

# **Secure Copy**

This document provides the procedure to configure a Cisco device for Secure Copy (SCP) server-side functionality.

- Prerequisites for Secure Copy, on page 1
- Information About Secure Copy, on page 1
- How to Configure Secure Copy, on page 2
- Configuration Examples for Secure Copy, on page 6
- Additional References for Secure Copy, on page 6
- Feature History for Secure Copy, on page 7

# **Prerequisites for Secure Copy**

- Configure Secure Shell (SSH), authentication, and authorization on the device.
- Because the Secure Copy Protocol (SCP) relies on SSH for its secure transport, the device must have a Rivest, Shamir, and Adelman (RSA) key pair.

# **Information About Secure Copy**

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

The behavior of SCP is similar to that of Remote Copy Protocol (RCP), which comes from the Berkeley r-tools suite (Berkeley university's own set of networking applications), except that SCP relies on SSH for security. In addition, SCP requires authentication, authorization, and accounting (AAA) to be configured to ensure that the device can determine whether a user has the correct privilege level.

SCP allows only users with a privilege level of 15 to copy a file in the Cisco IOS File System (Cisco IFS) to and from a device by using the **copy** command. An authorized administrator can also perform this action from a workstation.



Note

- Enable the SCP option while using the pscp.exe file.
- An RSA public-private key pair must be configured on the device for SSH to work.

Similar to SCP, SSH File Transfer Protocol (SFTP) can be used to copy switch configuration or image files. For more information, refer the *Configuring SSH File Transfer Protocol* chapter of the *Security Configuration Guide*.

### **Secure Copy Performance Improvements**

SSH bulk data transfer mode can be used to enhance the throughput performance of SCP that is operating in the capacity of a client or a server. Beginning from Cisco IOS XE Dublin 17.10.1, SSH bulk data transfer mode is enabled by default with default window size of 128KB. TCP selective acknowledgement (SACK) is enabled by default if the bulk mode window size is configured.

The default bulk mode window size of 128 KB is optimal to copy large files in most network settings. However, in long big networks where the round-trip time (RTT) is high, 128 KB is not enough. You can enable the most optimal SCP throughput performance by configuring the bulk mode window size using the **ip ssh bulk-mode** window-size command. For example, in an ideal lab testing environment, a window size of 2 MB in a 200-milliseconds round-trip time setting can give around 500 percent improved throughput performance when compared to the default 128-KB window size.

The bulk mode window size must be configured as per the network bandwidth-delay product, that is, a multiple of total available bandwidth in bits per second and the round-trip time in seconds. Because the CPU usage may increase with the increased window size, make sure to balance this by choosing the right window size.

# **How to Configure Secure Copy**

The following sections provide information about the Secure Copy configuration tasks.

### **Configuring Secure Copy**

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

### Procedure

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	

	Command or Action	Purpose	
Step 3	aaa new-model	Sets AAA authentication at login.	
	Example:		
	Device(config)# aaa new-model		
Step 4	aaa authentication login {default   list-name} method1 [ method2 ]	Enables the AAA access control system.	
	Example:		
	Device(config)# aaa authentication login default group tacacs+		
Step 5	username name [privilege level] password encryption-type encrypted-password	Establishes a username-based authentication system.	
	Example:	Note You can omit this step if a network-based authentication	
	Device(config)# username superuser privilege 2 password 0 superpassword	mechanism, such as TACACS+ or RADIUS, has been configured.	
Step 6	ip scp server enable	Enables SCP server-side functionality.	
	Example:		
	Device(config)# ip scp server enable		
Step 7	exit	Exits global configuration mode and returns t privileged EXEC mode.	
	Example:		
	Device(config)# exit		
Step 8	debug ip scp	(Optional) Troubleshoots SCP authentication	
	Example:	problems.	
	Device# debug ip scp		

# **Configuring SCP Username Password**

To configure a username and password for SCP, perform the following steps:

#### **Procedure**

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode. Enter your
	Example:	password, if prompted.
	Device> enable	

	Command or Action	Purpose
Step 2	configure terminal	Enters global configuration mode.
	Example:  Device# configure terminal	
Step 3	ip scp usernameusername	Defines the username.
	Example:  Device# ip scp username cisco	
Step 4	<pre>ip scp password Example:   Device# ip scp password 0 cisco</pre>	Defines the password. Specify the encryption level.  • 0 – Unencrypted password.  • 0 – Encrypted password.  • Line – Clear text password.
Step 5	<pre>exit Example: Device(config)# exit</pre>	Exits global configuration mode and returns to privileged EXEC mode.

### **Enabling Secure Copy on the SSH Server**

The following task shows how to configure the server-side functionality for SCP. This task shows a typical configuration that allows a device to securely copy files from a remote workstation.

#### **Procedure**

	Command or Action	Purpose
Step 1	enable	Enables privileged EXEC mode.
	Example:	Enter your password, if prompted.
	Device> enable	
Step 2	configure terminal	Enters global configuration mode.
	Example:	
	Device# configure terminal	
Step 3	aaa new-model	Enables the Authentication, Authorization, and Accounting (AAA) access control model.
	Example:	
	Device(config)# aaa new-model	
Step 4	aaa authentication login default local	Sets AAA authentication to use the local username database for authentication at login.
	Example:	
	Device(config)# aaa authentication login default local	

	Command or Action	Purpose
Step 5	aaa authorization exec default local  Example:  Device(config)# aaa authorization exec default local	Sets the parameters that restrict user access to a network, runs the authorization to determine if the user ID is allowed to run an privileged EXEC shell, and specifies that the system must use the local database for authorization.
Step 6	username name privilege privilege-level password password  Example:  Device(config) # username samplename privilege 15 password password1	Establishes a username-based authentication system, and specifies the username, privilege level, and an unencrypted password.  Note  The minimum required value for the privilege-level argument is 15. A privilege level of less than 15 results in the connection closing.
Step 7	<pre>ip ssh time-out seconds Example:    Device(config)# ip ssh time-out 120</pre>	Sets the time interval (in seconds) that the device waits for the SSH client to respond.
Step 8	<pre>ip ssh authentication-retries integer Example:    Device(config) # ip ssh authentication-retries 3</pre>	Sets the number of authentication attempts after which the interface is reset.
Step 9	<pre>ip scp server enable Example: Device(config) # ip scp server enable</pre>	Enables the device to securely copy files from a remote workstation.
Step 10	<pre>ip ssh bulk-mode window-size Example: Device(config) # ip ssh bulk-mode 33107232</pre>	(Optional) Sets the bulk mode window size to enhance the throughput performance of SCP.  Note  Beginning from Cisco IOS XE Dublin 17.10.1, SSH bulk data transfer mode is enabled by default with default window size of 128KB.
Step 11	<pre>exit Example: Device(config)# exit</pre>	Exits global configuration mode and returns to privileged EXEC mode.
Step 12	debug ip scp  Example:  Device# debug ip scp	(Optional) Provides diagnostic information about SCP authentication problems.

## **Configuration Examples for Secure Copy**

The following are examples of the Secure Copy configuration.

### **Example: Secure Copy Configuration Using Local Authentication**

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

```
! AAA authentication and authorization must be configured properly in order for SCP to work.

Device> enable

Device# configure terminal

Device(config)# aaa new-model

Device(config)# aaa authentication login default local

Device(config)# aaa authorization exec default local

Device(config)# username user1 privilege 15 password 0 lab

! SSH must be configured and functioning properly.

Device(config)# ip scp server enable

Device(config)# end
```

# **Example: Secure Copy Server-Side Configuration Using Network-Based Authentication**

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

```
! AAA authentication and authorization must be configured properly for SCP to work.

Device> enable

Device# configure terminal

Device(config)# aaa new-model

Device(config)# aaa authentication login default group tacacs+

Device(config)# aaa authorization exec default group tacacs+
! SSH must be configured and functioning properly.

Device(config)# ip ssh time-out 120

Device(config)# ip ssh authentication-retries 3

Device(config)# ip scp server enable

Device(config)# end
```

# **Additional References for Secure Copy**

#### **Related Documents**

Related Topic	Document Title
Secure Shell Version 1 and 2 support	Configuring Secure Shell

#### **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.	

# **Feature History for Secure Copy**

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Fuji 16.9.2	Secure Copy	The Secure Copy feature provides a secure and authenticated method for copying device configurations or device image files. SCP relies on SSH, an application and protocol that provide a secure replacement for the Berkeley r-tools suite.
		The following commands were introduced or modified: <b>debug ip scp</b> and <b>ip scp server enable</b> .
Cisco IOS XE Amsterdam 17.2.1	Secure Copy Performance Improvements	SSH bulk mode enables certain optimizations to enhance the throughput performance of procedures involving large amount of data transfer. This mode can be enabled by using the <b>ip ssh bulk-mode</b> global configuration command.
Cisco IOS XE Bengaluru 17.6.1	Secure Copy Improvement in Large RTT Scenario	Secure copy in large RTT settings can be configured by using the <i>window-size</i> variable option of the <b>ip ssh bulk-mode</b> command.
Cisco IOS XE Cupertino 17.9.1	Secure Copy	This feature was implemented on C9200CX-12P-2X2G, C9200CX-8P-2X2G, and C9200CX-12T-2X2G models of the Cisco Catalyst 9200CX Series Switches, which were introduced in this release.
Cisco IOS XE Dublin 17.10.1	Secure Copy Performance Improvements	SSH bulk mode is enabled by default with the default window size of 128KB.

Use Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to <a href="http://www.cisco.com/go/cfn">http://www.cisco.com/go/cfn</a>.

Feature History for Secure Copy