

Cisco IOS Login Enhancements-Login Block

The Cisco IOS Login Enhancements (Login Block) feature allows users to enhance the security of a router by configuring options to automatically block further login attempts when a possible denial-of-service (DoS) attack is detected.

The login block and login delay options introduced by this feature can be configured for Telnet or SSH virtual connections. By enabling this feature, you can slow down “dictionary attacks” by enforcing a “quiet period” if multiple failed connection attempts are detected, thereby protecting the routing device from a type of denial-of-service attack.

Note Whenever you want to use the AAA "quiet-mode" feature, you have to configure the aaa new-model using the **aaa new-model** command.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table.

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. An account on Cisco.com is not required.

Information About Cisco IOS Login Enhancements

Protecting Against Denial of Service and Dictionary Login Attacks

Connecting to a routing device for the purposes of administering (managing) the device, at either the User or Executive level, is most frequently performed using Telnet or SSH (secure shell) from a remote console (such as a PC). SSH provides a more secure connection option because communication traffic between the user's device and the managed device are encrypted. The Login Block capability, when enabled, applies to both Telnet connections and SSH connections.

The automated activation and logging of the Login Block and Quiet Period capabilities introduced by this feature are designed to further enhance the security of your devices by specifically addressing two well known methods that individuals use to attempt to disrupt or compromise networked devices.

If the connection address of a device is discovered and is reachable, a malicious user may attempt to interfere with the normal operations of the device by flooding it with connection requests. This type of attack is referred to as an attempted Denial-of-Service, because it is possible that the device may become too busy trying to process the repeated login connection attempts to properly handle normal routing services or will not be able to provide the normal login service to legitimate system administrators.

The primary intention of a dictionary attack, unlike a typical DoS attack, is to actually gain administrative access to the device. A dictionary attack is an automated process to attempt to login by attempting thousands, or even millions, of username/password combinations. (This type of attack is called a "dictionary attack" because it typically uses, as a start, every word found in a typical dictionary as a possible password.) As scripts or programs are used to attempt this access, the profile for such attempts is typically the same as for DoS attempts; multiple login attempts in a short period of time.

By enabling a detection profile, the routing device can be configured to react to repeated failed login attempts by refusing further connection request (login blocking). This block can be configured for a period of time, called a "quiet period". Legitimate connection attempts can still be permitted during a quiet period by configuring an access-list (ACL) with the addresses that you know to be associated with system administrators.

Login Enhancements Functionality Overview

Delays Between Successive Login Attempts

A Cisco device can accept virtual connections as fast as they can be processed. Introducing a delay between login attempts helps to protect the Cisco device against malicious login connections such as dictionary attacks and DoS attacks. Delays can be enabled in one of the following ways:

- Via the **auto secure** command. If you enable the AutoSecure feature, the default login delay time of one second is automatically enforced.
- Via the **login block-for** command. You must enter this command before issuing the **login delay** command. If you enter only the **login block-for** command, the default login delay time of one second is automatically enforced.
- Via the new global configuration mode command, **login delay**, which allows you to specify a the login delay time to be enforced, in seconds.

Login Shutdown If DoS Attacks Are Suspected

If the configured number of connection attempts fail within a specified time period, the Cisco device will not accept any additional connections for a "quiet period." (Hosts that are permitted by a predefined access-control list [ACL] are excluded from the quiet period.)

The number of failed connection attempts that trigger the quiet period can be specified via the new global configuration mode command **login block-for**. The predefined ACL that is excluded from the quiet period can be specified via the new global configuration mode command **login quiet-mode access-class**.

This functionality is disabled by default, and it is not enabled if autosecure if enabled.

How to Configure Cisco IOS Login Enhancements

Configuring Login Parameters

Use this task to configure your Cisco device for login parameters that help detect suspected DoS attacks and slow down dictionary attacks.

All login parameters are disabled by default. You must issue the **login block-for** command, which enables default login functionality, before using any other login commands. After the **login block-for** command is enabled, the following defaults are enforced:

- A default login delay of one second
- All login attempts made via Telnet or SSH are denied during the quiet period; that is, no ACLs are exempt from the login period until the **login quiet-mode access-class** command is issued.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **aaa new-model**
4. **login block-for** *seconds* **attempts** *tries* **within** *seconds*
5. **login quiet-mode access-class** {*acl-name* | *acl-number*}
6. **login delay** *seconds*

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	Purpose
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**aaa new-model** **Example:** `Router(config)# aaa new-model`	Enables the authentication, authorization, and accounting (AAA) access control model.
Step 4	**login block-for** *seconds* **attempts** *tries* **within** *seconds* **Example:** `Router(config)# login block-for 100 attempts 2 within 100`	Configures your Cisco IOS XE device for login parameters that help provide DoS detection. **Note** This command must be issued before any other login command can be used.

Step 5	**login quiet-mode access-class** {*acl-name* | *acl-number*}
	Example:
	`Router(config)# login quiet-mode access-class myacl`
		(Optional) Although this command is optional, it is recommended that it be configured to specify an ACL that is to be applied to the router when the router switches to quiet mode. When the router is in quiet mode, all login requests are deniedand the only available connection is through the console.
		If this command is not configured, then the default ACL **sl_def_acl** is created on the router. This ACL is hidden in the running configuration. Use the **show access-list sl_def_acl** to view the parameters for the default ACL.
		For example:
		`Router#show access-lists sl_def_acl`
		`Extended IP access list sl_def_acl`
		`10 deny tcp any any eq telnet`
		`20 deny tcp any any eq www`
		`30 deny tcp any any eq 22`
		`40 permit ip any any`

Step 6	**login delay** *seconds* **Example:** `Router(config)# login delay 10`	(Optional) Configures a delay between successive login attempts.

What to Do Next

After you have configured login parameters on your router, you may wish to verify the settings. To complete this task, see the following section "Verifying Login Parameters, on page 5."

Verifying Login Parameters

Use this task to verify the applied login configuration and present login status on your router.

SUMMARY STEPS

1. **enable**
2. **show login failures**

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show login failures** **Example:** `Router# show login`	Displays login parameters. • **failures** --Displays information related only to failed login attempts.

Examples

The following sample output from the **show login** command verifies that no login parameters have been specified:

```
Router# show login
No login delay has been applied.
No Quiet-Mode access list has been configured.
All successful login is logged and generate SNMP traps.
All failed login is logged and generate SNMP traps
Router NOT enabled to watch for login Attacks
```

The following sample output from the **show login** command verifies that the **login block-for**command is issued. In this example, the command is configured to block login hosts for 100 seconds if 16 or more login requests fail within 100 seconds; five login requests have already failed.

```
Router# show login
A default login delay of 1 seconds is applied.
No Quiet-Mode access list has been configured.
All successful login is logged and generate SNMP traps.
All failed login is logged and generate SNMP traps.
```

```
Router enabled to watch for login Attacks.
If more than 15 login failures occur in 100 seconds or less, logins will be disabled for
100 seconds.
Router presently in Watch-Mode, will remain in Watch-Mode for 95 seconds.
Present login failure count 5.
```

The following sample output from the **show login** command verifies that the router is in quiet mode. In this example, the **login block-for** command was configured to block login hosts for 100 seconds if 3 or more login requests fail within 100 seconds.

```
Router# show login
A default login delay of 1 seconds is applied.
No Quiet-Mode access list has been configured.
All successful login is logged and generate SNMP traps.
All failed login is logged and generate SNMP traps.
Router enabled to watch for login Attacks.
If more than 2 login failures occur in 100 seconds or less, logins will be disabled for 100
 seconds.
Router presently in Quiet-Mode, will remain in Quiet-Mode for 93 seconds.
Denying logins from all sources.
```

The following sample output from **show login failures** command shows all failed login attempts on the router:

```
Router# show login failures
Information about login failure's with the device
Username      Source IPAddr  lPort Count  TimeStamp
try1          10.1.1.1        23    1     21:52:49 UTC Sun Mar 9 2003
try2          10.1.1.2        23    1     21:52:52 UTC Sun Mar 9 2003
```

The following sample output from **show login failures** command verifies that no information is presently logged:

```
Router# show login failures
*** No logged failed login attempts with the device.***
```

Configuration Examples for Login Parameters

Setting Login Parameters Example

The following example shows how to configure your router to enter a 100 second quiet period if 15 failed login attempts is exceeded within 100 seconds; all login requests will be denied during the quiet period except hosts from the ACL “myacl.”

```
Router(config)# aaa new-model
Router(config)# login block-for 100 attempts 15 within 100
Router(config)# login quiet-mode access-class myacl
```

Additional References

Related Documents

Related Topic	Document Title
Configuring autosecure	AutoSecure feature module.
Security commands: complete command syntax, command modes, command history, defaults, usage guidelines, and examples	*Cisco IOS Security Command Reference*
Secure Management/Administrative Access	Role-Based CLI Access feature module.

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: http://www.cisco.com/go/mibs

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 website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for Cisco IOS Login Enhancements-Login Block

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.

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Table 1: Feature Information for Cisco IOS Login Enhancements (Login Block)

Feature Name	Releases	Feature Configuration Information
Cisco IOS Login Enhancements	Cisco IOS XE Release 2.1	The Cisco IOS Login Enhancements (Login Block) feature allows users to enhance the security of a router by configuring options to automatically block further login attempts when a possible denial-of-service (DoS) attack is detected. In Cisco IOS XE Release 2.1, this feature was introduced on Cisco ASR 1000 Series Service Aggregation Routers. The following commands were modified by this feature: **login block-for**, **login delay**, **login quiet-mode access-class**, **show login**.