



# Firepower System User Management

The following topics describe how a user with Administrator access can manage user accounts in the Firepower System:

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- [User Accounts, on page 20](#)
- [Firepower System User Authentication, on page 26](#)
- [LDAP Authentication, on page 29](#)
- [RADIUS Authentication, on page 50](#)
- [Single Sign-on \(SSO\), on page 59](#)

## User Roles

The Firepower System lets you allocate user privileges based on the user's role. For example, you can grant analysts predefined roles such as Security Analyst and Discovery Admin and reserve the Administrator role for the security administrator managing the Firepower System. You can also create custom user roles with access privileges tailored to your organization's needs.

In the platform settings policy for a managed device, you set a default access role for all users from that device who are externally authenticated. After an externally authenticated user logs in for the first time, you can add or remove access rights for that user on the User Management page. If you do not modify the user's rights, the user has only the rights granted by default. Because you create internally authenticated users manually, you set the access rights when you create them.

If you configured management of access rights through LDAP groups, the access rights for users are based on their membership in LDAP groups. They receive the default access rights for the group that they belong to that has the highest level of access. If they do not belong to any groups and you have configured group access, they receive the default user access rights configured in the authentication object for the LDAP server. If you configure group access, those settings override the default access setting in the platform settings policy.

Similarly, if you assign a user to specific user role lists in a RADIUS authentication object, the user receives all assigned roles, unless one or more of those roles are mutually incompatible. If a user is on the lists for two mutually incompatible roles, the user receives the role that has the highest level of access. If the user does not belong to any lists and you have configured a default access role in the authentication object, the user receives that role. If you configure default access in the authentication object, those settings override the default access setting in the platform settings policy.

In a multidomain deployment, you can assign users roles in multiple domains. For example, you can assign a user read-only privileges in the Global domain, but Administrator privileges in a subdomain.

## Predefined User Roles

The Firepower System includes ten predefined user roles that provide a range of access privilege sets to meet the needs of your organization. Note that 7000 and 8000 Series devices have access to only three of the ten predefined user roles: Administrator, Maintenance User, and Security Analyst.

Although you cannot edit predefined user roles, you can use their access privilege sets as the basis for custom user roles. In addition, you cannot configure them to escalate to another user role.

The following table briefly describes the predefined roles available to you.

### Access Admin

Provides access to access control policy and associated features in the **Policies** menu. Access Admins cannot deploy policies.

### Administrator

Administrators have access to all functionality; their sessions present a higher security risk if compromised, so you cannot make them exempt from login session timeouts.

You should limit use of the Administrator role for security reasons.

### Discovery Admin

Provides access to network discovery, application detection, and correlation features in the **Policies** menu. Discovery Admins cannot deploy policies.

### External Database User

Provides read-only access to the Firepower System database using an application that supports JDBC SSL connections. For the third-party application to authenticate to the Firepower System appliance, you must enable database access in the system settings. On the web interface, External Database Users have access only to online help-related options in the **Help** menu. Because this role's function does not involve the web interface, access is provided only for ease of support and password changes.

### Intrusion Admin

Provides access to all intrusion policy, intrusion rule, and network analysis policy features in the **Policies** and **Objects** menus. Intrusion Admins cannot deploy policies.

### Maintenance User

Provides access to monitoring and maintenance features. Maintenance Users have access to maintenance-related options in the **Health** and **System** menus.

### Network Admin

Provides access to access control, SSL inspection, DNS policy, and identity policy features in the **Policies** menu, as well as device configuration features in the **Devices** menu. Network Admins can deploy configuration changes to devices.

### Security Analyst

Provides access to security event analysis features, and read-only access to health events, in the **Overview**, **Analysis**, **Health**, and **System** menus.

### Security Analyst (Read Only)

Provides read-only access to security event analysis features and health event features in the **Overview**, **Analysis**, **Health**, and **System** menus.

### Security Approver

Provides limited access to access control and associated policies and network discovery policies in the **Policies** menu. Security Approvers can view and deploy these policies, but cannot make policy changes.

Externally authenticated users, if assigned no other roles, have minimum access rights based on the settings in LDAP or RADIUS authentication objects and in platform settings. You can assign additional rights to these users, but to remove or change minimum access rights, you must perform the following tasks:

- Move the user from one list to another in the authentication object or change the user's attribute value or group membership on the external authentication server.
- Update platform settings.
- Use the User Management page to remove the access from that user account.

### Related Topics

[User Account Privileges](#), on page 4

## Custom User Roles

In addition to the predefined user roles, you can also create custom user roles with specialized access privileges. Custom user roles can have any set of menu-based and system permissions, and may be completely original or based on a predefined user role. Like predefined user roles, custom roles can serve as the default role for externally authenticated users. Unlike predefined roles, you can modify and delete custom roles.

Selectable permissions are hierarchical, and are based on the Firepower System menu layout. Permissions are expandable if they have sub-pages or if they have more fine-grained permissions available beyond simple page access. In that case, the parent permission grants page view access and the children granular access to related features of that page. Permissions that contain the word “Manage” grant the ability to edit and delete information that other users create.



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**Tip** For pages or features not included in the menu structure, privileges are granted by parent or related pages. For example, the Modify Intrusion Policy privilege also allows you to modify network analysis policies.

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You can apply restricted searches to a custom user role. These constrain the data a user may see in the event viewer. You can configure a restricted search by first creating a private saved search and selecting it from the **Restricted Search** drop-down menu under the appropriate menu-based permission.

When you configure a custom user role on a Firepower Management Center, all menu-based permissions are available for you to grant. When you configure a custom user role on a managed device, only some permissions are available — those relevant to device functions.

The selectable options under System Permissions allow you to create a user role that can make queries to the external database or escalate to the permissions of a target user role.

Optionally, instead of creating a new custom user role, you can export a custom user role from another appliance, then import it onto your appliance. You can then edit the imported role to suit your needs before you apply it.

### Related Topics

[User Account Privileges](#), on page 4

[External Database Access Settings](#)

## Example: Custom User Roles and Access Control

You can create custom user roles for access control-related features to designate whether Firepower System users can view and modify access control and associated policies.

The following table lists custom roles that you could create and user permissions granted for each example. The table lists the privileges required for each custom role. In this example, Policy Approvers can view (but not modify) access control and intrusion policies. They can also deploy configuration changes to devices.

**Table 1: Example Access Control Custom Roles**

Custom Role Permission	Example: Access Control Editor	Example: Intrusion & Network Analysis Editor	Example: Policy Approver
<b>Access Control</b>	yes	no	yes
Access Control Policy	yes	no	yes
Modify Access Control Policy	yes	no	no
Intrusion Policy	no	yes	yes
Modify Intrusion Policy	no	yes	no
<b>Deploy Configuration to Devices</b>	no	no	yes

## User Account Privileges

The following sections provide a list of the configurable user permissions in the Firepower System and the predefined user roles that can access them. Not all permissions are available on managed devices; permissions available only on the Firepower Management Center are marked accordingly.

### Overview Menu

The following table lists, in order, the user role privileges required to access each option in the Overview menu and whether the user role has access to the sub-permissions within. The Security Approver, Discovery Admin, Intrusion Admin, Access Admin, Network Admin, and External Database User roles have no permissions in the Overview menu.

**Table 2: Overview Menu**

Permission	Admin	Maint User	Security Analyst	Security Analyst (RO)
<b>Dashboards</b>	yes	yes	yes	yes
Manage Dashboards	yes	no	no	no
Appliance Information Widget	yes	yes	yes	yes
Appliance Status Widget ( <i>FMC only</i> )	yes	yes	yes	yes

Permission	Admin	Maint User	Security Analyst	Security Analyst (RO)
Correlation Events Widget	yes	no	yes	yes
Current Interface Status Widget	yes	yes	yes	yes
Current Sessions Widget	yes	no	no	no
Custom Analysis Widget ( <i>FMC only</i> )	yes	no	yes	yes
Disk Usage Widget	yes	yes	yes	yes
Interface Traffic Widget	yes	yes	yes	yes
Intrusion Events Widget ( <i>FMOnly</i> )	yes	no	yes	yes
Network Correlation Widget ( <i>FMC only</i> )	yes	no	yes	yes
Product Licensing Widget ( <i>FMC only</i> )	yes	yes	no	no
Product Updates Widget	yes	yes	no	no
RSS Feed Widget	yes	yes	yes	yes
System Load Widget	yes	yes	yes	yes
System Time Widget	yes	yes	yes	yes
White List Events Widget ( <i>FMC only</i> )	yes	no	yes	yes
<b>Reporting</b> ( <i>FMC only</i> )	yes	no	yes	yes
Manage Report Templates ( <i>FMC only</i> )	yes	no	yes	yes
<b>Summary</b>	yes	no	yes	yes
Intrusion Event Statistics ( <i>FMC only</i> )	yes	no	yes	yes
Intrusion Event Performance	yes	no	no	no
Intrusion Event Graphs ( <i>FMC only</i> )	yes	no	yes	yes
Discovery Statistics ( <i>FMC only</i> )	yes	no	yes	yes
Discovery Performance ( <i>FMOnly</i> )	yes	no	no	no
Connection Summary ( <i>FMC only</i> )	yes	no	yes	yes

## Analysis Menu

The following table lists, in order, the user role privileges required to access each option in the Analysis menu and whether the user role has access to the sub-permissions within. Permissions that appear multiple times under different headings will be listed on the table only where they first appear, except to indicate submenu headings. The Security Approver, Intrusion Admin, Access Admin, Network Admin, and External Database

User roles have no permissions in the Analysis menu. The Analysis menu is only available on the Firepower Management Center.

**Table 3: Analysis Menu**

Menu	Admin	Discovery Admin	Maint User	Security Analyst	Security Analyst (RO)
Context Explorer	yes	no	no	yes	yes
<b>Connection Events</b>	yes	no	no	yes	yes
Modify Connection Events	yes	no	no	yes	no
Connection Summary Events	yes	no	no	yes	yes
Modify Connection Summary Events	yes	no	no	yes	no
<b>Security Intelligence Events</b>	yes	no	no	yes	yes
Modify Security Intelligence Events	yes	no	no	yes	no
<b>Intrusion</b>	yes	no	no	yes	yes
Intrusion Events	yes	no	no	yes	yes
Modify Intrusion Events	yes	no	no	yes	no
View Local Rules	yes	no	no	yes	yes
Reviewed Events	yes	no	no	yes	yes
Clipboard	yes	no	no	yes	yes
Incidents	yes	no	no	yes	yes
Modify Incidents	yes	no	no	yes	no
<b>Files</b>	yes	no	no	yes	yes
Malware Events	yes	no	no	yes	yes
Modify Malware Events	yes	no	no	yes	no
File Events	yes	no	no	yes	yes
Modify File Events	yes	no	no	yes	no
Captured Files	yes	no	no	yes	yes
Modify Captured Files	yes	no	no	yes	no
File Trajectory	yes	no	no	yes	yes
File Download	yes	no	no	yes	yes
Dynamic File Analysis	yes	no	no	yes	no

Menu	Admin	Discovery Admin	Maint User	Security Analyst	Security Analyst (RO)
<b>Hosts</b>	yes	no	no	yes	yes
Network Map	yes	no	no	yes	yes
Hosts	yes	no	no	yes	yes
Modify Hosts	yes	no	no	yes	no
Indications of Compromise	yes	no	no	yes	yes
Modify Indications of Compromise	yes	no	no	yes	no
Servers	yes	no	no	yes	yes
Modify Servers	yes	no	no	yes	no
Vulnerabilities	yes	no	no	yes	yes
Modify Vulnerabilities	yes	no	no	yes	no
Host Attributes	yes	no	no	yes	yes
Modify Host Attributes	yes	no	no	yes	no
Applications	yes	no	no	yes	yes
Application Details	yes	no	no	yes	yes
Modify Application Details	yes	no	no	yes	no
Host Attribute Management	yes	no	no	no	no
Discovery Events	yes	no	no	yes	yes
Modify Discovery Events	yes	no	no	yes	no
<b>Users</b>	yes	yes	no	yes	yes
User Activity	yes	yes	no	yes	yes
Modify User Activity Events	yes	yes	no	yes	no
Users	yes	yes	no	yes	yes
Modify Users	yes	yes	no	yes	no
<b>Vulnerabilities</b>	yes	no	no	yes	yes
Third-party Vulnerabilities	yes	no	no	yes	yes
Modify Third-party Vulnerabilities	yes	no	no	yes	no
<b>Correlation</b>	yes	yes	no	yes	yes

Menu	Admin	Discovery Admin	Maint User	Security Analyst	Security Analyst (RO)
Correlation Events	yes	yes	no	yes	yes
Modify Correlation Events	yes	yes	no	yes	no
White List Events	yes	yes	no	yes	yes
Modify White List Events	yes	yes	no	yes	no
White List Violations	yes	yes	no	yes	yes
Remediation Status	yes	yes	no	no	no
Modify Remediation Status	yes	yes	no	no	no
<b>Custom</b>	yes	no	no	yes	yes
Custom Workflows	yes	no	no	yes	yes
Manage Custom Workflows	yes	no	no	yes	yes
Custom Tables	yes	no	no	yes	yes
Manage Custom Tables	yes	no	no	yes	yes
<b>Search</b>	yes	no	yes	yes	yes
Manage Search	yes	no	no	no	no
<b>Bookmarks</b>	yes	no	no	yes	yes
Manage Bookmarks	yes	no	no	yes	yes
Application Statistics	yes	no	no	yes	yes
Geolocation Statistics	yes	no	no	yes	yes
User Statistics	yes	no	no	yes	yes
URL Category Statistics	yes	no	no	yes	yes
URL Reputation Statistics	yes	no	no	yes	yes
DNS Queries by Record Types	yes	no	no	yes	yes
SSL Statistics	yes	no	no	yes	yes
Intrusion Event Statistics by Application	yes	no	no	yes	yes
Intrusion Event Statistics by User	yes	no	no	yes	yes
Security Intelligence Category Statistics	yes	no	no	yes	yes
File Storage Statistics by Disposition	yes	no	no	yes	yes

Menu	Admin	Discovery Admin	Maint User	Security Analyst	Security Analyst (RO)
File Storage Statistics by Type	yes	no	no	yes	yes
Dynamic File Analysis Statistics	yes	no	no	yes	yes

## Policies Menu

The following table lists, in order, the user role privileges required to access each option in the Policies menu and whether the user roles has access to the sub-permissions within. The External Database User, Maintenance User, Security Analyst, and Security Analyst (Read Only) roles have no permissions in the Policies menu. The Policies menu is only available on the Firepower Management Center.

Note that the Intrusion Policy and Modify Intrusion Policy privileges also allow you to create and modify network analysis policies.

*Table 4: Policies Menu*

Menu	Access Admin	Admin	Discovery Admin	Intrusion Admin	Network Admin	Security Approver
<b>Access Control</b>	yes	yes	no	no	yes	yes
Access Control Policy	yes	yes	no	no	yes	yes
Modify Access Control Policy	yes	yes	no	no	yes	no
Modify Administrator Rules	yes	yes	no	no	yes	no
Modify Root Rules	yes	yes	no	no	yes	no
Intrusion Policy	no	yes	no	yes	no	yes
Modify Intrusion Policy	no	yes	no	yes	no	no
Malware & File Policy	yes	yes	no	no	no	yes
Modify Malware & File Policy	yes	yes	no	no	no	no
DNS Policy	yes	yes	no	no	yes	yes
Modify DNS Policy	yes	yes	no	no	yes	no
Identity Policy	yes	yes	no	no	yes	no
Modify Identity Policy	yes	yes	no	no	yes	no
Modify Administrator Rules	yes	yes	no	no	yes	no
Modify Root Rules	yes	yes	no	no	yes	no
SSL Policy	yes	yes	no	no	yes	yes
Modify SSL Policy	yes	yes	no	no	yes	no

Menu	Access Admin	Admin	Discovery Admin	Intrusion Admin	Network Admin	Security Approver
Modify Administrator Rules	yes	yes	no	no	yes	no
Modify Root Rules	yes	yes	no	no	yes	no
<b>Network Discovery</b>	no	yes	yes	no	no	yes
Custom Fingerprinting	no	yes	yes	no	no	no
Modify Custom Fingerprinting	no	yes	yes	no	no	no
Custom Topology	no	yes	yes	no	no	no
Modify Custom Topology	no	yes	no	no	no	no
Modify Network Discovery	no	yes	yes	no	no	no
<b>Application Detectors</b>	no	yes	yes	no	no	no
Modify Application Detectors	no	yes	yes	no	no	no
User 3rd Party Mappings	no	yes	yes	no	no	no
Modify User 3rd Party Mappings	no	yes	no	no	no	no
Custom Product Mappings	no	yes	yes	no	no	no
Modify Custom Product Mappings	no	yes	no	no	no	no
<b>Correlation</b>	no	yes	no	no	no	no
Policy Management	no	yes	no	no	no	no
Modify Policy Management	no	yes	yes	no	no	no
Rule Management	no	yes	no	no	no	no
Modify Rule Management	no	yes	yes	no	no	no
White List	no	yes	no	no	no	no
Modify White List	no	yes	yes	no	no	no
Traffic Profiles	no	yes	no	no	no	no
Modify Traffic Profiles	no	yes	yes	no	no	no
<b>Actions</b>	no	yes	yes	no	no	yes
Alerts	no	yes	yes	no	no	yes
Impact Flag Alerts	no	yes	yes	no	no	no
Modify Impact Flag Alerts	no	yes	yes	no	no	no

Menu	Access Admin	Admin	Discovery Admin	Intrusion Admin	Network Admin	Security Approver
Discovery Event Alerts	no	yes	yes	no	no	no
Modify Discovery Event Alerts	no	yes	yes	no	no	no
Email	no	yes	no	yes	no	no
Modify Email	no	yes	no	yes	no	no
Modify Alerts	no	yes	yes	no	no	no
Scanners	no	yes	yes	no	no	no
Scan Results	no	yes	yes	no	no	no
Modify Scan Results	no	yes	yes	no	no	no
Modify Scanners	no	yes	yes	no	no	no
Groups	no	yes	no	no	no	no
Modify Groups	no	yes	yes	no	no	no
Modules	no	yes	no	no	no	no
Modify Modules	no	yes	yes	no	no	no
Instances	no	yes	no	no	no	no
Modify Instances	no	yes	yes	no	no	no

## Devices Menu

The **Devices** menu table lists, in order, the user role privileges required to access each option in the Devices menu and the sub-permissions within. The Discovery Admin, External Database User, Intrusion Admin, Maintenance User, Security Analyst, and Security Analyst (Read Only) have no permissions in the Devices menu. The Devices menu is only available on the Firepower Management Center.

**Table 5: Devices Menu**

Menu	Access Admin	Admin	Network Admin	Security Approver
<b>Device Management</b>	no	yes	yes	yes
Modify Devices	no	yes	yes	no
<b>NAT</b>	yes	yes	yes	yes
NAT List	yes	yes	yes	yes
Modify NAT Policy	yes	yes	yes	no

Menu	Access Admin	Admin	Network Admin	Security Approver
VPN	no	yes	yes	yes
Modify VPN	no	yes	yes	no
<b>Device Management</b>	no	yes	yes	no
Modify Devices	no	yes	yes	no

## Object Manager Menu

The Object Manager menu table lists, in order, the user role privileges required to access each option in the Object Manager menu and the sub-permission within. The Discovery Admin, Security Approver, Maintenance User, External Database User, Security Analyst, and Security Analyst (Read Only) have no permissions in the Object Manager menu. The Object Manager menu is available only on the Firepower Management Center.

*Table 6: Object Manager Menu*

Menu	Access Admin	Admin	Intrusion Admin	Network Admin
<b>Object Manager</b>	yes	yes	no	yes
Rule Editor	no	yes	yes	no
Modify Rule Editor	no	yes	yes	no
NAT List	yes	yes	no	yes
Modify Object Manager	no	yes	no	no

## Cisco AMP

The Cisco AMP permission is available only to the Administrator user role. This permission is available only on the Firepower Management Center.

## Deploy Configuration to Devices

The Deploy Configuration to Devices permission is available to the Administrator, Network Admin, and Security Approver roles. This permission is available only on the Firepower Management Center.

## System Menu

The following table lists, in order, the user role privileges required to access each option in the System menu and whether the user role has access to the sub-permissions within. The External Database User role has no permissions in the System Menu.

Table 7: System Menu

Menu	Access Admin	Admin	Discovery Admin	Intrusion Admin	Maint User	Network Admin	Security Approver	Se Ar
Configuration	no	yes	no	no	no	no	no	no
Domains	no	yes	no	no	no	no	no	no
<b>Integration</b>	no	yes	no	no	no	yes	yes	no
Cisco CSI	yes	yes	no	no	no	yes	yes	no
Identity Realms ( <i>FMC only</i> )	yes	yes	no	no	no	yes	yes	no
Modify Identity Realms ( <i>FMC only</i> )	yes	yes	no	no	no	yes	no	no
Identity Sources ( <i>FMC only</i> )	yes	yes	no	no	no	yes	yes	no
Modify Identity Sources ( <i>FMC only</i> )	yes	yes	no	no	no	yes	no	no
eStreamer	no	yes	no	no	no	no	no	no
Host Input Client ( <i>FMC only</i> )	no	yes	no	no	no	no	no	no
Smart Software Satellite ( <i>FMC only</i> )	yes	yes	no	no	no	yes	yes	no
Modify Smart Software Satellite ( <i>FMC only</i> )	yes	yes	no	no	no	yes	no	no
<b>User Management</b>	no	yes	no	no	no	no	no	no
Users	no	yes	no	no	no	no	no	no
User Roles	no	yes	no	no	no	no	no	no
External Authentication ( <i>FMC only</i> )	no	yes	yes	no	no	no	no	no
<b>Updates</b>	no	yes	no	no	no	no	no	no
Rule Updates ( <i>FMC only</i> )	no	yes	no	yes	no	no	no	no
Rule Update Import Log ( <i>FMC only</i> )	no	yes	no	no	no	no	no	no
<b>Licenses</b>	no	yes	no	no	no	no	no	no
Smart Licences	no	yes	no	no	no	no	no	no
Modify Smart Licenses	no	yes	no	no	no	no	no	no
Classic Licenses	no	yes	no	no	no	no	no	no
<b>Health (<i>FMC only</i>)</b>	no	yes	no	no	yes	no	no	yes
Health Policy ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes
Modify Health Policy ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes

Menu	Access Admin	Admin	Discovery Admin	Intrusion Admin	Maint User	Network Admin	Security Approver	Security Analyst
Apply Health Policy ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes
Health Events ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes
Modify Health Events ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes
<b>Monitoring</b>	no	yes	no	no	yes	yes	yes	yes
Audit	no	yes	no	no	yes	no	no	no
Modify Audit Log	no	yes	no	no	yes	no	no	no
Syslog	no	yes	no	no	yes	no	no	no
Statistics	no	yes	no	no	yes	no	no	no
<b>Tools</b>	no	yes	no	no	yes	no	no	yes
Backup Management	no	yes	no	no	yes	no	no	no
Restore Backup	no	yes	no	no	yes	no	no	no
Scheduling	no	yes	no	no	yes	no	no	no
Delete Other Users' Scheduled Tasks	no	yes	no	no	no	no	no	no
Import/Export	no	yes	no	no	no	no	no	no
Discovery Data Purge ( <i>FMC only</i> )	no	yes	no	no	no	no	no	yes
Whois ( <i>FMC only</i> )	no	yes	no	no	yes	no	no	yes

## Help Menu

The Help menu and its permissions are accessible to all user roles. You cannot restrict Help menu options.

## Managing User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

Each Firepower System user is associated with a user access role or roles. These user roles are assigned permissions that determine access to menus and other options in the system. For example, an analyst needs access to event data to analyze the security of your network, but might not require access to administrative functions for the Firepower System itself. You can grant Security Analyst access to analysts while reserving the Administrator role for the user or users managing the Firepower System.

The Firepower System includes ten predefined user roles designed for a variety of administrators and analysts. These predefined user roles have a set of predetermined access privileges.

You can also create custom user roles with more granular access privileges.

You can also restrict the data that a user role can view in the event viewer by applying a restricted search to that role. To create a custom role with restricted access, you must choose the tables you want to restrict from the Menu Based Permissions list, then choose private saved searches from the Restrictive Search drop-down lists.

You cannot delete predefined user roles, but you can delete custom roles that are no longer necessary. If you want to disable a custom role without removing it entirely, you can deactivate it instead. Note that you cannot delete your own user role or a role that is set as a default user role in a platform settings policy.

### Procedure

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- Step 1** Choose **System > Users**.
- Step 2** Click the **User Roles** tab.
- Step 3** Manage user roles:
- **Activate** — Activate or deactivate a predefined user role as described in [Activating and Deactivating User Roles, on page 15](#).
  - **Create** — Create custom user roles as described in [Creating Custom User Roles, on page 16](#)
  - **Copy** — Copy an existing user role to create a new custom user role as described in [Copying User Roles, on page 17](#).
  - **Edit** — Edit a custom user role as described in [Editing Custom User Roles, on page 18](#).
  - **Delete** — Click **Delete** () next to the custom role you want to delete. If the controls are dimmed, the configuration belongs to an ancestor domain, or you do not have permission to modify the configuration.
  - **Note** If a deleted role is the only role assigned to a given user, that user can log in and access the User Preferences menu, but is otherwise unable to access the Firepower System.
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## Activating and Deactivating User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You cannot delete predefined user roles, but you can deactivate them. Deactivating a role removes that role and all associated permissions from any user who is assigned that role.

In a multidomain deployment, the system displays custom user roles created in the current domain, which you can edit. It also displays custom user roles created in ancestor domains, which you cannot edit. To view and edit custom user roles in a lower domain, switch to that domain.



**Caution** If a deactivated role is the only role assigned to a given user, that user can log in and access the User Preferences menu, but is otherwise unable to access the Firepower System.

**Procedure**

- Step 1** Choose **System > Users**.
- Step 2** Click the **User Roles** tab.
- Step 3** Click the slider next to the user role you want to activate or deactivate.

If the controls are dimmed, the configuration belongs to an ancestor domain, or you do not have permission to modify the configuration.

If you deactivate, then reactivate, a role with Lights-Out Management while a user with that role is logged in, or restore a user or user role from a backup during that user’s login session, that user must log back into the web interface to regain access to IPMItool commands.

## Creating Custom User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin



**Caution** Users with menu-based User Management permissions have the ability to elevate their own privileges or create new user accounts with extensive privileges, including the Administrator user role. For system security reasons we strongly recommend you restrict the list of users with User Management permissions appropriately.

**Procedure**

- Step 1** Choose **System > Users**.
- Step 2** Click the **User Roles** tab.
- Step 3** Click **Create User Role**.
- Step 4** In the **Name** field, enter a name for the new user role. User role names are case sensitive.
- Step 5** Optionally, add a **Description**.
- Step 6** Choose menu-based permissions for the new role.

When you choose a permission, all of its children are chosen, and the multi-value permissions use the first value. If you clear a high-level permission, all of its children are cleared also. If you choose a permission but not its children, it appears in italic text.

Copying a predefined user role to use as the base for your custom role preselects the permissions associated with that predefined role.

- Step 7** Optionally, set database access permissions for the new role by checking or unchecking the **External Database Access** checkbox.
- Step 8** Optionally, on Firepower Management Centers, set escalation permissions for the new user role as described in [Configuring a Custom User Role for Escalation, on page 19](#).
- Step 9** Click **Save**.

## Copying User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You can copy an existing role to use as the basis for a new custom role. This preselects the existing role's permissions in the User Role Editor so you can model one role on another.

You can copy any existing role, including predefined user roles and custom user roles inherited from ancestor domains.

### Procedure

- Step 1** Choose **System > Users**.
- Step 2** Click the **User Roles** tab.
- Step 3** Click **Copy**  next to the user role you want to copy.
- Step 4** Enter a new **Name**.
- The system creates a default name for the new user role by combining the name of the original user role and the `(copy)` suffix.
- Step 5** Enter a new **Description**.
- The system retains the description of the original user role if you do not overwrite it.
- Step 6** Optionally, modify the menu-based permissions inherited from the original user role.
- When you choose a permission, all of its children are chosen, and the multi-value permissions use the first value. If you clear a high-level permission, all of its children are cleared also. If you choose a permission but not its children, the permission appears in italic text.
- Step 7** Optionally, set the database access permissions for the new role by checking or unchecking the **External Database Access** checkbox.
- Step 8** Optionally, set escalation permissions for the new user role as described in [Configuring a Custom User Role for Escalation, on page 19](#).
- Step 9** Click **Save**.

## Editing Custom User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You cannot edit predefined user roles.

In a multidomain deployment, the system displays custom user roles created in the current domain, which you can edit. It also displays custom user roles created in ancestor domains, which you cannot edit. To view and edit custom user roles in a lower domain, switch to that domain.

### Procedure

- 
- Step 1** Choose **System** > **Users**.
  - Step 2** Click the **User Roles** tab.
  - Step 3** Click **Edit** () next to the custom user role you want to modify. If **View** () appears instead, the configuration belongs to an ancestor domain, or you do not have permission to modify the configuration.
  - Step 4** Modify the **Name** and **Description** fields. User role names are case sensitive.
  - Step 5** Choose menu-based permissions for the user role.  
  
When you choose a permission, all of its children are chosen, and the multi-value permissions use the first value. If you clear a high-level permission, all of its children are cleared also. If you choose a permission but not its children, the permission appears in italic text.
  - Step 6** Optionally, set the database access permissions for the role by checking or unchecking the **External Database Access** checkbox.
  - Step 7** Optionally, on Firepower Management Centers, set escalation permissions for the user role as described in [Configuring a Custom User Role for Escalation, on page 19](#).
  - Step 8** Click **Save**.
- 

## User Role Escalation

You can give custom user roles the permission, with a password, to temporarily gain the privileges of another, targeted user role in addition to those of the base role. This allows you to easily substitute one user for another during an absence, or to more closely track the use of advanced user privileges.

For example, a user whose base role has very limited privileges may escalate to the Administrator role to perform administrative actions. You can configure this feature so that users can use their own passwords, or so they use the password of another user that you specify. The second option allows you to easily manage one escalation password for all applicable users.

Note that only one user role at a time can be the escalation target role. You can use a custom or predefined user role. Each escalation lasts for the duration of a login session and is recorded in the audit log.

## Setting the Escalation Target Role

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You can assign any of your user roles, predefined or custom, to act as the system-wide escalation target role. This is the role to which any other role may escalate, if it has the ability.

### Procedure

- 
- Step 1** Choose **System > Users**.
- Step 2** Click **User Roles**.
- Step 3** Click **Configure Permission Escalation**.
- Step 4** Choose a user role from the drop-down list.
- Step 5** Click **OK** to save your changes.

**Note** Changing the escalation target role is effective immediately. Users in escalated sessions now have the permissions of the new escalation target.

---

## Configuring a Custom User Role for Escalation

Smart License	Classic License	Supported Device	Supported Domains	Access
Any	Any	Any	Any	Admin

Consider the needs of your organization when you configure the escalation password for a custom role. If you want to easily manage many escalating users, you may want to choose another user whose password serves as the escalation password. If you change that user's password or deactivate that user, all escalating users who require that password are affected. This allows you to manage user role escalation more efficiently, especially if you choose an externally authenticated user that you can manage centrally.

### Procedure

- 
- Step 1** Begin configuring your custom user role as described in [Creating Custom User Roles, on page 16](#).
- Step 2** In System Permissions, choose the **Set this role to escalate to:** check box.  
The current escalation target role is listed beside the check box.
- Step 3** Choose the password that this role uses to escalate. You have two options:
- If you want users with this role to use their own passwords when they escalate, choose **Authenticate with the assigned user's password**.
  - If you want users with this role to use the password of another user, choose **Authenticate with the specified user's password** and enter that username.

**Note** When authenticating with another user's password, you can enter any username, even that of a deactivated or nonexistent user. Deactivating the user whose password is used for escalation makes escalation impossible for users with the role that requires it. You can use this feature to quickly remove escalation powers if necessary.

**Step 4** Click **Save**.  
Users with this role can now escalate to the target user role.

## Escalating Your User Role

Smart License	Classic License	Supported Device	Supported Domains	Access
Any	Any	FMC	Any	Any

When a user has an assigned custom user role with permission to escalate, that user may escalate to the target role's permissions at any time. Note that escalation has no effect on user preferences.

### Before you begin

- Confirm that a system administrator configured the escalation target role or custom user role for escalation as described in [Setting the Escalation Target Role, on page 19](#) or [Configuring a Custom User Role for Escalation, on page 19](#).

### Procedure

- Step 1** From the drop-down list under your user name, choose **Escalate Permissions**.
- Step 2** Enter the authentication password.
- Step 3** Click **Escalate**. You now have all permissions of the escalation target role in addition to your current role.
- Note** Escalation lasts for the remainder of your login session. To return to the privileges of your base role only, you must log out, then begin a new session.

## User Accounts

The admin account and optional, custom user accounts on a Firepower Management Center or Firepower 7000 and 8000 Series device allow users to log into these. For internally-authenticated users, accounts must be created manually. For externally-authenticated users, accounts are created automatically.

### Related Topics

- [Firepower System User Accounts](#)
- [Firepower System User Interfaces](#)

## Managing User Accounts

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

### Procedure

**Step 1** Choose **System > Users**.

**Step 2** Manage user accounts:

- **Activate/Deactivate** — Click the slider next to a user to reactivate a deactivated user, or to disable an active user account without deleting it. Only internally authenticated users can be activated and deactivated.
- **Create** — Create a new user account; see [Creating a User Account, on page 21](#).
- **Edit** — Edit an existing user account; see [Editing a User Account, on page 22](#).
- **Delete** — If you want to delete a user, click **Delete** (). You can delete user accounts from the system at any time, with the exception of the admin account, which cannot be deleted.

### Related Topics

[Lights-Out Management User Access Configuration](#)

[Predefined User Roles, on page 2](#)

[Custom User Roles, on page 3](#)

## Creating a User Account

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	FMC 7000 & 8000 Series	Any	Admin

When you set up a new user account, you can control which parts of the system the account can access. You can set password expiration and strength settings for the user account during creation. For a local account on a 7000 or 8000 Series device, you can also configure the level of command line access the user will have.

In a multidomain deployment, you can create user accounts in any domain in which you have been assigned Admin access. You can also create accounts in a higher-level domain and assign the users lower-level access only. For example, you might want a single user to be an administrator of two domains, but deny them access to the ancestor domain. This kind of user account can only be modified by switching to a subdomain in which access is assigned.

### Procedure

**Step 1** Choose **System > Users**.

**Step 2** Click **Create User**.

**Step 3** Enter a **User Name**.

**Step 4** Modify the login options; see [User Account Login Options, on page 24](#).

**Step 5** Enter values in **Password** and **Confirm Password**.

The values you construct must be based on the password options you set earlier.

**Step 6** If you are creating a user account on a 7000 or 8000 Series device, assign the appropriate level of **Command-Line Interface Access** as described in [Command Line Access Levels, on page 25](#).

**Step 7** Assign user roles:

- Check or uncheck the check box next to the user role(s) you want to assign the user.
- In a multidomain deployment, if you are adding a user account to a domain with descendant domains, click the **Add Domains** button that displays instead of the user role check boxes. Continue as described in [Assigning User Roles in Multiple Domains, on page 23](#).

**Note** User roles determine the user's access rights. For more information, see [Managing User Roles, on page 14](#).

**Step 8** Click **Save**.

## Editing a User Account

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

After adding user accounts to the system, you can modify access privileges, account options, or passwords at any time. Note that password management options do not apply to users who authenticate to an external directory server. You manage those settings on the external server. However, you must configure access rights for all accounts, including those that are externally authenticated.



**Note** For externally authenticated users, you cannot remove the minimum access rights through the Firepower System user management page for users assigned an access role because of LDAP group or RADIUS list membership or attribute values. You can, however, assign additional rights. When you modify the access rights for an externally authenticated user, the Authentication Method column on the User Management page provides a status of **External - Locally Modified**.

If you change the authentication for a user from externally authenticated to internally authenticated, you must supply a new password for the user.

### Procedure

**Step 1** Choose **System > Users**.

**Step 2** Click **Edit** () next to the user you want to modify.

**Step 3** Modify settings described in [Creating a User Account, on page 21](#).

**Step 4** Click **Save**.

---

## Assigning User Roles in Multiple Domains

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

In a multidomain deployment, you can assign users roles in ancestor and descendant domains. For example, you can assign a user read-only privileges in the Global domain, but Admin privileges in a descendant domain.

### Procedure

---

- Step 1** In the user account editor, click **Add Domain**.
- Step 2** Choose a domain from the **Domain** drop-down list.
- Step 3** Check the user roles you want to assign the user.
- Step 4** Click **Save**.
- 

## Converting a User from Internal to External Authentication

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin



**Note** When you convert a user from internal to external authentication, the user account retains the permissions already present in that account. The existing permissions override any permissions associated with the associated authentication object group or the default user role set in the platform settings policy.

---

### Before you begin

- A user record with the same user name must be present on the external authentication server.

### Procedure

---

- Step 1** Enable LDAP (with or without CAC) or RADIUS authentication. For more information, see [LDAP Authentication, on page 29](#) or [RADIUS Authentication, on page 50](#).
- Step 2** Instruct the user to log in with the password stored for that user on the external server.
-

## User Account Login Options

The following table describes some of the options you can use to regulate passwords and account access for Firepower System users.



### Note

- Password management options do not apply to users who authenticate to an external directory server. You manage those settings on the external authentication server. After you enable **Use External Authentication Method**, the system removes password management options from the display.
- If you enable STIG compliance or Lights-Out Management (LOM) on an appliance, different password restrictions apply. For more information on STIG compliance, see [Enabling STIG Compliance](#).

Table 8: User Account Login Options

Option	Description
Use External Authentication Method	<p>Select this check box if you want this user's credentials to be externally authenticated. If you enable this option, the password management options are no longer displayed.</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>• For users to authenticate to an external directory server, you must also create an authentication object for the server you want to use, and deploy a platform settings policy with authentication enabled.</li> <li>• Note that for externally authenticated users, if the authentication object for the server is disabled, the <b>Authentication Method</b> column in the Users list displays <b>External (Disabled)</b>.</li> <li>• If you select this option for the user and the external authentication server is unavailable, that user can log into the web interface but cannot access any functionality.</li> </ul>
Maximum Number of Failed Logins	<p>Enter an integer, without spaces, that determines the maximum number of times each user can try to log in after a failed login attempt before the account is locked. The default setting is five tries; use <b>0</b> to allow an unlimited number of failed logins.</p>
Minimum Password Length	<p>Enter an integer, without spaces, that determines the minimum required length, in characters, of a user's password. The default setting is <b>8</b>. A value of <b>0</b> indicates that no minimum length is required.</p> <p>If you enable the <b>Check Password Strength</b> option, and set a value for <b>Minimum Password Length</b> that exceeds 8 characters, the higher value applies.</p>
Days Until Password Expiration	<p>Enter the number of days after which the user's password expires. The default setting is <b>0</b>, which indicates that the password never expires. If you set this option, the <b>Password Lifetime</b> column of the Users list indicates the days remaining on each user's password.</p>
Days Before Password Expiration Warning	<p>Enter the number of warning days users have to change their password before their password actually expires. The default setting is <b>0</b> days.</p> <p><b>Note</b> The number of warning days must be <b>less than</b> the number of days before the password expires.</p>

Option	Description
Force Password Reset on Login	Select this option to force users to change their passwords the next time they log in.
Check Password Strength	Select this option to require strong passwords. A strong password must be at least eight alphanumeric characters of mixed case and must include at least one numeric character and one special character. It cannot be a word that appears in a dictionary or include consecutive repeating characters.
Exempt from Browser Session Timeout	Select this option if you do not want a user's login sessions to terminate due to inactivity. Users with the Administrator role cannot be made exempt.

## Command Line Access Levels

You can use the local web interface on a 7000 or 8000 Series device to assign command line interface access to local device users. Note that you can also assign command line access for users on an NGIPSv, but you use commands from the command line interface.

The commands a user can run depend on the level of access you assign to the user. Possible values for the **Command-Line Interface Access** setting include:

### None

The user cannot log into the appliance on the command line. Any session the user starts will close when the user provides credentials. The access level defaults to **None** on user creation.

### Configuration

The user can access any of the command line options. Exercise caution in assigning this level of access to users.



**Caution** Command line access granted to externally authenticated users defaults to the **Configuration** level of command line access, granting rights to all command line utilities.

### Basic

A specific set of commands can be run by the user, listed below.

**Table 9: Basic Command Line Commands**

configure password	interfaces
end	lcd
exit	link-state
help	log-ips-connection
history	managers
logout	memory
?	model

??	mpls-depth
access-control-config	NAT
alarms	network
arp-tables	network-modules
audit-log	ntp
bypass	perfstats
high-availability	portstats
cpu	power-supply-status
database	process-tree
device-settings	processes
disk	routing-table
disk-manager	serial-number
dns	stacking
expert	summary
fan-status	time
fastpath-rules	traffic-statistics
gui	version
hostname	virtual-routers
hyperthreading	virtual-switches
inline-sets	

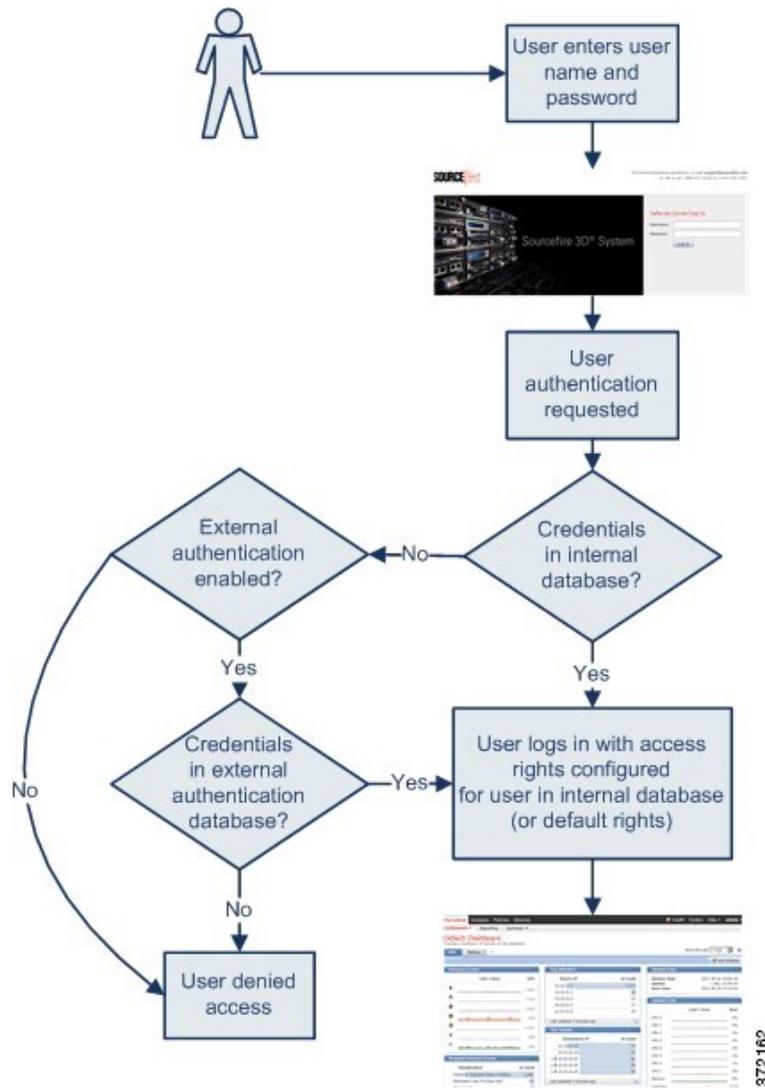
## Firepower System User Authentication

When a user logs into the web interface on a Firepower Management Center or a managed device, the appliance looks for a match for the user name and password in the local list of users. This process is called *authentication*.

There are two types of authentication:

- *internal authentication* — The system checks the list in the local database for the user.
- *external authentication* — The system checks the list in the local database for the user and, if the user is not present on that list, queries an external authentication server for its user list.

The authentication process is illustrated below.



When you create a user account, you specify either internal or external authentication for that user.

## Internal Authentication

In internal authentication, user credentials are verified against records in the internal Firepower System database. This is the default authentication type.

You set the access rights for internal authentication users when you create the user's account.



**Note** When an internally authenticated user is converted to external authentication, you cannot revert to internal authentication.

## External Authentication

In external authentication, the Firepower Management Center or managed device retrieves user credentials from a repository on an external server. External servers can be either a Lightweight Directory Access Protocol (LDAP) directory server or a Remote Authentication Dial In User Service (RADIUS) authentication server.

You enable external authentication using a platform settings policy and settings in individual user accounts. Note the following guidelines:

- You can use multiple external authentication objects to authenticate users to access the Firepower Management Center web interface. In other words, if you have five external authentication objects, users from any of them can be authenticated to access the web interface.
- You can use only one external authentication object for shell access to the Firepower Management Center. If you have more than one external authentication object set up, users can authenticate using only the first object in the list.

When the user logs into an appliance for the first time, the appliance associates the external credentials with a set of permissions by creating a local user record. The user is assigned permissions based on either:

- the group or access list they belong to
- the default user access role you set in the platform settings policy for the appliance

If permissions are granted through group or list membership, they cannot be modified. However, if they are assigned by default user role, you can modify them in the user account, and the modifications you make override the default settings. For example:

- If the default role for externally authenticated user accounts is set to a specific access role, users can log into the appliance using their external account credentials without any additional configuration by the system administrator.
- If an account is externally authenticated and by default receives no access privileges, users can log in but cannot access any functionality. You (or your system administrator) can then change the permissions to grant the appropriate access to user functionality.

You cannot manage passwords for externally authenticated users or deactivate externally authenticated users through the Firepower System interface. For externally authenticated users, you cannot remove the minimum access rights through the Firepower System user management page for users assigned an access role because of LDAP group or RADIUS list membership or attribute values. On the Edit User page for an externally authenticated user, rights granted because of settings on an external authentication server are marked with a status of **Externally Modified**.

You can, however, assign additional rights. When you modify the access rights for an externally authenticated user, the Authentication Method column on the User Management page provides a status of **External - Locally Modified**.

### Related Topics

[LDAP Authentication](#), on page 29

[RADIUS Authentication](#), on page 50

# LDAP Authentication

LDAP, or the Lightweight Directory Access Protocol, allows you to set up a directory on your network that organizes objects, such as user credentials, in a centralized location. Multiple applications can then access those credentials and the information used to describe them. If you ever need to change a user's credentials, you can change them in one place.

You must create LDAP authentication objects on a Firepower Management Center, but you can use the external authentication object on any managed devices that have a web interface (that is, on 7000 and 8000 Series devices) by deploying a platform settings policy where the object is enabled to the device. When you deploy the policy, the object is copied to the device.



---

**Note** Before enabling external authentication on 7000 and 8000 Series devices, remove any internally-authenticated shell or CLI users that have the same user name as externally-authenticated users included in your shell access filter.

---

You can use LDAP naming standards for address specification and for filter and attribute syntax in your authentication object. For more information, see the RFCs listed in the Lightweight Directory Access Protocol (v3): Technical Specification, RFC 3377. Examples of syntax are provided throughout this procedure. Note that when you set up an authentication object to connect to a Microsoft Active Directory Server, you can use the address specification syntax documented in the Internet RFC 822 (Standard for the Format of ARPA Internet Text Messages) specification when referencing a user name that contains a domain. For example, to refer to a user object, you might type `JoeSmith@security.example.com` rather than the equivalent user distinguished name of `cn=JoeSmith,ou=security,dc=example,dc=com` when using Microsoft Active Directory Server.



---

**Note** Currently, the Firepower System supports LDAP external authentication on LDAP servers running Microsoft Active Directory on Windows Server 2008, Oracle Directory Server Enterprise Edition 7.0 on Windows Server 2008, or OpenLDAP on Linux. However, the Firepower System does not support external authentication for NGIPSv or ASA FirePOWER devices.

---

Microsoft has announced that Active Directory servers will start enforcing LDAP binding and LDAP signing in 2020. Microsoft is making these a requirement because when using default settings, an elevation of privilege vulnerability exists in Microsoft Windows that could allow a man-in-the-middle attacker to successfully forward an authentication request to a Windows LDAP server. For more information, see [2020 LDAP channel binding and LDAP signing requirement for Windows](#) on the Microsoft support site.

If you have not done so already, we recommend you start using TLS/SSL encryption to authenticate with an Active Directory server.

## Required Information for Creating LDAP Authentication Objects

Before you configure a connection to your LDAP server, you should collect the information that you need to create the LDAP authentication object.



**Note** You must have TCP/IP access from your local appliance to the authentication server where you want to connect.

You need the following, at minimum, to create a basic authentication object:

- the server name or IP address for the server where you plan to connect
- the server type of the server where you plan to connect
- the user name and password for a user account with sufficient privileges to browse the LDAP tree; Cisco recommends that you use a domain admin user account for this purpose
- if there is a firewall between the appliance and the LDAP server, an entry in the firewall to allow outgoing connections
- if possible, the base distinguished name for the server directory where the user names reside



**Tip** You can use a third-party LDAP client to browse the LDAP tree and see base DN and attribute descriptions. You can also use that client to confirm that your selected user can browse the base DN you select. Ask your LDAP administrator to recommend an approved LDAP client for your LDAP server.

Depending on how you plan to customize your advanced LDAP authentication object configuration, you might also need the information in the following table.

**Table 10: Additional LDAP Configuration Information**

To...	You need...
connect over a port other than 389	the port number
connect via an encrypted connection	the certificate for the connection
filter the users who can access your appliance based on an attribute value	the attribute-value pair to filter by
use an attribute as a UI access attribute rather than checking the user distinguished name	the name of the attribute
use an attribute as a shell login attribute rather than checking the user distinguished name	the name of the attribute
filter the users who can access your appliance via the shell based on an attribute value	the attribute-value pair to filter by
associate groups with specific user roles	the distinguished name of each group, as well as the group member attribute if the groups are static groups or the group member URL attribute if the groups are dynamic groups

To...	You need...
use CACs for authentication and authorization	your CAC, a server certificate signed by the same CA that issued your CAC, and the certificate chain for both certificates

## CAC Authentication

If your organization uses Common Access Cards (CACs), you can configure LDAP authentication to authenticate users logging into the web interface and authorize access to specific functionality based on group membership or default access rights. With CAC authentication and authorization configured, users have the option to log in directly without providing a separate username and password for the appliance.



**Note** You **must** have a valid user certificate present in your browser (in this case, a certificate passed to your browser via your CAC) to enable user certificates as part of the CAC configuration process. After you configure CAC authentication and authorization, users on your network **must** maintain the CAC connection for the duration of their browsing session. If you remove or replace a CAC during a session, your web browser terminates the session and the system logs you out of the web interface.

CAC-authenticated users are identified in the system by their electronic data interchange personal identifier (EDIPI) numbers. After users log in using their CAC credentials for the first time, you can manually add or remove access privileges for those users on the User Management page. If you did not preconfigure a user's privileges using group-controlled access roles, the user has only the privileges granted by default in the platform settings policy.



**Tip** The system purges manually configured access privileges when it purges CAC-authenticated users from the User Management page after 24 hours of inactivity. The users are restored to the page after each subsequent login, but you must reconfigure any manual changes to their access privileges.

## Configuring CAC Authentication

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	FMC 7000 and 8000 Series	Any	Admin/Network Admin

Before users on your network can log into Firepower Management Centers and 7000 and 8000 Series devices using their CAC credentials, a user with appropriate permissions must complete the multi-step configuration process for CAC authentication and authorization.

### Before you begin

- Gather the information described in [Required Information for Creating LDAP Authentication Objects](#), on page 29.

## Procedure

---

- Step 1** Insert a CAC as directed by your organization.
- Step 2** Direct your browser to the web interface of the FMC or device.
- Step 3** If prompted, enter the PIN associated with the CAC you inserted in step 1.
- Step 4** If prompted, choose the appropriate certificate from the drop-down list.
- Step 5** On the Login page, in the **Username** and **Password** fields, log in as a user with Administrator privileges. User names are case sensitive.
- You cannot log in using your CAC credentials until you have fully configured CAC authentication and authorization.
- Step 6** Navigate to **System > Users** and click the **External Authentication** tab.
- Step 7** Create an LDAP authentication object exclusively for CAC authentication and authorization.
- See [Creating Advanced LDAP Authentication Objects, on page 35](#). You must configure:
- The **User Name Template** in the advanced options of the **LDAP-Specific Parameters** section.
  - The **UI Access Attribute** in the **Attribute Mapping** section.
  - The distinguished names for existing LDAP groups in the **Group Controlled Access Roles** section, if you want to preconfigure access rights through LDAP group membership.
- You cannot configure both CAC authentication and shell access in the same authentication object. If you also want to authorize users for shell access, create and enable separate authentication objects.
- Step 8** Click **Save**.
- Step 9** Enable external authentication and CAC authentication.
- Step 10** Select **System > Configuration** and click **HTTPS Certificate**.
- Step 11** Import a HTTPS server certificate, if necessary.
- See [Uploading Server Certificates](#). The same certificate authority (CA) must issue the HTTPS server certificate and the user certificates on the CACs you plan to use for authentication and authorization.
- Step 12** Under **HTTPS User Certificate Settings**, choose **Enable User Certificates**.
- For more information, see [Requiring Valid User Certificates](#).
- 

## What to do next

- After the user logs in for the first time, you can manually add or remove the user's access rights. If you do not modify the rights, the user has only the rights granted by default. For more information, see [Editing a User Account, on page 22](#).

## Related Topics

[LDAP Group Fields, on page 44](#)

[LDAP-Specific Fields, on page 40](#)

[Logging Into a 7000 or 8000 Series Device with CAC Credentials](#)

[Logging Into the Firepower Management Center with CAC Credentials](#)

## Creating Basic LDAP Authentication Objects

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You can set up an LDAP authentication object where you customize many of the values. However, if you just want to authenticate all the users in a particular directory, you can create a basic authentication object with the base DN for that directory. If you set defaults to those for your server type and supply authentication credentials for the account used to retrieve user data from the server, you can quickly create an authentication object. Follow the procedure below to do so.



**Note** If you prefer to consider and possibly customize each authentication setting when creating the authentication object (to grant shell access, for example), use the advanced procedure to create the object. You should also use the advanced procedure if you plan to encrypt your connection to the server, set user timeouts, customize the user name template, or assign Firepower user roles based on LDAP group membership.

In a multidomain deployment, external authentication objects are only available in the domain in which they are created.

### Before you begin

- Gather the information described in [Required Information for Creating LDAP Authentication Objects, on page 29](#).

### Procedure

- 
- Step 1** Choose **System > Users**.
- Step 2** Click the **External Authentication** tab.
- Step 3** Click **Add External Authentication Object**.
- Step 4** Choose **LDAP** from the **Authentication Method** drop-down list.
- Step 5** Provide a **Name**, **Description**, **Server Type**, and **Primary Server Host Name/IP Address** as described in [Identifying the LDAP Authentication Server, on page 39](#).
- Tip** If you click **Set Defaults**, the system populates the **User Name Template**, **UI Access Attribute**, **Shell Access Attribute**, **Group Member Attribute**, and **Group Member URL Attribute** fields with default values.
- Step 6** Choose **Fetch DNs** to specify a base distinguished name and, optionally, provide a **Base Filter** as described in [Configuring LDAP-Specific Parameters, on page 42](#).
- Step 7** Enter a distinguished name as the **User Name** and the **Password** for a user who has sufficient credentials to browse the LDAP server as described in [Configuring LDAP-Specific Parameters, on page 42](#).
- Step 8** Re-enter the password in the **Confirm Password** field.
- Step 9** Test the connection as described in [Testing LDAP Authentication Connections, on page 48](#).

**Step 10** Click **Save**.**Example**

The following figures illustrate a basic configuration of an LDAP login authentication object for a Microsoft Active Directory Server. The LDAP server in this example has an IP address of 10.11.3.4. The connection uses port 389 for access.

**External Authentication Object**

Authentication Method: LDAP

Use for CAC authentication and authorization

Name \*: Basic Configuration Example

Description:

Server Type: MS Active Directory

**Primary Server**

Host Name/IP Address \*: ex. IP or hostname

Port \*: 389

**Backup Server (Optional)**

Host Name/IP Address: ex. IP or hostname

Port: 389

**LDAP-Specific Parameters**

Base DN \*: ou=security,DC=it,DC=example,DC=com ex. dc=sourcefire,dc=com

Base Filter: ex. (cn=jsmith), (lcn=jsmith), (&(cn=jsmith)(!(cn=bsmith)(cn=csmith\*)))

User Name \*: CN=admin,DC=example,DC=com ex. cn=jsmith,dc=sourcefire,dc=com

Password \*:

Confirm Password \*:

Show Advanced Options

372784

This example shows a connection using a base distinguished name of `OU=security,DC=it,DC=example,DC=com` for the security organization in the information technology domain of the Example company.

**Attribute Mapping**

UI Access Attribute \*

Shell Access Attribute \*

**Group Controlled Access Roles (Optional)** ▶

**Shell Access Filter**

Same as Base Filter ex. (cn=jsmith), (lcn=jsmith), (&(cn=jsmith)(!(cn=bsmith)(cn=csmith\*)))

Shell Access Filter

**Additional Test Parameters**

User Name

Password

\*Required Field

372785

However, because this server is a Microsoft Active Directory server, it uses the `sAMAccountName` attribute to store user names rather than the `uid` attribute. Choosing the MS Active Directory server type and clicking **Set Defaults** sets the UI Access Attribute to `sAMAccountName`. As a result, the system checks the `sAMAccountName` attribute for each object for matching user names when a user attempts to log into the system.

In addition, a Shell Access Attribute of `sAMAccountName` causes each `sAMAccountName` attribute to be checked for all objects in the directory for matches when a user logs into a shell or CLI account on the appliance.

Note that because no base filter is applied to this server, the system checks attributes for all objects in the directory indicated by the base distinguished name. Connections to the server time out after the default time period (or the timeout period set on the LDAP server).

### What to do next

- If you want to refine the list of users retrieved, see [Troubleshooting LDAP Authentication Connections, on page 49](#) for more information.

## Creating Advanced LDAP Authentication Objects

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

When you create a basic authentication object, you define basic settings that let you connect to an authentication server. When you create an advanced authentication object, you define basic settings and you also choose the directory context and search criteria you want to use to retrieve user data from the server. Optionally, you can configure shell access authentication.

Although you can use the default settings for your server type to quickly set up an LDAP configuration, you can also customize advanced settings to control whether the appliance makes an encrypted connection to the LDAP server, the timeout for the connection, and which attributes the server checks for user information.

For the LDAP-specific parameters, you can use LDAP naming standards and filter and attribute syntax. For more information, see the RFCs listed in the Lightweight Directory Access Protocol (v3): Technical Specification, RFC 3377. Examples of syntax are provided throughout this procedure. Note that when you set up an authentication object to connect to a Microsoft Active Directory Server, you can use the address specification syntax documented in the Internet RFC 822 (Standard for the Format of ARPA Internet Text Messages) specification when referencing a user name that contains a domain. For example, to refer to a user object, you might enter `JoeSmith@security.example.com` rather than the equivalent user distinguished name of `cn=JoeSmith,ou=security,dc=example,dc=com` when using Microsoft Active Directory Server.




---

**Note** If you are configuring an LDAP authentication object for use with CAC authentication, do **not** remove the CAC inserted in your computer. You **must** have a CAC inserted at all times after enabling user certificates.

---

In a multidomain deployment, external authentication objects are only available in the domain in which they are created.

### Before you begin

- Gather the information described in [Required Information for Creating LDAP Authentication Objects, on page 29](#).
- Remove any internally authenticated shell users that have the same user name as externally authenticated users included in your shell access filter.

### Procedure

---

- Step 1** Choose **System > Users**.
- Step 2** Click **External Authentication**, then **Add External Authentication Object**.
- Step 3** Identify the authentication server as described in [Identifying the LDAP Authentication Server, on page 39](#).
- Step 4** Configure authentication settings as described in [Configuring LDAP-Specific Parameters, on page 42](#).
- Step 5** Optionally, configure LDAP groups to use as the basis for default access role assignments as described in [Configuring Access Rights by Group, on page 45](#).
- If you plan to use this object for CAC authentication and authorization, we recommend you configure LDAP groups to manage access role assignments.
- Step 6** Optionally, configure authentication settings for shell access as described in [Configuring LDAP Shell Access, on page 47](#).
- Step 7** Test your configuration as described in [Testing LDAP Authentication Connections, on page 48](#).
- Step 8** Click **Save**.
- 

### Example

This example illustrates an advanced configuration of an LDAP login authentication object for a Microsoft Active Directory Server. The LDAP server in this example has an IP address of 10.11.3.4. The connection uses port 636 for access.

**Authentication Object**

Authentication Method:

Name \*:

Description:

Server Type:

**Primary Server**

Host Name/IP Address \*:

Port \*:

This example shows a connection using a base distinguished name of `OU=security,DC=it,DC=example,DC=com` for the security organization in the information technology domain of the Example company. However, note that this server has a base filter of `(cn=*smith)`. The filter restricts the users retrieved from the server to those with a common name ending in `smith`.

**LDAP-Specific Parameters**

Base DN \*:

Base Filter:

User Name \*:

Password \*:

Confirm Password \*:

Show Advanced Options:

Encryption:  SSL  TLS  None

SSL Certificate Upload Path:

User Name Template:

Timeout (Seconds):

**Attribute Mapping**

UI Access Attribute \*:

Shell Access Attribute \*:

The connection to the server is encrypted using SSL and a certificate named `certificate.pem` is used for the connection. In addition, connections to the server time out after 60 seconds because of the **Timeout** setting.

Because this server is a Microsoft Active Directory server, it uses the `sAMAccountName` attribute to store user names rather than the `uid` attribute. Note that the configuration includes a UI Access Attribute of `sAMAccountName`. As a result, the Firepower System checks the `sAMAccountName` attribute for each object for matching user names when a user attempts to log into the Firepower System.

In addition, a Shell Access Attribute of `sAMAccountName` causes each `sAMAccountName` attribute to be checked for all objects in the directory for matches when a user logs into a shell account on the appliance.

This example also has group settings in place. The Maintenance User role is automatically assigned to all members of the group with a `member` group attribute and the base domain name of `CN=SFmaintenance,DC=it,DC=example,DC=com`.

The shell access filter is set to be the same as the base filter, so the same users can access the appliance through the shell or CLI as through the web interface.

## LDAP Authentication Server Fields

### CAC

Select this checkbox if you want to use CAC for authentication and authorization.

### Name

A name for the authentication server.

### Description

A description for the authentication server.

### Server Type

The type of LDAP server you plan to connect to. You have the following options when selecting a type:

- If you are connecting to a Microsoft Active Directory server, select **MS Active Directory**.

- If you are connecting to a Sun Java Systems Directory Server or Oracle Directory Server, select **Oracle Directory**.
- If you are connecting to an OpenLDAP server, select **OpenLDAP**.
- If you are connecting to a LDAP server other than those listed above and want to clear default settings, select **Other**.



**Tip** If you click Set Defaults, the system populates the **User Name Template**, **UI Access Attribute**, **Shell Access Attribute**, **Group Member Attribute**, and **Group Member URL Attribute** fields with default values.

### Primary Server Host Name/IP Address

The IP address or host name for the primary server where you want to obtain authentication data.



**Note** If you are using a certificate to connect via TLS or SSL, the host name in the certificate must match the host name used in this field. In addition, IPv6 addresses are not supported for encrypted connections.

### Primary Server Port

The port used by the primary authentication server.

### Backup Server Host Name/IP Address

The IP address or host name for the backup server where you want to obtain authentication data.

### Backup Server Port

The port used by the backup authentication server.

## Identifying the LDAP Authentication Server

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

When you create an authentication object, you first specify the primary and backup server and server port where you want the managed device or Firepower Management Center to connect for authentication.



**Note** If you are configuring an LDAP authentication object for use with CAC authentication, do **not** remove the CAC inserted in your computer. You **must** have a CAC inserted at all times after enabling user certificates.

In a multidomain deployment, external authentication objects are only available in the domain in which they are created.

## Procedure

---

- Step 1** Choose **System** > **Users**.
- Step 2** Click the **External Authentication** tab.
- Step 3** Click **Add External Authentication Object**.
- Step 4** Choose **LDAP** from the **Authentication Method** drop-down list.
- Step 5** Optionally, check the check box for **CAC** if you plan to use this authentication object for CAC authentication and authorization.
- Note** You must follow the procedure in [Configuring CAC Authentication, on page 31](#) to fully configure CAC authentication and authorization.
- Step 6** Enter a name and description for the authentication server in the **Name** and **Description** fields.
- Step 7** Choose a **Server Type** from the drop-down list as described in [LDAP Authentication Server Fields, on page 38](#). Optionally, click **Set Defaults**.
- Step 8** Enter a **Primary Server Host Name/IP Address**.
- Note** If you are using a certificate to connect via TLS or SSL, the host name in the certificate must match the host name used in this field. In addition, IPv6 addresses are not supported for encrypted connections.
- Step 9** Optionally, enter a **Primary Server Port**.
- Step 10** Optionally, enter a **Backup Server Host Name/IP Address**.
- Step 11** Optionally, enter a **Backup Server Port**.
- 

## What to do next

- Continue creating your LDAP authentication object as described in [Creating Advanced LDAP Authentication Objects, on page 35](#).

## LDAP-Specific Fields

The following table describes each of the LDAP-specific parameters.

**Table 11: LDAP-Specific Parameters**

Setting	Description	Examples
Base DN	<p>Supplies the base distinguished name of the directory where the appliance searches for user information on the LDAP server.</p> <p>Typically, the base DN has a basic structure indicating the company domain and operational unit.</p> <p>Note that after you identify a primary server, you can automatically retrieve a list of available base DN's from the server and select the appropriate base DN.</p>	<p>The Security organization of the Example company might have a base DN of <code>ou=security,dc=example,dc=com</code></p>

Setting	Description	Examples
Base Filter	Focuses your search by only retrieving objects in the base DN that have the specific attribute-value pair set in the filter. The base filter is an attribute type, a comparison operator, and the attribute value you want to use as a filter enclosed in parentheses.	To filter for only users with a common name starting with F, use the filter <code>(cn=F*)</code> .
User Name/Password	Allows the local appliance to access the user objects. Supplies user credentials for a user with appropriate rights to the authentication objects you want to retrieve. The distinguished name for the user you specify must be unique to the directory information tree for the LDAP server. Server user names associated with a Microsoft Active Directory Server cannot end with the <code>\$</code> character.	The user name for the <code>admin</code> user in the Security organization of the Example company might have a user name of <code>cn=admin, ou=security, dc=example, dc=com</code>
Encryption	Determines whether and how the communications are encrypted. You can choose no encryption, Transport Layer Security (TLS), or Secure Sockets Layer (SSL) encryption. Note that if you are using a certificate to authenticate when connecting via TLS or SSL, the name of the LDAP server in the certificate <b>must</b> match the <b>User Name</b> you supply.  If you change the encryption method after specifying the port, the port resets to the default value for the selected server type.	If you enter <code>10.10.10.250</code> in the external authentication settings and <code>computer1.example.com</code> in the certificate, the connection fails, even if <code>computer1.example.com</code> has an IP address of <code>10.10.10.250</code> . Changing the name of the server in the external authentication settings to <code>computer1.example.com</code> causes the connection to succeed.
SSL Certificate Upload Path	Indicates the path on your local computer to the certificate to be used for encryption.	<code>c:/server.crt</code>
User Name Template	Indicates how user names entered on login should be formatted, by mapping the string conversion character ( <code>%s</code> ) to the value of the <b>UI Access Attribute</b> for the user. The user name template is the format for the distinguished name used for authentication. When a user enters a user name into the login page, the appliance substitutes the name for the string conversion character and uses the resulting distinguished name to search for the user credentials.  If you want to use this object for CAC authentication and authorization, you <b>must</b> enter a <b>User Name Template</b> .	<code>%s@security.example.com,</code> <code>%s@mail.com,</code> <code>%s@mil,</code> <code>%s@smil.mil,</code>
Timeout	Sets a timeout for the connection attempt to the primary server, so the connection rolls over to the backup server. If the number of seconds indicated in this field (or the timeout on the LDAP server) elapses without a response from the primary authentication server, the appliance then queries the backup server.  However, if LDAP is running on the port of the primary LDAP server and for some reason refuses to service the request, the failover to the backup server does not occur.	If the primary server has LDAP disabled, the appliance queries the backup server.

Setting	Description	Examples
UI Access Attribute	<p>Tells the local appliance to match the value of a specific attribute rather than the value of the user distinguished name. You can use any attribute, if the value of the attribute is a valid user name for the Firepower System web interface. If one of the objects has a matching user name and password, the user login request is authenticated.</p> <p>Selecting a server type and setting defaults prepopulates the <b>UI Access Attribute</b> with a value typically appropriate for that type of server.</p> <p>If you leave this field blank, the local appliance checks the user distinguished name value for each user record on the LDAP server to see if it matches the user name.</p> <p>If you want to use this object for CAC authentication and authorization, you <b>must</b> enter a value that corresponds with your <b>User Name Template</b> value.</p>	sAMAccountName, userPrincipalName, mail

## Configuring LDAP-Specific Parameters

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

The settings in the LDAP-specific parameters section determine the area of the LDAP directory where the appliance searches for user names, and control details of how the appliance connects to the LDAP server.

Valid user names are unique, and can include underscores (\_), periods (.), hyphens (-), and alphanumeric characters.

In addition for most LDAP-specific settings, you can use LDAP naming standards and filter and attribute syntax. For more information, see the RFCs listed in the Lightweight Directory Access Protocol (v3): Technical Specification, RFC 3377. Examples of syntax are provided throughout this procedure. Note that when you set up an authentication object to connect to a Microsoft Active Directory Server, you can use the address specification syntax documented in the Internet RFC 822 (Standard for the Format of ARPA Internet Text Messages) specification when referencing a user name that contains a domain. For example, to refer to a user object, you might enter `JoeSmith@security.example.com` rather than the equivalent user distinguished name of `cn=JoeSmith,ou=security,dc=example,dc=com` when using Microsoft Active Directory Server.



**Note** If you are configuring an LDAP authentication object for use with CAC authentication, do **not** remove the CAC inserted in your computer. You **must** have a CAC inserted at all times after enabling user certificates.

### Procedure

#### Step 1

In the **LDAP-Specific Parameters** section of the Create External Authentication Object page, you have two options for setting the base DN:

- Click **Fetch DNs**, and choose the appropriate base distinguished name from the drop-down list.

- Enter the base distinguished name for the LDAP directory you want to access in the **Base DN** field. For example, to authenticate names in the Security organization at the Example company, enter `ou=security,dc=example,dc=com`.

**Step 2** Optionally, enter a **Base Filter**.

**Example:**

For example, if the user objects in a directory tree have a `physicalDeliveryOfficeName` attribute and users in the New York office have an attribute value of `NewYork` for that attribute, to retrieve only users in the New York office, enter `(physicalDeliveryOfficeName=NewYork)`.

**Step 3** Enter a distinguished name as the **User Name** and the **Password** for a user who has sufficient credentials to browse the LDAP server.

**Example:**

For example, if you are connecting to an OpenLDAP server where user objects have a `uid` attribute and the object for the administrator in the Security division at our example company has a `uid` value of `NetworkAdmin`, you might enter `uid=NetworkAdmin,ou=security,dc=example,dc=com`.

**Caution** If you are connecting to a Microsoft Active Directory Server, you cannot provide a server user name that ends with the `$` character.

**Step 4** Re-enter the password in the **Confirm Password** field.

**Step 5** After you configure the basic LDAP-specific parameters, you have several options:

- To access advanced options, click the arrow next to **Show Advanced Options** and continue with the next step.
- If you want to configure user default roles based on LDAP group membership, continue with [Configuring Access Rights by Group, on page 45](#).
- If you are not using LDAP groups for authentication, continue with [Configuring LDAP Shell Access, on page 47](#).

**Step 6** Choose an **Encryption** mode for your LDAP connection.

**Note** Note that if you change the encryption method after specifying a port, you reset the port to the default value for that method. For none or TLS, the port uses the default value of 389. If you choose SSL encryption, the port uses the default of 636.

**Step 7** If you choose TLS or SSL encryption and you want to use a certificate to authenticate, **Browse** to the location of a valid TLS or SSL certificate.

**Note** If you previously uploaded a certificate and want to replace it, upload the new certificate and redeploy the configuration to your appliances to copy over the new certificate.

**Step 8** Optionally, provide a **User Name Template** that corresponds with your **UI Access Attribute**.

**Example:**

For example, to authenticate all users who work in the Security organization of our example company by connecting to an OpenLDAP server where the UI access attribute is `uid`, you might enter `uid=%s,ou=security,dc=example,dc=com` in the **User Name Template** field. For a Microsoft Active Directory server, you could enter `%s@security.example.com`.

**Note** If you want to use CAC credentials for authentication and authorization, you **must** enter a value in the **User Name Template** field.

- Step 9** Optionally, in the **Timeout** field, enter the number of seconds that should elapse before rolling over to the backup connection.
- Step 10** Optionally, to retrieve users based on an attribute instead of the Base DN and Base Filter, you have two options:
- Click **Fetch Attrs** to retrieve a list of available attributes, and choose the appropriate attribute.
  - Enter a **UI Access Attribute**. For example, on a Microsoft Active Directory Server, you may want to use the UI Access Attribute to retrieve users, because there may not be a `uid` attribute on Active Directory Server user objects. Instead, you can search the `userPrincipalName` attribute by typing `userPrincipalName` in the **UI Access Attribute** field.
- Note** If you want to use CAC credentials for authentication and authorization, you **must** enter a value in the **UI Access Attribute** field.
- 

### What to do next

- Continue creating your LDAP authentication object as described in [Creating Advanced LDAP Authentication Objects, on page 35](#).

## LDAP Group Fields

Any group you reference must exist on the LDAP server. You can reference static LDAP groups or dynamic LDAP groups. Static LDAP groups are groups where membership is determined by group object attributes that point to specific users, and dynamic LDAP groups are groups where membership is determined by creating an LDAP search that retrieves group users based on user object attributes. Group access rights for a role only affect users who are members of the group.

The access rights granted when a user logs into the Firepower System depend on the LDAP configuration:

- If no group access rights are configured for your LDAP server, when a new user logs in, the Firepower System authenticates the user against the LDAP server and then grants user rights based on the default minimum access role set in the platform settings policy.
- If you configure any group settings, new users belonging to specified groups inherit the minimum access setting for the groups where they are members.
- If a new user does not belong to any specified groups, the user is assigned the default minimum access role specified in the Group Controlled Access Roles section of the authentication object.
- If a user belongs to more than one configured group, the user receives the access role for the group with the highest access as a minimum access role.

You cannot use the Firepower System user management page to remove the minimum access rights for users assigned an access role because of LDAP group membership. You can, however, assign additional rights. When you modify the access rights for an externally authenticated user, the Authentication Method column on the User Management page provides a status of **External - Locally Modified**.




---

**Note** If you use a dynamic group, the LDAP query is used exactly as it is configured on the LDAP server. For this reason, the Firepower System limits the number of recursions of a search to four to prevent search syntax errors from causing infinite loops. If a user's group membership is not established in those recursions, the default access role defined in the Group Controlled Access Roles section is granted to the user.

---

### Firepower System User Roles

The distinguished names for the LDAP groups that contain users who should be assigned each user role.

### Default User Role

The default minimum access role for users that do not belong to any of the specified groups.

### Group Member Attribute

The LDAP attribute that contains the LDAP search string in a static group.

### Group Member URL Attribute

The LDAP attribute that designates membership in a dynamic group

## Configuring Access Rights by Group

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

If you prefer to base default access rights on a user's membership in an LDAP group, you can specify distinguished names for existing groups on your LDAP server for each of the access roles used by your Firepower System. When you do so, you can configure a default access setting for those users detected by LDAP that do not belong to any specified groups. When a user logs in, the Firepower System dynamically checks the LDAP server and assigns default access rights according to the user's current group membership.

If you do not configure a user's privileges using group-controlled access roles, a user has only the privileges granted by default in the platform settings policy.

If you plan to use an object for CAC authentication and authorization, Cisco recommends configuring LDAP groups to manage access role assignments for CAC-authenticated users.




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**Note** If you are configuring an LDAP authentication object for use with CAC authentication, do **not** remove the CAC inserted in your computer. You **must** have a CAC inserted at all times after enabling user certificates.

---

### Before you begin

- Confirm that the group you plan to reference exists on the LDAP server.

## Procedure

---

**Step 1** On the Create External Authentication Object page, click the down arrow next to **Group Controlled Access Roles**.

**Step 2** Optionally, in the **DN** fields that correspond to Firepower System user roles, enter the distinguished name for the LDAP groups that contain users who should be assigned to those roles.

**Example:**

For example, you might enter the following in the **Administrator** field to authenticate names in the information technology organization at the `Example` company:

```
cn=itgroup,ou=groups, dc=example,dc=com
```

**Step 3** Choose a **Default User Role**.

**Step 4** If you use static groups, enter a **Group Member Attribute**.

**Example:**

For example, if the `member` attribute is used to indicate membership in the static group you reference for default Security Analyst access, enter `member`.

**Step 5** If you use dynamic groups, enter a **Group Member URL Attribute**.

**Example:**

For example, if the `memberURL` attribute contains the LDAP search that retrieves members for the dynamic group you specified for default Admin access, enter `memberURL`.

---

## What to do next

- Continue creating your LDAP authentication object as described in [Creating Advanced LDAP Authentication Objects, on page 35](#).

## LDAP Shell Access Fields

With the exception of the admin account, shell access is controlled entirely through the shell access attribute you set. The shell access filter you set determines which set of users on the LDAP server can log into the shell.

Note that a home directory for each shell user is created on login, and when an LDAP shell access user account is disabled (by disabling the LDAP connection), the directory remains, but the user shell is set to `/bin/false` in `/etc/passwd` to disable the shell. If the user then is re-enabled, the shell is reset, using the same home directory.

Shell users can log in using user names with lowercase, uppercase, or mixed case letters. Login authentication for the shell is case sensitive.

### Shell Access Attribute

The access attribute you want to use for filtering. You can use any attribute if the value of the attribute is a valid user name for shell access.

If you leave this field blank, the user distinguished name is used for shell access authentication.



**Tip** Selecting a server type and setting defaults prepopulates this field with an attribute typically appropriate for that type of server.

### Shell Access Filter

The attribute value you want to use to retrieve administrative user entries for shell access. The filter is an attribute name, a comparison operator, and the attribute value.

The **Same as Base Filter** check box allows you to search more efficiently if all users qualified in the base DN are also qualified for shell access privileges. Normally, the LDAP query to retrieve users combines the base filter with the shell access filter. If the shell access filter was the same as the base filter, the same query runs twice, which is unnecessarily time-consuming. You can use the **Same as Base Filter** option to run the query only once for both purposes.

If you leave this field blank, you prevent LDAP authentication of shell access.

## Configuring LDAP Shell Access

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You can use the LDAP server to authenticate accounts for shell access on your managed device or Firepower Management Center. Specify a search filter that retrieves entries for users you want to grant shell access.

You **cannot** configure CAC authentication and authorization and shell access in the same authentication object. Instead, create and enable separate authentication objects.

The authentication object for shell access must be the first authentication object on the Firepower Management Center.

Cisco does not support external authentication for NGIPSv devices or ASA FirePOWER devices. In addition, IPv6 is not supported for shell access authentication.



**Caution** On all appliances, users with shell access (whether obtained through external authentication or through using the CLI `expert` command) have `sudoers` privileges in the shell, which can present a security risk. If you establish external authentication, make sure that you restrict the list of users with shell access appropriately. Similarly, when granting CLI access privileges, restrict the list of users with **Configuration** level access. Cisco strongly recommends that you do not establish additional shell users on the Firepower Management Center.

You **cannot** configure CAC authentication and authorization and shell access in the same authentication object. Checking the **CAC** check box disables the shell access configuration options on the page. Instead, create and enable separate authentication objects.

### Before you begin

- Remove any internally-authenticated CLI or shell users that have the same user name as externally-authenticated users included in your shell access filter.

## Procedure

**Step 1** On the Create External Authentication Object page, if you want to use a shell access attribute other than the user distinguished type a **Shell Access Attribute**.

### Example:

For example, on a Microsoft Active Directory Server, use the `sAMAccountName` shell access attribute to retrieve shell access users by typing `sAMAccountName` in the **Shell Access Attribute** field.

**Step 2** Set a shell access account filter. You have multiple options:

- To retrieve administrative user entries based on attribute value, enter the attribute name, a comparison operator, and the attribute value you want to use as a filter, enclosed in parentheses, in the **Shell Access Filter** field. For example, if all network administrators have a `manager` attribute which has an attribute value of `shell`, you can set a base filter of `(manager=shell)`.
- To use the same filter you specified when configuring authentication settings, choose **Same as Base Filter**.
- To prevent LDAP authentication of shell access, leave the field blank.

## What to do next

- Continue creating your LDAP authentication object as described in [Creating Advanced LDAP Authentication Objects, on page 35](#).

## Testing LDAP Authentication Connections

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

After you configure LDAP server and authentication settings, you can specify user credentials for a user who should be able to authenticate to test those settings.

For the **User Name**, you can enter the value for the `uid` attribute for the user you want to test with. If you are connecting to a Microsoft Active Directory Server and supplied a UI access attribute in place of `uid`, use the value for that attribute as the user name. You can also specify a fully qualified distinguished name for the user.

Use the **Password** for the same user.

The test output lists valid and invalid user names. Valid user names are unique, and can include underscores (`_`), periods (`.`), hyphens (`-`), and alphanumeric characters.

Note that testing the connection to servers with more than 1000 users only returns 1000 users because of web interface page size limitations.



**Tip** If you mistype the name or password of the test user, the test fails even if the server configuration is correct. Test the server configuration without the additional test parameters first. If that succeeds supply a user name and password to test with the specific user.

## Procedure

---

**Step 1** On the Add External Authentication Object page, enter a **User Name** and **Password**.

**Example:**

For example, to test to see if you can retrieve the `JSmith` user credentials at the Example company, enter `JSmith` and `password`.

**Step 2** Click **Test**. You have two options:

- If the test succeeds, the test output appears at the bottom of the page. Click **Save**.
  - If the test fails, see [Troubleshooting LDAP Authentication Connections, on page 49](#) for suggestions for troubleshooting the connection.
- 

## Troubleshooting LDAP Authentication Connections

If you create an LDAP authentication object and it either does not succeed in connecting to the server you select, or does not retrieve the list of users you want, you can tune the settings in the object.

If the connection fails when you test it, try the following suggestions to troubleshoot your configuration:

- Use the messages displayed at the top of the screen and in the test output to determine which areas of the object are causing the issue.
- Check that the user name and password you used for the object are valid:
  - Check that the user has the rights to browse to the directory indicated in your base distinguished name by connecting to the LDAP server using a third-party LDAP browser.
  - Check that the user name is unique to the directory information tree for the LDAP server.
  - If you see an LDAP bind error 49 in the test output, the user binding for the user failed. Try authenticating to the server through a third-party application to see if the binding fails through that connection as well.
- Check that you have correctly identified the server:
  - Check that the server IP address or host name is correct.
  - Check that you have TCP/IP access from your local appliance to the authentication server where you want to connect.
  - Check that access to the server is not blocked by a firewall and that the port you have configured in the object is open.
  - If you are using a certificate to connect via TLS or SSL, the host name in the certificate must match the host name used for the server.
  - Check that you have not used an IPv6 address for the server connection if you are authenticating shell access.
  - If you used server type defaults, check that you have the correct server type and click **Set Defaults** again to reset the default values.

- If you typed in your base distinguished name, click **Fetch DNs** to retrieve all the available base distinguished names on the server, and select the name from the list.
- If you are using any filters, access attributes, or advanced settings, check that each is valid and typed correctly.
- If you are using any filters, access attributes, or advanced settings, try removing each setting and testing the object without it.
- If you are using a base filter or a shell access filter, make sure that the filter is enclosed in parentheses and that you are using a valid comparison operator.
- To test a more restricted base filter, try setting it to the base distinguished name for the user to retrieve just that user.
- If you are using an encrypted connection:
  - Check that the name of the LDAP server in the certificate matches the host name that you use to connect.
  - Check that you have not used an IPv6 address with an encrypted server connection.
- If you are using a test user, make sure that the user name and password are typed correctly.
- If you are using a test user, remove the user credentials and test the object.
- Test the query you are using by connecting to the LDAP server via the command line on the appliance you want to connect from using this syntax:

```
ldapsearch -x -b 'base_distinguished_name'
-h LDAPserver_ip_address -p port -v -D
'user_distinguished_name' -W 'base_filter'
```

For example, if you are trying to connect to the security domain on `myrtle.example.com` using the `domainadmin@myrtle.example.com` user and a base filter of `(cn=*)`, you could test the connection using this statement:

```
ldapsearch -x -b 'CN=security,DC=myrtle,DC=example,DC=com'
-h myrtle.example.com -p 389 -v -D
'domainadmin@myrtle.example.com' -W '(cn=*)'
```

If you can test your connection successfully but authentication does not work after you deploy a platform settings policy, check that authentication and the object you want to use are both enabled in the platform settings policy that is applied to the appliance.

If you connect successfully but want to adjust the list of users retrieved by your connection, you can add or change a base filter or shell access filter or use a more restrictive or less restrictive base DN.

## RADIUS Authentication

The Remote Authentication Dial In User Service (RADIUS) is an authentication protocol used to authenticate, authorize, and account for user access to network resources. You can create an authentication object for any RADIUS server that conforms to RFC 2865.

When a user authenticated on a RADIUS server logs in for the first time, the user receives the roles specified for that user in the authentication object. If the user is not listed for any of the user roles, they receive the default access role you selected in the authentication object. If no default access role is selected in the authentication object, they receive the default access role set in the platform settings policy. You can modify a user's roles, if needed, unless the settings are granted through the user lists in the authentication object. Note that when a user authenticated on a RADIUS server using attribute matching attempts to log in for the first time, the login is rejected as the user account is created. The user must log in a second time.



**Note** Before enabling external authentication on 7000 or 8000 Series devices, remove any internally-authenticated CLI users that have the same user name as externally-authenticated users included in your shell access filter.

The Firepower System implementation of RADIUS supports the use of SecurID® tokens. When you configure authentication by a server using SecurID, users authenticated against that server append the SecurID token to the end of their SecurID PIN and use that as their password when they log into a Cisco system. As long as SecurID is configured correctly to authenticate users outside the Firepower System, those users can log into a Firepower Management Center or 7000 or 8000 Series device using their PIN plus the SecurID token without any additional configuration.

## Creating RADIUS Authentication Objects

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

When you create a RADIUS authentication object, you define settings that let you connect to an authentication server. You also grant user roles to specific and default users. If your RADIUS server returns custom attributes for any users you plan to authenticate, you must define those custom attributes. Optionally, you can also configure CLI or shell access authentication.

In a multidomain deployment, external authentication objects are only available in the domain in which they are created.

### Before you begin

- Confirm that you have TCP/IP access from your local appliance to the authentication server where you want to connect.

### Procedure

- Step 1** Choose **System > Users**.
- Step 2** Click the **External Authentication** tab.
- Step 3** Click **Add External Authentication Object**.
- Step 4** Choose **RADIUS** from the **Authentication Method** drop-down list.
- Step 5** Identify the authentication server as described in [Configuring RADIUS Connection Settings, on page 53](#).
- Step 6** Configure user roles as described in [Configuring RADIUS User Roles, on page 55](#).
- Step 7** Optionally, configure shell access as described in [Configuring RADIUS Shell Access, on page 56](#).

- Step 8** Optionally, define custom attributes as described in [Defining Custom RADIUS Attributes, on page 57](#).
- Step 9** Test your configuration as described in [Testing RADIUS Authentication Connections, on page 58](#).

### Example

The following figure illustrates a sample RADIUS login authentication object for a server running FreeRADIUS with an IP address of 10.10.10.98. Note that the connection uses port 1812 for access, and note that connections to the server time out after 30 seconds of disuse, then retry three times before attempting to connect to a backup authentication server.

This example illustrates important aspects of RADIUS user role configuration:

Users `ewharton` and `gsand` are granted administrative access to appliances where this authentication object is enabled.

The user `cbronte` is granted Maintenance User access to appliances where this authentication object is enabled.

The user `jausten` is granted Security Analyst access to appliances where this authentication object is enabled.

The user `ewharton` can log into the appliance using a shell account.

The following graphic depicts the role configuration for the example:

**RADIUS-Specific Parameters**

Timeout (Seconds)	30
Retries	3
Access Admin	
Administrator	ewharton, gsand
External Database User	
Intrusion Admin	
Maintenance User	cbronte
Network Admin	
Discovery Admin	
Security Approver	
Security Analyst	jausten
Security Analyst (Read Only)	
Default User Role	Access Admin Administrator External Database User Intrusion Admin
<b>Shell Access Filter</b>	
Administrator Shell Access User List	ewharton

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### Example

You can use an attribute-value pair to identify users who should receive a particular user role. If the attribute you use is a custom attribute, you must define the custom attribute.

The following figure illustrates the role configuration and custom attribute definition in a sample RADIUS login authentication object for the same FreeRADIUS server as in the previous example.

In this example, however, the `MS-RAS-Version` custom attribute is returned for one or more of the users because a Microsoft remote access server is in use. Note the `MS-RAS-Version` custom attribute is a string. In this example, all users logging in to RADIUS through a Microsoft v. 5.00 remote access server should receive the Security Analyst (Read Only) role, so you enter the attribute-value pair of `MS-RAS-Version=MSRASV5.00` in the **Security Analyst (Read Only)** field.

The screenshot shows a configuration window with the following sections:

- RADIUS-Specific Parameters:** A list of fields for various roles: Timeout (Seconds) [30], Retries [3], Access Admin, Administrator [ewharton, gsand], External Database User, Intrusion Admin, Maintenance User, Network Admin, Discovery Admin, Security Approver, Security Analyst, Security Analyst (Read Only) [MS-RAS-Version=MSRASV5.00], and Default User Role (dropdown menu with options: Access Admin, Administrator, External Database User, Intrusion Admin).
- Shell Access Filter:** Administrator Shell Access User List [ewharton].
- Define Custom RADIUS Attributes:** A table with columns for Attribute Name, Attribute ID, and Attribute Type. An 'Add' button is present. Below the table, a row is shown: MS-Ras-Version | 18 | string | Delete.

## Configuring RADIUS Connection Settings

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

When you create a RADIUS authentication object, you first specify the primary and backup server and server port where you want the local appliance (managed device or Firepower Management Center) to connect for authentication.




---

**Note** For RADIUS to function correctly, you must open its authentication and accounting ports (by default, 1812 and 1813) on your firewall.

---

If you specify a backup authentication server, you can set a timeout for the connection attempt to the primary server. If the number of seconds indicated in the **Timeout** field (or the timeout on the LDAP server) elapses without a response from the primary authentication server, the appliance then re-queries the primary server.

After the appliance re-queries the primary authentication server the number of times indicated by the **Retries** field and the number of seconds indicated in the **Timeout** field again elapses without a response from the primary authentication server, the appliance then rolls over to the backup server.

If, for example, the primary server has RADIUS disabled, the appliance queries the backup server. If RADIUS is running on the port of the primary RADIUS server and for some reason refuses to service the request (due to misconfiguration or other issues), however, the failover to the backup server does not occur.

### Procedure

---

- Step 1** Choose **System** > **Users**.
- Step 2** Click the **External Authentication** tab.
- Step 3** Click **Create External** > **Authentication Object**.
- Step 4** Choose **RADIUS** from the **Authentication Method** drop-down list.
- Step 5** Enter a **Name** and **Description** for the authentication server.
- Step 6** Enter the IP address or host name for the primary RADIUS server where you want to obtain authentication data in the **Primary Server Host Name/IP Address** field.
  - Note** IPv6 addresses are not supported for shell authentication. To allow shell authentication when using an IPv6 address for your primary RADIUS server, set up an authentication object using an IPv4 address for the server and use that IPv4 object as the first authentication object on the Firepower Management Center.
- Step 7** Optionally, modify the port used by the primary RADIUS authentication server in the **Primary Server Port** field.
  - Note** If your authentication port and accounting port numbers are not sequential, leave this field blank. The system then determines RADIUS port numbers from the `radius` and `radacct` data in your appliance's `/etc/services` file.
- Step 8** Enter the **RADIUS Secret Key** for the primary RADIUS authentication server.
- Step 9** Optionally, enter the IP address or host name for the backup RADIUS authentication server where you want to obtain authentication data in the **Backup Server Host Name/IP Address** field.
- Step 10** If you set a backup server, modify the **Backup Server Port**, **RADIUS Secret Key**, and **Timeout** and enter the number of times the primary server connection should be tried before rolling over to the backup connection in the **Retries** field.

**Note** If your authentication port and accounting port numbers are not sequential, leave this field blank. The system then determines RADIUS port numbers from the `radius` and `radacct` data in your appliance's `/etc/services` file.

### What to do next

- Continue creating your RADIUS authentication object as described in [Creating RADIUS Authentication Objects, on page 51](#).

## Configuring RADIUS User Roles

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

When a user logs in, the Firepower System checks the RADIUS server and grants access rights depending on the RADIUS configuration:

- If specific access rights are not configured for a user and a default access role is not specified, when a new user logs in, the Firepower System authenticates the user against the RADIUS server and then grants user rights based on the default access role (or roles) set in the platform settings policy.
- If a new user is not specified on any lists and default access roles are specified in the **Default User Role** list of the authentication object, the user is assigned those access roles.
- If you add a user to the list for one or more specific role, that user receives all assigned access roles.

You can also use attribute-value pairs, rather than user names, to identify users who should receive a particular user role. For example, if you know all users who should be Security Analysts have the value `Analyst` for their `User-Category` attribute, you can enter `User-Category=Analyst` in the Security Analyst List field to grant that role to those users.

You can assign a default user role (or roles) to be assigned to any users that are authenticated externally but not listed for a specific role. You can specify multiple roles in the **Default User Role** list.

You cannot remove the minimum access rights for users assigned an access role because of RADIUS user list membership through the Firepower System user management page. You can, however, assign additional rights.



**Caution** If you want to change the minimum access setting for a user, you must not only move the user from one list to another in the RADIUS Specific Parameters section or change the user's attribute on the RADIUS server, you must redeploy the configuration to the managed device and remove the assigned user right on the user management page.

### Before you begin

- Define custom attributes if you plan to use them to set user role membership, as described in [Defining Custom RADIUS Attributes, on page 57](#).

## Procedure

- Step 1** On the Create External Authentication Object page, in the fields that correspond to Firepower System user roles, enter the name of each user or identifying attribute-value pair that should be assigned to those roles. Separate usernames and attribute-value pairs with commas.
- Example:**
- For example, to grant the Administrator role to the users `jsmith` and `jdooe`, enter `jsmith, jdooe` in the **Administrator** field. As another example, to grant the Maintenance User role to all users with a `User-Category` value of `Maintenance`, enter `User-Category=Maintenance` in the **Maintenance User** field.
- Step 2** Choose the default minimum access role for users that do not belong to any of the specified groups from the **Default User Role** list.

## What to do next

- Continue creating your RADIUS authentication object as described in [Creating RADIUS Authentication Objects](#), on page 51.

## Configuring RADIUS Shell Access

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

You can also use the RADIUS server to authenticate accounts for CLI or shell access on your local appliance (managed device or Firepower Management Center). Specify user names for users you want to grant CLI or shell access.



- Note** IPv6 addresses are not supported for shell authentication. If you configure a primary RADIUS server with an IPv6 address and also configure administrative shell access, the shell access settings are ignored. To allow shell authentication when using an IPv6 address for your primary RADIUS server, set up another authentication object using an IPv4 address for the server and use that object as the first authentication object on the Firepower Management Center.

With the exception of the admin account, the shell access list you set on the RADIUS authentication object entirely controls CLI or shell access on the appliance. CLI or shell users are configured as local users on the appliance when you deploy the platform settings policy. Note that when a user authenticated on a RADIUS server using attribute matching attempts to log in for the first time, the login is rejected as the user account is created. The user must log in a second time.

Note that a home directory for each CLI or shell user is created on login, and when an RADIUS shell access user account is disabled (by disabling the RADIUS connection), the directory remains, but the user shell is set to `/bin/false` in `/etc/passwd` to disable the shell. If the user then is re-enabled, the shell is reset, using the same home directory.

CLI or shell users can log in using user names with lowercase, uppercase, or mixed case letters. Login authentication for the CLI or shell is case sensitive.



**Caution** On all appliances, users with shell access (whether obtained through external authentication or through using the CLI `expert` command) have `sudoers` privileges in the shell, which can present a security risk. If you establish external authentication, make sure that you restrict the list of users with shell access appropriately. Similarly, when granting CLI access privileges, restrict the list of users with **Configuration** level access. Cisco strongly recommends that you do not establish additional shell users on the Firepower Management Center.

### Procedure

On the Create External Authentication Object page, enter the user names, separated by commas, in the **Administrator Shell Access User List** field.

**Note** If you choose not to specify a shell access filter, a warning displays when you save the authentication object to confirm that you meant to leave the filter blank.

### What to do next

- Continue creating your RADIUS authentication object as described in [Creating RADIUS Authentication Objects, on page 51](#).

## Defining Custom RADIUS Attributes

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

If your RADIUS server returns values for attributes not included in the `dictionary` file in `/etc/radiusclient/` and you plan to use those attributes to set user roles for users with those attributes, you need to define those attributes in the login authentication object. You can locate the attributes returned for a user by looking at the user's profile on your RADIUS server.

When you define an attribute, you provide the name of the attribute, which consists of alphanumeric characters. Note that words in an attribute name should be separated by dashes rather than spaces. You also provide the attribute ID, which should be an integer and should not conflict with any existing attribute IDs in the `etc/radiusclient/dictionary` file. You also specify the type of attribute: string, IP address, integer, or date.

When you create a RADIUS authentication object, a new dictionary file for that object is created on the appliance in the `/var/sf/userauth` directory. Any custom attributes you add to the authentication object are added to the dictionary file.

In a multidomain deployment, external authentication objects are only available in the domain in which they are created.

## Procedure

- 
- Step 1** On the Add External Authentication Object page, click the arrow to expand the Define Custom RADIUS Attributes section.
  - Step 2** Enter an attribute name in the **Attribute Name** field.
  - Step 3** Enter the attribute ID, in integer form, in the **Attribute ID** field.
  - Step 4** Choose the type of attribute from the **Attribute Type** drop-down list.
  - Step 5** Click **Add** to add the custom attribute to the authentication object.

**Tip** You can remove a custom attribute from an authentication object by clicking **Delete** next to the attribute.

---

## Example

If a RADIUS server is used on a network with a Cisco router, you might want to use the `Ascend-Assign-IP-Pool` attribute to grant a specific role to all users logging in from a specific IP address pool. `Ascend-Assign-IP-Pool` is an integer attribute that defines the address pool where the user is allowed to log in, with the integer indicating the number of the assigned IP address pool.

To declare that custom attribute, you create a custom attribute with an attribute name of `Ascend-IP-Pool-Definition`, an attribute ID of 218, and an attribute type of `integer`.

You could then enter `Ascend-Assign-IP-Pool=2` in the **Security Analyst (Read Only)** field to grant read-only security analyst rights to all users with an `Ascend-IP-Pool-Definition` attribute value of 2.

## What to do next

- Continue creating your RADIUS authentication object as described in [Creating RADIUS Authentication Objects](#), on page 51.

## Testing RADIUS Authentication Connections

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	Any	Any	Admin

After you configure RADIUS connection, user role, and custom attribute settings, you can specify user credentials for a user who should be able to authenticate to test those settings.

For the user name, you can enter the user name for the user you want to test with.

Note that testing the connection to servers with more than 1000 users only returns 1000 users because of UI page size limitations.



**Tip** If you mistype the name or password of the test user, the test fails even if the server configuration is correct. To verify that the server configuration is correct, click **Test** without entering user information in the **Additional Test Parameters** field first. If that succeeds, supply a user name and password to test with the specific user.

### Procedure

**Step 1** On the Add External Authentication Object page, in the **User Name** and **Password** fields, enter the user name and password for the user whose credentials should be used to validate access to the RADIUS server.

**Example:**

For example, to test to see if you can retrieve the `jsmith` user credentials at our example company, enter `jsmith`.

**Step 2** Choose **Show Details**, and click **Test**.

**Step 3** If the test succeeds, click **Save**.

## Single Sign-on (SSO)

Single sign-on (SSO) enables integration between Cisco Security Manager (CSM) Version 4.7 or higher and the Firepower Management Center, which allows you to access the Firepower Management Center from CSM without additional authentication to log in. When managing an ASA FirePOWER module, you may want to modify the policies deployed to the module. You can select the managing Firepower Management Center in CSM and launch it in a web browser.

If you have access based on your user role, the system navigates you to the Device tab of the Device Management page for the device you cross-launched from in CSM. Otherwise, the system navigates you to the Summary Dashboard page (**Overview > Dashboards**), except for user accounts with no dashboard access, which use the Welcome page.

The system disables SSO when STIG compliance is enabled for the Firepower Management Center.



**Note** You cannot login with single sign-on if your organization uses CACs for authentication.

### Related Topics

[STIG Compliance](#)

## Configuring SSO

Smart License	Classic License	Supported Devices	Supported Domains	Access
Any	Any	ASA FirePOWER	Any	Admin

You must set up a one-way, encrypted authentication path from CSM to the Firepower Management Center before you configure Single sign-on.

In NAT environments, the Firepower Management Center and CSM must reside on the same side of the NAT boundary. You must provide specific criteria to enable communications between CSM and the Firepower Management Center.



---

**Note** You cannot login with single sign-on if your organization uses CACs for authentication.

---

### Procedure

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- Step 1** From CSM, generate an SSO shared encryption key that identifies the connection. See your CSM documentation for more information.
- Step 2** From the Firepower Management Center, choose **System > Users**.
- Step 3** Choose **CSM Single Sign-on**.
- Step 4** Enter the **CSM hostname** or **IP** address and the server **Port**.
- Step 5** Enter the **Shared key** that you generated from CSM.
- Step 6** Optionally, if you want to use the Firepower Management Center's proxy server to communicate with CSM, choose the **Use Proxy For Connection** check box.
- Step 7** Click **Submit**.
- Step 8** Click **Confirm Certificate** to save the Certificate.  
You can now log in from CSM to the Firepower Management Center without an additional login.

---

### Related Topics

[Configure Management Interfaces](#)