Configuring Authentication

This chapter includes the following sections:

Authentication Services

Cisco UCS supports two methods to authenticate user logins:

- Through user accounts local to Cisco UCS Manager
- Remotely through one of the following protocols:
  - LDAP
  - RADIUS
  - TACACS+

Guidelines and Recommendations for Remote Authentication Providers

If a system is configured for one of the supported remote authentication services, you must create a provider for that service to ensure that Cisco UCS Manager can communicate with it. In addition, you need to be aware of the following guidelines that impact user authorization:

User Accounts in Remote Authentication Services

User accounts can exist locally in Cisco UCS Manager or in the remote authentication server.

The temporary sessions for users who log in through remote authentication services can be viewed through Cisco UCS Manager GUI or Cisco UCS Manager CLI.

User Roles in Remote Authentication Services

If you create user accounts in the remote authentication server, you must ensure that the accounts include the roles those users require for working in Cisco UCS Manager and that the names of those roles match the names used in Cisco UCS Manager. Depending on the role policy, a user may not be allowed to log in or will be granted only read-only privileges.

User Attributes in Remote Authentication Providers

You must configure a user attribute for Cisco UCS in each remote authentication provider through which users log in to Cisco UCS Manager. This user attribute holds the roles and locales assigned to each user.

When a user logs in, Cisco UCS Manager does the following:

1. Queries the remote authentication service.
2. Validates the user.
3. If the user is validated, checks for the roles and locales assigned to that user.

The following table contains a comparison of the user attribute requirements for the remote authentication providers supported by Cisco UCS.

Table 1: Comparison of User Attributes by Remote Authentication Provider

Authentication Provider	Custom Attribute	Schema Extension	Attribute ID Requirements
LDAP	Optional	Optional. You can choose to do either of the following: • Do not extend the LDAP schema and configure an existing, unused attribute that meets the requirements. • Extend the LDAP schema and create a custom attribute	The Cisco LDAP implementation requires a unicode type attribute. If you choose to create the CiscoAVPair custom attribute, use the following attribute ID: 1.3.6.1.4.1.9.287247.1 A sample OID is provided in the following section.

Authentication Provider	Custom Attribute	Schema Extension	Attribute ID Requirements
		with a unique name, such as CiscoAVPair.	
RADIUS	Optional	Optional. You can choose to do either of the following: • Do not extend the RADIUS schema and use an existing, unused attribute that meets the requirements. • Extend the RADIUS schema and create a custom attribute with a unique name, such as cisco-avpair.	The vendor ID for the Cisco RADIUS implementation is 009 and the vendor ID for the attribute is 001. The following syntax example shows how to specify multiples user roles and locales if you choose to create the cisco-avpair attribute: `shell:roles="admin,aaa" shell:locales="L1,abc"`. Use a comma "," as the delimiter to separate multiple values.
TACACS+	Required	Required. You must extend the schema and create a custom attribute with the name cisco-av-pair.	The cisco-av-pair name is the string that provides the attribute ID for the TACACS+ provider. The following syntax example shows how to specify multiples user roles and locales when you create the cisco-av-pair attribute: `cisco-av-pair=shell:roles="admin aaa" shell:locales="L1 abc"`. Use a space as the delimiter to separate multiple values.

Sample OID for LDAP User Attribute

The following is a sample OID for a custom CiscoAVPair attribute:

```
CN=CiscoAVPair,CN=Schema,
CN=Configuration,CN=X
objectClass: top
objectClass: attributeSchema
cn: CiscoAVPair
distinguishedName: CN=CiscoAVPair,CN=Schema,CN=Configuration,CN=X
instanceType: 0x4
uSNCreated: 26318654
attributeID: 1.3.6.1.4.1.9.287247.1
attributeSyntax: 2.5.5.12
isSingleValued: TRUE
showInAdvancedViewOnly: TRUE
adminDisplayName: CiscoAVPair
adminDescription: UCS User Authorization Field
oMSyntax: 64
lDAPDisplayName: CiscoAVPair
name: CiscoAVPair
objectCategory: CN=Attribute-Schema,CN=Schema,CN=Configuration,CN=X
```

LDAP Group Rule

The LDAP group rule is used to determine whether Cisco UCS should use LDAP groups when assigning user roles and locales to a remote user.

Configuring LDAP Providers

Configuring Properties for LDAP Providers

The properties that you configure in this task apply to all LDAP provider connections.

If you are using Active Directory as your LDAP server, create a user account in the Active Directory server to bind with Cisco UCS. This account should be given a non-expiring password.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **set attribute** *attribute*	Restricts database searches to records that contain the specified attribute.
Step 4	UCS-A /security/ldap # **set basedn** *distinguished-name*	Restricts database searches to records that contain the specified distinguished name.
Step 5	UCS-A /security/ldap # **set filter** *filter*	Restricts database searches to records that contain the specified filter.
Step 6	UCS-A /security/ldap # **set timeout** *seconds*	(Optional) Sets the time interval the system waits for a response from the LDAP server before noting the server as down.
Step 7	UCS-A /security/ldap # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the LDAP attribute to CiscoAvPair, the base distinguished name to "DC=cisco-ucsm-aaa3,DC=qalab,DC=com", the filter to sAMAccountName=$userid, and the timeout interval to 5 seconds, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # set attribute CiscoAvPair
UCS-A /security/ldap* # set basedn "DC=cisco-ucsm-aaa3,DC=qalab,DC=com"
UCS-A /security/ldap* # set filter sAMAccountName=$userid
UCS-A /security/ldap* # set timeout 5
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

What to Do Next

Create an LDAP provider.

Creating an LDAP Provider

Cisco UCS Manager supports a maximum of 16 LDAP providers.

Before You Begin

If you are using Active Directory as your LDAP server, create a user account in the Active Directory server to bind with Cisco UCS. This account should be given a non-expiring password.

- In the LDAP server, perform one of the following configurations:
  - Configure LDAP groups. LDAP groups contain user role and locale information.
  - Configure users with the attribute that holds the user role and locale information for Cisco UCS Manager. You can choose whether to extend the LDAP schema for this attribute. If you do not want to extend the schema, use an existing LDAP attribute to hold the Cisco UCS user roles and locales. If you prefer to extend the schema, create a custom attribute, such as the CiscoAVPair attribute.

    The Cisco LDAP implementation requires a unicode type attribute.

    If you choose to create the CiscoAVPair custom attribute, use the following attribute ID: 1.3.6.1.4.1.9.287247.1
  - For a cluster configuration, add the management port IP addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IP address used by Cisco UCS Manager.
- If you want to use secure communications, create a trusted point containing the certificate of the root certificate authority (CA) of the LDAP server in Cisco UCS Manager.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **create server** *server-name*	Creates an LDAP server instance and enters security LDAP server mode. If SSL is enabled, the *server-name* , typically an IP address or FQDN, must exactly match a Common Name (CN) in the LDAP server's security certificate. Unless an IP address is specified, a DNS server must be configured in Cisco UCS Manager.
Step 4	UCS-A /security/ldap/server # **set attribute** *attr-name*	(Optional) Specifies the LDAP attribute that stores the value for user roles and locales.

	Command or Action	Purpose
		If you do not specify this property, Cisco UCS Manager uses the default set on the LDAP General tab.
Step 5	UCS-A /security/ldap/server # **set basedn** *basedn-name*	(Optional) Specifies the distinguished name in the LDAP hierarchy where the server should begin to search when it receives an authorization request. If the distinguished name is not set for a specific LDAP provider, it is taken from the general properties set for LDAP providers.
Step 6	UCS-A /security/ldap/server # **set binddn** *binddn-name*	(Optional) Specifies the distinguished name (DN) for the LDAP database superuser account. If you do not specify this property, Cisco UCS Manager uses the default set on the LDAP General tab.
Step 7	UCS-A /security/ldap/server # **set filter** *filter-value*	(Optional) Restricts the LDAP search to those usernames that match the defined filter. If the filter is not set for a specific LDAP provider, it is taken from the general properties set for LDAP providers.
Step 8	UCS-A /security/ldap/server # **set password**	Specifies the password for the LDAP database superuser account. To set the password, press **Enter** after typing the **set password** command and enter the key value at the prompt.
Step 9	UCS-A /security/ldap/server # **set order** *order-num*	(Optional) Specifies when in the order this server will be tried.
Step 10	UCS-A /security/ldap/server # **set port** *port-num*	(Optional) Specifies the port used to communicate with the LDAP server. The standard port number is 389.
Step 11	UCS-A /security/ldap/server # **set ssl** {**yes** | **no**}	Enables or disables the use of encryption when communicating with the LDAP server. The options are as follows: • **yes** —Encryption is required. If encryption cannot be negotiated, the connection fails. • **no** —Encryption is disabled. Authentication information is sent as clear text. LDAP uses STARTTLS. This allows encrypted communication using port 389.
Step 12	UCS-A /security/ldap/server # **set timeout** *timeout-num*	Specifies the amount of time in seconds that the system should spend trying to contact the LDAP database before it times out.
Step 13	UCS-A /security/ldap/server # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates an LDAP server instance named 10.193.169.246, configures the binddn, password, order, port, and SSL settings, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap* # create server 10.193.169.246
UCS-A /security/ldap/server* # set binddn
"cn=Administrator,cn=Users,DC=cisco-ucsm-aaa3,DC=qalab,DC=com"
UCS-A /security/ldap/server* # set password
Enter the password:
Confirm the password:
UCS-A /security/ldap/server* # set order 2
UCS-A /security/ldap/server* # set port 389
UCS-A /security/ldap/server* # set ssl yes
UCS-A /security/ldap/server* # set timeout 30
UCS-A /security/ldap/server* # commit-buffer
UCS-A /security/ldap/server #
```

What to Do Next

For implementations involving a single LDAP database, select LDAP as the authentication service.

For implementations involving multiple LDAP databases, configure an LDAP provider group.

Changing the LDAP Group Rule for an LDAP Provider

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **scope server** *ldap-provider*	Enters security LDAP provider mode.
Step 4	UCS-A /security/ldap/server # **scope ldap-group-rule**	Enters LDAP group rule mode.
Step 5	UCS-A /security/ldap/server/ldap-group-rule # **set authorization** {**enable** | **disable**}	Specifies whether Cisco UCS searches LDAP groups when assigning user roles and locales to a remote user. • **disable**—Cisco UCS does not access any LDAP groups. • **enable**—Cisco UCS searches the LDAP provider groups mapped in this Cisco UCS instance. If the remote user is found, Cisco UCS assigns the user roles and locales defined for that LDAP group in the associated LDAP group map. **Note** Role and locale assignment is cumulative. If a user is included in multiple groups, or has a role or locale specified in the LDAP attribute, Cisco UCS assigns that user all the roles and locales mapped to any of those groups or attributes.

	Command or Action	Purpose
Step 6	UCS-A /security/ldap/server/ldap-group-rule # **set member-of-attribute** *attr-name*	Specifies the attribute Cisco UCS uses to determine group membership.
Step 7	UCS-A /security/ldap/server/ldap-group-rule # **set traversal** {**non-recursive** | **recursive**}	Specifies whether Cisco UCS takes the settings for a group member's parent group, if necessary. This can be: • **non-recursive**—Cisco UCS only searches those groups that the user belongs to. • **recursive**—Cisco UCS searches all the ancestor groups belonging to the user.
Step 8	UCS-A /security/ldap/server/ldap-group-rule # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the LDAP group rule to enable authorization, sets the member of attribute to ldapdb1, sets the traversal to non-recursive, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # scope server ldapprovider
UCS-A /security/ldap/server # scope ldap-group-rule
UCS-A /security/ldap/server/ldap-group-rule # set authorization enable
UCS-A /security/ldap/server/ldap-group-rule* # set member-of-attribute ldapdb1
UCS-A /security/ldap/server/ldap-group-rule* # set traversal non-recursive
UCS-A /security/ldap/server/ldap-group-rule* # commit-buffer
UCS-A /security/ldap/server/ldap-group-rule #
```

Deleting an LDAP Provider

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode
Step 3	UCS-A /security/ldap # **delete server** *serv-name*	Deletes the specified server.
Step 4	UCS-A /security/ldap # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes the LDAP server called ldap1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete server ldap1
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

LDAP Group Mapping

For organizations that already use LDAP groups to restrict access to LDAP databases, group membership information can be used by UCSM to assign a role or locale to an LDAP user during login. This eliminates the need to define role or locale information in the LDAP user object when Cisco UCS Manager is deployed.

When a user logs in to Cisco UCS Manager, information about the user's role and locale are pulled from the LDAP group map. If the role and locale criteria match the information in the policy, access is granted.

Role and locale definitions are configured locally in UCSM and do not update automatically based on changes to an LDAP directory. When deleting or renaming LDAP groups in an LDAP directory, it is important that you update your Cisco UCS Manager instance with the change.

An LDAP group map can be configured to include any of the following combinations of roles and locales:

- Roles only
- Locales only
- Both roles and locales

For example, consider an LDAP group representing a group of server administrators at a specific location. The LDAP group map might be configured to include user roles like server-profile and server-equipment. To restrict access to server administrators at a specific location, the locale could be set to a particular site name.

Note Cisco UCS Manager includes many out-of-the-box user roles but does not include any locales. Mapping an LDAP provider group to a locale requires that you create a custom locale.

Creating an LDAP Group Map

Before You Begin

- Create an LDAP group in the LDAP server.
- Configure the distinguished name for the LDAP group in the LDAP server.
- Create locales in Cisco UCS Manager (optional).
- Create custom roles in Cisco UCS Manager (optional).

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **create ldap-group** *group-dn*	Creates an LDAP group map for the specified DN.

	Command or Action	Purpose
Step 4	UCS-A /security/ldap/ldap-group # **create locale** *locale-name*	Maps the LDAP group to the specified locale.
Step 5	UCS-A /security/ldap/ldap-group # **create role** *role-name*	Maps the LDAP group to the specified role.
Step 6	UCS-A /security/ldap/ldap-group # **commit-buffer**	Commits the transaction to the system configuration.

The following example maps the LDAP group mapped to a DN, sets the locale to pacific, sets the role to admin, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # create ldap-group cn=security,cn=users,dc=lab,dc=com
UCS-A /security/ldap/ldap-group* # create locale pacific
UCS-A /security/ldap/ldap-group* # create role admin
UCS-A /security/ldap/ldap-group* # commit-buffer
UCS-A /security/ldap/ldap-group #
```

What to Do Next

Set the LDAP group rule.

Deleting an LDAP Group Map

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **delete ldap-group** *group-dn*	Deletes the LDAP group map for the specified DN.
Step 4	UCS-A /security/ldap # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes an LDAP group map and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete ldap-group cn=security,cn=users,dc=lab,dc=com
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

Configuring RADIUS Providers

Configuring Properties for RADIUS Providers

The properties that you configure in this task apply to all RADIUS provider connections.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope radius**	Enters security RADIUS mode.
Step 3	UCS-A /security/radius # **set retries** *retry-num*	(Optional) Sets the number of times to retry communicating with the RADIUS server before noting the server as down.
Step 4	UCS-A /security/radius # **set timeout** *seconds*	(Optional) Sets the time interval that the system waits for a response from the RADIUS server before noting the server as down.
Step 5	UCS-A /security/radius # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the RADIUS retries to 4, sets the timeout interval to 30 seconds, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # set retries 4
UCS-A /security/radius* # set timeout 30
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #
```

What to Do Next

Create a RADIUS provider.

Creating a RADIUS Provider

Cisco UCS Manager supports a maximum of 16 RADIUS providers.

Before You Begin

Perform the following configuration in the RADIUS server:

- Configure users with the attribute that holds the user role and locale information for Cisco UCS Manager. You can choose whether to extend the RADIUS schema for this attribute. If you do not want to extend the schema, use an existing RADIUS attribute to hold the Cisco UCS user roles and locales. If you prefer to extend the schema, create a custom attribute, such as the cisco-avpair attribute.

The vendor ID for the Cisco RADIUS implementation is 009 and the vendor ID for the attribute is 001.

The following syntax example shows how to specify multiples user roles and locales if you choose to create the cisco-avpair attribute: `shell:roles="admin,aaa" shell:locales="L1,abc"`. Use a comma "," as the delimiter to separate multiple values.

- For a cluster configuration, add the management port IP addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IP address used by Cisco UCS Manager.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope radius**	Enters security RADIUS mode.
Step 3	UCS-A /security/radius # **create server** *server-name*	Creates a RADIUS server instance and enters security RADIUS server mode
Step 4	UCS-A /security/radius/server # **set authport** *authport-num*	(Optional) Specifies the port used to communicate with the RADIUS server.
Step 5	UCS-A /security/radius/server # **set key**	Sets the RADIUS server key. To set the key value, press **Enter** after typing the **set key** command and enter the key value at the prompt.
Step 6	UCS-A /security/radius/server # **set order** *order-num*	(Optional) Specifies when in the order this server will be tried.
Step 7	UCS-A /security/radius # **set retries** *retry-num*	(Optional) Sets the number of times to retry communicating with the RADIUS server before noting the server as down.
Step 8	UCS-A /security/radius # **set timeout** *seconds*	(Optional) Sets the time interval that the system waits for a response from the RADIUS server before noting the server as down.
Step 9	UCS-A /security/radius/server # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates a server instance named radiusserv7, sets the authentication port to 5858, sets the key to radiuskey321, sets the order to 2, sets the retries to 4, sets the timeout to 30, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # create server radiusserv7
UCS-A /security/radius/server* # set authport 5858
UCS-A /security/radius/server* # set key
Enter the key: radiuskey321
Confirm the key: radiuskey321
```

```
UCS-A /security/radius/server* # set order 2
UCS-A /security/radius/server* # set retries 4
UCS-A /security/radius/server* # set timeout 30
UCS-A /security/radius/server* # commit-buffer
UCS-A /security/radius/server #
```

What to Do Next

For implementations involving a single RADIUS database, select RADIUS as the primary authentication service.

For implementations involving multiple RADIUS databases, configure a RADIUS provider group.

Deleting a RADIUS Provider

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope RADIUS**	Enters security RADIUS mode.
Step 3	UCS-A /security/radius # **delete server** *serv-name*	Deletes the specified server.
Step 4	UCS-A /security/radius # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes the RADIUS server called radius1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # delete server radius1
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #
```

Configuring TACACS+ Providers

Configuring Properties for TACACS+ Providers

The properties that you configure in this task apply to all TACACS+ provider connections.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope tacacs**	Enters security TACACS+ mode.

	Command or Action	Purpose
Step 3	UCS-A /security/tacacs # **set timeout** *seconds*	(Optional) Sets the time interval that the system waits for a response from the TACACS+ server before noting the server as down.
Step 4	UCS-A /security/tacacs # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the TACACS+ timeout interval to 45 seconds and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # set timeout 45
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

What to Do Next

Create a TACACS+ provider.

Creating a TACACS+ Provider

Cisco UCS Manager supports a maximum of 16 TACACS+ providers.

Before You Begin

Perform the following configuration in the TACACS+ server:

- Create the cisco-av-pair attribute. You cannot use an existing TACACS+ attribute.

  The cisco-av-pair name is the string that provides the attribute ID for the TACACS+ provider.

  The following syntax example shows how to specify multiples user roles and locales when you create the cisco-av-pair attribute: `cisco-av-pair=shell:roles="admin aaa" shell:locales="L1 abc"`. Use a space as the delimiter to separate multiple values.

- For a cluster configuration, add the management port IP addresses for both fabric interconnects. This configuration ensures that remote users can continue to log in if the first fabric interconnect fails and the system fails over to the second fabric interconnect. All login requests are sourced from these IP addresses, not the virtual IP address used by Cisco UCS Manager.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope tacacs**	Enters security TACACS+ mode.
Step 3	UCS-A /security/tacacs # **create server** *server-name*	Creates an TACACS+ server instance and enters security TACACS+ server mode

	Command or Action	Purpose
Step 4	UCS-A /security/tacacs/server # **set key**	(Optional) Sets the TACACS+ server key. To set the key value, press **Enter** after typing the **set key** command and enter the key value at the prompt.
Step 5	UCS-A /security/tacacs/server # **set order** *order-num*	(Optional) Specifies when in the order this server will be tried.
Step 6	UCS-A /security/tacacs/server # **set port** *port-num*	Specifies the port used to communicate with the TACACS+ server.
Step 7	UCS-A /security/tacacs/server # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates a server instance named tacacsserv680, sets the key to tacacskey321, sets the order to 4, sets the authentication port to 5859, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # create server tacacsserv680
UCS-A /security/tacacs/server* # set key
Enter the key: tacacskey321
Confirm the key: tacacskey321
UCS-A /security/tacacs/server* # set order 4
UCS-A /security/tacacs/server* # set port 5859
UCS-A /security/tacacs/server* # commit-buffer
UCS-A /security/tacacs/server #
```

What to Do Next

For implementations involving a single TACACS+ database, select TACACS+ as the primary authentication service.

For implementations involving multiple TACACS+ databases, configure a TACACS+ provider group.

Deleting a TACACS+ Provider

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope tacacs**	Enters security TACACS mode.
Step 3	UCS-A /security/tacacs # **delete server** *serv-name*	Deletes the specified server.
Step 4	UCS-A /security/tacacs # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes the TACACS server called tacacs1 and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # delete server TACACS1
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

Configuring Multiple Authentication Systems

Multiple Authentication Systems

You can configure Cisco UCS to use multiple authentication systems by configuring the following features:

- Provider groups
- Authentication domains

Once provider groups and authentication domains have been configured in Cisco UCS Manager, the following syntax can be used to log in to the system using Cisco UCS Manager CLI: **ucs:** *auth-domain* \ *user-name*

Provider Groups

A provider group is a set of providers that will be used by Cisco UCS during the authentication process. Cisco UCS Manager allows you to create a maximum of 16 provider groups, with a maximum of eight providers allowed per group.

During authentication, all the providers within a provider group are tried in order. If all of the configured servers are unavailable or unreachable, Cisco UCS Manager automatically falls back to the local authentication method using the local username and password.

Creating an LDAP Provider Group

Creating an LDAP provider group allows you to authenticate using multiple LDAP databases.

Note Authenticating with a single LDAP database does not require you to set up an LDAP provider group.

Before You Begin

Create one or more LDAP providers.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.

	Command or Action	Purpose
Step 3	UCS-A /security/ldap # **create auth-server-group** *auth-server-group-name*	Creates an LDAP provider group and enters authentication server group security LDAP mode.
Step 4	UCS-A /security/ldap/auth-server-group # **create server-ref** *ldap-provider-name*	Adds the specified LDAP provider to the LDAP provider group and enters server reference authentication server group security LDAP mode.
Step 5	UCS-A /security/ldap/auth-server-group/server-ref # **set order** *order-num*	Specifies the order in which Cisco UCS uses this provider to authenticate users. Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
Step 6	UCS-A /security/ldap/auth-server-group/server-ref # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates an LDAP provider group called ldapgroup, adds two previously configured providers called ldap1 and ldap2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # create auth-server-group ldapgroup
UCS-A /security/ldap/auth-server-group* # create server-ref ldap1
UCS-A /security/ldap/auth-server-group/server-ref* # set order 1
UCS-A /security/ldap/auth-server-group/server-ref* # up
UCS-A /security/ldap/auth-server-group* # create server-ref ldap2
UCS-A /security/ldap/auth-server-group/server-ref* # set order 2
UCS-A /security/ldap/auth-server-group/server-ref* # commit-buffer
UCS-A /security/ldap/auth-server-group/server-ref #
```

What to Do Next

Configure an authentication domain or select a default authentication service.

Deleting an LDAP Provider Group

Before You Begin

Remove the provider group from an authentication configuration.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope ldap**	Enters security LDAP mode.
Step 3	UCS-A /security/ldap # **delete auth-server-group** *auth-server-group-name*	Deletes the LDAP provider group.

	Command or Action	Purpose
Step 4	UCS-A /security/ldap # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes an LDAP provider group called ldapgroup and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope ldap
UCS-A /security/ldap # delete auth-server-group ldapgroup
UCS-A /security/ldap* # commit-buffer
UCS-A /security/ldap #
```

Creating a RADIUS Provider Group

Creating a RADIUS provider group allows you to authenticate using multiple RADIUS databases.

Note Authenticating with a single RADIUS database does not require you to set up a RADIUS provider group.

Before You Begin

Create one or more RADIUS providers.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope radius**	Enters security RADIUS mode.
Step 3	UCS-A /security/radius # **create auth-server-group** *auth-server-group-name*	Creates a RADIUS provider group and enters authentication server group security RADIUS mode.
Step 4	UCS-A /security/RADIUS/auth-server-group # **create server-ref** *radius-provider-name*	Adds the specified RADIUS provider to the RADIUS provider group and enters server reference authentication server group security RADIUS mode.
Step 5	UCS-A /security/radius/auth-server-group/server-ref # **set order** *order-num*	Specifies the order in which Cisco UCS uses this provider to authenticate users. Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
Step 6	UCS-A /security/radius/auth-server-group/server-ref # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates a RADIUS provider group called radiusgroup, adds two previously configured providers called radius1 and radius2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # create auth-server-group radiusgroup
UCS-A /security/radius/auth-server-group* # create server-ref radius1
UCS-A /security/radius/auth-server-group/server-ref* # set order 1
UCS-A /security/radius/auth-server-group/server-ref* # up
UCS-A /security/radius/auth-server-group* # create server-ref radius2
UCS-A /security/radius/auth-server-group/server-ref* # set order 2
UCS-A /security/radius/auth-server-group/server-ref* # commit-buffer
UCS-A /security/radius/auth-server-group/server-ref #
```

What to Do Next

Configure an authentication domain or select a default authentication service.

Deleting a RADIUS Provider Group

Remove the provider group from an authentication configuration.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope radius**	Enters security RADIUS mode.
Step 3	UCS-A /security/radius # **delete auth-server-group** *auth-server-group-name*	Deletes the RADIUS provider group.
Step 4	UCS-A /security/radius # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes a RADIUS provider group called radiusgroup and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope radius
UCS-A /security/radius # delete auth-server-group radiusgroup
UCS-A /security/radius* # commit-buffer
UCS-A /security/radius #
```

Creating a TACACS Provider Group

Creating a TACACS+ provider group allows you to authenticate using multiple TACACS+ databases.

Note Authenticating with a single TACACS+ database does not require you to set up a TACACS+ provider group.

Before You Begin

Create a TACACS provider.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope tacacs**	Enters security TACACS mode.
Step 3	UCS-A /security/tacacs # **create auth-server-group** *auth-server-group-name*	Creates a TACACS provider group and enters authentication server group security TACACS mode.
Step 4	UCS-A /security/tacacs/auth-server-group # **create server-ref** *tacacs-provider-name*	Adds the specified TACACS provider to the TACACS provider group and enters server reference authentication server group security TACACS mode.
Step 5	UCS-A /security/tacacs/auth-server-group/server-ref # **set order** *order-num*	Specifies the order in which Cisco UCS uses this provider to authenticate users. Valid values include no-value and 0-16, with the lowest value indicating the highest priority. Setting the order to no-value is equivalent to giving that server reference the highest priority.
Step 6	UCS-A /security/tacacs/auth-server-group/server-ref # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates a TACACS provider group called tacacsgroup, adds two previously configured providers called tacacs1 and tacacs2 to the provider group, sets the order, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # create auth-server-group tacacsgroup
UCS-A /security/tacacs/auth-server-group* # create server-ref tacacs1
UCS-A /security/tacacs/auth-server-group/server-ref* # set order 1
UCS-A /security/tacacs/auth-server-group/server-ref* # up
UCS-A /security/tacacs/auth-server-group* # create server-ref tacacs2
UCS-A /security/tacacs/auth-server-group/server-ref* # set order 2
UCS-A /security/tacacs/auth-server-group/server-ref* # commit-buffer
UCS-A /security/tacacs/auth-server-group/server-ref #
```

What to Do Next

Configure an authentication domain or select a default authentication service.

Deleting a TACACS Provider Group

Remove the provider group from an authentication configuration.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope tacacs**	Enters security TACACS mode.
Step 3	UCS-A /security/tacacs # **delete auth-server-group** *auth-server-group-name*	Deletes the TACACS provider group.
Step 4	UCS-A /security/tacacs # **commit-buffer**	Commits the transaction to the system configuration.

The following example deletes a TACACS provider group called tacacsgroup and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope tacacs
UCS-A /security/tacacs # delete auth-server-group tacacsgroup
UCS-A /security/tacacs* # commit-buffer
UCS-A /security/tacacs #
```

Authentication Domains

Authentication domains are used by Cisco UCS Manager to leverage multiple authentication systems. Each authentication domain is specified and configured during login. If no authentication domain is specified, the default authentication service configuration is used.

You can create up to eight authentication domains. Each authentication domain is associated with a provider group and realm in Cisco UCS Manager. If no provider group is specified, all servers within the realm are used.

Creating an Authentication Domain

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **create auth-domain** *domain-name*	Creates an authentication domain and enters authentication domain mode.
Step 3	UCS-A /security/auth-domain # **create default-auth**	Creates a default authentication for the specified authentication domain.
Step 4	UCS-A /security/auth-domain/default-auth # **set auth-server-group** *auth-serv-group-name*	(Optional) Specifies the provider group for the specified authentication domain.
Step 5	UCS-A /security/auth-domain/default-auth # **set realm** {**ldap** | **local** | **radius** | **tacacs**}	Specifies the realm for the specified authentication domain.

	Command or Action	Purpose
Step 6	UCS-A /security/auth-domain/default-auth # **commit-buffer**	Commits the transaction to the system configuration.

The following example creates an authentication domain called domain1 that uses the providers in ldapgroup1, sets the realm type to ldap, and commits the transaction.

```
UCS-A# scope security
UCS-A /security # create auth-domain domain1
UCS-A /security/auth-domain* # create default-auth
UCS-A /security/auth-domain/auth-domain* # set auth-server-group ldapgroup1
UCS-A /security/auth-domain/auth-domain* # set realm ldap
UCS-A /security/auth-domain/auth-domain* # commit-buffer
UCS-A /security/auth-domain/auth-domain #
```

Selecting an Authentication Service

Selecting the Console Authentication Service

Before You Begin

If the system uses a remote authentication service, create a provider for that authentication service. If the system uses only local authentication through Cisco UCS, you do not need to create a provider first.

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope console-auth**	Enters console authorization security mode.
Step 3	UCS-A /security/console-auth # **set realm** *auth-type*	Specifies the console authentication, where the *auth-type* argument is one of the following keywords: • **ldap** —Specifies LDAP authentication • **local** —Specifies local authentication • **none** —Allows local users to log on without specifying a password • **radius** —Specifies RADIUS authentication • **tacacs** —Specifies TACACS+ authentication
Step 4	UCS-A /security/console-auth # **set auth-server-group** *auth-serv-group-name*	(Optional) The associated provider group, if any.
Step 5	UCS-A /security/console-auth # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the authentication to LDAP, sets the console authentication provider group to provider1, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope console-auth
UCS-A /security/console-auth # set realm local
UCS-A /security/console-auth # set auth-server-group provider1
UCS-A /security/console-auth* # commit-buffer
UCS-A /security/console-auth #
```

Selecting the Default Authentication Service

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **scope default-auth**	Enters default authorization security mode.
Step 3	UCS-A /security/default-auth # **set realm** *auth-type*	Specifies the default authentication, where the *auth-type* argument is one of the following keywords: • **ldap** —Specifies LDAP authentication • **local** —Specifies local authentication • **none** —Allows local users to log on without specifying a password • **radius** —Specifies RADIUS authentication • **tacacs** —Specifies TACACS+ authentication
Step 4	UCS-A /security/default-auth # **set auth-server-group** *auth-serv-group-name*	(Optional) The associated provider group, if any.
Step 5	UCS-A /security/default-auth # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the default authentication to LDAP, sets the default authentication provider group to provider1, and commits the transaction:

```
UCS-A# scope security
UCS-A /security # scope default-auth
UCS-A /security/default-auth # set realm ldap
UCS-A /security/default-auth # set auth-server-group provider1
UCS-A /security/default-auth* # commit-buffer
UCS-A /security/default-auth #
```

Role Policy for Remote Users

By default, if user roles are not configured in Cisco UCS Manager read-only access is granted to all users logging in to Cisco UCS Manager from a remote server using the LDAP, RADIUS, or TACACS protocols. For security reasons, it might be desirable to restrict access to those users matching an established user role in Cisco UCS Manager.

You can configure the role policy for remote users in the following ways:

assign-default-role	Does not restrict user access to Cisco UCS Manager based on user roles. Read-only access is granted to all users unless other user roles have been defined in Cisco UCS Manager. This is the default behavior.
no-login	Restricts user access to Cisco UCS Manager based on user roles. If user roles have not been assigned for the remote authentication system, access is denied.

Configuring the Role Policy for Remote Users

Procedure

	Command or Action	Purpose
Step 1	UCS-A# **scope security**	Enters security mode.
Step 2	UCS-A /security # **set remote-user default-role** {**assign-default-role** | **no-login**}	Specifies whether user access to Cisco UCS Manager is restricted based on user roles.
Step 3	UCS-A /security # **commit-buffer**	Commits the transaction to the system configuration.

The following example sets the role policy for remote users and commits the transaction:

```
UCS-A# scope security
UCS-A /security # set remote-user default-role assign-default-role
UCS-A /security* # commit-buffer
UCS-A /security #
```