Active Fabric Manager for Microsoft Cloud Platform System

Installation Guide for AFM-CPS 2.2(0.0)

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Contents

1

Introduction

Active Fabric Manager for Microsoft Cloud Platform System (AFM-CPS) reduces the complexity of implementing a self-service cloud and provides an integrated software and hardware solution — combining Windows Server 2012 R2, System Center 2012 R2, and Windows Azure — powered by Dell hardware. AFM-CPS provides the benefits of a software-defined datacenter when operating cloud services. AFM-CPS scales from a single rack to four racks and is optimized for Infrastructure-as-a-Service (IaaS) for Windows and Linux and Platform-as-a-Service (PaaS) deployments.

AFM-CPS includes integrated fabric-based backup for the virtual machines, disaster recovery, anti-virus, and monitoring capabilities. You can also use REST-based APIs and Windows PowerShell to enhance and customize your operations.

Features

AFM-CPS is a Dell and Microsoft-validated solution that provides the following features.

AFM-CPS 2.2(0.0) New Features

AFM-CPS 2.2(0.0) supports the following features.

- Ability to generate a new SSL certificate during installation using the AFM virtual machine
- CPS 2015 renamed to CPS 2016
- Support for selected REST APIs
- TACACS Authentication Support
- BGP Neighbor Authentication
- Tech Support Features
- SNMP V3 Support
- SCP Protocol Support
- Wiring validation change

AFM-CPS 2.2(0.0) Rack Features

With AFM-CPS 2.2(0.0), you can deploy one to four racks. After initial deployment, you can expand the racks from one rack to a total of four racks. Each rack has the following features:

- 512 cores across 32 servers (each with dual-socket Intel Xeon processors)
- 8 TB RAM with 256 GB per server
- 282 TB of usable storage
- 1360 Gbps of internal rack connectivity
- 560 Gbps inter-rack connectivity
- Up to 60 Gbps WAN connectivity

A single rack can support up to 2000 virtual machines (2vCPS, 1.75 GB RAM and 50 GB hard drive). You can scale up to 8000 virtual machines using a full stamp with four racks.

General Features

AFM-CPS 2.2(0.0) supports the following general features.

- Generate and apply a custom switch configuration based on a template
- Upgrade Dell network operating system software
- Validate the switch configuration, links, and traffic
- Monitor support for CPU and memory reporting
- Display faceplate representations showing port status, port monitoring, top 10 active ports and more
- Back up and restore switch configurations
- Generate rack wiring diagrams and output to PDF or Visio files

About this Document

The *Dell Active Fabric Manager for Microsoft Cloud Platform System Installation Guide for AFM-CPS 2.2(0.0)* includes information to help you set up and begin using AFM-CPS 2.2(0.0) in a cloud environment. This document includes basic information to help you deploy the AFM virtual machine and the AFM-CPS 2.2(0.0) virtual machine and it includes instructions to guide you with initial administration tasks. This document also includes instructions to help you work with system files and AFM database files that interact with AFM-CPS.

This document is part of the Dell AFM-CPS 2.2(0.0) documentation set that also includes the following documentation:

- *Dell Active Fabric Manager for Microsoft Cloud Platform System, Release Notes for AFM-CPS 2.2(0.0)*
- *Dell Active Fabric Manager for Microsoft Cloud Platform System, User Guide for AFM-CPS 2.2(0.0)*

Be sure to check the latest information in the *Dell Active Fabric Manager for Microsoft Cloud Platform System, Release Notes for AFM-CPS 2.2(0.0)* for current product and licensing information.

For information on Dell Active Fabric Manager, see the specific documentation set for your version of Dell Active Fabric Manager.

AFM-CPS Terminology

AFM-CPS documentation includes the following terms.

Term	Description
CPS 2016	Devices supported in AFM-CPS 2.2(0.0): S4048-ON and S3048-ON.
CPS 2014	Devices supported in AFM-CPS 2.2(0.0): S55 and S4810 switches.
Baseboard Management Controller (BMC)	Device that provides connectivity to the management interfaces within a rack. The BMC devices are the S3048-ON switch (CPS 2016) and the S55 switch (CPS 2014).
Access switches	Devices that provide access to the servers: S4810 and S4048-ON switches.
Aggregation switches	Devices that connect the access switches to the management/BMC switch: S4048-ON and S4810. Aggregation switches also provide external (off the stamp) connectivity.
Stamp	Collection of servers, switches, storage and management infrastructure that includes a single management entity for AFM-CPS.

2

Requirements

AFM-CPS and AFM have specific hardware and software requirements.

Hardware Requirements

This section includes information on supported hardware including servers, racks, and the AFM-CPS laptop that is used to install and deploy AFM-CPS.

AFM-CPS 2.2(0.0) Supported Hardware

AFM-CPS 2.2(0.0) supports the following devices.

Table 1. CPS Supported Hardware

Hardware Version	Supported Devices	Version
CPS 2016	S3048-ON	9.11(0.0)
	S4048-ON	9.11(0.0)
CPS 2014	S4810	9.11(0.0)
	S55	8.3.5.6

AFM-CPS 2.2(0.0) also supports CPS 2016 racks with S3048-ON and S4048-ON devices and CPS 2014 racks with S4810 devices.

Table 2. Supported Rack Deployments

AFM-CPS 2.2(0.0)	Supported Rack Deployments
CPS 2016	One to four racks. Each CPS 2016 rack can include: • One S3048-ON switch • Five S4048-ON switches (one for aggregation, two tenant switches configured as a VLT pair, and two data center switches)
CPS 2014	Each CPS 2014 rack can include: • One S55 switch • Five S4810 switches (one for aggregation, two tenant switches configured as a VLT pair, and two data center switches)

About CPS 2016 Racks

- The aggregation, tenant, and data center switches are connected using a distributed core mesh.
- AFM-CPS uses virtual link trunking (VLT) in the access fabric to connect the rack switches to the server and internal BGP (iBGP) for the traffic in the fabric.
- Each S4048-ON switch in the same rack connects to the S3048-ON switch from ports 37 to 41.
- Each aggregation switch connects to the S3048-ON switch from ports 7 to 52.
- Port 42 is reserved for the AFM CPS 2.2(0.0) laptop to connect to the S3048-ON switch in each rack for deployment and management of the switches.

- Each rack has its own subnet and default gateway.
- The S3048-ON in each rack is not directly connected to the switches in the other racks.
- The aggregation switch contains the L3 uplink running BGP connected to the edge router in the network.
- The edge router is not considered part of any single fabric because it is shared with multiple fabrics.
- Manually configure any edge routers for AFM CPS to run validation checks on the racks and route traffic across the switches
- To validate the link between the management port on the S4048-ON switch and the S3048-ON switch, use the `ping` command.
- With AFM-CPS 2.2(0.0), you can expand the racks to a maximum of four racks.

AFM-CPS Server and Client Requirements

The following tables describe the hardware requirements for the server and client switches.

Table 3. AFM-CPS Server Requirements

Hardware+	Requirement
Processor	Intel® Xeon® E5620 2.4Ghz, 12M Cache, Turbo, HT, 1066MHz Max Memory
Operating System	Windows Server 2012 R2
Memory	32GB Memory (8x4GB) minimum, 1333MHz Dual Ranked LV RDIMMs for 2 processors, Advanced ECC
Disk Space	1TB 7.2K RPM SATA 3.5 hot plug Hard Drive

Table 4. AFM-CPS Client Requirements

Hardware	Requirement
Processor	Intel® Core (TM) i5-2520M CPU @2.50Ghz
Operating System	Windows 8.1 64-bit
Memory	8 GB (minimum)

AFM-CPS Client Requirements

To install and deploy AFM-CPS and to deploy the racks, use a laptop as a host for the AFM-CPS virtual machine (VM). You install the AFM-CPS virtual hard disk (VHDx) on the laptop Hyper-V virtual machine. For information on how to import or export files using Hyper-V, see the Microsoft Hyper-V documentation.

Using AFM-CPS 2.2(0.0), connect the laptop to each S3048-ON switch in the rack for the initial deployment or after replacement or redeployment of aggregation switches.

Table 5. AFM-CPS Client Requirements

Hardware	Requirement
Processor	Intel® Core (TM) i5-2520M CPU @2.50Ghz <dual core?>
Operating System	Windows 8.1 64-bit OS or Windows Server 2012 R2
Memory	4 GB (minimum)
Software	Microsoft Hyper-V
	Microsoft System Center Virtual Machine Manager (SCVMM) (required for Hyper-V)

Software Requirements

This section describes information about the virtual machine, client, and server software. For information about Dell switch software, see Hardware Requirements.

Virtual Machine Requirements

AFM-CPS runs as a virtual machine and requires the following software.

Table 6. AFM-CPS Virtual Machine Software

Hypervisor	Version
Microsoft Hyper-V	6.3.9600.16384
Microsoft System Center Virtual Machine Manager (SCVMM) — Microsoft Hyper-V requires SCVMM.	

AFM-CPS Client Software Requirements

The AFM-CPS client and server requires the following software.

Table 7. AFM-CPS Client and Server Software

Software	Description
Server OS	Windows Server 2012 R2
	Windows requires Administrator permission on the target server. Make sure that you have modification permissions on the network service account for the system temp directory: %systemroot%\temp
Client OS	Windows 8.1 64-bit
	System Center 2012 R2
	Windows Azure
Browser	Internet Explorer 9 or higher
	Firefox 12 or higher

Rack Expansion

The rack expansion feature requires switches running CPS 2016.

IP Address Requirements

Before deployment, verify that you have the following IP address information available.

- The AFM-CPS laptop IP address
- The AFM-CPS IP address and default gateway for each rack — The IP addresses are different for each rack because each rack has its own subnet and default gateway.
- The final AFM-CPS IP address in the infrastructure rack.

IP Address Generator

You can use the Microsoft IP Address Generator tool to generate IP addresses for deployment. For information about this tool, see the documentation for the IP Address Generator.

Port Configuration Requirements

AFM-CPS requires the following AFM port configurations.

Table 8. Port Configuration

Port	Protocol
20 and 21	FTP
22	SSH and SCP (communication to the switches and CLI access to AFM)
23	Telnet (communication to the switches)
49	TACACS
67 and 68	DHCP
69	TFTP
80	AFM server port listening for client connection and requests
123	NTP
161	SNMP get and set protocol between AFM server and switch.
162	SNMP trap listener between AFM and switch.
443	HTTPS communication protocol where the AFM takes requests from the client browser.
5432	Database server
8080	TCP/UDP
61616	ActiveMQ

3

Installing the VHDx File Using a Microsoft Hyper-V Virtual Machine

Begin the installation process by installing the VHDx image file using a Microsoft Hyper-V virtual machine (VM).

Install the VHDx File Using a Microsoft Hyper-V Virtual Machine

1. Start the Microsoft SCVMM client on the Windows server.
2. Copy the AFM VHDx image file from the directory containing the AFM package to a location where the SCVMM client can access it.
3. To create the AFM VM, import the VHDx image file.
4. Power on the VM.

4

Starting the Virtual Machine

After completing the VM Creation wizard and deploying the VM, power on the AFM VM and connect to the console.

1. In Hyper-V, click the VM name and select **Power > Power On**.
2. To open the VM console, right-click the console name and select **Connect**.
3. Open the console and log in with the default credentials. Log in from the console or SSH for the first time using the `superuser` account. If an IP is assigned to the VM, AFM prompts you to change the password for the `superuser` account. This password is used for both the web URL login and console login.

   NOTE: The default AFM user name is `superuser` and password is `Superuser1.`

4. When the VM is on and DHCP is available, an IP address is automatically assigned to the VM. If no IP is assigned to the VM because you did not enable DHCP, AFM displays the following message: `There is no IP address assigned. Press the <Enter> and the Network Configuration Wizard will be started (This wizard can be manually started by selecting "Configure System" from the console menu):`. If this message appears, press `Enter` and configure the network:
   a. When the network configuration warning message appears, enter `Y` to continue.

      The **Select Action** screen appears.
   b. Select **Device configuration**. To navigate between elements, use the **Tab** and down arrow keys.

      The **Network Configuration** screen appears. The `eth0` device is selected by default. The device name cannot be changed.
   c. In the **Static IP** field, specify the static IP Address of the AFM server. To verify that the IP address is not in use by another system, ping the IP address assigned to AFM. If the destination host is unreachable, you can safely assign the IP address to AFM.
   d. Select **OK** to save your changes.
   e. Select **Quit** to exit this screen. The AFM VM now reboots so the network changes can take effect.
5. Manage the AFM virtual machine.

5

AFM Server Initial Configuration

After you deploy and start the AFM VM, you can perform the initial AFM server configuration tasks. To access the AFM virtual machine:

1. From the AFM VM, click the **Console** button.
2. Log in as `superuser`. If there is an IP assigned to the VM the first time you log in from the console or SSH using `superuser`, AFM prompts you to change the password for `superuser`.

   Use this password for both the web URL login and console login. If no IP is assigned to the VM because you did not enable DHCP, AFM prompts you to configure the network and reboots the VM.

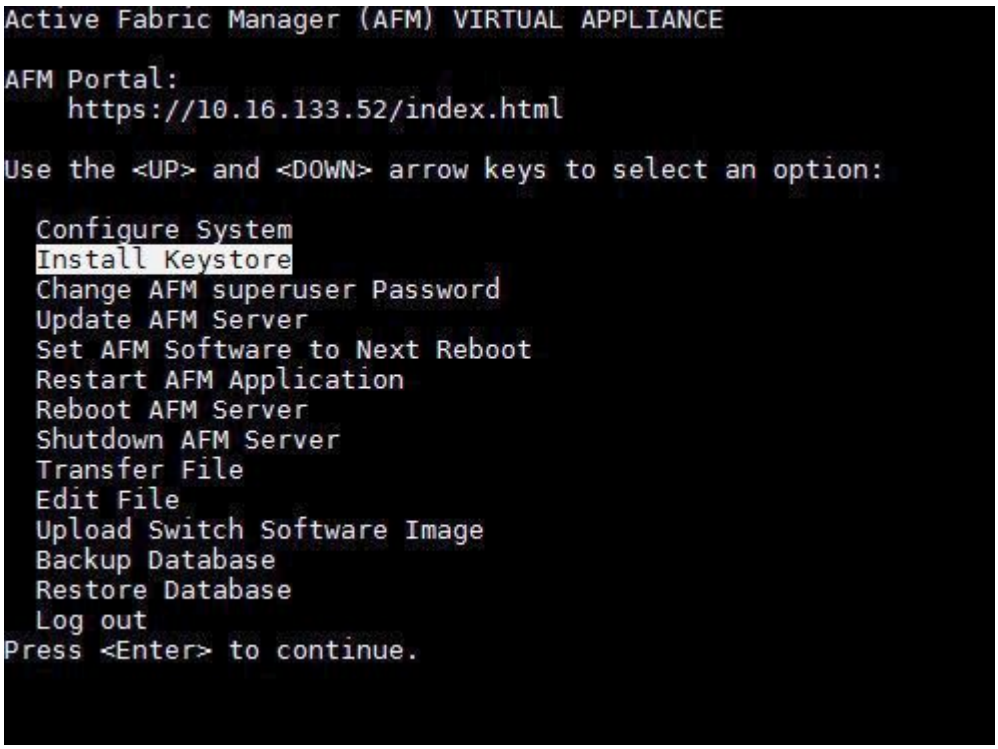

Figure 1. AFM Virtual Machine Menu

Applying AFM Updates on Restart

There are two versions of the AFM software package: one in the current partition and the other in the available partition.

1. Select **Set AFM Software to Next Restart** and press **Enter**.
2. To apply the available update on the next reboot, enter `y` and press **Enter**.
3. Press **Enter** to return to the main menu.

Configuring the System

To configure the AFM server settings, use the **Configure System** option.

1. Select **Configure System** and press **Enter**.

   The following network configuration warning message displays: `*WARNING* System will have to restart to properly update all the services if network configuration is changed. Do you wish to continue? Y or N? :`
2. Enter `Y`.

   The **Network Configuration** screen appears.

   ```
   Do you want to enable DHCP? [y/n]: n
   Enter the IP:
   Enter the network mask:
   Enter the Gateway IP:
   ```

   Figure 2. Network Configuration Settings
3. View or modify the following settings as needed:
   - **Do you want to enable DHCP** — Enable DHCP or manually assign an IP address to the VM by typing **n** on the screen. Typing **y** will use DHCP.
   - **Enter the IP** — Specify the static IP Address of the AFM server. When you change the AFM IP address, the system prompts you to restart the AFM server.
   - **Enter the network mask** — Specify the subnet mask of the static IP address for the AFM server.
   - **Enter the Gateway IP** — Specify the gateway IP address of the AFM server.
4. You will be prompted to confirm the changes. Go ahead and confirm the changes.
5. Restart the AFM server.
6. Verify connectivity to the AFM server. Ping the AFM server IP address and validate that the IP address has changed.
7. Log in to AFM using the new IP address in the following format: **https://new_ip_address/afm** (where **new_ip_address** represents the new IP address).
8. Navigate to the **Administration > Settings > System Information** screen.
9. Click **Edit** and then select the new AFM server IP address from the **System IP Address** drop-down menu.
10. Validate the following information to verify that the new AFM IP address is being used:
    - **TFTP/FTP/SCP** settings — Validate local settings only
    - **SNMP Configuration** — Verify that the new AFM IP address is applied to the SNMP configuration, ensuring that the traps are registered to the switch and that AFM receives the alarms.
    - **Syslog IP Address** — Verify that the new IP is applied to the first system log entry. The AFM IP address uses the first system log entry by default, so the first system log entry is typically the AFM server.
11. Click the refresh icon on the top right of the **Settings** screen and verify that the new AFM IP address is applied.
12. On the AFM Virtual Appliance console, log in as `superuser` and select **Restart AFM Application**. When AFM starts, the AFM server uses the new IP address.
13. To register the trap host and system log IP address, redeploy all the fabrics with the new IP address.
14. To save your changes, select **OK**.
15. To exit this screen, select **Quit**.

Migrating AFM-CPS from CentOS to Debian

You can migrate the AFM-CPS database and configuration from CentOS (versions 2.1(0.0)P2 and earlier) to Debian. Migration from CentOS to Debian involves the following steps:

- Backing up database and configuration from AFM-CPS CentOS VM using the AFM-CPS VM console.
- Transferring files to AFM-CPS Debian VM.

- Restoring database and configuration in AFM-CPS Debian VM using the AFM-CPS VM console.

1. Access the AFM-CPS CentOS VM console using SSH.
2. Log in as `superuser`.
3. Select **Backup Database**.

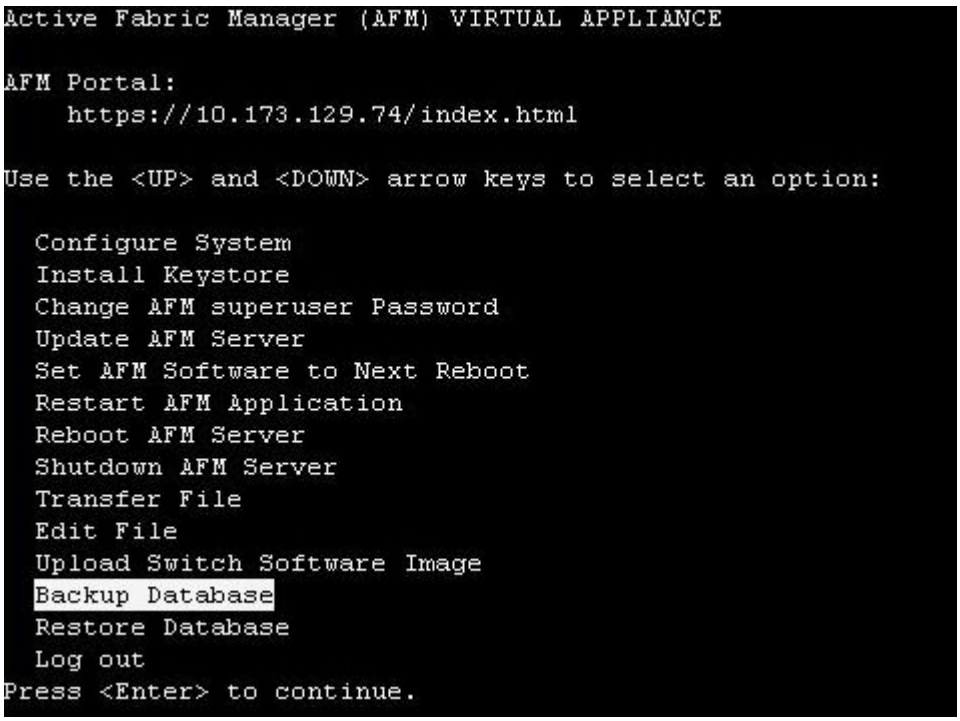

Figure 3. AFM-CPS VM Console Menu Options

The Backup Configuration and Database screen appears.

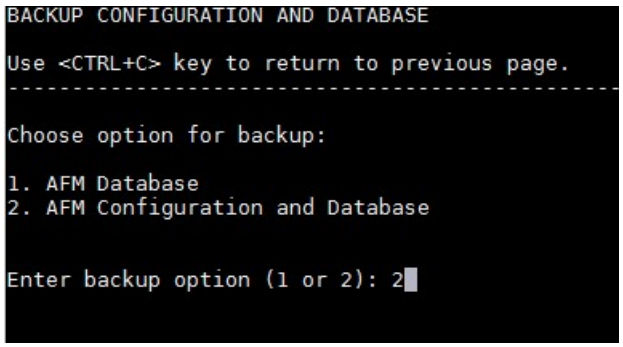

Figure 4. Backup Configuration and Database Screen

4. Select a back up option:
   - **AFM Database**—Select to back up the AFM-CPS database files only. Switch configuration and `dhcpd.conf` files are not included.
   - **AFM Configuration and Database**—Select to back up the AFM configuration and database files.

   AFM-CPS backs up the files.

```
pg_dump: dumping contents of table wnm_unit
pg_dump: dumping contents of table wnm_vlan
pg_dump: dumping contents of table wnm_vltdomain
pg_dump: dumping contents of table wnm_vltmember
pg_dump: dumping contents of table wnm_vltpeerlag
pg_dump: dumping contents of table wnm_vrrpoperation

Database backup created: /data/backup/postgres/afm-db-backup-2016_11_21-04_52_22.custom

Configuration and database backup created: /data/backup/config-db/afm-config-db-backup-2016_11_21-04_52_22.ta


Backup completed. Press <Enter> to return main menu.
```

Figure 5. AFM-CPS File Backup

5. Copy the back up file from the AFM-CPS CentOS VM to the AFM-CPS Debian VM or to another server using Secure File Transfer Protocol (SFTP), File Transfer Protocol (FTP), or Secure Copy (SCP).
6. Access the AFM-CPS Debian VM using the AFM-CPS VM console.

```
Active Fabric Manager (AFM) VIRTUAL APPLIANCE

AFM Portal:
    https://10.173.129.74/index.html

Use the <UP> and <DOWN> arrow keys to select an option:

  Configure System
  Install Keystore
  Change AFM superuser Password
  Update AFM Server
  Set AFM Software to Next Reboot
  Restart AFM Application
  Reboot AFM Server
  Shutdown AFM Server
  Transfer File
  Edit File
  Upload Switch Software Image
  Backup Database
  Restore Database
  Log out
Press <Enter> to continue.
```

Figure 6. AFM-CPS VM Console Menu Options

7. Select **Restore Database**.
   The Restore Configuration and Database screen appears.

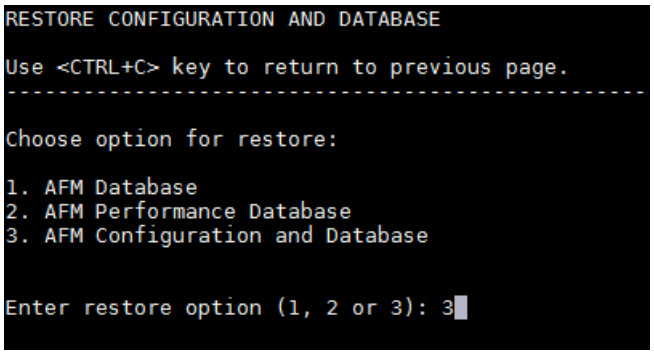

Figure 7. Restore Configuration and Database Screen

8. Select a restoration option: option 1 to restore only the AFM-CPS database; option 3 to restore both the AFM-CPS configuration and database.

   NOTE: Created back up files are type-specific. Use the Backup files created using the AFM Database option in step 4 only when selecting option 1. Similarly, only use a backup file created in the AFM Configuration and Database option in step 4 when selecting option 3.

9. At the **Enter database option** prompt, select **User specified location** as the location of the backup file.

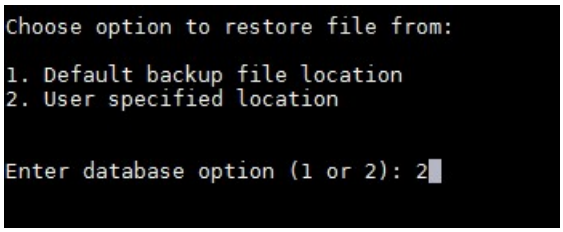

Figure 8. Enter database option Prompt

10. At the **Shared Storage Location** prompt, enter the complete file path of the local backup file location copied from the AFM-CPS CentOS VM.

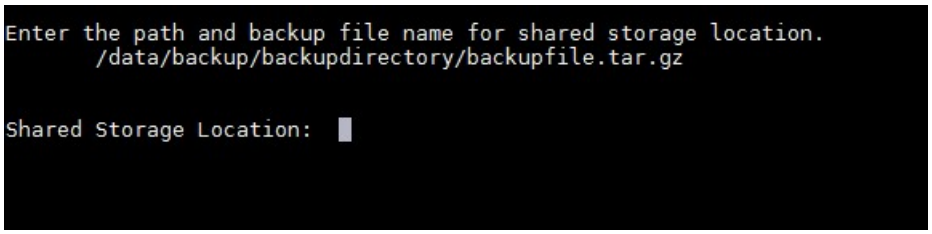

Figure 9. Shared Storage Location Prompt

11. To restore the database and restart AFM-CPS, enter `Y`.

After the backup is restored, verify the following:

- You can start AFM-CPS and log in.
- Confirm that fabrics created in AFM-CPS CentOS are listed in the AFM-CPS Debian user interface.

Installing Keystores

AFM-CPS supports the installation of third party Keystores that contain Secure Sockets Layer (SSL) certificates.
To install an SSL certificate, you first must have a third party signed SSL certificate and corresponding Keystore file generated from a third party SSL certificate using a PEM file.

1. Use SSH to access the AFM Virtual Machine (VM) console.
2. Log in as `superuser`.

3. Select **Install Keystore**.

```
Active Fabric Manager (AFM) VIRTUAL APPLIANCE

AFM Portal:
    https://10.16.133.52/index.html

Use the <UP> and <DOWN> arrow keys to select an option:

  Configure System
  Install Keystore
  Change AFM superuser Password
  Update AFM Server
  Set AFM Software to Next Reboot
  Restart AFM Application
  Reboot AFM Server
  Shutdown AFM Server
  Transfer File
  Edit File
  Upload Switch Software Image
  Backup Database
  Restore Database
  Log out
Press <Enter> to continue.
```

Figure 10. AFM VM Console Menu

4. Select **Import Java Keystore**.

```
1. Import Java Keystore
2. Restore Default Keystore


Choose the option (1 or 2): 1
```

Figure 11. Install Keystore Menu Options

5. At the **URL location** prompt, enter the local or remote location of the Keystore file in one of the following formats:
   - Local Keystore file path
   - [s]ftp://[*<user>*:*<pass>*@]*<address>*[:*port*]/*<Keystore file path>*

     NOTE: Entering the FTP user name and password is optional.
   - https://[*<user>*:*<pass>*@]*<address>*[:*port*]/*<Keystore file path>*

```
IMPORT JAVA KEYSTORE.

Use <CTRL+C> key to return to previous page.
-----------------------------------------------------------------

Enter URL location in following formats

Example 1: <local java keystore file path>
Example 2: ftp://[<user>:<pass>@]<address>[:port]/<java keystore filename>
Example 3: sftp://[<user>:<pass>@]<address>[:port]/<java keystore file path>
Example 4: https://[<user>:<pass>@]<address>[:port]/<java keystore file path>


URL location:
```

Figure 12. URL Location Prompt

6. At the **Keystore Password** prompt, enter the password. This entry should be the same password that generated the Keystore file from the PEM file.

```
Keystore Password (Enter password used in Java Keystore generation):
Confirm Password:
```

Figure 13. Keystore Password and Confirm Password Prompts

NOTE: AFM VM does echo back the password.

7. At the **Confirm Password** prompt, reenter the Keystore password.
   When the Keystore file successfully transfers and installs, you must restart the AFM-CPS server for your change to take effect.
8. At the **Restart AFM application now** prompt, enter `Yes`.

```
Java Keystore copied successfully. Keystore changes will be reflected only after AFM application restart.

Restart AFM application now? [Yes/No]:
```

Figure 14. Restart AFM application now Prompt

Restoring Default Keystore Files

AFM-CPS supports restoring default Keystore files.

1. Use SSH to access the AFM Virtual Machine (VM) console.
2. Log in as `superuser`.
3. Select **Install Keystore**.
4. Select **Restore Default Keystore**.

```
1. Import Java Keystore
2. Restore Default Keystore

Choose the option (1 or 2): 2
```

Figure 15. Keystore Menu Options

5. At the confirmation prompt, enter `Y`.

```
RESTORE DEFAULT KEYSTORE.

 Use <CTRL+C> key to return to previous page.
-----------------------------------------------------------------
Are you sure want to restore
Y or N? :
```

Figure 16. Restore Default Keystore Confirmation Prompt

Restart the AFM-CPS server for the change to take effect.

6. At the **Restart AFM application now** prompt, enter `Yes`.

```
Default Keystore restored successfully. Keystore changes will be reflected only after AFM application restart

Restart AFM application now? [Yes/No]:
```

Figure 17. Restart AFM Application Now Prompt

Changing the AFM Superuser Password

1. Select **Change AFM Superuser Password**.
2. Press **Enter**.

   The **Change AFM Superuser Password** screen appears.

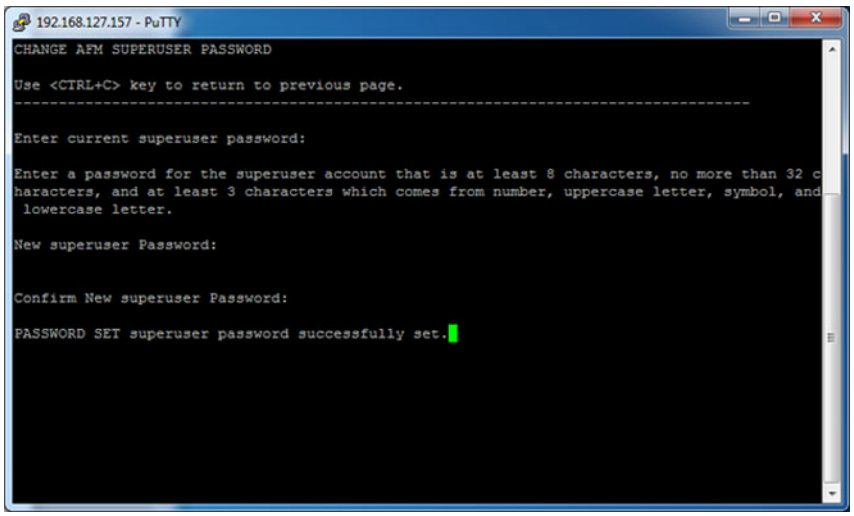

Figure 18. Change AFM Superuser Password Screen

3. In the **Enter current superuser password** field, enter the `superuser` account password. The default password is `Superuser1`.

   NOTE: The password must be 8-32 characters and include at least three characters from the following categories:
   - lowercase alphabetic character
   - uppercase alphabetic character
   - numeric character (0-9)
   - special character
4. Press **Enter**.
5. In the **Confirm New Superuser Password** field, enter the new `superuser` password again to confirm the `superuser` password.
6. Press **Enter** to return to the main menu.

Updating the AFM Server

You can update version 2.1.0(P3) to AFM 2.2 using the AFM VM console.

1. Select **Update AFM Server** and press **Enter**.

   The **Update AFM Server** screen displays the current version and the version of any available updates.

NOTE: If you download an updated .deb file from the remote server, it overwrites the current software version.

2. To download the latest AFM software package in .deb format file from the remote URL to the available partition, enter `y`. To download the AFM software package .deb format file from the local workstation where the AFM console is started to the AFM server, enter `n`.
3. If the location is a remote server, enter the URL location of the .deb file on the remote server using the following formats and then press **Enter**.

   NOTE: The .deb file name must start with AFM and must end with `.noarch.deb`; for example, `AFM2.5.0.79.noarch.deb`

   - `https://ipaddress/path_to_deb.file`
   - `ftp://ipaddress/path_to_deb.file`
   - `sftp://ipaddress/path_to_deb.file`
4. If the location is local, enter the absolute path of the .deb file and press **Enter**.
5. If necessary, enter your user name and password.
6. To return to the main menu, press **Enter**.

Restarting AFM

1. Select **Restart AFM Application** and press **Enter**.

   The following warning message displays: `The next software version is AFM <VersionNumber> from current software. Are you sure you want to restart the AFM application? Y or N?:` (where `<VersionNumber>` is the version number).
2. Enter `y` to restart the application.
3. Press `Enter` to return to the main menu.

Rebooting the AFM Server

1. Select the **Reboot AFM Server** option and press **Enter**.
2. Enter `y`.

Transferring Files

Verify the FTP/ TFTP/ SCP configuration during the initial AFM server setup.

1. To transfer all files from the AFM server to the remote server using the FTP, TFTP or SCP, select **Transfer File**, and press **Enter**.

   The **Transfer File** screen appears.

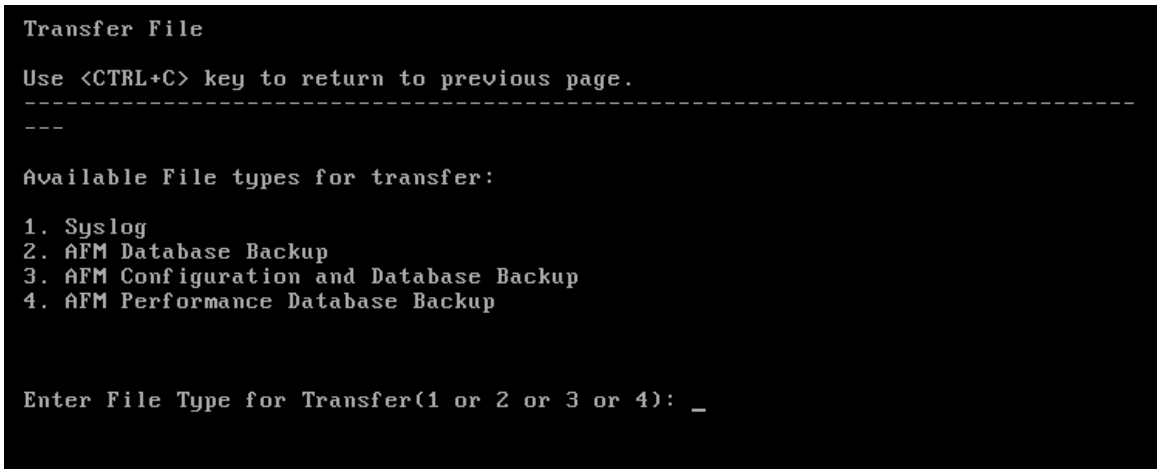

Figure 19. Transfer Files Screen

2. Enter the file type to transfer:
   - **1. Syslog**
   - **2. AFM Database Backup**
   - **3. AFM Configuration and Database Backup**
   - **4. AFM Performance Database Backup**
3. Press **Enter**.
4. Enter `y` to upload all the files to the FTP, TFTP or SCP server.
5. Press **Enter**.
6. Press `Enter` again to return to the main menu.

Editing AFM Files

To edit the following file types, use the **Edit File** option:

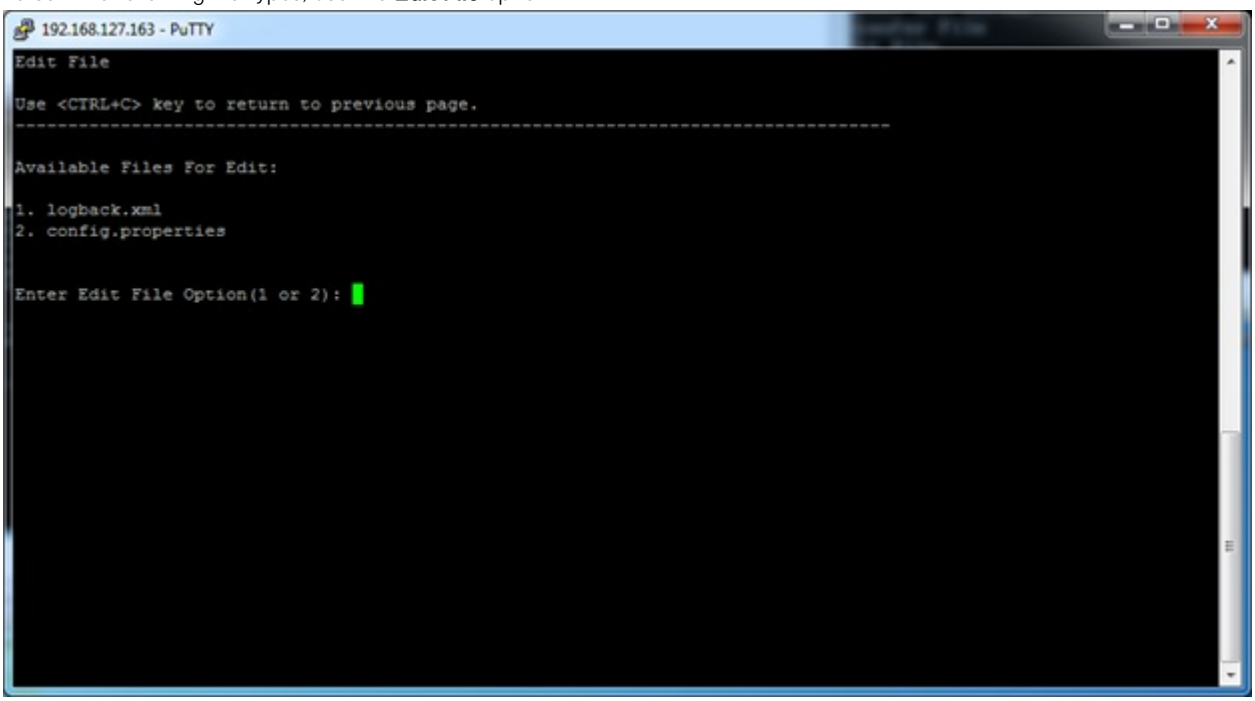

Figure 20. Edit File Screen

- 1. **logback.xml** — The `logback.xml` file contains the database logging file and enables or disables debugging. By default, the logging level is set to `INFO`. The available logging levels are:
  - `ALL`
  - `DEBUG`
  - `ERROR`
  - `INFO`
  - `OFF`
  - `TRACE`
  - `WARN`

  The typical use case is changing the logging level from `INFO` to `DEBUG`, as shown in the following example:

  ```
  <logger name="com.dell.indigo" level="INFO" /> change to <logger
  name="com.dell.indigo" level=" DEBUG" />
  <logger name="com.dell.dfm" level=" INFO " /> changed to
  <logger name="com.dell.dfm" level="DEBUG" />
  <logger name="com.dell.wnm" level=" INFO " /> changed to <logger
  name="com.dell.wnm" level="DEBUG" />
  ```

  2. **config.properties** — The `config.properties` file contains the system level configuration for the database backup, which is based on the Linux cron job.

Editing Logback Files

1. Select **Edit File**.
2. To select the **logback.xml** option, enter `1`.
3. Press **Enter**.
4. Search for `com.dell.dfm` and `com.dell.wnm` keywords and change the logging level.

   For example, from `level=INFO` to `level=DEBUG` as shown in the following example.

   ```
   <logger name="com.dell.dfm" level="DEBUG">
                                   <appender-ref ref="DCM-MESSAGE" />
                                   <!-- appender-ref ref="DCM-ERROR" />
                                   <appender-ref ref="DCM-TRACE" /-->
                   </logger>
                   <logger name="b" level="DEBUG">
                                   <appender-ref ref="WNM-MESSAGE" />
                                   <!-- appender-ref ref="WNM-ERROR" />
                                   <appender-ref ref="WNM-TRACE" /-->
                   </logger>
   ```
5. Save the file using the vi editor commands such as `:w` (save file) and quit `:q` (quit editing).
6. To return to the main menu, press **Enter**.

Editing Config Properties Files

1. Select **Edit File**.
2. Enter the edit file option **2** and then select **config.properties**.
3. Press **Enter**.
4. To change the time of the cron job, search for `2am` or `1am` as a keyword. You can change `2am` to `3am` for the backup PostgreSQL DB or change it from `1am` to `4am` for the HBase.

   ```
   # The folder to store backed up database files. If the folder does not exist, the
   backup program will try to create it.
   wnm.database.backup.folder=/data/backup/postgres
   # The backup job will be started every day at 2am.
   wnm.database.backup.schedule=0 0 2am * * ?
   # *************** Database parameter : END ***************************
   # *************** HBASE parameter : Start ****************************
   ```

```
# The folder to store backed up database files. If the folder does not exist, the
backup program will try to create it
wnm.database.hbase.backup.folder=/data/backup/hbase
#The backup job will be started every day at 1am.
wnm.database.hbase.backup.schedule=0 0 1am * * ?
```

5. Save the file using the vi editor commands such as `:w` (save file) and quit `:q` (quit editing).
6. To return to the main menu, press **Enter**

Uploading the Switch Software Image

1. Select **Upload Switch Software Image** and press **Enter**.

   The **Upload Switch Software Image** screen appears.

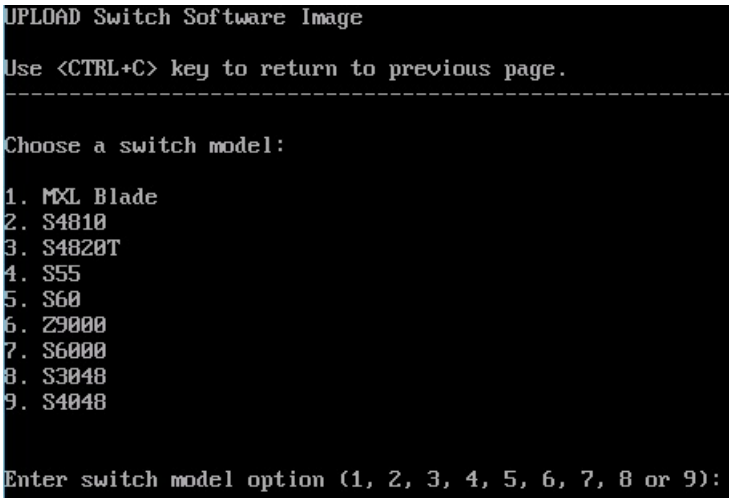

Figure 21. AFM Virtual Appliance Upload Switch Software Image Screen

2. Enter a switch model option. The range is from 1 to 9.
   - 1. MXL Blade
   - 2. S4810
   - 3. S4820T
   - 4. S55
   - 5. S60
   - 6. Z9000
   - 7. S6000
   - 8. S3048
   - 9. S4048
3. Enter your user name and password for the FTP connection. This option transfers the software image file into the `/data/FTOS/<SwitchModel>` directory and copies the files to the TFTP/FTP/SCP location.
4. To upload the switch software image using the formats listed in the **Upload Switch Software Image** screen, enter the URL location.
5. To return to the main menu, press **Enter**.

Restoring AFM Database Files

To restore AFM database files, use the **Restore Database** option. To restore configuration or performance history, select a file type to restore.

Restoring AFM Database Files

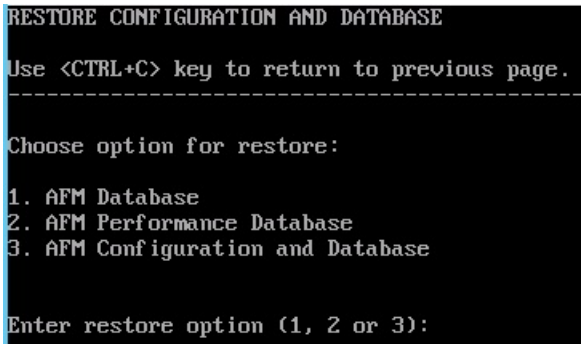

Figure 22. Restore Database Screen

1. Select **Restore Database**.
   The **RESTORE DATABASE** screen appears.
2. Make one of the following selections:
   - To select the **AFM Database** option, enter `1`.
     This option only restores the AFM-CPS database.
   - To select the **AFM Performance Database** option, enter `2`.
     This option restores performance history data.
   - To select the **AFM Configuration and Database** option, enter `3`.
     This option restores AFM-CPS database and switch configuration files.

   The screen specific to your choice appears.
3. Enter a database file option.
4. To restore the database process and restart AFM, enter `Y`.

Logging Out of the AFM Virtual Machine

1. Select **Log out**.
2. Press **Enter**.

Shutting Down the AFM Server

To shut down the AFM server VM, perform the following steps.

1. Select the **Shutdown AFM Server** option and press **Enter**.
2. Enter `y`.

6

Upgrading AFM-CPS

The AFM-CPS browser client can be used to upgrade AFM-CPS 1.0 to AFM-CPS 2.2(0.0). If you are currently running AFM-CPS 1.0 and you want to use the rack expansion feature, upgrade to AFM-CPS 2.2(0.0).
You can view and manage AFM-CPS updates on the **Server Update**.

To use the AFM-CPS 1.0 Linux console to perform an upgrade, see Updating the AFM Server.

1. From the AFM browser client menu, click **Administration** and then click the **Server Update** tab.
2. In the **Select file location** area, select one of the following options:
   - **Local Drive (DVD, USB)**
   - **Remote Server**

     NOTE: If the location is a remote server, enter the URL location of the .deb file on the remote server.

     1. From the **Protocol Type** drop-down menu, select the protocol type:
        - **https**
        - **ftp**
        - **sftp**
     2. Specify the path of the .deb package using the following formats:

        NOTE: The .deb filename must start with AFM and must end with .noarch.deb (for example, `AFM<version>.noarch.deb`).

        - `https://ipaddress/path_to_deb.file`
        - `ftp://ipaddress/path_to_deb.file`
        - `sftp://ipaddress/path_to_deb.file`
3. From the **Select the server update method** area, select:
   - **AFM Upload/Download** — Copy the update to the standby partition on the server but do not apply it or restart. To update, manually start the update from the AFM server update page.
4. Click **Update**. An information note appears, indicating that the server update job is scheduled. See the execution details in the job results tab. When the software image is available, it is listed in the Available Software Version column in the **Server Update** tab.
5. Click **Activate Available Version**.
6. To activate the available AFM software and reboot the server, click **Yes**. During the upgrade process, the AFM server is restarted to active the update in the standby partition. View the process details in the **Job Results** tab.

   When the upgrade is complete, you can confirm the update listed in the **Current Software Version** column in the **Server Upgrade** tab.

7

Creating and Expanding a Fabric

Using the AFM-CPS web interface, you can create a fabric; using AFM-CPS 2.2(0.0), you can expand an existing fabric.

Creating a New Fabric Using AFM-CPS

You can use the AFM-CPS 2.2(0.0) web client to create a fabric with one to four racks.

1. From the Getting Started screen, click **Design New Fabric**.
2. In the **Fabric Name and Rack** section:
   a. Enter a Fabric Name and Description (optional)
   b. Select the number of racks.
   c. Select **CPS 2016** to design a rack with S4048-ON and S3048-ON devices.

   Depending on whether you selected **CPS 2016** or **CPS 2014**, the **Supported Device Types** field displays the supported devices for that release.

   The **Output** screen shows the CPS 2016 network topology and wiring plan of the CPS 2016 racks. You can view the topology and wiring diagrams using the graphical and tabular views.
3. To complete the design and update the wiring plan, click **Finish**.

Expanding a Deployed Fabric in AFM-CPS

You can use the AFM-CPS 2.2(0.0) web client to expand an existing fabric from 1 to 4 racks. Upgrade to AFM-CPS 2.2(0.0) to use the rack expansion feature.

NOTE: AFM-CPS only supports expanding a deployed fabric for CPS 2016 racks.

1. From the **Getting Started** tab, click **Edit Existing Fabric**.
2. From the **Select a Fabric** dialog box, select an existing fabric and click **OK**.
3. In the **Description** field, add or modify a fabric description. The fabric name is read only.
4. In the **Number of Racks** field, make a selection.

   You cannot change the **Hardware Platform** setting for existing racks. The **Output** screen shows the network topology and wiring plan of the racks. You can view the topology and wiring diagrams using the **Graphical** and **Tabular** views.
5. To complete the design and update the wiring plan, click **Finish**.

Predeployment Configuration

After you create the fabric or expand the racks in an existing fabric, you can configure network settings for the Management IP address and system MAC address for each node. You can also generate a DHCP configuration file to add to your existing DHCP server.

1. From the **Getting Started** tab, click **Pre-deployment Configuration** and select a fabric to start the Predeployment wizard.

   The wizard walks you through the following predeployment tasks. As you progress through the wizard, you can click **Back**, **Next**, **Save and Exit**, or **Cancel** at any time during the tasks.
2. BGP Password Authentication — Allows you to enable BGP neighbor password authentication.
3. Assign Switch Identities — You can upload a MAC address csv file that you can use to map the MAC address to the switch name.

4. Management IP — Provide IP addresses for the fabric switches.
5. Switch Specific Configuration — Select and upload the CPS IP generator output file. The CPS 2016 Rack template file is listed in the Template Name column.
6. Authentication Settings — Allows you to enable TACACS Authentication and configure it.
7. SNMP and CLI Credentials — Enter SNMP and CLI credential to overwrite the defaults.
8. Software Images — Select or enter the path to the software image file for each model of node required in the core deployment. The software image must be placed on a TFTP/FTP site (as specified in the Administrative settings).
9. DHCP Integration — This step generates a DHCP file that must be manually integrated into the existing configuration.
10. Summary — The Summary screen shows the file transfer Completed status and the software image details.
11. Click **Finish** to power on and reload all rack one devices in BMP mode.

NOTE: You can revert rack expansion before deployment by editing the fabric to its previous size. From the Getting Started tab, click Edit Existing Fabric and select the fabric. However, you cannot reverse rack expansion after the rack is deployed.

Deploy and validate expanded racks.

Deploy and Validate the Expanded Racks

After predeployment configuration and the BMP process are complete, you can deploy and validate the expanded racks.

1. From the **Fabric Deployment Summary** screen, click **Deploy and Validate**.
2. Select the devices and click **Deploy Selected**.
3. Select **Overwrite entire configuration on the switch** and select **Reset** to factory default for the newly expanded rack.
4. Click **Deploy Selected**.
5. Click **Yes**.
6. Select a configuration deployment option:

Option	Description
Apply configuration changes to the switch	Apply new configuration changes from AFM to the switch.
Overwrite entire configuration on the switch	Overwrite the entire current configuration on the switch instead of applying only the changes to the current switch configuration.
Reset to factory default	If the Reset to factory defaults option is selected — AFM resets the switch to the factory default mode (BMP mode). AFM deploys the new configuration on the switch by overwriting the current configuration. If the Reset to factory defaults option is not selected — AFM deploys the new configuration on the switch by overwriting the current configuration.
Skip Deployment and proceed to Validation	Skip the deployment process and validate the switch.

8

Deploying Racks

After pre-deployment configuration and the BMP process are complete, you can deploy and validate the expanded racks.

Deploy Rack 1

Overview

During this task, you will:

- Enable BMP on the BMC switch.
- Deploy the access and aggregation switches.
- Deploy the BMC switch.

Function	Device
Baseboard Management Controller (BMC)	S3048-ON or S55 switch
Access switches	S4048-ON or S4810
Aggregation switches	S4048-ON or S4810

CAUTION:

- All switches in Rack 1 must be in BMP mode.
- Because BMP is enabled by default on the access or aggregate switches, do not initialize any switch until the BMC deployment is complete. If BMP is disabled, avoid enabling BMP on any switch during the BMC deployment.
- Do not deploy the BMC device and access or aggregate switches in the same rack at the same time.

Detailed Procedure

1. Verify that the AFM-CPS laptop's Ethernet link is connected to port 43 of the BMC switch on Rack 1.
2. Configure the IP on the AFM laptop as assigned for Rack 1.

   Note the `.out` file that the Microsoft IP Address Generator tool generates for the IP address of the AFM laptop in Rack 1.
3. On the AFM-CPS VM, configure the IP address of Rack 1 as `<AFM-IP-Rack-1>`.

   Note the `.out` file that the Microsoft IP Address Generator tool generates for the IP address of the AFM VM in Rack 1. The AFM VM reboots.
4. Log in to the AFM-CPS GUI.

   The IP address is `https://<AFM-IP-Rack-1>/afm/`.
5. Configure the following using the wizard:
   a. The FTP/TFTP server as local (`<AFM-IP-Rack-1>`)
   b. The DHCP server as local
   c. The syslog server as applicable for the fabric

      The IP address of the syslog server does not need to be the same as the IP address of the AFM server.
6. Design the fabric with one, two, three, or four racks.
7. To configure the following settings on all switches in the rack, use the predeployment wizard:

a. MAC address
b. Management IP address

   Use the IP address and gateway information provided in the output from the IP Address Generator tool. The management IP address is a loopback IP to the BMC switch.
c. Template
d. Template variable values that the IP Address Generator tool generates
e. Software image

8. When pre-deployment is complete on Rack 1, the DHCP server restarts using the predeployed configuration and BMP is enabled on the BMC switch connected to the AFM laptop.

   The BMP process takes some time to fully initialize on the S55 switch. Wait until the process completes on all switches in the rack before continuing to the next step; this step can take up to 25 minutes to complete.
9. Deploy the access and aggregate switches in Rack 1 (aggregation, tenant, and data center switches).
   - The BMC switch must be active, but do not make any configuration changes to it.
   - If you receive a ping verification error during deployment, verify that BMP is enabled and active on the BMC switch and all access or aggregate switches. If BMP is not active, debug DHCP to locate the request from the switches.
10. When all switches in the rack are validated and deployed, deploy the BMC switch in Rack 1.

    During deployment of the BMC switch:
    - Port 43 is temporarily unavailable
    - The network of the AFM-CPS VM is temporarily unavailable
    - The AFM-CPS browser times out while the switch reboots

    Connectivity is restored after you log in.

After you have deployed Rack 1, deploy Rack 2.

Deploy Rack 2

After deploying Rack 1, use this procedure to deploy additional racks in a new fabric.

Overview

During this task, you will:

- Confirm that BMP is enabled on the BMC switch.
- Deploy the access and aggregation switches.
- Deploy the BMC switch.

Function	Device
Baseboard Management Controller (BMC)	S3048-ON or S55 switch
Access switches	S4048-ON or S4810
Aggregation switches	S4048-ON or S4810

To add racks in an existing fabric, see Expanding a Deployed Fabric

1. Connect the laptop Ethernet link to port 43 of the BMC switch in Rack 2.
2. Configure the IP on the AFM-CPS laptop as assigned for Rack 2.

   Note the `.out` file that the Microsoft IP Address Generator tool generates for the IP address of the AFM laptop in Rack 2.
3. Start the AFM-CPS VM.
4. Configure the IP address of the AFM VM in Rack 2.

Note the `.out` file that the Microsoft IP Address Generator tool generates for the IP address of the AFM VM in Rack 2. The AFM VM reboots.

5. Log in to the AFM GUI using the following link format: `https://<AFM-IP-Rack-2>/afm/`.
6. Go to the **Administration** > **Setting** screen in the AFM GUI.
7. Change the system information to `<AFM-IP-Rack-2>`.
8. Use SSH to access `<AFM-IP-Rack-2>` as `superuser`.
9. Reboot the AFM-CPS server.
10. Log in to the AFM-CPS GUI using the following link format: `https://<AFM-IP-Rack-2>/afm/`.
11. Deploy the access and aggregate switches in Rack 2 (aggregation, tenant, and data center switches).
    - The BMC switch must be active, but do not make any configuration changes to it.
    - If you receive a ping verification error during deployment, verify that BMP is enabled and active on the BMC switch and all access or aggregate switches. If BMP is not active, debug DHCP to locate the request from the switches.
12. When all switches in the rack are deployed, deploy the BMC switch on Rack 2.

    During deployment of the BMC switch:

    - Port 43 is temporarily unavailable
    - The network of the AFM-CPS VM is temporarily unavailable
    - the AFM-CPS browser times out while the switch reboots

    Connectivity is restored after you log in.
13. Shut down the AFM-CPS VM.
14. To deploy additional racks, repeat this process from Step 1.

9

Migrating AFM to Deployed Racks

After deploying the racks, you can migrate AFM to the servers on the racks.

Migrating AFM to Rack 1

After deploying all the racks, port the laptop and AFM-CPS VM back to the Rack 1 IP address. If you configure the trap host as `AFM-IP-Rack-1`, the switches send any traps to that location.

1. Connect the laptop Ethernet link to port 43 on the BMC switch in Rack 1.
2. On the AFM-CPS laptop, assign an IP address to Rack 1.
   Note the `.out` file that the Microsoft IP Address Generator tool generates for the IP address of the AFM laptop in Rack 1.
3. Start the AFM-CPS VM.
4. Configure the IP on the AFM VM as assigned for Rack 1 (`<AFM-IP-Rack-1>`).
   The AFM VM reboots.
5. Log in the AFM-CPS GUI using `https://<AFM-IP-Rack-1>/afm/`.
6. Go to the **Administration > Settings** screen and change the system information to `<AFM-IP-Rack-1>`.
7. Using SSH, connect to `<AFM-IP-Rack-1>` as `superuser`.
8. Reboot the AFM server.
9. Log in the AFM GUI using `https://<AFM-IP-Rack-1>/afm/`.
10. Verify that the edge router is connected to all aggregation switches and is configured correctly.
    If the edge router is not configured correctly, AFM-CPS cannot validate the fabric.
11. Go to the **Network >** *<Fabric Name>* **> Configure and Deploy > Deploy and Validate > Validate** screen in the AFM-CPS GUI.
12. Run a validation check on all switches simultaneously.
13. Analyze and resolve any errors.
14. Go to the **Administration > Settings** screen and change the DHCP configuration to remote.

Migrating the AFM VM

To migrate the AFM VM from the laptop to the Rack 1 tenant server after deploying all the racks with the laptop, perform the following steps.

1. Copy the AFM VHDx to the laptop.
2. Create a VM on the tenant server with the Hyper-V Manager on the local drive C:\VM.
3. Select **Attach hard disk later**.
4. Do not attach the VM to a network.
5. Select **MAC Spoofing** and use the same MAC address as the AFM VM on the laptop.
6. Copy the AFM VHDx from the laptop to the tenant server.
   The file path is C:\VM\AFM
7. In the new VM created in Step 2, click **Settings**.
8. Attach the IDE Disk 0 (Boot) and point to the existing disk at the following filepath: C:\VM\AFM\AFM.VHDX
9. Start the AFM VM.

10. Disable DHCP.
11. Assign a static IP.
12. Shut down the VM manager.
13. Open the VM and create an IP reservation for the static IP used in Step 8.
14. Select the AFM VM and right-click.
15. Select **Migrate Virtual Machine** and select the VM.
16. Check the **Make Virtual Machine High Available** check box.
17. After migration completes, open the AFM VM properties in the VM manager.
18. Attach the AFM VM to the infrastructure network and select **Vlan 8**.
19. Start the VM.

Migrating AFM to the Infrastructure Rack

When all network switches are deployed and the network is ready, the server/cloud infrastructure is deployed. After deployment, the AFM VM can be migrated to the servers on Rack 1. For runtime management, migrate the data on the AFM-CPS laptop to the Rack 1 servers.

1. Export the AFM-CPS VM from the laptop used for deployment.

   For more information on how to import or export files to or from Hyper-V, see the Microsoft Hyper-V documentation.
2. Import the AFM-CPS VM exported in Step 1 to the infrastructure rack servers on Rack 1.
3. Log in to the AFM-CPS GUI using the format `https://<AFM-IP-Rack-1>/afm/`.
4. Go to **Administration > Settings** and change the following settings:
   - FTP/TFTP settings to local on `<AFM-IP-Rack-1>`
   - DHCP configuration to remote (AFM-CPS uses the DHCP server on the infrastructure rack)
5. Download the rack's DHCP configuration file from AFM-CPS.
6. Import the DHCP configuration file from AFM-CPS to the DHCP server on the infrastructure rack.
7. Go to the **Network >** *Fabric Name* **> Configure and Deploy > Deploy and Validate > Validate** screen.
8. Run a validation check on all switches simultaneously.
9. Analyze and resolve any errors.

Runtime Management

When the network is ready, use AFM-CPS to manage all the racks from the server on Rack 1.

NOTE: When you deploy AFM-CPS on Rack 1 in a two, three, or four-rack configuration, it can access aggregation switches on other racks through the BMC switch in Rack 1, and tenant and data center switches on other racks through their BMC and aggregation switches. If aggregation of Rack 2, 3, or 4 is unavailable, the management path in the rest of the switches in that rack is also unavailable.