Configuring TACACS+

This chapter describes how to configure the Terminal Access Controller Access Control System Plus (TACACS+) protocol on Cisco NX-OS devices.

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Finding Feature Information

Your software release might not support all the features documented in this module. For the latest caveats and feature information, see the Bug Search Tool at https://bst.cloudapps.cisco.com/bugsearch and the release notes for your software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "New and Changed Information"chapter or the Feature History table in this chapter.

Information About TACACS+

The TACACS+ security protocol provides centralized validation of users attempting to gain access to a Cisco NX-OS device. TACACS+ services are maintained in a database on a TACACS+ daemon running, typically, on a UNIX or Windows NT workstation. You must have access to and must configure a TACACS+ server before the configured TACACS+ features on your Cisco NX-OS device are available.

TACACS+ provides for separate authentication, authorization, and accounting facilities. TACACS+ allows for a single access control server (the TACACS+ daemon) to provide each service—authentication, authorization, and accounting—independently. Each service can be tied into its own database to take advantage of other services available on that server or on the network, depending on the capabilities of the daemon.

The TACACS+ client/server protocol uses TCP (TCP port 49) for transport requirements. Cisco NX-OS devices provide centralized authentication using the TACACS+ protocol.

TACACS+ Advantages

TACACS+ has the following advantages over RADIUS authentication:

- Provides independent AAA facilities. For example, the Cisco NX-OS device can authorize access without authenticating.
- Uses the TCP transport protocol to send data between the AAA client and server, making reliable transfers with a connection-oriented protocol.
- Encrypts the entire protocol payload between the switch and the AAA server to ensure higher data confidentiality. The RADIUS protocol only encrypts passwords.

TACACS+ Operation for User Login

When a user attempts a Password Authentication Protocol (PAP) login to a Cisco NX-OS device using TACACS+, the following actions occur:

Note TACACS+ allows an arbitrary conversation between the daemon and the user until the daemon receives enough information to authenticate the user. This action is usually done by prompting for a username and password combination, but may include prompts for other items, such as your mother's maiden name.

1. When the Cisco NX-OS device establishes a connection, it contacts the TACACS+ daemon to obtain the username and password.
2. The Cisco NX-OS device will eventually receive one of the following responses from the TACACS+ daemon:

   ACCEPT
   User authentication succeeds and service begins. If the Cisco NX-OS device requires user authorization, authorization begins.
   REJECT
   User authentication failed. The TACACS+ daemon either denies further access to the user or prompts the user to retry the login sequence.
   ERROR
   An error occurred at some time during authentication either at the daemon or in the network connection between the daemon and the Cisco NX-OS device. If the Cisco NX-OS device receives an ERROR response, the Cisco NX-OS device tries to use an alternative method for authenticating the user.

   After authentication, the user also undergoes an additional authorization phase if authorization has been enabled on the NX-OS device. Users must first successfully complete TACACS+ authentication before proceeding to TACACS+ authorization.

3. If TACACS+ authorization is required, the Cisco NX-OS device again contacts the TACACS+ daemon and it returns an ACCEPT or REJECT authorization response. An ACCEPT response contains attributes that are used to direct the EXEC or NETWORK session for that user and determines the services that the user can access.

   Services include the following:

   - Telnet, rlogin, Point-to-Point Protocol (PPP), Serial Line Internet Protocol (SLIP), or EXEC services
   - Connection parameters, including the host or client IP address (IPv4 or IPv6), access list, and user timeouts

Default TACACS+ Server Encryption Type and Secret Key

You must configure the TACACS+ secret key to authenticate the switch to the TACACS+ server. A secret key is a secret text string shared between the Cisco NX-OS device and the TACACS+ server host. The length of the key is restricted to 63 characters and can include any printable ASCII characters (white spaces are not allowed). You can configure a global secret key for all TACACS+ server configurations on the Cisco NX-OS device to use.

You can override the global secret key assignment by explicitly using the **key** option when configuring an individual TACACS+ server.

Command Authorization Support for TACACS+ Servers

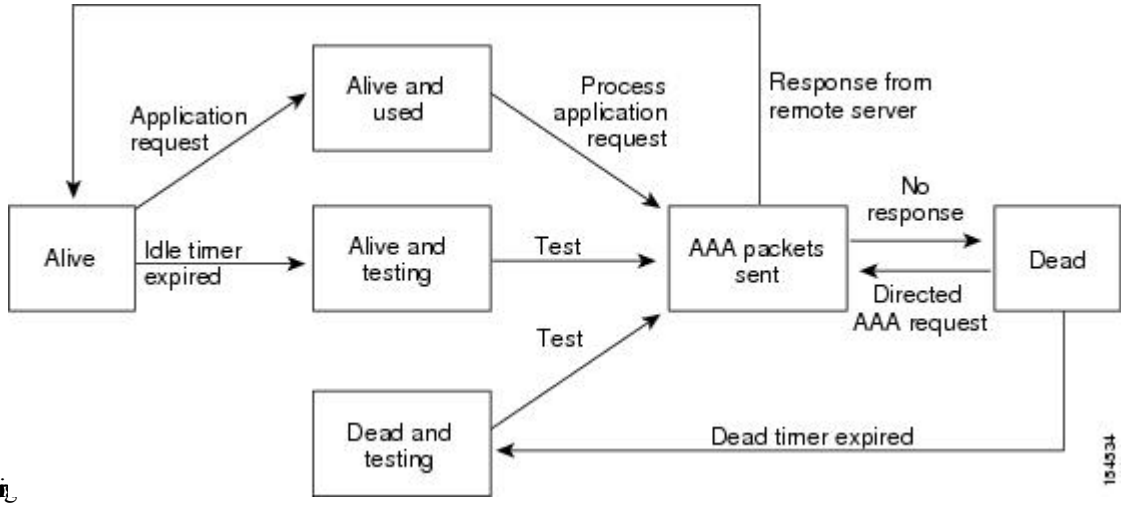
By default, command authorization is done against a local database in the Cisco NX-OS software when an authenticated user enters a command at the command-line interface (CLI). You can also verify authorized commands for authenticated users using TACACS+.

TACACS+ Server Monitoring

An unresponsive TACACS+ server can delay the processing of AAA requests. A Cisco NX-OS device can periodically monitor a TACACS+ server to check whether it is responding (or alive) to save time in processing AAA requests. The Cisco NX-OS device marks unresponsive TACACS+ servers as dead and does not send AAA requests to any dead TACACS+ servers. A Cisco NX-OS device periodically monitors dead TACACS+ servers and brings them to the alive state once they are responding. This process verifies that a TACACS+ server is in a working state before real AAA requests are sent its way. Whenever a TACACS+ server changes to the dead or alive state, a Simple Network Management Protocol (SNMP) trap is generated and the Cisco NX-OS device displays an error message that a failure is taking place before it can impact performance.

Figure 1: TACACS+ Server States

This figure shows the server states for TACACS+ server



monitoring

Note The monitoring interval for alive servers and dead servers are different and can be configured by the user. The TACACS+ server monitoring is performed by sending a test authentication request to the TACACS+ server.

TACACS+ Configuration Distribution

Cisco Fabric Services (CFS) allows the Cisco NX-OS device to distribute the TACACS+ configuration to other Cisco NX-OS devices in the network. When you enable CFS distribution for a feature on your device, the device belongs to a CFS region containing other devices in the network that you have also enabled for CFS distribution for the feature. CFS distribution for TACACS+ is disabled by default.

Note You must explicitly enable CFS for TACACS+ on each device to which you want to distribute configuration changes.

After you enable CFS distribution for TACACS+ on your Cisco NX-OS device, the first TACACS+ configuration command that you enter causes the Cisco NX-OS software to take the following actions:

- Creates a CFS session on your Cisco NX-OS device.
- Locks the TACACS+ configuration on all Cisco NX-OS devices in the CFS region with CFS enabled for TACACS+.
- Saves the TACACS+ configuration changes in a temporary buffer on the Cisco NX-OS device.

The changes stay in the temporary buffer on the Cisco NX-OS device until you explicitly commit them to be distributed to the devices in the CFS region. When you commit the changes, the Cisco NX-OS software takes the following actions:

- Applies the changes to the running configuration on your Cisco NX-OS device.

- Distributes the updated TACACS+ configuration to the other Cisco NX-OS devices in the CFS region.
- Unlocks the TACACS+ configuration in the devices in the CFS region.
- Terminates the CFS session.

CFS does not distribute the TACACS+ server group configuration, periodic TACACS+ server testing configurations, or server and global keys. The keys are unique to the Cisco NX-OS device and are not shared with other Cisco NX-OS devices.

For detailed information on CFS, see the *Cisco Nexus 7000 Series NX-OS System Management Configuration Guide*.

Vendor-Specific Attributes for TACACS+

The Internet Engineering Task Force (IETF) draft standard specifies a method for communicating vendor-specific attributes (VSAs) between the network access server and the TACACS+ server. The IETF uses attribute 26. VSAs allow vendors to support their own extended attributes that are not suitable for general use.

Cisco VSA Format for TACACS+

The Cisco TACACS+ implementation supports one vendor-specific option using the format recommended in the IETF specification. The Cisco vendor ID is 9, and the supported option is vendor type 1, which is named cisco-av-pair. The value is a string with the following format:

```
protocol : attribute separator value *
```

The protocol is a Cisco attribute for a particular type of authorization, the separator is = (equal sign) for mandatory attributes, and * (asterisk) indicates optional attributes.

When you use TACACS+ servers for authentication on a Cisco NX-OS device, the TACACS+ protocol directs the TACACS+ server to return user attributes, such as authorization information, along with authentication results. This authorization information is specified through VSAs.

The following VSA protocol options are supported by the Cisco NX-OS software:

Shell
Protocol used in access-accept packets to provide user profile information.

Accounting
Protocol used in accounting-request packets. If a value contains any white spaces, you should enclose the value within double quotation marks.

The Cisco NX-OS software supports the following attributes:

roles

Lists all the roles to which the user belongs. The value field is a string that lists the role names delimited by white space. For example, if the user belongs to roles network-operator and vdc-admin, the value field would be network-operator vdc-admin. This subattribute, which the TACACS+ server sends in the VSA portion of the Access-Accept frames, can only be used with the shell protocol value. The following examples show the roles attribute as supported by Cisco ACS:

```
shell:roles=network-operator vdc-admin

shell:roles*network-operator vdc-admin
```

Note When you specify a VSA as shell:roles*"network-operator vdc-admin", this VSA is flagged as an optional attribute and other Cisco devices ignore this attribute.

accountinginfo
Stores accounting information in addition to the attributes covered by a standard TACACS+ accounting protocol. This attribute is sent only in the VSA portion of the Account-Request frames from the TACACS+ client on the switch. It can be used only with the accounting protocol data units (PDUs).

Prerequisites for TACACS+

TACACS+ has the following prerequisites:

- Obtain the IPv4 or IPv6 addresses or hostnames for the TACACS+ servers.
- Obtain the secret keys from the TACACS+ servers, if any.
- Ensure that the Cisco NX-OS device is configured as a TACACS+ client of the AAA servers.

Guidelines and Limitations for TACACS+

TACACS+ has the following guidelines and limitations:

- You may get the following error message sporadically after you have configured a TACACS+ server host followed by the AAA configuration to actually use the host:

  ```
  %TACACS-3-TACACS_ERROR_MESSAGE: All servers failed to respond
  ```

  This is a known issue from Cisco NX-OS Release 8.0(1) onwards and there is no workaround. If the remote authentication works properly without any TACACS server connectivity issue, you can ignore the message and continue with your further configuration.
- You can configure a maximum of 64 TACACS+ servers on the Cisco NX-OS device.
- If you have a user account configured on the local Cisco NX-OS device that has the same name as a remote user account on an AAA server, the Cisco NX-OS software applies the user roles for the local user account to the remote user, not the user roles configured on the AAA server.
- Cisco recommends that you configure the dead-time interval if more than six servers are configured in a group. If you must configure more than six servers, make sure to set the dead-time interval to a value greater than 0 and enable dead server monitoring by configuring the test username and test password.
- For Cisco NX-OS Releases 4.x and 5.x, command authorization on TACACS+ servers is available only for non-console sessions. If you use a console to login to the server, command authorization is disabled. Beginning with Cisco NX-OS Release 6.0, command authorization on TACACS+ servers is available for both console and non-console sessions.

Default Settings for TACACS+

This table lists the default settings for TACACS+ parameters.

Table 1: Default TACACS+ Parameters Settings

Parameters	Default
TACACS+	Disabled
Dead timer interval	0 minutes
Timeout interval	5 seconds
Idle timer interval	0 minutes
Periodic server monitoring username	test
Periodic server monitoring password	test

Configuring TACACS+

This section describes how to configure TACACS+ on a Cisco NX-OS device.

Note If you are familiar with the Cisco IOS CLI, be aware that the Cisco NX-OS commands for this feature might differ from the Cisco IOS commands that you would use.

TACACS+ Server Configuration Process

Procedure

Step 1 Enable TACACS+.

Step 2 If needed, enable CFS configuration distribution for TACACS+.

Step 3 Establish the TACACS+ server connections to the Cisco NX-OS device.

Step 4 Configure the secret keys for the TACACS+ servers.

Step 5 If needed, configure TACACS+ server groups with subsets of the TACACS+ servers for AAA authentication methods.

Step 6 (Optional) Configure the TCP port.

Step 7 (Optional) If needed, configure periodic TACACS+ server monitoring.

Step 8 (Optional) If TACACS+ distribution is enabled, commit the TACACS+ configuration to the fabric.

Related Topics

Enabling TACACS+, on page 8

Enabling TACACS+

By default, the TACACS+ feature is disabled on the Cisco NX-OS device. You must explicitly enable the TACACS+ feature to access the configuration and verification commands for authentication.

SUMMARY STEPS

1. **configure terminal**
2. **feature tacacs+**
3. **exit**
4. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**feature tacacs+** **Example:** `switch(config)# feature tacacs+`	Enables TACACS+.

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Configuring TACACS+ Server Hosts

To access a remote TACACS+ server, you must configure the IP address or the hostname for the TACACS+ server on the Cisco NX-OS device. You can configure up to 64 TACACS+ servers.

Note By default, when you configure a TACACS+ server IP address or hostname on the Cisco NX-OS device, the TACACS+ server is added to the default TACACS+ server group. You can also add the TACACS+ server to another TACACS+ server group.

Before you begin

Enable TACACS+.

Obtain the IPv4 or IPv6 addresses or the hostnames for the remote TACACS+ servers.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*host-name* | *ipv4-address* | *ipv6-address*} [**key** [**0** | **6** | **7**] *shared-secret*] [**port** *port-number*] [**timeout** *seconds*] [**single-connection**]
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*host-name* | *ipv4-address* | *ipv6-address*} [**key** [**0** | **6** | **7**] *shared-secret*] [**port** *port-number*] [**timeout** *seconds*] [**single-connection**] **Example:** `switch(config)# tacacs-server host 10.10.2.2`	Specifies the IPv4 or IPv6 address or hostname for a TACACS+ server. Use the **single-connection** option to improve performance by configuring a single TACACS+ connection. Rather than have the device open and close a TCP connection to the daemon each time it must communicate, this option maintains a single open connection between the device and the daemon.
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the TACACS+ configuration pending for distribution.
Step 4	(Optional) **tacacs+ commit** **Example:**	Applies the TACACS+ configuration changes in the temporary database to the running configuration and

	Command or Action	Purpose
	`switch(config)# tacacs+ commit`	distributes TACACS+ configuration to other NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 6	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29
Configuring TACACS+ Server Groups, on page 13

Configuring Global TACACS+ Keys

You can configure secret TACACS+ keys at the global level for all servers used by the Cisco NX-OS device. A secret key is a shared secret text string between the Cisco NX-OS device and the TACACS+ server hosts.

Note CFS does not distribute the TACACS+ global keys. The keys are unique to the Cisco NX-OS device and are not shared with other Cisco NX-OS devices.

Before you begin

Enable TACACS+.

Obtain the secret key values for the remote TACACS+ servers.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server key** [**0** | **7**] *key-value*
3. **exit**
4. (Optional) **show tacacs-server**
5. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server key** [**0** | **7**] *key-value* **Example:** `switch(config)# tacacs-server key 0 QsEfThUkO`	Specifies a TACACS+ key for all TACACS+ server. You can specify that the *key-value* is in clear text format (**0**) or is type-7 encrypted (**7**). The Cisco NX-OS software encrypts a clear text key before saving it to the running configuration. The default format is clear text. The maximum length is 63 characters. By default, no secret key is configured.

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration. **Note** The secret keys are saved in encrypted form in the running configuration. Use the **show running-config** command to display the encrypted secret keys.
Step 5	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

AES Password Encryption and Master Encryption Keys
Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring a Key for a Specific TACACS+ Server

You can configure secret keys for a TACACS+ server. A secret key is a shared secret text string between the Cisco NX-OS device and the TACACS+ server host.

Note CFS does not distribute the TACACS+ server keys. The keys are unique to the Cisco NX-OS device and are not shared with other Cisco NX-OS devices.

Before you begin

Enable TACACS+.

Obtain the secret key values for the remote TACACS+ servers.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **key** [**0** | **6** | **7**] *key-value*
3. **exit**
4. (Optional) **show tacacs-server**
5. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **key** [**0** | **6** | **7**] *key-value* **Example:** `switch(config)# tacacs-server host 10.10.1.1 key 0 PlIjUhYg`	Specifies a secret key for a specific TACACS+ server. You can specify the format of the secret key with the option **key**: • **key 0** specifies that the *key-value* entered is in clear text format • **key 6** specifies that the *key-value* entered is in type-6 encrypted format • **key 7** specifies that the *key-value* entered is in type-7 encrypted format If no key is specified, NX-OS software assumes the *key-value* to be clear text and encrypts it using type-7 encryption before saving it to running configuration. The maximum length of *key-value* is 63 characters This secret key is used instead of the global secret key. **Note** Type-6 encryption is done using AES cipher and a user-defined master key. Without this master key, type-6 keys are unusable. The master key is defined by the user and is never displayed in the configuration. Type-6 passwords are more secure. Type-7 encryption is done using a weak cipher and an encryption key that is hardwired into the OS. Type-7 passwords configured on one device can be decrypted on

	Command or Action	Purpose
		any other device because the encryption/decryption key is contained within the OS.

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration. **Note** The secret keys are saved in encrypted form in the running configuration. Use the **show running-config** command to display the encrypted secret keys.
Step 5	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

AES Password Encryption and Master Encryption Keys

Configuring TACACS+ Server Groups

You can specify one or more remote AAA servers to authenticate users using server groups. All members of a group must belong to the TACACS+ protocol. The servers are tried in the same order in which you configure them.

You can configure these server groups at any time but they only take effect when you apply them to an AAA service.

Note CFS does not distribute the TACACS+ server group configuration.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*host-name* | *ipv4-address* | *ipv6-address*} [**key** [**0** | **6** | **7**] *shared-secret*] [**port** *port-number*] [**timeout** *seconds*] [**single-connection**]
3. **aaa group server tacacs+** *group-name*
4. **server** {*ipv4-address* | *ipv6-address* | *host-name*}
5. **exit**
6. (Optional) **show tacacs-server groups**

7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*host-name* | *ipv4-address* | *ipv6-address*} [**key** [**0** | **6** | **7**] *shared-secret*] [**port** *port-number*] [**timeout** *seconds*] [**single-connection**]
	Example:
	`switch(config)# tacacs-server host 10.10.2.2`
	`switch(config-tacacs+)#`
		Specifies the IPv4 or IPv6 address or hostname for a TACACS+ server.
		Use the **single-connection** option to improve performance by configuring a single TACACS+ connection. Rather than have the device open and close a TCP connection to the daemon each time it must communicate, this option maintains a single open connection between the device and the daemon.

Step 3	**aaa group server tacacs+** *group-name*
	Example:
	`switch(config)# aaa group server tacacs+ TacServer`
	`switch(config-tacacs+)#`
		Creates a TACACS+ server group and enters the TACACS+ server group configuration mode for that group.

Step 4	**server** {*ipv4-address* | *ipv6-address* | *host-name*} **Example:** `switch(config-tacacs+)# server 10.10.2.2`	Configures the TACACS+ server as a member of the TACACS+ server group. If the specified TACACS+ server is not found, configure it using the **tacacs-server host** command and retry this command.

Step 5	**exit**
	Example:
	`switch(config-tacacs+)# exit`
	`switch(config)#`
		Exits TACACS+ server group configuration mode.

Step 6	(Optional) **show tacacs-server groups** **Example:** `switch(config)# show tacacs-server groups`	Displays the TACACS+ server group configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8

Remote AAA Services
Configuring TACACS+ Server Hosts, on page 8
Configuring the TACACS+ Dead-Time Interval, on page 22

Configuring the Global Source Interface for TACACS+ Server Groups

You can configure a global source interface for TACACS+ server groups to use when accessing TACACS+ servers. You can also configure a different source interface for a specific TACACS+ server group. By default, the Cisco NX-OS software uses any available interface.

SUMMARY STEPS

1. **configure terminal**
2. **ip tacacs source-interface** *interface*
3. **exit**
4. (Optional) **show tacacs-server**
5. (Optional) **copy running-config startup config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)`
		Enters global configuration mode.

Step 2	**ip tacacs source-interface** *interface* **Example:** `switch(config)# ip tacacs source-interface mgmt 0`	Configures the global source interface for all TACACS+ server groups configured on the device.

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration information.
Step 5	(Optional) **copy running-config startup config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Configuring TACACS+ Server Groups, on page 13

Allowing Users to Specify a TACACS+ Server at Login

You can configure the switch to allow the user to specify which TACACS+ server to send the authentication request by enabling the directed-request option. By default, a Cisco NX-OS device forwards an authentication request based on the default AAA authentication method. If you enable this option, the user can log in as *username@vrfname:hostname*, where *vrfname* is the VRF to use and *hostname* is the name of a configured TACACS+ server.

Note If you enable the directed-request option, the Cisco NX-OS device uses only the TACACS+ method for authentication and not the default local method.

Note User-specified logins are supported only for Telnet sessions.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server directed-request**
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server directed-request**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

	Command or Action	Purpose
Step 2	**tacacs-server directed-request** **Example:** `switch(config)# tacacs-server directed-request`	Allows users to specify a TACACS+ server to send the authentication request when logging in. The default is disabled.
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the pending TACACS+ configuration.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes TACACS+ configuration to other NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 6	(Optional) **show tacacs-server directed-request** **Example:** `switch# show tacacs-server directed-request`	Displays the TACACS+ directed request configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring the Global TACACS+ Timeout Interval

You can set a global timeout interval that the device waits for responses from all TACACS+ servers before declaring a timeout failure. The timeout interval determines how long the device waits for responses from TACACS+ servers before declaring a timeout failure.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. From the Feature Selector pane, choose **Security > AAA > Server Groups**.
2. From the Summary pane, double-click the device to display the server groups.
3. Click **Default TACACS Server Group**.

4. From the Details pane, click the **Global Settings** tab.
5. In the Time out(secs) field, enter the number of seconds for the timeout interval.
6. From the menu bar, choose **File > Deploy** to apply your changes to the device.

DETAILED STEPS

Procedure

Step 1 From the Feature Selector pane, choose **Security > AAA > Server Groups**.

Step 2 From the Summary pane, double-click the device to display the server groups.

Step 3 Click **Default TACACS Server Group**.

Step 4 From the Details pane, click the **Global Settings** tab.

Step 5 In the Time out(secs) field, enter the number of seconds for the timeout interval.
The default is 5 seconds.

Step 6 From the menu bar, choose **File > Deploy** to apply your changes to the device.

Related Topics

Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring the Timeout Interval for a TACACS+ Server

You can set a timeout interval that the Cisco NX-OS device waits for responses from a TACACS+ server before declaring a timeout failure. The timeout interval determines how long the Cisco NX-OS device waits for responses from a TACACS+ server before declaring a timeout failure.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **timeout** *seconds*
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **timeout** *seconds* **Example:** `switch(config)# tacacs-server host server1 timeout 10`	Specifies the timeout interval for a specific server. The default is the global value. **Note** The timeout interval value specified for a TACACS+ server overrides the global timeout interval value specified for all TACACS+ servers.
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the TACACS+ configuration pending for distribution.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes the TACACS+ configuration to other Cisco NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 6	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring TCP Ports

You can configure another TCP port for the TACACS+ servers if there are conflicts with another application. By default, Cisco NX-OS devices use port 49 for all TACACS+ requests.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **port** *tcp-port*
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **port** *tcp-port* **Example:** `switch(config)# tacacs-server host 10.10.1.1 port 2`	Specifies the TCP port to use for TACACS+ messages to the server. The default TCP port is 49. The range is from 1 to 65535.
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ distribution pending`	Displays the TACACS+ configuration pending for distribution.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes TACACS+ configuration to other NX-OS devices if you have enabled CFS configuration distribution for the user role feature.
Step 5	**exit** **Example:**	Exits configuration mode.

	Command or Action	Purpose
	`switch(config)# exit` `switch#`	
Step 6	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring Periodic TACACS+ Server Monitoring on Individual Servers

You can monitor the availability of individual TACACS+ servers. The configuration parameters include the username and password to use for the server and an idle timer. The idle timer specifies the interval in which a TACACS+ server receives no requests before the Cisco NX-OS device sends out a test packet. You can configure this option to test servers periodically, or you can run a one-time only test.

Note To protect network security, we recommend that you use a username that is not the same as an existing username in the TACACS+ database.

Note The default idle timer value is 0 minutes. When the idle time interval is 0 minutes, periodic TACACS+ server monitoring is not performed.

Before you begin

Enable TACACS+.

Add one or more TACACS+ server hosts.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **test** {**idle-time** *minutes* | **password** *password* [**idle-time** *minutes*] | **username** *name* [**password** *password* [**idle-time** *minutes*]]}
3. **tacacs-server dead-time** *minutes*
4. **exit**
5. (Optional) **show tacacs-server**
6. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server host** {*ipv4-address* | *ipv6-address* | *host-name*} **test** {**idle-time** *minutes* | **password** *password* [**idle-time** *minutes*] | **username** *name* [**password** *password* [**idle-time** *minutes*]]} **Example:** `switch(config)# tacacs-server host 10.10.1.1 test username user1 password Ur2Gd2BH idle-time 3`	Specifies parameters for individual server monitoring. The default username is test, and the default password is test. The default value for the idle timer is 0 minutes, and the valid range is from 0 to 1440 minutes. **Note** For periodic TACACS+ server monitoring, the idle timer value must be greater than 0.
Step 3	**tacacs-server dead-time** *minutes* **Example:** `switch(config)# tacacs-server dead-time 5`	Specifies the number of minutes before the Cisco NX-OS device checks a TACACS+ server that was previously unresponsive. The default value is 0 minutes, and the valid range is from 0 to 1440 minutes.

Step 4	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 5	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 6	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Configuring TACACS+ Server Hosts, on page 8
Enabling TACACS+ Configuration Distribution, on page 29

Configuring the TACACS+ Dead-Time Interval

You can configure the dead-time interval for all TACACS+ servers. The dead-time interval specifies the time that the Cisco NX-OS device waits, after declaring a TACACS+ server is dead, before sending out a test packet to determine if the server is now alive.

Note When the dead-timer interval is 0 minutes, TACACS+ servers are not marked as dead even if they are not responding. You can configure the dead-timer per group.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs-server deadtime** *minutes*
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs-server deadtime** *minutes* **Example:** `switch(config)# tacacs-server deadtime 5`	Configures the global dead-time interval. The default value is 0 minutes. The range is from 1 to 1440 minutes.
Step 3	(Optional) **show tacacs+** {**pending**	**pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the pending TACACS+ configuration.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes TACACS+ configuration to other NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

	Command or Action	Purpose
Step 6	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+ Configuration Distribution, on page 29

Configuring ASCII Authentication

You can enable ASCII authentication on the TACACS+ server.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **aaa authentication login ascii-authentication**
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show tacacs-server**
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**aaa authentication login ascii-authentication** **Example:** `switch(config)# aaa authentication login ascii-authentication`	Enables ASCII authentication. The default is disabled.

	Command or Action	Purpose
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the pending TACACS+ configuration.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes TACACS+ configuration to the other Cisco NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 6	(Optional) **show tacacs-server** **Example:** `switch# show tacacs-server`	Displays the TACACS+ server configuration.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Configuring Command Authorization on TACACS+ Servers

You can configure authorization for commands on TACACS+ servers.

Caution Command authorization disables user role-based authorization control (RBAC), including the default roles.

Note

- For Cisco NX-OS Releases 4.x and 5.x, command authorization is available only for non-console sessions. If you use a console to login to the server, command authorization is disabled. Beginning with Cisco NX-OS Release 6.0, command authorization is available for both non-console and console sessions. By default, command authorization is disabled for console sessions even if it is configured for default (non-console) sessions. You must explicitly configure a AAA group for the console to enable command authorization for console sessions.
- By default, context sensitive help and command tab completion show only the commands supported for a user as defined by the assigned roles. When you enable command authorization, the Cisco NX-OS software displays all commands in the context sensitive help and in tab completion, regardless of the role assigned to the user.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. **aaa authorization** {**commands** | **config-commands**} {**console** | **default**}
3. (Optional) **show tacacs+** {**pending** | **pending-diff**}
4. (Optional) **tacacs+ commit**
5. **exit**
6. (Optional) **show aaa authorization** [**all**]
7. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**aaa authorization** {**commands**	**config-commands**} {**console**	**default**}
			Example:
			`switch(config)# aaa authorization commands default group TacGroup`
			`Per command authorization will disable RBAC for all`
			`users. Proceed (y/n)?`
				Configures the command authorization method for specific roles on a TACACS+ server.
				The **commands** keyword configures authorization sources for all EXEC commands, and the **config-commands** keyword configures authorization sources for all configuration commands.
				The **console** keyword configures command authorization for a console session, and the **default** keyword configures command authorization for a non-console session.
				The *group-list* argument consists of a space-delimited list of TACACS+ server group names. Servers belonging to this group are contacted for command authorization. The **local** method uses the local role-based database for authorization.
				The **local** method is used only if all the configured server groups fail to respond and you have configured **local** as the fallback method. The default method is **local**.
				If you have not configured a fallback method after the TACACS+ server group method, authorization fails if all server groups fail to respond.
				If you press **Enter** at the confirmation prompt, the default action is **n**.

	Command or Action	Purpose
Step 3	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the pending TACACS+ configuration.
Step 4	(Optional) **tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes TACACS+ configuration to other Cisco NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 5	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits global configuration mode.

Step 6	(Optional) **show aaa authorization** [**all**] **Example:** `switch(config)# show aaa authorization`	Displays the AAA authorization configuration. The **all** keyword displays the default values.
Step 7	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Testing Command Authorization on TACACS+ Servers, on page 27

Testing Command Authorization on TACACS+ Servers

You can test the command authorization for a user on the TACACS+ servers.

Note You must send correct commands for authorization or else the results may not be reliable.

Note The **test** command uses the default (non-console) method for authorization, not the console method.

Before you begin

Enable TACACS+.

Ensure that you have configured command authorization for the TACACS+ servers.

SUMMARY STEPS

1. **test aaa authorization command-type** {**commands** | **config-commands**} **user** *username* **command** *command-string*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**test aaa authorization command-type** {**commands** | **config-commands**} **user** *username* **command** *command-string* **Example:** `switch# test aaa authorization command-type commands user TestUser command reload`	Tests a user's authorization for a command on the TACACS+ servers. The **commands** keyword specifies only EXEC commands and the **config-commands** keyword specifies only configuration commands. **Note** Put double quotes (") before and after the *command-string* argument if it contains spaces.

Related Topics

Enabling TACACS+, on page 8
Configuring Command Authorization on TACACS+ Servers, on page 25
Configuring User Accounts and RBAC

Enabling and Disabling Command Authorization Verification

You can enable and disable command authorization verificaiton on the command-line interface (CLI) for the default user session or for another username.

Note The commands do no execute when you enable authorization verification.

SUMMARY STEPS

1. **terminal verify-only** [**username** *username*]
2. **terminal no verify-only** [**username** *username*]

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**terminal verify-only** [**username** *username*] **Example:** `switch# terminal verify-only`	Enables command authorization verification. After you enter this command, the Cisco NX-OS software indicates whether the commands you enter are authorized or not.
Step 2	**terminal no verify-only** [**username** *username*] **Example:** `switch# terminal no verify-only`	Disables command authorization verification.

Enabling TACACS+ Configuration Distribution

Only Cisco NX-OS devices that have distribution enabled can participate in the distribution of the TACACS+ configuration changes in the CFS region.

Before you begin

Ensure that CFS distribution is enabled.

SUMMARY STEPS

1. **configure terminal**
2. **tacacs+ distribute**
3. **exit**
4. (Optional) **show tacacs+ status**
5. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**tacacs+ distribute** **Example:** `switch(config)# tacacs+ distribute`	Enables TACACS+ configuration distribution. The default is disabled.

	Command or Action	Purpose

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **show tacacs+ status** **Example:** `switch(config)# show tacacs+ status`	Displays the TACACS+ CFS distribution configuration.
Step 5	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+, on page 8
Configuring TACACS+ Server Hosts, on page 8
TACACS+ Server Configuration Process, on page 7
Configuring TACACS+ Server Groups, on page 13

Committing the TACACS+ Configuration to Distribution

You can apply the TACACS+ global and server configuration stored in the temporary buffer to the running configuration across all Cisco NX-OS devices in the fabric (including the originating device).

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. (Optional) **show tacacs+** {**pending** | **pending-diff**}
3. **tacacs+ commit**
4. **exit**
5. (Optional) **show tacacs+ distribution status**
6. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:**	Enters global configuration mode.

	Command or Action	Purpose
	`switch# configure terminal` `switch(config)#`	
Step 2	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the TACACS+ configuration pending for distribution.
Step 3	**tacacs+ commit** **Example:** `switch(config)# tacacs+ commit`	Applies the TACACS+ configuration changes in the temporary database to the running configuration and distributes the TACACS+ configuration to other Cisco NX-OS devices if you have enabled CFS configuration distribution for the user role feature.

Step 4	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 5	(Optional) **show tacacs+ distribution status** **Example:** `switch(config)# show tacacs+ distribution status`	Displays the TACACS distribution configuration and status.
Step 6	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Applies the running configuration to the startup configuration.

Related Topics

Enabling TACACS+ Configuration Distribution, on page 29

Discarding the TACACS+ Distribution Session

You can discard the temporary database of TACACS+ changes and end the CFS distribution session.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **configure terminal**
2. (Optional) **show tacacs+** {**pending** | **pending-diff**}
3. **tacacs+ abort**
4. **exit**
5. (Optional) **show tacacs+ distribution status**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	(Optional) **show tacacs+** {**pending** | **pending-diff**} **Example:** `switch(config)# show tacacs+ pending`	Displays the TACACS+ configuration pending for distribution.
Step 3	**tacacs+ abort** **Example:** `switch(config)# tacacs+ abort`	Discards the TACACS+ configuration in the temporary storage and ends the session.

Step 4	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 5	(Optional) **show tacacs+ distribution status** **Example:** `switch(config)# show tacacs+ distribution status`	Displays the TACACS distribution configuration and status.

Related Topics

Enabling TACACS+ Configuration Distribution, on page 29

Clearing the TACACS+ Distribution Session

You can clear an active CFS distribution session and unlock TACACS+ configuration in the network.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **clear tacacs+ session**
2. (Optional) **show tacacs+ distribution status**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**clear tacacs+ session** **Example:** `switch# clear tacacs+ session`	Clears the CFS session for TACACS+ and unlocks the fabric.
Step 2	(Optional) **show tacacs+ distribution status** **Example:** `switch(config)# show tacacs+ distribution status`	Displays the TACACS distribution configuration and status.

Related Topics

Enabling TACACS+ Configuration Distribution, on page 29

Manually Monitoring TACACS+ Servers or Groups

You can manually issue a test message to a TACACS+ server or to a server group.

Before you begin

Enable TACACS+.

SUMMARY STEPS

1. **test aaa server tacacs+** {*ipv4-address* | *ipv6-address* | *host-name*} [**vrf** *vrf-name*] *username password*
2. **test aaa group** *group-name username password*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**test aaa server tacacs+** {*ipv4-address* | *ipv6-address* | *host-name*} [**vrf** *vrf-name*] *username password* **Example:** `switch# test aaa server tacacs+ 10.10.1.1 user1 Ur2Gd2BH`	Sends a test message to a TACACS+ server to confirm availability.
Step 2	**test aaa group** *group-name username password* **Example:** `switch# test aaa group TacGroup user2 As3He3CI`	Sends a test message to a TACACS+ server group to confirm availability.

Related Topics

Configuring TACACS+ Server Hosts, on page 8
Configuring TACACS+ Server Groups, on page 13

Disabling TACACS+

You can disable TACACS+.

Caution When you disable TACACS+, all related configurations are automatically discarded.

SUMMARY STEPS

1. **configure terminal**
2. **no feature tacacs+**
3. **exit**
4. (Optional) **copy running-config startup-config**

DETAILED STEPS

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**no feature tacacs+** **Example:** `switch(config)# no feature tacacs+`	Disables TACACS+.

Step 3	**exit**
	Example:
	`switch(config)# exit`
	`switch#`
		Exits configuration mode.

Step 4	(Optional) **copy running-config startup-config** **Example:** `switch# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Monitoring TACACS+ Servers

You can monitor the statistics that the Cisco NX-OS device maintains for TACACS+ server activity.

Before you begin

Configure TACACS+ servers on the Cisco NX-OS device.

SUMMARY STEPS

1. **show tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*}

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**show tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*} **Example:** `switch# show tacacs-server statistics 10.10.1.1`	Displays the TACACS+ statistics.

Related Topics

Configuring TACACS+ Server Hosts, on page 8
Clearing TACACS+ Server Statistics, on page 35

Clearing TACACS+ Server Statistics

You can display the statistics that the Cisco NX-OS device maintains for TACACS+ server activity.

Before you begin

Configure TACACS+ servers on the Cisco NX-OS device.

SUMMARY STEPS

1. (Optional) **show tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*}
2. **clear tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*}

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	(Optional) **show tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*} **Example:** `switch# show tacacs-server statistics 10.10.1.1`	Displays the TACACS+ server statistics on the Cisco NX-OS device.

	Command or Action	Purpose
Step 2	**clear tacacs-server statistics** {*hostname* | *ipv4-address* | *ipv6-address*} **Example:** `switch# clear tacacs-server statistics 10.10.1.1`	Clears the TACACS+ server statistics.

Related Topics

Configuring TACACS+ Server Hosts, on page 8

Verifying the TACACS+ Configuration

To display the TACACS+ configuration, perform one of the following tasks:

Command	Purpose
show tacacs+ { **status** | **pending** | **pending-diff**}	Displays the TACACS+ Cisco Fabric Services distribution status and other details.
show running-config tacacs+ [**all**]	Displays the TACACS+ configuration in the running configuration.
show startup-config tacacs	Displays the TACACS+ configuration in the startup configuration.
show tacacs-server [*host-name* | *ipv4-address* | *ipv6-address*] [**directed-request** | **groups** | **sorted** | **statistics**]	Displays all configured TACACS+ server parameters.

For detailed information about the fields in the output from this command, see the *Cisco Nexus 7000 Series NX-OS Security Command Reference*.

Configuration Examples for TACACS+

The following example shows how to configure a TACACS+ server host and server group:

```
feature tacacs+
tacacs-server key 7 "ToIkLhPpG"
tacacs-server host 10.10.2.2 key 7 "ShMoMhTl"
aaa group server tacacs+ TacServer
    server 10.10.2.2
```

The following example shows how to configure and use command authorization verification:

```
switch# terminal verify-only
switch# show interface ethernet 7/2 brief
%Success
switch# terminal no verify-only
switch# show interface ethernet 7/2 brief
```

```
--------------------------------------------------------------------------------
Ethernet      VLAN    Type Mode   Status  Reason                   Speed     Port
Interface                                                                    Ch #
--------------------------------------------------------------------------------
Eth7/2        1       eth  access down    SFP not inserted           auto(D) --
```

Where to Go Next

You can now configure AAA authentication methods to include the server groups.

Additional References for TACACS+

This section includes additional information related to implementing TACACS+.

Related Documents

Related Topic	Document Title
Cisco NX-OS licensing	*Cisco NX-OS Licensing Guide*
Command reference	*Cisco Nexus 7000 Series NX-OS Security Command Reference*
VRF configuration	*Cisco Nexus 7000 Series NX-OS Unicast Routing Configuration Guide*

Standards

Standards	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

MIBs

- CISCO-AAA-SERVER-MIB
- CISCO-AAA-SERVER-EXT-MIB

Feature History for TACACS+

This table lists the release history for this feature.

Table 2: Feature History for TACACS+

Feature Name	Releases	Feature Information	
TACACS+	6.2(2)	Added support for a single TACACS+ connection.	
TACACS+	6.0(1)	Added the ability to configure command authorization for a console session.	