



## Secure Copy

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The Secure Copy Protocol (SCP) feature provides a secure and authenticated method for copying router configuration or router image files. SCP relies on Secure Shell (SSH), an application and a protocol that provide a secure replacement for the Berkeley r-tools.

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## Prerequisites for Secure Copy

- Before enabling SCP, you must correctly configure SSH, authentication, and authorization on the router.
- Because SCP relies on SSH for its secure transport, the router must have an Rivest, Shamir, and Adelman (RSA) key pair.

## Restrictions for Secure Copy Performance Improvement

- Incrementing window-size must be used mainly for SCP operations only.
- Depending on the platform type, the maximum window size can cause high CPU usage.
- As a precaution, increments can be made up to four times the default size.

# Information About Secure Copy

## How SCP Works

The behavior of SCP is similar to that of remote copy (rcp), which comes from the Berkeley r-tools suite, except that SCP relies on SSH for security. In addition, SCP requires that authentication, authorization, and accounting (AAA) authorization be configured so the router can determine whether the user has the correct privilege level.

SCP allows a user who has appropriate authorization to copy any file that exists in the Cisco IOS XE File System (IFS) to and from a router by using the **copy** command. An authorized administrator may also perform this action from a workstation.

## How to Configure SCP

### Configuring SCP

To enable and configure a Cisco router for SCP server-side functionality, perform the following steps.

#### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **aaa new-model**
4. **aaa authentication login** {default | list-name} method1[method2...]
5. **aaa authorization** {network | exec | commands level | reverse-access | configuration} {default | list-name} [method1 [method2...]]
6. **username name** [privilege level] {password encryption-type encrypted-password}
7. **ip scp server enable**

#### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b>  Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b>  Router# configure terminal	Enters global configuration mode.

	Command or Action	Purpose
<b>Step 3</b>	<b>aaa new-model</b> <b>Example:</b> <pre>Router (config)# aaa new-model</pre>	Sets AAA authentication at login.
<b>Step 4</b>	<b>aaa authentication login {default   list-name} method1[method2...]</b> <b>Example:</b> <pre>Router (config)# aaa authentication login default group tacacs+</pre>	Enables the AAA access control system.
<b>Step 5</b>	<b>aaa authorization {network   exec   commands level   reverse-access   configuration} {default   list-name} [method1 [method2...]]</b> <b>Example:</b> <pre>Router (config)# aaa authorization exec default group tacacs+</pre>	Sets parameters that restrict user access to a network. <b>Note</b> <b>The exec</b> keyword runs authorization to determine if the user is allowed to run an EXEC shell; therefore, you must use it when you configure SCP.
<b>Step 6</b>	<b>username name [privilege level]{password encryption-type encrypted-password}</b> <b>Example:</b> <pre>Router (config)# username superuser privilege 2 password 0 superpassword</pre>	Establishes a username-based authentication system. <b>Note</b> You may skip this step if a network-based authentication mechanism--such as TACACS+ or RADIUS--has been configured.
<b>Step 7</b>	<b>ip scp server enable</b> <b>Example:</b> <pre>Router (config)# ip scp server enable</pre>	Enables SCP server-side functionality.

## Verifying SCP

To verify SCP server-side functionality, perform the following steps.

### SUMMARY STEPS

1. enable
2. show running-config

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>

	Command or Action	Purpose
	Router> enable	
<b>Step 2</b>	<b>show running-config</b>  <b>Example:</b>  Router# show running-config	Verifies the SCP server-side functionality.

## Troubleshooting SCP

### SUMMARY STEPS

1. enable
2. debug ip scp

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b>  Router> enable	Enables privileged EXEC mode.  <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>debug ip scp</b>  <b>Example:</b>  Router# debug ip scp	Troubleshoots SCP authentication problems.

## Configuration Examples for Secure Copy

### Example SCP Server-Side Configuration Using Local Authentication

The following example shows how to configure the server-side functionality of SCP. This example uses a locally defined username and password.

```
! AAA authentication and authorization must be configured properly for SCP to work.
aaa new-model
aaa authentication login default local
aaa authorization exec default local
username tiger privilege 15 password 0 lab
! SSH must be configured and functioning properly.
ip ssh time-out 120
ip ssh authentication-retries 3
ip scp server enable
```

## Example SCP Server-Side Configuration Using Network-Based Authentication

The following example shows how to configure the server-side functionality of SCP using a network-based authentication mechanism:

```
! AAA authentication and authorization must be configured properly for SCP to work.
aaa new-model
aaa authentication login default group tacacs+
aaa authorization exec default group tacacs+
! SSH must be configured and functioning properly.
ip ssh time-out 120
ip ssh authentication-retries 3
ip scp server enable
```

## Additional References

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Security commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	<i>Cisco IOS Security Command Reference</i>
Secure Shell	Configuring Secure Shell and Secure Shell Version 2 Support feature modules.
Configuring authentication and authorization	Configuring Authentication , Configuring Authorization , and Configuring Accounting feature modules.

### Standards

Standards	Title
None	--

### MIBs

MIBs	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

**RFCs**

RFCs	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	--

**Technical Assistance**

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for Secure Copy

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for Secure Copy**

Feature Name	Releases	Feature Configuration Information
Secure Copy	Cisco IOS XE Release 2.1	<p>The Secure Copy (SCP) feature provides a secure and authenticated method for copying router configuration or router image files. SCP relies on Secure Shell (SSH), an application and a protocol that provide a secure replacement for the Berkeley r-tools.</p> <p>In Cisco IOS XE Release 2.1, this feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers.</p> <p>The following commands were introduced or modified: <b>debug ip scp</b>, <b>ip scp server enable</b>.</p>

## Glossary

**AAA** --authentication, authorization, and accounting. Framework of security services that provide the method for identifying users (authentication), for remote access control (authorization), and for collecting and sending security server information used for billing, auditing, and reporting (accounting).

**rcp** --remote copy. Relying on Remote Shell (Berkeley r-tools suite) for security, rcp copies files, such as router images and startup configurations, to and from routers.

**SCP** --secure copy. Relying on SSH for security, SCP support allows the secure and authenticated copying of anything that exists in the Cisco IOS XE File Systems. SCP is derived from rcp.

**SSH** --Secure Shell. Application and a protocol that provide a secure replacement for the Berkeley r-tools. The protocol secures the sessions using standard cryptographic mechanisms, and the application can be used similarly to the Berkeley rexec and rsh tools. SSH Version 1 is implemented in the Cisco IOS XE software.

