

Configuring Users and Common Roles

The CLI and SNMP use common roles in all switches in the Cisco MDS 9000 Family. You can use the CLI to modify a role that was created using SNMP and vice versa.

Users, passwords, and roles for all CLI and SNMP users are the same. A user configured through the CLI can access the switch using SNMP (for example, the Fabric Manager or the Device Manager) and vice versa.

This chapter includes the following sections:

- Role-Based Authorization, page 39-1
- Role Distributions, page 39-7
- User Accounts, page 39-10
- SSH Services, page 39-14
- Recovering the Administrator Password, page 39-19
- Configuring Cisco ACS Servers, page 39-20
- Default Settings, page 39-23

Role-Based Authorization

Switches in the Cisco MDS 9000 Family perform authentication based on roles. Role-based authorization limits access to switch operations by assigning users to roles. This kind of authentication restricts you to management operations based on the roles to which you have been added.

When you execute a command, perform command completion, or obtain context sensitive help, the switch software allows the operation to progress if you have permission to access that command.

This section includes the following topics:

- About Roles, page 39-2
- Configuring Roles and Profiles, page 39-2
- Deleting Common Roles, page 39-3
- About the VSAN Policy, page 39-3
- Modifying the VSAN Policy, page 39-4
- About Rules and Features for Each Role, page 39-4
- Modifying Rules, page 39-5
- Displaying Role-Based Information, page 39-7

About Roles

Each role can contain multiple users and each user can be part of multiple roles. For example, if role1 users are only allowed access to configuration commands, and role2 users are only allowed access to debug commands, then if Joe belongs to both role1 and role2, he can access configuration as well as debug commands.

Note

If you belong to multiple roles, you can execute a union of all the commands permitted by these roles. Access to a command takes priority over being denied access to a command. For example, suppose you belong to a TechDocs group and you were denied access to configuration commands. However, you also belong to the engineering group and have access to configuration commands. In this case, you will have access to configuration commands.

 \mathcal{P} Tip

Any role, when created, does not allow access to the required commands immediately. The administrator must configure appropriate rules for each role to allow access to the required commands.

Configuring Roles and Profiles

To create an additional role or to modify the profile for an existing role using Fabric Manager, follow these steps:

Step 1 Expand **Switches > Security** and then select **Users and Roles** from the Physical Attributes pane. Click the **Roles** tab in the Information pane.

You see the information Figure 39-1

Figure 39-1 Roles Tab in Users and Roles Screen

/SAN/Fabric sw172-22-46-233 [a	ıdmin@localhost]	- Fabric	Manager 3.0(0.347)			
File View Zone Tools Performance	Server Help					
⊴⊗# 6126 ⊕®≣	1 🛛 😂 🕸 🗐	🛛 🛛 🕄	😵 🔒 🗷 💷 💡			🗹 Advanced
-Logical Domains 🖃 🥶 Fabric sw172-22-46-233 🔒		1	🕽 🖬 🗳 🖉 🛛 CFS 🔻	/SAN/Fabi	ic sw172-22-46-233/Switches	/Security/Users and Roles
🖃 🔄 All VSANs	Roles CFS Roles	Users I	Jsers (<3.0) Communities Privacy			
	Master	Name	Description	Sc	ope Scope whe VSAN M List	
Domain Manager 🗠	sw172-22-46-225	test			1-10	
Physical Attributes	sw172-22-46-225 sw172-22-46-225	role2			1,4001	
Switches Hardware	sw172-22-46-225	default-role	This is a system defined role and applies to all users	[
	AT]

Step 2 Click **Create Row** to create a role in Fabric Manager.

Figure 39-2

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You see the Roles - Create dialog box in Figure 39-2.

Create Roles Dialog Box

Name:	
Description:	
-VSAN Sco	ppe
	Enable
List:	

- **Step 3** Select the switches on which to configure a role.
- **Step 4** Enter the name of the role in the Name field.
- **Step 5** Enter the description of the role in the Description field.
- **Step 6** Optionally, check the **Enable** check box to enable the VSAN scope and enter the list of VSANs in the Scope field to which you want to restrict this role.
- **Step 7** Click **Create** to create the role, or click **Close** to close the Roles Create dialog box without creating the common role.

Note

Device Manager automatically creates six roles that are required for Device Manager to display a view of a switch. These roles are: system, snmp, module, interface, hardware, and environment.

Deleting Common Roles

To delete a common role using Fabric Manager, follow these steps:

- **Step 1** Expand **Switches > Security** and then select **Users and Roles** from the Physical Attributes pane. Click the **Roles** tab in the Information pane.
- **Step 2** Click the role you want to delete.
- **Step 3** Click **Delete Row** to delete the common role.
- Step 4 Click Yes to confirm the deletion or No to cancel it.

About the VSAN Policy

Configuring the VSAN policy requires the ENTERPRISE_PKG license (see Chapter 10, "Obtaining and Installing Licenses").

You can configure a role so that it only allows tasks to be performed for a selected set of VSANs. By default, the VSAN policy for any role is permit, which allows tasks to be performed for all VSANs. You can configure a role that only allows tasks to be performed for a selected set of VSANs. To selectively allow VSANs for a role, set the VSAN policy to deny, and then set the configuration to permit or the appropriate VSANs.

Note

Users configured in roles where the VSAN policy is set to deny cannot modify the configuration for E ports. They can only modify the configuration for F or FL ports (depending on whether the configured rules allow such configuration to be made). This is to prevent such users from modifying configurations that may impact the core topology of the fabric.

 $\underline{\rho}$ Tip

Roles can be used to create VSAN administrators. Depending on the configured rules, these VSAN administrators can configure MDS features (for example, zone, fcdomain, or VSAN properties) for their VSANs without affecting other VSANs. Also, if the role permits operations in multiple VSANs, then the VSAN administrators can change VSAN membership of F or FL ports among these VSANs.

Users belonging to roles in which the VSAN policy is set to deny are referred to as VSAN-restricted users.

Modifying the VSAN Policy

To modify the VSAN policy for an existing role using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select Users and Roles from the Physical Attributes pane. Click the Roles tab in the Information pane.
- **Step 2** Check the **Scope Enable** check box if you want to enable the VSAN scope and restrict this role to a subset of VSANs.
- Step 3 Enter the list of VSANs in the Scope VSAN Id List field that you want to restrict this role to.
- **Step 4** Click **Apply Changes** to save these changes or click **Undo Changes** to discard any unsaved changes.

About Rules and Features for Each Role

Up to 16 rules can be configured for each role. These rules reflect what CLI commands are allowed. The user-specified rule number determines the order in which the rules are applied. For example, rule 1 is applied before rule 2, which is applied before rule 3, and so on. A user not belonging to the network-admin role cannot perform commands related to roles.

For example, if user A is permitted to perform all **show** CLI commands, user A cannot view the output of the **show role** CLI command if user A does not belong to the network-admin role

A **rule** specifies operations that can be performed by a specific role. Each rule consists of a rule number, a rule type (permit or deny), a CLI command type (for example, **config**, **clear**, **show**, **exec**, **debug**), and an optional feature name (for example, FSPF, zone, VSAN, fcping, or interface).



In this case, **exec** CLI commands refer to all commands in the EXEC mode that do not fall in the **show**, **debug**, and **clear**, CLI command categories.

Modifying Rules

To modify the rules for an existing role using Device Manager, follow these steps:

- Step 1 Click Security > Roles.
- **Step 2** You see the Common Roles dialog box shown in Figure 39-3.

Figure 39-3 Common Roles Dialog Box in Device Manager

🗬 c-186 - Roles 🛛 🔀									
₩ ₩51	. \$								
blomo	Description	Vsan S	Scope						
Name	Description	Enable	List						
test									
role111									
vsan1to6	allow vsans 1 to 200		1-200						
vsan1to10	allow vsan 1 to 10		1-10						
default-role	This is a system defined role and applies to all users								
Rules 5 row(s)	Create Delete Apply Refresh	Help	Close						

Step 3 Click the role for which you want to edit the rules.

Step 4 Click **Rules** to view the rules for the role.

Γ

You see the Rules dialog box shown in Figure 39-4. It may take a few minutes to display.

	comig		-9 <u></u> 3		LEXEC		_
CLICommond	FM/DM		c)peration:	3		
CEI Command	Support ?	Clear	Config	Debug	Show	Exec	
qos	true						^
install	true						
in-order-guarantee	true				>		≣
port-channel	true						
cloud-discovery							
mkdir	true						
interface	true						
counters							
test							
arp							
zone	true				 Image: A start of the start of		
trunk	true						
fcfwd	true						
wwn	true				 Image: A start of the start of		
version	true						
banner					 Image: A set of the set of the		
debug					 Image: A set of the set of the		
cimserver							
cd	true						
vni				 Image: A set of the set of the			
accounting	true						
module	true			 Image: A start of the start of			
ficon	true			 Image: A set of the set of the			
format							×

Figure 39-4 Edit Common Role Rules Dialog Box

- **Step 5** Edit the rules you want to enable or disable for the common role.
- **Step 6** Click **Apply** to apply the new rules and close the Rules dialog, or click **Close** to close the Rules dialog without applying the rules.

Rule 1 is applied first, thus permitting, for example, sangroup users access to all **config** CLI commands. Rule 2 is applied next, denying FSPF configuration to sangroup users. As a result, sangroup users can perform all other **config** CLI commands, except **fspf** CLI configuration commands.



The order of rule placement is important. If you had swapped these two rules and issued the **deny config feature fspf** rule first and issued the **permit config** rule next, you would be allowing all sangroup users to perform all configuration commands because the second rule globally overrode the first rule.

Displaying Role-Based Information

The rules are displayed by rule number and are based on each role. All roles are displayed if the role name is not specified.

To view rules for a role using Device Manager, follow these steps:

Step 1 Click Security > Roles.

You see the Roles dialog box.

- Step 2Select a role name and click Rules.You see the Rules dialog box.
- **Step 3** Click **Summary** to get a summarized view of the rules configured for this role.

Role Distributions

Role-based configurations use the Cisco Fabric Services (CFS) infrastructure to enable efficient database management, and to provide a single point of configuration for the entire fabric (see Chapter 13, "Using the CFS Infrastructure").

The following configurations are distributed:

- Role names and descriptions
- List of rules for the roles
- VSAN policy and the list of permitted VSANs

This section includes the following topics:

- About Role Databases, page 39-7
- Locking the Fabric, page 39-8
- Committing the Changes, page 39-8
- Discarding the Changes, page 39-9
- Enabling Distribution, page 39-9
- Clearing Sessions, page 39-9
- Database Merge Guidelines, page 39-10
- Displaying Roles When Distribution is Enabled, page 39-10

About Role Databases

Role-based configurations use two databases to accept and implement configurations.

- Configuration database—The running database currently enforced by the fabric.
- Pending database—Your subsequent configuration changes are stored in the pending database. If you modify the configuration, you need to commit or discard the pending database changes to the configuration database. The fabric remains locked during this period. Changes to the pending database are not reflected in the configuration database until you commit the changes.

Locking the Fabric

The first action that modifies the database creates the pending database and locks the feature in the entire fabric. Once you lock the fabric, the following situations apply:

- No other user can make any configuration changes to this feature.
- A copy of the configuration database becomes the pending database along with the first change.

Committing the Changes

If you commit the changes made to the pending database, the configuration is committed to all the switches in the fabric. On a successful commit, the configuration change is applied throughout the fabric and the lock is released. The configuration database now contains the committed changes and the pending database is now cleared.

To commit role-based configuration changes using Fabric Manager, follow these steps:

Step 1 Expand Switches > Security and then select Users and Roles in the Physical Attributes pane. Click the Roles CFS tab in the Information pane.

You see the screen shown in Figure 39-5.

Figure 39-5 Roles CFS Tab

🖷 /SAN/Fabric sw172-22-46-233 [admin@localhost] - Fabric Manager 3.0(0.347)														
<u>File ⊻iew Zone Tools Perfor</u>	mance <u>S</u> erver <u>H</u> el	р												
C 응 A I 1 1 2 3 3 1 2 2 2 3 3 1 2 2 2 3 3 2 3 2														
-Logical Domains	📲 🕲 🖬 🛤	5 🔒 🗳	×.					/S/						d Roles
E C ALVSANS	Roles CFS Roles	s Users Us	ers (<3.0)	Commu	nities Privacy	1								
⊞	Switch	Admin	Oner	Global	Config	Config View es	Last	Last	Owner IR Address	Owner	Merce	Mastar	Attributes	
Domain Manage 🔽	sw172-22-46-223	noSelection	disabled	enable	noSelection	runnina	Commania	ressur	- Address	USCI IVGING	morgo	muster	fcFabric ipNetwork	
< >	sw172-22-46-224	noSelection	disabled	enable	noSelection	running							n/a	
A T	sw172-22-46-222	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
Physical Attributes	sw172-22-46-233	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
Users and Roles 🔺	sw172-22-46-153	noSelection	disabled	n/a	noSelection	running							n/a	
SSH and Telnet	sw172-22-46-225	noSelection	enabled	enable	noSelection	running					success		fcFabric ipNetwork	
FC-SP (DHCHAP)	sw172-22-46-174	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
PKI 💻	sw172-22-46-221	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
IKE 🐱														
All fabric switches participate in CFS		If fabric switches participate in CFS												

- **Step 2** Set the Global drop-down menu to **enable** to enable CFS.
- **Step 3** Click **Apply Changes** to save this change.
- **Step 4** Set the Config Action drop-down menu to **commit** to commit the roles using CFS.
- **Step 5** Click **Apply Changes** to save this change.

Discarding the Changes

If you discard (abort) the changes made to the pending database, the configuration database remains unaffected and the lock is released.

To discard role-based configuration changes using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select Users and Roles in the Physical Attributes pane. Click the Roles CFS tab in the Information pane.
- **Step 2** Set the Config Action drop-down menu to **abort** to discard any uncommitted changes.
- **Step 3** Click **Apply Changes** to save this change.

Enabling Distribution

To enable role-based configuration distribution using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select Users and Roles in the Physical Attributes pane. Click the Roles CFS tab in the Information pane.
- **Step 2** Set the Global drop-down menu to **enable** to enable CFS distribution.
- **Step 3** Click **Apply Changes** to save this change.

Clearing Sessions

To forcibly clear the existing role session in the fabric using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select Users and Roles in the Physical Attributes pane. Click the Roles CFS tab in the Information pane.
- **Step 2** Set the Config Action drop-down menu to **clear** to clear the pending database.
- **Step 3** Click **Apply Changes** to save this change.



Any changes in the pending database are lost when you clear a session.

Database Merge Guidelines

Fabric merge does not modify the role database on a switch. If two fabrics merge, and the fabrics have different role databases, the software generates an alert message.

See the "CFS Merge Support" section on page 13-11 for detailed concepts.

- Verify that the role database is identical on all switches in the entire fabric.
- Be sure to edit the role database on any switch to the desired database and then commit it. This synchronizes the role databases on all the switches in the fabric.

Displaying Roles When Distribution is Enabled

When you enable distribution for roles, you can view either the pending role database (the database before it is distributed) or the running database.

To view the roles using Fabric Manager, follow these steps:

Step 1 Expand Switches > Security and then select Users and Roles in the Physical Attributes pane. Click the Roles CFS tab in the Information pane (see Figure 39-6).

Figure 39-6 Roles CFS Tab

le ⊻iew <u>Z</u> one <u>T</u> ools <u>P</u> erform	nance <u>S</u> erver <u>H</u> el	0												
- ③ 外 · · · · · · · · · · · · · · · · · ·														
ogical Domains	🗐 🚱 🖬 🛤	5 🔒 😂	P					/SA	N/Fabric sv	N172-22-4	6-233/Sw	itches	/Security/Users and	d Roles
	Roles CFS Role:	Users Us	ers (<3.0)	Commu	nities Privacy									
⊞	Switch	Admin	Oper	Global	Config Action	Config View as	Last Command	Last Result	Owner IP Address	Owner User Name	Merge	Master	Attributes	
Domain Manage ⊻	sw172-22-46-223	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
	sw172-22-46-224	noSelection	disabled	enable	noSelection	running							n/a	
▼	sw172-22-46-222	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
Physical Attributes	sw172-22-46-233	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
Users and Roles 🛛 🔥	sw172-22-46-153	noSelection	disabled	n/a	noSelection	running							n/a	
SSH and Telnet	sw172-22-46-225	noSelection	enabled	enable	noSelection	running					success	Image: A start of the start	fcFabric ipNetwork	
FC-SP (DHCHAP)	sw172-22-46-174	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
ркі 💻	sw172-22-46-221	noSelection	disabled	enable	noSelection	running							fcFabric ipNetwork	
IKE 🗸														

- **Step 2** Set the View Config As drop-down value to **pending** to view the pending database or set the View Config As drop-down menu to **running** to view the running database.
- **Step 3** Click **Apply Changes** to save this change.

User Accounts

Every Cisco MDS 9000 Family switch user has the account information stored by the system. Your authentication information, user name, user password, password expiration date, and role membership are stored in your user profile.

The tasks explained in this section enable you to create users and modify the profile of an existing user. These tasks are restricted to privileged users as determined by your administrator.

The password should have the strong characteristics, such as the following:

- Are at least eight characters long
- Not contain many consecutive characters (such as "abcd")
- Not contain many repeating characters (such as "aaabbb")
- Not contain dictionary words
- · Contain both upper- and lowercase characters
- Contain numbers

The following are examples of strong passwords:

- If2CoM18
- 2004AsdfLkj30
- Cb1955S21



Clear test passwords can only contain alphanumeric characters. Special characters such as the dollar sign (\$) or the percent sign (%) are not allowed.

This section includes the following topics:

- About Users, page 39-11
- Configuring Users, page 39-12
- Deleting a User, page 39-14
- Displaying User Account Information, page 39-14

About Users

The passphrase specified in the **snmp-server user** option and the password specified **username** option are synchronized (see the "SNMPv3 CLI User Management and AAA Integration" section on page 31-3).

By default, the user account does not expire unless you explicitly configure it to expire. The **expire** option determines the date on which the user account is disabled. The date is specified in the YYYY-MM-DD format.

 \mathcal{P} Tip

The following words are reserved and cannot be used to configure users: bin, daemon, adm, lp, sync, shutdown, halt, mail, news, uucp, operator, games, gopher, ftp, nobody, nscd, mailnull, rpc, rpcuser, xfs, gdm, mtsuser, ftpuser, man, and sys.



Note

User passwords are not displayed in the switch configuration file.



If a password is trivial (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password as shown in the sample configuration. Passwords are case-sensitive. "admin" is no longer the default password for any Cisco MDS 9000 Family switch. You must explicitly configure a strong password.



Cisco MDS SAN-OS does not support all numeric user names, whether created with TACACS+ or RADIUS, or created locally. Local users with all numeric names cannot be created. If an all numeric user name exists on an AAA server and is entered during login, the user is not logged in.

Configuring Users

To configure a new user or to modify the profile of an existing user using Fabric Manager, follow these steps:

Step 1 Expand Switches > Security and then select Users and Roles from the Physical Attributes pane. Click the Users tab in the Information pane to see a list of users like the one in Figure 39-7.

Figure 39-7 Users listed under the Users Tab

Switch	Hear	Drimary Role	Other Role	Digest	Encryption
3998011 500473333346.403	Jodmin	Primary Noie	Other Noie	MDE	MaDria
SW172-22-46-162	aumin	network-admin		MDS	NOPTIV
sw172-22-46-224	abcd	network-operator	network-admin	MD5	DES
sw172-22-46-153	admin	network-admin		MD5	NoPriv
sw172-22-46-182	md5usr	network-operator		MD5	DES
sw172-22-46-224	admin	network-admin		MD5	DES
sw172-22-46-224	mchinn	network-operator	network-admin	MD5	DES
sw172-22-46-224	md5usr	network-admin		MD5	DES
sw172-22-46-153	mchinn	network-operator	network-admin	MD5	DES
sw172-22-46-224	mchinn1	network-operator	network-admin	MD5	NoPriv
sw172-22-46-224	shadmin	network-operator	network-admin	SHA	DES
sw172-22-46-153	md5usr	network-admin		MD5	DES
sw172-22-46-153	; junknew	network-operator	network-admin	MD5	DES
sw172-22-46-153	mchinn1	network-operator	network-admin	MD5	DES
sw172-22-46-153	mchinn5	network-operator	network-admin	MD5	NoPriv
sw172-22-46-153	shadmin	network-operator	network-admin	SHA	DES
sw172-22-46-153	testUser	network-operator	test	MD5	DES

Step 2 Click Create Row.

You see the Create Users dialog box shown in Figure 39-8.

🎧 /SAN/Fabric sw1	72-22-46-223/Switches/Security/Use 🔀
Switches:	✓ sw172-22-46-174 ✓ sw172-22-46-220 ✓ sw172-22-46-221 ✓ sw172-22-46-222 ✓ sw172-22-46-222 ✓ sw172-22-46-223
New User:	
Password:	
Roles: (Visit Roles Tab First)	devrule role2 default-role role1 test
Digest:	⊙ MD5 ○ SHA ○ None
Encryption:	⊙ DES ○ AES ○ None
- Optional ExpiryDate: (eg. yyyy/mm/dd) SshKeyFilename: ([bootflash: volatile:])	Create

Figure 39-8 Create Users Dialog Box

- **Step 3** Optionally alter the Switches check boxes to specify one or more switches.
- **Step 4** Enter the user name in the New User field.
- Step 5 Select a role from the Role drop-down menu. You can also enter a new role name in the field if you do not want to select one from the drop-down menu. If you do this, go back and configure this role appropriately (see the "User Accounts" section on page 39-10).
- **Step 6** Enter the password for the user in the New Password and Confirm Password fields. Enter the same new password in the New Password and Confirm Password fields.
- **Step 7** Check the **Privacy** check box and complete the password fields to encrypt management traffic.
- **Step 8** Click **Create** to create the entry or click **Close** to discard any unsaved changes and close the dialog box.

Deleting a User

To delete a user using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select Users and Roles from the Physical Attributes pane. Click the Users tab in the Information pane to see a list of users.
 Step 2 Click the name of the user you want to delete.
 Step 3 Click Delete Row to delete the selected user.
- **Step 4** Click **Apply Changes** to save this change.

Displaying User Account Information

To display configured information about user accounts using Fabric Manager, follow these steps:

- **Step 1** Expand **Security** and then select **Users and Roles** in the Physical Attributes pane.
- **Step 2** Click the Users tab. You see the list of SNMP users shown in Figure 39-9 in the Information pane.

Figure 39-9 Users listed under the Users Tab

Switch	User	Primary Role	Other Role	Digest	Encryption
sw172-22-46-182	admin	network-admin		MD5	NoPriv
sw172-22-46-224	abcd	network-operator	network-admin	MD5	DES
sw172-22-46-153	admin	network-admin		MD5	NoPriv
sw172-22-46-182	md5usr	network-operator		MD5	DES
sw172-22-46-224	admin	network-admin		MD5	DES
sw172-22-46-224	mchinn	network-operator	network-admin	MD5	DES
sw172-22-46-224	md5usr	network-admin		MD5	DES
sw172-22-46-153	mchinn	network-operator	network-admin	MD5	DES
sw172-22-46-224	mchinn1	network-operator	network-admin	MD5	NoPriv
sw172-22-46-224	shadmin	network-operator	network-admin	SHA	DES
sw172-22-46-153	md5usr	network-admin		MD5	DES
sw172-22-46-153	junknew	network-operator	network-admin	MD5	DES
sw172-22-46-153	mchinn1	network-operator	network-admin	MD5	DES
sw172-22-46-153	mchinn5	network-operator	network-admin	MD5	NoPriv
sw172-22-46-153	shadmin	network-operator	network-admin	SHA	DES
sw172-22-46-153	testUser	network-operator	test	MD5	DES

SSH Services

The Telnet service is enabled by default on all Cisco MDS 9000 Family switches. Before enabling the SSH service, generate a server key pair (see the "Generating the SSH Server Key Pair" section on page 39-16).

This section includes the following topics:

- About SSH, page 39-15
- About the SSH Server Key Pair, page 39-15

- Generating the SSH Server Key Pair, page 39-16
- Overwriting a Generated Key Pair, page 39-17
- Enabling SSH or Telnet Service, page 39-17
- Enabling SSH or Telnet Service, page 39-17
- SSH Authentication Using Digital Certificates, page 39-18

About SSH

SSH provides secure communications to the Cisco SAN-OS CLI. You can use SSH keys for the following SSH options:

- SSH1
- SSH2, using RSA
- SSH2 using DSA

About the SSH Server Key Pair

Be sure to have an SSH server key pair with the appropriate version before enabling the SSH service. Generate the SSH server key pair according to the SSH client version used. The number of bits specified for each key pair ranges from 768 to 2048.

The SSH service accepts three types of key pairs for use by SSH versions 1 and 2.

- The rsa1 option generates the RSA1 key pair for the SSH version 1 protocol.
- The dsa option generates the DSA key pair for the SSH version 2 protocol.
- The rsa option generates the RSA key pair for the SSH version 2 protocol.



If you delete all of the SSH keys, you cannot start a new SSH session.

Generating the SSH Server Key Pair

To generate the SSH server key pair, follow these steps:

Step 1 Expand **Switches > Security** and then select **SSH and Telnet**.

You see the configuration shown in Figure 39-10 in the Information pane.

Figure 39-10 SSH and Telnet Configuration

/SAN/Fabric sw172-22-46-3	233 [admin@localhost] - Fabric Manager 3.0(0.347)	
<u>File ⊻iew Z</u> one <u>T</u> ools <u>P</u> erforma	ance Server Help	
🖃 🏶 🛯 🖬 🏶	≋ ∄ 17 ≧ 22 🦉 🔉 😵 🖇 🛣 🖉 📍	Advanced
Logical Domains	(e)	/SAN/Fabric sw172-22-46-233/Switches/Security/SSH and Telnet
Giller Fabric sw172-22-4 Giller Galaxie Galax	SSH Keys Control	
🗄 🧰 IVR	Switch Protocol NumBits Key Fingerprint La	astCreationTime
DPVM (Dynamic	sw172-22-46-221 SSH2(rsa) 1024 27:49:40:16:20:03:7d:91:57:a3:79:49:95:18:57:3a 20	06/2/20-14:54:32
<	3W172-22-40-222 [3312(130)] 1024 [16:48:01:33:30:60:00:03:66:01:60:01:00:00:33 [20	0001178-10.42.40
A T		
Physical Attributes		>
SSH and Telnet	SAN Reprint Sw172-22-48-233 Reprint Sw-isola-220 Reprint C-186	Log 🔥 Events
H COMMENSION		
2 rows		

Step 2 Click Create Row.

You see the SSH and Telnet Key Create dialog box shown in Figure 39-11.

Figure 39-11 Create SSH and Telnet Dialog Box

🔵 /SAN/I	abric sw172-22-46-233/Switches/Security/SSH and Telnet/SSH Keys - Create	×
Switches:	 ✓ sw172-22-46-153 ✓ sw172-22-46-174 ✓ sw172-22-46-182 ✓ sw172-22-46-221 ✓ sw172-22-46-222 	 • •
Protocol:	🔿 SSH1 💿 SSH2(rsa) 🔿 SSH2(dsa)	
NumBits:	1024 7682048 (dsa:1856)	

- **Step 3** Check the switches you want to assign to this SSH key pair.
- **Step 4** Choose the key pair option type from the listed Protocols. The listed protocols are SSH1, SSH2(rsa), and SSH2(dsa).
- **Step 5** Set the number of bits that will be used to generate the key pairs in the NumBits drop-down menu.
- Step 6 Click Create to generate these keys or click Close to discard any unsaved changes.

Overwriting a Generated Key Pair

If the SSH key pair option is already generated for the required version, you can force the switch to overwrite the previously generated key pair.

To overwrite a previously generated key pair using Fabric Manager, follow these steps:

Step 1	Expand Switches > Security and then select SSH and Telnet.
	You see the configuration in the Information pane.
Step 2	Highlight the key that you want to overwrite and click Delete Row .
Step 3	Click Apply Changes to save these changes or click the Undo Changes to discard unsaved changes.
Step 4	Click the Create Row .
	You see the SSH and Telnet Key Create dialog box.
Step 5	Check the switches you want to assign this SSH key pair.
Step 6	Choose the key pair option type from the Protocols radio buttons.
Step 7	Set the number of bits that will be used to generate the key pairs in the NumBits drop-down menu.
Step 8	Click Create to generate these keys or click Close to discard any unsaved changes.

Enabling SSH or Telnet Service

By default, the SSH service is disabled. Fabric Manager enables SSH automatically when you configure it.

To enable or disable SSH using Fabric Manager, follow these steps:

- Step 1 Expand Switches > Security and then select SSH and Telnet.
- **Step 2** Select the **Control** tab and check an **SSH** check box or **Telnet** check box for each switch as shown in Figure 39-12.

/SAN/Fabric sw172-22-46-233	3 [admin@localhost] - Fabric Manager 3.0(0.347)	
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-Logical Domains - Cogical Domains - Fabric sw172-22-4 - All VSANs Statements - Cogical Domains - Co	SH Keys Control	/SAN/Fabric sw172-22-46-233/Switches/Security/SSH and Telnet
IVR DPVM (Dynamic Domain Manage Sw Sw Physical Attributes Sw	SSH Telnet v172-22-46-182 v177-22-26-275 v172-22-46-275 v172-22-46-275 v172-22-46-273	
Switches	MT72-224-221 ♥ ♥ MT72-224-251 ♥ ♥ MT72-224-81-53 ■ ■ MT72-224-81-174 ■ ♥	
Brows		

Figure 39-12 Control Tab under SSH and Telnet

Step 3 Click **Apply Changes** to save this change or click **Undo Changes** to discard unsaved changes.

Γ

<u>Note</u>

If you are logging in to a switch through SSH and you have issued the **aaa authentication login default none CLI** command, you must enter one or more key strokes to log in. If you press the **Enter** key without entering at least one keystroke, your log in will be rejected.

SSH Authentication Using Digital Certificates

SSH authentication on the Cisco MDS 9000 Family switches provide X.509 digital certificate support for host authentication. An X.509 digital certificate is a data item that vouches for the origin and integrity of a message. It contains encryption keys for secured communications and is "signed" by a trusted certification authority (CA) to verify the identity of the presenter. The X.509 digital certificate support provides either DSA or RSA algorithms for authentication.

The certificate infrastructure uses the first certificate that supports the Secure Socket Layer (SSL) and is returned by the security infrastructure, either through query or notification. Verification of certificates is successful if the certificates are from any of the trusted CAs.

You can configure your switch for either SSH authentication using an X.509 certificate or SSH authentication using a Public Key Certificate, but not both. If either of them is configured and the authentication fails, you will be prompted for a password.

For more information on CAs and digital certificates, see Chapter 34, "Configuring Certificate Authorities and Digital Certificates."

Creating or Updating Users

The passphrase specified in the **snmp-server user** option and the password specified **username** option are synchronized.

By default, the user account does not expire unless you explicitly configure it to expire. The **expire** option determines the date on which the user account is disabled. The date is specified in the YYYY-MM-DD format.



The following words are reserved and cannot be used to configure users: bin, daemon, adm, lp, sync, shutdown, halt, mail, news, uucp, operator, games, gopher, ftp, nobody, nscd, mailnull, rpc, rpcuser, xfs, gdm, mtsuser, ftpuser, man, and sys.



User passwords are not displayed in the switch configuration file.



If a password is trivial (short, easy-to-decipher), your password configuration is rejected. Be sure to configure a strong password as shown in the sample configuration. Passwords are case-sensitive. "admin" is no longer the default password for any Cisco MDS 9000 Family switch. You must explicitly configure a strong password.

Cisco	MDS SAN-OS does not support all numeric usernames, whether created with TACACS+ or
RADI userna	US, or created locally. Local users with all numeric names cannot be created. If an all numeric name exists on an AAA server and is entered during login, the user is not logged in.
To iss that is	ue commands with the internal keyword for troubleshooting purposes, you must have an account a member of the network-admin group.
Only 1	he network-admin users are allowed to modify other user's privileges.
To con steps:	nfigure a new user or to modify the profile of an existing user using Fabric Manager, follow these
Expan the Us	d Switches > Security and then select Users and Roles from the Physical Attributes pane. Click sers tab in the Information pane to see the user information.
Click	Create Row to create a user.
You se	ee the Create Users dialog box.
Select	the switches to which this user will be allowed access.
Assig	n a new user name and password.
Note	User account names must contain non-numeric characters.
~ .	
Select	the roles that you want to assign to this new user.
Select	the digest and encryption for the user that you are creating or updating.
Option	nally, enter an expiry date and an SSH file name for the user.
	Create to support the user of Class to discould be shown as

Recovering the Administrator Password

You can recover the administrator password using one of two methods:

- From the CLI with a user name that has network-admin privileges.
- Power cycling the switch.



To recover an administrator's password, refer to the Cisco MDS 9000 Family CLI Configuration Guide.

Configuring Cisco ACS Servers

The Cisco Access Control Server (ACS) uses TACACS+ and RADIUS protocols to provide AAA services that ensure a secure environment. When using the AAA server, user management is normally done using Cisco ACS. Figure 39-13, Figure 39-14, Figure 39-15, and Figure 39-16 display ACS server user setup configurations for network-admin roles and multiple roles using either TACACS+ or RADIUS.

∕!∖ Caution

Cisco MDS SAN-OS does not support all numeric usernames, whether created with TACACS+ or RADIUS, or created locally. Local users with all numeric names cannot be created. If an all numeric user name exists on an AAA server and is entered during login, the user is not logged in.



Each role specified in the cisco-av-pair must exist in the MDS, or the user will have the 'network-operator' role.



CISCO SYSTEMS	User Setup		×
Iltu	O Permit	- Help	
User Betup Setup S		 Account Disabled Deleting a Username Supplementary User Info Password Authentication Group to which the user is assigned Callback Client IP Address Assignment Advanced Settings Network Access Restrictions Max Sessions Usage Quotas Account Disable Downloadable ACLs Advanced TACACS+ Settings TACACS+ Enable Control TACACS+ Shell Command Authorization Command Authorization for Network Device Management Applications TACACS+ Unbound Services IETF RADIUS Attributes RADIUS Vendor-Specific Attributes 	
	Submit Delete Cancel	Account Disabled Status Select the Account Disabled check box to disable this account, clear the check box to enable the account [Back to Top] Deleting a Username	575
	Applet dialup_filter started		120

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n I Shared Profile		Group to which the user is assigned
🕸 Components		Callback
Network	Arguments:	Client IP Address Assignment
		Advanced Settings
System Configuration		Network Access Restrictions
D. Interface		<u>Max Sessions</u>
E Configuration		Usage Quotas
Administration	Unlisted arguments	Account Disable Downloadable ACL c
Control	C Permit	Advanced TACACS+ Settings
External User	© Deny	TACACS+ Enable Control
> Reports and		TACACS+ Enable Password
Activity		TACACS+ Outbound Password
Documentation		<u>TACACS+ Shell Command Authorization</u>
	Cisco IOS/PIX RADIUS Attributes 🛛 💡	Command Authorization for Network Device
	F [009001] cisco_arr pair	TACACS+ University Semicor
		IFTE RADIUS Attributes
	Role7"snmpv3:auth=MD5 priv=DES	RADIUS Vendor-Specific Attributes
		Account Disabled Status
		Account Disableu Status
		Select the Account Disabled check box to disable this
		account; clear the check box to enable the account.
		Back to Top

Figure 39-14 Configuring Multiple Roles with SNMPv3 Attributes When Using RADIUS

Figure 39-15 Configuring the network-admin Role with SNMPv3 Attributes When Using TACACS+

TAC.	ACS+ Settings	? Help
□ PPP IP		Account Disabled
📃 🔲 In access control list	:	Deleting a Username
Out access control !	ist	Supplementary User Info
- Route		Password Authentication
file Deuting	E Enchlad	Group to which the user is assigned
Custom attributes	_ Enabled	Client IB Address Assignment
on Custom aurioutes		Advanced Settings
		Network Access Restrictions
		Max Sessions
on		Usage Quotas
ion		<u>Account Disable</u>
Note: PPP LCP will be aut	matically enabled if this service is en	bled
er		Advanced TACACS+ Settings TACACS+ Enable Control
🖂 Shell (exec)		TACACS+ Enable Password
Access control list		TACACS+ Outbound Password
Auto command		TACACS+ Shell Command Authorization
Callback line		Command Authorization for Network Device
Callback rotary		TACACS+ Unknown Services
		ETF RADIUS Attributes
	E Eachte d	RADIUS Vendor-Specific Attributes
	Enabled	
I INO Escape	Enabled	
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I Timeout		Select the Account Disabled check box to disable this
Custom attributes		account, clear the check box to enable the account.
cisco-av-pair=shel Role3"snmnv3:auths	l:roles="Role1	[Back to Top]
		Deleting a Usernema
Subr	it Delete Cencel	Deleting a Userhame

Figure 39-16 Configuring Multiple Roles with SNMPv3 Attributes When Using TACACS+

TACACS+ Se	ettings 🥂	- Help
PPP IP		
In access control list		Account Disabled
□ Out access control list		Deleting a Username
		Supplementary User Info Deserved Arthentiestics
Route		<u>Password Authentication</u> Group to which the user is assigned
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Custom attributes		Client IP Address Assignment
		Advanced Settings
		Network Access Restrictions
		Max Sessions
		Usage Quotas
lata, DDD I CD will be autored 11-	anablad if this corrige is	Account Disable Developedable ACLe
nabled	enabled II this service is	Downloadable ACLs Advanced TACACS+ Settings
		Advanced TACACS+ Settings TACACS+ Enable Control
		TACACS+ Enable Password
≤ Snell (exec)		TACACS+ Outbound Password
Access control list		TACACS+ Shell Command Authorization
Auto command		Command Authorization for Network Device
🗌 Callback line		Management Applications
🗌 Callback rotary		TACACS+ Unknown Services
Idle time		EIFRADIUS Attributes BADIUS Vender Specific Attributes
No callback verify	□ Enabled	· IADIOS Venuor-specific Autoutes
No escape	Enabled	
No hangup	Enabled	A scount Dischlad Status
□ Privilege level		Account Disabled Status
Timeout		Select the Account Disabled check box to disable this
Z Custom attributes		account; clear the check box to enable the account.
		[Reals to Top]
etwork-admin"snmpv3:auth	n=md5	
priv=aes-128		Deleting a Username
	sta I. Canaal I	

Default Settings

Table 39-1 lists the default settings for all switch security features in any switch.

 Table 39-1
 Default Switch Security Settings

Parameters	Default
Roles in Cisco MDS Switches	Network operator (network-operator).
AAA configuration services	Local.
Authentication port	1821.
Accounting port	1813.
Preshared key communication	Clear text.
RADIUS server time out	1 (one) second.

Parameters	Default
RADIUS server retries	Once.
TACACS+	Disabled.
TACACS+ servers	None configured.
TACACS+ server timeout	5 seconds.
AAA server distribution	Disabled.
VSAN policy for roles	Permit.
User account	No expiry (unless configured).
Password	None.
Accounting log size	250 KB.
SSH service	Disabled.
Telnet service	Enabled.

Table 39-1 Default Switch Security Settings (continued)