



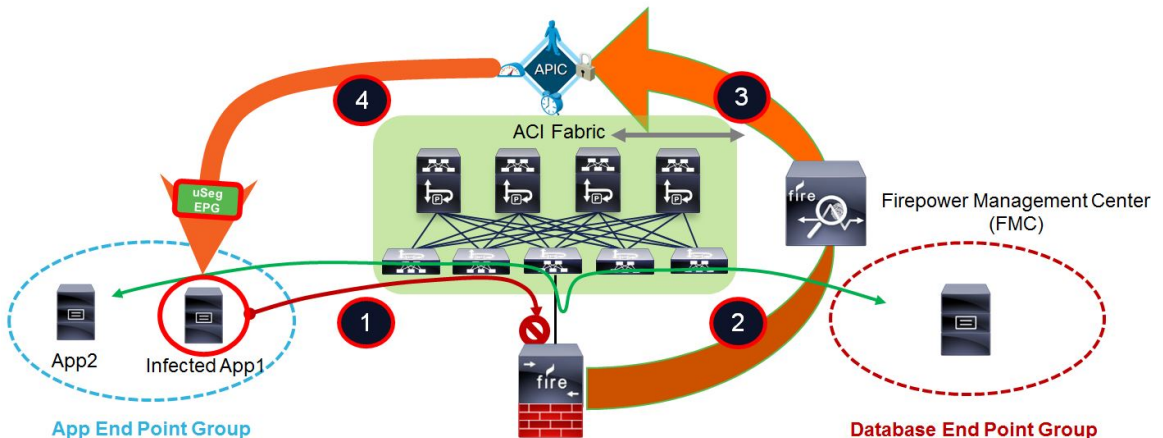
CISCO FIREPOWER MANAGEMENT CENTER REMEDIATION MODULE FOR ACI, VERSION 1.0.1_7 QUICK START GUIDE

Revised: December 2, 2021

1 About the Cisco Firepower Management Center Remediation Module for ACI

With the Cisco Firepower Management Center Remediation Module for ACI, when an attack on your network is detected by the Firepower Management Center 6.1 or FireSIGHT Management Center 5.4.x, the offending endpoint can be completely quarantined in the Application Policy Infrastructure Controller (APIC) so that no further traffic is allowed to go in or out of that endpoint. The following illustration shows the relationship between the Firepower Management Center (FMC) and the APIC when the Remediation Module is installed:

FMC to APIC Rapid Threat Containment



The illustration above shows the following process of quarantining a network attack in the APIC:

- Step 1** An endpoint with an infected application in an endpoint group (EPG) launches an attack on your network. The attack is blocked inline by either a Cisco Firepower Next-Generation Firewall (physical or virtual), a Cisco ASA with FirePOWER Services, or a Cisco FirePOWER Appliance (physical or virtual).
- Step 2** An attack event is generated and sent to the FMC. The attack event includes information about the infected endpoint.
- Step 3** The attack event is configured to trigger the remediation module for APIC, which uses the APIC northbound (NB) API to contain the infected endpoint in the ACI fabric.
- Step 4** The APIC quickly contains or quarantines the infected application workload into an isolated microsegment (uSeg) EPG.

**Note**

Currently, this only works with east-west traffic, where the attacking host is deployed in the ACI and learned on the APIC. An attack from an external, outside source connected to the fabric by L3Out and its north-south traffic is not blocked.

Behavior Supported in Version 1.0.1

**Note**

In VMware Distributed Virtual Switch (DVS) and Bare Metal deployments, not all switches can support uSeg quarantine functionality on the APIC. Contact your Cisco representative to determine which model(s) of the Cisco Nexus 9000 Series switches to order if you plan to use the uSeg quarantine feature in DVS and Bare Metal deployments.

This release enables you to quarantine offending endpoints that are detected by the Firepower Management Center 6.1 or FireSIGHT Management Center 5.4.x, using the APIC version 1.2(7). For version 1.0.1 of the Cisco Firepower Management Center Remediation Module for ACI, the supported behavior when endpoints are quarantined is described in the following table:

	Cisco Application Virtual Switch (AVS)	VMware Distributed Virtual Switch (DVS)	Bare Metal
Verified in IPS inline mode	Yes	Yes	Yes
EPG bridge mode	Yes	Yes	Yes
EPG routed mode	Yes	No	No
Multiple IP to one MAC checking	No	Yes	Yes
Create only an IP address filter uSeg attribute	Yes	No	No
Create both an IP address filter and a MAC address filter uSeg attribute	No	Yes	Yes

2 Deploy the Cisco Firepower Management Center Remediation Module for ACI

Download, Install, and Configure the Cisco Firepower Management Center Remediation Module for ACI

To download, install, and configure the Cisco Firepower Management Center Remediation Module for ACI, complete the following procedure:

Step 1 Download the remediation module.

a. Go to the software download page:

<https://software.cisco.com/download/home/286259687/type/286311510/release/ACI>

b. Download the Cisco Firepower Management Center Remediation Module for ACI.

Step 2 Install the remediation module.

- a. On the **Policies** tab of the FMC GUI, select the **Actions > Modules** sub-tab.
- b. In the Install a New Module dialog box, click **Choose File** as shown below.
- c. Select the file for the APIC/FMC Remediation Module.
- d. Click **Install**.

When successfully installed, the Cisco Firepower Management Center Remediation Module for ACI is displayed in the list of installed remediation modules:

The screenshot shows the Cisco Firepower Management Center (FMC) GUI. The top navigation bar includes 'Overview', 'Analysis', 'Policies', 'Devices', 'Objects', and 'AMP'. The 'Policies' tab is active, and the 'Actions > Modules' sub-tab is selected. Below the navigation bar, there are tabs for 'Access Control', 'Intrusion', 'Files', 'Network Discovery', 'SSL', 'Application Detectors', 'Users', 'Correlation', and 'Alerts Remediations Groups'. The main content area displays a table titled 'Installed Remediation Modules' with the following data:

Module Name	Version	Description
APIC/FirePOWER Remediation Module	1.0.1	APIC/FirePOWER Remediation Module
Cisco IOS Null Route	1.0	Block an IP address in a Cisco IOS router
Cisco PIX Shun	1.1	Shun an IP address in the PIX firewall
Nmap Remediation	2.0	Perform an Nmap Scan
Set Attribute Value	1.0	Set an Attribute Value

Below the table, an 'Install a new module' dialog box is open. It contains a 'Choose File' button, the text 'no file selected', and an 'Install' button.

- Step 3** Create an instance of the remediation module for each APIC server in your network.
- Click the edit icon for the remediation module in the list of installed remediation modules (on the **Policies** tab and **Actions > Modules** sub-tab, as shown above).
 - Enter an **Instance Name** and optional **Description**.
 - Enter the IP address, username, and password for the APIC server.
 - Click **Create**.

The screenshot displays the 'Edit Instance' configuration page. At the top, there is a navigation bar with tabs: Overview, Analysis, Policies (selected), Devices, Objects, AMP, Health, System, and Help. Below this is a sub-menu with: Access Control, Intrusion, Files, Network Discovery, SSL, Application Detectors, and Users. A secondary menu shows Alerts, Remediations (selected), and Groups.

The main form area is titled 'Edit Instance' and contains the following fields:

- Instance Name:** RemIns101
- Module:** APIC/FirePOWER Remediation Module (v1.0.1)
- Description:** Quarantine a bad EP (end point)
- APIC server username:** admin
- APIC server password:** Two masked password fields (Retype to confirm).
- APIC cluster instance 1 IP:** 172.23.37.154
- APIC cluster instance 2 IP:** Empty field
- APIC cluster instance 3 IP:** Empty field
- APIC cluster instance 4 IP:** Empty field
- APIC cluster instance 5 IP:** Empty field

At the bottom right, there are two buttons: 'Create' (circled in red) and 'Cancel'.

- Step 4** Create a Remediation Type for each instance of the APIC/FMC Remediation Module.
- On the **Policies** tab and **Actions > Instances** sub-tab, click the edit icon for the instance of the APIC/FMC Remediation Module that you just created.
 - Select **Quarantine an End Point on APIC**.
 - Click **Add**.
 - Click **Save**.

Edit Instance

Instance Name: RemIns101
 Module: APIC/FirePOWER Remediation Module (v1.0.1)

Description:

APIC server username:
 APIC server password:
Retype to confirm

APIC cluster instance 1 IP:
 APIC cluster instance 2 IP:
 APIC cluster instance 3 IP:
 APIC cluster instance 4 IP:
 APIC cluster instance 5 IP:

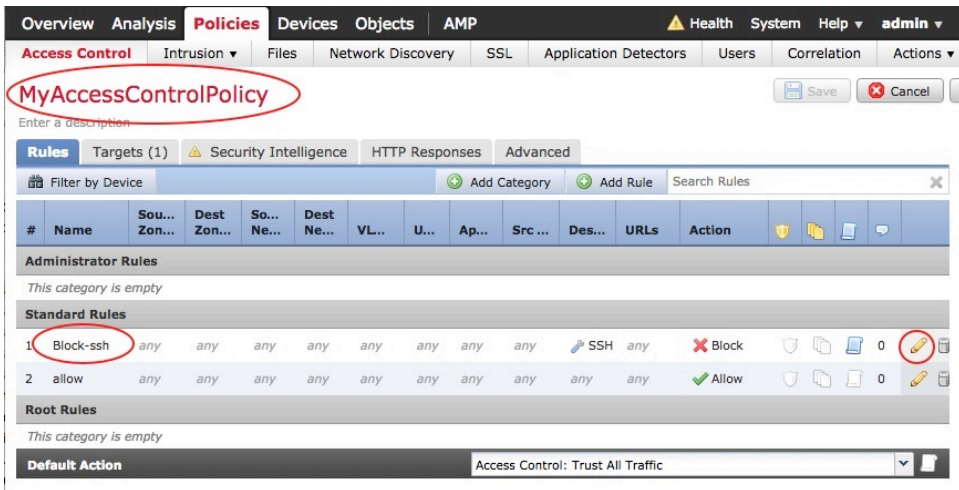
Configured Remediations

Remediation Name	Remediation Type	Description
QuarantineBadEP	Quarantine an End Point on APIC	

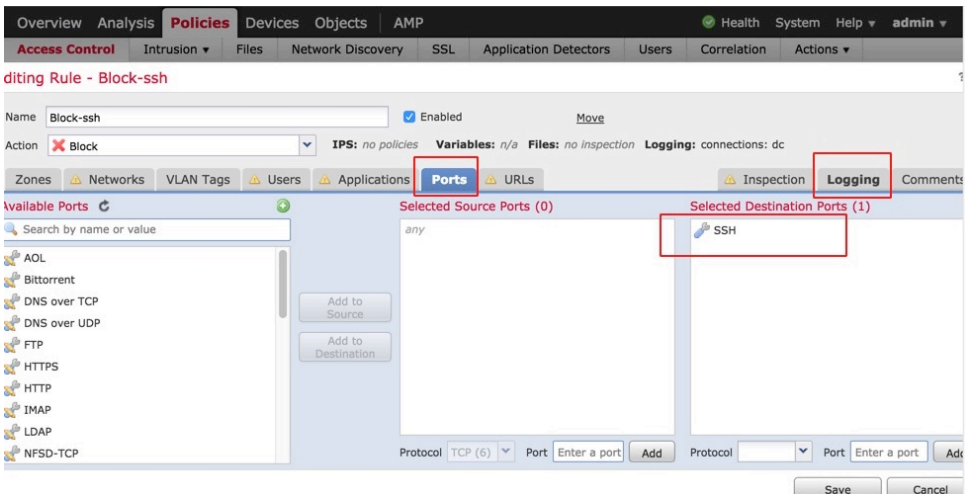
Add a new remediation of type:

Step 5 Configure an access control policy.

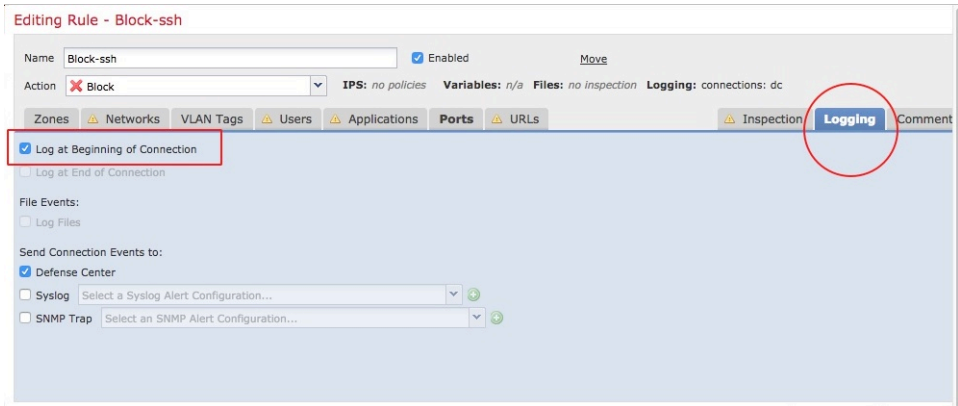
- a. Navigate to Policies > Access Control > Rules to add a rule (for example, a Block-ssh rule).
- b. Click the Edit icon for the Standard Rules to configure a rule to block SSH.



- c. Select Block for the Action.
- d. On the Ports tab, select SSH from the list of protocols for the Destination Port and click Add.



- e. Click **Save**.
- f. On the **Logging** tab, select **Log at Beginning of Connection**.
- g. Click **Save**.



Step 6 Configure a correlation rule.

- a. Navigate to **Policies > Correlation > Rule Management**.
- b. Enter a Rule Name.
- c. In the “Select the type of event for this rule” section, select a **connection event occurs and at either the beginning or the end of the connection**.
- d. Click the drop-down icon and select **Access Control Policy** and the name of the access control policy that you previously configured in Step 5.
- e. Click **Add condition** and change the operator from **OR** to **AND**.
- f. Select **Access Control Rule Name**, select **Is**, and select the rule you created (such as **Block-ssh** in this example).
- g. Click **Save**.

Overview Analysis **Policies** Devices Objects AMP Health System Help admin

Access Control Intrusion Files Network Discovery SSL Application Detectors Users **Correlation** Actions

Alerts Remediations Groups

Policy Management Rule Management White List Traffic Profiles

Rule Information

Rule Name:

Rule Description:

Rule Group:

Select the type of event for this rule

If at either the beginning or the end of the connection and it meets the following conditions:

Access Control Policy is MyAccessControlPolicy

Access Control Rule Name is Block-ssh

Rule Options

Snooze: If this rule generates an event, snooze for hours

Inactive Periods: There are no defined inactive periods. To add an inactive period, click "Add Inactive Period".

- Step 7** Associate the instance of the remediation module with a correlation rule as a response.
- Navigate to **Policies > Correlation > Policy Management**.
 - Enter a Policy Name and optional Policy Description and Default Priority.
 - Click **Add Rules** and select **BlockSSHRule**.
 - Click **Add** and click on the red-colored Responses icon.
 - Select **QuarantineBadEP (Remediation)** from the **Unassigned Responses** box to **Assigned Responses** box.
 - Click **Update** and **Save**.

The screenshot displays the Palo Alto Networks management console. The top navigation bar includes 'Overview', 'Analysis', 'Policies', 'Devices', 'Objects', and 'AMP'. Below this, a secondary bar shows 'Access Control', 'Intrusion', 'Files', 'Network Discovery', 'SSL', 'Application Detectors', 'Users', 'Correlation', and 'Actions'. The main content area is titled 'Policy Management' and contains a form for 'Correlation Policy Information' and a table for 'Policy Rules'.

Correlation Policy Information

Policy Name: BlockSSHPolicy
Policy Description: BlockSSHPolicy
Default Priority: None

Policy Rules

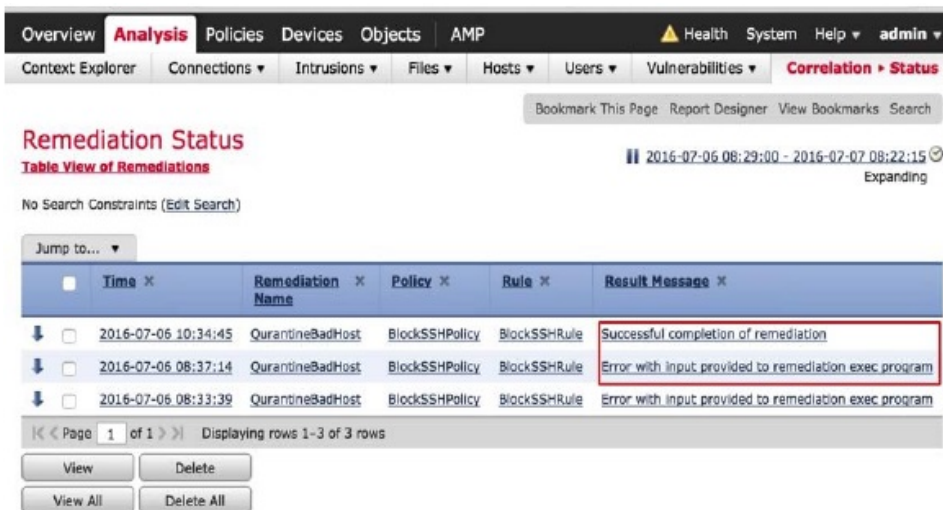
Rule	Responses	Priority
BlockSSHRule BlockSSHRule	QuarantineBadEP (Remediation)	Default

Verify that the Remediation Executed Properly

Because remediations can fail for various reasons, complete the following steps to verify that no error messages are listed for the remediation status on the Cisco FMC.

Step 1 On the **Analysis** tab of the FMC GUI, select the **Correlation > Status** tab.

Step 2 In the Remediation Status table, find the row for your policy and view the result message.



The screenshot shows the Cisco FMC Remediation Status page. The navigation bar includes tabs for Overview, Analysis (selected), Policies, Devices, Objects, and AMP. Below the navigation bar, there are links for Context Explorer, Connections, Intrusions, Files, Hosts, Users, Vulnerabilities, and Correlation > Status (selected). The main heading is "Remediation Status" with a sub-link "Table View of Remediations". A date range filter is set to "2016-07-06 08:29:00 - 2016-07-07 08:22:15" with an "Expanding" status. Below the filter, there is a search bar and a "Jump to..." dropdown. The main table has columns for Time, Remediation Name, Policy, Rule, and Result Message. The first row shows a successful completion of remediation, while the second and third rows show errors with input provided to the remediation exec program. The table is on page 1 of 1, displaying rows 1-3 of 3 rows. There are buttons for View, Delete, View All, and Delete All.

Time	Remediation Name	Policy	Rule	Result Message
2016-07-06 10:34:45	QuarantineBadHost	BlockSSHPolicy	BlockSSHRule	Successful completion of remediation
2016-07-06 08:37:14	QuarantineBadHost	BlockSSHPolicy	BlockSSHRule	Error with input provided to remediation exec program
2016-07-06 08:33:39	QuarantineBadHost	BlockSSHPolicy	BlockSSHRule	Error with input provided to remediation exec program

Step 3 If the remediation was successful, continue to the next section.

Step 4 If an error is shown, the end point may still be quarantined if subsequent remediation events are successful. When you see an error, go the next section to verify that the quarantine happened.

If the quarantine of the end point was eventually successful, you can ignore all of its error messages.

Check the Result of the Quarantine



Note In DVS and Bare Metal deployments, not all switches can support uSeg quarantine functionality on the APIC. If the quarantine fails, contact your Cisco representative to determine which model(s) of the Cisco Nexus 9000 Series switches you must use.

- Step 1** On the **Tenants** tab of the APIC GUI, expand the infected application in the left panel, expand uSeg EPGs, and select the EPG quarantine for the offending end point.
- Step 2** In the right panel, select the **Policies** tab and the **General** sub-tab.
- Step 3** Verify that one or more uSeg attributes were created on the APIC server.

The screenshot displays the APIC GUI configuration for the EPG quarantine-epg11. The left sidebar shows the navigation tree with 'EPG quarantine-epg11' selected. The main panel shows the 'Properties' tab for the policy, with 'uSeg Attributes' table highlighted.

Properties

Name: quarantine-epg11
Description: optional
Tags: enter tags separated by comma
Alias:
uSeg EPG: true
pcTag(sclass): 32772
QoS class: Unspecified
Custom QoS: select a value
Intra EPG Isolation: Enforced Unenforced
Preferred Group Member: Exclude Include
Configuration Status: applied
Configuration Issues:
Label Match Criteria: AtleastOne
Bridge Domain: ed/bd-ext
Resolved Bridge Domain: ed/bd-ext
Monitoring Policy: select a value

uSeg Attributes:

Name	Value
192.168.103.21	IP Address: 192.168.103.21

**Note**

For VMware DVS and Bare Metal (in bridged mode), two attributes (filters) are automatically created when an endpoint is quarantined, one attribute for the IP address and one attribute for the MAC address. Therefore, to remove the quarantine, you must delete both attributes.

Step 4 If the quarantine was not successful (no uSeg attributes were created), you can manually quarantine the IP address, as described in the next section.

Manually Quarantine an IP Address

If the quarantine was unsuccessful, optionally complete the following steps to manually quarantine the IP address.

- Step 1** Identify the IP address of the end point that you want to quarantine.
- On the **Analysis** tab on the FMC GUI, select the **Correlation > Status** sub-tab.
 - On the Remediation Status page, find the time stamp of entry for the unsuccessful quarantine and make note of the source IP address.
 - On the **Operations** tab, select **EP Tracker**, enter the IP address, and press **Enter**.
 - If no information is displayed, the end point cannot be quarantined. If more than one IP address is displayed, look for the one in the offending tenant.
- Step 2** If you can identify the EPG of the end point that you want to quarantine, create a uSeg EPG attribute corresponding to this end point.
- On the **Tenants** tab of the APIC GUI, use the information from Step 1 to find the EPG and make note of the bridge domain.
 - Expand the EPG and make note of the domain profile name.
 - On the **Tenants** tab, expand the **Application Profiles**, and right-click **uSeg EPG**.
 - Enter a name for the uSeg EPG, in this format: “quarantine-EPG_name_of_the_EP.”
 - Select the bridge domain of the EPG from Step 2a.
 - Add an IP filter attribute by clicking the plus sign on lower right and entering the IP address for the name and filter.
 - Click **Next Step** and select the same domain profile from Step 2b.
 - Set the **Deployment Immediacy** to **Immediate**.
 - Click **Update** and then click **Finish**.

- j. For DVS and Bare Metal, in addition to creating an IP address filter attribute, you must also create a MAC address filter attribute.

For IP filter, use the IP address as the name. For MAC filter, use the IP address plus an underscore and the last three octets of the MAC address as a name.

To find the MAC address, go to the APIC Object Store Browser by navigating to: https://apic_IP_address/visore.html. Use the IP address of the endpoint to run a query and display the MAC address.

APIC Object Store Browser

Filter			
Class or DN:	fvCEp		
Property:	ip	Op: ==	Val1: 192.168.103.21
<input type="button" value="Run Query"/>			

[Display URI of last query](#)

[Display last response](#)

fvCEp	
childAction	
contName	
dn	uni/tn-ed/ap-app2/epg-quarantine-epg11/cep-00:50:56:81:7F:A9
encap	vlan-176
id	0
idepdn	
ip	192.168.103.21
lcC	learned,vmm
lcOwn	local
mac	00:50:56:81:7F:A9

- k. Right-click on **Domains (VMs and Bare Metals)** under the newly created uSeg EPG, and add a domain association with the same name and Domain Type as the original EPG.
 - l. For Bare Metal, right-click on **Static Leafs**, and select **Statically Link With Node**.

Step 3 Verify that no traffic can go into or out from this endpoint.

For example, after an IP address is quarantined, pinging it should fail.

3 Related Documentation

For additional information about the Cisco Firepower Management Center 6.1 and FireSIGHT Management Center 5.4.x, see the *Configuration Guide for the appropriate version*.

For additional information about the Cisco APIC and ACI, see [APIC Documentation](#) and [Cisco Application Centric Infrastructure Security Solution](#).

4 Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: <http://www.cisco.com/c/en/us/td/docs/general/whatsnew/whatsnew.html>.

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