

Chapter 26

Secure Shell

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Introduction

This chapter describes the Secure Shell protocol, support for Secure Shell on the switch, how to configure the switch to act both as a Secure Shell server and client, and how to use Secure Shell to manage the switch.

Secure management is increasingly important in modern networks, as the ability to easily and effectively manage switches and the requirement for security are two almost universal requirements. Traditionally, switches are managed using either remote terminal sessions via the Telnet protocol or SNMP. Both methods have serious security problems. They are protected by plaintext reusable passwords that are vulnerable to wiretapping and password guessing, which could result in sensitive information, even the passwords themselves, traversing the network as plaintext.

The Secure Shell (SSH) protocol is similar to the Telnet and rlogin protocols in providing encrypted and strongly authenticated remote login sessions. SSH provides sessions between a host running a Secure Shell server and a machine with a Secure Shell client.

The switch implements both a Secure Shell server and a Secure Shell client to enable network managers to securely—with the benefit of cryptographic authentication and encryption—manage the switches over an insecure network:

- Secure Shell replaces Telnet for remote terminal sessions. Secure Shell is strongly authenticated and encrypted.
- Remote command execution allows manager commands to be sent to a switch securely and conveniently, without requiring a terminal session on the switch.
- Secure Shell supports Secure Copy (SCP), which provides a way of securely copying files between the switch and remote machines.
- A network manager logged onto a switch may connect to another switch or a secure host using Secure Shell.

Secure Shell on the Switch

The switch implementation of the Secure Shell protocol is compatible with the Secure Shell protocol described in the Internet Draft, *The SSH (Secure Shell) Remote Login Protocol*.

The protocol depends on other technologies, including DES encryption and RSA public key encryption, that may require licencing in some regions, and may be subject to ITAR export controls.

Secure Shell supports the following features:

- inbound Secure Shell connections (server mode) and outbound Secure Shell connections (client mode).
- file loading to and from remote machines using Secure Copy, using either the SSH client or SSH server mode.
- RSA public keys with lengths of 512–2048 bits. Keys are stored in a format compatible with other Secure Shell implementations, and mechanisms are provided to copy keys to and from the switch.
- Single DES encryption for Secure Shell sessions.
- remote non-interactive shell that allows arbitrary switch commands to be sent securely to the switch, possibly automatically.

Secure Shell does **not** support the following features:

- IDEA or Blowfish encryption.
- Compression of Secure Shell traffic.
- Non-encrypted Secure Shell sessions. The purpose of Secure Shell is to provide encrypted and strongly-authenticated terminal sessions so the Secure Shell server refuses to operate in non-encrypted mode.
- Tunnelling of TCP/IP traffic. Instead IP encryption should be implemented using Security Associations.

Log messages are generated to record the following events:

- addition, deletion or modification of a Secure Shell user
- acceptance or rejection of a Secure Shell connection
- enabling or disabling the Secure Shell server
- regeneration of the Secure Shell server key
- disconnection of Secure Shell connections
- enabling or disabling Secure Copy service
- reasons for failed or aborted file transfers using Secure Copy

The Secure Shell implementation is functionally similar to existing implementations on various platforms, such as ssh-1.2.26 (UNIX) and Datafellows F-Secure SSH (Windows), and interoperates with these implementations.

Configuring Secure Shell

Configuring the server

The Secure Shell server must be enabled before connections from Secure Shell and Secure Copy clients are accepted. If a firewall policy exists on the Secure Shell server, you must add a rule that allows access to the Secure Shell server on port 22 before Secure Shell connections are accepted. When the Secure Shell server is disabled, connections from Secure Shell clients are rejected.

To enable or disable the Secure Shell server, use the commands:

```
enable ssh server hostkey=key-id serverkey=key-id
[expirytime=0..168] [logintimeout=1..600]
[scp={enabled|disabled}]

disable ssh server
```

To modify the Secure Shell server configuration, use the command:

```
set ssh server [hostkey=key-id] [serverkey=key-id]
[expirytime=0..168] [logintimeout=1..600]
[scp={enabled|disabled}]
```

Secure Copy can be disabled or enabled on the SSH server using the **scp** parameter in the **enable ssh server** and **set ssh server** commands. This allows you to reject Secure Copy file transfer requests, while still allowing Secure Shell connections.

To display the current configuration of the Secure Shell server, use the command:

```
show ssh
```

Configuring the client

The **set ssh client** command allows you to specify timeout and file modification options when the switch is acting as an SSH client. Use the command:

```
set ssh client idletimeout=[0..4294967295]
[logintimeout=1..600] [preservetime={enabled|disabled}]
```

To initiate a Secure Shell connection from the switch to a remote switch or Secure Shell server, use the command:

```
ssh ipadd user=username {password=password|keyid=key-id}
[command=string]
```

To display the current configuration of the Secure Shell client, use the command:

```
show ssh
```

Configuring users

The Secure Shell server accepts only connections from registered users or users configured on a RADIUS server. If the session username is not found in the list of registered users, and one or more RADIUS servers are defined, the user is authenticated using RADIUS. If authentication fails, the Secure Shell server will not accept the connection.

The following commands add and delete registered users:

```
add ssh user=username {password=password|keyid=key-id}
[ipaddress=ipadd] [mask=mask]

delete ssh user=username
```

To modify the configuration for an existing registered user, use the command:

```
set ssh user=username {password=password|keyid=key-id}
[ipaddress=ipadd] [mask=mask]
```

To temporarily disable and enable a registered user, use the commands:

```
disable ssh user=username
enable ssh user=username
```

A user that is disabled cannot make Secure Shell connections to the Secure Shell server. If a Secure Shell user makes 5 consecutive incorrect logins, their status changes to disabled. To display a list of registered users and their current status, use the command:

```
show ssh user[=username]
```

Secure Shell encryption key management is implemented by the ENCO module. RSA public keys can be imported and exported to/from the single-line ASCII format used by all Secure Shell implementations.

To use RADIUS to authenticate SSH users, you must:

- Configure at least one RADIUS server using the [add radius server command on page 23-32 of Chapter 23, User Authentication](#).
- Configure the appropriate username and password on the RADIUS server.
- Make sure a user with the same name does not exist in the list of registered users. Use the [show ssh user command on page 26-35](#).

Passwords You can apply the rules for minimum length, valid characters, lifetime, and history of passwords from the User Authentication Database to an SSH user by configuring the SSH user to use a password from the User Authentication Database.

To apply password rules to SSH users:

1. Set the password rules:

```
set user [pwdforce={yes|no|on|off|true|false}]
[pwdhistory=0..15] [pwdlifetime=0..1000]
[pwdmincat=1..4] [other-options...]
```

2. Create a user in the User Authentication Database with manager or security officer privilege:

```
add user=username password=password
privilege={manager|securityofficer} [other-options...]
```

3. Create an SSH user with the same name and configure it to use the password from the User Authentication Database:

```
add ssh user=username useuserpwd [other-options...]
```

You can modify an existing SSH user, by using the command:

```
set ssh user=username
[{password=password|keyid=key-id|useuserpwd}]
[ipaddress={ipadd|ipv6add}] [mask=mask]
```

You can display information about SSH users, including which users are configured to use a password from the User Authentication Database, by using the commands:

```
show ssh user

show ssh user=username
```

Using Secure Copy

Secure Copy can copy files to and from the switch, from either the switch's location or from a remote machine. To allow client SCP sessions to connect to the switch, enable SCP service on the server:

```
set ssh server=enabled
```

To use the switch's SCP client to load files onto the switch, use the command:

```
load method=scp [delay=delay] [destfile=destfilename]
[destination={cflash|flash|nvs}]
[{file|srcfile}=filename]
[{keyid=key-id|password=password}]
[server={hostname|ipadd|ipv6add}] [username=username]
```

To use the switch's SCP client to upload files onto a remote machine, use the command:

```
upload method=scp [destfile=destfilename] [file=filename]
[{keyid=key-id|password=password}]
[server={hostname|ipadd}] [username=username]
```

For further information on loading files using Secure Copy, see:

- [“Loading from a Remote Device using Secure Copy” on page 5-8](#)
- [“Using Secure Copy” on page 5-12 of Chapter 5, Managing Configuration Files and Software Versions](#)

Managing sessions

You can monitor the current status of Secure Shell and Secure Copy connections by using the **show ssh session** command. This displays both uploads and downloads, and whether the switch is acting as a client or server. Use the command:

```
show ssh session[={all|scp|ssh}]
```

To delete Secure Shell and Secure Copy sessions without disabling the SSH server, use the command:

```
delete ssh session={session-id|all}
```

To see detailed information about the Secure Shell and Secure Copy counters, use the command:

```
show ssh counter[={all|scp|ssh}]
```

Debugging SSH and SCP

Information which may be useful for troubleshooting SSH and SCP connections is available using the SSH debugging function. To enable or disable debugging on either SSH, SCP, or both, use the commands:

```
enable ssh debug[={ssh|scp|all}]

disable ssh debug[={ssh|scp|all}]
```

Configuration Example

This example shows how to create encryption keys, configure the Secure Shell server, and register users to make Secure Shell connections to the switch.

1. Create a Security Officer login on the server.

A Security Officer must be configured before putting the switch in security mode. Add a user with Security Officer privilege to the User Authentication database:

```
add user=login-name login={true|false|on|off|yes|no}
password=password privilege=securityofficer
[other-user-parameters]
```

See the [add user command on page 23-35 of Chapter 23, User Authentication](#).

2. Enable security mode.

To store the Secure Shell configuration and other security information, such as encryption keys when the switch is restarted, enable the security mode as follows:

```
enable system security_mode
```

When the switch is in security mode, only a user with Security Officer privilege can configure security-sensitive aspects of it. See [“Operating Modes” on page 23-6 of Chapter 23, User Authentication](#).

Important Sensitive data, such as encryption keys, created on a switch that is not in security mode is destroyed when the switch is restarted. Enable security mode before creating encryption keys.

3. Create encryption keys.

Two RSA private keys are required to enable the Secure Shell server. The first, is the *host key*, which is the switch’s own RSA key. The recommended length of this key is 1024 bits. The second key, the *server key*, is a randomly created key, which is re-generated after the specified timeout. This key must be 128 bits shorter than the host key, but should be at least 512 bits.

Before creating keys, first define a user with Security Officer privileges. Defining a security officer lets that user enable security mode when logging in. The security officer definition process must be carried out on all switches that use the keys (i.e., on the head office switch and the remote office switch).

```
create enco key=0 type=rsa length=1024
description="Host Key" form=ssh

create enco key=1 type=rsa length=768
description="Server Key" form=ssh
```

To verify the key creation, use the command:

```
show enco key
```

4. Enable the Secure Shell server.

Once the required host and server keys have been generated, the Secure Shell server can be enabled using the command:

```
enable ssh server hostkey=0 serverkey=1 expirytime=1
logintimeout=60
```

In this case, the server key expiry time has been set to 1 hour. Because switches are always busy (unlike a UNIX box), it is recommended that the expiry time be set to ensure that RSA keys are re-generated in off-peak

times. One method of doing this is to set the expiry time to 0 (never) and then use the switch script facility to destroy and recreate the key.

To verify the SSH server status, use the command:

```
show ssh
```

5. Register users in the User Authentication database.

In order to connect and execute commands that require manager or security officer privilege on the switch, users must be registered in the SSH user database, and in the User Authentication database of the switch. You can create an SSH only user, but they would have very limited abilities.

To create a user in the User Authentication database, use the command:

```
add user=john password=secret privilege=manager
```

The password configured for this user is not important; it need not match the password for the SSH user. For details see the [add user command on page 23-35 of Chapter 23, User Authentication](#).

6. Set up authentication.

SSH users cannot connect unless they can be authenticated. There are two ways to authenticate an SSH session: password, and RSA private/public key.

For password authentication

To create the user "john" with the password "secret", enter:

```
add ssh user=john password=secret
```

For RSA authentication

Create an RSA public key for the user. This RSA public key must be the public part of the RSA private key that the user sends when opening the SSH session.

To create the public key on the server, do one of the following:

- (a) Create the public key file. This can be done in a number of ways by using a variety of SSH client programs. It can also be done on the switch. In this example, we are creating the public key on the client switch. The remote switch in this example is called the *server* switch.

First create a private key on the **client** switch:

```
create enco key=5 type=rsa length=768 description="Example  
private key"
```

The length of the key is flexible; it need not be 768 bits.

Then from the private key, create a public key in a file:

```
create enco key=5 type=rsa file=user.key form=ssh
```

The key number entered in this command must be the same as that used in the previous command because the purpose of this command is to create a public key from the private key. The file name must have a .key extension.

After you create the key file, you can upload it to a TFTP server or zmodem server so that you can load it onto the SSH server. Use one of the following commands:

```
upload server=ipadd file=user.key
```

```
upload po=0 method=zmo file=user.key
```


- (b) Load the public key file onto the *server* switch with one of the following commands:

```
load server=ipadd destination=flash file=user.key  
load po=0 meth=zmo destination=flash
```

- (c) Create an ENCO key from this file on the *server* switch:

```
create enco key=7 type=rsa file=user.key  
description="user's public key" form=ssh
```

7. Create an SSH user.

To create an SSH user, use the command:

```
add ssh user=name keyid=7
```

Other SSH user parameters

An IP address or subnet can also be added to force the user to login from that address. To require the user "john" to attach from the network IP 192.168.2.0, use the command:

```
set ssh user=john ipaddress=192.168.2.0 mask=255.255.255.0
```

To verify the list of registered Secure Shell users, use the command:

```
show ssh user
```

8. Create an outgoing SSH terminal session.

Use the authentication method (password or RSA) that matches the method from previous steps to create users.

Password authentication

To create an outgoing terminal session using password authentication, follow this procedure:

A user "john" has been configured with password authentication (password "secret") on a remote server with the IP address 192.168.2.5. To login from a client switch to the remote server, use the command:

```
ssh 192.168.2.5 user=john password=secret
```

The first time that you make an SSH connection from a client switch to a server using password authentication, the server sends the public part of its host key to the client switch. Because the client switch has not seen this host key before, it displays the message:

```
Host key not recognised - saved as ssh.key
```

```
SSH. Session closed.
```

At this point you must create an ENCO key from the saved public key file. Use the command:

```
create enco key=6 type=rsa file=ssh.key  
description="B host key" form=ssh
```

You can then successfully create an SSH connection to the server with the command:

```
ssh 192.168.2.5 user=john password=secret
```

RSA authentication

To create the outgoing terminal session using RSA authentication, follow this procedure:

A user "Admin" has been configured with an RSA public key (matching RSA private key 5 on the local switch) on a server switch with the IP address 192.168.2.5. To use Secure Shell to login to the server switch as user "Admin", on the client switch, use the command:

```
ssh 192.168.2.5 user=Admin keyid=5
```

Connecting and Executing Commands After Configuration

It is possible to make an SSH connection that simply connects to the server switch, executes a command, and disconnects again. Use the command:

```
ssh 192.168.2.5 user=john password=secret  
command="act scr=test.scp"
```

In order to execute commands that require manager or security officer privilege, the server switch must be configured with a manager or security officer user corresponding to the SSH user. If the SSH user is a member of the switch's User Authentication database, then the user also has the associated privileges.

For example, having created the SSH user "john", it is necessary to also create "john" in the User Authentication database on the switch. Use the command:

```
add user=john password=any_old_thing privilege=manager
```

The password configured for this user is not important; it need not match the password for the SSH user.

Command Reference

This section describes the commands available on the switch to enable, configure, control, and monitor the Secure Shell client and server.

The shortest valid command is denoted by capital letters in the Syntax section. See [“Conventions” on page xxxviii of About this Software Reference](#) in the front of this manual for details of the conventions used to describe command syntax. See [Appendix A, Messages](#) for a complete list of messages and their meanings.

add ssh user

Syntax ADD SSH USER=*username*
{PASSword=*password*|KEYid=*key-id*|USEuserpwd}
[IPaddress=*ipadd*] [MASk=*mask*]

Description This command adds a user to the list of registered users who can connect to the switch via Secure Shell. If the registered user is also a member of the User Authentication Database, then the user has the associated privileges. If the SSH session username is not found in the list of registered users, and one or more RADIUS servers are defined, the user is authenticated using RADIUS. If authentication fails, the Secure Shell server will not accept the connection.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

Parameter	Description
USER	Username that the user must supply when connecting to the switch using a Secure Shell client. The <i>username</i> is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and decimal digits (0–9). The string cannot contain spaces. Default: no default
PASSword	Password that the user must supply when connecting to the switch using a Secure Shell client. The parameters password , keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using the password, you must specify an alternative authentication method using either keyid or useuserpwd . The <i>password</i> is a string 1 to 31 characters long. Valid characters are any printable character. If the string contains spaces, put double quotes around it. Default: no default

Parameter	Description (Continued)		
KEYid	<p>RSA key being used to authenticate the user. This parameter enables Secure Shell RSA authentication. The specified key must exist. The parameters password, keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using an RSA key, you must specify an alternative authentication method using either password or useuserpwd.</p> <p>The <i>key-id</i> is a decimal number.</p> <p>Default: no default</p>		
USEuserpwd	<p>Password for the corresponding user in the User Authentication Database password will be used for Secure Shell authentication. The corresponding user must exist. The parameters password, keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using the password from the User Authentication Database, you must specify an alternative authentication method using either password or keyid.</p> <p>Default: no default</p>		
IPaddress	<p>Range of IP addresses from which the user may connect.</p> <p>Default: no default (all connections are accepted from any IP address)</p>		
	<table> <tr> <td><i>ipadd</i></td><td>An IPv4 address in dotted decimal notation.</td></tr> </table>	<i>ipadd</i>	An IPv4 address in dotted decimal notation.
<i>ipadd</i>	An IPv4 address in dotted decimal notation.		
MASK	<p>Range of IP addresses from which the user may connect. Valid only when ipaddress is an IPv4 address.</p> <p>Default: the natural mask for the network, based on whether it is a class A, B, or C network</p>		

Example To add a Secure Shell user with password authentication and a specified IP address, use the command:

```
add ssh user=john pass=secret ip=192.168.2.1
mas=255.255.255.0
```

To add a Secure Shell user with RSA authentication, use the command:

```
add ssh user=john key=5
```

To create an SSH user named Admin and use the password from the User Authentication Database, use the command:

```
add ssh user=Admin use
```

Related Commands

- [delete ssh user](#)
- [set ssh user](#)
- [show ssh user](#)

delete ssh session

Syntax DELEte SSH SESSion={*session-id*|ALL}

Description This command deletes Secure Shell and Secure Copy sessions that are currently active on the switch. This can include both server and client sessions. The deleted sessions are closed.

The *session-id* is the number assigned to each connection. Use a comma-separated list to specify more than one session. To see a list of current SSH sessions with their *session-id* numbers, use the **show ssh session** command. If a *session-id* is specified, it is closed. If **all** is specified, all connections are closed, except the sessions that are listening on the TCP port for new SSH connections.

Example To delete the SSH sessions with the ID numbers 2, 4 and 5, use the command:

```
del ssh se=2,4,5
```

Related Commands [show ssh session](#)

delete ssh user

Syntax DELEte SSH USER=*username*

Description This command deletes the specified user from the list of registered users who can connect to the switch via Secure Shell.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

The **user** parameter specifies the user name to delete. The *username* is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and decimal digits (0–9). The string cannot contain spaces.

Example To delete a Secure Shell user use the command:

```
del ssh user=john
```

Related Commands [add ssh user](#)
[set ssh user](#)
[show ssh user](#)

disable ssh debug

Syntax `DISable SSH DEBug [= {ALL | SCP | SSH}]`

Description This command disables the SSH server debugging facility. Debugging is disabled by default.

Parameter	Description
DEBug	Debugging to disable. Default: ssh
ALL	Debugging is stopped for both Secure Shell and Secure Copy.
SCP	Debugging is stopped for Secure Copy.
SSH	Debugging is stopped for Secure Shell.

Example To disable debugging of Secure Copy, use the command:

```
dis ssh deb=scp
```

Related Commands [enable ssh debug](#)
[show ssh](#)

disable ssh server

Syntax `DISable SSH SERver`

Description This command disables the Secure Shell server. When the Secure Shell server is disabled, connections from Secure Shell and Secure Copy clients are not accepted.

The Secure Shell server is disabled by default. Secure Shell and Secure Copy sessions may be initiated from the switch to another host, but inbound connections are not accepted.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

Example To disable the Secure Shell server, use the command:

```
dis ssh ser
```

Related Commands [enable ssh server](#)
[set ssh server](#)
[show ssh](#)

disable ssh user

Syntax DISable SSH USER=*username*

Description This command disables a Secure Shell user so that they cannot login. By default, users are enabled when they are added to the list of registered users.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

The **user** parameter specifies the user name to disable. The *username* is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and digits (0–9). The string cannot contain spaces.

Example To disable a Secure Shell user, use the command:

```
dis ssh user
```

Related Commands [add ssh user](#)
[delete ssh user](#)
[enable ssh user](#)
[set ssh user](#)
[show ssh user](#)

enable ssh debug

Syntax ENABle SSH DEBug [= {ALL | SCP | SSH}]

Description This command enables the SSH server debugging facility. Debugging is disabled by default.

Parameter	Description
DEBug	Debugging to enable. Default: ssh
ALL	Debugging for both Secure Shell and Secure Copy is turned on.
SCP	Debugging is turned on for Secure Copy.
SSH	Debugging is turned on for Secure Shell.

Example To start debugging for Secure Copy, use the command:

```
ena ssh deb=scp
```

Related Commands [disable ssh debug](#)
[show ssh](#)

enable ssh server

Syntax `ENABle SSH SERver HOSTKey=key-id SERVERKey=key-id
[EXPIrytime=0..168] [LOGintimeout=1..600]
[SCP={ENABled|DISABled}]`

Description This command enables the Secure Shell server. Once enabled, connections from Secure Shell and Secure Copy clients are accepted. Secure Copy connections can be disabled, while still allowing Secure Shell connections, using this command. If a firewall is configured on the switch, you must add a rule that accepts Secure Shell connections before you can enable the Secure Shell server.

The Secure Shell server is disabled by default. Secure Shell and Secure Copy sessions may be initiated from the switch to another host but inbound connections are not accepted.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

Parameter	Description
HOSTKey	Key that must be used for the switch host key. The specified key must exist. The <i>key-id</i> is a decimal number. Default: no default
SERVERKey	Key that must be used for the Secure Shell server key. The specified key must exist. The <i>key-id</i> is a decimal number. Default: no default
EXPIrytime	Hours after which the Secure Shell server key expires and is regenerated. If 0 is specified, the key does not expire. Default: 0
LOGintimeout	Seconds the server waits before disconnecting an un-authenticated client. This timeout cannot be disabled. Default: 60
SCP	Whether the SSH server supports Secure Copy connections. Default: enabled
	ENABled Allows Secure Copy connections
	DISABled Does not allow Secure Copy connections

Example To enable the Secure Shell server, use the command:

```
ena ssh ser hostk=0 serverk=1
```

Related Commands [disable ssh server](#)
[set ssh server](#)
[show ssh](#)

enable ssh user

Syntax `ENABle SSH USER=username`

Description This command enables a Secure Shell user. By default, users are enabled when they are added to the list of registered users. However, if a user fails to login five times in a row, the user is disabled. This command enables the user again.

This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

The **user** parameter specifies the user name to enable. The *username* is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and digits (0–9). The string cannot contain spaces.

Example To enable a Secure Shell user who has been disabled, use the command:

```
ena ssh user=john
```

Related Commands

- [add ssh user](#)
- [delete ssh user](#)
- [disable ssh user](#)
- [set ssh user](#)
- [show ssh user](#)

set ssh client

Syntax SET SSH CLient [IDLEtimeout=0..4294967295]
[LOGintimeout=1..600]
[PREservetime={ENabled|DISabled}]

Description This command modifies the configuration of the Secure Shell client. When the switch is in security mode, this command requires a user with Security Officer privilege.

Parameter	Description				
IDLEtimeout	Seconds for the SSH client's idle timer. If the specified time lapses since the last time an SSH session received data from the remote server, the session is terminated. This applies from the moment that the SSH session becomes established, regardless of whether the user has logged in or not. If the SSH client idle timeout period is modified while there are established SSH sessions, the idle timers for those sessions are reset so that they use the new timeout value. Any idle time accumulated by those sessions prior to the modification is lost. Default: 0 <table><tr><td>0</td><td>The idle timer remains off, and the session must be terminated by the user.</td></tr><tr><td>1..4294967295</td><td>The idle timer is active, and the session terminates when the idletimeout limit is reached.</td></tr></table>	0	The idle timer remains off, and the session must be terminated by the user.	1..4294967295	The idle timer is active, and the session terminates when the idletimeout limit is reached.
0	The idle timer remains off, and the session must be terminated by the user.				
1..4294967295	The idle timer is active, and the session terminates when the idletimeout limit is reached.				
LOGintimeout	Seconds that the client waits for the SSH session to establish. This cannot be turned off. Default: 30				
PREservetime	Whether the Secure Copy client preserves the modification time of the source file. Default: enabled <table><tr><td>ENabled</td><td>Files copied to and from the switch keep the same modified time as the source file.</td></tr><tr><td>DISabled</td><td>Files copied to and from the switch show the time of being copied as the modified time.</td></tr></table>	ENabled	Files copied to and from the switch keep the same modified time as the source file.	DISabled	Files copied to and from the switch show the time of being copied as the modified time.
ENabled	Files copied to and from the switch keep the same modified time as the source file.				
DISabled	Files copied to and from the switch show the time of being copied as the modified time.				

Example To set the SSH client idle timer to three minutes, and the login timer to 10 seconds, use the command:

```
set ssh client idle=180 log=10
```

Related Commands [disable ssh server](#)
[enable ssh server](#)
[set timezone](#) in Chapter 4, Configuring and Monitoring the System
[show ssh](#)
[show ssh session](#)
[ssh](#)

set ssh server

Syntax SET SSH SERVER [HOSTKey=key-id] [SERVERKey=key-id]
 [EXPIRYtime=0..168] [IDLEtimeout=0..4294967295]
 [LOGintimeout=1..600] [MAXSessions=0..6]
 [SCP={ENabled|DISabled}]

Description This command modifies the configuration of the Secure Shell server, including whether Secure Copy connections are allowed. When the switch is in security mode, this command requires a user with Security Officer privilege. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

Parameter	Description
HOSTKey	Key used for the switch host. The specified key must exist. The <i>key-id</i> is a decimal number. Default: no default
SERVERKey	Key used for the Secure Shell server. The specified key must exist. The <i>key-id</i> is a decimal number. Default: no default
EXPIRYtime	Hours after which the Secure Shell server key expires. If 0 is specified, the key does not expire. Default: 0
IDLEtimeout	Seconds for the SSH server's idle timer. If the specified period lapses since the last time an SSH session received data from the remote client, the session is terminated. This applies from the moment that the SSH session becomes established, regardless of whether the user has logged in or not. If the SSH server idle timeout period is modified while there are established SSH sessions, the idle timers for those sessions are reset so that they use the new timeout value. Any idle time accumulated by those sessions prior to the set command is lost. Default: 0 0 If specified, the idle timer remains off, and the session must be explicitly terminated. 1..4294967295 If specified, the idle timer is active, and the session terminates when the idletimeout limit is reached.
LOGintimeout	Seconds the server must wait before disconnecting an un-authenticated client. This timeout cannot be disabled. Default: 60
MAXSessions	Number of concurrent SSH sessions that are supported by the switch. Once the limit is reached, any subsequent session requests are rejected. The session limit cannot be set below the number of currently established SSH sessions. Default: 6
SCP	Whether Secure Copy is enabled on the SSH server. It is enabled by default.

Example To set the Secure Shell server key expiry time to 1 hour, use the command:

```
set ssh ser exp=1
```

Related Commands [disable ssh server](#)
[enable ssh server](#)
[show ssh](#)

set ssh user

Syntax SET SSH USER=*username*
 [{ PASSword=*password* | KEYid=*key-id* | USEuserpwd }]
 [IPaddress=*ipadd*] [MASK=*mask*]

Description This command modifies a user in the list of registered users who can connect to the switch via Secure Shell. This command requires a user with Security Officer privilege when the switch is in security mode. If security mode is disabled, sensitive data is destroyed when you restart the switch. This includes encryption keys created on the switch when not in security mode. For more information, see the [add user command on page 23-35 of Chapter 23, User Authentication](#) and [enable system security_mode command on page 23-45 of Chapter 23, User Authentication](#).

Parameter	Description
USER	Name that the user must supply when connecting to the switch using a Secure Shell client. The <i>username</i> is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and decimal digits (0–9). The string cannot contain spaces. Default: no default
PASSword	Password that the user must supply when connecting to the switch using a Secure Shell client. The parameters password , keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using the password, you must specify an alternative authentication method using either keyid or useuserpwd . The <i>password</i> is a string 1 to 31 characters long. Valid characters are any printable character. If the string contains spaces, put double quotes around it. Default: no default
KEYid	RSA key being used to authenticate the user. This parameter enables Secure Shell RSA authentication. The specified key must exist. The parameters password , keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using an RSA key, you must specify an alternative authentication method using either password or useuserpwd . The <i>key-id</i> is a decimal number. Default: no default
USEuserpwd	Password for the corresponding user in the User Authentication Database password will be used for Secure Shell authentication. The corresponding user must exist. The parameters password , keyid and useuserpwd are mutually exclusive—you can only specify one. To stop using the password from the User Authentication Database, you must specify an alternative authentication method using either password or keyid . Default: no default
IPaddress	Range of IP addresses from which the user may connect. Default: no default (all connections are accepted from any IP address). <i>ipadd</i> An IPv4 address in dotted decimal notation.
MASK	Range of IP addresses from which the user may connect. Valid only when ipaddress is an IPv4 address. Default: the natural mask for the network, based on whether it is a class A, B, or C network

Example To change a Secure Shell user to RSA authentication or to change their key, use the command:

```
set ssh user=john key=5
```

To modify the SSH user named Admin to use the password from the User Authentication Database, use the command:

```
set ssh user=Admin use
```

Related Commands [add ssh user](#)
[delete ssh user](#)
[show ssh user](#)

show ssh

Syntax SHow SSH

Description This command displays the current configuration of the Secure Shell client and server ([Figure 26-1](#), [Table 26-1](#)).

Figure 26-1: Example output from the **show ssh** command

```
Secure Shell Server Configuration
-----
Version..... 1.5
SSH Server..... Enabled
SCP Service..... Enabled
Maximum Sessions ..... 6
Current Sessions ..... 1
Port..... 22
Host Key ID..... 0
Host Key Bits..... 1024
Server Key ID..... 1
Server Key Bits..... 768
Server Key Expiry(hours)..... 0
Login Timeout (secs)..... 60
Idle Timeout(secs) ..... Off
Authentication Available..... Password,RSA
Ciphers Available..... DES
Services Available..... Shell ,Cmd, SCP
Debug..... ALL

Secure Shell Client Configuration
-----
Version..... 1.5
Login Timeout (secs)..... 30
Idle Timeout (secs)..... Off
Preserve File Modification Time (SCP).... Enabled
```

Table 26-1: Parameters in output of the **show ssh** command

Parameter	Meaning
Secure Shell Server Configuration	
Version	Compatible version of the Secure Shell protocol.
SSH Server	Whether the Secure Shell server is enabled or disabled.
SCP Service	Whether Secure Copy is enabled or disabled.
Maximum Sessions	Maximum number of concurrent sessions supported by the Secure Shell server.
Current Sessions	Number of currently established Secure Shell sessions.
Port	TCP port where the Secure Shell server listens for connections. The default is port 22.
Host Key ID	ENCO key ID for the switch's host RSA key. The Secure Shell server cannot operate without this key.
Host Key Bits	Length of the switch host key, which must be from 768 to 2048 bits.
Server Key ID	ENCO key ID for the Secure Shell server RSA key. The Secure Shell server cannot operate without this key.

Table 26-1: Parameters in output of the **show ssh** command (Continued)

Parameter	Meaning
Server Key Bits	Length of the Secure Shell server key. This must be at least 128 bits less than the host key (minimum 512 bits).
Server Key Expiry (hours)	Time in hours before the Secure Shell server key expires and is regenerated.
Login Timeout (secs)	Time in seconds when a client must authenticate itself before it is disconnected.
Idle Timeout (secs)	Time in seconds without data being received from a Secure Shell client before the corresponding session is terminated, or "Off" if the idle timeout is set to 0 (no timeout).
Authentication Available	List of available authentication methods; either Password or RSA.
Ciphers Available	DES.
Services Available	List of the available Secure Shell services. One or more of Shell, Cmd and SCP.
Debug	Whether debugging is active on the server. This can be set to debug SSH, SCP, ALL or NONE.
Secure Shell Client Configuration	
Version	Compatible version of the Secure Shell protocol.
Login Timeout (secs)	Time in seconds that the SSH client will wait to be authenticated.
Idle Timeout (secs)	Time in seconds that the SSH client will wait to receive data from an SSH server. The client disconnects if this timer limit is reached. If the timeout shows Off, timeout is set to 0 and never times out, so users must manually disconnect.
Preserve File Modification Time	Whether a copied file keep the source file's modification time (Enabled), or the modification time is set to the current time of copying (Disabled).

Example To display the current configuration of the Secure Shell client and server, use the command:

```
sh ssh
```

Related Commands

- [disable ssh server](#)
- [enable ssh server](#)
- [set ssh client](#)
- [set ssh server](#)
- [show ssh counter](#)
- [show ssh session](#)

show ssh counter

Syntax `SHoW SSH COUnTer [= {ALL | SSH | SCP}]`

Description This command displays client and server counters for Secure Shell and Secure Copy.

Parameter	Description
COUnTer	Which counters you want to display. Default: all
ALL	Counters for both Secure Shell and Secure Copy are displayed (Figure 26-2, Table 26-2, Figure 26-3 on page 26-26, Table 26-3 on page 26-27).
SCP	Counters for Secure Copy are displayed (Figure 26-2, Table 26-2).
SSH	Counters for Secure Shell are displayed (Figure 26-3 on page 26-26, Table 26-3 on page 26-27).

Figure 26-2: Example output from the **show ssh counter=scp** command

SCP Counters:					
uploadTotal	.....	5	downloadTotal	.....	12
uploadSuccess	.....	1	downloadSuccess	.....	5
uploadFailed	.....	1	downloadFailed	.....	7
uploadCancelled	.....	2	downloadCancelled	.....	0
readFileRequest	.....	3570	writeFileRequest	.....	733
readFileSuccess	.....	3570	writeFileSuccess	.....	733
readFileFailed	.....	0	writeFileFailed	.....	0

Table 26-2: Parameters in output of the show **ssh counter=scp** command

Parameter	Meaning
uploadTotal	Total number of upload requests received by the switch.
downloadTotal	Total number of load requests received by the switch.
uploadSuccess	Number of successful upload requests.
downloadSuccess	Number of successful load requests.
uploadFailed	Number of failed upload requests. All uncompleted requests are counted as failed, except those cancelled by using the reset loader command. Example reasons for failure include a request from an unauthorised user, or a missing file.
downloadFailed	Number of failed load requests. All uncompleted requests are counted as failed, except those cancelled by using the reset loader command. Example reasons for failure include a request from an unauthorised user, or an attempt to copy over an existing file.
uploadCancelled	Number of upload requests cancelled by using the reset loader command.
downloadCancelled	Number of load requests cancelled by using the reset loader command.
readFileRequest	Total number of read operations on local files.
writeFileRequests	Total number of write operations on local files.
readFileSuccess	Number of read successes.

Table 26-2: Parameters in output of the show **ssh counter=scp** command (Continued)

writeFileSuccess	Number of write successes.
readFileFailed	Number of read failures. A read failure results in an upload failure.
writeFileFailed	Number of write failures. A write failure results in a load failure.

Figure 26-3: Example output from the **show ssh counter=ssh** command

Secure Shell Counters:

```

inOctets ..... 1057328      outOctets ..... 5745494
rxPkt ..... 821             txPkt ..... 4169
rxVersionID ..... 22        txVersionID ..... 22
rxPktCheckFail ..... 0      txPktFail ..... 0
rxPktDataLengthInvalid ..... 0
rxPktDataOverflow ..... 0

rxMSGDisconnect ..... 0      txMSGDisconnect ..... 22
rxMSGPublicKey ..... 17      txMSGPublicKey ..... 4
rxMSGSessionKey ..... 3      txMSGSessionKey ..... 17
rxMSGUser ..... 3            txMSGUser ..... 17
rxMSGAuthRhosts ..... 0      txMSGAuthRhosts ..... 0
rxMSGAuthRSA ..... 3         txMSGAuthRSA ..... 0
rxMSGAuthRSACHallenge ..... 0 txMSGAuthRSACHallenge ..... 2
rxMSGAuthRSAResponse ..... 2 txMSGAuthRSAResponse ..... 0
rxMSGAuthPassword ..... 1    txMSGAuthPassword ..... 17
rxMSGAuthRhostsRSA ..... 0   txMSGAuthRhostsRSA ..... 0
rxMSGSuccess ..... 46        txMSGSuccess ..... 7
rxMSGFailure ..... 18        txMSGFailure ..... 4
rxMSGReqCompression ..... 0   txMSGReqCompression ..... 0
rxMSGReqX11Forwarding ..... 0 txMSGReqX11Forwarding ..... 0
rxMSGReqPortForwarding ..... 0 txMSGReqPortForwarding ..... 0
rxMSGReqAgentForwarding ..... 0 txMSGReqAgentForwarding ..... 0
rxMSGReqPty ..... 1          txMSGReqPty ..... 1
rxMSGWindowSize ..... 0      txMSGWindowSize ..... 0
rxMSGExecShell ..... 1       txMSGExecShell ..... 1
rxMSGExecCmd ..... 2         txMSGExecCmd ..... 0
rxMSGStdInData ..... 202     txMSGStdInData ..... 119
rxMSGStdOutData ..... 499    txMSGStdOutData ..... 303
rxMSGStdErrData ..... 0      txMSGStdErrData ..... 0
rxMSGEOF ..... 0             txMSGEOF ..... 0
rxMSGExitStatus ..... 0      txMSGExitStatus ..... 0
rxMSGExitConfirmation ..... 0 txMSGExitConfirmation ..... 0
rxUnsupportedMsg ..... 0
rxUnknownMsg ..... 0

encodeSKSuccess ..... 34     decodeSKSuccess ..... 3
encodeSKFail ..... 0         decodeSKFail ..... 0
getHostKeyFail ..... 0       getServerKeyFail ..... 0
serverKeyReGenerated ..... 0

encoderSACHallengeGood ..... 2 decoderSACHallengeGood ..... 0
encoderSACHallengeFail ..... 0 decoderSACHallengeFail ..... 0
getUserKeyFail ..... 0

encoConfigured ..... 20      encoConfigureFail ..... 0
encoDetached ..... 0         encoDead ..... 0
encoEncodeStart ..... 4133   encoDecodeStart ..... 788
encoEncoded ..... 4133      encoDecoded ..... 788
encoEncodeFail ..... 0       encoDecodeFail ..... 0
encoEncodeResetDone ..... 0   encoDecodeResetDone ..... 0
encoEncodeResetFail ..... 0   encoDecodeResetFail ..... 0
encoEncodeDiscard ..... 0     encoDecodeDiscard ..... 0

```

Table 26-3: Parameters in output of the **show ssh counter=ssh** command

Parameter	Meaning
inOctets	Number of octets the switch received.
outOctets	Number of octets the switch transmitted.
rxPkt	Number of packets the switch received.
txPkt	Number of packets the switch transmitted.
rxVersionID	Number of version identification messages the switch received.
txVersionID	Number of version identification messages the switch transmitted.
txPktCheckFail	Number of packets the switch received that contained an invalid checksum
rxPktFail	Number of packets the switch does not transmit due to an error.
rxPktDataLengthInvalid	Number of packets the switch received that contained an invalid data length
rxPktDataOverflow	Number of packets the switch received that contained smaller data than the specified data size.
rxMSGDisconnect	Number of SSH_MSG_DISCONNECT messages to terminate a session that the switch received.
txMSGDisconnect	Number of SSH_MSG_DISCONNECT messages to terminate a session that the switch transmitted.
rxSMSGPublicKey	Number of SSH_SMSG_PUBLIC_KEY messages the client received containing the remote server's host key, server public key, supported ciphers and supported authentication methods.
txSMSGPublicKey	Number of SSH_SMSG_PUBLIC_KEY messages the server transmitted containing the server's host key, server public key, supported ciphers and supported authentication methods.
rxCMSSGSessionKey	Number of SSH_CMSG_SESSION_KEY messages the server received containing the remote client's selected cipher, a copy of the 64-bit cookie sent by the server, the client's protocol flags and a session key encrypted with the server's host key and server key.
txCMSSGSessionKey	Number of SSH_CMSG_SESSION_KEY messages the client transmitted, containing the client's selected cipher, a copy of the 64-bit cookie sent by the remote server, the client's protocol flags and a session key encrypted with the remote server's host key and server key.
rxCMSSGUser	Number of SSH_CMSG_USER messages the server received containing a user name to login.
txCMSSGUser	Number of SSH_CMSG_USER messages the client transmitted containing a user name to login.
rxCMSSGAuthRhosts	Number of SSH_CMSG_AUTH_RHOSTS messages the server received containing the remote client's user name for .rhosts authentication.
txCMSSGAuthRhosts	Number of SSH_CMSG_AUTH_RHOSTS messages the client transmitted containing the client's user name for .rhosts authentication.

Table 26-3: Parameters in output of the **show ssh counter=ssh** command (Continued)

Parameter	Meaning
rxCMSSGAuthRSA	Number of SSH_CMSG_AUTH_RSA messages the server received, containing a remote client's public key for RSA authentication.
txCMSSGAuthRSA	Number of SSH_CMSG_AUTH_RSA messages the client transmitted containing the public key for RSA authentication.
rxSMSSGAuthRSACHallenge	Number of SSH_SMSG_AUTH_RSA_CHALLENGE messages the client received containing an encrypted challenge from the remote server.
txSMSSGAuthRSACHallenge	Number of SSH_SMSG_AUTH_RSA_CHALLENGE messages the server transmitted containing an encrypted challenge for the remote client.
rxCMSSGAuthRSAResponse	Number of SSH_CMSG_AUTH_RSA_RESPONSE messages the server received from a remote client containing the response to a challenge.
txCMSSGAuthRSAResponse	Number of SSH_CMSG_AUTH_RSA_RESPONSE messages the client transmitted to a remote server, containing the response to a challenge.
rxCMSSGAuthPassword	Number of SSH_CMSG_AUTH_PASSWORD messages the server received containing the remote client's plaintext password.
txCMSSGAuthPassword	Number of SSH_CMSG_AUTH_PASSWORD messages the client transmitted containing the client's plaintext password.
rxCMSSGAuthRhostsRSA	Number of SSH_CMSG_AUTH_RHOSTS_RSA messages the server received, containing the remote client's user name and public host key for .rhosts and RSA authentication.
txCMSSGAuthRhostsRSA	Number of SSH_CMSG_AUTH_RHOSTS_RSA messages the client transmitted containing the client's user name and public host key for .rhosts and RSA authentication.
rxSMSSGSuccess	Number of SSH_SMSG_SUCCESS messages the client received indicating a successful request.
txSMSSGSuccess	Number of SSH_SMSG_SUCCESS messages the server transmitted indicating a successful request.
rxSMSSGFailure	Number of SSH_SMSG_FAILURE messages the client received indicating a failed request.
txSMSSGFailure	Number of SSH_SMSG_FAILURE messages the server transmitted indicating a failed request.
rxCMSSGReqCompression	Number of SSH_CMSG_REQUEST_COMPRESSION messages the server received, requesting compression for the connection.
txCMSSGReqCompression	Number of SSH_CMSG_REQUEST_COMPRESSION messages the client transmitted, requesting compression for the connection.
rxCMSSGReqX11Forwarding	Number of SSH_CMSG_X11_REQUEST_FORWARDING messages the server received requesting forwarding of X11 connections.

Table 26-3: Parameters in output of the **show ssh counter=ssh** command (Continued)

Parameter	Meaning
txCMSGReqX11Forwarding	Number of SSH_CMSG_X11_REQUEST_FORWARDING messages the client transmitted requesting forwarding of X11 connections.
rxCMSGReqPortForwarding	Number of SSH_CMSG_PORT_FORWARD_REQUEST messages the server received requesting forwarding of a TCP/IP port.
txCMSGReqPortForwarding	Number of SSH_CMSG_PORT_FORWARD_REQUEST messages the client transmitted requesting forwarding of a TCP/IP port.
rxCMSGReqAgentForwarding	Number of SSH_CMSG_AGENT_REQUEST_FORWARDING messages the server received requesting forwarding of the connection to the authentication agent.
txCMSGReqAgentForwarding	Number of SSH_CMSG_AGENT_REQUEST_FORWARDING messages the client transmitted requesting forwarding of the connection to the authentication agent.
rxCMSGReqPty	Number of SSH_CMSG_REQUEST_PTY messages the server received requesting a pseudo terminal device be allocated for this session.
txCMSGReqPty	Number of SSH_CMSG_REQUEST_PTY messages the client transmitted requesting a pseudo terminal device be allocated for this session.
rxCMSGWindowSize	Number of SSH_CMSG_WINDOW_SIZE messages the client transmitted specifying a new size for the client's window.
txCMSGWindowSize	Number of SSH_CMSG_WINDOW_SIZE messages the server received specifying a new size for the remote client's window.
rxCMSGExecShell	Number of SSH_CMSG_EXEC_SHELL messages the server received to create an interactive terminal session.
txCMSGExecShell	Number of SSH_CMSG_EXEC_SHELL messages the client transmitted to create an interactive terminal session.
rxCMSGExecCmd	Number of SSH_CMSG_EXEC_CMD messages the server received containing a command to execute.
txCMSGExecCmd	Number of SSH_CMSG_EXEC_CMD messages the client transmitted containing a command to execute.
rxCMSGStdInData	Number of SSH_CMSG_STDIN_DATA messages the client received containing data written to stdout by applications on the remote server.
txCMSGStdInData	Number of SSH_CMSG_STDOUT_DATA messages the client transmitted containing data from the client to be written to stdin on the remote server.
rxSMSGStdOutData	Number of SSH_SMSG_STDOUT_DATA messages the server received containing data from the remote client to be written to stdin on the server.
txSMSGStdOutData	Number of SSH_SMSG_STDOUT_DATA messages the server transmitted containing data written to stdout by applications on the server.
rxSMSGStdErrData	Number of SSH_SMSG_STDERR_DATA messages the client received containing data written to stderr by applications on the remote server.

Table 26-3: Parameters in output of the **show ssh counter=ssh** command (Continued)

Parameter	Meaning
txMSGStdErrData	Number of SSH_MSG_STDERR_DATA messages the server transmitted containing data written to stderr by applications on the server.
rxMSGEOF	Number of SSH_MSG_EOF messages the server received from the remote client, indicating end of input from the remote client
txMSGEOF	Number of SSH_MSG_EOF messages the client transmitted to the remote server, indicating end of input from the client
rxMSGExitStatus	Number of SSH_MSG_EXITSTATUS messages the client received indicating that the shell or command has exited.
txMSGExitStatus	Number of SSH_MSG_EXITSTATUS messages the server transmitted indicating that the shell or command has exited.
rxMSGExitConfirmation	Number of SSH_MSG_EXIT_CONFIRMATION messages the server received in response to an SSH_MSG_EXITSTATUS message.
txMSGExitConfirmation	Number of SSH_MSG_EXIT_CONFIRMATION messages the client transmitted in response to an SSH_MSG_EXITSTATUS message.
rxUnsupportedMsg	Number of requests for unsupported options the server received.
rxUnknownMsg	Number of requests for unrecognised options the server received.
encodeSKSuccess	Number of double RSA encryptions of a session key.
decodeSKSuccess	Number of double RSA decryptions of a session key.
encodeSKFail	Number of failed attempts to encode a session key.
decodeSKFail	Number of failed attempts to decode a session key.
getHostKeyFail	Number of failed attempts to get the host key from the ENCO module.
getServerKeyFail	Number of failed attempts to get the server key from the ENCO module.
serverKeyReGenerated	Number of times a new random server key was created.
encodeRSACHallengeGood	Number of times the server encrypted a random challenge for RSA authentication.
decodeRSACHallengeGood	Number of times the server decrypted a random challenge for RSA authentication.
encodeRSACHallengeFail	Number of times the server failed to encrypt an RSA challenge.
decodeRSACHallengeFail	Number of times the server failed to decrypt an RSA challenge.
getUserKeyFail	Number of times the server failed to get the user RSA key from the ENCO module.
encoConfigured	Number of times an encryption channel was configured for a session.
encoConfigureFail	Number of times the server failed to configure an encryption channel.

Table 26-3: Parameters in output of the **show ssh counter=ssh** command (Continued)

Parameter	Meaning
encoDetached	Number of times the encryption channel of a session was destroyed.
encoDead	Number of times the encryption engine has failed.
encoEncodeStart	Number of times an encode job was started on an ENCO channel.
encoDecodeStart	Number of times a decode job was started on an ENCO channel.
encoEncoded	Number of times an encode job completed.
encoDecoded	Number of times a decode job completed.
encoEncodeFail	Number of times an encode job failed to complete.
encoDecodeFail	Number of times a decode job failed to complete.
encoEncodeResetDone	Number of times an encryption channel has been reset.
encoDecodeResetDone	Number of times a decryption channel has been reset.
encoEncodeResetFail	Number of times the server failed to reset an encryption channel.
encoDecodeResetFail	Number of times the server failed to reset an decryption channel.
encoEncodeDiscard	Number of times an encode job has been discarded by the ENCO module.
encoDecodeDiscard	Number of times a decode job has been discarded by the ENCO module.

Example To display the counters for both Secure Shell and Secure Copy, use the command:

```
sh ssh cou=all
```

Related Commands

- [disable ssh server](#)
- [enable ssh server](#)
- [set ssh server](#)
- [show ssh session](#)

show ssh session

Syntax `SHoW SSH SESSion[={ALL|SSH|SCP}]`

Description This command displays the status of Secure Shell and Secure Copy sessions currently active on the switch, including both outbound sessions to another host and inbound sessions into the switch.

Parameter	Description
SESSion	Session details that are displayed. Default: all
ALL	The status of both Secure Shell and Secure Copy sessions are displayed (Figure 26-4, Table 26-4 Figure 26-5 on page 26-33, Table 26-5 on page 26-33).
SCP	The status of Secure Copy sessions are displayed (Figure 26-4, Table 26-4).
SSH	The status of both Secure Shell and Secure Copy sessions are displayed (Figure 26-5 on page 26-33, Table 26-5 on page 26-33).

Figure 26-4: Example output from the **show ssh session=scp** command

SCP Sessions:							
ID	Type	Operation	Filename	Filesize	State		
5	Server	Download	86s-276.rez	4282204	RxData	8%	
6	Client	Upload	test1.cfg	210372	TxData	34%	

Table 26-4: Parameters in output of the **show ssh session=scp** command

Parameter	Meaning
ID	Unique identifier for each Secure Shell session.
Type	Whether the switch is operating as a server or client.
Operation	Type of file copying.
	Download The file is copying to the switch.
	Upload The file is copying to a remote machine.
Filename	Name of the file being copied.
Filesize	Size of the file being copied.

Table 26-4: Parameters in output of the **show ssh session=scp** command (Continued)

Parameter	Meaning
State	Current state of the Secure Copy session.
Init	Session is initiated.
Open	Server or client session started.
Control	Awaiting a control message or a response to a control message.
Ready	Ready to send or receive data.
TxData	Transmitting data. This state will also show the progress of the file transfer as a percentage.
RxData	Receiving data. This state will also show the progress of the file transfer as a percentage.
WaitClosed	Awaiting a final message.

Figure 26-5: Example output from the **show ssh session=ssh** command

Secure Shell Sessions:					
ID	Type	Dir	Peer Address	User	State
0	Listen	In	0.0.0.0		Initial
1	Listen	In	::		Initial
2	Shell	In	192.168.2.5	manager	Open
3	Shell	Out	192.168.100.264	john	Open
4	SCP	In	172.17.1.1	root	Authen
5	SCP	Out	172.17.1.1	john	Request

Table 26-5: Parameters in output of the **show ssh session=ssh** command

Parameter	Meaning
ID	Unique identifier for each Secure Shell session.
Type	Type of Secure Shell connection.
Listen	Listen session for incoming connections.
Shell	Interactive shell connection.
Cmd	Non-interactive remote command execution.
SCP	Secure Copy connection.
Dir	Direction of the connection.
In	Connection made from a client to the Secure Shell server.
Out	Connection made from the switch to a remote Secure Shell server.
Peer Address	IP address of the remote end of the Secure Shell connection.
User	Username under which the connection is made, or a hyphen if user authentication has not yet taken place. For inbound sessions, the specified username identifies a user account on the switch. For outbound sessions, it identifies a user on the remote host.

Table 26-5: Parameters in output of the **show ssh session=ssh** command (Continued)

Parameter	Meaning
State	Current state of the Secure Shell connection.
Initial	Connection being initiated.
Starting	Host-to-host authentication underway.
Authen	User authentication in progress.
Request	Request of session type in progress.
Open	Session in progress.

Example To display current Secure Copy sessions, use the command:

```
sh ssh se=scp
```

Related Commands

- [delete ssh session](#)
- [disable ssh server](#)
- [enable ssh server](#)
- [set ssh client](#)
- [set ssh server](#)
- [show ssh](#)

show ssh user

Syntax `SHOW SSH USER[=username]`

Description This command displays information about the users allowed to make connections to the Secure Shell server.

The **user** parameter specifies the user name being displayed. The *username* is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and digits (0–9). The string cannot contain spaces.

If a user is not specified, summary information about all users is displayed (Figure 26-6, Table 26-6).

If a user is specified, details are displayed about that user (Figure 26-7, Table 26-7 on page 26-36).

Figure 26-6: Example output from the **show ssh user** command

Secure Shell User List				
User	IpAddr	Auth	KeyId	Status
test4	fe80:230:84ff:fe0e:263e	Pass	0	enabled
test2	fe80:230:84ff:fe0e:263d	Pass	0	enabled
secoff	0.0.0.0	RSA	5	enabled
800	0.0.0.0	RSA	4	enabled
admin	0.0.0.0	RSA	7	disabled
john	192.168.2.1	Pass*	0	enabled

Table 26-6: Parameters in output of the **show ssh user** command

Parameter	Meaning
User	Name of the user.
IpAddr	IP address from which the user may login.
Auth	Authentication method; one of "RSA" or "Pass" (password). Pass is followed by an asterisk ("*") if the password from the User Authentication Database is used.
KeyId	Key ID of the ENCO key used for RSA authentication.
Status	Whether the status of the user is enabled.

Figure 26-7: Example output from the **show ssh user** command for a specific user

User.....	john
Status.....	Enabled
Authorisation method.....	Password (user database)
RSA key ID.....	0
Shell.....	Yes
IpAddress.....	192.168.2.1
Mask.....	255.255.255.255
Failed Logins.....	0

Table 26-7: Parameters in output of the **show ssh user** command for a specific user

Parameter	Meaning
User	Name for the user.
Status	Whether the status of the user is enabled.
Authorisation method	Authentication method; one of "RSA" or "Password". Password is followed by "(user database)" if the password from the User Authentication Database is used.
RSA key ID	Key ID of the ENCO key used for RSA authentication.
Shell	Whether the user has Shell access.
IpAddress	IP address from which the user may login.
Mask	Network mask for the IP address.
Failed Logins	Total number of failed login attempts by the user.

Example To display the Secure Shell user list, use the command:

```
sh ssh user
```

To display specific information about the Secure Shell user named "john", use the command:

```
sh ssh user=john
```

Related Commands

- [add ssh user](#)
- [delete ssh user](#)
- [disable ssh user](#)
- [enable ssh user](#)
- [set ssh user](#)

ssh

Syntax `SSH {ipadd|host} USER=username
{PASSword=password|KEYid=key-id} [COMmand=string]`

Description This command initiates a Secure Shell connection to a specific host.

Parameter	Description
<i>ipadd</i>	IP address in dotted decimal notation. Default: no default
<i>host</i>	A full-domain name of a host, a host nickname created with the add ip host command on page 13-56 of Chapter 13, Internet Protocol (IP), or a host name in the same domain. Default: no default
USER	Name of a user on the remote host. The <i>username</i> is a string 1 to 15 characters long. Valid characters are uppercase and lowercase letters, and digits (0-9). The string cannot contain spaces. Default: no default
PASSword	The password for the Secure Shell password authentication. The <i>password</i> is a string 1 to 31 characters long. Valid characters are any printable character. If the string contains spaces, put double quotes around it. Default: no default
KEYid	The RSA key being used to authenticate the user. This parameter enables Secure Shell RSA authentication. The specified key must exist on both the client (RSA Private Key) and the server (RSA Public Key). The <i>key-id</i> is a decimal number. Default: no default
COMmand	A command to be executed on the remote host or switch. If this parameter is present, the command is executed on the remote system and the connection is closed. If command is not specified, an interactive terminal session is created. The <i>string</i> can be 1 to 80 characters long. Valid characters are any printable characters. If the string contains spaces, put double quotes around it. Default: no default

Examples To connect to the remote host with IP address 172.16.1.5 as user "Admin" with password "l8Again", use the command:

```
ssh 172.16.1.5 user=Admin pass=l8Again
```

Related Commands [set ssh client](#)
[show ssh session](#)

