# exit
   awplus(config)# ip route 0.0.0.0/0 <gateway-address>
   ```
   Where `<gateway-address>` is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.
6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.
   **TFTP server:** Use the command:
   ```
   awplus# copy tftp://<server-address>/<filename.jar> flash:/
   ```
   **SD card:** use the command:
   ```
   awplus# copy card:/<filename.jar> flash:/
   ```
   **USB storage device:** use the command:
   ```
   awplus# copy usb:/<filename.jar> flash:/
   ```
   where `<server-address>` is the IP address of the TFTP server, and where `<filename.jar>` is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:
   ```
   awplus# configure terminal
   awplus(config)# service http
   ```
   The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.
   ```
   awplus(config)# username <username> privilege 15 password <password>
   ```
   You can create multiple users to log into the GUI. For information about the `username` command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser
   On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.
   Next, click on the ‘Security’ tab. Ensure the ‘Enable Java content in the browser’ checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List
    Click on the ‘Edit Site List’ button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the ‘Exception Site List’ dialog, enter the IP address you configured in Step 4, with a http:// prefix.
    After entering the URL click the Add button then click OK.

11. Log into the GUI.
    Start a browser and enter the switch's IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.
AlliedWare Plus Version 5.4.4-2.3
For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series,
x510 Series, IX5-28GPX, x310 Series, x230 Series and x210 Series Switches

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Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-2.3 since version 5.4.4-1.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in Table 1 below.

Caution: Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:
- “Licensing this Software Version on an SBx908 Switch” on page 44 and
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 46.

### Table 1: Switch models and software file names

<table>
<thead>
<tr>
<th>Models</th>
<th>Series</th>
<th>Software File</th>
<th>GUI File</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210-9GT</td>
<td>x210</td>
<td>x210-5.4.4-2.3.rel</td>
<td>x210-gui_544_06.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x210-16GT</td>
<td>x210</td>
<td>x210-5.4.4-2.3.rel</td>
<td>x210-gui_544_06.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x210-24GT</td>
<td>x210</td>
<td>x210-5.4.4-2.3.rel</td>
<td>x210-gui_544_06.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x230-10GP</td>
<td>x230</td>
<td>x230-5.4.4-2.3.rel</td>
<td>x230-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x230-18GP</td>
<td>x230</td>
<td>x230-5.4.4-2.3.rel</td>
<td>x230-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x310-26FT</td>
<td>x310</td>
<td>x310-5.4.4-2.3.rel</td>
<td>x310-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x310-50FT</td>
<td>x310</td>
<td>x310-5.4.4-2.3.rel</td>
<td>x310-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x310-26FP</td>
<td>x310</td>
<td>x310-5.4.4-2.3.rel</td>
<td>x310-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x310-50FP</td>
<td>x310</td>
<td>x310-5.4.4-2.3.rel</td>
<td>x310-gui_544_02.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>IX5</td>
<td>IX5-5.4.4-2.3.rel</td>
<td>IX5-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510-28GTX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510-52GTX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510-28GPX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510-50GPX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510-28GSX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x510DP-52GTX</td>
<td>x510</td>
<td>x510-5.4.4-2.3.rel</td>
<td>x510-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-24Ts</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-24Ts-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-24Ts/X</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-48Ts</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-48Ts-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-48Ts/X</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x610-48Ts/X-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-2.3.rel</td>
<td>x610-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x900-12XT/S</td>
<td>x900</td>
<td>x900-5.4.4-2.3.rel</td>
<td>x900-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x900-24XS</td>
<td>x900</td>
<td>x900-5.4.4-2.3.rel</td>
<td>x900-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>x900-24XT</td>
<td>x900</td>
<td>x900-5.4.4-2.3.rel</td>
<td>x900-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>SwitchBlade x908</td>
<td>SBx908</td>
<td>SBx908-5.4.4-2.3.rel</td>
<td>SBx908-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>SwitchBlade x8106</td>
<td>SBx8100</td>
<td>SBx81CFC400-5.4.4-2.3.rel</td>
<td>SBx81CFC400-gui_544_07.jar</td>
<td>10/2014</td>
</tr>
<tr>
<td>SwitchBlade x8112</td>
<td>SBx8100</td>
<td>SBx81CFC960-5.4.4-2.3.rel</td>
<td>SBx81CFC960-gui_544_07.jar</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.
Key New Features and Enhancements

Software version 5.4.4-2.3 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-1.1.

This section summarizes the key new features. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Web-Authentication Enhancements

The following enhancements have been added to web-authentication.

- Custom login page
- External login page
- Robust web-authentication

**Custom login page**

You can customize the web-authentication page by changing the web page logo image, success message, welcome message, and web page title.

The following commands have been introduced for this enhancement.

- `auth-web-server page logo`
- `auth-web-server page sub-title`
- `auth-web-server page success-message`
- `auth-web-server page title`
- `auth-web-server page welcome-message`
- `show auth-web-server page`

**External login page**

You can use an external login page for web-authentication rather than using the built-in AlliedWare Plus login page.

The `auth-web forward` command has been introduced for this enhancement.

**Robust web-authentication**

Web-authentication configuration has been simplified and some limitations have been removed. For command details, see Authentication Commands in this release note.

- Previously, you could configure an intercept mode on the web-authentication server for supplicants (client devices). Now, you no longer need to configure the intercept mode. Intercept mode is always available and it intercepts HTTP packets but doesn't intercept ARP or DNS messages. As a result, the `auth-web-server mode` command has been deleted.

- Previously, you could enable the HTTP redirect feature on every interface on which web-based port authentication was enabled. Now, the HTTP redirect feature is always enabled and you cannot disable it. As a result, the `auth-web-server http-redirect` command has been deleted.

- Previously, you needed to register the gateway information when the supplicant was authorized. Now, the AlliedWare Plus device acts as the default gateway and you no longer need to add the gateway information. As a result, the `auth-web-server gateway` command has been deleted.
Previously, you could set the HTTPS port number for the web authentication server. Now, you no longer need to set the port number and the default port number 443 is used. As a result, the `auth-web-server sslport` command has been deleted.

The default behavior of web-authentication packet forwarding has changed. Previously, packet forwarding for port authentication was disabled by default. Now, ARP, DHCP, DNS forwarding for port authentication are enabled by default. TCP and UDP forwarding for port authentication are disabled by default. As a result, the default behavior of the `auth-web forward` command has been changed.

Previously, you could use either HTTP protocol or HTTPS protocol for the web authentication server. Both HTTP and HTTPS packets were redirected to HTTP server or HTTPS server. Now, you can use both HTTP protocol and HTTPS protocol. When both protocols are used, HTTP packet is redirected to HTTP server and HTTPS packet is redirected to HTTPS server respectively. As a result, the `auth-web-server ssl` command has been changed and you can use the `hybrid` option of this command to enable both HTTP and HTTPS for the web authentication server.

Previously, you could register only HTTP intercept port numbers. Now, you can use the `auth-web-server ssl intercept-port` new command to register HTTPS intercept port numbers when the HTTPS server uses custom port numbers.

Previously, you couldn't assign a hostname to the web authentication server. Now, you can use the `auth-web-server host-name` new command to assign a hostname to the web authentication server.

As a result of the enhancements, the output of the `show auth-web-server` command has been changed.

If you configure a virtual IP address for the web-authentication server by using the `auth-web-server ipaddress` command or the `auth-web-server dhcp ipaddress` command, you must add a hardware ACL which sends the packets going to the virtual IP address to the CPU on the web-authentication enabled interfaces. If the hardware ACL is not set, the web-authentication success page will not appear on the supplicant's web browser. For example, if you configure the virtual IP address 1.2.3.4 and web-authentication is enabled on port1.0.1 and port1.0.7, you must add the hardware filter `send-to-cpu ip any 1.2.3.4/32` to port1.0.1 and port1.0.7 as shown in the following `show running-config` command output:

```
...  
  auth-web-server ipaddress 1.2.3.4  
  access-list hardware acl-web  
  send-to-cpu ip any 1.2.3.4/32  
  !  
  interface port1.0.1  
  auth-web enable  
  access-group acl-web  
  !  
  interface port1.0.7  
  auth-web enable  
  access-group acl-web  
  !
```
Stack-Local-VLANs Enhancements

Network data VLANs are shared by the stack and use the stack’s virtual MAC address. Consequently only the stack master is able to respond to messages such as ARP or ICMP requests. One disadvantage of this is that although network administrators can ping the whole stack to determine its operational status, such pinging will not provide status information for individual stack members. Stack-local-VLANs provide a solution to this problem. For command details, see `vlan mode stack-local-vlan` in this release note.

Note: This enhancement exists only on the following stackable switches: x310, x510, and x610 Series.

Stack-Local-VLAN Operation

Each stack-local-VLAN belongs to a specific stack member, and uses that stack member’s physical MAC address, rather than the stack’s virtual MAC address. This enables a stack member to process stack-local-VLAN traffic directly on its own CPU, even if this is the stack master.

This strict association of local VLAN to specific stack member enables network administrators to ping each stack member individually in order to monitor the health of the entire stack, on a member-by-member basis.

Stack-local-VLANs are especially useful within networks where ping polling is used to monitor the health of network devices.

Stack-Local-VLAN Configuration

The following example shows a stack-local-VLAN configuration for a two member stack. Note that overlapping IP subnets are permitted on local VLAN interfaces:

Table 1-1: Configuring Stack-Local-VLANs on a Two Member Stack

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. Create the stack-local-VLANs for stack members 1 and 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter global configuration mode.</td>
<td>awplus#</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Enter VLAN database mode.</td>
<td>awplus(config)#</td>
<td>vlan database</td>
</tr>
<tr>
<td>Create the stack-local-VLAN for stack member 1.</td>
<td>awplus(config-vlan)#</td>
<td>vlan 4001 mode stack-local-vlan 1</td>
</tr>
<tr>
<td>Create the stack-local-VLAN for stack member 2.</td>
<td>awplus(config-vlan)#</td>
<td>vlan 4001 mode stack-local-vlan 2</td>
</tr>
</tbody>
</table>

Step 2. Apply the access port mode to port 1.0.24

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter global configuration mode.</td>
<td>awplus#</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Enter interface configuration mode for port 1.0.24.</td>
<td>awplus(config)#</td>
<td>interface port1.0.24</td>
</tr>
<tr>
<td>Set the port to access mode.</td>
<td>awplus(config-if)#</td>
<td>switchport mode access</td>
</tr>
<tr>
<td>Add this port to member 1’s local VLAN.</td>
<td>awplus(config-if)#</td>
<td>switchport access vlan 4001</td>
</tr>
</tbody>
</table>

Step 3. Apply the access port mode to port 2.0.24
Table 1-1: Configuring Stack-Local-VLANs on a Two Member Stack

<table>
<thead>
<tr>
<th>Description (cont.)</th>
<th>Prompt (cont.)</th>
<th>Command (cont.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter interface configuration mode for port 2.0.24.</td>
<td>awplus(config)#</td>
<td>interface port2.0.24</td>
</tr>
<tr>
<td>Set the port to access mode.</td>
<td>awplus(config-if)#</td>
<td>switchport mode access</td>
</tr>
<tr>
<td>Add this port to member 2’s local VLAN.</td>
<td>awplus(config-if)#</td>
<td>switchport access vlan 4002</td>
</tr>
</tbody>
</table>

**Step 4. Apply the IP address 192.168.1.1/24 to VLAN 4001**

<table>
<thead>
<tr>
<th>Description (cont.)</th>
<th>Prompt (cont.)</th>
<th>Command (cont.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter global configuration mode.</td>
<td>awplus#</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Select local VLAN interface for member 1</td>
<td>awplus(config)#</td>
<td>interface vlan4001</td>
</tr>
<tr>
<td>Assign an IP address that member 1 will reply to.</td>
<td>awplus(config-if)#</td>
<td>ip address 192.168.1.1/24</td>
</tr>
</tbody>
</table>

**Step 5. Apply the IP address 192.168.1.2/24 to VLAN 4002**

<table>
<thead>
<tr>
<th>Description (cont.)</th>
<th>Prompt (cont.)</th>
<th>Command (cont.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enter global configuration mode.</td>
<td>awplus#</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Select local VLAN interface for member 2</td>
<td>awplus(config)#</td>
<td>interface vlan4002</td>
</tr>
<tr>
<td>Assign an IP address that member 2 will reply to.</td>
<td>awplus(config-if)#</td>
<td>ip address 192.168.1.2/24</td>
</tr>
</tbody>
</table>
Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:
- “Licensing this Software Version on an SBx908 Switch” on page 44 and
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 46.

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the reboot rolling command, you can reduce downtime when upgrading a VCStack.

You can use the reboot rolling command to upgrade to 5.4.4-2.3 from any 5.4.4-1.x version. The following table shows the process for using it to update from earlier versions.

<table>
<thead>
<tr>
<th>Upgrading from</th>
<th>How to upgrade using the reboot rolling command</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.4-0.x</td>
<td>First upgrade to 5.4.4-1.x, then to 5.4.4-2.x.</td>
</tr>
<tr>
<td>5.4.3-x.x</td>
<td>First upgrade to any 5.4.4-0.x version, then to 5.4.4-1.x, then to 5.4.4-2.x.</td>
</tr>
</tbody>
</table>

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

<table>
<thead>
<tr>
<th>If the existing VCStack is running ...</th>
<th>then a new member can join the VCStack if it is running ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>any 5.4.4-0.x version</td>
<td>any 5.4.4-0.x version</td>
</tr>
<tr>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
</tr>
<tr>
<td>5.4.4-2.3 or 5.4.4-2.4</td>
<td>5.4.4-2.3 or 5.4.4-2.4</td>
</tr>
</tbody>
</table>

Before you add a new switch to a stack, make sure the new switch’s version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.
ISSU (In-Service Software Upgrade)

This version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.

AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with:

- x210 Series switches running version 5.4.4-1.2 (but not earlier versions)
- other AlliedWare Plus switches running version 5.4.3-2.6 and later or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

For x210 Series switches, you can use these methods to upgrade to this version from 5.4.4-1.2, but not from earlier versions.

For other switches, you can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-x.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).

2. Decide which AMF upgrade method is most suitable.

3. Initiate the AMF network upgrade using the selected method. To do this:
   
   a. create a working-set of the switches you want to upgrade

   b. enter the command `atmf reboot-rolling <location>` or `atmf distribute-firmware <location>` where `<location>` is the location of the .rel files.

   c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.
Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the license certificate command, then validated with the show license or show license brief commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the show system mac license command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the license certificate command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands show license or show license brief to confirm release license application.

On a stacked switch, use the command show license member or show license brief member to confirm release license application.
From version 5.4.4, the **show license** command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses

<table>
<thead>
<tr>
<th>Index</th>
<th>License name</th>
<th>Customer name</th>
<th>Quantity of licenses</th>
<th>Type of license</th>
<th>License issue date</th>
<th>License expiry date</th>
<th>Features included</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Base License</td>
<td>ABC Consulting</td>
<td>1</td>
<td>Full</td>
<td>10-Jul-2014</td>
<td>N/A</td>
<td>EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64, RADIUS-100, RIP, VRRP</td>
</tr>
<tr>
<td>2</td>
<td>5.4.4-rl</td>
<td>ABC Consulting</td>
<td>-</td>
<td>Full</td>
<td>10-Jul-2014</td>
<td>N/A</td>
<td>5.4.4</td>
</tr>
</tbody>
</table>
```
Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the license certificate command, then validated with the show license or show license brief commands. Follow these steps:

- Obtain the MAC address for a control card
- Obtain a release license for a control card
- Apply a release license on a control card
- Confirm release license application

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the license certificate command on the stack master will automatically apply the release licenses to all the control cards within the stack.

Step 1: Obtain the MAC address for a control card

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the show system mac license command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:
Card          MAC Address
------------- ------------------------
1.5           eccd.6d9e.3312
1.6           eccd.6db3.58e7
Chassis MAC Address eccd.6d7b.3bc2
```

Step 2: Obtain a release license for a control card

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a control card

Use the license certificate command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.
Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

**Step 4: Confirm release license application**

On a stand-alone chassis, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked chassis, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index                         : 1
License name                  : Base License
Customer name                 : ABC Consulting
Quantity of licenses          : 1
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Features included             : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100
                               Virtual-MAC, VRRP

Index                         : 2
License name                  : 5.4.4-rl
Customer name                 : ABC Consulting
Quantity of licenses          : -
Type of license               : Full
License issue date            : 10-Jul-2014
License expiry date           : N/A
Release                       : 5.4.4
```
Installing this Software Version

Caution: Software version 5.4.4-2.3 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see “Licensing this Software Version on an SBx908 Switch” on page 44 and “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 46.

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.

2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:
   
   awplus# show file systems

   To list files, use the command:
   
   awplus# dir

   To delete files, use the command:
   
   awplus# del <filename>

   You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.
   
   awplus# copy tftp flash

   Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:
   
   awplus# configure terminal

   Then set the switch to reboot with the new software version:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210 Series</td>
<td>awplus(config)# boot system x210-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>x230 Series</td>
<td>awplus(config)# boot system x230-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>x310 Series</td>
<td>awplus(config)# boot system x310-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>awplus(config)# boot system IX5-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>x510 Series</td>
<td>awplus (config)# boot system x510-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>x610 Series</td>
<td>awplus(config)# boot system x610-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>x900 Series</td>
<td>awplus(config)# boot system x900-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>SBx908</td>
<td>awplus(config)# boot system SBx908-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>SBx8100 with CFC400</td>
<td>awplus(config)# boot system SBx81CFC400-5.4.4-2.3.rel</td>
</tr>
<tr>
<td>SBx8100 with CFC960</td>
<td>awplus(config)# boot system SBx81CFC960-5.4.4-2.3.rel</td>
</tr>
</tbody>
</table>
Return to Privileged Exec mode and check the boot settings, by using the commands:

`awplus(config)# exit`
`awplus# show boot`

5. Reboot using the new software version.

`awplus# reload`
Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (.jar) gives the earliest version of the software file (.rel) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- **PC Platform:**
  - Windows XP SP2 and up / Windows Vista SP1 and up
- **Browser:** (must support Java Runtime Environment (JRE) version 6)
  - Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (.jar extension) onto your TFTP server, SD card or USB storage device.

2. Connect to the switch's management port, then log into the switch.

3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.
   - To see the memory usage, use the command:
     ```
     awplus# show file systems
     ```
   - To list files, use the command:
     ```
     awplus# dir
     ```
   - To delete files, use the command:
     ```
     awplus# del <filename>
     ```
     You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:
   ```
   awplus# configure terminal
   awplus(config)# interface vlan1
   awplus(config-if)# ip address <address>/<prefix-length>
   ```
   Where `<address>` is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:
   ```
   awplus(config-if)# ip address 192.168.2.6/24
   ```

5. If required, **configure a default gateway for the switch.**
   ```
   awplus(config-if)# exit
   awplus(config)# ip route 0.0.0.0/0 <gateway-address>
   ```
   Where `<gateway-address>` is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.
6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.
   **TFTP server:** Use the command:
   ```
   awplus# copy tftp://<server-address>/<filename.jar> flash:/
   ```
   **SD card:** use the command:
   ```
   awplus# copy card:/<filename.jar> flash:/
   ```
   **USB storage device:** use the command:
   ```
   awplus# copy usb:/<filename.jar> flash:/
   ```
   where `<server-address>` is the IP address of the TFTP server, and where `<filename.jar>` is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:
   ```
   awplus# configure terminal
   awplus(config)# service http
   ```
   The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.
   ```
   awplus(config)# username <username> privilege 15 password <password>
   ```
   You can create multiple users to log into the GUI. For information about the `username` command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser
   On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.
   Next, click on the ‘Security’ tab. Ensure the ‘Enable Java content in the browser’ checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List
    Click on the ‘Edit Site List’ button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the ‘Exception Site List’ dialog, enter the IP address you configured in Step 4, with a `http://` prefix.
    After entering the URL click the Add button then click OK.

11. Log into the GUI.
    Start a browser and enter the switch’s IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.
Authentication Commands

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**auth-web forward**

This command enables the web authentication packet forwarding feature on the interface specified. This command also enables ARP forwarding, and adds forwarded packets to the TCP or UDP port number specified.

Use the `no` variant of this command disables or deletes the packet forwarding feature on the interface.

**Syntax**

```
auth-web forward {arp|dhcp}
no auth-web forward {arp|dhcp}
```

```
auth-web forward [<ip-address>] {dns|tcp <1-65535>|udp <1-65535>}
```

```
no auth-web forward <ip-address> {dns|tcp <1-65535>|udp <1-65535>}
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;ip-address&gt;</code></td>
<td>Enable forwarding to the destination IPv4 address.</td>
</tr>
<tr>
<td>arp</td>
<td>Enable forwarding of ARP.</td>
</tr>
<tr>
<td>dhcp</td>
<td>Enable forwarding of DHCP (UDP port 67).</td>
</tr>
<tr>
<td>dns</td>
<td>Enable forwarding of DNS (UDP port 53).</td>
</tr>
<tr>
<td>tcp</td>
<td>Enable forwarding of TCP specified port number.</td>
</tr>
<tr>
<td><code>&lt;1-65535&gt;</code></td>
<td>TCP Port number.</td>
</tr>
<tr>
<td>udp</td>
<td>Enable forwarding of UDP specified port number.</td>
</tr>
<tr>
<td><code>&lt;1-65535&gt;</code></td>
<td>UDP Port number.</td>
</tr>
</tbody>
</table>

**Default**

ARP, DHCP and DNS forwarding for port authentication are enabled by default. TCP and UDP forwarding for port authentication are disabled by default.

**Mode**

Interface Configuration for a static channel, a dynamic (LACP) channel group, or a switch port.

**Examples**

To enable the ARP forwarding feature on interface port1.0.2, use the following commands:
```
awplus# configure terminal
awplus(config)# interface port1.0.2
awplus(config-if)# auth-web forward arp
```

To enable the ARP forwarding feature on auth config-group student, use the following commands:
```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# auth-web forward arp
```
To add the TCP forwarding port 137 on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# auth-web forward tcp 137
```

To disable the ARP forwarding feature on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward arp
```

To delete the TCP forwarding port 137 on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward tcp 137
```

To delete all of TCP forwarding on auth config-group student, use the following commands:

```
awplus# configure terminal
awplus(config)# auth config-group student
awplus(config-auth-group)# no auth-web forward tcp
```

**Related Commands**

- `show auth-web`
- `show auth-web interface`
- `show running-config`
**auth-web-server host-name**

This command assigns a hostname to the web authentication server.

Use the **no** variant of this command to remove the hostname from the web authentication server.

**Syntax**

```
auth-web-server host-name <hostname>
no auth-web-server host-name
```

**Parameter** | **Description**
--- | ---
<hostname> | URL string of the hostname

**Default**
The web authentication server has no hostname.

**Mode**
Global Configuration

**Usage**
When the web authentication server uses HTTPS protocol, the web browser will validate the certificate. If the certificate is invalid, the web page gives a warning message before displaying server content. However, the web page will not give warning message if the server has a hostname same as the one stored in the installed certificate.

**Examples**
To set the auth.example.com as the hostname of the web authentication server, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server host-name auth.example.com
```

To remove hostname auth.example.com from the web authentication server, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server host-name
```

**Related Commands**

- `aaa authentication auth-web`
- `auth-web enable`
**auth-web-server login-url**

This command sets the web-authentication login page URL. Use the **no** variant of this command to delete the set URL.

**Syntax**

```
auth-web-server login-url <URL>
no auth-web-server login-url
```

**Default**

The built-in login page is set by default.

**Mode**

Global Configuration

**Examples**

To set `http://example.com/login.html` as the login page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server login-url http://example.com/login.html
```

To unset the login page URL, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server login-url
```

**Parameter** | **Description**
---|---
<URL> | Set login page URL

**Validation Commands**

show running-config
**auth-web-server page logo**

This command sets the type of logo that will be displayed on the web authentication page.

Use the `no` variant of this command to set the logo type to `auto`.

**Syntax**

```
auth-web-server page logo {auto|default|hidden}
```

```
no auth-web-server page logo
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auto</td>
<td>Display the custom logo if installed; otherwise display the default logo</td>
</tr>
<tr>
<td>default</td>
<td>Display the default logo</td>
</tr>
<tr>
<td>hidden</td>
<td>Hide the logo</td>
</tr>
</tbody>
</table>

**Default**

Logo type is `auto` by default.

**Mode**

Global Configuration

**Examples**

To display the default logo with ignoring installed custom logo, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page logo default
```

To set back to the default logo type `auto`, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page logo
```

**Validation Commands**

`show auth-web-server page`
**auth-web-server page sub-title**

This command sets the custom sub-title on the web authentication page.

Use the **no** variant of this command to reset the sub-title to its default.

**Syntax**

```
auth-web-server page sub-title {hidden|text <sub-title>}
```

```
no auth-web-server page sub-title
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hidden</td>
<td>Hide the sub-title</td>
</tr>
<tr>
<td>&lt;sub-title&gt;</td>
<td>Text string of the sub-title</td>
</tr>
</tbody>
</table>

**Default**

"Allied-Telesis" is displayed by default.

**Mode**

Global Configuration

**Examples**

To set the custom sub-title, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page sub-title text Web Authentication
```

To hide the sub-title, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page sub-title hidden
```

To change back to the default title, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page sub-title
```

**Validation Commands**

```
show auth-web-server page
```
### auth-web-server page success-message

This command sets the success message on the web-authentication page.

Use the `no` variant of this command to remove the success message.

**Syntax**

```plaintext
auth-web-server page success-message text <success-message>
no auth-web-server page success-message
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;success-message&gt;</code></td>
<td>Text string of the success message</td>
</tr>
</tbody>
</table>

**Default**

No success message is set by default.

**Mode**

Global Configuration

**Examples**

To set the success message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page success-message text
Your success message
```

To unset the success message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page success-message
```

**Validation Commands**

`show auth-web-server page`
**auth-web-server page title**

This command sets the custom title on the web authentication page. Use the `no` variant of this command to remove the custom title.

**Syntax**

```plaintext
auth-web-server page title {hidden|text <title>}
no auth-web-server page title
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>hidden</td>
<td>Hide the title</td>
</tr>
<tr>
<td>&lt;title&gt;</td>
<td>Text string of the title</td>
</tr>
</tbody>
</table>

**Default**

“Web Access Authentication Gateway” is displayed by default.

**Mode**

Global Configuration

**Examples**

To set the custom title on the web authentication page, use the commands:

```plaintext
awplus# configure terminal
awplus(config)# auth-web-server page title text Login
```

To hide the title on the web authentication page, use the commands:

```plaintext
awplus# configure terminal
awplus(config)# auth-web-server page title hidden
```

To unset the custom title on the web authentication page, use the commands:

```plaintext
awplus# configure terminal
awplus(config)# no auth-web-server page title
```

**Validation Commands**

`show auth-web-server page`
**auth-web-server page welcome-message**

This command sets the welcome message on the web-authentication page.

Use the `no` variant of this command to remove the welcome message.

**Syntax**

```
auth-web-server page welcome-message text <welcome-message>
no auth-web-server page welcome-message
```

**Default**

No welcome message is set by default.

**Mode**

Global Configuration

**Examples**

To set the welcome message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server page welcome-message text Your welcome message
```

To remove the welcome message on the web-authentication page, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server page welcome-message
```

**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;welcome-message&gt;</code></td>
<td>Text string of the welcome message</td>
</tr>
</tbody>
</table>

**Validation Commands**

`show auth-web-server page`
**auth-web-server ssl**

This command enables HTTPS protocol or both HTTP protocol and HTTPS protocol for the web authentication server feature.

When both protocols are enabled, HTTP packet is redirected to HTTP server and HTTPS packet is redirected to HTTPS server respectively.

Use the `no` variant of this command to disable HTTPS protocol.

**Syntax**

```
auth-web-server ssl [hybrid]
no auth-web-server ssl
```

**Default**

HTTP protocol is enabled by default.

**Mode**

Global Configuration

**Examples**

To enable HTTPS functionality for the web authentication server feature, use the following commands:

```
awplus# configure terminal
awplus(config)# auth-web-server ssl
```

To enable both HTTP protocol and HTTPS protocol, use the following commands:

```
awplus# configure terminal
awplus(config)# auth-web-server hybrid
```

To disable HTTPS functionality for the web authentication server feature, use the following commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server ssl
```

**Validation Commands**

```
show auth-web
show auth-web-server
```
**auth-web-server ssl intercept-port**

Use this command to register HTTPS intercept port numbers when the HTTPS server uses custom port number (not TCP port number 443).

Note that you need to use the **auth-web-server intercept-port** command to register HTTP intercept port numbers.

Use the **no** variant of this command to delete registered port number.

**Syntax**

```
auth-web-server ssl intercept-port <1-65535>
no auth-web-server ssl intercept-port <1-65535>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-65535&gt;</td>
<td>TCP port number in the range from 1 through 65535</td>
</tr>
</tbody>
</table>

**Default**

443/TCP is registered by default.

**Mode**

Global Configuration

**Examples**

To register HTTPS port number 3128, use the commands:

```
awplus# configure terminal
awplus(config)# auth-web-server ssl intercept-port 3128
```

To delete HTTPS port number 3128, use the commands:

```
awplus# configure terminal
awplus(config)# no auth-web-server ssl intercept-port 3128
```

**Validation Commands**

`show auth-web-server`

**Related Commands**

`auth-web-server intercept-port`
show auth-web-server

This command shows the web authentication server configuration and status on the switch.

Syntax
show auth-web-server

Mode
Privileged Exec

Examples
To display web authentication server configuration and status, use the command:

awplus# show auth-web-server

Figure 1: Example output from the show auth-web-server command on the console.

awplus#show auth-web-server
Web authentication server
 Server status: enabled
 Server address: --
 Server Host-Name: --
 Server protocol: HTTP
 DHCP server: disabled
 DHCP lease time: 20
 DHCP WPAD option URL: --
 HTTP Port No: --
 Certification: default
 HTTP Intercept Port No: 80
 HTTPS Intercept Port No: 443
 Redirect URL: --
 Redirect delay time: 5
 Session keep: disabled
 Login URL: --
 PingPolling: disabled
 PingInterval: 30
 Timeout: 1
 FailCount: 5
 ReauthTimerRefresh: disabled
awplus#

Related Commands
auth-web forward
auth-web-server ipaddress
auth-web-server port
auth-web-server redirect-delay-time
auth-web-server redirect-url
auth-web-server session-keep
auth-web-server ssl
auth-web-server ssl intercept-port
show auth-web-server page

This command displays the web-authentication page configuration and status.

**Syntax**  
show auth-web-server page

**Mode**  
Privileged Exec

**Examples**  
To show the web-authentication page information, use the command:

```
awplus# show auth-web-server page
```

**Figure 2:** Example output from the show auth-web-server page command on the console.

```
awplus#show auth-web-server page
Web authentication page
    Logo: auto
    Title: default
    Sub-Title: Web Authentication
    Welcome message: Your welcome message
    Success message: Your success message
```

**Related Commands**  
auth-web forward
auth-web-server page logo
auth-web-server page sub-title
auth-web-server page success-message
auth-web-server page title
auth-web-server page welcome-message
Stack-Local-VLANs Commands

Contents

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**vlan mode stack-local-vlan**

This command enables you to create stack-local-VLANs and use ICMP to monitor and diagnose issues within specific members of the stack. When a VLAN is added using this method, all its traffic will be trapped to and processed by the CPU of the specific local stack member, rather than the CPU of the stack master.

The **no** variant of this command destroys the specified VLAN.

**Syntax**

```
vlan <vid> mode stack-local-vlan <member-id>
no vlan <vid>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;vid&gt;</code></td>
<td>The VID of the VLAN to be created in the range 2-4094. We recommend that the first stack-local-vlan be assigned the number 4001 for the first stack member, then incremented by one for each stack member. So a stack of four members would be assigned the following VID numbers: stack member one VID 4001 stack member two VID 4002 stack member three VID 4003 stack member four VID 4004</td>
</tr>
<tr>
<td>mode stack-local-vlan</td>
<td>Specifies that the new VLAN will function as a stack-local-VLAN.</td>
</tr>
<tr>
<td><code>&lt;member-id&gt;</code></td>
<td>Specifies the new stack member ID. Enter a decimal number in the range 1-8.</td>
</tr>
</tbody>
</table>

**Default**

By default, VLANs are automatically enabled as they are added.

**Mode**

VLAN Configuration

**Examples**

To add a stack-local-VLAN with the VID of 4002 and assign it to stack member 2, use the following commands:

```
awplus# configure terminal
awplus(config)# vlan database
awplus(config-vlan)# vlan 4002 mode stack-local-vlan 2
```

To remove VLAN 4002, use the following commands:

```
awplus# configure terminal
awplus(config)# vlan database
awplus(config-vlan)# no vlan 4002
```

**Related Commands**

`mtu`
`vlan database`
`show vlan`
AlliedWare Plus Version 5.4.4-1.1
For SwitchBlade x8100 Series, SwitchBlade x908, x900 Series, x610 Series, x510 Series, IX5-28GPX, x310 Series, x230 Series, and x210 Series Switches

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Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4-1.1 since version 5.4.4-0.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in Table 1 below.

Caution: Software version 5.4.4-1.1 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- “Licensing this Software Version on an SBx908 Switch” on page 85 and
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 87.

Table 1: Switch models and software file names

<table>
<thead>
<tr>
<th>Models</th>
<th>Series</th>
<th>Software File</th>
<th>GUI File</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210-9GT</td>
<td>x210</td>
<td>x210-5.4.4-1.1.rel</td>
<td>x210-gui_544_06.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x210-16GT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x210-24GT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x230-10GP</td>
<td>x230</td>
<td>x230-5.4.4-1.1</td>
<td>Not applicable</td>
<td>07/2014</td>
</tr>
<tr>
<td>x230-18GP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x310-26FT</td>
<td>x310</td>
<td>x310-5.4.4-1.1.rel</td>
<td>x310-gui_544_02.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x310-50FT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x310-26FP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x310-50FP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>IX5</td>
<td>IX5-5.4.4-1.1.rel</td>
<td>IX5-gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x510-28GTX</td>
<td>x510</td>
<td>x510-5.4.4-1.1.rel</td>
<td>x510-gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x510-52GTX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x510-28GPX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x510-52GPX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x510-28GSX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x510DP-52GTX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-24Ts</td>
<td>x610</td>
<td>x610-5.4.4-1.1.rel</td>
<td>x610-gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x610-24Ts-PoE+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-24Ts/X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-24Ts/X-PoE+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-24SPs/X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-48Ts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-48Ts-PoE+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-48Ts/X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x610-48Ts/X-PoE+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x900-12XT/S</td>
<td>x900</td>
<td>x900-5.4.4-1.1.rel</td>
<td>x900-gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>x900-24XS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x900-24XT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SwitchBlade x908</td>
<td>SBx908</td>
<td>SBx908-5.4.4-1.1.rel</td>
<td>x900-gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>SwitchBlade x8106</td>
<td>SBx8100</td>
<td>SBx81CFC400-5.4.4-1.1.rel</td>
<td>SBx81CFC400_gui_544_07.jar</td>
<td>07/2014</td>
</tr>
<tr>
<td>SwitchBlade x8112</td>
<td>SBx8112</td>
<td>SBx81CFC960-5.4.4-1.1.rel</td>
<td>Not applicable</td>
<td>07/2014</td>
</tr>
</tbody>
</table>
Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.
New Products in 5.4.4-1.1

AlliedWare Plus version 5.4.4-1.1 supports the following products that are new since 5.4.4-0.1.

x230 Series Enterprise PoE+ Gigabit Edge Switches

The Allied Telesis x230-GP Series of Layer 2+ Gigabit switches offer an impressive set of features in a compact design. Power over Ethernet Plus (PoE+) capability makes them ideal for powering access and security devices at the network edge.

Allied Telesis x230-GP Series switches provide optimal performance for connecting and remotely powering wireless access points, IP video surveillance cameras, and IP phones. The x230-10GP and x230-18GP provide 8 or 16 PoE+-capable Gigabit ports, and 2 SFP uplinks, for secure powered connectivity at the network edge.

Table 2: x230 Series models and port specifications

<table>
<thead>
<tr>
<th>Product</th>
<th>10/100/1000T (RJ-45) Copper Ports</th>
<th>100/1000X SPF Ports</th>
<th>PoE Capable Ports</th>
<th>Switching Fabric</th>
<th>Forwarding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-x230-10GP</td>
<td>8</td>
<td>2</td>
<td>8</td>
<td>20 Gbps</td>
<td>14.9 Mpps</td>
</tr>
<tr>
<td>AT-x230-18GP</td>
<td>16</td>
<td>2</td>
<td>16</td>
<td>36 Gbps</td>
<td>26.8 Mpps</td>
</tr>
</tbody>
</table>

For more information on the x230 Series switches, see the x230 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x230

x310 Series Stackable Access Switches

The Allied Telesis x310 Series stackable access switches offer an impressive set of features in a high-value package, ideal for applications at the network edge.

The Allied Telesis x310 Series provide a high performing and scalable access solution for today’s networks. With a choice of 24-port and 48-port 10/100BASE-T versions with Gigabit uplinks, Power over Ethernet (PoE), plus the ability to stack up to four units, the x310 Series is perfect for demanding applications at the edge of enterprise networks.
Table 3: x310 Series models and port specifications

<table>
<thead>
<tr>
<th>Product</th>
<th>10/100BASE-T (RJ-45) Copper Ports</th>
<th>100/1000 Combo Uplink Ports</th>
<th>1 Gigabit Stacking Ports</th>
<th>PoE Capable Ports</th>
<th>Switching Capacity</th>
<th>Forwarding Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-x310-26FT</td>
<td>24</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>12.8 Gbps</td>
<td>6.5 Mpps</td>
</tr>
<tr>
<td>AT-x310-50FT</td>
<td>48</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>17.6 Gbps</td>
<td>10.1 Mpps</td>
</tr>
<tr>
<td>AT-x310-26FP</td>
<td>24</td>
<td>2</td>
<td>2</td>
<td>24</td>
<td>12.8 Gbps</td>
<td>6.5 Mpps</td>
</tr>
<tr>
<td>AT-x310-50FP</td>
<td>48</td>
<td>2</td>
<td>2</td>
<td>48</td>
<td>17.6 Gbps</td>
<td>10.1 Mpps</td>
</tr>
</tbody>
</table>

For more information on the x310 Series switches, see the x310 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x310

SBx81XS16 Line Card for SBx8100 Series

The SBx81XS16 line card provides 16 x 10 Gigabit ports, enabling high-speed backbone connectivity from the core chassis to distribution devices.

The ability to partner 10 Gigabit Ethernet with Allied Telesis EPSRing™ (Ethernet Protection Switched Ring) technology allows the deployment of a high-speed distributed network solution. Failover in a little as 50ms prevents a node or link failure from affecting the customer experience, even with demanding applications such as IP telephony and video monitoring.

For more information on the SBx81XS16 line card, see our website at alliedtelesis.com/switches/sbx8100.
Key New Features and Enhancements

Software version 5.4.4-1.1 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.4-0.1.

This section summarizes the key new features. For a list of all new and enhanced features and commands, see “Changes in this Version” on page 78. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Cable Fault Locator

The Cable Fault Locator (CFL) is a cable diagnostic tool for copper (but not fiber) cables. You can select a port and the CFL will display, for that port, connection status or faults that exist in either the connected cable or in its terminations. The CFL operates using a technology known as Time Domain Reflectometry (TDR) to test all four pairs of wires inside the cable.

CFL is now supported on the x510 and x510-DP Series switches.

For more information see “Cable Fault Locator Introduction” on page 93 and “Cable Fault Locator Commands” on page 97.

In-Service Software Upgrade (ISSU)

ISSU is available on standalone SBx8100 Series switches with dual CFC960 control cards, and on switches using VCStack Plus to create a single virtual unit out of two chassis (where each chassis has a pair of CFC960 control cards). ISSU allows you to upgrade the software release running on the CFCs with no disruption to network traffic passing through the chassis.

AMF Enhancements

Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provides a simplified approach to network management. Since its initial release in software version 5.4.3-1.4, AMF has been continually enhanced with features to increase its versatility. The latest enhancements are described below.

Backup to remote file server

You can now choose to store your switch's backup data on a remote backup server rather than on the Master node's external media. The server is used for both backup and recovery. Each AMF master can support up to two remote file servers, which are mounted on the Master's file system.

Recovery progress LED indication

This feature displays the recovery status during automatic recovery. Two distinct flash patterns indicate the different possible states during node recovery: “node recovery in progress” and “node recovery failed”. You can use a new command (atmf recover led-off) during a recovery to turn off the progress indication and return the port LEDs to their normal running state.
**Node provisioning**

You can now pre-configure, or provision, a port for a future node before it is added to the network. A provisioned node can be created as a new unique entity, or can be cloned using the backup data from an existing node. When you add the new node to the provisioned port in the AMF network, its configuration is automatically loaded from the information stored in the backup media, with no further effort from you.

**Node cleaning**

A clean device is one that has had its previous release and configuration components removed. Thanks to the new `atmf cleanup` command you can now easily return a used switch to its original “out-of-the-box” state.

This process of cleaning is required when replacing a device with one that has been used previously and still retains components of its previous configuration. Once you have cleaned a switch, you can connect it to your AMF network and know that automatic node recovery will start effortlessly.

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**Release Licensing**

From software version 5.4.4-0.4 onwards, AlliedWare Plus software release licenses are needed for SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license. For details, see:

- “Licensing this Software Version on an SBx908 Switch” on page 85 and
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 87.
Important Considerations Before Upgrading to this Version

Licensing

From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases need to be licensed for the SBx908 and SBx8100 switches.

If you are upgrading the software on your SBx908 or SBx8100 switch, please ensure you have a 5.4.4 license on your switch. To obtain a license, contact your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:
- “Licensing this Software Version on an SBx908 Switch” on page 85
- “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 87.

Upgrading a VCStack

This software version supports VCStack “reboot rolling” upgrades. With the reboot rolling command, you can reduce downtime when upgrading a VCStack.

You can use the reboot rolling command to upgrade to 5.4.4-1.1 from any 5.4.4-0.x version.

However, if you want to use the reboot rolling command to upgrade from any 5.4.3-xx version to 5.4.4-1.1, you must upgrade to 5.4.4-0.x first.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

However, auto-synchronization is not supported between all versions of 5.4.4. The following table lists compatible versions:

<table>
<thead>
<tr>
<th>If the existing VCStack is running ...</th>
<th>then a new member can join the VCStack if it is running ...</th>
</tr>
</thead>
<tbody>
<tr>
<td>any 5.4.4-0.x version</td>
<td>any 5.4.4-0.x version</td>
</tr>
<tr>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
<td>5.4.4-1.1 or 5.4.4-1.2</td>
</tr>
</tbody>
</table>

Before you add a new switch to a stack, make sure the new switch's version is compatible with the stack's version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.

ISSU (In-Service Software Upgrade)

This software version does not support ISSU: You cannot use ISSU to upgrade to this minor software version.
AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release.

If this is not possible, switches running this minor version are compatible with switches running version 5.4.3-2.6 and later, or any 5.4.4-x.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

You can use these methods to upgrade to this version from 5.4.3-2.6 and later, or from any 5.4.4-0.x version.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
   a. create a working-set of the switches you want to upgrade
   b. enter the command `atmf reboot-rolling <location>` or `atmf distribute-firmware <location>` where `<location>` is the location of the .rel files.
   c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.
**Changes in this Version**

Table 4 on page 78 lists all new and modified commands in this version and shows which chapter of the Software References has details of each command.

Table 5 on page 83 lists new and modified features in this version.

Table 6 on page 84 lists new and modified SNMP (Simple Network Management Protocol) MIBs (Management Information Bases) in this version.

If your existing configurations include commands modified or deprecated in this version (see the Status column in the following tables), check whether you need to modify these configurations. For full command descriptions, modes and examples, see the appropriate Software Reference for your switch.

### Table 4: New and modified commands in 5.4.4-1.1

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x230</th>
<th>x310</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100 CFC400</th>
<th>SBx8100 CFC960</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>atmf backup delete</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command removes a backup file from external media.</td>
</tr>
<tr>
<td>atmf backup server</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and configures remote file servers as the destination for AMF backups.</td>
</tr>
<tr>
<td>atmf backup stop</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and stops a backup that is currently running the master node you are logged onto.</td>
</tr>
<tr>
<td>atmf backup synchronize</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and initiates a system backup of files from your master node's active remote file server to its backup remote file server.</td>
</tr>
<tr>
<td>atmf cleanup</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command erases data from nvs and flash, then reboots to put the device into a clean state ready to be used as a replacement node on a provisioned port.</td>
</tr>
</tbody>
</table>
### Table 4: New and modified commands in 5.4.4-1.1

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x230</th>
<th>x310</th>
<th>x315</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>CFC400</th>
<th>SBx8100</th>
<th>CFC960</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>atmf provision</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td>This command tells an AMF port to expect that a new node will be connected to it later, and tells it the name of the expected node. This command needs to be run in Interface Configuration mode on master nodes only.</td>
</tr>
<tr>
<td>atmf provision node clone</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and is part of setting up the files that will download onto a provisioned node. It allows a customer to use another node as a basis for the provisioned one.</td>
</tr>
<tr>
<td>atmf provision node configure</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and sets the configuration file to use during the next boot cycle. This command can also set a backup configuration file to use if the main configuration file cannot be accessed for an AMF provisioned node.</td>
</tr>
<tr>
<td>atmf provision node configure boot config</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td></td>
<td></td>
<td>This command is available on master nodes only and sets the configuration file to use during the next boot cycle. This command can also set a backup configuration file to use if the main configuration file cannot be accessed for an AMF provisioned node.</td>
</tr>
<tr>
<td>atmf provision node configure boot system</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td></td>
<td></td>
<td>This command is available on master nodes only and sets the release file to use during the next boot cycle. This command can also set a backup release file to use if the main configuration file cannot be accessed for an ATMF provisioned node.</td>
</tr>
<tr>
<td>atmf provision node create</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and creates a new directory for use with a provisioned node and is part of setting up the files that will download.</td>
</tr>
</tbody>
</table>
### Table 4: New and modified commands in 5.4.4-1.1

| Command                          | Status   | x210 | x220 | x310 | xS5 | x510 | x610 | x900 | SBx908 | SBx8100 CFC400 | SBx8100 CFC960 | Software Reference Chapter | Description                                                                                                                                                                                                 |
|---------------------------------|----------|------|------|------|-----|------|------|------|--------|----------------|----------------|---------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| atmf provision node delete      | New      | N    | N    | N    | N   | Y    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command is available on master nodes only and removes files that would otherwise download onto a provisioned node.                                                                                   |
| atmf provision node license-cert| New      | N    | N    | N    | N   | N    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command is available on master nodes only and is used to set up the license certificate for a provisioned node.                                                                                     |
| atmf provision node locate      | New      | N    | N    | N    | N   | N    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command is available on master nodes only and changes the working directory of the switch to that of a provisioned node in the backup media.                                                      |
| atmf recover led-off            | New      | Y    | Y    | Y    | Y   | Y    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command turns off the recovery failure flashing port LEDs and reverts the LEDs function to their normal operational mode.                                                                          |
| erase factory-default           | New      | Y    | Y    | Y    | Y   | Y    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command erases data from nvs and flash to put the device in a clean state when rebooted.                                                                                                          |
| show atmf backup                | Modified | N    | N    | N    | N   | Y    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command is available on master nodes only and has been modified to include a new parameter server-status to display connectivity diagnostics information for each configured remote file server. |
| show atmf links                 | Modified | N    | N    | N    | N   | N    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command displays brief information about AMF links on a switch.                                                                                                                               |
| show atmf links detail          | Modified | N    | N    | N    | N   | N    | Y    | Y    | Y      | Y              | Y              | AMF Commands        | This command now displays detailed information about AMF links on a switch.                                                                                                                         |
### Table 4: New and modified commands in 5.4.4-1.1

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x230</th>
<th>x310</th>
<th>x330</th>
<th>x510</th>
<th>x530</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100 CFC400</th>
<th>SBx8100 CFC960</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show atmf links statistics</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>In addition to its original function, this command is now also able to display the AMF link configuration and packet exchange statistics for a specified interface.</td>
</tr>
<tr>
<td>show atmf provision nodes</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>AMF Commands</td>
<td>This command is available on master nodes only and provides the user with details of a provisioned node created in the backup media.</td>
</tr>
<tr>
<td>clear test cable-diagnostics tdr</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Cable Fault Locator Commands</td>
<td>This command clears the results of a cable-diagnostics CFL test.</td>
</tr>
<tr>
<td>show test cable-diagnostics tdr</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Cable Fault Locator Commands</td>
<td>This command displays the results of a cable-diagnostics CFL test.</td>
</tr>
<tr>
<td>test cable-diagnostics tdr</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Cable Fault Locator Commands</td>
<td>This command initiates cable-diagnostics tests to twisted pair data cables in order to detect either correct, short, or open circuit terminations.</td>
</tr>
<tr>
<td>show boot</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>File Management Commands</td>
<td>This command now provides ISSU version status information.</td>
</tr>
<tr>
<td>show version</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>File Management Commands</td>
<td>The show output now displays a message whenever ISSU is running.</td>
</tr>
<tr>
<td>issu abort-timeout</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>ISSU Commands</td>
<td>ISSU Commands</td>
<td>This command initiates an abort timeout to apply when running an ISSU.</td>
</tr>
<tr>
<td>issu boot</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>ISSU Commands</td>
<td>ISSU Commands</td>
<td>This command initiates an ISSU.</td>
</tr>
<tr>
<td>issu rejoin-timeout</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>ISSU Commands</td>
<td>ISSU Commands</td>
<td>This command configures the ISSU CFC rejoin timeout that will be applied to each CFC.</td>
</tr>
<tr>
<td>show issu</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>ISSU Commands</td>
<td>ISSU Commands</td>
<td>This command shows the ISSU configuration and its process status.</td>
</tr>
</tbody>
</table>
### Table 4: New and modified commands in 5.4.4-1.1

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x230</th>
<th>x310</th>
<th>ix5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100 CFC400</th>
<th>SBx8100 CFC960</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type issu</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>This new command configures a trigger that will activate if the automatic phase of the ISSU process enters one of the following selectable states: upgraded, completed, or aborted.</td>
</tr>
<tr>
<td>exception</td>
<td>Deleted</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>This command has been deprecated in 5.4.4 release and deleted in 5.4.4-1.1 release. There are no alternative commands.</td>
</tr>
<tr>
<td>coredump size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>show card</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>When running this command while ISSU is actively rebooting CFCs, an asterisk is now appended to the line card’s state on the output. This indicates that the card is not running the same software version as the chassis’ active CFC. An explanation line is also added at the end of the output.</td>
</tr>
<tr>
<td>show card detail</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>This command now provides software version information.</td>
</tr>
<tr>
<td>show system</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>This command now displays a warning message when ISSU is in progress.</td>
</tr>
<tr>
<td>type issu</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>This command configures a trigger to that will activate at a selected point in the ISSU process.</td>
</tr>
</tbody>
</table>
### Table 5: New and modified features in 5.4.4-1.1

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>IX5</th>
<th>210</th>
<th>220</th>
<th>310</th>
<th>510</th>
<th>610</th>
<th>900</th>
<th>908</th>
<th>CFC400</th>
<th>SB8100</th>
<th>CFC960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable fault locator</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>AMF: Interoperability with xSTP</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>AMF: Node provisioning</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>AMF: Restoring a Node to a “Clean” state</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>AMF: Using a remote backup server</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>In-Service Software Upgrade (ISSU)</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Description

- **Cable Fault Locator**
  - The Cable Fault Locator (CFL) is a new diagnostic tool that can detect faults in a port’s connection cable or its terminations.

- **AMF: Interoperability with xSTP**
  - RSTP, STP, and MSTP now interoperate with the Allied Telesis Management Framework (AMF). You can now use any of these spanning tree protocols to control loops in your AMF network.

- **AMF: Node provisioning**
  - You can now pre-configure, or provision, a future node before it is added to the network. A provisioned node can be created as a new, unique entity, or can be cloned using the backup data from an existing node.

- **AMF: Restoring a Node to a “Clean” state**
  - You can now use the new `atmf cleanup` command to return a device to a clean state after a device failure in order for AMF automatic node recovery to work.

- **AMF: Using a remote backup server**
  - System backup data can now be held on a remote backup server rather than on the Master node’s external media.

- **In-Service Software Upgrade (ISSU)**
  - The In-Service Software Upgrade (ISSU) feature enables you to upgrade the software running on the CFC960 cards residing in either a stand alone x8100 switch or an x8100 VCStack Plus, while still forwarding data traffic.
<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>IXS</th>
<th>X210</th>
<th>X230</th>
<th>X310</th>
<th>X510</th>
<th>X610</th>
<th>X900</th>
<th>CFC400</th>
<th>CFC960</th>
<th>SBx8100</th>
<th>SBx8100</th>
<th>SBx908</th>
<th>SBx908</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-CHASSIS-MIB</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>A number of new objects have been added to this MIB. These relate to chassis card version (for ISSU), chassis mapping tables, and card IDs.</td>
</tr>
</tbody>
</table>
Licensing this Software Version on an SBx908 Switch

Release licenses are applied with the license certificate command, then validated with the show license or show license brief commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch. Switches may have several MAC addresses. Use the show system mac license command to show the switch MAC address for release licensing:

```
awplus# show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the license certificate command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

Step 4: Confirm release license application

On a stand-alone switch, use the commands show license or show license brief to confirm release license application.

On a stacked switch, use the command show license member or show license brief member to confirm release license application.
From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index : 1
License name : Base License
Customer name : ABC Consulting
Quantity of licenses : 1
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Features included : EPSR-MASTER, IPv6Basic, MLDSnoop, OSPF-64, RADIUS-100, RIP, VRRP

Index : 2
License name : 5.4.4-rl
Customer name : ABC Consulting
Quantity of licenses : -
Type of license : Full
License issue date : 10-Jul-2014
License expiry date : N/A
Release : 5.4.4
```
Licensing this Software Version on a Control Card for an SBx8100 Series Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- **Obtain the MAC address for a control card**
- **Obtain a release license for a control card**
- **Apply a release license on a control card**
- **Confirm release license application**

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the `license certificate` command on the stack master will automatically apply the release licenses to all the control cards within the stack.

**Step 1: Obtain the MAC address for a control card**

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the `show system mac license` command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The chassis MAC address is not used for release licensing. Use the card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card          MAC Address
------------- ----------------
1.5           eccd.6d9e.3312
1.6           eccd.6d8e.58e7
Chassis MAC Address eccd.6d7b.3bc2
```

**Step 2: Obtain a release license for a control card**

Contact your authorized Allied Telesis support center to obtain a release license.

**Step 3: Apply a release license on a control card**

Use the `license certificate` command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.
Entering a valid release license changes the console message displayed about licensing:

11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus# license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting
unlicensed mode.

Stack member 1 installed 1 license
1 license installed.

**Step 4: Confirm release license application**

On a stand-alone chassis, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked chassis, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus# show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index | License name | Customer name | Quantity of licenses | Type of license | License issue date | License expiry date | Release |
------------------------------------------------------------------------
1     | Base License | ABC Consulting| 1                   | Full            | 10-Jul-2014        | N/A              | 5.4.4   |
Features included: IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100, Virtual-MAC, VRRP

Index | License name | Customer name | Quantity of licenses | Type of license | License issue date | License expiry date |
------------------------------------------------------------------------
2     | 5.4.4-rl     | ABC Consulting| -                   | Full            | 10-Jul-2014        | N/A              |
```

Release : 5.4.4
Installing this Software Version

**Caution:** Software version 5.4.4-1.1 requires a release license for the SBx908 and SBx8100 switches. If you are using either of these switches, ensure that your switch has a 5.4.4 release license certificate before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see “Licensing this Software Version on an SBx908 Switch” on page 85 and “Licensing this Software Version on a Control Card for an SBx8100 Series Switch” on page 87.

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.

2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:

   `awplus# show file systems`

   To list files, use the command:

   `awplus# dir`

   To delete files, use the command:

   `awplus# del <filename>`

   You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.

   `awplus# copy tftp flash`

   Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:

   `awplus# configure terminal`

   Then set the switch to reboot with the new software version:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210 Series</td>
<td><code>awplus(config)# boot system x210-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>x230 Series</td>
<td><code>awplus(config)# boot system x230-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>x310 Series</td>
<td><code>awplus(config)# boot system x310-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td><code>awplus(config)# boot system IX5-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>x510 Series</td>
<td><code>awplus(config)# boot system x510-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>x610 Series</td>
<td><code>awplus(config)# boot system x610-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>x900 Series</td>
<td><code>awplus(config)# boot system x900-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>SBx908</td>
<td><code>awplus(config)# boot system SBx908-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC400</td>
<td><code>awplus(config)# boot system SBx81CFC400-5.4.4-1.1.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC960</td>
<td><code>awplus(config)# boot system SBx81CFC960-5.4.4-1.1.rel</code></td>
</tr>
</tbody>
</table>
Return to Privileged Exec mode and check the boot settings, by using the commands:

awplus(config)# exit
awplus# show boot

5. Reboot using the new software version.
awplus# reload
Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (.jar) gives the earliest version of the software file (.rel) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- **PC Platform:**
  - Windows XP SP2 and up / Windows Vista SP1 and up
- **Browser:** (must support Java Runtime Environment (JRE) version 6)
  - Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (.jar extension) onto your TFTP server, SD card or USB storage device.

2. Connect to the switch's management port, then log into the switch.

3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.
   
   To see the memory usage, use the command:
   ```
   awplus# show file systems
   ```
   To list files, use the command:
   ```
   awplus# dir
   ```
   To delete files, use the command:
   ```
   awplus# del <filename>
   ```
   You cannot delete the current boot file.

4. Assign an IP address for connecting to the GUI. Use the commands:
   ```
   awplus# configure terminal
   awplus(config)# interface vlan1
   awplus(config-if)# ip address <address>/<prefix-length>
   ```
   Where `<address>` is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:
   ```
   awplus(config-if)# ip address 192.168.2.6/24
   ```

5. If required, **configure a default gateway for the switch.**
   ```
   awplus(config-if)# exit
   awplus(config)# ip route 0.0.0.0/0 <gateway-address>
   ```
   Where `<gateway-address>` is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.
6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.
   **TFTP server:** Use the command:
   
   ```
   awplus# copy tftp://<server-address>/<filename.jar> flash:/
   ```
   
   **SD card:** use the command:
   
   ```
   awplus# copy card:/<filename.jar> flash:/
   ```
   
   **USB storage device:** use the command:
   
   ```
   awplus# copy usb:/<filename.jar> flash:/
   ```
   
   where `<server-address>` is the IP address of the TFTP server, and where `<filename.jar>` is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

   ```
   awplus# configure terminal
   awplus(config)# service http
   ```

   The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.

   ```
   awplus(config)# username <username> privilege 15 password <password>
   ```

   You can create multiple users to log into the GUI. For information about the `username` command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

   On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

   Next, click on the ‘Security’ tab. Ensure the ‘Enable Java content in the browser’ checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

    Click on the ‘Edit Site List’ button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the ‘Exception Site List’ dialog, enter the IP address you configured in Step 4, with a http:// prefix.

    After entering the URL click the Add button then click OK.

11. Log into the GUI.

    Start a browser and enter the switch’s IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.
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Introduction to the Cable Fault Locator

The Cable Fault Locator (CFL) is a cable diagnostic tool located within the switch. For a selected port, the CFL will display connection status or faults that exist in either the connecting cable itself, or its terminations.

Capabilities

The CFL is designed to operate on cable systems that utilize the following:
- fixed copper ports, i.e. not using SFP type pluggable transceivers.
- unshielded twisted pair data cables such as CAT 5 or CAT 6 and up to 100 meters long.
- cable terminations that use RJ-45 or RJ-0.5 connections.
- data rates from 10 Mbps to 1 Gbps (10 Gbps over copper cable is not supported).

The CFL operates using a technology known as Time Domain Reflectometry (TDR) to test all four pairs of wires inside the cable.

TDR Operating Principles

When a data cable is correctly terminated, the data energy traveling along it is absorbed by its terminating load resistance. However, if the cable is unplugged, broken or short circuited, this energy is reflected at the cable termination and travels back along the cable towards its source connection.

To test the cable, the CFL generates a pulse at the cable source connection and monitors the cable for the presence of a returning (reflected) pulse. By measuring the timing between the transmitted and reflected pulses, the CFL can calculate the distance between a fault (usually at the distant termination) and cable's source connection. Also, by detecting the polarity of the reflected signal, the CFL can determine whether the fault is due to an open circuit, or a short circuit, condition.

Note that CFL cannot run on a port that is currently supplying power via PoE.
Using the Cable Fault Locator

To run a CFL diagnostics test, use the command, “test cable-diagnostics tdr interface” on page 100. This will return a prompt asking you to confirm whether or not you want to continue with the test. This confirmation prompt is generated because the link is unable to carry data during the test, typically taking between 1 and 2 seconds to complete.

Example

To run a CFL test on the cable inserted into port 1.0.1 use the following command:

```bash
awplus# test cable-diagnostics tdr interface port1.0.1
```

This command returns the following message:

Link will go down while test is in progress. Continue? (y/n):
Select y to continue.

```bash
awplus# y
```

Answering y returns the following message:

Test started. This will take several seconds to complete. Use "show test cable-diagnostics tdr" to print results.

Once the cable test has run you can display its results by running the `show test cable-diagnostics tdr` command on page 99.

Output

Figure 1: Example output from the `show test cable-diagnostics tdr` command

<table>
<thead>
<tr>
<th>Port</th>
<th>Pair</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0.1</td>
<td>A</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5 +/- 5 m</td>
<td>Open</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>Pair</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>A</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5 +/- 2 m</td>
<td>Open</td>
</tr>
</tbody>
</table>

From the monitoring tests described, the CFL presents cable termination status information as shown, together with explanations, in Table 1.

Table 1: Cable Status Table

<table>
<thead>
<tr>
<th>Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>OK</td>
<td>The pair is good and is terminated.</td>
</tr>
</tbody>
</table>
## Status Definitions

<table>
<thead>
<tr>
<th>Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>The pair is not terminated.</td>
</tr>
<tr>
<td>Short (within-pair)</td>
<td>There is a short between the two wires of the pair.</td>
</tr>
<tr>
<td>Short (cross-pair)</td>
<td>There is a short between wires of different pairs.</td>
</tr>
<tr>
<td>Error</td>
<td>The test was unable to get a result. This error condition may occur when connecting to remote devices that issue idle traffic data when operating in the 10/100 M mode.</td>
</tr>
</tbody>
</table>
Cable Fault Locator Commands

Contents

- clear test cable-diagnostics tdr ................................................................. 98
- show test cable-diagnostics tdr ................................................................. 99
- test cable-diagnostics tdr interface ......................................................... 100
clear test cable-diagnostics tdr

This command clears the results of the last cable test that was run.

Syntax: clear test cable-diagnostics tdr

Mode: Privileged Exec

Examples: To clear the results of a previous cable-diagnostics test use the following commands:

```plaintext
awplus# clear test cable-diagnostics tdr
```
show test cable-diagnostics tdr

This command displays the results of the last cable-diagnostics test that was run using the TDR (Time Domain Reflectometry) on a fixed copper cable port.

The displayed status of the cable can be either:

- OK
- Open
- Short (within-pair)
- Short (across-pair)
- Error

**Syntax**  
show test cable-diagnostics tdr

no enable

**Mode**  
Privileged Exec

**Examples**  
To show the results of a cable-diagnostics test use the following command:

```
awplus# show test cable-diagnostics tdr
```

**Output**  
Figure 1: Example output from the show test cable-diagnostics tdr command.

<table>
<thead>
<tr>
<th>Port</th>
<th>Pair</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>A</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5 +/- 5 m</td>
<td>Open</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>Pair</th>
<th>Length</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>A</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>-</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>5 +/- 2 m</td>
<td>Open</td>
</tr>
</tbody>
</table>
test cable-diagnostics tdr interface

This command applies the Cable Fault Locator’s (CFL) cable-diagnostics tests to twisted pair data cables for a selected port. The tests will detect either correct, short circuit, or open, circuit terminations. For more information on running the CFL, see the Cable Fault Locator Introduction chapter.

The test can take several seconds to complete. See the related show command to display the test results.

A new test can only be started if no other test is in progress. CFL cannot run on a port that is currently supplying power via PoE.

The displayed status of the cable can be either, OK, Short (within-pair), or Open. The “Open” or “Short” status is accompanied with the distance from the source port to the incorrect termination.

**Syntax**

```
test cable-diagnostics tdr interface <interface>.
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cable-diagnostics</td>
<td>The cable diagnostic tests.</td>
</tr>
<tr>
<td>tdr</td>
<td>Time Domain Reflectometry.</td>
</tr>
<tr>
<td>interface</td>
<td>Selects the interface to test.</td>
</tr>
<tr>
<td>&lt;interface&gt;</td>
<td>Interface number of the port to be tested, i.e. 1.0.2.</td>
</tr>
</tbody>
</table>

**Example**

To run a cable test on the cable inserted into port 1.0.1 use the following command:

```
awplus# test cable-diagnostics tdr interface port1.0.1
```

You will receive the following message:

Link will go down while test is in progress. Continue? (y/n): y

```
awplus# y
```

You will then receive the following message:

Test started. This will take several seconds to complete. Use "show test cable-diagnostics tdr" to print results.
ISSU Introduction

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Introduction to ISSU

The In-Service Software Upgrade feature (ISSU) enables you to upgrade the software running on the Controller Fabric Cards (CFCs) residing in either a standalone x8100 switch, or stacked using x8100 VCStack Plus, while still forwarding data traffic.

Operating Requirements

ISSU is supported on the SwitchBlade x8100 Series chassis (or VCStack Plus). ISSU support is subject to the following conditions:

- Your Controller Fabric cards must be CFC960. CFC400 cards do not support ISSU.
- Each chassis must contain two CFC960 cards to provide full ISSU functionality and continuous network availability. You can however, still run the `issu boot` command with only one CFC card installed. This operation is subject to there being a two chassis stack with at least one line card in each chassis, and there will be some network down-time as each line card reboots. Note that in this scenario - unlike the ISSU operation - all line cards and CFCs will reboot simultaneously causing a complete network outage on the chassis during this period.

Key Concepts

The ISSU feature enables you to upgrade the software in each of the CFC960 controller cards located within either a single chassis, or a stack of two x8100 chassis, while still continuing to forward traffic. However, note that at the completion of ISSU’s automatic phase, there will be a temporary mismatch between the software version running on the controller cards, and that running on the Line Interface cards (LFIs). In order to complete the ISSU process, the line cards must be rebooted to bring their software into line with their CFCs.

Whether or not this process results in a network outage depends on the degree of resiliency that is designed into the network itself. For example, in the network shown in the section “VCStack Plus Resilient Stacked Topology Example” in the Software Reference, VCStack Plus Introduction chapter, the CFC ISSU can be automatically accomplished, and the manual line cards can be sequentially rebooted without halting the network traffic to any of their remotely connected devices.

However, even in situations where the network has been designed for port density rather than resiliency and does not use link aggregation to backup downstream devices, ISSU still enables you to upgrade the CFCs to a later software version, and in addition allows you time to schedule the line card reboots for a period of low network activity. Triggers can also be employed to automatically schedule these reboots for an out of hours operating period - see “Automating the ISSU Process Using Triggers” on page 108. Note that all CFCs and line cards must be running the same software release before a subsequent ISSU can be applied.

An important point to note is that in the ISSU processing order, the Active CFC is the last controller card to be upgraded. For this reason when the Active CFC’s software is upgraded, it hands over its “Active CFC” role to the card having the next highest priority. In practice this will be the CFC in bay 1.5 to that in bay 1.6. Thus, applying an ISSU will result in a semi permanent change of the card that is the stack’s Active CFC. This new CFC will retain this role until the stack is next rebooted.
ISSU Operation

During the ISSU process, each CFC within either the chassis, or VCS Plus stack, is sequentially rebooted. For this process, ISSU sets the boot system configuration to boot using the release being upgraded to. When the stack is then rebooted, the CFCs start with the newly applied release.

Initially, ISSU gathers information about each of the CFC nodes within the stack. It uses this information to record which CFCs have been upgraded and which are yet to be upgraded. ISSU then processes this information in node ID order, starting with the CFC that has the highest node ID and ending with the CFC that has the lowest. Once a node has finished “syncing,” the next node is rebooted. The Active CFC is left until all the CFC nodes have been rebooted.

ISSU provides the following operating facets:

- Designed for Allied Telesis chassis products such as the x8100 Series switch.
- CFCs are sequentially upgraded with no network downtime and only a single fast failover.
- Line cards must be manually upgraded (or automatically upgraded using triggers) once the CFC upgrade process is complete, i.e. before the next ISSU is attempted.
- During the ISSU process, two different software releases will be running simultaneously on the chassis.
- Communication between cards continues while ISSU is in progress.

ISSU Phases

The ISSU process should be considered as having two phases.

1. An automatic phase, during which the CFCs are automatically upgraded.
2. A manual phase, during which the line cards are manually upgraded.

The ISSU process is only considered complete once all CFCs and line cards are running the new software version.

Automatic Phase

This phase of ISSU begins by comparing the first three numbers of the running versions against the version being upgraded to. For the ISSU process to successfully apply, these three numbers must match. However, no system check is made on either the minor or maintenance components, -x.y. Presently, ISSU can be tested by applying an upgrade from 5.4.4-1.1 to the same version, and can be applied in active operation when the move is made from the current version 5.4.4-1.1, to the next maintenance version 5.4.4-1.2. To what extent ISSU compatibility extends to the minor and maintenance components for future releases and how these will apply will be documented in the release notes for each specific build.

The software release that is configured using the `boot system command` must be available for all CFCs before ISSU can begin. The release must be locally stored on flash or a usb storage device. This release will be used (rolled back to) if there is an error in the ISSU process.
For ISSU to progress, the above conditions must be met and there must be no pre-existing ISSU operation in progress. If ISSU is unable to progress, a warning message will be printed to the console. Similarly, when using VCStack Plus, if one of the chassis has only a single CFC, the console will first display a warning message followed by a confirmation message.

The diagram of Figure 1 on page 104 illustrates ISSU’s automatic phase. This diagram shows that the first step is to upgrade the software on the Member CFC. During this step the line cards are still running the old software version from the existing Active CFC. Once this step is complete, the Active CFC is deactivated and receives the software upgrade. At this time the stack Active CFC role moves from the existing Active CFC to the Member CFC. Once this process is complete the line cards can be manually upgraded.

**Figure 1: Illustration Showing ISSU’s Automatic Phase**

---

1. All cards running old software version.
2. Reboot slave CFC with new software version.
3. Do a failover and switch to the new software version. The CFC upgrades are now complete.
Manual Phase
This phase comprises rebooting each of the line cards. The diagram shown in Figure 2 on page 105 illustrates ISSU’s manual phase.

**Figure 2: Illustration Showing ISSU’s Manual Phase**

![ISSU Overview - Manual Phase](ISSU-Manual-Phase.png)

1. Reboot some line cards. This diagram shows line cards 2 and 4 as having been rebooted.

2. Reboot all other line cards. The ISSU process is now complete.

Initiating the ISSU Automatic Phase

In order to perform an ISSU, the following conditions must be met:

- You must have a chassis (or a stack) with more than one CFC960 inserted. Note that ISSU will not operate with CFC400 cards.
- There must be no previous ISSU operation in progress.
- The software specified by the CLI must be a valid AW+ release for the running system; that is, it must be on the same maintenance branch as that used currently. For example, 5.4.4.
- The release that is configured using the `boot system` command must be available for all stack members.
Use the **issu boot command** to complete the automatic phase of the ISSU operation.

**Example**  
To upgrade a system with a release file in the Flash, SBx81CFC960-5.4.5-1.2.rel, use the command:

```
awplus# issu boot SBx81CFC960-5.4.5-1.2
```

**Initiating the ISSU Manual Phase**

In order to complete the ISSU process all the LIFs must be rebooted. You use the **reboot card** command to successively reboot each line card in your switch.

**Example**  
To reboot the line card in slot 1 of chassis 2, use the command:

```
awplus> enable
awplus# reboot card 2.1
reboot card 2.1 system? (y/n): y
```

If the specified card does not exist in the chassis, the command is rejected.

**Errors and Recovery**

If an error occurs during the ISSU process (such as a CFC failing to rejoin the chassis, or the Active CFC leaving the stack) the ISSU process will halt, and one of two conditions can result:

- If the ISSU process fails before the new active master CFC is running the new release, then the boot system configuration is reset, and the old release reverts to being the primary release. In effect, the stack returns to its pre ISSU condition.
- If the new Active CFC is running the new release, the new release becomes the primary release

Either situation requires manual intervention by rebooting all stack members that are not running the same release as the stack Active CFC.

If the ISSU process aborts, the reason can be viewed by displaying the **show issu command**. You can use this show output and the logs produced to help determine the cause of the failure. The most common failure is likely to be due to the node rejoin time expiring. This could be because the configuration takes too long to replay, and the CFC cannot rejoin the stack before the rejoin timer expires. If this happens a solution might be to increase the value of the node rejoin timer.

**Example**  
To display the ISSU state, use the command:

```
awplus# show issu
```
Output

This is a sample output from the `show issu` command following a fault condition.

```
awplus#show issu
ISSU configuration:
Node rejoin timeout : 10 mins (default)
Abort timeout       : 45 mins (default)

ISSU state : Aborted
Old boot release  : SBx81CFC960-5.4.4-1.1.rel
New boot release  : SBx81CFC960-5.4.4-1.2.rel
Process started    : Fri May 23 14:54:11 2014
Process elapsed     : 00:50:56
Abort reason        : the rebooting CFC failed to rejoin the chassis

Progress on CFCs:
card 1.5 : Not upgraded
card 1.6 : Not upgraded
card 2.5 : Upgrading
card 2.6 : Upgraded
```
Automating the ISSU Process Using Triggers

You will probably want to upgrade your software at a convenient time for your operation.

One possibility is to upgrade the CFCs during a time when technical staff are available and use the automatic phase of ISSU to eliminate, or at least reduce, system downtime. Then use triggers to apply the line card upgrades for a period when the network has either a low usage, or a scheduled maintenance period.

In the following example, we assume that the automatic phase of ISSU has been successfully completed, and that you want to use triggers to implement a reboot of your line cards.

Caution ISSU trigger scripts that use any type other than “ISSU Completed” must not place the switch into Configuration Mode.

Step 1: Quantify the line cards that need to be upgraded

Use the following command to display summary information about the cards in your switch or VCStack Plus:

```
awplus# show card
```

Output Figure 3: Example output from the show card command

```
show card
Stack member 1
Card Type State
----------------- -------------------------------
1.1 AT-SBx81GP24 Online
1.2 - -
1.3 - -
1.4 - -
1.5 AT-SBx81CFC960 Online (Standby)
1.6 AT-SBx81CFC960 Online (Standby)
----------------- -------------------------------
Stack member 2
2.1 AT-SBx81GP24 Online
2.2 - -
2.3 - -
2.4 - -
2.5 AT-SBx81CFC960 Online (Active)
2.6 AT-SBx81CFC960 Online (Standby)
----------------- -------------------------------
```
Step 2: Write scripts and create the triggers

Example One

From the show output, the AT-SBx81GP24 line cards in card slots 1.1 and 2.1 need to be rebooted. You decide that a good time to do this is Sunday at 1:00 a.m.

Create the following script “lif.scp” that will reboot these cards:

Write the Script

```
enable
reboot card 1.1
y
wait 120
reboot card 2.1
y
```

Create the Trigger

Next, create a trigger called “trigger 1” that will run this script at the desired time:

```
trigger 1
type time 01:00
repeat once
day sunday
script 1 lif.scp
```

Example Two

An alternative arrangement might be for the line cards to be rebooted during the day. This method uses a trigger that would activate when the ISSU reaches CFC Upgraded, i.e. that the automatic phase has successfully completed.

Create the following script “lif.scp” that will reboot these cards:

Write the Script

```
enable
reboot card 1.1
y
wait 120
reboot card 2.1
y
```

Create the Trigger

```
trigger 1
type issu cfcs-upgraded
script 1 lif.scp
```

Related Information

For more information on creating and using triggers, see the Triggers Introduction chapter and the type issu command on page 131.
ISSU Commands

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show system ................................................................................................................................... 123
show version ................................................................................................................................. 128
type issu ..................................................................................................................................... 131
**issu boot**

To perform an ISSU, you must have a chassis (or VCStack Plus) with more than one CFC960 (Controller Fabric Card). Note that ISSU will not run with CFC400 cards, nor will it run if there is already an ISSU process in progress. Therefore a new ISSU cannot start until all CFC960s and LIFs (Line Interface cards) are running with the same software release.

The software specified by the Command Line Interface (CLI) must be a valid AW+ release for the running system and on the same maintenance branch as the currently running software, such as version 5.4.4.

If any of these preconditions are not met, ISSU will not start, and a warning message will be printed to the console.

In a VCStack Plus configuration, if one of the chassis has only a single CFC, the console will first display a warning message followed by a confirmation message.

**Syntax**

```
issu boot <file>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;file&gt;</td>
<td>URL of the release file - either a USB or Flash. Note that if set to a release on USB, then each CFC requires a USB drive to be present. The new release will then be synced to each USB drive, and the location ISSU boots each CFC from will be USB. We recommend that the file be loaded from Flash.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Examples**

To upgrade a system with a release file in the Flash, SBx81CFC960-5.4.4-1.2.rel, use the command:

```
awplus# issu boot SBx81CFC960-5.4.4-1.2.rel
```

**Related Commands**

- issu abort-timeout
- issu rejoin-timeout
- show issu
**issu abort-timeout**

This command configures the ISSU abort timeout. This is the time period that the ISSU process waits for an acknowledgment that all CFCs have rebooted. If the ISSU process fails to receive all acknowledgments within the specified timeout period, it will abort the process.

The no variant of this command resets ISSU abort timeout to its default value.

**Syntax**

```plaintext
issu abort-timeout <20-120>
no issu abort-timeout
```

**Default**

45 minutes.

**Mode**

Global Configuration Mode

**Example**

To change the ISSU abort timeout to 60 minutes, use the command:

```
awplus(config)# issu abort-timeout 60
```

**Related Commands**

- issu abort-timeout
- issu boot
- issu rejoin-timeout
- show issu

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20-120&gt;</td>
<td>The number of minutes set for the abort timeout period.</td>
</tr>
</tbody>
</table>
**issu rejoin-timeout**

This command configures the ISSU CFC rejoin timeout that will be applied to each CFC. Following a reboot, this timeout sets the period that the ISSU process will wait for each CFC to join the chassis. If any of the CFC cards fail to rejoin the chassis within the period configured by this command, the ISSU process is aborted.

The no variant of this command resets ISSU node rejoin timeout to its default value.

The ISSU process will only operate with CFC960 cards.

### Syntax

```
issu rejoin-timeout <7-30>
no issu rejoin-timeout
```

### Default

10 minutes before timing out.

### Mode

Global Configuration

### Examples

To change the ISSU node rejoin timeout to 15 minutes, use the command:

```
awplus# configure terminal
awplus(config)# issu rejoin-timeout 15
```

### Related Commands

- issu abort-timeout
- issu boot
- show issu
**show issu**

This command shows the ISSU configuration and its process status.

**Syntax**  
show issu

**Mode**  
Privileged Exec

**Example**  
To display the ISSU state, use the command:

```
awplus# show issu
```

**Output**  
This is a sample output from the `show issu` command

```
ISSU configuration:
CFC rejoin timeout : 10 mins (default)
Abort timeout : 45 mins (default)
ISSU state : Upgrading Standby
Old boot release : SBx81CFC960-5.4.4-1.1.rel
New boot release : SBx81CFC960-5.4.4-1.2.rel
Process started : Mon May 5 09:48:43 2014
Process elapsed : 00:00:03
CFC rejoin timer : 00:09:56 remaining
Abort timer : 00:44:56 remaining
Progress on CFCs:
card 1.5 : Not upgraded
card 1.6 : Not upgraded
card 2.5 : Not upgraded
card 2.6 : Upgrading
```
**show boot**

This command displays the current boot configuration. We recommend that the currently running release is set as the current boot image. ISSU will not execute if there is no current boot image.

**Syntax**

```
show boot
```

**Mode**

Privileged Exec

**Note**

When running ISSU, this command will compare the software versions that are running on each of the CFCs. Where there is a difference in versions running on either VCStack Plus, or a standalone chassis, an asterisk is appended to the current version. An explanation is also shown at the end of the output screen indicating what further action can be taken.

**Example**

To show the current boot configuration, use the command:

```
awplus# show boot
```

**Output**

**Figure 1:** Example output from the show boot command with current boot config set on an SD card

```
awplus#show boot
Boot configuration
-----------------------------------------------------------
Current software : <add-platform-here>-<add-release-here>.rel
Current boot image : card:/<add-platform-here>-<add-release-here>.rel
Backup boot image : flash:/<add-platform-here>-<add-release-here>.rel
Default boot config: flash:/default.cfg
Current boot config: card:/my.cfg (file exists)
Backup boot config: flash:/backup.cfg (file not found)
Autoboot status : enabled
```

**Figure 2:** Example output from the show boot command with the current boot configuration set on a USB storage device

```
awplus#show boot
Boot configuration
-----------------------------------------------------------
Current software : SBx81CFC960-5.4.4-1.2.rel
Current boot image : usb:/SBx81CFC960-5.4.4-1.2.rel
Backup boot image : flash:/SBx81CFC960-5.4.4-1.1.rel
Default boot config: flash:/default.cfg
Current boot config: usb:/my.cfg (file exists)
Backup boot config: flash:/backup.cfg (file not found)
Autoboot status : enabled
```
### Related Commands
- `autoboot enable`
- `boot config-file backup`
- `boot system backup`
- `show autoboot`
show card

Use this command to display information about current and provisioned slots for chassis line cards or control cards. Note that when ISSU is actively rebooting CFCs an asterisk is displayed beside a line card’s state to indicate that the card is not running the same software version as its Active Master CFC. An explanation line is also added at the end of the display.

Syntax  show card

Mode   Privileged Exec

Example To display summary information about the cards, use the following commands:

awplus# show card

Output Figure 5: Example output from the show card command

```
awplus# show card
Card    Type                 State
----------                        ---------------------------
1.1      AT-SBx81GP24     Online
1.2      AT-SBx81XS6      Online
1.3      AT-SBx81GP24     Online *
1.4      -                -
1.5      AT-SBx81CFC960   Online (Active)
1.6      AT-SBx81CFC960   Online (Standby)
1.7      AT-SBx81GS24a    Online *
1.8      -                -
1.9      -                -
1.10     -                -
1.11     AT-SBx81GT24     Online
1.12     AT-SBx81GS24a    Online
* Is running a different sw version to the Active CFC - needs a reboot
```

Table 2: Parameters in the output of the show card command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card</td>
<td>Chassis number and slot number of the card installed.</td>
</tr>
<tr>
<td>Type</td>
<td>Product name of the card installed in the slot. If no card is installed, but a slot has been provisioned, then the provisioned board class is displayed, for example “ge24”. If no card has been installed or slot provisioned then “-” is displayed.</td>
</tr>
</tbody>
</table>
### Table 2: Parameters in the output of the show card command (cont.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State</strong></td>
<td>The current state of the card. One of the following:</td>
</tr>
<tr>
<td>Booting</td>
<td>The card is currently loading its software release.</td>
</tr>
<tr>
<td>Initializing</td>
<td>The card has loaded its software release and is currently initializing software processes.</td>
</tr>
<tr>
<td>Joining</td>
<td>The card is communicating with other cards and is currently in the process of joining the chassis or VCStack Plus.</td>
</tr>
<tr>
<td>Syncing</td>
<td>The Standby Control Fabric Card is running a different software release to the Active Control Fabric Card. This software is being automatically upgraded, so that the Control Fabric Card can fully join the chassis.</td>
</tr>
<tr>
<td>Configuring</td>
<td>The chassis configuration is currently being applied to the card.</td>
</tr>
<tr>
<td>Syncing</td>
<td>The Standby Control Fabric Card has just joined and is now configured, but it is still synchronizing dynamic protocol information from the active Control Fabric Card.</td>
</tr>
<tr>
<td>Online</td>
<td>The card is fully operational.</td>
</tr>
<tr>
<td>Provisioned</td>
<td>The slot is pre-configured for the insertion of a card at a later time.</td>
</tr>
</tbody>
</table>

In addition, the Control Fabric Cards will also display in brackets Active or Standby, depending on whether they are the Active or Standby Control Fabric Card.

**Related Commands**
- `show provisioning (card)`
- `show system`
- `show tech-support`
- `stack management subnet`
**show card detail**

**Syntax**

```bash
show card detail
```

**Mode**

Privileged Exec

**Example**

To display detailed information about the cards, use the following command:

```bash
awplus# show card detail
```

**Figure 6: Example output from the show card detail command**

```
DUT2-x8100# show card detail
Card 1.1:-------------------------------------------------------------
Type                      AT-SBx81GP24
State                     Online
Uptime                    -
Bootloader Version        -
Mac Address               eccd.6d7b.3014
Software Version          5.4.4-1.2

Card 1.2:-------------------------------------------------------------
Type                      AT-SBx81GT40
State                     Online
Uptime                    -
Bootloader Version        -
Mac Address               eccd.6da3.e6b3
Software Version          5.4.4-1.2

Card 1.3:-------------------------------------------------------------
Type                      -
State                     -
Uptime                    -
Bootloader Version        -
Mac Address               -
Software Version          -

Card 1.4:-------------------------------------------------------------
Type                      -
State                     -
Uptime                    -
Bootloader Version        -
Mac Address               -
Software Version          -

Card 1.5:
```
Figure 6: Example output from the show card detail command (cont.)

<table>
<thead>
<tr>
<th>Type</th>
<th>AT-SBx81CFC960</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Online (Active)</td>
</tr>
<tr>
<td>Uptime</td>
<td>-</td>
</tr>
<tr>
<td>Bootloader Version</td>
<td>-</td>
</tr>
<tr>
<td>Mac Address</td>
<td>eccd.6d9e.330e</td>
</tr>
<tr>
<td>Software Version</td>
<td>5.4.4-1.2</td>
</tr>
</tbody>
</table>

Card 1.6:

<table>
<thead>
<tr>
<th>Type</th>
<th>AT-SBx81CFC960</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Online (Standby)</td>
</tr>
<tr>
<td>Uptime</td>
<td>-</td>
</tr>
<tr>
<td>Bootloader Version</td>
<td>-</td>
</tr>
<tr>
<td>Mac Address</td>
<td>eccd.6d9e.3310</td>
</tr>
<tr>
<td>Software Version</td>
<td>5.4.4-1.2</td>
</tr>
<tr>
<td>Chassis management subnet address</td>
<td>192.168.255.0</td>
</tr>
</tbody>
</table>
Table 3: Parameters in the output of the show card detail command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card</td>
<td>Chassis number and slot number where the card is installed.</td>
</tr>
<tr>
<td>Type</td>
<td>Product name of the card installed in the slot. If no card is installed, but one has been provisioned, then the provisioned board class is displayed, for example “ge24”. If no card has been installed or provisioned then “-” is displayed.</td>
</tr>
<tr>
<td>State</td>
<td>The current state of the card. One of the following will apply:</td>
</tr>
<tr>
<td>Booting</td>
<td>The card is currently loading its software release.</td>
</tr>
<tr>
<td>Initializing</td>
<td>The card has loaded its software release and is currently initializing software processes.</td>
</tr>
<tr>
<td>Joining</td>
<td>The card is communicating with other cards and is currently in the process of joining the chassis.</td>
</tr>
<tr>
<td>Syncing Firmware</td>
<td>The Standby Control Fabric Card is running a different software release to the Active Control Fabric Card. This software is being automatically upgraded, so that the Control Fabric Card can fully join the chassis.</td>
</tr>
<tr>
<td>Configuring</td>
<td>The chassis configuration is currently being applied to the card.</td>
</tr>
<tr>
<td>Syncing</td>
<td>The Standby Control Fabric Card has just joined and is now configured, but it is still synchronizing dynamic protocol information from the Active Control Fabric Card.</td>
</tr>
<tr>
<td>Online</td>
<td>The card is fully operational.</td>
</tr>
<tr>
<td>Provisioned</td>
<td>The slot is pre-configured for the insertion of a card at a later time.</td>
</tr>
<tr>
<td>In addition, the Control Fabric Cards will also display in brackets Active or Standby, depending on whether they are the Active or Standby Control Fabric Card.</td>
<td></td>
</tr>
<tr>
<td>Uptime</td>
<td>The time the card has been running for. If the card is not in the online state then “-” is displayed.</td>
</tr>
<tr>
<td>Bootloader Version</td>
<td>The version of the bootloader that the card has installed on it. If the card is not in the online state, then “-” is displayed.</td>
</tr>
<tr>
<td>Mac Address</td>
<td>The hardware MAC address of the card. If the card is not in the “Online” state then “-” is displayed.</td>
</tr>
<tr>
<td>Chassis management subnet address</td>
<td>Displays the stack management subnet address used by the chassis.</td>
</tr>
</tbody>
</table>

Related Commands

- show provisioning (card)
- show system
- show tech-support
- stack management subnet
**show system**

This command displays general system information about the device, including the hardware installed, memory, and software versions loaded. It also displays location and contact details when these have been set.

Note that this command will also display a warning message when ISSU is in progress.

For information on output options, see “Controlling “show” command output” in the Getting Started chapter.

**Syntax**
```
show system
```

**Mode**
User Exec and Privileged Exec

**Usage**
For a stacked configuration, if this command is entered on the stack master, it will display the information for all the stack members. A stack member heading will be displayed to distinguish the different information for every stack member.

Entering this command will display the information for the entire system. In a stacked configuration a heading will be displayed to distinguish the different information for each stack member.

**Example**
To display configuration information, use the command:

```
awplus# show system
```

**Output**
Figure 7: Example output from the show system command
### Command Output

#### Output Figure 8: Example output from the `show system` command

```
swi_a_1350_1000#show system
Switch System Status                                   Tue Apr 15 13:26:13 2014
Board       ID  Bay   Board Name                         Rev   Serial number
--------------------------------------------------------------------------------
Chassis    315        AT-SBx8112                         E-0   A042764112500072
Controller 316  Bay5  AT-SBx81CFC960                     F-0   A042854111400005
Controller 316  Bay6  AT-SBx81CFC960                     F-0   A042854112500015
Blade      317  Bay7  AT-SBx81GP24                       C-0   A042774102900003
Blade      351  Bay12 AT-SBx81GT24                       D-1   A044024112500020
PSU        320  PSUA  AT-SBxPWRPOE1/AC                   A-0   -
PSU        319  PSUD  AT-SBxPWRSYS1/AC                   A-0   -
Fan module 321  FAN1  AT-SBxFAN12                        E-0   A042844112500016
--------------------------------------------------------------------------------
RAM:  Total: 512580 kB Free: 357016 kB
Flash:  126.0MB Used: 38.5MB Available: 87.5MB
--------------------------------------------------------------------------------
Environment Status : Normal
Uptime             : 1 days 00:48:55
Bootloader version : 2.0.9
Current software   : Software Version 5.4.4-1.1 or later
Software version   : SBx81CFC960-5.4.4-1.2.rel
Build date         : Mon Apr 14 11:43:54 NZST 2014
Warning: ISSU is currently in progress.
System may be running with different software versions
Current boot config: flash:/default.cfg (file exists)
System Name
awplus
System Contact
System Location
```

```
awplus#show system
Switch System Status                                   Mon Mar 10 08:42:16 2014
Board       ID  Bay   Board Name                             Rev  Serial number
--------------------------------------------------------------------------------
Base       219        x900-24XT                              A-0  61556953
--------------------------------------------------------------------------------
Memory:   DRAM: 255196 kB   Flash: 30.0MB Used: 26.4MB Available: 3.6MB
--------------------------------------------------------------------------------
Environment Status : Normal
Uptime             : 25 days 11:41:58
Bootloader version : 1.0.9
Current software   : <add-platform-here>--<add-release-here>.rel
Software version   : 5.4.4
Build date         : Mon Mar 03 02:41:04 NZDT 2014
Current boot config: flash:/default.cfg (file exists)
User Configured Territory: usa
System Name
System Contact
System Location
```
### Output: Figure 9: Example output from the show system command

```
awplus#show system
Switch System Status Mon Mar 10 08:42:16 2014
Board ID Bay Board Name Rev Serial number
-----------------------------------------------
Base 289 x610-24Ts X2-0 G1Q67B002
-----------------------------------------------
Expansion 306 Bay1 AT-StackXG A-0 N/A
-----------------------------------------------
RAM: Total: 513388 kB Free: 419212 kB
Flash: 63.0MB Used: 58.0MB Available: 5.0MB
Environment Status: Normal
Uptime: 24 days 06:04:58
Bootloader version: 1.1.0-rc12
Current software: <add-platform-here>-<add-release-here>.rel
Software version: 5.4.4
Build date: Mon Mar 03 08:42:16 NZST 2014
Current boot config: flash:/backup.cfg (file exists)
Territory: usa
System Name
awplus
System Contact
System Location
```

### Output: Figure 10: Example output from the show system command

```
awplus#show system
Switch System Status Mon Mar 10 08:42:16 2014
Board ID Bay Board Name Rev Serial number
-----------------------------------------------
Base 369 x510-24GTX A-0 A24SCA01M
-----------------------------------------------
RAM: Total: 495792 kB Free: 384904 kB
Flash: 63.0MB Used: 50.9MB Available: 12.1MB
Environment Status: Normal
Uptime: 0 days 16:31:49
Bootloader version: 2.0.12
Current software: <add-platform-here>-<add-release-here>.rel
Software version: 5.4.4
Build date: Mon Mar 03 13:42:20 NZST 2014
Current boot config: flash:/backup.cfg (file exists)
Territory: usa
System Name
awplus
System Contact
System Location
```
## ISSU Commands

### 126 New and Enhanced Features in AlliedWare Plus 5.4.4 Major and Minor Versions

#### Output

**Figure 11: Example output from the show system command**

<table>
<thead>
<tr>
<th>Board</th>
<th>ID</th>
<th>Bay</th>
<th>Board Name</th>
<th>Rev</th>
<th>Serial number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>386</td>
<td>IX5-28GPX</td>
<td>X5-0</td>
<td>A25DD5002</td>
<td></td>
</tr>
<tr>
<td>PSU</td>
<td>335</td>
<td>PSU1</td>
<td>PWR800</td>
<td>C-0</td>
<td>421LC7023</td>
</tr>
</tbody>
</table>

---

RAM: Total: 495756 kB Free: 391896 kB
Flash: 63.0MB Used: 45.5MB Available: 17.5MB

Environment Status : Normal
Uptime : 0 days 01:20:56
Boostrap version : 3.0.0-devel

Current software : <add-platform-here>--<add-release-here>.rel
Software version : 5.4.4
Build date : Mon Mar 03 18:37:04 NZDT 2014

Current boot config: flash:/default.cfg (file exists)
User Configured Territory: europe

System Name
awplus
System Contact

System Location

awplus#

---

**Figure 12: Example output from the show system command**

<table>
<thead>
<tr>
<th>Board</th>
<th>ID</th>
<th>Bay</th>
<th>Board Name</th>
<th>Rev</th>
<th>Serial number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>392</td>
<td>x310-26FT</td>
<td>X1-0</td>
<td>A04999H131100021</td>
<td></td>
</tr>
</tbody>
</table>

---

RAM: Total: 494848 kB Free: 396052 kB
Flash: 62.0MB Used: 45.4MB Available: 16.6MB

Environment Status : Normal
Uptime : 0 days 00:40:53
Boostrap version : 3.0.3

Current software : <add-platform-here>--<add-release-here>.rel
Software version : 5.4.4C-0.1
Build date : Thu May 29 01:32:39 NZST 2014

Current boot config: flash:/default.cfg (file exists)
User Configured Territory: europe

System Name
x310
System Contact

System Location

x310#
Output  Figure 13: Example output from the show system command

```plaintext
awplus#show system
Switch System Status  Mon Mar 10 04:12:14 2014

<table>
<thead>
<tr>
<th>Board</th>
<th>ID</th>
<th>Bay</th>
<th>Board Name</th>
<th>Rev</th>
<th>Serial number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>367</td>
<td>x210-16XT</td>
<td>B-0  G22SC403U</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RAM: Total: 124384 kB  Free: 64324kB
Flash: 63.0MB Used: 34.4 MB Available: 28.6MB

Environment Status: Normal
Uptime: 0 days 04:26:02
Bootloader version : 1.0.9

Current software  : <add-platform-here>--<add-release-here>.rel
Software version  : 5.4.4
Build date        : Mon Mar 03 09:27:05 NZST 2014

Current boot config: flash:/default.cfg (file exists)
User Configured Territory: japan

System Name
awplus

System Contact

System Location
```

Related Commands  show system environment
**show version**

This command displays the version number and copyright details of the current AlliedWare Plus™ OS your device is running.

The show output now displays a message whenever ISSU is running.

For information on output options, see “Controlling “show” command output” in the Getting Started chapter.

**Syntax**

show version

**Mode**

User Exec and Privileged Exec

**Example**

To display the version details of your currently installed software, use the command:

```
awplus# show version
```
Output  Figure 14: Example output from the show version command

```
awplus#show version
AlliedWare Plus (TM) 5.4.3 19/11/12 13:22:32
Build name : <add-platform-here>-<add-release-here>.rel
Build type : RELEASE
NET-SNMP SNMP agent software
  (c) 1996, 1998-2000 The Regents of the University of California.
  All rights reserved;
  (c) 2001-2003, Networks Associates Technology, Inc. All rights reserved.
  (c) 2001-2003, Cambridge Broadband Ltd. All rights reserved.
  (c) 2003, Sun Microsystems, Inc. All rights reserved.
  (c) 2003-2006, Sparta, Inc. All rights reserved.
  (c) 2004, Cisco, Inc and Information Network
  Center of Beijing University of Posts and Telecommunications.
  All rights reserved.
NET-SNMP SNMP agent software
  (c) 1996, 1998-2000 The Regents of the University of California.
  All rights reserved;
  (c) 2001-2003, Networks Associates Technology, Inc. All rights reserved.
  (c) 2001-2003, Cambridge Broadband Ltd. All rights reserved.
  (c) 2003, Sun Microsystems, Inc. All rights reserved.
  (c) 2003-2006, Sparta, Inc. All rights reserved.
  (c) 2004, Cisco, Inc and Information Network
  Center of Beijing University of Posts and Telecommunications.
  All rights reserved.
RSA Data Security, Inc. MD5 Message-Digest Algorithm
  (c) 1991-2, RSA Data Security, Inc. Created 1991. All rights reserved.
OpenSSL Library
  Copyright (C) 1998-2011 The OpenSSL Project. All rights reserved.
  Original SSLeay License
  Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com).
sFlow(R) Agent Software
  Copyright (c) 2002-2006 InMon Corp.
DHCP Library
  Copyright (c) 2004-2012 by Internet Systems Consortium, Inc. ("ISC")
  Copyright (c) 1995-2003 by Internet Software Consortium.
DHCP Bind
  Copyright (c) 2005 - 2008, Holger Zuleger HZnet. All rights reserved.
Application Interface Specification Framework
  Copyright (c) 2002-2004 MontaVista Software, Inc;
  Copyright (c) 2005-2010 Red Hat, Inc.
Hardware Platform Interface Library
  Copyright (c) 2004 by Intel Corp.
  Copyright (C) IBM Corp. 2004-2008.
Corosync Cluster Engine
  Copyright (c) 2002-2004 MontaVista Software, Inc. All rights reserved.
  Copyright (c) 2005-2010 Red Hat, Inc. File Utility Library
  Software written by Ian F. Darwin and others;
  maintained 1994- Christos Zoulas.
ProL2TP
  All rights reserved.
Portions of this product are covered by the GNU GPL, source code may be
downloaded from: http://www.alliedtelesis.co.nz/support/gpl/awp.html
```
Output  Figure 15: Example output from the show version command

```
awplus#show version
AlliedWare Plus (TM) 5.4.4 19/15/14 13:22:32
Build name : SBx81CFC960-5.4.4-1.2.rel*
Build type : RELEASE
* ISSU in progress - Run *show card detail* for more information
NET-SNMP SNMP agent software
(c) 1996, 1998-2000 The Regents of the University of California.
(c) 2001-2003, Networks Associates Technology, Inc. All rights reserved.
(c) 2001-2003, Cambridge Broadband Ltd. All rights reserved.
(c) 2003, Sun Microsystems, Inc. All rights reserved.
(c) 2003-2006, Sparta, Inc. All rights reserved.
(c) 2004-2006, Cisco, Inc and Information Network Center of Beijing University of Posts and Telecommunications.
All rights reserved.
RSA Data Security, Inc. MD5 Message-Digest Algorithm
(c) 1991-2, RSA Data Security, Inc. Created 1991. All rights reserved.
OpenSSL Library
Copyright (C) 1998-2011 The OpenSSL Project. All rights reserved.
Original SSLeay License
Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com).
sFlow(R) Agent Software
Copyright (c) 2002-2006 InMon Corp.
DHCP Library
Copyright (c) 2004-2012 by Internet Systems Consortium, Inc. ("ISC")
Copyright (c) 1995-2003 by Internet Software Consortium.
DHCP Bind
Copyright (c) 2005 - 2008, Holger Zuleger HZnet. All rights reserved.
Application Interface Specification Framework
Copyright (c) 2002-2004 MontaVista Software, Inc.
Copyright (c) 2005-2010 Red Hat, Inc.
Hardware Platform Interface Library
Copyright (c) 2004 by Intel Corp.
Copyright (C) IBM Corp. 2004-2008.
Corosync Cluster Engine
Copyright (c) 2004-2004 MontaVista Software, Inc. All rights reserved.
Copyright (c) 2005-2010 Red Hat, Inc. File Utility Library
Software written by Ian F. Darwin and others;
maintained 1994- Christos Zoulas.
ProL2TP
All rights reserved.
Portions of this product are covered by the GNU GPL, source code may be
downloaded from: http://www.alliedtelesis.co.nz/support/gpl/apw.html
```

Related Commands  boot system backup

show boot
**type issu**

This new command configures a trigger that will activate if the automatic phase of the ISSU process enters one of the following selectable states: upgraded, completed, or aborted.

**Syntax**

```
type issu [cfcs-upgraded|completed|aborted]
```

**Mode**

Trigger Configuration

To configure trigger 22 to activate when an ISSU process has completed, use the following commands:

```
awplus# configure terminal
awplus(config)# trigger 22
awplus(config-trigger)# type issu completed
```

**Caution**

ISSU trigger scripts that use any type other than “ISSU Completed” must not place the switch into Configuration Mode.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>cfcs-upgraded</td>
<td>Activates when the CFCs are upgraded, i.e. the automatic phase has completed.</td>
</tr>
<tr>
<td>completed</td>
<td>Activates when the ISSU process is completed.</td>
</tr>
<tr>
<td>aborted</td>
<td>Activates if the ISSU event (automatic phase) is aborted.</td>
</tr>
</tbody>
</table>

**Related Commands**

- `show trigger`
- `trigger`
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Introduction to AMF

The Allied Telesis Management Framework (AMF) is a suite of features that combine to simplify network management across all supported network switches from the core to the edge.

AMF also provides simplified switch recovery and firmware upgrade management. The primary function of AMF is to reduce the management and maintenance overhead on a network, while improving on responsiveness and handling of switch failures within the network.

This chapter provides a conceptual introduction to AMF together with its benefits, together with configuration guidelines showing how to use AMF in practical networks. For more information on the commands used in this chapter, see “AMF Commands” on page 185.

AMF Supported Products and Software Versions

The following list shows which Allied Telesis switches are capable of running AMF and indicates those capable of operating as Master Nodes.

An AMF-Master feature license is required for each AMF master node in the AMF network. AMF-Master feature licenses are available for the SBx8100 and SBx908 platforms.

Table 1: AMF Nodal Capability by Switch Type

<table>
<thead>
<tr>
<th>Switch Type</th>
<th>AMF Nodal Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>SwitchBlade™ x8100</td>
<td>master or member</td>
</tr>
<tr>
<td>SwitchBlade™ x908</td>
<td>master or member</td>
</tr>
<tr>
<td>x900 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>x610 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>x510 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>IXS-28GPX switches</td>
<td>member only</td>
</tr>
<tr>
<td>x310 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>x230 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>x210 series switches</td>
<td>member only</td>
</tr>
<tr>
<td>DC2552XS switch</td>
<td>member only</td>
</tr>
</tbody>
</table>
Key Benefits of AMF

The key benefits of AMF include its unified command-line, simple configuration backup and recovery process, and time-saving rolling firmware upgrade.

Unified Command-Line

The conventional means of configuring and controlling AlliedWare Plus (AW+) switches is to use their text-based command-line interface (CLI). In existing networks, the CLI is available via a serial console port and also to remote login sessions such as SSH.

AMF extends this capability from managing either a single switch to managing a whole network by using a single (unified) CLI session. Using the unified CLI, a network administrator can nominate all nodes or a subset of nodes within the AMF network to comprise an entity known as a "working-set". Commands can then be executed concurrently across all switching nodes within the defined working-set as if they were a single unit. Any existing configuration or diagnostic actions can thus be applied to multiple devices using a single command sequence, thus reducing maintenance costs and configuration complexity, while still retaining complete flexibility in network design and control.

Multiple AMF networks can exist side by side across a single physical network. Note that AMF treats a Virtual Chassis Stack (VCStack) as a single node.

Configuration Backup and Recovery

The master nodes use external storage to automatically backup the complete configuration information for all their member nodes, including boot configuration, firmware, licenses, and user scripts.

If an AMF member node should fail, the AMF process will automatically recognize and reconfigure an unconfigured replacement (standby) unit, completely recreating the stored configuration of the failed unit into the replacement unit. The new unit will then reboot and resume service, without any need for user intervention beyond physical hardware replacement and cable connection. In this way AMF provides a complete zero-touch recovery solution. For more information, see “Configuring Multiple Nodes at the Same Time: the Unified CLI” on page 155.

Rolling-Reboot Upgrade

Installing Firmware upgrades on a production network is typically an infrequent but sensitive and labor-intensive process. AMF is able to roll-out upgrades to a user-selected subset of nodes. All that needs to be entered is the target group of nodes, and the location where the new firmware is stored; AMF will then take care of the rest. Nodes are upgraded in a serial fashion, with each node tested before continuing the upgrade on the next node.

If an upgrade fails on a particular node, the upgrade process is automatically terminated and that node will revert to its previous firmware version. In this way firmware updates are almost completely hands-free, whilst also providing confidence that a bad update will not result in loss of service. For more information, see “Performing a Rolling-Reboot Upgrade” on page 177.
Node Provisioning

It is generally undesirable to have unconfigured devices connected to the network. Node provisioning enables you to preconfigure a port ready to accept and automatically configure a "clean" (as new) device for connection at a later date. This is achieved by storing the future node's configuration in the master node's backup files ready to be loaded to the new device when connected.
AMF Terminology and Introduction

This section contains a glossary of terminology used to describe AMF networking.

AMF Network

Conceptually an AMF network is a collection of interconnected network switch nodes. This interconnection in turn comprises a hierarchy of network domains. These terms are explained in more detail later in this chapter.

Network name

Because networks are able to interconnect, an AMF network name is necessary to identify the AMF network to which any given node belongs. It follows therefore, that all nodes within a single AMF network must be configured with the same AMF network name.

AMF Nodes

Two types of nodes exist within an AMF network, Master Nodes and Member Nodes. Either type can comprise either a single switch, or a VCStack.

Master Nodes

Master nodes are user defined by configuration. They then form the core domain of the AMF network. Aspects of master node functionality include:

- performing file system backups of all nodes in the AMF network.
- providing an essential component for the formation of an AMF network. That is, an AMF network cannot exist without the existence of at least one master node.
- at least one master node must be present for an AMF network to exist.

When more than one AMF master node exists in an AMF network, their operation is completely independent and unsynchronized.

Member Nodes

AMF member nodes are referred to simply as nodes.

Node Licensing

Master node License

AMF master nodes are supported on selected switch platforms: an AMF license is required for each master. For a list of node capability against specific switch types, see Table 1 on page 134

Only one AMF master license is required even if two CFCs (Controller Fabric Cards - for SBx8100 only) are installed. The license is for the chassis, not the CFC.

A VCStack needs to have consistent licensing on all stack members. Therefore, an AMF master license would be required on both devices in an SBx908 stack.

When more than one AMF master node exists in an AMF network, it is important to know that these operate completely independently of each other, and there is no synchronization between AMF master nodes.

For redundancy, an AMF network can have multiple master nodes, each acting as a master for the network. However, there is no synchronization of status or data files between the masters. The behavior of a master node is not changed at all by the presence of other master nodes.

Core distance

This is the distance (hop count) between a particular domain and its Core domain. The Core domain has a Core distance of 0, and the maximum recommended Core distance in an AMF network is 8.
Node Interconnection

Nodes can connect either horizontally using crosslinks, or vertically using Uplinks/Downlinks. This is shown in the illustration below:

**Figure 1: AMF Uplinks, Downlinks, and Crosslinks**

AMF links, of either type, are used to pass AMF management traffic between nodes; however, they can also carry other network traffic. Configuring an interface as an AMF-link will automatically put the port into trunk mode. An AMF link can be either a single link or a static aggregator. For more information on trunk mode see "Configuring VLANs" in the "VLAN Introduction" chapter in your switch's Software Reference.

**Crosslinks**

AMF crosslinks are used to connect AMF nodes to other AMF nodes within what is termed an AMF Domain. Configuring an interface as an AMF-crosslink will automatically put its port into trunk mode. A crosslink can be either a single link or a static aggregator.

AMF master nodes must be connected using AMF crosslinks to ensure they are part of the uppermost domain level.

**Up/Down Links**

Uplinks/Downlinks interconnect domains in what is a vertical hierarchy. The highest domain is the core domain.

**AMF Domains**

Every AMF node belongs to an AMF domain. Domains can comprise of a single node or multiple nodes. AMF master nodes are included in highest domain level, sometimes called the core domain, and all other domains are rooted in this domain.

As previously mentioned, AMF domains are determined by AMF crosslinks, (see "Working-Set" on page 140). All nodes connected via AMF crosslinks form part of the same domain, and nodes connected via regular AMF links will be part of either higher of lower level domains.

Nodes within a domain must be connected in either a chain or ring topology. This means that a maximum of two crosslinks should be configured on any single node. The advantage of an AMF domain is that two links from a domain to a single higher level domain will provide redundant AMF links. We recommend that an AMF domain should only be connected to a single higher level domain, though it may be connected to multiple lower level domains. We also recommend that you set a maximum number of 12 nodes per domain.
**Hop-Count**  The vertical distance of a domain from the core domain is known as its Hop-Count. The illustration “Core distance hop-counts between domains” on page 139 shows the relationship between nodes, domains and core distance (hop-count).

**Figure 2: Core distance hop-counts between domains**

**Node provisioning**  Node provisioning enables you to configure a node before it is physically present in the AMF network. When the node is eventually connected to an expectant port, it will automatically set itself up with the previously stored configuration files and release.
AMF Network Operational Concepts

Retention and Use of the ‘Manager’ Username

The default username for an AlliedWare Plus login is “manager”, with a documented default password. Users should change this password on all their nodes to provide login security.

It is possible to add new usernames and passwords to nodes, but to retain the ability to centrally manage the network, usernames should be uniformly configured across all AMF nodes within the AMF network.

Note that managing a network with AMF is incompatible with user authentication via RADIUS or TACACS+. Use the normal local database for user authentication.

Working-Set

Conceptually a working set is a collection of switches that can then be configured centrally as if there were a single device. A working set may comprise a pre-defined group that has been automatically created based on some common set of physical attributes such as switch type etc, or it may be created by a network user for ease of configuration.

Specifying or selecting a working-set allows CLI commands to be executed on all nodes within the selected working-set with a single command. A working-set can be defined, selected and configured from any node within an AMF network. The illustration “AMF working-set” on page 140 shows a number of switches which comprise a working set.
AMF Restricted-Login

By default, a user logged into any node on an AMF network is able to manage any other node by using either working-sets or atmf remote login (provided the login username exists on all nodes). Where the access provided by this feature is too wide, or contravenes network security restrictions, this access can be limited by running the command “atmf restricted-login” on page 231. This command will not be saved in the running configuration; it is a network property that can be enabled or disabled from any ATMF master. The status of restricted-login will be retained over a reboot.

When restricted login is enable on the network, only the ATMF Master nodes are able to create working-sets or manage other devices via atmf remote-logins. Other nodes may remote login to the ATMF Master, but they will require password authentication on that master, and will then be able to create working-sets originating from the Master.

Note that once you have run this command, certain other commands that utilize the AMF working-set command, such as the include, atmf reboot-rolling and show atmf group members commands, will operate only on master nodes.

Loop-Free Data Plane

The current version of AMF does not control the data plane, so it is a requirement that the network is configured such that the data plane (i.e. the paths defined by the data VLANs) is kept loop free.

Aggregators

Dynamic Aggregators (LACP) cannot be used on ports configured as AMF links or cross-links. Therefore any aggregated links in an AMF network need to be configured as static aggregators.

VCStacks

If any VCStacks are included as AMF nodes it is a requirement that the VCS virtual MAC feature is enabled to ensure correct operation of the AMF network. If the VCStack is running as an AMF master node and backup is required, then removable external storage media should be installed in both stack members.

AMF External Removable Media

In order to maintain a recovery capability, all AMF master nodes require external storage media installed, such as a USB or SD card. This external storage is used to hold a backup of all relevant files from all nodes within the AMF network, including other master nodes, so it must be large enough to accommodate all of the backed up files. Files that are backed up include all configuration files, release files, and scripts, but not core dumps, exception logs, or technical support files.

Typically a 4GB capacity external media device would be of sufficient size to hold backups for a 40 node AMF network.

When using Dual CFCs (Controller Fabric Card) in a SBx8100, a memory stick is required in both CFCs.
AMF Interaction with QoS and ACLs

It's important that ACL and QoS rules do not block any traffic on VLANs 4091 and 4092 because they are the default AMF control VLANs. Similarly, ACL and QoS rules should not block any Layer 3 traffic on 172.31.0.* or 172.31.128.* these being the default AMF management traffic subnets. Packets with protocol type 0xfbae and BPDU packets that use the MAC address: 0180.c200.002e should also not be blocked.

Note: The AMF control VLANs and AMF management subnets can be manually changed.

With AMF enabled, the number of ACLs on the DC2552XS, x210, 230, x310, x510 and x610 switches decreases from 2049 to 2048. If this is problematic and you are not using AMF, you can disable AMF, which will allow the previous maximum of 2049.

NTP and AMF

AMF uses NTP to synchronize the system clocks across nodes within the network. For this to operate, one or more external NTP servers must be configured on the network, and every node on the network must be configured to use the external server or servers.

Alternatively, you can configure an AlliedWare Plus device as the NTP master, but this NTP master must not be a member of the AMF network. Otherwise, NTP synchronisation issues can occur.

To configure an AlliedWare Plus device as an NTP master, use the command:

```
awplus(config)# ntp master 11
```

The primary function of NTP within an AMF network is to ensure that time and date stamps on backups are consistent across member nodes within the backup. This is particularly important in an AMF network that has multiple AMF master nodes, to ensure that node recovery is performed with the most up-to-date backup.

Configuring NTP on the AMF network

Before you configure NTP on the AMF network, we recommend setting all nodes in the network to the same time, date, and timezone, to ensure NTP synchronisation. To do this, create an AMF working-set of the whole network and set the date and time, for example:

```
awplus(config)# atmf working-set group all
awplus(config)# clock set 16:47:00 11 Sep 2014
awplus(config)# clock timezone utc plus 12
```

Once you have configured all nodes with the same time, date and timezone, configure the working-set of all nodes with the IP address of the NTP server, for example:

```
awplus(config)# ntp server 172.31.0.1
```
You can then check that the nodes have synchronised with the NTP server using the `show ntp status` command, for example:

```bash
awplus# show ntp status
```

```
awplus# show ntp status
Clock is synchronized, stratum 13, reference is 172.31.0.1
actual frequency is 7.1420 PPM, precision is 2**-18
reference time is d7bba834.19f1a68f (16:48:52.101 utc Thu Sep 11 2014)
clock offset is -1.286 msec, root delay is 2.237 msec
root dispersion is 45.213 msec
```

## Configuring AMF

The following configuration example uses a simplified network to explain the steps required to configure AMF.

**Figure 4: Simple AMF single master example**

![Simple AMF single master example diagram](image)
### Table 2: Configure the AMF master node

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1. Set the host name.</strong></td>
<td>Enter Global Configuration mode</td>
<td>(awplus#) configure terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>awplus(config)# hostname AMF_Master</td>
</tr>
<tr>
<td>Note that host names are used as the AMF node name and <strong>MUST BE UNIQUE</strong> within the AMF network.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2. Set the AMF network name.</strong></td>
<td>Set the AMF network name.</td>
<td>AMF_Master(config)# atmf network-name atmf1</td>
</tr>
<tr>
<td>Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <strong>rebooted</strong> before the AMF network name takes effect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3. Configure the switch to be the AMF master.</strong></td>
<td></td>
<td>AMF_Master(config)# atmf master</td>
</tr>
<tr>
<td>An AMF network must have at least one master configured. A license is required for each AMF master in the AMF network. If an AT-SBx8100 with dual CFCs is configured as an AMF master a license is only required on the CFC master, as the license will be synchronized across CFCs. If an AT-SBx908 is configured as an AMF master, a license is required to be installed on both stack members.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 4. Configure the data VLANs.</strong></td>
<td></td>
<td>AMF_Master(config)# vlan database</td>
</tr>
<tr>
<td></td>
<td>AMF_Master(config-vlan)# vlan 2-3</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5. Configure ports as AMF-links.</strong></td>
<td></td>
<td>AMF_Master(config)# interface port1.1.1-1.1.2</td>
</tr>
<tr>
<td></td>
<td>AMF_Master(config-if)# switchport atmf-link</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6. Configure data VLANs on AMF-links as required.</strong></td>
<td></td>
<td>AMF_Master(config-if)# switchport trunk allowed vlan add 2-3</td>
</tr>
<tr>
<td><strong>Step 7. Save the configuration and reboot the switch.</strong></td>
<td></td>
<td>AMF_Master# copy running-config startup-config</td>
</tr>
<tr>
<td>Building configuration...[OK]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMF_Master# reload</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you sure you want to reboot the whole chassis? (y/n): y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Configure the first member node (Member1)

<table>
<thead>
<tr>
<th>Description</th>
<th>Description of Steps</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1. Set the host name.</strong></td>
<td>Enter Global Configuration mode</td>
<td>(awplus#)</td>
<td>configure terminal</td>
</tr>
<tr>
<td></td>
<td>Set the host name</td>
<td>awplus(config)#</td>
<td>hostname Member1</td>
</tr>
<tr>
<td></td>
<td>Note that host names are used as the AMF node name and <strong>MUST BE UNIQUE</strong> within the AMF network.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2. Set the AMF network name.</strong></td>
<td>Set the AMF network name to atmf1.</td>
<td>Member1(config)#</td>
<td>atmf network-name atmf1</td>
</tr>
<tr>
<td></td>
<td>Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be rebooted before the AMF network name takes effect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3. Configure the data VLANs.</strong></td>
<td>Enter the VLAN Configuration mode</td>
<td>Member1(config)#</td>
<td>vlan database</td>
</tr>
<tr>
<td></td>
<td>Create VLANs 2 and 3</td>
<td>Member1(config-vlan)#</td>
<td>vlan 2-3</td>
</tr>
<tr>
<td><strong>Step 4. Configure ports as AMF-links.</strong></td>
<td>Enter Interface Configuration mode for ports 1.1.1 to 1.1.3</td>
<td>Member1(config)#</td>
<td>interface port1.1.1-1.1.3</td>
</tr>
<tr>
<td></td>
<td>Configure these ports as AMF links</td>
<td>Member1(config-if)#</td>
<td>switchport atmf-link</td>
</tr>
<tr>
<td><strong>Step 5. Configure data VLANs on the AMF-links as required.</strong></td>
<td>Set VLANs 2 to 3 to be data VLANs</td>
<td>Member1(config-if)#</td>
<td>switchport trunk allowed vlan add 2-3</td>
</tr>
<tr>
<td><strong>Step 6. Configure AMF-crosslink.</strong></td>
<td>Enter the Interface Configuration mode for port 1.1.2</td>
<td>Member1(config)#</td>
<td>interface port1.1.2</td>
</tr>
<tr>
<td></td>
<td>Set this port to be an AMF-crosslink</td>
<td>Member1(config-if)#</td>
<td>switchport atmf-crosslink</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Member1(config-if)#</td>
<td>switchport trunk native vlan none</td>
</tr>
<tr>
<td></td>
<td>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 7. Save the configuration and reboot the switch.</strong></td>
<td></td>
<td>Member1#</td>
<td>copy running-config startup-config</td>
</tr>
<tr>
<td></td>
<td>Building configuration...[OK]</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Are you sure you want to reboot the whole chassis? (y/n):</td>
<td>Member1#</td>
<td>y</td>
</tr>
</tbody>
</table>
Table 4: Configure the first member node (Member2)

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1. Set the host name.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter Global Configuration mode</td>
<td>awplus#</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Set the host name</td>
<td>awplus(config)#</td>
<td>hostname Member2</td>
</tr>
<tr>
<td>Note that host names are used as the AMF node name and MUST BE UNIQUE within the AMF network.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2. Set the AMF network name.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set the AMF network name to atmf1.</td>
<td>Member2(config)#</td>
<td>atmf network-name atmf1</td>
</tr>
<tr>
<td>Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be rebooted before the AMF network name takes effect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3. Configure the data VLANs.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter the VLAN Configuration mode</td>
<td>Member2(config)#</td>
<td>vlan database</td>
</tr>
<tr>
<td>Create VLANs 2 and 3</td>
<td>Member2(config-vlan)#</td>
<td>vlan 2-3</td>
</tr>
<tr>
<td><strong>Step 4. Configure ports as AMF-links.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter Interface Configuration mode for ports 1.1.1 to 1.1.3</td>
<td>Member2(config)#</td>
<td>interface port1.1.1-1.1.3</td>
</tr>
<tr>
<td>Configure these ports as AMF links</td>
<td>Member2(config-if)#</td>
<td>switchport atmf-link</td>
</tr>
<tr>
<td><strong>Step 5. Configure data VLANs on the AMF-links as required.</strong></td>
<td></td>
<td>switchport trunk allowed vlan add 2-3</td>
</tr>
<tr>
<td>Set VLANs 2 to 3 to be data VLANs</td>
<td>Member2(config-if)#</td>
<td>switchport trunk allowed vlan add 2-3</td>
</tr>
<tr>
<td><strong>Step 6. Configure AMF-crosslink.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter the Interface Configuration mode for port 1.1.2</td>
<td>Member2(config)#</td>
<td>interface port1.1.2</td>
</tr>
<tr>
<td>Set this port to be an AMF-crosslink</td>
<td>Member2(config-if)#</td>
<td>switchport atmf-crosslink</td>
</tr>
<tr>
<td></td>
<td>Member2(config-if)#</td>
<td>switchport trunk native vlan none</td>
</tr>
<tr>
<td>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 7. Save the configuration and reboot the switch.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building configuration...[OK]</td>
<td>Member2#</td>
<td>copy running-config startup-config</td>
</tr>
<tr>
<td>Are you sure you want to reboot the whole chassis? (y/n):</td>
<td>Member2#</td>
<td>reload</td>
</tr>
<tr>
<td></td>
<td></td>
<td>y</td>
</tr>
</tbody>
</table>
**Table 5: Configure the first member node (Member3)**

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1. Set the host name.</strong></td>
<td>Enter Global Configuration mode</td>
<td>(awplus#) configure terminal</td>
</tr>
<tr>
<td></td>
<td>Set the host name</td>
<td>awplus(config)# hostname Member3</td>
</tr>
<tr>
<td></td>
<td>Note that host names are used as the AMF node name and <strong>MUST BE UNIQUE</strong> within the AMF network.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2. Set the AMF network name.</strong></td>
<td>Set the AMF network name to atmf1.</td>
<td>Member3(config)# atmf network-name atmf1</td>
</tr>
<tr>
<td></td>
<td>Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <strong>rebooted</strong> before the AMF network name takes effect.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3. Configure the data VLANs</strong></td>
<td>Enter the VLAN Configuration mode</td>
<td>Member3(config)# vlan database</td>
</tr>
<tr>
<td></td>
<td>Create VLANs 2 and 3</td>
<td>Member3(config-vlan)# vlan 2-3</td>
</tr>
<tr>
<td><strong>Step 4. Configure ports as AMF-links.</strong></td>
<td>Enter Interface Configuration mode for ports 1.0.1 to 1.0.3</td>
<td>Member3(config)# interface port1.0.1-1.0.3</td>
</tr>
<tr>
<td></td>
<td>Configure these ports as AMF links</td>
<td>Member3(config-if)# switchport atmf-link</td>
</tr>
<tr>
<td><strong>Step 5. Configure data VLANs on the AMF-links as required.</strong></td>
<td>Set VLANs 2 to 3 to be data VLANs</td>
<td>Member3(config-if)# switchport trunk allowed vlan add 2-3</td>
</tr>
<tr>
<td><strong>Step 6. Configure AMF-crosslink.</strong></td>
<td>Enter the Interface Configuration mode for port 1.0.2</td>
<td>Member3(config)# interface port1.0.2</td>
</tr>
<tr>
<td></td>
<td>Set this port to be an AMF crosslink</td>
<td>Member3(config-if)# switchport atmf-crosslink</td>
</tr>
<tr>
<td></td>
<td>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</td>
<td></td>
</tr>
<tr>
<td><strong>Step 7. Save the configuration and reboot the switch.</strong></td>
<td>Building configuration...[OK]</td>
<td>Member3# copy running-config startup-config</td>
</tr>
<tr>
<td></td>
<td>Are you sure you want to reboot the whole chassis? (y/n):</td>
<td>y</td>
</tr>
</tbody>
</table>
### Table 6: Configure the first member node (Member4)

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1. Set the host name.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter Global Configuration mode</td>
<td></td>
<td>(awplus#) configure terminal</td>
</tr>
<tr>
<td>Set the host name</td>
<td></td>
<td>awplus(config)# hostname Member4</td>
</tr>
<tr>
<td>Note that host names are used as the AMF node name and <strong>MUST BE UNIQUE</strong> within the AMF network.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2. Set the AMF network name.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set the AMF network name to atmfl.</td>
<td></td>
<td>Member4(config)# atmf network-name atmfl</td>
</tr>
<tr>
<td>Note that the AMF network name must be the same on all nodes within the AMF network, and the device must be <strong>rebooted</strong> before the AMF network name takes effect.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 3. Configure the data VLANs.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter the VLAN Configuration mode</td>
<td></td>
<td>Member4(config)# vlan database</td>
</tr>
<tr>
<td>Create VLANs 2 and 3</td>
<td></td>
<td>Member4(config-vlan)# vlan 2-3</td>
</tr>
<tr>
<td><strong>Step 4. Configure ports as AMF-links.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter Interface Configuration mode for ports 1.0.1 to 1.0.3</td>
<td>Member4(config)# interface port1.0.1-1.0.3</td>
<td></td>
</tr>
<tr>
<td>Configure these ports as AMF links</td>
<td>Member4(config-if)# switchport atmf-link</td>
<td></td>
</tr>
<tr>
<td><strong>Step 5. Configure data VLANs on the AMF-links as required.</strong></td>
<td>Member4(config-if)# switchport trunk allowed vlan add 2-3</td>
<td></td>
</tr>
<tr>
<td><strong>Step 6. Configure AMF-crosslink.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter the Interface Configuration mode for port 1.0.2</td>
<td>Member4(config)# interface port1.0.2</td>
<td></td>
</tr>
<tr>
<td>Set this port to be an AMF crosslink</td>
<td>Member4(config-if)# switchport atmf-crosslink</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Member4(config-if)# switchport trunk native vlan none</td>
<td></td>
</tr>
<tr>
<td>Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 7. Save the configuration and reboot the switch.</strong></td>
<td>Member4# copy running-config startup-config</td>
<td></td>
</tr>
<tr>
<td>Building configuration...[OK]</td>
<td>Member4# reload</td>
<td></td>
</tr>
<tr>
<td>Are you sure you want to reboot the whole chassis? (y/n):</td>
<td>Member4# y</td>
<td></td>
</tr>
</tbody>
</table>
AMF Tunneling (Virtual Links)

AMF Tunneling enables you to extend your local uplinks and downlinks across a wide area network. The tunneled data is then wrapped in a Layer 3 IP packet for transmission across a wide area IP network. A simple AMF tunnel is shown in “AMF virtual link” on page 149. Switches 1 and 2 encapsulate the Layer 2 AMF uplink and downlink data and wrap this inside a Layer 3 IP packet to enable it to traverse an IP Network. Routers 1 and 2 (and any other routers within the cloud) perform a conventional routing function, reading the IP addresses of the tunneled packets and forwarding them to their destination.

Once connected through the tunnel, the remote AMF members will have the same AMF capabilities as a directly connected AMF member.

Figure 5: AMF virtual link
Configuring a virtual link

The Layer 2 tunnel created by the command `atmf virtual-link id ip remote-id remote-ip` command on page 232 enables a local AMF session to appear to pass transparently across a Wide Area Network (WAN) such as the Internet. The addresses configured as the local and remote tunnel IP addresses must have IP connectivity to each other. If the tunnel is configured to connect a head office and branch office over the Internet, typically this would involve using some type of managed WAN service such as a site-to-site VPN. Tunnels are only supported using IPv4.

Configuration involves creating the following:

- local tunnel ID
- local IP address
- remote tunnel ID
- remote IP address

A reciprocal configuration is also required on the corresponding remote device. The local tunnel ID must be unique to the device on which it is configured.

The tunneled link may operate via external (non AlliedWare Plus) routers in order to provide wide area network connectivity. However, in this configuration, these devices perform a conventional router-to-router connection. The protocol tunneling function is accomplished by the AMF nodes.

Note that the requirement to preconfigure the local IP address and tunnel ID on a device located at the far end of an AMF virtual-link tunnel means that zero touch device replacement cannot be achieved on a remote device that terminates the tunnel.

**Example**

Use the following command to create the tunnel shown in figure **Figure 5 on page 149**.

```plaintext
Host-A(config)# atmf virtual-link id 1 ip 192.168.1.1
remote-id 2 remote-ip 192.168.2.1
Host-B(config)# atmf virtual-link id 2 ip 192.168.2.1
remote-id 1 remote-ip 192.168.1.1
```

**Caution**

On an IP interface that is carrying ATMF virtual link traffic, do not set the MTU (Maximum Transmission Unit) below its default value of 1500 bytes.

Prioritizing the tunneled traffic

On the switch that interfaces to the wide area network router, we advise that you prioritize the tunneled traffic directed to the CPU over other CPU-bound user data. You can achieve this by allocating a higher Class of Service (CoS) tag to tunnel traffic than other traffic. The following configuration example shows an appropriate method. In the following configuration example, the virtual link traffic is between IP addresses 192.168.1.1 (on Host-A) and 192.168.2.1 (on Host-B). This connection is mapped to VLAN 10.

Note that the following process will prioritize the AMF traffic only within Switch 1 and Switch 2. To prioritize the tunneled AMF data across the IP network would require applying Layer 3 QoS by applying a DSCP (Differentiated Services Code Point) priority at the network boundary (Router 1 and Router 2) and ensuring that these priority levels are managed throughout the wide area network. Applying and managing QoS through the wide area network is outside the scope of this document.
Virtual link - configuration example

This example is based on the network shown in the illustration Figure 5 on page 149.

In this example, the virtual link traffic flows between 192.168.1.1 at the local end and 192.168.2.1 at the remote end. Subnet 192.168.1.1 exists on vlan10. Note that because this policy is being applied to incoming traffic, the switch IP address should match destination address in the ACL.

Figure 6: Prioritizing the tunneled traffic - Configured on Switch 1, Host-A

atmf virtual-link id 1 ip 192.168.1.1 remote-id 2 remote-ip 192.168.2.1
[...]
mls qos enable
access-list hardware vlink
  permit ip 192.168.2.1/32 ip 192.168.1.1/32
  !
class-map vlink
  match access-group vlink
  !
class-map vlinkarp
  match eth-format ethii-any protocol 0806
  match vlan 10
  !
policy-map vlink
  class default
  class vlink
    remark new-cos 4 both
  class vlinkarp
    remark new-cos 4 both
  !
[...]
!
interface port1.0.10
  switchport
  switchport mode access
  switchport access vlan 10
  service-policy input vlink
  !
[...]
interface vlan10
  ip address 192.168.1.1/24

Table 7: Set QoS CoS for an AMF tunneling switch

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1. Create VLAN 10.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter Global Configuration mode</td>
<td>(Host-A#)</td>
<td>configure terminal</td>
</tr>
<tr>
<td>Enter VLAN config mode</td>
<td>Host-A(config)#</td>
<td>vlan database</td>
</tr>
<tr>
<td>Create and enable VLAN 10</td>
<td>Host-A(vlan-config)#</td>
<td>vlan 10 name virtual-link state enable</td>
</tr>
<tr>
<td>Step 2. Configure VLAN10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enter the VLAN configuration mode for VLAN10.</td>
<td>Host-A(vlan-config)#</td>
<td>interface vlan10</td>
</tr>
<tr>
<td>Set the IP address for VLAN10 to be 192.168.1.1/24</td>
<td>Host-A(vlan-config-if)#</td>
<td>ip address 192.168.1.1/24</td>
</tr>
</tbody>
</table>
AMF Introduction and Configuration

Table 7: Set QoS CoS for an AMF tunneling switch (cont.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Prompt</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return to config mode</td>
<td>Host-A(config-if)#</td>
<td>exit</td>
</tr>
</tbody>
</table>

**Step 3. Add policy map vlink to port 1.0.10**

| Set port 1.0.10 for configuring                  | Host-A(config)#         | interface port 1.0.10                                                 |
| Set the port to access mode                     | Host-A(config-if)#      | switchport mode access                                                 |
| Associate the port with VLAN10                  | Host-A(config-if)#      | switchport access vlan10                                                |
| Add policy map vlink to port 1.0.10             | Host-A(config-if)#      | service-policy input vlink                                              |
| Return to config mode                           | Host-A(config-if)#      | exit                                                                     |

**Step 4. Create an AMF virtual-link tunnel**

| Create the virtual link tunnel                  | Host-A(config)#         | atmfl virtual-link id 1 ip 192.168.1.1 remote-id 2 remote-ip 192.168.2.1 |

**Step 5. Create an ACL to permit tunneled traffic**

| Enable QoS on switch 1                          | Host-A(config)#         | mls qos enable                                                          |
| Create an access-list for the virtual link      | Host-A(config)#         | access-list hardware vlink                                              |
| Permit traffic that has the tunneled IP addresses | Host-A(config-ip-hw-acl)# | permit ip 192.168.2.1/32 ip 192.168.1.0/32                             |

**Step 6. Create a class-map for the virtual link**

| Create a class-map named vlink                  | Host-A(config)#         | class-map vlink                                                         |

**Step 7.**

| Create a class-map named vlinkarp                | Host-A(config)#         | class-map vlinkarp                                                      |
|                                                 | Host-A(config-cmap)#    | match eth-format ethii-any protocol 0806                               |
| Ensure vlinkarp packets on vlan10 are also sent to the CPU |                   | match vlan10                                                            |

**Step 8.**

| Send vlink traffic to CoS queue 6                | Host-A(config)#         | policy-map vlink                                                        |
|                                                 | Host-A(config-pmap)#    | match access-group                                                      |
| Send vlinkarp traffic to CoS queue 6             | Host-A(config-pmap)#    | class default                                                            |
|                                                  | Host-A(config-pmap)#    | class vlink remark new-cos 4 both                                       |
|                                                  | Host-A(config-pmap)#    | class vlinkarp remark new-cos 4 both                                    |
Verifying the AMF Network

To check that all nodes have joined the AMF network use the `show atmf` command on page 242 with the summary parameter. You can run this command from any node in an AMF network.

**Figure 7: Checking AMF configuration using the show atmf summary command**

```
AMF_Master#show atmf summary
ATMF Summary Information:
ATMF Status : Enabled
Network Name : atmf1
Node Name : AMF_Master
Role : Master
Current ATMF Nodes : 5
```

The **Current AMF Nodes** field in the output above shows that all 5 nodes have joined the AMF network.

Use the `show atmf nodes` command on page 266 with the `nodes` parameter, to check information on individual nodes:

**Figure 8: Output from the show atmf nodes command**

```
AMF_Master#show atmf nodes
Node Information:
* = Local device
SC = Switch Configuration:
C = Chassis S = Stackable N = Standalone
Name Device ATMF Master SC Parent Depth
* AMF_Master AT-SBx81CFC400 Y C none 0
Member1 SwitchBlade x908 N S AMF_Master 1
Member2 SwitchBlade x908 N S AMF_Master 1
Member4 x510-52GTX N S Member2 2
Member3 x510-52GTX N S Member2 2
Current ATMF node count 5
```

Note that the **Parent** field in the output above refers to the parent domain and not the upstream device. In the example output above, Member2 is the domain controller for the parent domain for Member3 and Member4.
Use the `show atmf links` command on page 253 to check information on individual AMF links:

**Figure 9: Checking output with the show atmf links command**

```
switch1# show atmf links
ATMF Links Brief:
<table>
<thead>
<tr>
<th>Local Port</th>
<th>Link Type</th>
<th>Status</th>
<th>State</th>
<th>Adjacent Node</th>
<th>Adjacent Ifindex</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>sa1</td>
<td>Crosslink</td>
<td>Up</td>
<td>TwoWay</td>
<td>Building_1</td>
<td>4501</td>
<td>Forwarding</td>
</tr>
<tr>
<td>1.1.1</td>
<td>Downlink</td>
<td>Up</td>
<td>Full</td>
<td>Bld1_Floor_1</td>
<td>5001</td>
<td>Forwarding</td>
</tr>
<tr>
<td>1.1.2</td>
<td>Downlink</td>
<td>Up</td>
<td>Full</td>
<td>Bld1_Floor_2</td>
<td>5003</td>
<td>Forwarding</td>
</tr>
<tr>
<td>1.1.3</td>
<td>Downlink</td>
<td>Up</td>
<td>Full</td>
<td>Bld2_Floor_1</td>
<td>6101</td>
<td>Forwarding</td>
</tr>
<tr>
<td>1.1.4</td>
<td>Crosslink</td>
<td>Down</td>
<td>Init</td>
<td>*switch3</td>
<td>1201</td>
<td>Blocking</td>
</tr>
</tbody>
</table>
* = provisioned
```
Configuring Multiple Nodes at the Same Time: the Unified CLI

The unified CLI is a central component of AMF. It provides you with a configuration and display interface that can control a selected collection of nodes, or the entire AMF network, from a single point. This control is provided through the atmf working-set command.

The working-set

An AMF working-set is a set of nodes that can be collectively configured from a single device. Working sets can either arbitrarily user defined or automatically created (a pre-defined working-set). Specifying or selecting a working-set enables CLI commands to be executed on all nodes within the working-set by using a single command. A working-set can be defined, selected, and configured from any node within an AMF network.

Note

For security reasons you can limit the action of working sets by applying “restrictive login.” For more information, see “atmf restricted-login” on page 231.

By default, when you first log into a node that is part of an AMF network, you are implicitly placed into the working-set group local, a working-set that contains only the local node. In this instance the CLI prompt when you log in will be either:

- the host-name, if one has been assigned, or
- in the case of a new node in safe mode, a host name based on its MAC address followed by the usual prompt (> or #)

Node1> enable
Node1#

To create a working set containing a set of nodes use the command atmf working-set followed by a comma separated list of the nodes you wish to control. Whenever you select a working set containing any nodes other than the local device, the CLI prompt will display the AMF network name, followed by the number of nodes contained in the working set in square brackets (atmf[2] in the following example).

Node1# atmf working-set Node1,Node2
Node1,Node2

Working set join

atmf[2]#

To return to just controlling the local device from any other working set, use the command atmf working-set group local.
Working-Set Groups

AMF contains the ability to have working-set groups, so that it is not always necessary to use a comma separated list to specify a working-set.

AMF working-set groups can be split into two types:

- Automatic
- User-defined

Automatic working-set groups

There are three automatic working-set groups that will exist on every AMF network:

1. **All**—all nodes within the AMF network.

2. **Current**—the current working-set of nodes. This group is useful for adding additional nodes to the current working-set.

3. **Local**—the local device

In any AMF network there will also be a number of other automatic working-set groups that are dependent on the platform types which exist within the network. To see the platform dependent automatic working-set groups that exist on the AMF network use the command `show atmf group` with the automatic parameter:

```
x908_VCS_1#show atmf group members automatic

Retrieving Automatic groups from:
x510_1 Master x908_VCS_2 x908_VCS_1

ATMF Group membership

<table>
<thead>
<tr>
<th>Automatic Groups</th>
<th>Total Members</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>poe</td>
<td>1 Master</td>
<td></td>
</tr>
<tr>
<td>x510</td>
<td>1 x510_1</td>
<td></td>
</tr>
<tr>
<td>SBx8100</td>
<td>1 Master</td>
<td></td>
</tr>
<tr>
<td>x900</td>
<td>2 x908_VCS_2 x908_VCS_1</td>
<td></td>
</tr>
</tbody>
</table>
```

To select a working-set group use the `atmf working-set` command with the group parameter, followed by the group name. You can specify a single group, a comma-separated list of groups, or a comma-separated list of individual nodes followed by a comma-separated list of groups:

```
x908_VCS_1# atmf working-set x510_1,x510_2 group x900
x510_1, x510_2, x908_VCS_1, x908_VCS_2

Working set join
```

`atmf1[4]#`
If you specify a partially invalid working-set node list or group list, only the valid nodes or groups will join the working set. If you specify a completely invalid working-set, you will create a working-set containing no nodes. The switch will generate a warning message to alert you that the current working-set is empty:

```
atmf[3]# atmf working-set group x511
% Warning – working set is now empty
atmf[0]#
```

**User-defined working-set groups**

In addition to the automatic working-set groups, you can create user-defined groups for arbitrary sets of nodes that you wish to group together, for example, all AMF master nodes.

To create a user-defined working-set group:

1. Create a working-set containing the desired nodes.
2. In global configuration mode use the command “atmf group (membership)” on page 203.

```
Master# atmf working-set Master1, Master2
```

You can see all user-defined working-set groups that exist on the AMF network with the command “show atmf group members” on page 252:

```
x908_VCS_1# show atmf group members user-defined
```

Retrieving Automatic groups from:
x510_1 Master1, Master2, x908_VCS_2 x908_VCS_1

ATMF Group membership

<table>
<thead>
<tr>
<th>User-defined Groups</th>
<th>Total Members</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>Masters</td>
<td>2</td>
<td>Master1 Master2</td>
</tr>
</tbody>
</table>

```
Master#
```

**Executing Commands on Working-Sets**

Executing commands on a working-set of nodes is very similar to executing commands on a single AlliedWare Plus device.

When a command is executed that is valid for all nodes within the working-set, the output is displayed for each of the nodes separately. However, output will be grouped when it is the same for more than one node.
Here is an example output of the `show arp` command run from a working-set:

```
atmf1[4]#show arp
=======
Master:
=======

<table>
<thead>
<tr>
<th>IP Address</th>
<th>MAC Address</th>
<th>Interface</th>
<th>Port</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.31.0.1</td>
<td>eccd.6d7d.a542</td>
<td>ATMF</td>
<td>sa1</td>
<td>dynamic</td>
</tr>
<tr>
<td>172.31.0.3</td>
<td>0000.cd2b.0329</td>
<td>ATMF</td>
<td>sa1</td>
<td>dynamic</td>
</tr>
<tr>
<td>172.31.0.10</td>
<td>0000.cd37.0163</td>
<td>ATMF</td>
<td>sa1</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

=======
x510_1:
=======

<table>
<thead>
<tr>
<th>IP Address</th>
<th>MAC Address</th>
<th>Interface</th>
<th>Port</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.31.0.2</td>
<td>eccd.6d03.10f9</td>
<td>ATMF</td>
<td>sa4</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

=======
x908_VCS_1:
=======

<table>
<thead>
<tr>
<th>IP Address</th>
<th>MAC Address</th>
<th>Interface</th>
<th>Port</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.31.0.2</td>
<td>0000.cd37.1050</td>
<td>ATMF</td>
<td>sa1</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

=======
x908_VCS_2:
=======

<table>
<thead>
<tr>
<th>IP Address</th>
<th>MAC Address</th>
<th>Interface</th>
<th>Port</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>172.31.0.2</td>
<td>0000.cd37.1050</td>
<td>ATMF</td>
<td>sa3</td>
<td>dynamic</td>
</tr>
</tbody>
</table>

atmf1[4]#
```

Invalid working-set commands

Some commands can only be executed on certain nodes within the working-set. In this case the command will be attempted on all nodes within the working-set. For any node for which the command is not valid, the command execution will fail and the output displayed will indicate the nodes on which the command succeeded and nodes on which the command failed.

Below is example output from the `show card` command run from a working-set, which is only a valid command for the SBx8100 series switches.
Sub-configuration limitations for some nodes in a working-set

There will be some instances where a sub-configuration mode is only valid for some of the nodes in the working-set. One example of this would be when entering interface configuration mode for a port that exists on some members of the working-set and not on others. For example:

```
atmf1[4]# show card
======
Master:
======

<table>
<thead>
<tr>
<th>Slot</th>
<th>Card Type</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AT-SBx81GP24</td>
<td>Online</td>
</tr>
<tr>
<td>2</td>
<td>AT-SBx81GP24</td>
<td>Online</td>
</tr>
<tr>
<td>3</td>
<td>AT-SBx81GP24</td>
<td>Online</td>
</tr>
<tr>
<td>4</td>
<td>AT-SBx81XS6</td>
<td>Online</td>
</tr>
<tr>
<td>5</td>
<td>AT-SBx81CFC400</td>
<td>Online (Active)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

```
% Invalid input detected at '^' marker.
```

Sub-configuration limitations for some nodes in a working-set

In the example above the interface `port1.1.1` exists on two of the nodes in the working-set, but doesn't exist on nodes "Master" or "x510_1". The interface configuration mode fails for these nodes, and a warning message is output to indicate this. Inside the square brackets, the first number indicates the total number of nodes in the working-set, and the second number indicates the number of nodes in the sub-configuration mode that has been entered. Any configuration commands configured in this mode will only be executed on the nodes that successfully entered the sub-configuration mode.

Entering `exit` while in this mode will return to global configuration mode for all nodes within the working-set:

```
atmf1[4:2](config-if)# exit
atmf1[4](config)# (config)#
```
Interactive Commands

It is inappropriate to execute interactive commands simultaneously across multiple nodes within a working-set. These commands can only be executed on the local node working-set or on a working-set with a single member.

When any interactive commands are entered from within a working-set they will give an error:

```
   atmf1[4]# ping 4.2.2.1
   % Working set must contain only single node for this command
```

The list of current interactive commands, including any optional parameters, are:

- ping
- mtrace/mstat
- traceroute
- boot system
- boot configuration-file
- banner login
- tcpdump
- edit
- copy
- mail
- move
- terminal monitor
AMF Backups

AMF backups are a valuable part of AMF network operation. They are the mechanism by which AMF master nodes update their records of the AMF network. By default, AMF master nodes are configured to perform automatic scheduled backups of the entire AMF network once per day at 3.00am. AMF backups can be stored on remote file servers or external removable media such as USB sticks or SD cards. These backup files can be used in the recovery of a failed node.

Note that this feature will operate only on AMF master nodes.

Using External Media Storage

If storing data on external media, it is a requirement that all AMF masters have external removable media installed with sufficient capacity to hold all of the relevant files stored in the Flash on every node in the AMF network.

Typically a 4 GB capacity external media storage would be of sufficient size to hold backups for a 40 node AMF network.

The AMF node backup system has been designed such that the external media used to store the backup data can still be used to store other data. However, care needs to be taken to ensure that enough space is reserved for future AMF backups.

- AMF requires up to 128 MB backup space for SBx8100 nodes and up to 64 MB backup space for other nodes. The output from the show atmf backup command on page 246 will provide warnings if capacity on the backup media falls below a safe level.

Here is an output example from the show atmf backup command showing a backup media space warning:

Figure 10: Output showing backup media space warning

```
master1#show atmf backup
Scheduled Backup ...... Disabled
   Schedule ............. 1 per day starting at 12:45
Next Backup Time ...... 25 May 2014 12:45
Backup Media .......... SD (Total 3827.0MB, Free 7.1MB)
                        WARNING: Space on backup media is below 64MB
Current Action ........ Idle
   Started ............. -
   Current Node ........ -
```

Safe removal of external storage media

Removing external storage media, or rebooting the master node, while an AMF backup is underway could potentially cause corruption to files in the backup. Although files damaged as a result of mishandling backup media will be replaced during the next backup cycle, if the file system on the media becomes damaged, it may require reformatting before being inserted into the AMF master. To avoid any damage to the AMF backup files or file system, we recommend that the following procedure be followed before rebooting or removing any external storage media from an AMF master.

1. Disable backups to prevent a scheduled backup from occurring while the card is being removed.
2. Terminate any backup already in process.

3. Verify that it is safe to remove the media by checking that backups are disabled and that there are no backups currently in progress.

**Figure 11: Example of the safe external storage media removal procedure**

Once the media has been reinstalled, ensure that the backup scheduler is re-enabled.

### Performing a Manual Backup

Whenever a new device is physically added to the AMF network as a provisioned node, we advise that you perform a manual backup from the AMF master.

To perform a manual backup of the entire AMF network, on the AMF master enter the command **atmf backup now** command on page 192:

```
master1#conf t
master1(config)#no atmf backup enable
master1(config)#exit
master1#atmf backup stop
master1#show atmf backup
```

```
Scheduled Backup ....... Disabled
  Schedule ............. 1 per day starting at 12:45
  Next Backup Time .... 25 May 2014 12:45
  Backup Media .......... SD (Total 3827.0MB, Free 3257.1MB)
  Current Action ....... Idle
  Started ............. -
  Current Node ........ -
```

```
Master1# atmf backup now
Master1(config)# atmf backup enable
Master1(config)# exit
```

To check the status of the AMF backup use the **show atmf backup command on page 246**.

**Figure 12: Example output from the show atmf backup command entered during a backup**

```
AMP_Master#show atmf backup
Scheduled Backup ....... Enabled
  Schedule ............. 1 per day starting at 03:00
  Next Backup Time .... 14 Dec 2013 03:00
  Backup Media .......... USB (Total 3692.6MB, Free 1782.7MB)
  Current Action ....... Doing manual backup
  Started ............. 13 Dec 2012 05:20
  Current Node ........ Member1
```

```
Node Name     Date         Time      In ATMF  On Media  Status
-----------------------------
AMF_Master    13 Dec 2012  05:20:16  Yes     Yes       Good
Member1       -             -         Yes     Yes       -
Member2       -             -         Yes     No        -
Member3       -             -         Yes     No        -
Member4       -             -         Yes     No        -
```
Below is example output from the `show atmf backup` command entered after the backup has completed.

**Figure 13: Example output from the show atmf backup command entered after backup was completed**

```
AMF_Master#show atmf backup
Scheduled Backup ...... Enabled
   Schedule ............ 1 per day starting at 03:00
Next Backup Time .... 13 Dec 2013 03:00
Backup Media .......... USB (Total 3692.6MB, Free 1651.1MB)
Current Action .......... Idle
   Started .............. -
   Current Node .......... -

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>On Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMF_Master</td>
<td>13 Dec 2013</td>
<td>05:20:16</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Member1</td>
<td>13 Dec 2013</td>
<td>05:20:27</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Member2</td>
<td>13 Dec 2013</td>
<td>05:20:40</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Member3</td>
<td>13 Dec 2013</td>
<td>05:20:52</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
<tr>
<td>Member4</td>
<td>13 Dec 2013</td>
<td>05:21:08</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
</tr>
</tbody>
</table>
```

Note that the file system used by the AMF backup does not support the backing up of files that have the same name but have different case (e.g. “test.txt” and “TEST.txt”), and only one of these files will be stored in the backup. For this reason we recommend that all files on a node be given unique file names.

**Backups on a VCStack Plus running as AMF masters on an SBx8100**

This section is only applicable in configurations that are NOT using remote backup servers.

When a VCStack is operating as an AMF master node, AMF backups will only occur on the external removable media of the CFC that is the stack master. Therefore, in the event of a CFC failure, the new VCS master CFC will have no access to this backup information.

To avoid this situation, you can either configure a remote backup file server or use trigger scripts to automatically perform a manual backup of the AMF network following a failover event. This section explains how to use trigger scripts to automatically apply a manual backup. To apply the remote file server solution see “Back up to Remote Servers” on page 166.

**Example 1**

This example uses a manual backup activation script called `triggered-atmfbackup.scp`. When activated, this script applies the following commands to initiate a network backup:

```
enable
wait 180
atmf backup now
```
When a CFC failure event occurs, the trigger `type chassis active-CFC-fail` will activate. The following example shows how the above scripted steps can be automatically applied if this event occurs.

**Example 2** This example shows a trigger script configuration for the **SBx8100**:

```
Master1# conf t
Master1(config)# trigger 1
Master1(config-trigger)# type chassis active-CFC-fail
Master1(config-trigger)# script 1 triggered-atmfbackup.scp
```

To explain the sequence; if there is a failure of a CFC that is operating as a stack master, trigger 1, which is associated with the trigger `type chassis active-CFC-fail`, will activate. This process runs the script `triggered-atmfbackup.scp`, which will then apply the preconfigured instructions shown in Example 1.

**Backups on a VCStack running as AMF masters on an **SBx908**

In the event of a stack master failure, the trigger `type stack master-fail` will activate. The following example shows how the above scripted steps can be automatically applied if this event occurs.

**Example 3** This example shows a trigger script configuration that can operate when a stack master node fails:

```
Master1# conf t
Master1(config)# trigger 1
Master1(config-trigger)# type stack master-fail
Master1(config-trigger)# script 1 triggered-atmfbackup.scp
```

To explain the sequence; if there is a failure of a node that is operating as a stack master, trigger 1, which is associated with the trigger `type stack master-fail`, will activate. This process runs the script `triggered-atmfbackup.scp`, which will then apply the preconfigured instructions shown in Example 1.

**Backing up all master nodes**

If there are multiple AMF master nodes in the network, you may also want to use a trigger script or perform a manual backup of “all” master nodes after a failover event, so that all backups are up to date.

Create an AMF working-set group that contains all master nodes, then use the `atmf working-set` command in the trigger script to execute the manual backup on all nodes within the working-set.
To create a working-set containing all AMF master nodes, first manually select all AMF masters using the **atmf working-set** command:

```
Master# atmf working-set Master1,Master2
```

```
NetworkName[2]# conf t
NetworkName[2](config)# trigger 1
```

This command displays an output screen similar to the one shown below:

```
=================================================================
Master1, Master2
=================================================================
Working set join
ATMF1[2]#
```

On the SBx908, enter the following configuration commands, one per line. End with CNTL/Z:

```
ATMF1(2)# conf t
ATMF1(2)(config)# trigger 1
ATMF1(2)(config-trigger)# type **type stack master-fail**
ATMF1(2)(config-trigger)# script 1 triggered-atmfbackup.scp
```

On the SBx8100, enter the following configuration commands, one per line. End with CNTL/Z:

```
ATMF1(2)# conf t
ATMF1(2)(config)# trigger 1
ATMF1(2)(config-trigger)# **type chassis active-CFC-fail**
ATMF1(2)(config-trigger)# script 1 triggered-atmfbackup.scp
```

Next, create a user defined working-set group containing the nodes in the current working-set using the **atmf group (membership)** command:

```
atmf1[2]# conf t
atmf1[2](config)# atmf group AMF_masters
```

Here is an example manual backup activation script called atmfbackup_all_masters.scp:

```
enable
wait 180
atmf working-set group AMF_masters
atmf backup now
```

This script will initiate an AMF backup on all masters within the working-set.
Backing up to Remote Servers

System backup data can be held on up to two remote backup servers rather than on the master node's external media. These servers are used for both backup and recovery.

Each AMF master supports a maximum of two remote file servers. The remote backup file servers are mounted on the Master's file system using SSH and appear as folders.

First configure the servers. After you have configured the servers you can check the backup media, location, log details and server status using the `show atmf backup` command. You can also manually synchronize the contents of an active server and other configured servers, if required. The following steps show how to set up two backup servers:

1. Use the command “`atmf backup server` on page 194” for backup server 1.
   This command configures a remote file server(s) as the destination for AMF backups. Configuration of a remote server will switch the backup to remote server functionality and disable any further backup to external media. Use the `no` variant of this command to remove the destination servers and revert to backup from external media.
   Note that if no servers are configured, the backup will go to external media. If no servers are configured and no external media exists, no backup will occur.

2. Repeat step (1) for backup server 2.
   You should now have two file servers configured to backup your network.

3. Use the “`atmf backup now` on page 192” to force a manual backup of your network.
   This step is optional. Alternatively you could wait until the next scheduled back occurs.

4. Use the command “`show atmf backup` on page 246”.
   If you forced a manual backup, you will probably want to display the location and state of each configured file server. The display from this command also shows diagnostic results that test connectivity to each server by using the optional `server-status` parameter.

Below is example output from the `show atmf backup` command showing the configuration of two remote backup file servers.
Figure 14: Output from the show atmf backup command showing the configuration of two remote backup file servers

```
x900a#show atmf backup
Scheduled Backup ...... Enabled
Schedule ............. 24 per day starting at 14:25
Next Backup Time .... 19 May 2014 11:25
Backup Bandwidth ...... Unlimited
Backup Media .......... FILE SERVER (Total 503837.5MB, Free 186818.0MB)
Server Config .......... Synchronized
  Last Run ........... 19 May 2014 11:09:50
  1 ................ Configured (Mounted)
    Host ............ 10.36.150.54
    Username .......... user_1
    Path ........... temp/x900a_1
    Port ............. -
  * 2 ................ Configured (Mounted, Primary)
    Host ............ tb165.test.com
    Username .......... user_2
    Path ........... temp/x900a_2
    Port ............. -
Current Action ....... Idle
Started ............. -

--------------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>On Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronization</td>
<td>Date</td>
<td>Time</td>
<td>From Id</td>
<td>To Id</td>
<td>Status</td>
</tr>
<tr>
<td>x210a</td>
<td>19 May 2014 11:09:37</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x610a</td>
<td>19 May 2014 11:09:17</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x610b</td>
<td>19 May 2014 11:09:49</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x610c</td>
<td>19 May 2014 11:09:20</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x610d</td>
<td>19 May 2014 11:09:19</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x900a</td>
<td>19 May 2014 11:09:49</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>x908stk</td>
<td>19 May 2014 11:09:47</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>

You can use the `show atmf backup` with the parameter `server-status` to display the results of the diagnostics that test connectivity to each server:

Figure 15: Output from the show atmf backup command showing diagnostic test results from each server

```
Master1#sh atmf backup server-status
Id Last Check  State
-------------------------------------
1 186 s File server ready
2 1 s SSH no route to host
```
Node Recovery

Automatic Node Recovery

With AMF, you can replace a failed node with another device and let AMF automatically load the appropriate configuration onto the replacement device.

For this to work, the replacement device must have no configuration file. This means it must be either:

- a factory-new device, or
- a used device that has been returned to a “clean” state (see “Restoring a Node to a “Clean” State” on page 169)

To replace a failed device with a new device of a different platform or with a different node name, you need to provision the network to expect the new device. See “Node Provisioning” on page 179.

When a switch boots up, it goes through the process in the following flowchart to determine what configuration to use. This flowchart indicates when automatic node recovery will be successful.

**Figure 16: How a switch determines which configuration to use**
Automatic node recovery is not intended to recover multiple nodes simultaneously. If multiple nodes have failed, recover them one at a time.

**Caution**

Do not make any changes to the device’s configuration while a node recovery is underway. A log message will appear on the console or other VTY session indicating when recovery has finished (whether successfully or with errors). This message can also be found by viewing the log with the `show log` command.

**Figure 17: Example log output showing automatic node recovery**

```
23:03:15 awplus ATMF[863]: ATMF network detected
23:03:15 awplus ATMF[863]: ATMF safe config applied (forwarding disabled)
23:03:26 x510_1 ATMF[863]: Automatic node recovery started
23:03:26 x510_1 ATMF[863]: Attempting to recover as x510_1
23:03:26 x510_1 ATMF[863]: Checking master node availability
23:03:32 x510_1 ATMF[863]: Master has joined. 2 members in total.
23:03:32 x510_1 ATMF[863]: x908_VCS_2 has joined. 3 members in total.
23:03:32 x510_1 ATMF[863]: x908_VCS_1 has joined. 4 members in total.
23:03:37 x510_1 ATMFFSR[2950]: Retrieving recovery data from master node Master
23:05:18 x510_1 ATMFFSR[2950]: File recovery from master node succeeded. Node will now reboot
Flushing file system buffers...
Unmounting any remaining filesystems...
Restarting system.
```

**Recovery progress indication**

This is a visual feature that displays the recovery status during automatic recovery. This feature uses two distinct flash patterns to indicate the following states:

<table>
<thead>
<tr>
<th>Recovery State</th>
<th>LED Indication (green)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovery in progress</td>
<td>Progressive strobing of all port LEDs.</td>
</tr>
<tr>
<td>Recovery failure</td>
<td>All port LEDs alternating on and off, flashing at the same time.</td>
</tr>
</tbody>
</table>

When using this feature during a recovery failure, you can turn off the failure-alert indication and return the port LEDs to their normal running state. To do this, use the command **“atmf recover led-off” on page 229**.

You can repeat this process until the recovery failure has been fixed.

Note that the Find me and ecofriendly LED features cannot be used while AMF recovery progress indication is active.

**Restoring a Node to a “Clean” State**

When replacing a failed device, your replacement device should be one of the following types, in order for AMF automatic node recovery to work:

- A factory-new device
- A used device that has been returned to a “clean” state
A clean device is one that has had its previous configuration components removed. The process of cleaning is required when replacing a failed device with one that, although in working condition, has been used previously and still retains components of its previous configuration.

If you keep on-site spares, store them with clean configurations and current releases. When you upgrade your network to a new AlliedWare Plus version, we recommend you upgrade your spare devices too.

To clean up a previously used device, use the `atmf cleanup` command on page 198. This command erases all data from NVS and Flash apart from:

- The boot release file (a .rel file) and its release setting file
- v1 license files `.configs/.swfeature.lic`
- v2 license files `.configs/.sw_v2.lic`

The device is then rebooted to put it into a clean state. The device can then be used for automatic node recovery.

Any other user files that remain in Flash will be overwritten during the automatic recovery process. If there are any files stored in the Flash of the replacement device that need to be retained, back these files up prior to installing the device into the AMF network.

### Manual Node Recovery

There are certain situations where automatic recovery may fail. Automatic recovery has been designed to be cautious in its approach to recovering nodes for reasons such as:

- The backup stored on the AMF master not having a “Good” status
- The replacement device having a release of the AlliedWare Plus Operating System installed on it that is old enough to be incompatible with AW+ on the neighbor or the master.

When these situations occur, automatic node recovery will fail.

In this failed state, the replacement device will have the AMF safe configuration mode applied (see “AMF Safe Configuration Procedures” on page 172). After investigating the failure and taking remedial action, you may want to initiate manual node recovery. To do this, enter the following command:

```
amf1# atmf recover {<node_name>} {<master_node_name>}
```

where:

- `node_name` is the host name of the device you wish to recover.
- `master_node_name` is the host name of the AMF master that contains the backup you want to use for the recovery.

The manual recovery command will bypass the usual checks performed by automatic node recovery. Make sure that the backup configuration stored on the specified AMF master is correct before you execute the command.

If you attempt to manually recover a node with the backup file of a node from a different platform, the release file from the backup will be incompatible and won’t be copied to the replacement device. Instead, the existing release on the replacement device will be used, in order to ensure the device can join the AMF network and function correctly.
Node Recovery on VCStacks

Node recovery on VCStacks that are part of an AMF network is somewhat different to node recovery of standalone devices.

This is because VCStack has its own node recovery mechanism that has different requirements to AMF.

In the extremely unlikely situation of needing to replace an entire VCStack that is a member of an AMF network, you can use AMF automatic node recovery to first recover Stack ID 1, which will become the VCStack master.

The replacement device which will become the VCStack master must be a clean unit (see “Restoring a Node to a “Clean” State” on page 169).

The procedure for recovering an entire stack is as follows:

1. Connect a clean device to the AMF network, and power it on. The connections into the AMF network should be between the appropriately configured AMF links on the neighboring node, and the ports previously configured as AMF links in the backup for the failed node configuration.
2. The AMF network should detect the replacement device and begin automatic node recovery. Wait until automatic node recovery completes, then check that the replacement device has come up correctly as VCStack ID 1, and that the configuration is correct.
3. Configure the next replacement device as VCStack ID 2. Ensure it is installed with a compatible release and the same set of licenses that exist on ID 1. Connect the VCStack cables and power it on.
4. VCStack ID 1 should detect ID 2 and synchronize the configuration and firmware release. Once this has completed, check that the VCStack has formed correctly, and then connect the remaining network connections.

For any additional VCStack members, repeat the last two steps, ensuring that the VCStack ID is set to the next sequential value for each additional device that is added to the VCStack.

Figure 18: Example output showing manual recovery

```
amf1#atmf recover x510_1 Master
This command will erase ALL flash contents. Continue node recovery? (y/n)y
Manual node recovery successfully initiated
x510_1#23:15:32 x510_1 ATMFFSR[8477]: Retrieving recovery data from master node Master
23:17:17 x510_1 ATMFFSR[8477]: Manual node recovery completed
x510_1#
```
AMF Safe Configuration

If AMF automatic node recovery fails, AMF contains a safety net feature that puts the replacement node into a safe configuration state. This is to prevent an unconfigured device from joining the network and creating loops.

Detecting AMF Safe Configuration Operation

A log message will be generated when AMF safe configuration is applied. This message will appear in the log some time after the startup sequence.

The message will also be output to the console or any connected VTY session.

AMF Safe Configuration Procedures

The procedures for AMF safe configuration are shown below:

- A special VLAN is created in the disabled state and given the name `atmf_node_recovery_safe_vlan`. The VID of this VLAN is determined dynamically to ensure that it does not conflict with either of the AMF management VLANs, or any other VLANs that are detected on the AMF network.

- All ports are removed from their default VLAN membership (VLAN 1).

- All ports are set as tagged members of the safe VLAN.

- Additionally, all ports that are not an AMF link or cross-link are shut down. The links and cross-links are detected by AMF and added to the dynamic configuration. This is done to ensure correct behavior of static aggregators and Layer 3 protocols configured on the neighboring devices.

```
awplus#sh vlan brief
VLAN ID  Name            Type    State   Member ports   (u)-Untagged, (t)-Tagged
======= ================ ======= ======= =======================================
1       default          STATIC  ACTIVE
4090    atmf_node_recovery_safe_vlan
        STATIC  SUSPEND
port1.1.1(t)  port1.1.2(t)  port1.1.3(t)
port1.1.4(t)  port1.1.5(t)  port1.1.6(t)
port1.1.7(t)  port1.1.8(t)  port1.1.9(t)
port1.1.10(t) port1.1.11(t) port1.1.12(t)
port1.1.13(t) port1.1.14(t) port1.1.15(t)
port1.1.16(t) port1.1.17(t) port1.1.18(t)
port1.1.19(t) port1.1.20(t) port1.1.21(t)
port1.1.22(t) port1.1.23(t) port1.1.24(t)
```
Figure 20: Example output from the show vlan command with the brief parameter set for a device in AMF safe configuration mode

```
awplus#sh vlan brief

VLAN ID  Name            Type    State   Member ports   (u)-Untagged, (t)-Tagged
======= ================ ======= ======= =======================================
1        default          STATIC  ACTIVE
4090     atmf_node_recovery_safe_vlan  STATIC  SUSPEND port1.0.1(t)  port1.0.2(t)  port1.0.3(t)
          port1.0.4(t)  port1.0.5(t)  port1.0.6(t)
          port1.0.7(t)  port1.0.8(t)  port1.0.9(t)
          port1.0.10(t) port1.0.11(t)
          port1.0.12(t) port1.0.13(t)
          port1.0.14(t) port1.0.15(t)
          port1.0.16(t) port1.0.17(t)
          port1.0.18(t) port1.0.19(t)
          port1.0.20(t) port1.0.21(t)
          port1.0.22(t) port1.0.23(t)
          port1.0.24(t)
```

Figure 21: Example output from the show running-config command for a device in AMF safe configuration mode

```
awplus#show running-config
...
!
vlan database
  vlan 4090 name atmf_node_recovery_safe_vlan
  vlan 4090 state disable
!
  interface port1.1.1-1.1.4
    shutdown
    switchport
    switchport mode trunk
    switchport trunk allowed vlan add 4090
    switchport trunk native vlan none
!
  interface port1.1.5
    switchport
    switchport atmf-link
    switchport mode trunk
    switchport trunk allowed vlan add 4090
    switchport trunk native vlan none
!
  interface port1.1.6-1.1.24
    shutdown
    switchport
    switchport mode trunk
    switchport trunk allowed vlan add 4090
    switchport trunk native vlan none
!
...
```
Undoing an AMF Safe Configuration

If your node has had AMF safe configuration applied, you can use normal CLI configuration commands to modify the running-configuration to whatever configuration is required.

See below for an example of returning a device from AMF safe configuration mode to having default VLAN and port settings. Note that in this example a 24-port card has been used.

```
awplus# configure terminal
awplus(config)# interface port1.1.1-port1.1.24
awplus(config-if)# switchport trunk native vlan 1
awplus(config-if)# switchport trunk allowed vlan remove 4090
awplus(config-if)# switchport mode access
% port1.1.5 has ATMF link configured so its mode cannot be changed
awplus(config-if)# no shutdown
awplus(config-if)# exit
awplus(config-if)# vlan database
awplus(config-if)# no vlan 4090
awplus(config-if)# end
```

In order to retain connectivity to the AMF network, AMF link and crosslink settings should not be changed. In the example above you can see that port1.1.5 is an automatically configured AMF link. You can also see the error message indicating it was skipped by the `switchport mode access` command. This is because AMF links must be in trunk mode.

**Caution**

No changes should be made to the device’s configuration while a node recovery is underway. A log message will appear on the console or other logged in session indicating when recovery has finished (whether successfully or with errors). This message can also be found by viewing the log with the command `show log`. 
Rolling-Reboot Firmware Upgrade

The rolling-reboot firmware upgrade feature enables nodes within an AMF network to be rebooted and upgraded in a rolling sequence so that downtime and management overheads are minimized. First, specify a set of nodes within the AMF network using the `atmf working-set` command, then use the `atmf reboot-rolling` command. All nodes in the specified working-set will be rebooted and upgraded one by one, starting with the nodes furthest from the core domain, and ending with nodes closest to, or in, the core domain.

Once the rebooted node has finished running its configuration and has brought its ports up, it re-joins the AMF network and the next node in the working-set is rebooted and upgraded.

*Note:* The `atmf rolling-reboot` command can also be used to reboot a set of nodes without upgrading the firmware.

To upgrade firmware, a download URL can be selected from any media location. Supported media locations include:

- flash:
- card:
- usb:
- tftp:
- scp:
- http:

The latest compatible release for a node will be selected from one of these locations. Several checks need to be performed to ensure the upgrade will succeed. This includes checking that the current node release boots from Flash and that there is enough space in Flash on this node. The new release name is updated using the `boot system backup` command. The old release will become the backup release file.

Note that if the release file is to be copied from a remote location (e.g. via TFTP or HTTP), the URL should specify the exact release filename without using wild card characters.

The node is rebooted and the new software version will be used. On bootup, the software release is verified. Should an upgrade fail, the upgrading unit will fail back to its old software version. At the completion of this command, a report is run showing the release upgrade status of each node.

The `force` parameter enforces a node reboot, even though the node may not be suitable for upgrading software. This command can take a significant amount of time to complete.

*Note:* Rolling-reboot firmware upgrades can be performed on a working-set that includes the controlling node, although in this instance the user will not be presented with a summary report upon completion.
Here is an example of a Rolling-reboot firmware upgrade summary report:

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Reboot Status</th>
<th>Release Name</th>
<th>Release Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node1</td>
<td>Rebooted</td>
<td>x510-main-20121018-2.rel</td>
<td>Upgraded</td>
</tr>
<tr>
<td>Node2</td>
<td>Rebooted</td>
<td>x900-main-20121018-2.rel</td>
<td>Upgraded</td>
</tr>
<tr>
<td>Node3</td>
<td>Rebooted</td>
<td>x900-main-20121018-2.rel</td>
<td>Upgraded</td>
</tr>
<tr>
<td>Node4</td>
<td>Rebooted</td>
<td>x510-main-20121018-2.rel</td>
<td>Upgraded</td>
</tr>
</tbody>
</table>

ATMF Rolling Reboot Complete
Performing a Rolling-Reboot Upgrade

To perform a Rolling-reboot firmware upgrade on all nodes in the AMF network, first select all nodes using the default working-set group all:

```
SBSBx8100# atmf working-set group all
SBSBx8100, SBx908-VCS1, SBx908-VCS2, x510_1, x510_2:
```

Next, using the `atmf reboot-rolling` command, specify the path to the release files to use for the upgrade. In the following example the release files are stored on the external USB storage media installed in the node controlling the Rolling-reboot firmware upgrade, in a directory called "rel". Note that because the node controlling the Rolling-reboot firmware upgrade is included in the nodes to be upgraded, a message is output indicating that no summary will be available on completion.

```
SBSBx8100# atmf reboot-rolling usb:/rel/*.rel
```

Although in this example no summary report was generated, you can refer to the progress messages output on the console to confirm that the upgrades were successful. You can also use the `atmf working-set` and the `show boot` commands to confirm the current boot image for each node in the AMF network.
Copying Release : x510-main-20121203-1.rel to x510_1
Updating Release : x510-main-20121203-1.rel information on x510_1
ATMF Rolling Reboot: Rebooting x510_1

02:14:13 SBSBx8100 ATMF[1973]: x510_1 has left. 4 members in total.
% x510_1 has left the working-set
02:15:53 SBSBx8100 ATMF[1973]: x510_1 has joined. 5 members in total.
Reboot of x510_1 has completed

Copying Release : x900-main-20121203-1.rel to SBx908-VCS1
Updating Release : x900-main-20121203-1.rel information on SBx908-VCS1
ATMF Rolling Reboot: Rebooting SBx908-VCS1

02:19:02 SBSBx8100 ATMF[1973]: x510_1 has left. 4 members in total.
02:19:02 SBSBx8100 ATMF[1973]: SBx908-VCS1 has left. 3 members in total.
% SBx908-VCS1 has left the working-set
02:20:48 SBSBx8100 ATMF[1973]: SBx908-VCS1 has joined. 4 members in total.
Reboot of SBx908-VCS1 has completed
02:20:51 SBSBx8100 ATMF[1973]: x510_1 has joined. 5 members in total.

Copying Release : x900-main-20121203-1.rel to SBx908-VCS2
Updating Release : x900-main-20121203-1.rel information on SBx908-VCS2
ATMF Rolling Reboot: Rebooting SBx908-VCS2

02:21:54 SBSBx8100 ATMF[1973]: x510_2 has left. 4 members in total.
02:21:54 SBSBx8100 ATMF[1973]: SBx908-VCS2 has left. 3 members in total.
% SBx908-VCS2 has left the working-set
02:23:35 SBSBx8100 ATMF[1973]: SBx908-VCS2 has joined. 4 members in total.
Reboot of SBx908-VCS2 has completed

Copying Release : SBx81CFC400-main-20121203-1.rel to SBSBx8100
02:23:39 SBSBx8100 ATMF[1973]: x510_2 has joined. 5 members in total.
Updating Release : SBx81CFC400-main-20121203-1.rel information on SBSBx8100
ATMF Rolling Reboot: Rebooting SBSBx8100

02:24:07 SBSBx8100 ATMF: reboot-rolling Rebooting SBSBx8100 at request of user manager.
Node Provisioning

You can pre-configure, or provision, a port for a future node before the node is added to the network. A provisioned node can be created as a new unique entity, or can be cloned using the backup data from an existing node. When you connect the new node to the provisioned port in the AMF network, its configuration is loaded from the information stored in the backup media.

AMF commands are used to create and configure a provisioned node and to specify the port(s) that the node is expected to appear on.

When to use node provisioning

Node provisioning can be used in these instances:

■ For future extension of the AMF network. You can pre-configure future AMF network nodes via the `atmf provision node` commands. The following figure illustrates the position of a future, provisioned node. Port1.1.5 on Member 2 and port1.0.3 on Member 4 would need to be configured to expect the future node.

![Figure 22: Provisioning for a future node](image)

■ For replacing an existing node with a new node of a different platform (e.g. replacing an x310 switch with an x510), and/or with a different host name. Using the `atmf provision node` commands you can configure the ports on adjacent nodes to accept a replacement AMF member.

Creating a new provisioned node

You can pre-configure nodes by **creating** a new directory or by **cloning** an existing node (see Table 8 and Table 9).
These two methods can briefly be described as:

1. Using the command “atmf provision node create” on page 217.
   This command creates an “empty” directory to which release and configuration files can be added for use on a future node. You can copy configuration and release files from existing switches into the new directory. Alternatively, you can create the configuration files by following the instructions in these sections:
   « “Creating and Using Configuration Files” in the chapter “Creating and Managing Files” in your switch’s Software Reference.
   « “Configuring AMF” on page 143.

2. Using the command “atmf provision node clone” on page 213.
   This command creates a new directory and copies most settings and files from another backup or provisioned node. You can make additional changes manually to these files, if needed.
   We recommend that you select the donor node to be as close as possible to the new node, and for it to contain the same number of ports, or have the same XEMs installed in the same bays. This will limit the number of manual changes that will be required to the replicated configuration of the new node.

AMF stores the configuration files for the provisioned node on the master node’s backup media or a remote backup server. These files are automatically loaded onto the new node’s Flash when it is introduced to the network.

Configuring adjacent nodes

You need to configure the AMF links and cross-links on the adjacent node before the new node is connected. Later, when the provisioned node is introduced to the AMF network, the adjacent node(s) will recognize it and the new node will automatically join the AMF network.

If you plan to replace an existing AMF node with one that has a different host name, use the “atmf provision” on page 212 to configure the adjacent node to expect the new node in the future. This command is used to configure all AMF links and cross-links to the new node (excluding virtual links).

If you plan to extend your AMF network via ports that have not been used before, you must first fully configure the ports beforehand. Such configuration includes using the command “atmf provision” on page 212 and other commands, some of which are shown in Table 8 and Table 9.

More information on configuring switches can be found in “Creating and Using Configuration Files” in the chapter “Creating and Managing Files” in your switch’s Software Reference.

Table 8 on page 181 outlines the procedures to follow if you want to:

- create a provisioned node.
- configure the existing node(s) that the provisioned node will eventually connect to.

Table 9 on page 182 outlines the procedures to follow if you want to:

- clone a provisioned node.
- configure the existing node(s) that the provisioned node will eventually connect to.
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Command Details</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step a.</strong> Enter Privileged Exec mode</td>
<td></td>
<td>Member_4&gt;enable</td>
<td>This command sets up an empty directory on the backup media for use with a provisioned node.</td>
</tr>
<tr>
<td><strong>Step b.</strong> Set the name of the provisioned node to &quot;future_node&quot;</td>
<td></td>
<td>Member_4#atmf provision node future_node create</td>
<td>This command sets up an empty directory on the backup media for use with a provisioned node.</td>
</tr>
</tbody>
</table>
| **Step c.** Copy and set release file | To copy a release file from member4's Flash into the future_node directory, and set that release file to load onto future_node when it first boots up, enter the following commands: | Member_4#atmf provision node future_node locate  
Member_4#copy flash:member4.rel ./future_node.rel  
Member_4#atmf provision node future_node configure boot system future_node.rel  
OR  
Member_4#atmf provision node future_node locate  
Member_4#copy current-software member4.rel ./future_node.rel  
Member_4#atmf provision node future_node configure boot system future_node.rel  | For information on downloading AlliedWare Plus release files see the Download Centre at alliedtelesis.com/support  
For information on copying files see “Copying Files to and from Your Device” in the chapter “Creating and Managing Files” in your switch's Software Reference.                                                                                                      |
| **Step d.** Copy and set configuration file | To copy a configuration file named current.cfg from member4's Flash into the future_node directory, and set that configuration file to load onto future_node when it first boots up, enter the following commands: | Member_4#atmf provision node future_node locate  
Member_4#copy flash:current.cfg ./future_node.cfg  
Member_4#atmf provision node future_node configure boot config future_node.cfg | For information on configuring a switch for AMF see “Configuring AMF” on page 143                                                                                                                     |
| **Step e.** Edit configuration file if necessary. | Note that it is important to give the provisioned node a unique hostname. To alter the config file in the AlliedWare Plus text editor, use the edit command. |                                                                 | For information on configuring a switch for AMF see “Configuring AMF” on page 143                                                                                                                     |
| **Step f.** Copy and set license file | To copy a license certificate named member_4.txt from member4's Flash into the future_node directory, and set that license certificate to load onto future_node when it first boots up, enter the following commands: | Member_4#atmf provision node future_node locate  
Member_4#copy flash:member_4.txt ./future_node.txt  
Member_4#atmf provision node future_node license-cert future_node.txt | For information on licensing for AMF see the atmf provision node license-cert command on page 221 and the Licensing Introduction and Configuration chapter in your switch’s Software Reference.                                                                 |
Table 9: Procedure for cloning a provisioned node and configuring its adjacent nodes

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Enter Privileged Exec mode</td>
<td>AMF_Master1&gt;enable</td>
</tr>
<tr>
<td>b.</td>
<td>Set the name of the provisioned node to &quot;future_node&quot;. In this example, the provisioned node will be a clone of member_3</td>
<td>AMF_Master1&gt;atmf provision node future_node clone member_3</td>
</tr>
<tr>
<td>c.</td>
<td>Configure the port node(s) that will be connected to the provisioned node. In this example, port1.0.3 on member_4 is being configured as an AMF link and to expect the provisioned node future_node</td>
<td>AMF_Master1&gt;atmf working-set member_4 member_4#configure terminal member_4(config)#interface port1.0.3 member_4(config-if)#switchport atmf-link member_4(config-if)#switchport trunk native vlan none member_4(config-if)#atmf provision future_node member_4(config-if)#exit member_4(config)#exit member_4#atmf working-set group local</td>
</tr>
</tbody>
</table>

Note that AMF links and crosslinks do not need to be configured with data VLANs and can be used solely to provide AMF management VLAN redundancy.

Step c can be repeated to configure the ports on other adjacent nodes to expect the provisioned node.

---

Connecting a provisioned node to an AMF network

When you add the new node to the AMF network, its settings and files are automatically downloaded from the master node’s backup media, or a remote backup server, to the new node’s Flash. All you need to do is cable the new device into the network.

The switch’s port LEDs will flash to show that its settings are being loaded. Progressive strobing of all the port LEDs indicates that a recovery is underway. For more information on the node recovery LEDs see “Recovery progress indication” on page 169.
The following example shows the expected output when a provisioned node named `future_node` joins the AMF network to replace a node called `member_5`.

```
21:57:35 awplus ATMF[999]: ATMF network detected
21:57:35 awplus ATMF[999]: ATMF safe config applied (forwarding disabled)
21:57:45 awplus ATMF[999]: Shutting down all non ATMF ports
21:57:45 awplus ATMF[999]: member_5 has left. 0 member in total.
21:57:45 x510-2 ATMF[999]: future_node has joined. 1 member in total.
21:57:45 x510-2 ATMF[999]: Automatic node recovery started
21:57:45 x510-2 ATMF[999]: Attempting to recover as future_node
21:57:46 x510-2 ATMF[999]: Checking master node availability
21:57:52 x510-2 ATMF[999]: AMF_Master1 has joined. 2 members in total.
21:57:54 x510-2 ATMF[999]: member_1 has joined. 3 members in total.
21:57:56 x510-2 ATMF[999]: member_2 has joined. 4 members in total.
21:58:00 x510-2 ATMF[999]: member_3 has joined. 5 members in total.
21:58:03 x510-2 ATMF[999]: member_4 has joined. 6 members in total.
21:58:04 x510-2 ATMFFSR[6779]: Retrieving recovery data from master node AMF_Master1
21:58:34 x510-2 ATMFFSR[6779]: Licence installed from certificate.
21:58:35 x510-2 ATMFFSR[6779]: File recovery from master node succeeded. Node will now reboot
```
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atmf virtual-link id ip remote-id remote-ip ....................................................................................... 232
atmf working-set .................................................................................................................................. 234
clear atmf links statistics .................................................................................................................. 235
debug atmf ......................................................................................................................................... 236
debug atmf packet ............................................................................................................................ 238
erase factory-default ........................................................................................................................ 241
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show atmf group .............................................................................................................................. 250
show atmf group members ............................................................................................................... 252
show atmf links ............................................................................................................................... 253
show atmf links detail ....................................................................................................................... 255
show atmf links statistics .................................................................................................................. 261
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show atmf provision nodes ............................................................................................................. 267
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Introduction

This chapter provides an alphabetical reference for AMF commands.

AMF Naming Convention

When AMF is enabled on a switch, it will automatically be assigned a host name. If a host name has already been assigned, by using the command “hostname”, this will remain. If however, no host name has been assigned, then the name applied will be the prefix, host_ followed (without a space) by the MAC address of the device. For example, a device whose MAC address is 0016.76b1.7a5e will have the name host_0016_76b1_7a5e assigned to it.

To efficiently manage your network using AMF, we strongly advise that you devise a naming convention for your network switches, and accordingly apply an appropriate hostname to each switch in your AMF network.
**atmf backup**

This command can only be applied to a master node. It manually schedules an AMF backup to start at a specified time and to execute a specified number of times per day.

Use the `no` variant of this command to disable the schedule.

**Syntax**

```plaintext
atmf backup (default|<hh:mm> frequency <1-24>)

no atmf backup enable
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>default</td>
<td>Restore the default backup schedule.</td>
</tr>
<tr>
<td><code>&lt;hh:mm&gt;</code></td>
<td>Sets the time of day to apply the first backup, in hours and minutes. Note that this parameter uses the 24 hour clock.</td>
</tr>
<tr>
<td>backup</td>
<td>Enables AMF backup to external media.</td>
</tr>
<tr>
<td>frequency <code>&lt;1-24&gt;</code></td>
<td>Sets the number of times within a 24 hour period that backups will be taken.</td>
</tr>
</tbody>
</table>

**Default**

Backups run daily at 03:00 AM, by default

**Mode**

Global Configuration

**Usage**

Running this command only configures the schedule. To enable the schedule, you should then apply the command `atmf backup enable`.

**Example**

To schedule backup requests to begin at 11 am and execute twice per day (11 am and 11 pm), use the following command:

```
VCF_1# configure terminal
VCF_1(config)# atmf backup 11:00 frequency 2
```

**Caution**

File names that comprise identical text, but with differing case, such as `Test.txt` and `test.txt`, will not be recognized as being different on a FAT32 based backup media such as a USB storage device. However, these filenames will be recognized as being different on your Linux based switch. Therefore, for good practice, ensure that you apply a consistent case structure for your back-up file names.

**Related Commands**

- `atmf backup enable`
- `atmf backup stop`
- `show atmf backup`
**atmf backup bandwidth**

This command sets the maximum bandwidth in kilobytes per second (kBps) available to the AMF backup process. This command enables you to restrict the bandwidth that is utilized for downloading file contents during a backup.

```
Use the no variant of this command to reset (to its default value of zero) the maximum bandwidth in kilobytes per second (kBps) available when initiating an AMF backup. A value of zero tells the backup process to transfer files using unlimited bandwidth.
```

**Syntax**

```
atmf backup bandwidth <0-1000>

no atmf backup bandwidth
```

**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0-1000&gt;</td>
<td>Sets the bandwidth in kilobytes per second (kBps)</td>
</tr>
</tbody>
</table>

**Default**

The default value is zero, allowing unlimited bandwidth when executing an AMF backup.

**Mode**

Global Configuration

**Examples**

To set an atmf backup bandwidth of 750 kBps, use the commands:

```
node2# configure terminal
node2(config)# atmf backup bandwidth 750
```

To set the atmf backup bandwidth to the default value for unlimited bandwidth, use the commands:

```
node2# configure terminal
node2(config)# no atmf backup bandwidth
```

**Related Commands**

show atmf backup

---

**Note**

This command will only run on an AMF master. An error message will be generated if the command is attempted on node that is not a master.

Also note that setting the bandwidth value to zero will allow the transmission of as much bandwidth as is available, which can exceed the maximum configurable speed of 1000 kBps. In effect, zero means unlimited.
atmf backup delete

This command removes the backup file from the external media of a specified AMF node.

**Syntax**

```
atmf backup delete <node name>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;node name&gt;</td>
<td>The AMF node name of the backup file to be deleted.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Example**

To delete the backup file from node2, use the following command:

```
Node_1# atmf backup delete node2
```
**atmf backup enable**

This command enables automatic AMF backups on the AMF master node that you are connected to. By default, automatic backup starts at 3:00 AM. However, this schedule can be changed by the **atmf backup command on page 188**. Note that backups are initiated and stored only on the master nodes.

Use the **no** variant of this command to disable any AMF backups that have been scheduled and previously enabled.

**Syntax**

```
atmf backup enable
no atmf backup enable
```

**Default**

Automatic AMF backup functionality is enabled on the AMF master when it is configured and external media, i.e. an SD card or a USB storage device or remote server, is detected.

**Mode**

Global Configuration

**Usage**

A warning message will appear if you run the **atmf backup enable** command with either insufficient or marginal memory availability on your external storage device.

You can use the command “**show atmf backup**” on page 246 to check the amount of space available on your external storage device.

**Example**

To turn on automatic AMF backup, use the following command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup enable
```

**Related Commands**

- show atmf
- show atmf backup
- atmf backup
- atmf backup now
- atmf enable
atmf backup now

This command initiates an immediate AMF backup of either all AMF members, or a selected AMF member. Note that this backup information is stored in the external media on the master node of the switch on which this command is run, even though the selected AMF member may not be a master node.

**Syntax**

```
atmf backup now [ <nodename> ]
```

**Parameter**

- `<nodename>` or `<hostname>`
  - The name of the AMF member to be backed up - as set by the command `hostname`. Where no name has been assigned to this device, then you must apply the prefix, host underscore followed (without a space) by the MAC address of the device to be backed up. For example `host_0016_76b1_7a5e`
  - Note that the node-name appears as the command Prompt when in Privileged Exec mode.

**Default**

A backup is initiated for all nodes on the AMF (but stored on the master nodes).

**Mode**

Privileged Exec

**Usage**

Although this command will select the AMF node to be backed-up; it can only be run from any AMF master node.

**Note**

The backup produced will be for the selected node but the backed-up config will reside on the external media of the AMF master node on which the command was run. However, this process will result in the information on one master being more up-to-date. To maintain concurrent backups on both masters, you can apply the backup now command to the master working-set. This is shown in “Example 4” on page 193.

**Example 1**

In this example, an AMF member has not been assigned a host name. The following command is run on the AMF_Master_2 node to immediately backup the device - identified by its MAC address of 0016.76b1.7a5e:

```
AMF_Master_2# atmf backup now host_0016_76b1_7a5e
```

**Note**

When a host name is derived from its MAC address, the syntax format entered changes from XXXX.XXXXX.XXXX to XXXX_XXXX_XXXX.

**Example 2**

In this example, an AMF member has the host name, `office_annex`. The following command will immediately backup this device:

```
AMF_Master_2# atmf backup now office_annex
```

This command is initiated on the switch’s master node named `AMF_Master_2` and initiates an immediate backup on the switch named `office_annex`. 
Example 3  To initiate from AMF_master_1 an immediate backup of all AMF member nodes, use the following command:

`AMF_Master_1# amf backup now`

Example 4  To initiate an immediate backup of the node with the host-name “office_annex” and store the configuration on both masters, use the following process:

From the AMF_master_1, set the working-set to comprise only of the automatic group, master nodes.

`AMF_Master_1# atmf working-set group master`

This command returns the following display:

```
================================
AMF_Master_1, AMF_Master_2
================================
Working set join
```

Backup the AMF member with the host name, **office_annex** on both the master nodes as defined by the working set.

`AMF_Master[2]# atmf backup now office_annex`

Note that the [2] shown in the command prompt indicates a 2 node working-set.

Related Commands

- `atmf backup`
- `atmf backup stop`
- `hostname`
- `show atmf backup`
atmf backup server

This command configures remote file servers as the destination for AMF backups.

Use the no variant of this command to remove the destination server(s). When all servers are removed the system will revert to backup from external media.

**Syntax**

```
atmf backup server id {1|2} <hostlocation> username <username>[path <path>|port <1-65535>]
```

```
no atmf backup server id {1|2}
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>Remote server backup server identifier.</td>
</tr>
<tr>
<td>{1</td>
<td>2}</td>
</tr>
<tr>
<td>&lt;hostlocation&gt;</td>
<td>Either the name or the IP address (IPv4 or IPv6) of the selected backup server (1 or 2).</td>
</tr>
<tr>
<td>username</td>
<td>Configure the username to log in with on the selected remote file server.</td>
</tr>
<tr>
<td>&lt;username&gt;</td>
<td>The selected remote file server’s username.</td>
</tr>
<tr>
<td>path</td>
<td>The location of the backup files on the selected remote file server. By default this will be the home directory of the username used to log in with.</td>
</tr>
<tr>
<td>&lt;path&gt;</td>
<td>The directory path utilized to store the backup files on the selected remote file server. No spaces are allowed in the path.</td>
</tr>
<tr>
<td>port</td>
<td>The connection to the selected remote backup file server using SSH. By default SSH connects to a device on TCP port 22 but this can be changed with this command.</td>
</tr>
<tr>
<td>&lt;1-65535&gt;</td>
<td>A TCP port within the specified range.</td>
</tr>
</tbody>
</table>

**Defaults**

Remote backup servers are not configured. The default SSH TCP port is 22. The path utilized on the remote file server is the home directory of the username.

**Mode**

Global Exec

**Usage**

The hostname and username parameters must both be configured.

**Examples**

To configure a remote backup server at 192.168.1.1 with the login username of backup1, the backup repository on atmf/network/location/ port 1024, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 192.168.1.1 username backup1 path atmf/network/location/port 1024
```
To configure server 1 with an ipv4 address and a username of backup1, use the commands:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 192.168.1.1 username backup1
```

To configure server 1 with an ipv6 address and a username of backup1, use the command:

```
AMF_backup1_1# configure terminal
AMF_Master_1(config)# atmf backup server id 1 FFEE::01 username backup1
```

To configure server 2 with a hostname and username, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 2 www.example.com username backup2
```

To configure server 2 with a hostname and username in addition, the optional path and port parameters, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# atmf backup server id 2 www.example.com username backup2 path tokyo port 1024
```

To unconfigure the AMF remote backup file server 1, use the command:

```
AMF_Master_1# configure terminal
AMF_Master_1(config)# no atmf backup server id 1
```

**Related Commands**

- `show atmf backup`
atmf backup stop

Running this command stops a backup that is currently running on the master node you are logged onto. Note that if you have two masters and want to stop both, then you can either run this command separately on each master node, or add both masters to a working set, and issue this command to the working set.

**Syntax**

```
atmf backup stop
```

**Mode**

Privileged Exec

**Usage**

This command is used to halt an AMF backup that is in progress. In this situation the backup process will finish on its current node and then stop.

**Example**

To stop a backup that is currently executing on master node VCF-1, use the following command:

```
AMF_Master_1# atmf backup stop
```

**Related Commands**

- atmf backup
- atmf backup enable
- atmf backup now
- show atmf backup
**atmf backup synchronize**

For the master node you are connected to, this command initiates a system backup of files from the node's active remote file server to its backup remote file server. Note that this process happens automatically each time the network is backed up.

**Syntax**

`atmf backup synchronize`

**Mode**

Privileged Exec

**Example**

When connected to the master node AMF_Master_1, the following command will initiate a backup of all system related files from its active remote file server to its backup remote file server.

```
AMF_Master_1# atmf backup synchronize
```

**Related Commands**

- `show atmf backup`
- `atmf backup enable`
- `show atmf`
**atmf cleanup**

This command erases all data from NVS and all data from Flash **excluding** the following:

- The current release file and its /flash/.release file
- The backup release file and /flash/.backup file
- v1 license files /flash/.configs/.swfeature.lic
- v2 license files /flash/.configs/.sw_v2.lic

It then reboots to put the device in a clean state ready to be used as a replacement node on a provisioned port.

**Syntax**

```
atmf cleanup
```

**Mode**

Privileged Exec

**Usage**

This command is an alias to the `erase factory-default` command on page 241.

**Example**

To erase data, use the command:

```
Node_1(config)# atmf cleanup
```

This command will erase all NVS, all flash contents except for the boot release, and any license files, and then reboot the switch. Continue? (y/n): y

**Related Commands**

`erase factory-default`
atmf distribute firmware

This command can be used to upgrade software one AMF node at a time. A URL can be selected from any media location. The latest compatible release for a node will be selected from this location.

Several procedures are performed to ensure the upgrade will succeed. This includes checking the current node release boots from flash. If there is enough space on flash the software release is copied to flash on the new location.

The new release name is updated using the `boot system` command. The old release will become the backup release file. If a release file exists in a remote device (such as TFTP or HTTP, for example) then the URL should specify the exact release filename without using a wild card character.

Supported units include x908, x8100, x610, x210 and all stack configurations.

The command will continue to upgrade software until all nodes are upgraded. At the end of the upgrade cycle the `reboot` command should be used on the working-set.

**Syntax**

atmf distribute firmware <url>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;url&gt;</td>
<td>The URL of the file. See “URL Syntax” in the “Creating and Managing Files” chapter of your switch’s Software Reference for valid URL syntax.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Examples**

To upgrade nodes in a atmf network with a predefined AMF group called `sw_team`, use the following commands:

```
SW_Team1# atmf working-set group sw_team
```

**Output**

```plaintext
ATMF_NETWORK[3]# atmf distribute firmware card:*.*.rel
```
### ATMF Firmware Upgrade:

<table>
<thead>
<tr>
<th>Node Name</th>
<th>New Release File</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW_Team1</td>
<td>x510-main-20140204-2.rel</td>
<td>Release ready</td>
</tr>
<tr>
<td>SW_Team2</td>
<td>x610-main-20140204-2.rel</td>
<td>Release ready</td>
</tr>
<tr>
<td>SW_Team3</td>
<td>x610-main-20140204-2.rel</td>
<td>Release ready</td>
</tr>
</tbody>
</table>

Continue the rolling reboot? [y/n]: y

---

Copying Release : x510-main-20140204-2.rel to SW_Team1
Updating Release : x510-main-20140204-2.rel information on SW_Team1

Copying Release : x610-main-20140204-2.rel to SW_Team2
Updating Release : x610-main-20140204-2.rel information on SW_Team2

Copying Release : x610-main-20140204-2.rel to SW_Team3
Updating Release : x610-main-20140204-2.rel information on SW_Team3

New firmware will not take effect until nodes are rebooted.

---

atmf working-set
**atmf domain vlan**

The AMF domain vlan is one of the internal VLANs that are used to communicate information about the state of the AMF network between nodes. AMF uses its internal VLANs (the management VLAN and the domain VLAN) to communicate its inter nodal network status information. These VLANs must be reserved for AMF and not used for other purposes.

When an AMF network is first created all its nodes are assigned a domain VLAN with a default (domain) VID of 4091. An important point conceptually is that although this VLAN then exists globally across the AMF network, it is assigned separately to each domain. The AMF network therefore can be thought of as comprising a series of domain VLANS each having the same VID and each being applied to a horizontal slice (domain) of the AMF. It follows therefore that the domain VLANS are only applied to ports that form cross-links and not to ports that form uplinks/downlinks.

If you assign a VLAN ID to this VLAN (i.e. changing its value from the default of 4091) then you will need to do this separately on every device within the AMF network. The AMF domain subnet will then be applied to this new VID when all devices within the AMF network are next rebooted.

Use the no variant of this command to reset the VLAN ID to its default value of 4091.

**Syntax**

```
atmf domain vlan <2-4090>
```

```
no atmf domain vlan
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2-4090&gt;</td>
<td>The VLAN number in the range 2 to 4090.</td>
</tr>
</tbody>
</table>

**Default**
The default domain VLAN ID for the AMF is 4091.

**Mode**
Global Configuration

**Usage**
The VLANs involved in this process, must be reserved for AMF and cannot be used for other purposes. This command enables you to change the domain VLAN to match your network's specific configuration.

**Caution**
Setting this command, then rebooting the switch will only apply the AMF VLAN for the switch being configured. The new domain vlan will not become effective for the AMF network until all its member nodes have been updated, and all its member switches rebooted.

As part of its automatic creation process, this VLAN will also be assigned an IP subnet address based on the value configured by the command "atmf management subnet" on page 206. Refer to this command for more information.

**Examples**
To change the AMF domain VLAN to 4000 use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# atmf domain vlan 4000
```
To reset the AMF domain VLAN to its default of 4091, use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# no atmf domain vlan
```

**atmf enable**

This command manually enables (turns on) the AMF feature for the switch being configured.

Use the `no` variant of this command to disable (turn off) the AMF feature on the member node.

**Syntax**

```
atmf enable
no atmf enable
```

**Default**

Once AMF is configured, the AMF feature starts automatically when the switch starts up.

**Mode**

Global Configuration

**Usage**

The switch does not auto negotiate AMF domain specific settings such as the Network Name. You should therefore, configure your switch with any domain specific (non default) settings before enabling AMF.

**Examples**

To turn on the AMF the feature:

```
MyNode# config terminal
MyNode(config)# atmf enable
```

To turn off the AMF feature:

```
MyNode(config)# no atmf enable
```

This command returns the following display:

```
% Warning: The ATMF network config has been set to enable
% Save the config and restart the system for this change to take effect.
```
atmf group (membership)

This command configures a switch to be a member of one or more AMF groups. Groups exist in three forms: Implicit Groups, Automatic Groups, and User-defined Groups.

- Implicit Groups
  - All - All nodes in the AMF
  - Current - The current working-set
  - Local - The originating node.
  
  Note that the Implicit Groups do not appear in show group output.

- Automatic Groups - These are defined by hardware architecture, e.g. x510, x610, x900, x8100.

- User-defined Groups - These enable you to define arbitrary groups of AMF members based on your own criteria.

Each node in the AMF is automatically assigned membership to the implicit groups, and the automatic groups that are appropriate to its node type, e.g. x610, PoE. Similarly, nodes that are configured as masters are automatically assigned to the master group.

Use the no variant of this command to remove the membership.

Syntax

atmf group <group-list>

no atmf group <group-list>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;group-list&gt;</td>
<td>A list of group names. These should be entered as a comma delimited list without spaces.</td>
</tr>
</tbody>
</table>

Mode

Global Configuration

Usage

You can use this command to define your own arbitrary groups of AMF members based on your own network's configuration requirements. Applying a node to a non-existing group will result in the group automatically being created.

Note that the master nodes are automatically assigned to be members of the pre-existing master group.

The following example configures the switch to be members of three groups; two are company departments, and one comprises all devices located in building_2. To avoid having to run this command separately on each device that is to be added to these groups, you can remotely assign all of these devices to a working-set, then use the capabilities of the working-set to apply the atmf group (membership) command to all members of the working set.
Example
To specify the switch to become a member of AMF groups named, Marketing, Sales, and Building_2, use the following command:

```
VCF-1# configure terminal
VCF-1(config)# atmf group marketing,sales,building_2
```

First add the nodes "master_node1" and "member_node_1" to the working-set:

```
master_node# atmf working-set master_node1,member_node_1
```

This command returns the following output confirming that the nodes "master_node" and "node_2" are now part of the working-set:

```
====================
master_node1, member_node_1
====================
```

```
Working set join
```

```
atmf-net[2]# configure terminal
Add the groups building1 and sales to the working-set
atmf-net[2](config)# atmf group building1,sales
atmf-net[2](config)# exit
Show the groups that are members of the working-set
atmf-net[2]# show atmf group
```

This command returns the following output displaying the groups that are members of the working-set.

```
====================
master_node1
====================
```

```
AMF group information
building1, sales, master, poe, x8100
```

Related Commands
- `show atmf group`
- `show atmf group members`
**atmf log-verbose**

This command limits the number of log messages displayed on the console or permanently logged.

**Syntax**

```
  atmf log-verbose <1-3>
  no atmf log-verbose
```

**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1-3&gt;</td>
<td>The verbose limitation (3 = noisiest, 1 = quietest)</td>
</tr>
</tbody>
</table>

**Default**

The default log display is 3.

**Usage**

This command is intended for use in large networks where verbose output can make the console unusable for periods of time while nodes are joining and leaving.

**Mode**

Global Configuration

**Example**

To set the log-verbose to noise level 2, use the command:

```
  VCF-1# configure terminal
  VCF-1(config)# atmf log-verbose 2
```

**Validation Command**

`show atmf`
atmf management subnet

This command is used to assign a subnet that will be allocated to the AMF management and domain management VLANs. From the address space defined by this command, two subnets are created, a management subnet component and a domain component, as explained in the Usage section of this command description.

AMF uses these internal IPv4 subnets when exchanging its inter nodal status packets. These subnet addresses must be reserved for AMF and should be used for no other purpose.

The new management subnet will not become effective until all members of the AMF network have been updated and all its units rebooted.

Use the no variant of this command to remove the assigned subnet VLANs.

**Syntax**

```
atmf management subnet <a.b.0.0>
natmf management subnet
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;a.b.0.0&gt;</td>
<td>The IP address selected for the management subnet. Because a mask of 255.255.0.0 (i.e. /16) will be applied automatically, an IP address in the format a.b.0.0 must be selected. Usually this subnet address is selected from an appropriate range from within the private address space of 172.16.0 to 172.31.255.255, or 192.168.0.0 as defined in RFC1918.</td>
</tr>
</tbody>
</table>

**Default** 172.31.0.0 (Note that a subnet mask of 255.255.0.0 will automatically be applied).

**Mode** Global Configuration

**Usage** Typically a network administrator would use this command to change the default subnet address to match local network requirements.

As previously mentioned, running this command will result in the creation of a further two subnets (within the class B address space assigned) and the mask will extend from /16 to /17.

For example, if the management subnet is assigned the address 172.31.0.0/16, this will result in the automatic creation of the following two subnets:

- 172.31.0.0/17 assigned to the atmf management vlan
- 172.31.128.0/17 assigned to the atmf domain vlan.
**Examples**  
To change the AMF management subnet address on node VCF-1 to 172.25.0.0:

```
VCF-1# configure terminal
VCF-1(config)# atmf management subnet 172.25.0.0
```

To change the AMF management subnet address on node VCF-1 back to its default of 172.31.0.0:

```
VCF-1# configure terminal
VCF-1(config)# no atmf management subnet
```
**atmf management vlan**

The AMF management VLAN is created when the AMF network is first initiated and is assigned its default VID of 4092. This command enables you to change the VID from this default value.

The AMF management VLAN is one of the internal VLANs that are used to communicate information about the state of the AMF network between nodes. AMF uses its internal VLANs (such as the management VLAN and the domain VLAN) to communicate its internal network status information. These VLANs must be reserved for AMF and not used for other purposes.

If you assign a VLAN ID to this VLAN (i.e. change its value from the default of 4092) then you will need to do this separately on every device within the AMF. The AMF management subnet will then be applied to this new VID when all devices within the AMF network are next rebooted.

Use the **no** variant of this command to restore the VID to the default of 4092.

**Syntax**

```
atmf management vlan <2-4090>
```

```
o atmf management vlan
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2-4090&gt;</td>
<td>The VID assigned to the AMF management VLAN.</td>
</tr>
</tbody>
</table>

**Default**
The default VLAN ID for the AMF is 4092.

---

**Mode**
Global Configuration

**Usage**
You can use this command to change the management VLAN to meet your network's requirements and standards, particularly in situations where the default address value is unacceptable.

- **Notes**
  - Although the value applied by default lies outside the user configurable range. You can use the “no” form of this command to reset the VLAN to its default value.
  - This VLAN will automatically be assigned an IP subnet address based on the value configured by the command “atmf management subnet” on page 206. Refer to this command description for further details.

**Examples**
To change the AMF management VLAN to 4090 use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# atmf management vlan 4090
```
To reset the AMF domain VLAN to its default of 4092, use the following commands:

```
VCF-1# configure terminal
VCF-1(config)# no atmf management vlan
```

Related Commands
- `atmf domain vlan`
- `show atmf`
atmf master

This command configures the switch to be an AMF master node and automatically creates an AMF master group. The master node is considered to be the core of the AMF network, and must be present for the AMF to form. The AMF master has its node depth set to 0. Note that the node depth vertical distance is determined by the number of uplinks/downlinks that exist between the node and its master.

An AMF master node must be present for an AMF network to form. Up to two AMF master nodes may exist in a network, and they must be connected by an AMF crosslink.

Note  Master nodes are an essential component of an AMF network. In order to run AMF, an AMF License is required for each master node.

If the crosslink between two AMF masters fails, then one of the masters will become isolated from the rest of the AMF network.

Use the no variant of this command to remove the switch as an AMF master node. The node will retain its node depth of 0 until the network is rebooted.

Note  Node depth is the vertical distance (or level) from the master node (whose depth value is 0).

Syntax  

```text
atmf master
no atmf master
```

Default  The switch is not configured to be an AMF master node.

Mode  Global Configuration

Example  To specify that this node is an AMF master, use the following command:

```
VCF-1# configure terminal
VCF-1(config)# atmf master
```

Related Commands  

- `show atmf`
- `show atmf group`
atmf network-name

This command applies an AMF network name to a (prospective) AMF node. In order for an AMF network to be valid, its network-name must be configured on at least two nodes, one of which must be configured as a master and have an AMF License applied. These nodes may be connected using either AMF downlinks or crosslinks.

For more information on configuring an AMF master node, see “atmf master” on page 210.

Use the no variant of this command to remove the AMF network name.

Syntax

```
atmf network-name <name>
no atmf network-name
```

Mode Global Configuration

Usage This is one of the essential commands when configuring AMF and must be entered on each node that is to be part of the AMF. This command will not take effect until the particular node is rebooted.

A switching node (master or member) may be a member of only one AMF network.

Caution Ensure that you enter the correct network name. Entering an incorrect name will cause the AMF network to fragment (at the next reboot).

Example To set the AMF network name to amf_net use the command:

```
Node_1(config)# atmf network-name amf_net
```
atmf provision

This command configures a specified port on an AMF node to accept a provisioned node, via an AMF link, some time in the future.

Use the no variant of this command to remove the provisioning on the node.

**Syntax**

```
atmf provision [<nodename>]

no atmf provision
```

**Parameter** | **Description**
--- | ---
<nodename> | The name of the provisioned node that will appear on the AMF network in the future.

**Default**  
No provision.

**Mode**  
Interface Configuration

**Usage**  
The port should be configured as an AMF link or cross link and should be “down” to add or remove a provisioned node.

**Example**  
To provision an AMF node named node1 for port1.0.1, use the command:

```
host1(config)# interface port1.0.1
host1(config-if)# atmf provision node1
```

**Related Commands**

- switchport atmf-link
- switchport atmf-crosslink
- show atmf links
**atmf provision node clone**

This command sets up a space on the backup media for use with a provisioned node and copies into it almost all files and directories from a chosen backup or provisioned node.

Alternatively, you can set up a new, unique provisioned node by using the command `atmf provision node create`.

**Syntax**

```
atmf provision node <nodename> clone <source nodename>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;nodename&gt;</code></td>
<td>The name that will be assigned to the clone when connected.</td>
</tr>
<tr>
<td><code>&lt;source nodename&gt;</code></td>
<td>The name of the node whose configuration is to be copied for loading to the clone.</td>
</tr>
</tbody>
</table>

**Mode**  
Privileged Exec

**Usage**

This command is only available on master nodes in the AMF network.

You must run either this command or `atmf provision node create` command, before you can use other "atmf provision node" commands using the specified node name. If a backup or provisioned node already exists for the specified node then you must delete it before using the `atmf provision node` command.

When using this command it is important to be aware of the following:

- A copy of `<media>:atmf/<atmf_name>/nodes/<source_node>/flash` will be made for the provisioned node and stored in the backup media.
- The directory `<node_backup_dir>/flash/.config/ssh` is excluded from the copy.
- All contents of `<root_backup_dir>/nodes/<nodename>` will be deleted or overwritten.
- Settings for the expected location of other provisioned nodes are excluded from the copy.

The active and backup configuration files are automatically modified in the following ways:

- The "hostname" command is modified to match the name of the provisioned node.
- The "stack virtual-chassis-id" command is removed, if present.

**Example**

To copy from the backup of Switch2 to create backup files for the new provisioned node Switch3 use the following command:

```
switch1# atmf provision node switch3 clone switch2
```

**Figure 1: Sample output from the atmf provision node clone command**

```
switch1# atmf provision node switch3 clone switch2
Copying...
Successful operation
```
To confirm that a new provisioned node has been cloned, use the command:

```
switch1# show atmf backup
```

The output from this command is shown in Figure 2, below, and shows the details of the new provisioned node switch3.

**Figure 2: Sample output from the show atmf backup command**

```
switch1#show atmf backup
Scheduled Backup ...... Enabled
  Schedule ............ 1 per day starting at 03:00
Next Backup Time .... 01 Jan 2014 03:00
Backup Bandwidth ...... Unlimited
Backup Media .......... USB (Total 7446.0MB, Free 7297.0MB)
Server Config ........
  Synchronization ..... Unsynchronized
    Last Run .......... -
      1 ................ Unconfigured
      2 ................ Unconfigured
Current Action ........ Idle
  Started ............. -
  Current Node ........ -

------------------------------------------------------------------------
<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>On Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch3</td>
<td></td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Prov</td>
</tr>
<tr>
<td>switch1</td>
<td>01 Jan 2014 00:05:49</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>switch2</td>
<td>01 Jan 2014 00:05:44</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>
------------------------------------------------------------------------
```
**atmf provision node configure boot config**

This command sets the configuration file to use during the next boot cycle. This command can also set a backup configuration file to use if the main configuration file cannot be accessed for an AMF provisioned node. To unset the boot configuration or the backup boot configuration use the no boot command.

Use the no variant of this command to set back to the default.

**Syntax**

```
 atmf provision node <nodename> configure boot config [backup] [<file-path|URL>]
```

```
 atmf provision node [<nodename>] configure no boot config [backup]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;nodename&gt;</td>
<td>The name of the provisioned node.</td>
</tr>
<tr>
<td>&lt;file-path</td>
<td>URL&gt;</td>
</tr>
</tbody>
</table>

**Default**

No boot configuration files or backup configuration files are specified for the provisioned node.

**Mode**

Privileged Exec

**Usage**

When using this command to set a backup configuration file, the specified AMF provisioned node must exist. The specified file must exist in the flash directory created for the provisioned node in the AMF remote backup media.

**Examples**

To set the configuration file branch.cfg on the AMF provisioned node node1, use the command:

```plaintext
 MasterNodeName# atmf provision node node1 configure boot config branch.cfg
```

To set the configuration file backup.cfg as the backup to the main configuration file on the AMF provisioned node node1, use the command:

```plaintext
 MasterNodeName# atmf provision node node1 configure boot config backup usb:/atmf/amf_net/nodes/node1/config/backup.cfg
```

To unset the boot configuration, use the command:

```plaintext
 MasterNodeName# atmf provision node node1 configure no boot config
```

To unset the backup boot configuration, use the command:

```plaintext
 MasterNodeName# atmf provision node node1 configure no boot config backup
```

**Related Commands**

atmf provision node configure boot system
show atmf provision nodes
atmf provision node configure boot system

This command sets the release file that will load onto a specified provisioned node during the next boot cycle. This command can also set the backup release file to be loaded for an AMF provisioned node. To unset the boot system release file or the backup boot release file use the no boot command.

Use the no variant of this command to set back to the default.

This command can only be run on amf master nodes.

**Syntax**

```
atmf provision node <nodename> configure boot system [backup] [<file-path|URL>]
atmf provision node <nodename> configure no boot system [backup]
```

**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;nodename&gt;</td>
<td>The name of the provisioned node.</td>
</tr>
<tr>
<td>&lt;file-path</td>
<td>URL&gt;</td>
</tr>
</tbody>
</table>

**Default**

No boot release file or backup release files are specified for the provisioned node.

**Mode**

Privileged Exec

**Usage**

When using this command to set a backup release file, the specified AMF provisioned node must exist. The specified file must exist in the flash directory created for the provisioned node in the AMF remote backup media.

**Examples**

To set the release file `x900-5.4.4-1.rel` on the AMF provisioned node `node1`, use the command:

```
MasterNodeName# atmf provision node node1 configure boot system x900-5.4.4-1.rel
```

To set the backup release file `900-5.4.4-1.rel` as the backup to the main release file on the AMF provisioned node `node1`, use the command:

```
MasterNodeName# atmf provision node node1 configure boot system backup card:/atmf/amf_net/nodes/node1/flash/x900-5.4.4-1.rel
```

To unset the boot release, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot system
```

To unset the backup boot release, use the command:

```
MasterNodeName# atmf provision node node1 configure no boot system backup
```

**Related Commands**

- `atmf provision node configure boot config`
- `show atmf provision nodes`
**atmf provision node create**

This command sets up an empty directory on the backup media for use with a provisioned node. This directory can have configuration and release files copied to it from existing switches. Alternatively, the configuration files can be created by the user.

An alternative way to create a new provisioned node is with the command `atmf provision node clone`.

This command can only run on `amf master` nodes.

**Syntax**

```
atmf provision node <nodename> create
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;nodename&gt;</code></td>
<td>The name of the node that is being provisioned.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Usage**

This command is only available on master nodes in the AMF network.

The `atmf provision node create` command (or `atmf provision node clone`) must be executed before you can use other “atmf provision node” commands with the specified node name. If a backup or provisioned node already exists for the specified node name then you must delete it before using this command.

A date and time is assigned to the new provisioning directory reflecting when this command was executed. If there is a backup or provisioned node with the same name on another AMF master then the most recent one will be used.

**Example**

To create a new provisioned node named switch2 use the command:

```
switch1# atmf provision node switch2 create
```

Running this command will create the following directories:

- `<media>:atmf/<atmf_name>/nodes/<node>`
- `<media>:atmf/<atmf_name>/nodes/<node>/flash`

To confirm the new node’s settings, use the command:

```
switch1# show atmf backup
```

The output for the show atmf backup command is shown in Figure 3, and shows details for the new provisioned node switch2.
Figure 3: Sample output from the show atmf backup command

```
switch1#show atmf backup
Scheduled Backup ...... Enabled
  Schedule ............ 1 per day starting at 03:00
Next Backup Time .... 02 Jan 2014 03:00
Backup Bandwidth ...... Unlimited
Backup Media .......... USB (Total 7446.0MB, Free 7315.2MB)
Server Config .........
  Synchronization ..... Unsynchronized
    Last Run .......... -
    1 ................ Unconfigured
    2 ................ Unconfigured
Current Action ......... Idle
  Started ............ -
  Current Node ....... -

-----------------------------------------------
<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>On Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch2</td>
<td>-</td>
<td>-</td>
<td>No</td>
<td>Yes</td>
<td>Prov</td>
</tr>
<tr>
<td>switch1</td>
<td>01 Jan 2014</td>
<td>00:05:49</td>
<td>No</td>
<td>Yes</td>
<td>Good</td>
</tr>
</tbody>
</table>
```

For instructions on how to configure on a provisioned node refer to “Configuring AMF” on page 143 and “Creating and Using Configuration Files” in the “Creating and Managing Files” chapter of your switch’s Software Reference.

**Related commands**

- `atmf provision node clone`
**atmf provision node delete**

This command deletes files that have been created for loading onto a provisioned node. It can only be run on master nodes.

**Syntax**

```
atmf provision node <nodename> delete
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;nodename&gt;</td>
<td>The name of the provisioned node to be deleted.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Usage**

This command is only available on master nodes in the AMF network. The command will only work if the provisioned node specified in the command has already been set up (although the device itself is still yet to be installed). Otherwise, an error message is shown when the command is run.

You may want to use the `atmf provision node delete` command to delete a provisioned node that was created in error or that is no longer needed.

This command cannot be used to delete backups created by the AMF backup procedure. In this case, use the command `atmf backup delete` to delete the files.

**Note**

This command allows provisioned entries to be deleted even if they have been referenced by the `atmf provision` command, so take care to only delete unwanted entries.

**Example**

To delete backup files for a provisioned node named switch3 use the command:

```
switch1# atmf provision node switch3 delete
```

To confirm that the backup files for provisioned node switch3 have been deleted use the command:

```
switch1# show atmf backup
```

The output should show that the provisioned node switch3 no longer exists in the backup file, as shown in **Figure 4**.
Figure 4: Sample output showing the show atmf backup command

```
switch1#show atmf backup

Scheduled Backup ...... Enabled
  Schedule ............ 1 per day starting at 03:00
  Next Backup Time .... 01 Jan 2014 03:00
Backup Bandwidth ...... Unlimited
Backup Media ............ USB (Total 7446.0MB, Free 7297.0MB)
Server Config ..........
  Synchronization ..... Unsynchronized
    Last Run ............ -
    1  .................. Unconfigured
    2  .................. Unconfigured
Current Action ......... Idle
  Started ............ -
  Current Node ........ -

---------------------------------------------------------------
<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>On Media</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>switch1</td>
<td>01 Jan 2014 00:05:49</td>
<td>No</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>switch2</td>
<td>01 Jan 2014 00:05:44</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td></td>
</tr>
</tbody>
</table>
---------------------------------------------------------------
```

Related commands  
```
atmf provision node create```

New and Enhanced Features in AlliedWare Plus 5.4.4 Major and Minor Versions
atmf provision node license-cert

This command is used to set up the license certificate for a provisioned node.

The certificate file usually has all the license details for the network, and can be stored anywhere in the network. This command makes a hidden copy of the certificate file and stores it in the space set up for the provisioned node on AMF backup media.

For node provisioning, the new device has not yet been part of the AMF network, so the user is unlikely to know its product ID or its MAC address. When such a device joins the network, assuming that this command has been applied successfully, the copy of the certificate file will be applied automatically to the provisioned node.

Once the new device has been resurrected on the network and the certificate file has been downloaded to the provisioned node, the hidden copy of the certificate file is deleted from AMF backup media.

Use the no variant of this command to set it back to the default.

This command can only be run on amf master nodes.

Syntax

atmf provision node {<nodename>} license-cert <file-path|URL>

no atmf provision node {<nodename>} license-cert

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;nodename&gt;</td>
<td>The name of the provisioned node.</td>
</tr>
<tr>
<td>&lt;file-path</td>
<td>URL&gt;</td>
</tr>
</tbody>
</table>

Default

No license certificate file is specified for the provisioned node.

Mode

Privileged Exec

Usage

This command is only available on master nodes in the AMF network. It will only operate if the provisioned node specified in the command has already been set up, and if the license certification is present in the backup file. Otherwise, an error message is shown when the command is run.

Example 1

To apply the license certificate cert1.txt stored on a TFTP server for AMF provisioned node “Switch2”, use the command:

```
switch1# atmf provision node switch2 license-cert tftp://192.168.1.1/cert1.txt
```

Example 2

To apply the license certificate cert2.txt stored on AMF master's flash directory for AMF provisioned node “host2”, use the command:

```
switch1# atmf provision node switch2 license-cert/cert2.txt
```

To confirm that the license certificate has been applied to the provisioned node, use the command show atmf provision nodes. The output from this command is shown Figure 5 below, and displays license certification details in the last line.
Figure 5: Sample output from the show atmf provision nodes command

switch1#show atmf provision nodes

ATMF Provisioned Node Information:

Backup Media .............: SD (Total 3827.0MB, Free 3481.1MB)

Node Name                 : switch2
Date & Time               : 06-May-2014 & 23:25:44
Provision Path            : card:/atmf/nodes

Boot configuration :
Current boot image        : x510-1766_atmf_backup.rel (file exists)
Backup  boot image        : x510-main-20140113-2.rel (file exists)
Default boot config       : flash:/default.cfg (file exists)
Current boot config       : flash:/abc.cfg (file exists)
Backup  boot config       : flash:/xyz.cfg (file exists)

Software Licenses :
Repository file           : ./.configs/.sw_v2.lic
                          : ./.configs/.swfeature.lic
Certificate file           : card:/atmf/lok/nodes/awplus1/flash/.atmf-lic-cert

Related commands   show atmf provision nodes
**atmf provision node locate**

This command changes the present working directory to the directory of a provisioned node. This makes it easier to edit files and create a unique provisioned node in the backup.

This command can only be run on amf master nodes.

**Syntax**

```
atmf provision node <nodename> locate
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;nodename&gt;</td>
<td>The name of the provisioned node.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Usage**

This command is only available on master nodes in the AMF network. The command will only work if the provisioned node specified in the command has already been set up. Otherwise, an error message is shown when the command is run.

**Note**

We advise that after running this command, you return to a known working directory, typically flash.

**Example**

To change the working directory that happens to be on switch1 to the directory of provisioned node switch2, use the following command:

```
switch1# atmf provision node switch2 locate
```

The directory of the node switch2 should now be the working directory. You can use the command `pwd` to check this, as shown in the following figure.

**Figure 6: Sample output from the pwd command**

```
switch2#pwd
card:/atmf/building_2/nodes/switch2/flash
```

The output above shows that the working directory is now the flash of switch2.

**Related commands**

- `atmf provision node create`
- `atmf provision node clone`
- `pwd`
AMF Commands

atmf reboot-rolling

This command enables you to reboot the nodes in an AMF working-set, one at a time, as a rolling sequence in order to minimize downtime. Once a rebooted node has finished running its configuration and its ports are up, it re-joins the AMF network and the next node is rebooted.

By adding the url parameter, you can also upgrade your switches' software one AMF node at a time.

The force command enforces a node reboot even if a previous node does not rejoin the AMF network. In this situation the unsuitable node will time-out and the rolling reboot process stops. However, with the force parameter applied, the process will ignore the timeout and move on to reboot the next node in the sequence.

This command can take a significant amount of time to complete.

Syntax

```
  atmf reboot-rolling [force] [<url>]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>force</td>
<td>Ignore a failed node and move on to the next node. Where a node fails to reboot a timeout is applied based on the time taken during the last reboot.</td>
</tr>
<tr>
<td>&lt;url&gt;</td>
<td>The URL path to the software upgrade file.</td>
</tr>
</tbody>
</table>

Mode

Privileged Exec

Usage

You can load the software from a variety of locations. The latest compatible release for a node will be selected from your selected location - based on the parameters and URL you have entered.

For example card:/5.4.3/x*-5.4.3-*-rel will select from the folder card:/5.4.3 the latest file that matches the selection x (wildcard) -5.4.3-(wildcard).rel. Because x* is applied, each switch type will be detected and its appropriate release file will be installed.

Other allowable entries are:

- **card:*.*.rel:**
  Used when loading SW from SD cards.

- **tftp:ip address:**
  Used when loading SW from a TFTP server.

- **usb:**
  Used when loading SW from a USB flash drive.

- **flash:**
  Used when loading SW from flash memory, i.e. from one x900 switch to another.

- **scp:**
  Used when loading SW from a secure copy.

- **http:**
  Used when loading SW from an HTTP file server site.
Several checks are performed to ensure the upgrade will succeed. These include checking the current node release boots from flash. If there is enough space on flash, the software release is copied to flash to a new location on each node as it is processed. The new release name will be updated using the “boot system <release-name>” command, and the old release will become the backup release file.

Note: If you are using TFTP or HTTP, for example, to access a file on a remote device then the URL should specify the exact release filename without using wild card characters.

On bootup the software release is verified. Should an upgrade fail, the upgrading unit will revert back to its previous software version. At the completion of this command, a report is run showing the release upgrade status of each node.

This function is supported on the following switches: AT-SBx908, SBx8100 Series, x610 Series, x510 Series and AT-IXS-28GPX. It is supported on all stack configurations.

Note: Take care when removing external media or rebooting your switches. Removing an external media while files are being written entails a significant risk of causing a file corruption.

Example 1: To reboot all x510 nodes in an AMF network, use the following command:

```
Bld2_Floor_1# atmf working-set group x510
```

This command returns the following type of screen output:

```
===================
nod1, node2, node3:
===================
Working set join
AMP_NETWORK_Name[3]#

ATMF_NETWORK[3]# atmf reboot-rolling
```
When the reboot has completed, a number of status screens appear. The selection of these screens will depend on the parameters set.

```
Bld2_Floor_1#atmf working-set group x510
=======================================
SW_Team1, SW_Team2, SW_Team3:
=======================================

Working set join

ATMFNETWORK[3]#atmf reboot-rolling
ATMF Rolling Reboot Nodes:

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Timeout (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW_Team1</td>
<td>14</td>
</tr>
<tr>
<td>SW_Team2</td>
<td>8</td>
</tr>
<tr>
<td>SW_Team3</td>
<td>8</td>
</tr>
</tbody>
</table>

Continue the rolling reboot? (y/n): y
=======================================
ATMF Rolling Reboot: Rebooting SW_Team1
=======================================
% SW_Team1 has left the working-set
Reboot of SW_Team1 has completed
=======================================
ATMF Rolling Reboot: Rebooting SW_Team2
=======================================
% SW_Team2 has left the working-set
Reboot of SW_Team2 has completed
=======================================
ATMF Rolling Reboot: Rebooting SW_Team3
=======================================
% SW_Team3 has left the working-set
Reboot of SW_Team3 has completed
=======================================
ATMF Rolling Reboot Complete

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Reboot Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW_Team1</td>
<td>Rebooted</td>
</tr>
<tr>
<td>SW_Team2</td>
<td>Rebooted</td>
</tr>
<tr>
<td>SW_Team3</td>
<td>Rebooted</td>
</tr>
</tbody>
</table>
```
Example 2  To update firmware releases, use the following command:

```
Node_1# atmf working-set group all
ATMF_NETWORK[9]# atmf reboot-rolling card:/5.4.3/x*-5.4.3-*.rel
```

ATMF Rolling Reboot Nodes:

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Timeout (Minutes)</th>
<th>New Release File</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW_Team1</td>
<td>8</td>
<td>x510-5.4.3-0.5.rel</td>
<td>Release Ready</td>
</tr>
<tr>
<td>SW_Team2</td>
<td>10</td>
<td>x510-5.4.3-0.5.rel</td>
<td>Release Ready</td>
</tr>
<tr>
<td>SW_Team3</td>
<td>8</td>
<td>---</td>
<td>Not Supported</td>
</tr>
<tr>
<td>HW_Team1</td>
<td>6</td>
<td>---</td>
<td>Incompatible</td>
</tr>
<tr>
<td>Bld2_Floor_1</td>
<td>6</td>
<td>x900-5.4.3-0.5.rel</td>
<td>Release Ready</td>
</tr>
<tr>
<td>Bld3_Floor_2</td>
<td>2</td>
<td>x610-5.4.3-0.5.rel</td>
<td>Release Ready</td>
</tr>
<tr>
<td>Bld3_Floor_1</td>
<td>4</td>
<td>---</td>
<td>Incompatible</td>
</tr>
<tr>
<td>Building_1</td>
<td>2</td>
<td>---</td>
<td>Incompatible</td>
</tr>
<tr>
<td>Building_2</td>
<td>2</td>
<td>x900-5.4.3-0.5.rel</td>
<td>Release Ready</td>
</tr>
</tbody>
</table>

Continue upgrading releases? (y/n):
**atmf recover**

This command is used to manually initiate the recovery (or replication) of an AMF node, usually when a node is being replaced. The recovery/replication process involves loading the configuration file for a node that is either about to be replaced or has experienced some problem. The configuration file of the device being replaced is selected by the `nodename` parameter, and the master node holding the configuration file is specified by the parameter `<master-nodename>`.

If the `<nodename>` parameter is not entered then the node will attempt to use one that has been previously configured. If the replacement node has no previous configuration (and has no previously used nodename), then the recovery will fail.

If the `<master-nodename>` parameter is not specified then the device will poll all known AMF masters and execute an election process (based on the last successful backup and its timestamp) to determine which master node to use. If no valid backup master is found, then this command will fail.

**Syntax**

```
atmf recover [ <nodename> <master-nodename> ]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;nodename&gt;</code></td>
<td>The name of the device whose configuration is to be recovered or replicated.</td>
</tr>
<tr>
<td><code>&lt;master-nodename&gt;</code></td>
<td>The name of the master device that holds the required configuration information. Note that although you can omit both the nodename and the master nodename; you can only omit the master nodename if you also omit the nodename.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Usage**

No error checking occurs when this command is run, and regardless of the last backup status, the recovering node will attempt to load its configuration from the master node specified by the `master-nodename` parameter.

Note that if the node has previously been configured, we recommend that you suspend any AMF backup before running this command. This is to prevent corruption of the backup files on the AMF master as it attempts to both backup and recover the node at the same time.

**Example**

To recover the AMF node named `Node_10` from the AMF master node named `Master_2`, use the following command:

```
Master_2# atmf recover Node_10 Master_2
```

**Related Commands**

- `atmf backup stop`
- `show atmf backup`
- `show atmf`
**atmf recover led-off**

This command turns off the recovery failure flashing port LEDs. It reverts the LED’s function to their normal operational mode, and in doing so assists with resolving the recovery problem. You can repeat this process until the recovery failure has been resolved. For more detailed information see “Recovery progress indication” on page 169.

**Syntax**

```
atmf recover led-off
```

**Default**

Normal operational mode

**Mode**

Privileged Exec

**Example**

To revert the LEDs on Node1 from recovery mode display, to their normal operational mode, use the command:

```
Node1# atmf recover led-off
```
atmf remote-login

Use this command to remotely login to other AMF nodes in order to run commands as if you were a local user of that node.

**Syntax**

```bash
atmf remote-login [user <name>] <nodename>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;name&gt;</td>
<td>User name.</td>
</tr>
<tr>
<td>&lt;nodename&gt;</td>
<td>Node name.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec (This command will only run at privilege level 15)

**Usage**

You do not need a valid login on the local device in order to run this command. The session will take you to the enable prompt on the new device. If the remote login session exits for any reason (i.e. device reboot) you will be returned to the originating node.

The software will not allow you to run multiple remote login sessions. You must exit an existing session before starting a new one.

**Example 1**

To remotely login from node Node10 to Node20 use the following command:

```
Node10# atmf remote-login node20
```

**Example 2**

In this example, user Whitney is a valid user of node5. She can remotely login from node5 to node3 by using the following commands:

```
node5# atmf remote-login user whitney node3
```

Type ‘exit’ to return to node5#

```
node3> enable
```

**Note**

In the above example the user name whitney is valid on both nodes. Therefore, to prevent unauthorized access, user names should be unique across all nodes within the AMF network.
atmf restricted-login

This command restricts the use of the “atmf working-set” on page 234 command on all AMF master nodes to privilege 15 users only. Once entered on any AMF master node, this command will propagate across the network.

Note that once you have run this command, certain other commands that utilize the AMF working-set command, such as the include, atmf reboot-rolling and show atmf group members commands, will operate only on master nodes.

Use the no variant of this command to disable restricted login on the AMF network. This allows access to the atmf working-set command from any node in the AMF network.

**Syntax**

```
atmf restricted-login
no atmf restricted-login
```

**Mode**

Privileged Exec

**Default**

Master nodes operate with atmf restricted-login disabled.

Member nodes operate with atmf restricted-login enabled.

---

**Note**

The default conditions of this command vary from those applied by its “no” variant. This is because the restricted-login action is only applied by master nodes, and in the absence of a master node, the default is to apply the restricted action to all member nodes with AMF configured.

In the presence of a master node, its default of “atmf restricted-login disabled” will permeate to all its member nodes. Similarly, any change in this command’s status that is made on a master node, will also permeate to all its member nodes.

---

**Example**

To enable restricted login, use the command

```
Node_20(config)# atmf restricted-login node20
```

**Validation Command**

show atmf
**atmf virtual-link id ip remote-id remote-ip**

This command creates one or more Layer 2 tunnels that enable AMF nodes to transparently communicate across a wide area network using Layer 2 connectivity protocols.

Once connected through the tunnel, the remote member will have the same AMF capabilities as a directly connected AMF member.

Use the no variant of this command to remove the specified virtual link.

**Syntax**

```
atmf virtual-link id <1-32> ip <a.b.c.d> remote-id <1-32> remote-ip <a.b.c.d>
no atmf virtual-link id <1-32>
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ip</strong></td>
<td>The Internet Protocol (IP).</td>
</tr>
<tr>
<td>&lt;a.b.c.d&gt;</td>
<td>The IP address, of the local amf node (at its interface to the tunnel) entered in a.b.c.d format.</td>
</tr>
<tr>
<td>remote-id</td>
<td>The ID of the (same) tunnel that will be applied by the remote node. Note that this must match the local-id that is defined on the remote node. This means that (for the same tunnel) the local and remote tunnel IDs are reversed on the local and remote nodes.</td>
</tr>
<tr>
<td>&lt;1-32&gt;</td>
<td>The ID range 1-32.</td>
</tr>
<tr>
<td>remote-ip</td>
<td>The IP address of the remote node</td>
</tr>
<tr>
<td>&lt;a.b.c.d&gt;</td>
<td>The IP address, of the remote node (at its interface to the tunnel) entered in a.b.c.d format.</td>
</tr>
</tbody>
</table>

**Mode** Privileged Exec

**Usage**
The Layer 2 tunnel that this command creates enables a local AMF session to appear to pass transparently across a Wide Area Network (WAN) such as the Internet. The addresses configured as the local and remote tunnel IP addresses must have IP connectivity to each other. If the tunnel is configured to connect a head office and branch office over the Internet, typically this would involve using some type of managed WAN service such as a site-to-site VPN. Tunnels are only supported using IPv4.

Configuration involves creating a local tunnel ID, a local IP address, a remote tunnel ID and a remote IP address. A reciprocal configuration is also required on the corresponding remote device. The local tunnel ID must be unique to the device on which it is configured.
The tunneled link may operate via external (non AlliedWare Plus) routers in order to provide wide area network connectivity. However in this configuration, the routers perform a conventional router to router connection. The protocol tunneling function is accomplished by the AMF nodes.

**Note**  The requirement to pre-configure the local IP address and tunnel ID on a device located at the far end of an AMF virtual-link tunnel means that zero touch device replacement cannot be achieved on a remote device that terminates the tunnel connection.

**Example**  Use the following command to create the tunnel shown in figure Figure 7 on page 233.

```
Node_10(config)# atmf virtual-link id 1 ip 192.168.1.1
             remote-id 2 remote-ip 192.168.2.1

Node_20(config)# atmf virtual-link id 2 ip 192.168.2.1
             remote-id 1 remote-ip 192.168.1.1
```

**Figure 7: AMF virtual link example**

**Validation**  show atmf

**command**
atmf working-set

The AMF working-set command enables you to execute commands across an individually listed set (or preselected group) of AMF nodes. Group selection is made using the atmf group (membership) command on page 203.

This command opens a session on multiple network devices. When you change the working set to anything other than the local device, the prompt will change to the AMF network name, followed by the size of the working set, shown in square brackets. This command has to be run at privilege level 15.

In addition to the user defined groups, the following system assigned groups are automatically created:

- **Implicit Groups**
  - all - All nodes in the AMF
  - current - All nodes that comprise the current working-set
  - local - The originating node.

- **Automatic Groups** - These can be defined by hardware architecture, i.e. x510, x610, x900, x8100, or by certain AMF nodal designations such as master.

Note that the Implicit Groups do not appear in show group output.

If a node is an AMF master it will be automatically added to the master group.

**Syntax**

```
atmf working-set {<node-list>}[group{<group-list>|all|local|current}]
```

**Parameter** | **Description**
---|---

<node-list> | A comma delimited list (without spaces) of nodes to be included in the working-set.

group | The AMF group.

<group-list> | A comma delimited list (without spaces) of groups to be included in the working-set. Note that this can include either defined groups, or any of the Automatic, or Implicit Groups shown earlier in the bulleted list of groups.

all | All nodes in the AMF.

local | Local node

Running this command with the parameters `group local` will return you to the local prompt and local node connectivity.

current | Nodes in current list.

**Default** | Needs to be entered

**Mode** | Privileged Exec

**Example 1** To add all nodes in the AMF to the working-set, use the command:

```
node1# atmf working-set group all
```
This command displays an output screen similar to the one shown below:

```
node1, node2, node3, node4, node5, node6:
Working set join
ATMF_NETWORK_Name[6]#
```

Example 2 To return to the local prompt, and connectivity to only the local node; use the command:

```
ATMF_NETWORK_Name[6]# atmf working-set group local
node1#
```

### clear atmf links statistics

This command resets the values of all AMF link, port, and global statistics to zero.

**Syntax**
clear atmf links statistics

**Mode**
Privilege Exec

**Example** To reset the AMF link statistics values, use the command:

```
node_1# clear atmf links statistics
```

### Parameter Description

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>node1, node2</td>
<td>The name of the nodes - as set by the hostname command.</td>
</tr>
<tr>
<td>ATMF_Network_Name</td>
<td>The name of the AMF network - as set by the atmf network-name command on page 211.</td>
</tr>
</tbody>
</table>
**debug atmf**

This command enables the AMF debugging facilities, and displays information that is relevant (only) to the current node. The detail of the debugging displayed depends on the parameters specified.

If no additional parameters are specified, then the command output will display all AMF debugging information, including link events, topology discovery messages and all notable AMF events.

The “no” variant of this command disables either all AMF debugging information, or only the particular information as selected by the command’s parameters.

**Syntax**

```
debug atmf [link|crosslink|database|neighbor|error|all]
no debug atmf [link|crosslink|database|neighbor|error|all]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>link</td>
<td>Output displays debugging information relating to uplink or downlink information.</td>
</tr>
<tr>
<td>crosslink</td>
<td>Output displays all crosslink events.</td>
</tr>
<tr>
<td>database</td>
<td>Output displays only notable database events.</td>
</tr>
<tr>
<td>neighbor</td>
<td>Output displays only notable AMF neighbor events.</td>
</tr>
<tr>
<td>error</td>
<td>Output displays AMF error events.</td>
</tr>
<tr>
<td>all</td>
<td>Output displays all AMF events.</td>
</tr>
</tbody>
</table>

**Default**

All debugging facilities are disabled.

**Mode**

User Exec and Global Configuration

**Usage**

If no additional parameters are specified, then the command output will display all AMF debugging information, including link events, topology discovery messages and all notable AMF events.

**Note**

An alias to the no variant of this command is “undebug atmf” on page 279.

**Examples**

To debug all AMF debugging, use the command:

```
node_1# debug atmf
```

To debug all AMF link debugging, use the command:

```
node_1# debug atmf link
```

To debug all AMF crosslink debugging, use the command:

```
node_1# debug atmf crosslink
```
To debug all AMF database debugging, use the command:

```
node_1# debug atmf database
```

To debug all AMF neighbor debugging, use the command:

```
node_1# debug atmf neighbor
```

To debug all AMF error debugging, use the command:

```
node_1# debug atmf error
```

To debug all AMF facilities, use the command:

```
node_1# debug atmf all
```

**Related Commands**  
no debug all
**debug atmf packet**

This command configures AMF Packet debugging parameters. The debug only displays information relevant to the current node. The command has following parameters:

**Syntax**

debug atmf packet{[direction {rx|tx|both}][level {1|2|3}][timeout <seconds>][num-pkts <quantity>][filter node <name> ][interface <ifname>][pkt-type {[1][2][3][4][5][6][7][8][9][10][11]}}

**Simplified Syntax**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>debug atmf packet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[direction {rx</td>
</tr>
<tr>
<td></td>
<td>[level {1</td>
</tr>
<tr>
<td></td>
<td>[timeout &lt;seconds&gt;]</td>
</tr>
<tr>
<td></td>
<td>[num-pkts &lt;quantity&gt;]</td>
</tr>
<tr>
<td>debug atmf packet</td>
<td>filter [node &lt;name&gt;]</td>
</tr>
<tr>
<td></td>
<td>[interface &lt;ifname&gt;]</td>
</tr>
<tr>
<td></td>
<td>[pkt-type {[1][2][3][4][5][6][7][8][9][10][11]}}</td>
</tr>
</tbody>
</table>

**Note**

You can combine the syntax components shown, but when doing so, you must retain their original order.

**Default**

Level 1, both Tx and Rx, a timeout of 60 seconds with no filters applied.

**Note**

An alias to the no variant of this command - undebug atmf - can be found elsewhere in this chapter.

**Mode**

User Exec and Global Configuration

**Usage**

If no additional parameters are specified, then the command output will apply a default selection of parameters shown below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>direction</td>
<td>Sets debug to packet received, transmitted, or both</td>
</tr>
<tr>
<td>rx</td>
<td>packets received by this node</td>
</tr>
<tr>
<td>tx</td>
<td>Packets sent from this node</td>
</tr>
<tr>
<td>1</td>
<td>AMF Packet Control header Information, Packet Sequence Number. Enter 1 to select this level.</td>
</tr>
<tr>
<td>2</td>
<td>AMF Detailed Packet Information. Enter 2 to select this level.</td>
</tr>
<tr>
<td>3</td>
<td>AMF Packet HEX dump. Enter 3 to select this level.</td>
</tr>
<tr>
<td>timeout</td>
<td>Sets the execution timeout for packet logging</td>
</tr>
<tr>
<td>&lt;seconds&gt;</td>
<td>Seconds</td>
</tr>
<tr>
<td>num-pkts</td>
<td>Sets the number of packets to be dumped</td>
</tr>
</tbody>
</table>
### AMF Commands

#### New and Enhanced Features in AlliedWare Plus 5.4.4 Major and Minor Versions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>pkts</strong></td>
<td>The actual number of packets</td>
</tr>
<tr>
<td><strong>filter</strong></td>
<td>Sets debug to filter packets</td>
</tr>
<tr>
<td><strong>node</strong></td>
<td>Sets the filter on packets for a particular Node</td>
</tr>
<tr>
<td><strong>&lt;name&gt;</strong></td>
<td>The name of the remote node</td>
</tr>
<tr>
<td><strong>interface</strong></td>
<td>Sets the filter to dump packets from an interface (portx.x.x) on the local node</td>
</tr>
<tr>
<td><strong>ifname</strong></td>
<td>Interface port or virtual-link</td>
</tr>
<tr>
<td><strong>pkt-type</strong></td>
<td>Sets the filter on packets with a particular AMF packet type</td>
</tr>
<tr>
<td>1</td>
<td>Crosslink Hello BPDU packet with crosslink links information. Enter 1 to select this packet type.</td>
</tr>
<tr>
<td>2</td>
<td>Crosslink Hello BPDU packet with downlink domain information. Enter 2 to select this packet type.</td>
</tr>
<tr>
<td>3</td>
<td>Crosslink Hello BPDU packet with uplink information. Enter 3 to select this packet type.</td>
</tr>
<tr>
<td>4</td>
<td>Downlink and uplink hello BPDU packets. Enter 4 to select this packet type.</td>
</tr>
<tr>
<td>5</td>
<td>Non broadcast hello unicast packets. Enter 5 to select this packet type.</td>
</tr>
<tr>
<td>6</td>
<td>Stack hello unicast packets. Enter 6 to select this packet type.</td>
</tr>
<tr>
<td>7</td>
<td>Database description. Enter 7 to select this packet type.</td>
</tr>
<tr>
<td>8</td>
<td>DBE request. Enter 8 to select this packet type.</td>
</tr>
<tr>
<td>9</td>
<td>DBE update. Enter 9 to select this packet type.</td>
</tr>
<tr>
<td>10</td>
<td>DBE bitmap update. Enter 10 to select this packet type.</td>
</tr>
<tr>
<td>11</td>
<td>DBE acknowledgment. Enter 11 to select this packet type.</td>
</tr>
</tbody>
</table>
Examples

To set a packet debug on node 1 with level 1 and no timeout, use the command:

```
node_1# debug atmf packet direction tx timeout 0
```

To set a packet debug with level 3 and filter packets received from AMF node 1:

```
node_1# debug atmf packet direction tx level 3 filter node_1
```

To enable send and receive 500 packets only on vlank1 for packet types 1, 7, and 11, use the command:

```
node_1# debug atmf packet num-pkts 500 filter interface vlank1 pkt-type 1 7 11
```

This example applies the debug atmf packet command and combines many of its options:

```
node_1# debug atmf packet direction rx level 1 num-pkts 60 filter node x900 interface port1.0.1 pkt-type 4 7 10
```

Example

This example applies the debug atmf packet command and combines many of its options:

```
node_1# debug atmf packet direction rx level 1 num-pkts 60 filter node x900 interface port1.1.1 pkt-type 4 7 10
```

Note

In this example the local switch is an x8100 that is filtering traffic on its port 1.1.1 from a remote x900 switch.
erase factory-default

This command erases all data from NVS and all data from flash *excluding* the following:

- The current release file and its /flash/.release file
- The backup release file and /flash/.backup file
- v1 license files /flash/.configs/swfeature.lic
- v2 license files /flash/.configs/sw_v2.lic

The device is then rebooted and returns the switch to its factory default condition. The switch can then be used for automatic node recovery.

**Syntax**  
erase factory-default

**Mode**  
Global Configuration.

**Usage**  
This command is an alias to the *atmf cleanup command on page 198.*

**Example**  
To erase data, use the command:

```
Node_1(config)# erase factory-default
```

This command will erase all NVS, all flash contents except for the boot release, and any license files, and then reboot the switch. Continue? (y/n):y

**Related Commands**  
atmf cleanup
**show atmf**

Displays information about the current AMF node.

**Syntax**

```
show atmf [summary|tech|nodes|session]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>summary</td>
<td>Displays summary information about the current AMF node.</td>
</tr>
<tr>
<td>tech</td>
<td>Displays global AMF information.</td>
</tr>
<tr>
<td>nodes</td>
<td>Displays a list of AMF nodes together with brief details.</td>
</tr>
<tr>
<td>session</td>
<td>Displays information on an AMF session.</td>
</tr>
</tbody>
</table>

**Default** Only summary information is displayed.

**Mode** User Exec and Privileged Exec

**Usage** AMF uses internal VLANs to communicate between nodes about the state of the AMF network. Two VLANs have been selected specifically for this purpose. Once these have been assigned, they are reserved for AMF and cannot be used for other purposes.

**Example 1**

To show summary information on AMF node_1 use the following command:

```
node_1 show atmf summary
```

The following figure shows some example output from running this command for a specific AMF node.

**Figure 8: Output from the show atmf summary command**

```
node_1#show atmf
ATMF Summary Information:
  ATMF Status : Enabled
  Network Name : ATMF_NET
  Node Name   : node_1
  Role        : Master
  Current ATMF Nodes : 8
```

**Example 2**

To show information specific to AMF nodes use the following command:

```
node_1 show atmf nodes
```
The `show AMF` command displays all CLI (Command Line Interface) sessions for users that are currently logged in and running a CLI session. For example, in the case below, `node_1` and `node5` have active users logged in.

**Example 3** To display AMF active sessions, use the following command:

```
node_1 show AMF sessions
```

The `show AMF` session command displays all CLI (Command Line Interface) sessions for users that are currently logged in and running a CLI session. For example, in the case below, `node_1` and `node5` have active users logged in.
The AMF tech command collects all the AMF commands, and displays them. You can use this command when you want to see an overview of the AMF network.

**Example 4** To display AMF technical information, use the following command:

```
node_1  show atmf tech
```

**Figure 11: Output from the show atmf tech command**

```
node_1#show atmf tech
ATMF Summary Information:
ATMF Status : Enabled
Network Name : ATMF_NET
Node Name : node_1
Role : Master
Current ATMF Nodes : 8

ATMF Technical information:
Network Name : ATMF_NET
Domain : node_1's domain
Node Depth : 0
Domain Flags : 0
Authentication Type : 0
MAC Address : 0014.2299.137d
Board ID : 287
Domain State : DomainController
Domain Controller : node_1
Backup Domain Controller : node2
Domain controller MAC : 0014.2299.137d
Parent Domain : -
Parent Domain Controller : -
Parent Domain Controller MAC : 0000.0000.0000
Number of Domain Events : 0
Crosslink Ports Blocking : 0
Uplink Ports Waiting on Sync : 0
Crosslink Sequence Number : 7
Domains Sequence Number : 28
Uplink Sequence Number : 2
Number of Crosslink Ports : 1
Number of Domain Nodes : 2
Number of Neighbors : 5
Number of Non Broadcast Neighbors : 3
Number of Link State Entries : 1
Number of Up Uplinks : 0
Number of Up Uplinks on This Node : 0
DBE Checksum : 84fc6
Number of DBE Entries : 0
Management Domain Ifindex : 4391
Management Domain VLAN : 4091
Management ifindex : 4392
Management VLAN : 4092
```

**Table 1: Parameter definitions from the show atmf tech command**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMF Status</td>
<td>The Node's AMF status, either Enabled or Disabled.</td>
</tr>
<tr>
<td>Network Name</td>
<td>The AMF network that a particular node belongs to.</td>
</tr>
<tr>
<td>Node Name</td>
<td>The name assigned to a particular node.</td>
</tr>
<tr>
<td>Role</td>
<td>The role configured for this AMF device, either Master or Member.</td>
</tr>
<tr>
<td>Current ATMF Nodes</td>
<td>The count of AMF nodes in an AMF Network.</td>
</tr>
<tr>
<td>Node Address</td>
<td>An Address used to access a remotely located node (.atmf).</td>
</tr>
</tbody>
</table>
Table 1: Parameter definitions from the show atmf tech command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Node ID</td>
<td>A Unique identifier assigned to a Node on an AMF network.</td>
</tr>
<tr>
<td>Node Depth</td>
<td>The number of nodes in path from this node to level of the AMF root node. It can be thought of as the vertical depth of the AMF network from a particular node to the zero level of the AMF root node.</td>
</tr>
<tr>
<td>Domain State</td>
<td>The state of Node in a Domain in AMF network as Controller/Backup.</td>
</tr>
<tr>
<td>Recovery State</td>
<td>The AMF node recovery status. Indicates whether a node recovery is in progress on this device - Auto, Manual, or None.</td>
</tr>
<tr>
<td>Management VLAN</td>
<td>The VLAN created for traffic between Nodes of different domain (up/down links).</td>
</tr>
<tr>
<td>Domain VLAN</td>
<td>The VLAN assigned for traffic between Nodes of same domain (crosslink).</td>
</tr>
<tr>
<td>Device Type</td>
<td>The Product Series Name.</td>
</tr>
<tr>
<td>ATMF Master</td>
<td>The 'Y' if the node belongs to a Core domain.</td>
</tr>
<tr>
<td>SC</td>
<td>The Switch Configuration, C - Chassis(SBx81series), S - Stackable (VCS) and N - Standalone.</td>
</tr>
<tr>
<td>Parent</td>
<td>The a Node to which the current node has an active uplink.</td>
</tr>
<tr>
<td>Node Depth</td>
<td>The the number of nodes in path from this node to the Core domain.</td>
</tr>
</tbody>
</table>

Related Commands  show atmf detail
show atmf backup

This command displays information about AMF backup status for all the nodes in an AMF network. It can only be run on amf master nodes.

**Syntax**

```
show atmf backup [logs|server-status|synchronize [logs]]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>logs</td>
<td>Displays detailed log information.</td>
</tr>
<tr>
<td>server-status</td>
<td>Displays connectivity diagnostics information for each configured remote file server.</td>
</tr>
<tr>
<td>synchronize</td>
<td>Display the file server synchronization status</td>
</tr>
<tr>
<td>logs</td>
<td>For each remote file server, display the logs for the last synchronization</td>
</tr>
</tbody>
</table>

**Mode**  Privileged Exec

**Example 1**  To display the AMF backup information, use the command:

```
node_1# show atmf backup
```

Node_1# show atmf backup
ScheduledBackup ......Enabled
Next Backup Time.....19 May 2012 03:00
Backup Media.........SD (Total 1974.0 MB, Free 197.6 MB)
Current Action.......Starting manual backup
Started...............18 May 2012 10:08
CurrentNode...........atmf_testbox1

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Date</th>
<th>Time</th>
<th>In ATMF</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>atmf_testbox1</td>
<td>17May 2012</td>
<td>09:58:59</td>
<td>Yes</td>
<td>Errors</td>
</tr>
<tr>
<td>atmf_testbox2</td>
<td>17May 2012</td>
<td>10:01:23</td>
<td>Yes</td>
<td>Good</td>
</tr>
</tbody>
</table>

Node_1# show atmf backup logs
Log File Location: card:/atmf/office/logs/rsync_<nodename>.log

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Log Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>atmf_testbox2</td>
<td>2012/05/22 03:41:32 [30299]File list size: 6199</td>
</tr>
<tr>
<td></td>
<td>2012/05/22 03:41:32 [30299]File list generation time: 0.011 seconds</td>
</tr>
<tr>
<td></td>
<td>2012/05/22 03:41:32 [30299]File list transfer time: 0.000 seconds</td>
</tr>
<tr>
<td></td>
<td>2012/05/22 03:41:32 [30299]Total bytes sent: 696</td>
</tr>
<tr>
<td></td>
<td>2012/05/22 03:41:32 [30299]Total bytes received: 16.03K bytes</td>
</tr>
<tr>
<td></td>
<td>2012/02/20 03:41:32 [30299]sent 696 bytes received 603 bytes</td>
</tr>
<tr>
<td></td>
<td>total size is 21.73M speedup is 1298.93 K bytes/sec</td>
</tr>
<tr>
<td></td>
<td>2012/05/22 03:41:32 [30297]sent 626 bytes received 6203 bytes total size 43451648</td>
</tr>
</tbody>
</table>
Example 2  To display the AMF backup information with the optional parameter server-status, use the command:

```
Node_1# show atm_backup server-status
```

Node_1# sh atm_backup server-status

<table>
<thead>
<tr>
<th>Id</th>
<th>Last Check</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>186 s</td>
<td>File server ready</td>
</tr>
<tr>
<td>2</td>
<td>1 s</td>
<td>SSH no route to host</td>
</tr>
</tbody>
</table>

Table 2: Parameter definitions from the show atm_backup server-status command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scheduled Backup</td>
<td>Indicates whether AMF backup scheduling is enabled or disabled.</td>
</tr>
<tr>
<td>Schedule</td>
<td>Displays the configured backup schedule.</td>
</tr>
<tr>
<td>Next Backup Time</td>
<td>Displays the date and time of the next scheduled.</td>
</tr>
<tr>
<td>Backup Medium</td>
<td>The current backup medium in use. This will be one of USB, SD, or NONE. Note that the USB will take precedence over the SD card. Utilized and available memory (MB) will be indicated if backup media memory is present.</td>
</tr>
<tr>
<td>Current Action</td>
<td>The task that the AMF backup mechanism is currently performing. This will be a combination of either (Idle, Starting, Doing, Stopping), or (manual, scheduled).</td>
</tr>
<tr>
<td>Started</td>
<td>The date and time that the currently executing task was initiated in the format DD MMM YYYY.</td>
</tr>
<tr>
<td>Current Node</td>
<td>The name of the node that is currently being backed up.</td>
</tr>
<tr>
<td>Node Name</td>
<td>The name of the node that is storing backup data - on its backup media.</td>
</tr>
<tr>
<td>Date</td>
<td>The data of the last backup in the format DD MMM YYYY.</td>
</tr>
<tr>
<td>Time</td>
<td>The time of the last backup in the format HH:MM:SS.</td>
</tr>
<tr>
<td>In AMF</td>
<td>Whether the node shown is active in the AMF network, (Yes or No).</td>
</tr>
<tr>
<td>Status</td>
<td>The output can contain one of four values:</td>
</tr>
<tr>
<td></td>
<td>&quot;-&quot; meaning that the status file cannot be found or cannot be read.</td>
</tr>
<tr>
<td></td>
<td>&quot;Errors&quot; meaning that there are issues - note that the backup may still be deemed successful depending on the errors.</td>
</tr>
<tr>
<td></td>
<td>&quot;Stopped&quot; meaning that the backup attempt was manually aborted;</td>
</tr>
<tr>
<td></td>
<td>&quot;Good&quot; meaning that the backup was completed successfully.</td>
</tr>
<tr>
<td>Log File Location</td>
<td>All backup attempts will generate a result log file in the identified directory based on the node name. In the above example this would be: card/amf/office/logs/rsync_amf_testbox1.log.</td>
</tr>
<tr>
<td>Log Details</td>
<td>The contents of the backup log file.</td>
</tr>
<tr>
<td>server-status</td>
<td>Displays connectivity diagnostics information for each configured remove file server.</td>
</tr>
</tbody>
</table>

Related Commands  
show atm
atmf network-name
show atmf detail

This command displays details about an AMF node. It can only be run on amf master nodes.

Syntax  show atmf [detail]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>detail</td>
<td>Displays output in greater depth.</td>
</tr>
</tbody>
</table>

Mode  Privileged Exec

Example 1  To display the AMF node1 information in detail, use the command:

```
node1# show atmf detail
```

A typical output screen from this command is shown below:

```
node1# show atmf detail
ATMF Detail Information
Network Name : ATMF_NET
Node Name    : Admin2
Node Address : Admin2.atmf
Node ID      : 15
Node Depth   : 0
Domain State : DomainController
Recovery State: None
Management VLAN
VLAN ID      : 4092
Management Subnet : 172.31.0.0
Management IP Address : 172.31.0.1
Management Mask : 255.255.128.0
Domain VLAN
VLAN ID      : 4091
Domain Subnet : 172.31.128.0
Domain IP Address : 172.31.128.1
Domain Mask : 255.255.128.0
```

Table 3: Parameter definitions from the show atmf details command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMF Status</td>
<td>The Node's AMF status, either Enabled or Disabled.</td>
</tr>
<tr>
<td>Network Name</td>
<td>The AMF network that a particular node belongs to.</td>
</tr>
<tr>
<td>Node Name</td>
<td>The name assigned to a particular node.</td>
</tr>
<tr>
<td>Role</td>
<td>The role configured for this AMF device, either Master or Member.</td>
</tr>
<tr>
<td>Current ATMF Nodes</td>
<td>The count of AMF nodes in an AMF Network.</td>
</tr>
<tr>
<td>Node Address</td>
<td>An Address used to access a remotely located node. This is simply the Node Name plus the dotted suffix atmf (.atmf).</td>
</tr>
<tr>
<td>Node ID</td>
<td>A Unique identifier assigned to a Node on an AMF network.</td>
</tr>
<tr>
<td>Node Depth</td>
<td>The number of nodes in path from this node to level of the AMF root node. It can be thought of as the vertical depth of the AMF network from a particular node to the zero level of the AMF root node.</td>
</tr>
</tbody>
</table>
Domain State
The state of Node in a Domain in AMF network as Controller/Backup.

Recovery State
The AMF node recovery status. Indicates whether a node recovery is in progress on this device - Auto, Manual, or None.

Management VLAN
The VLAN created for traffic between Nodes of different domain (up/down links).
- VLAN ID - In this example VLAN 4092 is configured as the Management VLAN.
- Management Subnet - Network prefix for the subnet.
- Management IP Address - The IP address allocated for this traffic.
- Management Mask - The subnet mask used to create a subnet for this traffic (255.255.128.0).

Domain VLAN
The VLAN assigned for traffic between Nodes of same domain (crosslink).
- VLAN ID - In this example VLAN 4091 is configured as the domain VLAN.
- Domain Subnet - The subnet address used for this traffic.
- Domain IP Address - The IP address allocated for this traffic.
- Domain Mask - The subnet mask used to create a subnet for this traffic (255.255.128.0).

Device Type
The Product Series Name.

ATMF Master
'Y' if the node belongs to a Core domain.

SC
The Switch Configuration, C - Chassis(SBx81series), S - Stackable (VCS) and N - Standalone.

Parent
The a Node to which the current node has an active uplink.

Node Depth
The number of nodes in the path from this node to the Core domain.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain State</td>
<td>The state of Node in a Domain in AMF network as Controller/Backup.</td>
</tr>
<tr>
<td>Recovery State</td>
<td>The AMF node recovery status. Indicates whether a node recovery is in progress on this device - Auto, Manual, or None.</td>
</tr>
<tr>
<td>Management VLAN</td>
<td>The VLAN created for traffic between Nodes of different domain (up/down links).</td>
</tr>
<tr>
<td>Domain VLAN</td>
<td>The VLAN assigned for traffic between Nodes of same domain (crosslink).</td>
</tr>
<tr>
<td>Device Type</td>
<td>The Product Series Name.</td>
</tr>
<tr>
<td>ATMF Master</td>
<td>'Y' if the node belongs to a Core domain.</td>
</tr>
<tr>
<td>SC</td>
<td>The Switch Configuration, C - Chassis(SBx81series), S - Stackable (VCS) and N - Standalone.</td>
</tr>
<tr>
<td>Parent</td>
<td>The a Node to which the current node has an active uplink.</td>
</tr>
<tr>
<td>Node Depth</td>
<td>The number of nodes in the path from this node to the Core domain.</td>
</tr>
</tbody>
</table>
**show atmf group**

This command can be used to display the group membership within to a particular AMF node. It can also be used with the working-set command to display group membership within a working set.

Each node in the AMF is automatically added to the group that is appropriate to its hardware architecture, e.g. x510, x610. Nodes that are configured as masters are automatically assigned to the master group.

You can create arbitrary groups of AMF members based on your own selection criteria. You can then assign commands collectively to any of these groups.

**Syntax**

```
show atmf group [user-defined|automatic]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-defined</td>
<td>User-defined-group information display.</td>
</tr>
<tr>
<td>automatic</td>
<td>Automatic group information display.</td>
</tr>
</tbody>
</table>

**Default**

All groups are displayed

**Mode**

Privileged Exec

**Example 1**

To display group membership of node2, use the following command:

```
node2# show atmf group
```

A typical output screen from this command is shown below:

```
ATMF group information
master, x510
node2#
```

This screen shows that node2 contains the groups, master and x510. Note that although the node also contains the implicit groups, these do not appear in the show output.

**Example 2**

The following commands (entered on node2) will display all the automatic groups within the working set containing node-1 and all nodes that have been pre-defined to contain the sysadmin group:

First define the working-set:

```
Node-1# #atmf working-set node-1 group sysadmin
```
A typical output screen from this command is shown below:

```
ATMF group information
master, poe, x8100

node-1, node-2, node33, node-4, node-5, node-6:

ATMF group information
sysadmin, x8100
ATMF-Test-NETWORK[6]#
```

This confirms that the six nodes (node_1 to node6) are now members of the working-set and that these nodes reside within the AMF-Test-Network.

Note that to run this command, you must have previously entered the command “atmf working-set” on page 234. This can be seen from the network level prompt, which in this case is, ATM_Network[6]#.

**Figure 12: Sample output from the show atmf group command for a working set.**

```
ATMF_NETWORK[6]#show atmf group
node3, node4, node5, node6:

ATMF group information
edge_switches, x510
```

**Table 4: Parameter definitions from the show atmf group command for a working set**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMF group information</td>
<td>Displays a list of nodes and the groups that they belong to, for example:</td>
</tr>
<tr>
<td></td>
<td>■ master - Shows a common group name for Nodes configured as AMF masters.</td>
</tr>
<tr>
<td></td>
<td>■ Hardware Arch - Shows a group for all Nodes sharing a common Hardware architecture, e.g. x8100, x900, x610, for example.</td>
</tr>
<tr>
<td></td>
<td>■ User-defined - Arbitrary groups created by the user for AMF nodes.</td>
</tr>
</tbody>
</table>
### show atmf group members

This command will display all group memberships within an AMF working-set. Each node in the AMF working set is automatically added to automatic groups which are defined by hardware architecture, e.g. x510, x610. Nodes that are configured as masters are automatically assigned to the master group. User can define arbitrary groupings of AMF members based on their own criteria, which can be used to select groups of nodes.

**Syntax**

```
show atmf group members [user-defined|automatic]
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>user-defined</td>
<td>User defined group membership display.</td>
</tr>
<tr>
<td>automatic</td>
<td>Automatic group membership display.</td>
</tr>
</tbody>
</table>

**Mode**

Privileged Exec

**Example**

To display group membership of all nodes in a working-set, use the command:

```
ATMF_NETWORK[9]# show atmf group members
```

### Figure 13: Sample output from the show atmf group members command

#### ATMF Group membership

<table>
<thead>
<tr>
<th>Automatic Groups</th>
<th>Total Members</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>master</td>
<td>1</td>
<td>Building_1</td>
</tr>
<tr>
<td>poe</td>
<td>1</td>
<td>HW_Team1</td>
</tr>
<tr>
<td>x510</td>
<td>3</td>
<td>SW_Team1 SW_Team2 SW_Team3</td>
</tr>
<tr>
<td>x900</td>
<td>1</td>
<td>Bld1.Floor_2</td>
</tr>
<tr>
<td>x610</td>
<td>1</td>
<td>HW_Team1</td>
</tr>
<tr>
<td>x8100</td>
<td>2</td>
<td>Building_1 Building_2</td>
</tr>
</tbody>
</table>

#### ATMF Group membership

<table>
<thead>
<tr>
<th>User-defined Groups</th>
<th>Total Members</th>
<th>Members</th>
</tr>
</thead>
<tbody>
<tr>
<td>marketing</td>
<td>1</td>
<td>Bld1.Floor_1</td>
</tr>
<tr>
<td>software</td>
<td>3</td>
<td>SW_Team1 SW_Team2 SW_Team3</td>
</tr>
</tbody>
</table>

#### Table 5: Parameter definitions from the show atmf group members command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Groups</td>
<td>Lists the Automatic Groups and their nodal composition. The sample output shows AMF nodes based on same Hardware type or belonging to same Master group.</td>
</tr>
<tr>
<td>User-defined Groups</td>
<td>Shows grouping of AMF nodes in user defined groups.</td>
</tr>
<tr>
<td>Total Members</td>
<td>Shows the total number of members in each group.</td>
</tr>
<tr>
<td>Members</td>
<td>Shows the list of AMF Nodes in each group.</td>
</tr>
</tbody>
</table>

**Related Commands**

- show atmf group
- show atmf
- atmf group (membership)
show atmf links

This command displays brief information about AMF links on a switch, such as link status and adjacent nodes.

Provisioned node names will be displayed with a trailing * character, and will not have an entry under Adjacent Ifindex.

This command can only be run on amf master nodes.

**Syntax**  
```
show atmf links
```

**Mode**  
User Exec and Privileged Exec

**Example**  
To display the AMF links brief details, use the following command:
```
switch1# show atmf links brief
```

* = provisioned

---

### Table 6: Parameter definitions from the show atmf links brief command output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Port</td>
<td>Shows local port on the Node configured for AMF Network.</td>
</tr>
<tr>
<td>Link Type</td>
<td>Shows link type as Uplink/Downlink (parent and child) or Cross-link (nodes in same domain).</td>
</tr>
<tr>
<td>Port Status</td>
<td>Shows status of the local port on the Node as UP/DOWN.</td>
</tr>
</tbody>
</table>
AMF Commands

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Related Commands
no debug all
clear atmf links statistics
show atmf
show atmf nodes

Table 6: Parameter definitions from the show atmf links brief command output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATMF State</td>
<td>Shows AMF state of the local port:</td>
</tr>
<tr>
<td></td>
<td>■ Init - Link is down.</td>
</tr>
<tr>
<td></td>
<td>■ Hold - Link transitioned to up state, but waiting for hold period to ensure link is stable.</td>
</tr>
<tr>
<td></td>
<td>■ Incompatible - Neighbor rejected the link because of inconsistency in AMF configurations.</td>
</tr>
<tr>
<td></td>
<td>■ OneWay - Link is up and has waited the hold down period and now attempting to link to another unit in another domain</td>
</tr>
<tr>
<td></td>
<td>■ Full - Link hello packets are sent and received from its neighbor with its own node id.</td>
</tr>
<tr>
<td></td>
<td>■ Shutdown - Link has been shut down by user configuration.</td>
</tr>
<tr>
<td>Adjacent Node</td>
<td>Shows Adjacent AMF Node to this Node.</td>
</tr>
<tr>
<td>Adjacent IfIndex</td>
<td>Shows interface on the Adjacent AMF Node connected to this Node.</td>
</tr>
<tr>
<td>Link State</td>
<td>Shows state of AMF link Forwarding/Blocking.</td>
</tr>
</tbody>
</table>

Note: You can manage your show output, or make it more selective, by using a command modifier. For information on using show-command modifiers, see “Controlling “show” Command Output” in the “Getting Started” chapter of your switch’s Software Reference.
show atmf links detail

This command displays detailed information on all the links configured in the AMF network. It can only be run on amf master nodes.

**Syntax**

```
show atmf links [detail]
```

**Parameter**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>detail</td>
<td>Detailed AMF links information.</td>
</tr>
</tbody>
</table>

**Mode**

User Exec

**Example**

To display the AMF link details use this command:

```
switch1# show atmf links detail
```

The output from this command will display all the internal data held for AMF links.

**Figure 16: Sample output from the show atmf links detail command**

```
switch1# show atmf links details
ATMF Links Detail:
Port                               : sa1
Ifindex                            : 4501
VR ID                              : 0
Port Status                        : Up
Port State                         : Full
Port BPDU Receive Count            : 44441
Adjacent Node Name                 : Building_2
Adjacent Ifindex                   : 4501
Adjacent VR ID                     : 0
Adjacent MAC                       : 0014.2299.137d
Port Last Message Response         : 0
```
Figure 16: Sample output from the show atmf links detail command (cont.)

<table>
<thead>
<tr>
<th>Port</th>
<th>port2.0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ifindex</td>
<td>6002</td>
</tr>
<tr>
<td>VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Port Status</td>
<td>Down</td>
</tr>
<tr>
<td>Port State</td>
<td>Init</td>
</tr>
<tr>
<td>Port BPDU Receive Count</td>
<td>0</td>
</tr>
</tbody>
</table>

Link State Entries:

<table>
<thead>
<tr>
<th>Node.Ifindex</th>
<th>Building_2.4501 -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction ID</td>
<td>3 - 3</td>
</tr>
<tr>
<td>MAC Address</td>
<td>0014.2299.137d-</td>
</tr>
<tr>
<td>Link State</td>
<td>Full - Pull</td>
</tr>
</tbody>
</table>

Domain Nodes Tree:

<table>
<thead>
<tr>
<th>Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building_2</td>
</tr>
<tr>
<td>Links on Node</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Building_2.4501</td>
</tr>
<tr>
<td>Forwarding State</td>
</tr>
<tr>
<td>Forwarding</td>
</tr>
</tbody>
</table>

Crosslink Transaction Entries:

<table>
<thead>
<tr>
<th>Node</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building_2</td>
</tr>
<tr>
<td>Transaction ID</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Uplink Transaction ID</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

Uplink Information:

<table>
<thead>
<tr>
<th>Waiting for Sync</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction ID</td>
<td>3</td>
</tr>
<tr>
<td>Number of Links</td>
<td>0</td>
</tr>
<tr>
<td>Number of Local Uplinks</td>
<td>0</td>
</tr>
</tbody>
</table>

Uplink Information:

<table>
<thead>
<tr>
<th>Waiting for Sync</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction ID</td>
<td>3</td>
</tr>
<tr>
<td>Number of Links</td>
<td>0</td>
</tr>
<tr>
<td>Number of Local Uplinks</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Originating Node</th>
<th>Building_2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain</td>
<td>&quot;'s domain</td>
</tr>
<tr>
<td>Node</td>
<td>Building_2</td>
</tr>
<tr>
<td>Ifindex</td>
<td>0</td>
</tr>
<tr>
<td>VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>3</td>
</tr>
<tr>
<td>Flags</td>
<td>32</td>
</tr>
<tr>
<td>Domain Controller</td>
<td>-</td>
</tr>
<tr>
<td>Domain Controller MAC</td>
<td>0000.0000.0000</td>
</tr>
</tbody>
</table>
### Downlink Domain Information:

<table>
<thead>
<tr>
<th>Domain</th>
<th>Bld2_Floor_1's domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain Controller</td>
<td>Bld2_Floor_1</td>
</tr>
<tr>
<td>Domain Controller MAC</td>
<td>eccd.6d3f.fef7</td>
</tr>
<tr>
<td>Number of Links</td>
<td>2</td>
</tr>
<tr>
<td>Number of Links Up</td>
<td>2</td>
</tr>
<tr>
<td>Number of Links on This Node</td>
<td>1</td>
</tr>
<tr>
<td>Links are Blocked</td>
<td>0</td>
</tr>
<tr>
<td>Node Transaction List</td>
<td></td>
</tr>
<tr>
<td>Node Transaction List</td>
<td>Building_2</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>7</td>
</tr>
<tr>
<td>Domain List</td>
<td></td>
</tr>
<tr>
<td>Domain</td>
<td>Bld2_Floor_1's domain</td>
</tr>
<tr>
<td>Node</td>
<td>Building_2</td>
</tr>
<tr>
<td>Ifindex</td>
<td>5002</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>7</td>
</tr>
<tr>
<td>Flags</td>
<td>1</td>
</tr>
<tr>
<td>Domain</td>
<td>Bld2_Floor_1's domain</td>
</tr>
<tr>
<td>Node</td>
<td>Building_1</td>
</tr>
<tr>
<td>Ifindex</td>
<td>7002</td>
</tr>
<tr>
<td>Transaction ID</td>
<td>7</td>
</tr>
<tr>
<td>Flags</td>
<td>1</td>
</tr>
</tbody>
</table>

### Up/Downlink Ports Information

<table>
<thead>
<tr>
<th>Port</th>
<th>port1.3.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ifindex</td>
<td>7001</td>
</tr>
<tr>
<td>VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Port Status</td>
<td>Up</td>
</tr>
<tr>
<td>Port State</td>
<td>Full</td>
</tr>
<tr>
<td>Adjacent Node</td>
<td>Bld1_Floor_1</td>
</tr>
<tr>
<td>Adjacent Internal ID</td>
<td>4</td>
</tr>
<tr>
<td>Adjacent Ifindex</td>
<td>6001</td>
</tr>
<tr>
<td>Adjacent Board ID</td>
<td>290</td>
</tr>
<tr>
<td>Adjacent VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Adjacent MAC</td>
<td>0000.cd37.0ea4</td>
</tr>
<tr>
<td>Adjacent Domain Controller</td>
<td>Bld1_Floor_1</td>
</tr>
<tr>
<td>Adjacent Domain Controller MAC</td>
<td>0000.cd37.0ea4</td>
</tr>
<tr>
<td>Port Forwarding State</td>
<td>Blocking</td>
</tr>
<tr>
<td>Port BPDU Receive Count</td>
<td>0</td>
</tr>
<tr>
<td>Port Sequence Number</td>
<td>12</td>
</tr>
<tr>
<td>Port Adjacent Sequence Number</td>
<td>9</td>
</tr>
<tr>
<td>Port Last Message Response</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Port</th>
<th>port1.3.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ifindex</td>
<td>7002</td>
</tr>
<tr>
<td>VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Port Status</td>
<td>Up</td>
</tr>
<tr>
<td>Port State</td>
<td>Full</td>
</tr>
<tr>
<td>Adjacent Node</td>
<td>Bld2_Floor_1</td>
</tr>
<tr>
<td>Adjacent Internal ID</td>
<td>3</td>
</tr>
<tr>
<td>Adjacent Ifindex</td>
<td>5001</td>
</tr>
<tr>
<td>Adjacent Board ID</td>
<td>333</td>
</tr>
<tr>
<td>Adjacent VR ID</td>
<td>0</td>
</tr>
<tr>
<td>Adjacent MAC</td>
<td>eccd.6d3f.fef7</td>
</tr>
<tr>
<td>Adjacent Domain Controller</td>
<td>Bld2_Floor_1</td>
</tr>
<tr>
<td>Adjacent Domain Controller MAC</td>
<td>eccd.6d3f.fef7</td>
</tr>
<tr>
<td>Port Forwarding State</td>
<td>Blocking</td>
</tr>
<tr>
<td>Port BPDU Receive Count</td>
<td>0</td>
</tr>
<tr>
<td>Port Sequence Number</td>
<td>15</td>
</tr>
<tr>
<td>Port Adjacent Sequence Number</td>
<td>8</td>
</tr>
<tr>
<td>Port Last Message Response</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 7: Parameter definitions from the show atmfl links detail command output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Status</td>
<td>Shows status of the local port on the Node as UP/DOWN.</td>
</tr>
<tr>
<td>Adjacent Node</td>
<td>Shows Adjacent AMF Node to this Node.</td>
</tr>
<tr>
<td>Adjacent IfIndex</td>
<td>Shows interface on the Adjacent AMF Node connected to this Node.</td>
</tr>
<tr>
<td>Link State</td>
<td>Shows state of AMF link Forwarding/Blocking.</td>
</tr>
<tr>
<td>Crosslink Ports</td>
<td>Show details of all Crosslink ports on this Node:</td>
</tr>
<tr>
<td>Information</td>
<td>- Port - Name of the Port or static aggregation (sa&lt;*&gt;).</td>
</tr>
<tr>
<td></td>
<td>- IfIndex - Interface index for the crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- VR ID - Virtual router id for the crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- Port Status - Shows status of the local port on the Node as UP/DOWN.</td>
</tr>
<tr>
<td></td>
<td>- Port State - Same as AMF state as described above.</td>
</tr>
<tr>
<td></td>
<td>- Port BPDU Receive Count - The number of AMF protocol PDU’s received.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Node Name - name of the adjacent node in the domain.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent IfIndex - IfIndex of the adjacent node in the domain.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent VR ID - Virtual router id of the adjacent node in the domain.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent MAC - MAC address of the adjacent node in the domain.</td>
</tr>
<tr>
<td></td>
<td>- Port Last Message Response - Response from the remote neighbor to our AMF last hello packet.</td>
</tr>
<tr>
<td>Link State Entries</td>
<td>Show all the link state database entries:</td>
</tr>
<tr>
<td></td>
<td>- Node.IfIndex - Shows adjacent Node names and Interface index.</td>
</tr>
<tr>
<td></td>
<td>- Transaction ID - Shows transaction id of the current crosslink transaction.</td>
</tr>
<tr>
<td></td>
<td>- MAC Address - Shows adjacent Node MAC addresses.</td>
</tr>
<tr>
<td></td>
<td>- Link State - Shows AMF states of adjacent nodes on the link.</td>
</tr>
<tr>
<td>Domain Nodes Tree</td>
<td>Shows all the nodes in the domain:</td>
</tr>
<tr>
<td></td>
<td>- Node - Name of the node in the domain.</td>
</tr>
<tr>
<td></td>
<td>- Links on Node - Number of crosslinks on a vertex/node.</td>
</tr>
<tr>
<td></td>
<td>- Link no - Shows adjacent Node names and Interface index.</td>
</tr>
<tr>
<td></td>
<td>- Forwarding State - Shows state of AMF link Forwarding/Blocking.</td>
</tr>
<tr>
<td>Crosslink Transaction</td>
<td>Shows all the transaction entries:</td>
</tr>
<tr>
<td>Entries</td>
<td>- Node - Name of the AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Transaction ID - transaction id of the node.</td>
</tr>
<tr>
<td></td>
<td>- Uplink Transaction ID - transaction id of the remote node.</td>
</tr>
</tbody>
</table>
### Table 7: Parameter definitions from the show atmf links detail command output (cont.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uplink Information</strong></td>
<td></td>
</tr>
<tr>
<td>Show all uplink entries.</td>
<td></td>
</tr>
<tr>
<td>■ Waiting for Sync</td>
<td>Flag if uplinks are currently waiting for synchronization.</td>
</tr>
<tr>
<td>■ Transaction ID</td>
<td>Shows transaction id of the local node.</td>
</tr>
<tr>
<td>■ Number of Links</td>
<td>Number of up downlinks in the domain.</td>
</tr>
<tr>
<td>■ Number of Local Uplinks</td>
<td>Number of uplinks on this node to the parent domain.</td>
</tr>
<tr>
<td>■ Originating Node</td>
<td>Node originating the uplink information.</td>
</tr>
<tr>
<td>■ Domain</td>
<td>Name of the parent uplink domain.</td>
</tr>
<tr>
<td>■ Node</td>
<td>Name of the node in the parent domain, that is connected to the current domain.</td>
</tr>
<tr>
<td>■ Ifindex</td>
<td>Interface index of the parent node’s link to the current domain.</td>
</tr>
<tr>
<td>■ VR ID</td>
<td>Virtual router id of the parent node’s link to the current domain.</td>
</tr>
<tr>
<td>■ Flags</td>
<td>Used in domain messages to exchange the state:</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_DOWN</td>
<td>0</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_UP</td>
<td>1</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_BLOCK</td>
<td>2</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_NOT_PRESENT</td>
<td>4</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_NO_NODE</td>
<td>8</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_NOT_ACTIVE_PARENT</td>
<td>16</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_NOT_LINKS</td>
<td>32</td>
</tr>
<tr>
<td>■ ATMF_DOMAIN_FLAG_NO_CONFIG</td>
<td>64</td>
</tr>
<tr>
<td>■ Domain Controller</td>
<td>Domain Controller in the uplink domain.</td>
</tr>
<tr>
<td>■ Domain Controller MAC</td>
<td>MAC address of Domain Controller in uplink domain.</td>
</tr>
<tr>
<td><strong>Downlink Domain Information</strong></td>
<td></td>
</tr>
<tr>
<td>Shows all the downlink entries.</td>
<td></td>
</tr>
<tr>
<td>■ Domain</td>
<td>Name of the downlink domain.</td>
</tr>
<tr>
<td>■ Domain Controller</td>
<td>Controller of the downlink domain.</td>
</tr>
<tr>
<td>■ Domain Controller MAC</td>
<td>MAC address of the domain controller.</td>
</tr>
<tr>
<td>■ Number of Links</td>
<td>Total number of links to this domain from the Node.</td>
</tr>
<tr>
<td>■ Number of Links Up</td>
<td>Total number of links that are in UP state.</td>
</tr>
<tr>
<td>■ Number of Links on This Node</td>
<td>Number of links terminating on this node.</td>
</tr>
<tr>
<td>■ Links are Blocked</td>
<td>0 links are not blocked to the domain. 1 All links are blocked to the domain.</td>
</tr>
<tr>
<td><strong>Node Transaction List</strong></td>
<td>List of transactions from this downlink domain node.</td>
</tr>
<tr>
<td>■ Node</td>
<td>0 links are not blocked to the domain. 1 All links are blocked to the domain.</td>
</tr>
<tr>
<td>■ Transaction ID</td>
<td>Transaction id for this node.</td>
</tr>
<tr>
<td>■ Domain List</td>
<td>Shows list of nodes in the current domain and their links to the downlink domain.</td>
</tr>
<tr>
<td>■ Domain</td>
<td>Domain name of the downlink node.</td>
</tr>
<tr>
<td>■ Node</td>
<td>Name of the node in the current domain.</td>
</tr>
<tr>
<td>■ Ifindex</td>
<td>Interface index for the link from the node to the downlink domain.</td>
</tr>
<tr>
<td>■ Transaction ID</td>
<td>Transaction id of the node in the current domain.</td>
</tr>
<tr>
<td>■ Flags</td>
<td>As mentioned above.</td>
</tr>
</tbody>
</table>

AMF Commands
Table 7: Parameter definitions from the show atmf links detail command output (cont.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up/Downlink Ports Information</td>
<td>Shows all the configured up and down link ports on this node:</td>
</tr>
<tr>
<td></td>
<td>- Port - Name of the local port.</td>
</tr>
<tr>
<td></td>
<td>- Ifindex - Interface index of the local port.</td>
</tr>
<tr>
<td></td>
<td>- VR ID - Virtual router id for the local port.</td>
</tr>
<tr>
<td></td>
<td>- Port Status - Shows status of the local port on the Node as UP/DOWN.</td>
</tr>
<tr>
<td></td>
<td>- Port State - AMF state of the local port.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Node - nodename of the adjacent node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Internal ID - Unique node identifier of the remote node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Ifindex - Interface index for the port of adjacent AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Board ID - Product identifier for the adjacent node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent VR ID - Virtual router id for the port on adjacent AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent MAC - MAC address for the port on adjacent AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Domain Controller - nodename of the Domain controller for Adjacent AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Adjacent Domain Controller MAC - MAC address of the Domain controller for Adjacent AMF node.</td>
</tr>
<tr>
<td></td>
<td>- Port Forwarding State - Local port forwarding state Forwarding or Blocking.</td>
</tr>
<tr>
<td></td>
<td>- Port BPDU Receive Count - count of AMF protocol PDU's received.</td>
</tr>
<tr>
<td></td>
<td>- Port Sequence Number - hello sequence number, incremented every time the data in the hello packet changes.</td>
</tr>
<tr>
<td></td>
<td>- Port Adjacent Sequence Number - remote ends sequence number used to check if we need to process this packet or just note it arrived.</td>
</tr>
<tr>
<td></td>
<td>- Port Last Message Response - response from the remote neighbor to our last hello packet.</td>
</tr>
</tbody>
</table>

Related Commands
- no debug all
- clear atmf links statistics
- show atmf
show atmf links statistics

This command displays details of the AMF links configured on the device and also displays statistics about the AMF packet exchanges between the devices.

It is also possible to display the AMF link configuration and packet exchange statistics for a specified interface.

This command can only be run on amf master nodes

Syntax

show atmf links statistics [interface [port_number]]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>interface</td>
<td>Specifies that the command applies to a specific interface (port) or range of ports. Where both the interface and port number are unspecified, full statistics (not just those relating to ports) will be displayed.</td>
</tr>
<tr>
<td>&lt;port_number&gt;</td>
<td>Enter the port number for which statistics are required. A port range or a static channel can also be specified. Where no port number is specified, statistics will be displayed for all ports on the switch.</td>
</tr>
</tbody>
</table>

Mode

User Exec

Example 1

To display AMF link statistics for the whole switch, use the command:

```
switch1# show atmf links statistics
```
Example 2 To display the AMF links statistics on interface port1.1.5, use the command:

```
switch1# show atmf links statistics interface port1.1.5
```

Figure 18: Sample output from the show atmf links statistics command for interface 1.1.5
### Table 8: Parameter definitions from the show atmf links statistics command output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive</td>
<td>Shows a count of AMF protocol packets received per message type.</td>
</tr>
<tr>
<td>Transmit</td>
<td>Shows the number of AMF protocol packets transmitted per message type.</td>
</tr>
<tr>
<td>Database Entries</td>
<td>Shows the number of AMF elements existing in the distributed database.</td>
</tr>
<tr>
<td>Database Full Ages</td>
<td>Shows the number of times the entries aged in the database.</td>
</tr>
<tr>
<td>ATMF Packet Discards</td>
<td>Shows the number of discarded packets of each type:</td>
</tr>
<tr>
<td></td>
<td>- Type0: The number of discarded crosslink hello msgs received on a non crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- Type1: The number of discarded tx update packets - bad checksum.</td>
</tr>
<tr>
<td></td>
<td>- Type2: The number of discarded tx update bitmap packets - bad checksum.</td>
</tr>
<tr>
<td></td>
<td>- Type3: The number of discarded tx update packets - neighbor not in the correct state.</td>
</tr>
<tr>
<td></td>
<td>- Type4: The number of discarded update packets - bad checksum.</td>
</tr>
<tr>
<td></td>
<td>- Type5: The number of discarded update bitmap packets - bad checksum.</td>
</tr>
<tr>
<td></td>
<td>- Type6: The number of discarded crosslink hello msgs received on a non crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- Type7: The number of discarded crosslink hello msg received on a port that is not in the correct state.</td>
</tr>
<tr>
<td></td>
<td>- Type8: The number of discarded crosslink domain hello msgs received on a non crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- Type9: The number of discarded crosslink domain hello msgs received on a port that is not in the correct state.</td>
</tr>
<tr>
<td></td>
<td>- Type10: The number of crosslink uplink hello msgs received on a non crosslink port.</td>
</tr>
<tr>
<td></td>
<td>- Type11: The number of discarded crosslink uplink hello msgs ignored on a port that is not in the correct state.</td>
</tr>
<tr>
<td></td>
<td>- Type12: The number of messages with an incorrect name for this AMF network.</td>
</tr>
<tr>
<td></td>
<td>- Type13: The number of messages with a bad protocol version received on a port.</td>
</tr>
<tr>
<td></td>
<td>- Type14: The number of messages with a bad packet checksum calculation received on a port.</td>
</tr>
<tr>
<td></td>
<td>- Type15: The number of messages with a bad authentication type received on a port.</td>
</tr>
<tr>
<td></td>
<td>- Type16: The number of messages with a bad simple password received on a port.</td>
</tr>
<tr>
<td></td>
<td>- Type17: The number of messages with an unsupported authentication type received on a port.</td>
</tr>
<tr>
<td></td>
<td>- Type18: The number of messages with a bad over-long packets received on a port.</td>
</tr>
<tr>
<td>Related Commands</td>
<td><code>no debug all</code></td>
</tr>
<tr>
<td></td>
<td><code>clear atmf links statistics</code></td>
</tr>
<tr>
<td></td>
<td><code>show atmf</code></td>
</tr>
</tbody>
</table>
show atmf memory

This command displays a summary of the AMF memory usage. It can only be run on amf master nodes.

Syntax
show atmf memory

Mode
User Exec

Example
To display AMF memory allocations on Node_1, use the command:

node_1# show atmf memory

Figure 19: Sample output from the show atmf memory command

```
node_1#show atmf memory
ATMF Memory Allocation:
Total memory allocated : 30020 (bytes)
Total memory allocations : 77
Line 1238 number 1 memory 28 (bytes)
Line 244 number 2 memory 88 (bytes)
Line 3753 number 2 memory 1872 (bytes)
Line 1616 number 8 memory 320 (bytes)
Line 1391 number 1 memory 60 (bytes)
Line 1837 number 15 memory 600 (bytes)
Line 288 number 1 memory 17716 (bytes)
Line 3916 number 1 memory 1520 (bytes)
Line 1623 number 8 memory 320 (bytes)
Line 4477 number 1 memory 1520 (bytes)
Line 659 number 2 memory 512 (bytes)
Line 1844 number 6 memory 600 (bytes)
Line 1749 number 1 memory 32 (bytes)
Line 203 number 6 memory 600 (bytes)
Line 4205 number 1 memory 1520 (bytes)
Line 206 number 4 memory 1524 (bytes)
Line 549 number 1 memory 232 (bytes)
Line 3495 number 1 memory 56 (bytes)
Line 2628 number 2 memory 72 (bytes)
Line 678 number 1 memory 32 (bytes)
Line 1423 number 1 memory 48 (bytes)
Line 1733 number 3 memory 492 (bytes)
Line 1611 number 8 memory 256 (bytes)
```
### Figure 19: Sample output from the show atmf memory command (cont.)

ATMF Memory Deallocation:

<table>
<thead>
<tr>
<th>Line</th>
<th>number</th>
<th>memory</th>
<th>bytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1395</td>
<td>4</td>
<td>400</td>
<td>bytes</td>
</tr>
<tr>
<td>1956</td>
<td>1</td>
<td>164</td>
<td>bytes</td>
</tr>
<tr>
<td>1247</td>
<td>1</td>
<td>52</td>
<td>bytes</td>
</tr>
<tr>
<td>876</td>
<td>2</td>
<td>80</td>
<td>bytes</td>
</tr>
<tr>
<td>166</td>
<td>1</td>
<td>232</td>
<td>bytes</td>
</tr>
<tr>
<td>415</td>
<td>7</td>
<td>587</td>
<td>bytes</td>
</tr>
<tr>
<td>418</td>
<td>3</td>
<td>300</td>
<td>bytes</td>
</tr>
<tr>
<td>822</td>
<td>2</td>
<td>80</td>
<td>bytes</td>
</tr>
<tr>
<td>2341</td>
<td>4</td>
<td>160</td>
<td>bytes</td>
</tr>
<tr>
<td>3025</td>
<td>2</td>
<td>88</td>
<td>bytes</td>
</tr>
<tr>
<td>144</td>
<td>3</td>
<td>1596</td>
<td>bytes</td>
</tr>
<tr>
<td>146</td>
<td>6</td>
<td>312</td>
<td>bytes</td>
</tr>
<tr>
<td>2349</td>
<td>4</td>
<td>160</td>
<td>bytes</td>
</tr>
<tr>
<td>1111</td>
<td>1</td>
<td>59</td>
<td>bytes</td>
</tr>
<tr>
<td>1393</td>
<td>4</td>
<td>688</td>
<td>bytes</td>
</tr>
</tbody>
</table>

------------------------------
| Total memory in use | 4958 (bytes) |
| Total memory items  | 45           |

---
show atmf nodes

This command displays all nodes currently configured within the AMF network. It displays a topographical representation of the network infrastructure.

This command displays a summary of all virtual links currently in the running configuration.

**Syntax**

`show atmf nodes`

**Mode**

Privileged Exec

**Example**

To display AMF information for all nodes in the AMF, use the command:

```
node_1# show atmf nodes
```

Figure 20: Sample output from the show atmf nodes command.

```
node1#show atmf nodes

Node Information:
* = Local device
SC = Switch Configuration:
C = Chassis  S = Stackable  N = Standalone

<table>
<thead>
<tr>
<th>Node Name</th>
<th>Device Type</th>
<th>ATMF Master</th>
<th>SC</th>
<th>Parent</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building_1</td>
<td>AT-SBx8112</td>
<td>Y</td>
<td>C</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>* Building_2</td>
<td>x900-12XT/S</td>
<td>Y</td>
<td>N</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Bld1_Floor_1</td>
<td>SwitchBlade</td>
<td>N</td>
<td>S</td>
<td>Building_1</td>
<td>1</td>
</tr>
<tr>
<td>Bld1_Floor_2</td>
<td>x600-24Ts/XP</td>
<td>N</td>
<td>N</td>
<td>Building_1</td>
<td>1</td>
</tr>
<tr>
<td>Bld2_Floor_1</td>
<td>x610-24Ts-POE+</td>
<td>N</td>
<td>N</td>
<td>Building_1</td>
<td>1</td>
</tr>
<tr>
<td>SW_Team1</td>
<td>x210-24GT</td>
<td>N</td>
<td>N</td>
<td>Bld1_Floor_2</td>
<td>2</td>
</tr>
</tbody>
</table>

Current ATMF node count 8
```
**show atmf provision nodes**

This command displays information about each provisioned node with details about date and time of creation, boot and configuration files available in the backup, and license files present in the provisioned backup. This includes nodes that have joined the network but are yet to run their first backup.

This command can only be run on amf master nodes.

**Syntax**

```
show atmf provision nodes
```

**Mode**

Privileged Exec

**Usage**

This command is only available on master nodes in the AMF network. The command will only work if provisioned nodes have already been set up. Otherwise, an error message is shown when the command is run.

**Example**

To show the details of all the provisioned nodes in the backup use the command:

```
switch1#show atmf provision nodes
```

---

**Figure 21: Sample output from the show atmf provision nodes command**

```
switch1#show atmf provision nodes

ATMF Provisioned Node Information:
Backup Media .............: SD (Total 3827.0MB, Free 3481.1MB)
Node Name                 : switch2
Date & Time               : 06-May-2014 & 23:25:44
Provision Path            : card:/atmf/provision_nodes
Boot configuration :
Current boot image        : x510-1766_atmf_backup.rel (file exists)
Backup boot image         : x510-main-20140113-2.rel (file exists)
Default boot config       : flash:/default.cfg (file exists)
Current boot config       : flash:/abc.cfg (file exists)
Backup boot config        : flash:/xyz.cfg (file exists)
Software Licenses :
Repository file           : ./.configs/.sw_v2.lic
Certificate file          : card:/atmf/nodes/awplus1/flash/.atmf-lic-cert
```

**Related commands**

- atmf provision node create
- atmf provision node clone
- atmf provision node configure boot config
- atmf provision node configure boot system
- show atmf backup
show atmf tech

This command collects and displays all the AMF command output. The command can thus be used to display a complete picture of an AMF network.

**Syntax**  
show atmf tech

**Mode**  
Privileged Exec

**Example**  
To display output for all AMF commands, use the command:

```
NodeName# show atmf tech
```

*Figure 22: Sample output from the show atmf tech command.*

```
nodel#show atmf tech
ATMF Summary Information:
ATMF Status : Enabled
Network Name : ATMF_NET
Node Name : nodel
Role : Master
Current ATMF Nodes : 8
ATMF Technical information:
Network Name : ATMF_NET
Domain : nodel's domain
Node Depth : 0
Domain Flags : 0
Authentication Type : 0
MAC Address : 0014.2299.137d
Board ID : 287
Domain State : DomainController
Domain Controller : nodel
Backup Domain Controller : node2
Domain controller MAC : 0014.2299.137d
Parent Domain : -
Parent Domain Controller : -
Parent Domain Controller MAC : 0000.0000.0000
Number of Domain Events : 0
Crosslink Ports Blocking : 0
Uplink Ports Waiting on Sync : 0
Crosslink Sequence Number : 7
Domains Sequence Number : 28
Uplink Sequence Number : 0
Number of Crosslink Ports : 1
Number of Domain Nodes : 2
Number of Neighbors : 5
Number of Non Broadcast Neighbors : 3
Number of Link State Entries : 1
Number of Up Uplinks : 0
Number of Up Uplinks on This Node : 0
DBE Checksum : 84fc6
Number of DBE Entries : 0
Management Domain Ifindex : 4391
Management Domain VLAN : 4091
Management ifindex : 4392
Management VLAN : 4092
...
...
```
### Table 9: Parameter definitions from the show atmf tech command

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATMF Status</strong></td>
<td>Shows status of AMF feature on the Node as Enabled/Disabled.</td>
</tr>
<tr>
<td><strong>Network Name</strong></td>
<td>The name of the AMF network to which this node belongs.</td>
</tr>
<tr>
<td><strong>Node Name</strong></td>
<td>The name assigned to the node within the AMF network.</td>
</tr>
<tr>
<td><strong>Role</strong></td>
<td>The role configured on the switch within the AMF - either master or member.</td>
</tr>
<tr>
<td><strong>Current ATMF Nodes</strong></td>
<td>A count of the AMF nodes in the AMF network.</td>
</tr>
<tr>
<td><strong>Node Address</strong></td>
<td>The identity of a node (in the format name.atmf) that enables its access it from a remote location.</td>
</tr>
<tr>
<td><strong>Node ID</strong></td>
<td>A unique identifier assigned to an AMF node.</td>
</tr>
<tr>
<td><strong>Node Depth</strong></td>
<td>The number of nodes in path from this node to the core domain.</td>
</tr>
<tr>
<td><strong>Domain State</strong></td>
<td>A node's state within an AMF Domain - either controller or backup.</td>
</tr>
<tr>
<td><strong>Recovery State</strong></td>
<td>The AMF node recovery status. Indicates whether a node recovery is in progress on this device - either Auto, Manual, or None.</td>
</tr>
<tr>
<td><strong>Management VLAN</strong></td>
<td>The VLAN created for traffic between nodes of different domains (up/down links). VLAN ID - In this example VLAN 4092 is configured as the Management VLAN. Management Subnet - the Network prefix for the subnet. Management IP Address - the IP address allocated for this traffic. Management Mask - the Netmask used to create a subnet for this traffic 255.255.128.0 (= prefix /17)</td>
</tr>
<tr>
<td><strong>Domain VLAN</strong></td>
<td>The VLAN assigned for traffic between Nodes of same domain (crosslink). VLAN ID - In this example VLAN 4091 is configured as the domain VLAN. Domain Subnet - the Subnet address used for this traffic. Domain IP Address - the IP address allocated for this traffic. Domain Mask - the Netmask used to create a subnet for this traffic 255.255.128.0 (= prefix /17)</td>
</tr>
<tr>
<td><strong>Device Type</strong></td>
<td>Shows the Product Series Name.</td>
</tr>
<tr>
<td><strong>ATMF Master</strong></td>
<td>Indicates the nodes membership of the core domain (membership is indicated by Y)</td>
</tr>
<tr>
<td><strong>SC</strong></td>
<td>Shows switch configuration: ■ C - Chassis (such as SBx8100 series) ■ S - Stackable (VCS) ■ N - Standalone</td>
</tr>
<tr>
<td><strong>Parent</strong></td>
<td>A node to which connects to the present node's uplink, i.e. one layer higher in the hierarchy.</td>
</tr>
<tr>
<td><strong>Node Depth</strong></td>
<td>Shows the number of nodes in path from the current node to the Core domain.</td>
</tr>
</tbody>
</table>

**Note**: The show atmf tech command can produce very large output. For this reason only the most significant terms are defined in this table.
**show atmf working-set**

This command displays the nodes that form the current AMF working-set.

**Syntax**

```
show atmf working-set
```

**Mode**

Privileged Exec

**Example**

To show current members of the working-set, use the command:

```
ATMF_NETWORK[6]# show atmf working-set
```

**Figure 23: Sample output from the show atmf working-set command.**

```
ATMF Working Set Nodes:
node1, node2, node3, node4, node5, node6
Working set contains 6 nodes
```

**Related Commands**

- `atmf working-set`
- `show atmf`
- `show atmf group`
show debugging atmf

This command shows the debugging modes status for AMF.

**Syntax**
```
show debugging atmf
```

**Mode**
User Exec and Global Configuration

**Example**
To display the AMF debugging status, use the command:

```
node_1# show debugging atmf
```

Figure 24: Sample output from the show debugging atmf command.

```
node1# show debugging atmf
ATMF debugging status:
ATMF link debugging is on
ATMF crosslink debugging is on
ATMF database debugging is on
ATMF neighbor debugging is on
ATMF packet debugging is on
ATMF error debugging is on
```

**Related Commands**
`debug atmf packet`
show debugging atmf packet

This command shows details of AMF Packet debug command.

**Syntax**

```
show debugging atmf packet
```

**Mode**

User Exec and Global Configuration

**Example**

To display the AMF packet debugging status, use the command:

```
node_1# show debug atmf packet
```

Figure 25: Sample output from the show debugging atmf packet command.

```
ATMF packet debugging is on
=== ATMF Packet Debugging Parameters===
Node Name: x900
Port name: port1.0.1
Limit: 500 packets
Direction: TX
Info Level: Level 2
Packet Type Bitmap:
  2. Crosslink Hello BPDU pkt with downlink domain info
  3. Crosslink Hello BPDU pkt with uplink info
  4. Down and up link Hello BPDU pkts
  6. Stack hello unicast pkts
  8. DBE request
  9. DBE update
 10. DBE bitmap update
```

**Related Commands**

- debug atmf
- debug atmf packet
show running-config atmf

This command displays the running system information that is specific to AMF.

**Syntax**
show running-config atmf

**Mode**
User Exec and Global Configuration

**Example**
To display the current configuration of AMF, use the following commands:

```
node_1# show running-config atmf
```
switchport atmf-crosslink

This command configures the selected port or (statically) aggregated link to be an AMF crosslink. Running this command will automatically place the port or static aggregator into trunk mode (i.e. switchport mode trunk).

The connection between two AMF masters must utilize a crosslink. Crosslinks are used to carry the AMF control information between master nodes. Multiple crosslinks can be configured between two master nodes, but only one crosslink can be active at any particular time. All other crosslinks between masters will be placed in the blocking state, in order to prevent broadcast storms.

Use the no variant of this command to remove any crosslink that may exist for the selected port or aggregated link.

Syntax

switchport atmf-crosslink

no switchport atmf-crosslink

Mode
Interface Configuration

Usage
Crosslinks can be used anywhere within an AMF network. They have the effect of separating the AMF network into separate domains.

Where this command is used, it is also good practice to use the switchport trunk native vlan command with its parameter “none” selected. This is to prevent a network storm on a topology of ring connected switches.

Example 1
To make a switchport 1.0.1 an AMF crosslink, use the following commands:

```
Node_1# configure terminal
Node_1(config)# interface port1.0.1
Node_1(config-if)# switchport atmf-crosslink
```

Example 2
This example is shown twice. Example 2A is the most basic command sequence. Example 2B is a good practice equivalent that avoids problems such as broadcast storms that can otherwise occur.

Example 2A
To make static aggregator sa1 an AMF crosslink, use the following commands:

```
Node_1# configure terminal
Node_1(config)# interface sal
Node_1(config-if)# switchport atmf-crosslink
```
Example 2B  To make static aggregator sa1 an AMF crosslink, use the following commands for good practice:

Node_1# configure terminal
Node_1(config)# interface sa1
Node_1(config-if)# switchport atmf-crosslink
Node_1(config-if)# switchport trunk allowed vlan add 2
Node_1(config-if)# switchport trunk native vlan none

In this example VLAN 2 is assigned to the static aggregator, and the native VLAN (VLAN 1) is explicitly excluded from the aggregated ports and the crosslink assigned to it.

Note  The AMF management and domain VLANs are automatically added to the aggregator and the crosslink.

Related Commands  show atmf links statistics
**switchport atmf-link**

This command enables you to configure a port or aggregator to be an AMF uplink/downlink. Running this command will automatically place the port or aggregator into trunk mode.

Use the `no` variant of this command to remove any AMF-link that may exist for the selected port or aggregated link.

**Syntax**

```
switchport atmf-link
no switchport atmf-link
```

**Mode** Interface Configuration

**Example** To make a switchport 1.0.1 an AMF crosslink, use the following commands

```
Node_1# configure terminal
Node_1(config)# interface port1.0.1
Node_1(config-if)# switchport atmf-link
```

**Example** To make a switchport 1.0.1 an AMF crosslink, use the following commands

```
Node_1# configure terminal
Node_1(config)# interface port1.2.1
Node_1(config-if)# switchport atmf-link
```
**type atmf node**

This command configures a trigger to be activated at an AMF node join event or leave event.

**Syntax**

```
type atmf node {join|leave}
```

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>join</td>
<td>AMF node join event.</td>
</tr>
<tr>
<td>leave</td>
<td>AMF node leave event.</td>
</tr>
</tbody>
</table>

**Mode**

Trigger Configuration

**Example 1**

To configure trigger 5 to activate at an AMF node leave event, use the following commands. In this example the command is entered on node-1:

```
node1(config)# trigger 5
node1(config-trigger) type atmf node leave
```

**Example 2**

The following commands will configure trigger 5 to activate if an AMF node join event occurs on any node within the working set:

```
node1# atmf working-set group all
```

This command returns the following display:

```
====================
node1, node2, node3:
====================
Working set join
```

Note that the running the above command changes the prompt from the name of the local node, to the name of the AMF-Network followed, in square brackets, by the number of member nodes in the working set.

```
AMF-Net[3]# conf t
AMF-Net[3](config)# trigger 5
AMF-Net[3](config-trigger)# type atmf node leave
AMF-Net[3](config-trigger)# description "E-mail on AMF Exit"
AMF-Net[3](config-trigger)# active
```

Enter the name of the script to run at the trigger event.

```
AMF-Net[3](config-trigger)# script 1 email_me.scp
AMF-Net[3](config-trigger)# end
```
Display the trigger configurations

```
AMF-Net[3]# show trigger
```

This command returns the following display:

```
node1:
```

<table>
<thead>
<tr>
<th>TR#</th>
<th>Type &amp; Details</th>
<th>Description</th>
<th>Ac</th>
<th>Te</th>
<th>Tr</th>
<th>Repeat</th>
<th>#Scr Days/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Periodic (2 min)</td>
<td>Periodic Status Chk</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Continuous</td>
<td>1 smtwtfs</td>
</tr>
<tr>
<td>005</td>
<td>ATMF node (leave)</td>
<td>E-mail on ATMF Exit</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Continuous</td>
<td>1 smtwtfs</td>
</tr>
</tbody>
</table>

```
Node2, Node3,
```

<table>
<thead>
<tr>
<th>TR#</th>
<th>Type &amp; Details</th>
<th>Description</th>
<th>Ac</th>
<th>Te</th>
<th>Tr</th>
<th>Repeat</th>
<th>#Scr Days/Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>005</td>
<td>ATMF node (leave)</td>
<td>E-mail on ATMF Exit</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Continuous</td>
<td>1 smtwtfs</td>
</tr>
</tbody>
</table>

Display the triggers configured on each of the nodes in the AMF Network.

```
AMF-Net[3]# show running-config trigger
```

This command returns the following display:

```
node1:
```

```
trigger 1
type periodic 2
script 1 atmf.scp
```

```
trigger 5
type atmf node leave
description "E-mail on ATMF Exit"
script 1 email_me.scp
```

```
Node2, Node3:
```

```
trigger 5
type atmf node leave
description "E-mail on ATMF Exit"
script 1 email_me.scp
```
undo atmf

This command is an alias for the no variant of the debug atmf command on page 236.
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Introduction

This release note describes the new features and enhancements in AlliedWare Plus software version 5.4.4 since version 5.4.3-0.1. For more information, see the Software Reference for your switch. Software file details for this version are listed in Table 1-1 below.

Caution: Software version 5.4.4 requires a release license. Ensure that you load your license certificate onto each switch before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- “Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 313 and
- “Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 315.

Table 1-1: Switch models and software file names

<table>
<thead>
<tr>
<th>Models</th>
<th>Series</th>
<th>Software File</th>
<th>GUI File</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210-9GT x210-16GT x210-24GT</td>
<td>x210</td>
<td>x210-5.4.4-0.1.rel</td>
<td>x210-gui_544_06.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td>IX5</td>
<td>IX5-5.4.4-0.1.rel</td>
<td>x510-gui_544_07.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>x510-28GTX x510-52GTX x510-28GPX x510-52GPX x510-28GSX x510DP-52GTX</td>
<td>x510</td>
<td>x510-5.4.4-0.1.rel</td>
<td>x510-gui_544_07.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>x610-24Ts x610-24Ts-PoE+ x610-24Ts/X x610-24Ts/X-PoE+ x610-24SPs/X x610-48Ts x610-48Ts-PoE+ x610-48Ts/X x610-48Ts/X-PoE+</td>
<td>x610</td>
<td>x610-5.4.4-0.1.rel</td>
<td>x610-gui_544_07.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>x900-12XT/x900-24XS x900-24XT</td>
<td>x900</td>
<td>x900-5.4.4-0.1.rel</td>
<td>x900-gui_544_07.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>SwitchBlade x908</td>
<td>SBx908</td>
<td>SBx908-5.4.4-0.1.rel</td>
<td>x900-gui_544_07.jar</td>
<td>03/2014</td>
</tr>
<tr>
<td>SwitchBlade x8106</td>
<td>SBx8100</td>
<td>SBx81CFC400-5.4.4-0.1.rel</td>
<td>SBx81CFC400_gui_544_07.jar</td>
<td>03/2014</td>
</tr>
</tbody>
</table>
Caution: Using a software version file for the wrong switch model may cause unpredictable results, including disruption to the network. Information in this release note is subject to change without notice and does not represent a commitment on the part of Allied Telesis, Inc. While every effort has been made to ensure that the information contained within this document and the features and changes described are accurate, Allied Telesis, Inc. can not accept any type of liability for errors in, or omissions arising from, the use of this information.
New Products

AlliedWare Plus version 5.4.4 supports the following products that are new since 5.4.3-0.1.

### x210 Series Enterprise Edge Switches

The x210 Series is a reliable and value-packed solution for today’s networks. With a choice of 9-port, 16-port and 24-port versions, each with one or more SFP uplinks, the x210 Series switches are ideal for applications at the edge of the network where security and manageability are the key requirements.

**Table 1: x210 Series models and port specifications**

<table>
<thead>
<tr>
<th>Product</th>
<th>10/100/1000T (RJ-45) Copper Ports</th>
<th>SFP and 10/100/1000T Combo Ports</th>
<th>100/1000X SFP Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210-9GT</td>
<td>8</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>x210-16GT</td>
<td>14</td>
<td>2</td>
<td>–</td>
</tr>
<tr>
<td>x210-24GT</td>
<td>20</td>
<td>4</td>
<td>–</td>
</tr>
</tbody>
</table>

For more information on the x210 Series switches, see the x210 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x210.

### x510-GPX Series Stackable Gigabit Switches with PoE+

x510 GPX Series switches deliver the full 30 Watts of PoE+, making them great for high power devices in enterprises, retail, government, universities and medical campuses.

The two switches in the series feature 24 or 48 x 10/100/1000T PoE ports and 4 x 10G/1G SFP+ uplink ports. They include two internal power supplies for high reliability, as well as VCStack™, allowing devices to be stacked to create highly resilient solutions that can be distributed over long distances. They deliver up to 30 Watts per port (PoE+), perfect for supporting standard as well as Pan/Tilt/Zoom video surveillance and security cameras, wireless access points, IP phones, RFID readers, automatic doors and other PoE-powered devices. This PoE option eliminates the need for power rewiring and minimizes the clutter of power supplies and adapters in awkward places.

**Table 2: x510-GPX Series models and port specifications**

<table>
<thead>
<tr>
<th>Product</th>
<th>10/100/1000T (RJ-45) Copper Ports</th>
<th>1/10Gigabit SFP+ Ports</th>
<th>10 Gigabit Stacking Ports</th>
<th>Max PoE+ Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>x510-28GPX</td>
<td>24</td>
<td>4 (2 if stacked)*</td>
<td>2*</td>
<td>24</td>
</tr>
<tr>
<td>x510-52GPX</td>
<td>48</td>
<td>4 (2 if stacked)*</td>
<td>2*</td>
<td>48</td>
</tr>
</tbody>
</table>
*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510-28GSX switch, see the x510 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x510.

**x510-28GSX Stackable Fiber Gigabit Switch**

The AT-x510-28GSX provides an advanced feature set for fiber networks, with 24 x 100/1000X fiber access ports and 4 x 1G/10G SFP+ uplink ports. Two internal power supplies provide high reliability, and the power of VCStack™ allows multiple units to create a single virtual device for a highly resilient solution that can be distributed over long distances. The AT-x510-28GSX is ideal for Network Service Providers, supporting fiber access solutions for FTTB (Fiber To The Building) or FTTH (Fiber To The Home), and is equally well-suited to enterprise customers who require total data security, or industrial applications, where the noise immunity of fiber connectivity provides a reliable network infrastructure.

<table>
<thead>
<tr>
<th>Product</th>
<th>100/1000X SFP Ports</th>
<th>1/10Gigabit SFP+ Ports</th>
<th>10 Gigabit Stacking Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>x510-28GSX</td>
<td>24</td>
<td>4 (2 if stacked)*</td>
<td>2*</td>
</tr>
</tbody>
</table>

*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510-28GSX switch, see the x510 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x510.

**x510DP-52GTX Stackable Gigabit Switch for Datacenters**

The AT-x510DP-52GTX is the ideal Datacenter Top-of-Rack (ToR) switch, featuring 48 x 10/100/1000T ports and 4 x 10G SFP+ uplink ports for high speed server and storage connectivity. Dual hot-swappable load-sharing AC or DC power supplies with optional reverse airflow guarantee maximum uptime. Allied Telesis VCStack allows multiple units to be connected as a single virtual chassis, creating a highly resilient solution with no single point of failure that can even be distributed over long distances. The AT-x510DP-52GTX is the perfect choice for critical Datacenter applications requiring uninterrupted service.

<table>
<thead>
<tr>
<th>Product</th>
<th>10/100/1000T (RJ-45) Copper Ports</th>
<th>1/10Gigabit SFP+ Ports</th>
<th>10 Gigabit Stacking Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td>x510DP-52GTX</td>
<td>48</td>
<td>4 (2 if stacked)*</td>
<td>2*</td>
</tr>
</tbody>
</table>
*Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the x510DP-52GTX switch, see the x510 Series Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/x510dp-52gtx.

**IX5-28GPX High Availability Video Surveillance PoE+ Switch**

The IX5-28GPX provides a high performing and scalable solution for today's networks. With 24 PoE+ enabled 10/100/1000Mbps ports, four 1/10 Gigabit uplinks, plus the ability to stack up to four units, the AT-IX5-28GPX is the ideal solution for video surveillance applications where high performance and resilient PoE power are critical.

<table>
<thead>
<tr>
<th>Table 5: IX5 port specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
</tr>
<tr>
<td>IX5-28GPX</td>
</tr>
</tbody>
</table>

* Stacking ports can be configured as additional 1G/10G Ethernet ports when the switch is not stacked.

For more information on the IX5-28GPX switch, see the IX5 Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/ix5-28gpx.

**XEM-24T for x900 Series and SBx908 Switches**

The XEM-24T expansion module provides 24 x 10/100/1000T copper ports, utilizing the latest RJ point five connectors to double the port density previously available.

**SwitchBlade x8106 Advanced Layer 3+ Chassis Switch**

The SwitchBlade® x8106 features 80Gbps non-blocking throughput to each line card slot, providing maximum performance and wirespeed delivery of critical IPv4 and IPv6 traffic. This compact, 4RU advanced Layer 3+ chassis switch features 6 slots and an included fan module.
The SwitchBlade x8106 is a compact, high-performing, scalable solution providing an extensive range of connectivity options. Dual control cards are partnered with four line cards, or a single control card can be used with five line cards. Gigabit and 10 Gigabit line card options ensure a system capable of meeting the requirements of today’s networks, and the flexibility to expand when required.

For more information on the SBx8106 switch, see the SBx8100 Data Sheet, Installation Guide and Software Reference. These documents are available from our website at alliedtelesis.com/switches/sbx8100.

SBx81CFC960 control card for SBx8100 Series

With SBx81CFC960 control cards, the SwitchBlade x8100 Series support advanced features and high-availability for a superior network core solution. Dual CFC960 control cards provide up to 160Gbps non-blocking throughput to each line card slot, for maximum performance. The CFC960 control card supports four 10G fiber SFP+ modules.

Two CFC960 based chassis can be stacked together into a single virtual unit using VCStack Plus™. This creates a powerful and completely resilient network core, which can even be distributed over long distance. Other powerful features such as VRF-Lite ensure a network solution that is scalable and ready to meet the demands of the large enterprise business.

Key new features in 5.4.4 for SBx8100 Series switches with CFC960 control cards

- Allied Telesis Management Framework (AMF) for simple management of your whole network. The CFC960 supports larger networks of up to 120 nodes.¹
- VCStack Plus to stack two chassis into a distributed virtual chassis with no single point of failure
- VRF-Lite
- BGP4+ for IPv6 ²

For information about the AlliedWare Plus features on the CFC960, see the AlliedWare Plus Software Reference for SwitchBlade x8100 Series Switches. For more information about the hardware, see the Installation Guides.

These documents are available from our website at alliedtelesis.com/switches/sbx8100.

SBx81GT40 line card for SBx8100 Series

The SBx81GT40 line card provides 40 Gigabit copper ports for maximum port density, using RJ point five connectors. Up to 400 ports can be deployed in a single SwitchBlade x8112 7RU chassis, allowing for the aggregation of densely populated networking devices.

¹. The CFC400 supports networks of up to 80 AMF nodes
². BGP4+ is also available on the CFC400
For more information about the SBx81GT40, see our website at alliedtelesis.com/switches/sbx8100.
Key New Features and Enhancements

Software version 5.4.4 includes all the new features that have been added to AlliedWare Plus since the release of 5.4.3-0.1. This includes all features that were released in 5.4.3 minor releases.

This section summarizes the key new features. For a list of all new and enhanced features and commands, see “Changes in this Version” on page 293. For more information about all features on the switch, see the Software Reference for your switch. Unless otherwise stated, all new features and enhancements are available on all switch models running this version of AlliedWare Plus.

Allied Telesis Management Framework

Allied Telesis Management Framework (AMF) is a sophisticated suite of management tools that provides a simplified approach to network management. Common tasks are automated or made so simple that the day-to-day running of a network can be achieved without the need for highly trained, and expensive, network engineers. Powerful features like centralized management, auto-backup, auto-upgrade, auto-provisioning and auto-recovery enable plug-and-play networking and zero-touch management.

Since its initial release in software version 5.4.3-1.4, AMF has been enhanced with features to increase its versatility, including the ability to work over WAN links and support for larger networks—up to 120 nodes.

VCStack Plus for SBx8100 Series with CFC960 Control Cards

VCStack Plus makes networking simple. It allows a pair of physically separate chassis switches to be connected together via high speed stacking links. This aggregates the switches, which then appear as a single switch, or ‘virtual chassis’.

The virtual chassis can be configured and managed via a single serial console or IP address, which provides greater ease of management in comparison to an arrangement of individually managed switches, and often eliminates the need to configure protocols like VRRP and Spanning Tree. It is a powerful and completely resilient network core, which can be distributed over a long distance.

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.

VRF-Lite is now available on SBx8112 and SBx8106 Chassis switches with CFC960 control cards, as well as SBx908, x900 Series, and x610 Series switches.

DHCP Relay and DNS Relay are also now VRF-Lite aware.
BGP4+

Border Gateway Protocol (BGP) for IPv6 is an exterior gateway protocol, often used between gateway hosts on the Internet. It enables gateways to exchange routing information and so to advertise, learn, and choose the best paths inside the Internet.

Software version 5.4.4 supports BGP4+ for IPv6, as well as BGP for IPv4. BGP4+ is supported on x610 Series, x900 Series, SwitchBlade x908, and SwitchBlade x8100 Series switches.

IPv6 Hardware ACLs

IPv6 hardware access-lists enable you to control the transmission of IPv6 packets on an interface, and to restrict the content of routing updates.

IPv6 hardware ACLs are now available on IX5-28GPX, x510 Series, and x610 Series switches, as well as SwitchBlade x908 and SwitchBlade x8100 Series switches.

Authentication Enhancements

Authentication now includes the following enhancements:

- Web Authorization Proxy—enables Web Authentication to apply the supplicant’s Web Proxy settings.
- Two-step Authorization—improves security by authenticating both the device and the user.

Port Flapping Detection

Port flapping detection will disable any ports that flap more than 15 times in less than 15 seconds. This limits the impact of an unreliable link.

Release Licensing

From software version 5.4.4 onwards, AlliedWare Plus software releases are licensed. Before upgrading your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license. For details, see:

- “Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 313 and
- “Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 315.
Important Considerations Before Upgrading to this Version

Licensing

For software version 5.4.4-0.1 to 5.4.4-0.3, AlliedWare Plus software releases require a license on all products. From software version 5.4.4-0.4 onwards, AlliedWare Plus software releases require a license on SBx8100 and SBx908 Series switches only.

Before upgrading your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.

For details, see:
- “Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 313 and
- “Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 315.

Upgrading a VCStack

This version supports VCStack “reboot rolling” upgrades. With the reboot rolling command, you can reduce downtime when upgrading a VCStack.

You can use the reboot rolling command to upgrade to any 5.4.4-0.x version from any 5.4.3-x.x version.

Forming or extending a VCStack

If you create a VCStack from switches that are running different software versions, auto-synchronization ensures that all members will run the same software version when they boot up.

Auto-synchronization is supported between all versions of 5.4.4-0.x. It is not supported between 5.4.4-0.x and earlier versions, such as 5.4.3-x.x.

Before you add a new switch to a stack, make sure the new switch’s software version is compatible with the stack’s version. If the new switch is running an incompatible version, it cannot join the stack until you have manually upgraded it.
AMF software version compatibility

We strongly recommend that all switches in an AMF network run the same software release. If this is not possible, switches running this minor version are compatible with switches running version 5.4.3-2.6 and later, or any 5.4.4-0.x version.

Upgrading all switches in an AMF network

This version supports upgrades across AMF networks. There are two methods for upgrading firmware on an AMF network:

- Reboot-rolling, which upgrades and reboots each switch in turn
- Distribute firmware, which upgrades each switch, but does not reboot them. This lets you reboot the switches at a minimally-disruptive time.

You can use either of these methods to upgrade to this minor software version.

You can use these methods to upgrade to this version from 5.4.3-2.6 and later.

In summary, the process for upgrading firmware on an AMF network is:

1. Copy the release .rel files for each switch family to the media location you intend to upgrade from (Flash memory, SD card, USB stick etc).
2. Decide which AMF upgrade method is most suitable.
3. Initiate the AMF network upgrade using the selected method. To do this:
   a. create a working-set of the switches you want to upgrade
   b. enter the command `atmf reboot-rolling <location>` or `atmf distribute-firmware <location>` where `<location>` is the location of the .rel files.
   c. Check the console messages to make sure that all switches are “release ready”. If they are, follow the prompts to perform the upgrade.
Changes in this Version

Table 6 below lists new and modified features in this version.

Table 7 on page 298 below lists all new and modified commands in this version and shows which chapter of the Software References has details of each command.

Table 8 on page 312 below lists new and modified SNMP (Simple Network Management Protocol) MIBs (Management Information Bases) in this version.

Note

In the following tables the product columns contain the pre-release indicators \( P \) and \( P^1 \):

\( P \) indicates that the change was introduced prior to software release 5.4.3.

\( P^1 \) indicates that the change was introduced in a 5.4.3 maintenance release such as 5.4.3-1.4.
### Table 6: New and modified features in 5.4.4

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>x210</th>
<th>IX5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allied Telesis Management Framework</td>
<td>New</td>
<td>Y</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>AMF Introduction and Configuration</td>
<td>The Allied Telesis Management Framework (AMF) is a suite of features that combine to simplify network management across all supported network switches from the core to the edge.</td>
</tr>
<tr>
<td>BGP4+</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>BGP and BGP4+ Introduction</td>
<td>Software version 5.4.4 supports the routing protocol BGP4+ for IPv6, as well as BGP for IPv4. BGP4+ is described in RFC 2283 (Multiprotocol Extensions for BGP-4).</td>
</tr>
</tbody>
</table>
### Table 6: New and modified features in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>x210</th>
<th>ix5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DHCP Operation With VRF Lite</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Internet Protocol (IP) Addressing and Protocols</td>
<td>You can now configure DHCP Relay to forward packets within a VRF Lite instance. DHCP messages between DHCP Clients and a DHCP Server are then able to be relayed between VLAN interfaces within a VRF Lite instance.</td>
</tr>
<tr>
<td><strong>DNS Operation With VRF Lite</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Internet Protocol (IP) Addressing and Protocols</td>
<td>When running VRF Lite, you can now configure DNS Relay functionality to be VRF aware. In this mode DNS Relay messages can be forwarded within specified VRF instances. VRF aware DNS services to remotely connected DNS clients is also supported. These VRF aware services include: ping, traceroute, telnet client, SSH client, and tcpdump.</td>
</tr>
<tr>
<td><strong>IPv6 Hardware ACLs</strong></td>
<td>New</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Access Control Lists Introduction</td>
<td>IPv6 hardware access-lists enable you to control the transmission of IPv6 packets on an interface, and to restrict the content of routing updates. IPv6 hardware ACLs are now available on your switch.</td>
</tr>
<tr>
<td><strong>Release Licenses</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Introduction and Configuration</td>
<td>From software version 5.4.4 onwards, AlliedWare Plus software releases are licensed. If you want to upgrade your software, please obtain a license from your authorized Allied Telesis support center. You will need to provide the MAC addresses of the switches you want to license.</td>
</tr>
<tr>
<td><strong>Secure USB</strong></td>
<td>New</td>
<td>N</td>
<td>p1</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P</td>
<td>P</td>
<td>Creating and Managing Files</td>
<td>Support for secure USB storage devices has been added.</td>
</tr>
<tr>
<td><strong>TACACS+</strong></td>
<td>New</td>
<td>p1</td>
<td>p1</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>TACACS+ Introduction and Configuration</td>
<td>Software version 5.4.4 supports TACACS+ on x210 Series switches. TACACS+ provides a method for securely managing multiple network access points from a single management service. It allows a device to forward a user's username and password to an authentication server to determine whether access can be allowed. In addition to this authentication service, TACACS+ can also provide authorization and accounting services.</td>
</tr>
</tbody>
</table>
## Table 6: New and modified features in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
<th>x210</th>
<th>iX5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-step Authentication</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Introduction and Configuration</td>
<td>Support for Two-step Authentication has been added. Two-step Authentication improves security by requiring two forms of authentication.</td>
</tr>
<tr>
<td>VCStack Plus</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>VCFP400</td>
<td>VCStack Plus Introduction</td>
<td>VCStack Plus is a pair of physically separate switches that are configured to operate as a single switch. Two chassis can be stacked together into a single virtual unit creating a powerful and completely resilient network core, which can be distributed over a long distance.</td>
</tr>
<tr>
<td>VRF Lite</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>VRF-Lite Introduction and Configuration</td>
<td>The Virtual Routing and Forwarding Lite (VRF-Lite) feature is now available on your switch.</td>
</tr>
<tr>
<td>Web Authorization Proxy</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Introduction and Configuration</td>
<td>Support for Web Authorization Proxy has been added.</td>
</tr>
</tbody>
</table>
If your existing configurations include commands modified or deprecated in this version (see the Status column), check whether you need to modify these configurations. For full command descriptions, modes and examples, see the appropriate Software Reference for your switch.
### Table 7: New and modified commands in 5.4.4

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x456</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>58908</th>
<th>589100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>show dot1x</strong></td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>802.1X Commands</td>
<td>This command displays authentication information for 802.1X port authentication. It now includes output for the new commands <code>auth connect-timeout period</code> and <code>auth two-step enable</code>.</td>
</tr>
<tr>
<td><strong>show dot1x interface</strong></td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>802.1X Commands</td>
<td>This command displays authentication information for 802.1X port authentication. It now includes output for the new commands <code>auth two-step enable</code> and <code>auth connect-timeout period</code>.</td>
</tr>
<tr>
<td><strong>show dot1x supplicant</strong></td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>802.1X Commands</td>
<td>This command displays the supplicant state of the authentication mode set for the switch. It now displays Two-step Authentication states.</td>
</tr>
<tr>
<td><strong>show dot1x supplicant interface</strong></td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>802.1X Commands</td>
<td>This command displays the supplicant state of the authentication mode set for the switch. It now displays Two-step Authentication states.</td>
</tr>
<tr>
<td><strong>atmf backup bandwidth</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command sets the maximum bandwidth when initiating an AMF backup.</td>
</tr>
<tr>
<td><strong>atmf distribute firmware</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command can be used to upgrade software one AMF node at a time. A URL can be selected from any media location. The latest compatible release for a node will be selected from this location.</td>
</tr>
<tr>
<td><strong>atmf log-verbose</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command limits the number of log messages displayed on the console or permanently logged.</td>
</tr>
<tr>
<td><strong>atmf virtual-link id ip remote-id remote-ip</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command creates one or more layer two tunnels that enable AMF nodes to transparently communicate across a wide area network using only layer two protocols.</td>
</tr>
<tr>
<td><strong>show atmf detail</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command displays details about an AMF node.</td>
</tr>
<tr>
<td><strong>show atmf diagnostics</strong></td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command displays diagnostic information for an entire AMF network.</td>
</tr>
</tbody>
</table>
# New and Enhanced Features in AlliedWare Plus 5.4.4

This document provides a list of new and modified commands in AlliedWare Plus 5.4.4, along with their descriptions and status information.

## Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>IX5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>S8908</th>
<th>S89100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show atmfw links</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command displays details about an AMF node.</td>
<td></td>
</tr>
<tr>
<td>show atmfw links statistics</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>In addition to its original function, this command is now also able to display the AMF link configuration and packet exchange statistics for a specified interface.</td>
<td></td>
</tr>
<tr>
<td>show atmfw memory</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command displays a summary of the AMF memory usage.</td>
<td></td>
</tr>
<tr>
<td>show atmfw nodes</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command displays all nodes currently configured within the AMF network by showing a topographical representation of the network infrastructure.</td>
<td></td>
</tr>
<tr>
<td>show atmfw tech</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This new command collects and displays all the AMF command output.</td>
<td></td>
</tr>
<tr>
<td>show debugging atm</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This command shows the debugging modes status for AMF.</td>
<td></td>
</tr>
<tr>
<td>show debugging atm packet</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>AMF Commands</td>
<td>This command shows details of AMF Packet debug command.</td>
<td></td>
</tr>
<tr>
<td>auth supplicant-mac</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command has a new parameter <code>skip-second-auth</code> that enables the second authorization to be skipped.</td>
<td></td>
</tr>
<tr>
<td>auth timeout connect-timeout</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command sets the connect-timeout period for the interface.</td>
<td></td>
</tr>
<tr>
<td>auth two-step enable</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command enables the two-step authentication feature on the interface.</td>
<td></td>
</tr>
<tr>
<td>auth-mac password</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command changes the password for MAC-based authentication. Changing the password increases the security of MAC-based authentication, because the default password is easy for an attacker to discover.</td>
<td></td>
</tr>
<tr>
<td>auth-web forward</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command has a new parameter called <code>ip-address</code> that enables forwarding to the specified destination IPv4 address.</td>
<td></td>
</tr>
<tr>
<td>auth-web-server dhcp-wpad-option</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command sets the DHCP WPAD option for the web authentication temporary DHCP service.</td>
<td></td>
</tr>
</tbody>
</table>
Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>IX5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>S68908</th>
<th>S88100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>auth-web-server intercept-port</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command registers any additional TCP port numbers that the web authentication server is to intercept.</td>
</tr>
<tr>
<td>copy proxy-autoconfig-file</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command downloads the proxy auto configuration (PAC) file to your switch.</td>
</tr>
<tr>
<td>erase proxy-autoconfig-file</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command removes the proxy auto configuration file.</td>
</tr>
<tr>
<td>show auth two-step supplicant brief</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command displays the supplicant state of the two-step authentication feature on the interface.</td>
</tr>
<tr>
<td>show auth-web</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command displays the authentication information for Web-based authentication. It now includes output for the new command auth two-step enable.</td>
</tr>
<tr>
<td>show auth-web-server</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command has new output showing the web authentication server configuration and status on the switch.</td>
</tr>
<tr>
<td>show proxy-autoconfig-file</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>p1</td>
<td>p1</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Authentication Commands</td>
<td>This command displays the contents of the proxy autoconfig (PAC) file.</td>
</tr>
<tr>
<td>address-family</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now enters the IPv6 Address Family Configuration command mode with the new ipv6 parameter, in addition to the IPv4 Address Family Configuration mode with the existing ipv4 parameter. In this mode you can configure address-family specific parameters.</td>
<td></td>
</tr>
<tr>
<td>aggregate-address</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command has been modified for BGP4+ to optionally use an IPv6 prefix and length to add an aggregate route that can be advertised to BGP4+ neighbors. This command creates an aggregate entry in the BGP4+ routing table if the switch learns, by any means, any routes that are within the range configured by the aggregate address/mask.</td>
<td></td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210 N</th>
<th>x310 N</th>
<th>x510 N</th>
<th>x610 P</th>
<th>x900 P</th>
<th>SBx908 P</th>
<th>SBx8100 P</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>bgp router-id</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command now configure the router identifier for BGP and BGP4+. Note you must specify an IPv4 address with this when used for BG4+.</td>
</tr>
<tr>
<td>clear bgp (ASN)</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>The <strong>unicast</strong> and <strong>multicast</strong> parameter options have been removed in this release.</td>
</tr>
<tr>
<td>clear bgp (IPv4 or IPv6 address)</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command now enables you to reset BGP4+ connections for specified peers, as well as BGP connections. The new option has been available since version 5.4.3-2.5.</td>
</tr>
<tr>
<td>clear bgp external</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>The <strong>unicast</strong> and <strong>multicast</strong> parameter options have been removed in this release.</td>
</tr>
<tr>
<td>clear bgp ipv6 (ASN)</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command enables you to reset the BGP4+ connections to all peers in a specified Autonomous System Number (ASN).</td>
</tr>
<tr>
<td>clear bgp ipv6 (ipv6 address)</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command resets the BGP4+ connection to the peer specified by the IP address.</td>
</tr>
<tr>
<td>clear bgp ipv6 dampening</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command clears route dampening information and unsuppress routes that have been suppressed routes.</td>
</tr>
<tr>
<td>clear bgp ipv6 external</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command resets the BGP4+ connections to all external peers.</td>
</tr>
<tr>
<td>clear bgp ipv6 flap-statistics</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command clears the flap count and history duration for the specified prefixes.</td>
</tr>
<tr>
<td>clear bgp ipv6 peer-group</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>This command resets BGP4+ connections to all members of a peer group.</td>
</tr>
<tr>
<td>clear ip bgp (IPv4)</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>IPv6 address and IPv4 address parameters are available with the <strong>clear ip bgp</strong> command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td>clear ip bgp dampening</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td>P1</td>
<td></td>
<td>The <strong>unicast</strong> and <strong>multicast</strong> parameter options have been removed in this release.</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4(cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>XS5</th>
<th>X510</th>
<th>X610</th>
<th>X900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>clear ip bgp flap-statistics</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>The <code>unicast</code> and <code>multicast</code> parameter options have been removed in this release.</td>
</tr>
<tr>
<td>clear ip bgp peer-group</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>The <code>unicast</code> and <code>multicast</code> parameter options have been removed in this release.</td>
</tr>
<tr>
<td>exit-address-family</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now exits either the IPv6 or the IPv4 Address Family Configuration command mode.</td>
</tr>
<tr>
<td>neighbor activate</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now enables the exchange of BGP IPv4 and BGP4+ IPv6 routes with a BGP or BGP4+ neighboring router, and also within an IPv4 or an IPv6 specific address-family.</td>
</tr>
<tr>
<td>neighbor advertisement-interval</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now sets up the minimum interval between sending the BGP or BGP4+ routing updates.</td>
</tr>
<tr>
<td>neighbor allowas-in</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now accepts am AS-path with the specified Autonomous System (AS) number from inbound updates for both BGP and BGP4+ routes.</td>
</tr>
<tr>
<td>neighbor as-origination-interval</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now enables the sending of AS (Autonomous System) origination routing updates to the specified BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td>neighbor attribute-unchanged</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now advertises unchanged BGP or BGP4+ attributes to the specified BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td>neighbor capability graceful-restart</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now configures the device to advertise the Graceful Restart Capability to BGP and BGP4+ neighbors.</td>
</tr>
<tr>
<td>neighbor capability orf prefix-list</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now advertises the OSF (Outbound Route Filters) capability to BGP and BGP4+ neighbors.</td>
</tr>
<tr>
<td>neighbor capability route-refresh</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now advertises the route-refresh capability to the specified BGP and BGP4+ neighbors.</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>IX5</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>neighbor collide-established</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command specifies a BGP or BGP4+ neighbor, which is already in an 'established' state, for conflict resolution when a TCP connection collision is detected.</td>
</tr>
<tr>
<td><code>neighbor default-originate</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now allows a BGP or BGP4+ local router to send the default route, 0.0.0.0, to a neighbor.</td>
</tr>
<tr>
<td><code>neighbor description</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now associates a description with a BGP or a BGP4+ neighbor.</td>
</tr>
<tr>
<td><code>neighbor disallow-infinite-holdtime</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now disallows the configuration of infinite holdtime for BGP and BGP4+.</td>
</tr>
<tr>
<td><code>neighbor distribute-list</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now filters route updates from a particular BGP or BGP4+ neighbor using an Access Control List (ACL).</td>
</tr>
<tr>
<td><code>neighbor dont-capability-negotiate</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now disables capability negotiation for BGP and BGP4+.</td>
</tr>
<tr>
<td><code>neighbor ebgp-multihop</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now accepts and attempts BGP and BGP4+ connections to external peers on indirectly connected networks.</td>
</tr>
<tr>
<td><code>neighbor enforce-multihop</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now enforces the requirement that BGP and BGP4+ neighbors form multihop connections.</td>
</tr>
<tr>
<td><code>neighbor filter-list</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now creates a BGP or a BGP4+ filter using an AS (Autonomous System) path list.</td>
</tr>
<tr>
<td><code>neighbor interface</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now configures the interface name of a BGP and a BGP4+ speaking neighbor.</td>
</tr>
<tr>
<td><code>neighbor local-as</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now configures a local AS number for the specified BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td><code>neighbor maximum-prefix</code></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now controls the number of prefixes that can be received from a BGP or a BGP4+ neighbor.</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>neighbor next-hop-self</strong></td>
<td>Modified</td>
<td></td>
<td>This command now configures the BGP or BGP4+ router as the next hop for a BGP or BGP4+ speaking neighbor or peer group.</td>
</tr>
<tr>
<td><strong>neighbor override-capability</strong></td>
<td>Modified</td>
<td></td>
<td>This command now overrides a capability negotiation result for BGP and BGP4+.</td>
</tr>
<tr>
<td><strong>neighbor passive</strong></td>
<td>Modified</td>
<td></td>
<td>This command now configures the local BGP or BGP4+ router to be passive to the specified BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td><strong>neighbor password</strong></td>
<td>Modified</td>
<td></td>
<td>This command now enables MD5 authentication on a TCP connection between BGP and BGP4+ neighbors.</td>
</tr>
<tr>
<td><strong>neighbor peer-group (add a neighbor)</strong></td>
<td>Modified</td>
<td></td>
<td>This command now adds a BGP or a BGP4+ neighbor to an existing peer-group.</td>
</tr>
<tr>
<td><strong>neighbor peer-group (create a peer-group)</strong></td>
<td>Modified</td>
<td></td>
<td>This command now creates a peer-group for BGP and BGP4+.</td>
</tr>
<tr>
<td><strong>neighbor port</strong></td>
<td>Modified</td>
<td></td>
<td>This command now specifies the TCP port to which packets are sent to on a BGP or a BGP4+ neighbor.</td>
</tr>
<tr>
<td><strong>neighbor prefix-list</strong></td>
<td>Modified</td>
<td></td>
<td>This command now distributes BGP and BGP4+ neighbor information as specified in a prefix list.</td>
</tr>
<tr>
<td><strong>neighbor remote-as</strong></td>
<td>Modified</td>
<td></td>
<td>This command now configures an internal or external BGP or BGP4+ (iBGP or eBGP) peering relationship with another router.</td>
</tr>
<tr>
<td><strong>neighbor restart-time</strong></td>
<td>Modified</td>
<td></td>
<td>This command now configures a different restart-time from the global restart-time configured using the bgp graceful-restart command for BGP and BGP4+.</td>
</tr>
<tr>
<td><strong>neighbor route-map</strong></td>
<td>Modified</td>
<td></td>
<td>This command now applies a route map to incoming or outgoing routes for BGP and BGP4+.</td>
</tr>
<tr>
<td><strong>neighbor send-community</strong></td>
<td>Modified</td>
<td></td>
<td>This command now specifies that a community attribute should be sent to a BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td><strong>neighbor shutdown</strong></td>
<td>Modified</td>
<td></td>
<td>This command now disables a peering relationship with a BGP or BGP4+ neighbor.</td>
</tr>
<tr>
<td>Command</td>
<td>Status</td>
<td>x210</td>
<td>Ix5</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------</td>
<td>------</td>
<td>-----</td>
</tr>
<tr>
<td>neighbor soft-reconfiguration inbound</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor timers</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor transparent-as</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor transparent-nexthop</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor unsuppress-map</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor update-source</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>neighbor weight</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>network</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>network synchronization</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>show bgp ipv6</td>
<td>New</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4(cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x215</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>8889/8908</th>
<th>8888/1000</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show bgp ipv6 community</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 community-list</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 dampening</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 filter-list</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 inconsistent-as</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 longer-prefixes</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 neighbors</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 paths</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 prefix-list</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 quote-regexp</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 regexp</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 route-map</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
<tr>
<td>show bgp ipv6 summary</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>p</td>
<td>BG and BGP4+ Commands</td>
</tr>
</tbody>
</table>
## Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>xIVS</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBX908</th>
<th>SBX8100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>show ip bgp neighbors</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>This command now has separate IPv6 address and IPv4 address parameters, to support BGP on both IPv4 and IPv6. The new parameters have been available since version 5.4.3-2.5.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors connection-retrytime</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors connection-retrytime command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors hold-time</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors hold-time command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors keepalive</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors keepalive command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors keepalive-interval</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors keepalive-interval command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors notification</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors notification command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td><strong>show ip bgp neighbors open</strong></td>
<td>Modified</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>p1</td>
<td>BGP and BGP4+ Commands</td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors open command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
</tbody>
</table>
Table 7: New and modified commands in 5.4.4(cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show ip bgp neighbors rcvd-msgs</td>
<td>Modified</td>
<td></td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors rcvd-msgs command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td>show ip bgp neighbors sent-msgs</td>
<td>Modified</td>
<td></td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors sent-msgs command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td>show ip bgp neighbors update</td>
<td>Modified</td>
<td></td>
<td>IPv6 address and IPv4 address parameters are available with the show ip bgp neighbors update command with BGP4+ feature licensing for IPv6 available since AlliedWare Plus 5.4.3-2.5 release.</td>
</tr>
<tr>
<td>synchronization</td>
<td>New</td>
<td></td>
<td>This command enables IGP (Internal Gateway Protocol) synchronization of Internal BGP4+ (iBGP) learned routes with the IGP system in the Router Configuration mode or in the IPv6 Address Family Configuration mode.</td>
</tr>
<tr>
<td>show counter dhcp-relay</td>
<td>Modified</td>
<td></td>
<td>This command shows counters for the DHCP Relay Agent on your device. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance or the global VRF Lite instance.</td>
</tr>
<tr>
<td>show ip dhcp-relay</td>
<td>Modified</td>
<td></td>
<td>This command shows the configuration of the DHCP Relay Agent on each interface. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance or the global VRF Lite instance.</td>
</tr>
<tr>
<td>clear arp-cache</td>
<td>Modified</td>
<td></td>
<td>This command now enables you to specify the IPv4 address for a VRF Lite instance, of an ARP entry to be cleared from the ARP cache.</td>
</tr>
<tr>
<td>clear ip dns forwarding cache</td>
<td>Modified</td>
<td></td>
<td>This command clears the DNS Relay name resolver cache. This command has been modified to provide VRF Lite capability, allowing a specific VRF Lite instance.</td>
</tr>
<tr>
<td>Command</td>
<td>Status</td>
<td>iX50</td>
<td>iX70</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>----------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>ip name-server</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>show ip dns forwarding cache</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>show ip dns forwarding server</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>show ip nameserver</td>
<td>Modified</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>(ipv6 access-list named ICMP filter)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>(ipv6 access-list named protocol filter)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>(ipv6 access-list named TCP UDP filter)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>commit (IPv6)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
</tr>
</tbody>
</table>
Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x310</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>S8908</th>
<th>S88100</th>
<th>Software Reference Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ipv6 access-list (named)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>IPv6 Hardware Access Control List (ACL) Commands</td>
<td>This command creates a new IPv6 hardware access-list, or selects an existing IPv6 hardware access-list to add a filter to it.</td>
</tr>
<tr>
<td>ipv6 traffic-filter</td>
<td>New</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>IPv6 Hardware Access Control List (ACL) Commands</td>
<td>This command adds an IPv6 hardware-based access-list to an interface.</td>
</tr>
<tr>
<td>show ipv6 access-list (IPv6 Hardware ACLs)</td>
<td>New</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>IPv6 Hardware Access Control List (ACL) Commands</td>
<td>This command displays all configured hardware IPv6 access-lists or the IPv6 access-list specified by name.</td>
</tr>
<tr>
<td>license</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command enables the licensed software feature set.</td>
</tr>
<tr>
<td>license certificate</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command enables you to apply software release licenses from a license certificate file to devices.</td>
</tr>
<tr>
<td>license member (deleted)</td>
<td>Deleted</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command has been deleted. Use the license command instead to apply feature licenses to stack members.</td>
</tr>
<tr>
<td>show license</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command displays information about a specific software license, or all enabled software feature licenses on the device.</td>
</tr>
<tr>
<td>show license brief</td>
<td>Modified</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command displays information about a specific software license, or all enabled software feature licenses on the device.</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>S8x908</th>
<th>S8x1000</th>
<th>Software Reference</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show license brief member</td>
<td>Modified</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command displays summarized information about a specific software license, or all software feature licenses enabled on either a specific stack member or all stack members.</td>
</tr>
<tr>
<td>show license member</td>
<td>Modified</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command displays information about a specific software license, or all software feature licenses enabled on either a specific stack member or all stack members.</td>
</tr>
<tr>
<td>show system mac license</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Licensing Commands</td>
<td>This command displays the physical MAC address available on a stack, a chassis, or a standalone device required for release licensing.</td>
</tr>
<tr>
<td>exception coredump size</td>
<td>Deprecated</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Logging Commands</td>
<td>This command has been deprecated in 5.4.4 release, and will be removed in a later release. There are no alternative commands.</td>
</tr>
<tr>
<td>coredump size (deprecated)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>remote-command (deprecated)</td>
<td>Deprecated</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Stacking Commands</td>
<td>This command has been deprecated; please use the remote-login command instead.</td>
</tr>
<tr>
<td>card provision (deprecated)</td>
<td>Deprecated</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Switching Commands</td>
<td>This command has been deprecated; please use the switch card provision command instead.</td>
</tr>
<tr>
<td>linkflap action</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Switching Commands</td>
<td>This command enables port flapping detection. Port flapping detection will disable any ports that flap more than 15 times in less than 15 seconds. This limits the impact of an unreliable link.</td>
</tr>
<tr>
<td>platform stop-unreg-mc-</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Switching Commands</td>
<td>This command stops multicast packets flooding out of all the ports until these packets are registered. This command can be used to stop the initial flood of multicast packets that happens when a new multicast source, such as an IP camera, starts to send traffic.</td>
</tr>
<tr>
<td>flooding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>switch card provision</td>
<td>New</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Switching Commands</td>
<td>This command pre-configures a specified empty card slot within a specified chassis ready for inserting a particular card type.</td>
</tr>
</tbody>
</table>
### Table 7: New and modified commands in 5.4.4 (cont.)

<table>
<thead>
<tr>
<th>Command</th>
<th>Status</th>
<th>x210</th>
<th>x450</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>show system mac</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>This command displays the physical MAC address available on a stack, or a standalone switch, or a chassis. This command also shows the virtual MAC address for a stack if the stack virtual MAC address feature is enabled with the stack virtual-mac command.</td>
</tr>
</tbody>
</table>

### Table 8: New and modified SNMP MIBs in 5.4.4

<table>
<thead>
<tr>
<th>MIB</th>
<th>Status</th>
<th>x210</th>
<th>x450</th>
<th>x510</th>
<th>x610</th>
<th>x900</th>
<th>SBx908</th>
<th>SBx8100</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT-ATMF-MIB</td>
<td>New</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td>The ATMF-MIB defines objects for managing ATMF objects and triggers. Objects in this group have the object identifier ATMF ({ modules 603 })</td>
</tr>
<tr>
<td>AT-FILEv2-MIB</td>
<td>Obsoleted</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td></td>
<td></td>
<td>The object atFilev2InfoTable was obsoleted in AT-FILEv2-MIB.</td>
</tr>
</tbody>
</table>
Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch

Release licenses are applied with the license certificate command, then validated with the show license or show license brief commands. Follow these steps:

- Obtain the MAC address for a switch
- Obtain a release license for a switch
- Apply a release license on a switch
- Confirm release license application

Step 1: Obtain the MAC address for a switch

A release license is tied to the MAC address of the switch.

Switches may have several MAC addresses. Use the show system mac license command to show the switch MAC address for release licensing:

```
awplus#show system mac license
MAC address for licensing:
eccd.6d9d.4eed
```

Step 2: Obtain a release license for a switch

Contact your authorized Allied Telesis support center to obtain a release license.

Step 3: Apply a release license on a switch

Use the license certificate command to apply a release license to your switch.

Note the license certificate file can be stored on internal flash memory, or an external SD card or a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.

Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```
Step 4: Confirm release license application

On a stand-alone switch, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked switch, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus switches:

```
awplus#show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index               : 1
License name        : Base License
Customer name       : ABC Consulting
Quantity of licenses: 1
Type of license     : Full
License issue date  : 10-Dec-2013
License expiry date : N/A
Features included   : EPSR-MASTER, IPv6Basic, MLDsnoop, OSPF-64, RADIUS-100, RIP, VRRP

Index               : 2
License name        : 5.4.4-rl
Customer name       : ABC Consulting
Quantity of licenses: -
Type of license     : Full
License issue date  : 01-Oct-2013
License expiry date : N/A
Release             : 5.4.4
```
Licensing this Software Version on a Control Card on an SBx8100 Series Switch

Release licenses are applied with the `license certificate` command, then validated with the `show license` or `show license brief` commands. Follow these steps:

- Obtain the MAC address for a control card
- Obtain a release license for a control card
- Apply a release license on a control card
- Confirm release license application

If your control card is in a stacked chassis, you do not need to perform these steps on each chassis in the stack, only on the stack master.

If your license certificate contains release licenses for each control card present in a stacked chassis, entering the `license certificate` command on the stack master will automatically apply the release licenses to all the control cards within the stack.

**Step 1: Obtain the MAC address for a control card**

A release license is tied to the control card MAC address in a chassis.

Chassis may have several MAC addresses. Use the `show system mac license` command to show the control card MAC address for release licensing. Note the MAC addresses for each control card in the chassis. The Chassis MAC address is not used for release licensing. Use the Card MAC address for release licensing.

```
awplus#show system mac license
MAC address for licensing:

Card         MAC Address
-------------
1.5           eccd.6d9e.3312
1.6           eccd.6db3.58e7
Chassis MAC Address eccd.6d7b.3bc2
```

**Step 2: Obtain a release license for a control card**

Contact your authorized Allied Telesis support center to obtain a release license.

**Step 3: Apply a release license on a control card**

Use the `license certificate` command to apply a release license to each control card installed in your chassis or stack.

Note the license certificate file can be stored on internal flash memory, a USB drive, or on a TFTP server accessible by SCP or accessible by HTTP protocols.
Entering a valid release license changes the console message displayed about licensing:

```
11:04:56 awplus IMI[1696]: SFL: The current software is not licensed.
awplus#license certificate demo1.csv
A restart of affected modules may be required.
Would you like to continue? (y/n): y
11:58:14 awplus IMI[1696]: SFL: The current software is licensed. Exiting unlicensed mode.
Stack member 1 installed 1 license
1 license installed.
```

**Step 4: Confirm release license application**

On a stand-alone chassis, use the commands `show license` or `show license brief` to confirm release license application.

On a stacked chassis, use the command `show license member` or `show license brief member` to confirm release license application.

From version 5.4.4, the `show license` command displays the base feature license and any other feature and release licenses installed on AlliedWare Plus chassis:

```
awplus#show license
OEM Territory : ATI USA
Software Licenses
------------------------------------------------------------------------
Index                         : 1
License name                  : Base License
Customer name                 : ABC Consulting
Quantity of licenses          : 1
Type of license               : Full
License issue date            : 10-Dec-2013
License expiry date           : N/A
Features included             : IPv6Basic, LAG-FULL, MLDSnoop, RADIUS-100 Virtual-MAC, VRRP

Index                         : 2
License name                  : 5.4.4-rl
Customer name                 : ABC Consulting
Quantity of licenses          : -
Type of license               : Full
License issue date            : 01-Oct-2013
License expiry date           : N/A
Release                       : 5.4.4
```
Installing this Software Version

**Caution:** Software version 5.4.4 requires a release license. Ensure that you load your license certificate onto each switch before you upgrade. Contact your authorized Allied Telesis support center to obtain a license. For details, see:

- “Licensing this Software Version on an x210 Series, IX5-28GPX, x510 Series, x610 Series, x900 Series or SBx908 Switch” on page 313 and
- “Licensing this Software Version on a Control Card on an SBx8100 Series Switch” on page 315.

To install and enable this software version, use the following steps:

1. Copy the software version file (.rel) onto your TFTP server.

2. If necessary, delete or move files to create space in the switch's Flash memory for the new file. To see the memory usage, use the command:
   
   ```
   awplus# show file systems
   ```
   
   To list files, use the command:
   
   ```
   awplus# dir
   ```
   
   To delete files, use the command:
   
   ```
   awplus# del <filename>
   ```
   
   You cannot delete the current boot file.

3. Copy the new release from your TFTP server onto the switch.
   
   ```
   awplus# copy tftp flash
   ```
   
   Follow the onscreen prompts to specify the server and file.

4. Move from Privileged Exec mode to Global Configuration mode, using:
   
   ```
   awplus# configure terminal
   ```
   
   Then set the switch to reboot with the new software version:

<table>
<thead>
<tr>
<th>Switch</th>
<th>Command</th>
</tr>
</thead>
<tbody>
<tr>
<td>x210 series</td>
<td><code>awplus(config)# boot system x210-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>IX5-28GPX</td>
<td><code>awplus(config)# boot system IX5-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>x510 series</td>
<td><code>awplus(config)# boot system x510-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>x610 series</td>
<td><code>awplus(config)# boot system x610-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>x900 series</td>
<td><code>awplus(config)# boot system x900-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>SBx908</td>
<td><code>awplus(config)# boot system SBx908-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>SBx8100</td>
<td><code>awplus(config)# boot system SBx81CFC400-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC400</td>
<td><code>awplus(config)# boot system SBx81CFC400-5.4.4-0.1.rel</code></td>
</tr>
<tr>
<td>SBx8100 with CFC960</td>
<td><code>awplus(config)# boot system SBx81CFC960-5.4.4-0.1.rel</code></td>
</tr>
</tbody>
</table>

Return to Privileged Exec mode and check the boot settings, by using the commands:

```
awplus (config)# exit
awplus# show boot
```
5. Reboot using the new software version.
   awplus# reload
Installing the GUI

This section describes how to install and set up the AlliedWare Plus GUI using an SD card, a USB storage device, or a TFTP server. The version number in the GUI Java applet filename (.jar) gives the earliest version of the software file (.rel) that the GUI can operate with.

To install and run the AlliedWare Plus GUI requires the following system products and setup:

- **PC Platform:** Windows XP SP2 and up / Windows Vista SP1 and up
- **Browser:** (must support Java Runtime Environment (JRE) version 6) Microsoft Internet Explorer 7.0 and up / Mozilla Firefox 2.0 and up

To install the GUI on your switch, use the following steps:

1. Copy to the GUI Java applet file (.jar extension) onto your TFTP server, SD card or USB storage device.
2. Connect to the switch's management port, then log into the switch.
3. If necessary, delete or move files to create space in the switch's Flash memory for the new file.
   To see the memory usage, use the command:
   ```shell
   awplus# show file systems
   ```
   To list files, use the command:
   ```shell
   awplus# dir
   ```
   To delete files, use the command:
   ```shell
   awplus# del <filename>
   ```
   You cannot delete the current boot file.
4. Assign an IP address for connecting to the GUI. Use the commands:
   ```shell
   awplus# configure terminal
   awplus(config)# interface vlan1
   awplus(config-if)# ip address <address>/<prefix-length>
   ```
   Where `<address>` is the IP address that you will subsequently browse to when you connect to the GUI Java applet. For example, to give the switch an IP address of 192.168.2.6, with a subnet mask of 255.255.255.0, use the command:
   ```shell
   awplus(config-if)# ip address 192.168.2.6/24
   ```
5. If required, configure a default gateway for the switch.
   ```shell
   awplus(config-if)# exit
   awplus(config)# ip route 0.0.0.0/0 <gateway-address>
   ```
   Where `<gateway-address>` is the IP address for your gateway device. You do not need to define a default gateway if you browse to the switch from within its own subnet.
6. Copy the GUI file onto your switch from the TFTP server, SD card, or USB storage device.

**TFTP server:** Use the command:
```
awplus# copy tftp://<server-address>/<filename.jar> flash:/
```

**SD card:** use the command:
```
awplus# copy card://<filename.jar> flash:/
```

**USB storage device:** use the command:
```
awplus# copy usb://<filename.jar> flash:/
```

where `<server-address>` is the IP address of the TFTP server, and where `<filename.jar>` is the filename of the GUI Java applet.

7. Ensure the HTTP service is enabled on your switch. Use the commands:

```
awplus# configure terminal
awplus(config)# service http
```

The HTTP service needs to be enabled on the switch before it accepts connections from a web browser. The HTTP service is enabled by default. However, if the HTTP has been disabled then you must enable the HTTP service again.

8. Create a user account for logging into the GUI.
```
awplus(config)# username <username> privilege 15 password <password>
```

You can create multiple users to log into the GUI. For information about the `username` command, see the AlliedWare Plus Software Reference.

9. Start the Java Control Panel, to enable Java within a browser

On your PC, start the Java Control Panel by opening the Windows Control Panel from the Windows Start menu. Then enter Java Control Panel in the search field to display and open the Java Control Panel.

Next, click on the ‘Security’ tab. Ensure the ‘Enable Java content in the browser’ checkbox is selected on this tab.

10. Enter the URL in the Java Control Panel Exception Site List

Click on the ‘Edit Site List’ button in the Java Control Panel dialog Security tab to enter a URL in the Exception Site List dialog. In the ‘Exception Site List’ dialog, enter the IP address you configured in Step 4, with a http:// prefix. After entering the URL click the Add button then click OK.

11. Log into the GUI.

Start a browser and enter the switch’s IP address. The GUI starts up and displays a login screen. Log in with the username and password specified in the previous step.