



## **Cisco IOS Server Load Balancing Command Reference**

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## access (firewall farm)

To route specific flows to a firewall farm, use the **access** command in firewall farm configuration mode. To restore the default settings, use the **no** form of this command.

**access** [**source** *source-ip netmask*| **destination** *destination-ip netmask*| **inbound** {*inbound-interface*}| **datagram connection**}| **outbound** *outbound-interface*]

**no access** [**source** *source-ip netmask*| **destination** *destination-ip netmask*| **inbound** {*inbound-interface*}| **datagram connection**}| **outbound** *outbound-interface*]

### Syntax Description

<b>source</b>	(Optional) Routes flows based on source IP address.
<i>source-ip</i>	(Optional) Source IP address. The default is 0.0.0.0 (all sources).
<i>netmask</i>	(Optional) Source IP network mask. The default is 0.0.0.0 (all source subnets).
<b>destination</b>	(Optional) Routes flows based on destination IP address.
<i>destination-ip</i>	(Optional) Destination IP address. The default is 0.0.0.0 (all destinations).
<i>netmask</i>	(Optional) Destination IP network mask. The default is 0.0.0.0 (all destination subnets).
<b>inbound</b> <i>inbound-interface</i>	(Optional) Indicates that the firewall farm is to accept inbound packets only on the specified inbound interface.  You can specify a subinterface, such as Gigabitethernet7/3.100, for the <i>inbound-interface</i> argument.
<b>inbound datagram connection</b>	(Optional) Indicates that IOS SLB is to create connections for inbound traffic as well as outbound traffic.
<b>outbound</b> <i>outbound-interface</i>	(Optional) Indicates that the firewall farm is to accept outbound packets only on the specified outbound interface.  You can specify a subinterface, such as Gigabitethernet7/3.100, for the <i>outbound-interface</i> argument.

**Command Default**

The default source IP address is 0.0.0.0 (routes flows from all sources to this firewall farm). The default source IP network mask is 0.0.0.0 (routes flows from all source subnets to this firewall farm). The default destination IP address is 0.0.0.0 (routes flows from all destinations to this firewall farm). The default destination IP network mask is 0.0.0.0 (routes flows from all destination subnets to this firewall farm). If you do not specify an inbound interface, the firewall farm accepts inbound packets on all inbound interfaces. If you do not specify the **inbound datagram connection** option, IOS SLB creates connections only for outbound traffic. If you do not specify an outbound interface, the firewall farm accepts outbound packets on all outbound interfaces.

**Command Modes**

Firewall farm configuration (config-slb-fw)

**Command History**

Release	Modification
12.1(7)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	The <b>inbound</b> and <b>outbound</b> keywords and <i>inbound-interface</i> and <i>outbound-interface</i> arguments were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	This command was modified. The <b>datagram connection</b> keywords were added. The <i>inbound-interface</i> and <i>outbound-interface</i> arguments can be subinterfaces.

**Usage Guidelines**

You can specify more than one source or destination for each firewall farm. To do so, configure multiple **access** statements, making sure the network masks do not overlap each other.

You can specify up to two inbound interfaces and two outbound interfaces for each firewall farm. To do so, configure multiple **access** statements, keeping the following considerations in mind:

- All inbound and outbound interfaces must be in the same Virtual Private Network (VPN) routing and forwarding (VRF).
- All inbound and outbound interfaces must be different from each other.
- You cannot change inbound or outbound interfaces for a firewall farm while it is in service.

If you do not configure an access interface using this command, IOS SLB installs the wildcards for the firewall farm in all of the available interfaces of the device, including the VRF interfaces. If IOS SLB is not required on the VRF interfaces, use this command to limit wildcards to the specified interfaces only.

By default, IOS SLB firewall load balancing creates connections only for outbound traffic (that is, traffic that arrives through the real server). Inbound traffic uses those same connections to forward the traffic, which can impact the CPU. To enable IOS SLB to create connections for both inbound traffic and outbound traffic, reducing the impact on the CPU, use the **access inbound datagram connection** command.

**Examples**

The following example routes flows with a destination IP address of 10.1.6.0 to firewall farm FIRE1:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# access destination 10.1.6.0 255.255.255.0
```

**Related Commands**

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

## access (server farm)

To configure an access interface for a server farm, use the **access** command in server farm configuration mode. To disable the access interface, use the **no** form of this command.

**access** *interface*

**no access** *interface*

### Syntax Description

<i>interface</i>	Interface to be inspected. The server farm will handle outbound flows from real servers only on the specified interface.  You can specify a subinterface, such as Gigabitethernet7/3.100, for the <i>interface</i> argument.
------------------	--

### Command Default

The server farm handles outbound flows from real servers on all interfaces.

### Command Modes

Server farm configuration (config-slb-sfarm)

### Command History

Release	Modification
12.2(18)SXE	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	This command was modified. The <i>interface</i> argument can be a subinterface.

### Usage Guidelines

The virtual server and its associated server farm interfaces must be in the same Virtual Private Network (VPN) routing and forwarding (VRF).

You can specify up to two access interfaces for each server farm. To do so, configure two **access** statements, keeping the following considerations in mind:

- The two interfaces must be in the same VRF.
- The two interfaces must be different from each other.
- The access interfaces of primary and backup server farms must be the same.
- You cannot change the interfaces for a server farm while it is in service.

If you do not configure an access interface using this command, IOS SLB installs the wildcards for the server farm in all of the available interfaces of the device, including the VRF interfaces. If IOS SLB is not required on the VRF interfaces, use this command to limit wildcards to the specified interfaces only.

### Examples

The following example limits the server farm to handling outbound flows from real servers only on access interface Vlan106:

```
Router(config)# ip slb serverfarm SF1
Router(config-slb-sfarm)# access Vlan106
```

### Related Commands

Command	Description
<code>show ip slb serverfarms</code>	Displays information about the server farms.



## access (virtual server)

To enable framed-IP routing to inspect the ingress interface, use the **access** command in virtual server configuration mode. To disable framed-IP routing, use the **no** form of this command.

**access** *interface* [**route framed-ip**]

**no access** *interface* [**route framed-ip**]

### Syntax Description

<i>interface</i>	Interface to be inspected. You can specify a subinterface, such as Gigabitethernet7/3.100, for the <i>interface</i> argument.
<b>route framed-ip</b>	(Optional) Routes flows using framed-IP routing.

### Command Default

Framed-IP routing cannot inspect the ingress interface.

### Command Modes

Virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.1(12c)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	The command was modified to accept up to two framed-IP access interfaces (specified on separate commands).
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	This command was modified. The <i>interface</i> argument can be a subinterface.

### Usage Guidelines

This command enables framed-IP routing to inspect the ingress interface when routing subscriber traffic. All framed-IP sticky database entries created as a result of RADIUS requests to this virtual server will include the interface in the entry. In addition to matching the source IP address of the traffic with the framed-IP address, the ingress interface must also match this interface when this command is configured.

You can use this command to allow subscriber data packets to be routed to multiple service gateway service farms.

The virtual server and its associated server farm interfaces must be in the same Virtual Private Network (VPN) routing and forwarding (VRF).

You can specify up to two framed-IP access interfaces for each virtual server. To do so, configure two **access** statements, keeping the following considerations in mind:

- The two interfaces must be in the same VRF.
- The two interfaces must be different from each other.
- You cannot change the interfaces for a virtual server while it is in service.

If you do not configure an access interface using this command, IOS SLB installs the wildcards for the virtual server in all of the available interfaces of the device, including the VRF interfaces. If IOS SLB is not required on the VRF interfaces, use this command to limit wildcards to the specified interfaces only.

### Examples

The following example enables framed-IP routing to inspect ingress interface Vlan20:

```
Router(config)# ip slb vservice SSG_AUTH
Router(config-slb-vservice)# access Vlan20 route framed-ip
```

### Related Commands

Command	Description
<b>show ip slb vservices</b>	Displays information about the virtual servers defined to IOS SLB.

## address (custom UDP probe)

To configure an IP address to which to send custom User Datagram Protocol (UDP) probes, use the **address** command in custom UDP probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [ *ip-address* ] [**routed**]

**no address** [ *ip-address* ] [**routed**]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the custom UDP probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to <i>ip-address</i>.</li> </ul>

### Command Default

If the custom UDP probe is associated with a firewall farm, you must specify an IP address. If the custom UDP probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a custom UDP probe named PROBE6, enters custom UDP probe configuration mode, and configures the probe to receive responses from IP address 13.13.13.13:

```
Router(config)# ip slb probe PROBE6 custom udp
Router(config-slb-probe)# address 13.13.13.13
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb probe custom udp</b>	Configures a custom UDP probe name and enters custom UDP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## address (DNS probe)

To configure an IP address to which to send Domain Name System (DNS) probes, use the **address** command in DNS probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [*ip-address* [**routed**]]

**no address** [*ip-address* [**routed**]]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the DNS probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to the specified IP address.</li> </ul>

### Command Default

If the DNS probe is associated with a firewall farm, you must specify an IP address. If the DNS probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers.

### Command Modes

DNS probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.1(12c)E	The <b>routed</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example configures a DNS probe named PROBE4, enters DNS probe configuration mode, and configures the probe to receive responses from IP address 10.1.10.1:

```
Router(config)# ip slb probe PROBE4 dns
Router(config-slb-probe)# address 10.1.10.1
```

**Related Commands**

Command	Description
<b>ip slb probe dns</b>	Configures a DNS probe name and enters DNS probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## address (HTTP probe)

To configure an IP address to which to send HTTP probes, use the **address** command in HTTP probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [*ip-address* [**routed**]]

**no address** [*ip-address* [**routed**]]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the HTTP probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to the specified IP address.</li> </ul>

### Command Default

If the HTTP probe is associated with a firewall farm, you must specify an IP address. If the HTTP probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.1(12c)E	The <b>routed</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example configures an HTTP probe named PROBE2, enters HTTP probe configuration mode, and configures the probe to receive responses from IP address 10.1.10.1:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# address 10.1.10.1
```

**Related Commands**

Command	Description
<b>ip slb probe http</b>	Configures an HTTP probe name and enters HTTP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.



## address (ping probe)

To configure an IP address to which to send ping probes, use the **address** command in ping probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [*ip-address* [**routed**]]

**no address** [*ip-address* [**routed**]]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the ping probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to the specified IP address.</li> </ul>

### Command Default

If the ping probe is associated with a firewall farm, you must specify an IP address. If the ping probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers.

### Command Modes

Ping probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.1(12c)E	The <b>routed</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example configures a ping probe named PROBE1, enters ping probe configuration mode, and configures the probe to receive responses from IP address 10.1.10.1:

```
Router(config)# ip slb probe PROBE1 ping
Router(config-slb-probe)# address 10.1.10.1
```

**Related Commands**

Command	Description
<b>ip slb probe ping</b>	Configures a ping probe name and enters ping probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## address (TCP probe)

To configure an IP address to which to send TCP probes, use the **address** command in TCP probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [*ip-address* [**routed**]]

**no address** [*ip-address* [**routed**]]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the TCP probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to the specified IP address.</li> </ul>

### Command Default

If the TCP probe is associated with a firewall farm, you must specify an IP address. If the TCP probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers.

### Command Modes

TCP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.1(12c)E	The <b>routed</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example configures a TCP probe named PROBE5, enters TCP probe configuration mode, and configures the probe to receive responses from IP address 10.1.10.1:

```
Router(config)# ip slb probe PROBE5 tcp
Router(config-slb-probe)# address 10.1.10.1
```

**Related Commands**

Command	Description
<b>ip slb probe tcp</b>	Configures a TCP probe name and enters TCP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## address (WSP probe)

To configure an IP address to which to send Wireless Session Protocol (WSP) probes, use the **address** command in WSP probe configuration mode. To restore the default settings, use the **no** form of this command.

**address** [*ip-address* [**routed**]]

**no address** [*ip-address* [**routed**]]

### Syntax Description

<i>ip-address</i>	(Optional) Destination IP address that is to respond to the WSP probe.
<b>routed</b>	(Optional) Flags the probe as a routed probe, with the following considerations: <ul style="list-style-type: none"> <li>• Only one instance of a routed probe per server farm can run at any given time.</li> <li>• Outbound packets for a routed probe are routed directly to the specified IP address.</li> </ul>

### Command Default

If the WSP probe is associated with a firewall farm, you must specify an IP address. If the WSP probe is associated with a server farm, and you do not specify an IP address, the address is inherited from the server farm real servers. In dispatched mode, the *ip-address* argument value is the same as the virtual server IP address. In directed Network Address Translation (NAT) mode, an IP address is unnecessary.

### Command Modes

WSP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(5a)E	This command was introduced.
12.1(12c)E	The <b>routed</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a WSP probe named PROBE3, enters WSP probe configuration mode, and configures the probe to receive responses from IP address 10.1.10.1:

```
Router(config)# ip slb probe PROBE3 wsp
Router(config-slb-probe)# address 10.1.10.1
```

### Related Commands

Command	Description
<b>ip slb probe wsp</b>	Configures a WSP probe name and enters WSP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

# advertise

To control the installation of a static route to the Null0 interface for a virtual server address, use the **advertise** command in SLB virtual server configuration mode. To prevent the installation of a static route for the virtual server IP address, use the **no** form of this command.

**advertise [active]**

**no advertise [active]**

## Syntax Description

<b>active</b>	(Optional) Indicates that the host route is to be advertised only when the virtual IP address is available (that is, when there is at least one real server in OPERATIONAL, DFP_THROTTLED, or MAXCONNS state).
---------------	--

## Command Default

The virtual server IP address is advertised. That is, a static route to the Null0 interface is installed for the virtual server IP addresses and it is added to the routing table. If you do not specify the **active** keyword, the host route is advertised regardless of whether the virtual IP address is available.

## Command Modes

SLB virtual server configuration (config-slb-vserver)

## Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(7)E	The <b>active</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

Advertisement of a static route using the routing protocol requires that you configure redistribution of static routes for the routing protocol.

The **advertise** command does not affect virtual servers used for transparent web cache load balancing.

HTTP probes and route health injection require a route to the virtual server. The route is not used, but it must exist to enable the sockets code to verify that the destination can be reached, which in turn is essential for HTTP probes and route health injection to function correctly.

- For HTTP probes, the route can be either a host route (advertised by the virtual server) or a default route (specified using the **ip route 0.0.0.0 0.0.0.0** command, for example). If you specify either the **no advertise** or the **advertise active** command, you must specify a default route.
- For route health injection, the route must be a default route.

HTTP probes and route health injection can both use the same default route; you need not specify two unique default routes.

### Examples

The following example prevents advertisement of the virtual server's IP address in routing protocol updates:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# no advertise
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.



## agent

To identify a Dynamic Feedback Protocol (DFP) agent with which the IOS Server Load Balancing (IOS SLB) feature can initiate connections, use the **agent** command in SLB DFP configuration mode. To remove a DFP agent definition from the DFP configuration, use the **no** form of this command.

**agent** *ip-address* *port* [*timeout* [*retry-count* [*retry-interval* ]]]

**no agent** *ip-address* *port*

### Syntax Description

<i>ip-address</i>	Agent IP address.
<i>port</i>	Agent TCP or User Datagram Protocol (UDP) port number.
<i>timeout</i>	(Optional) Time period, in seconds, during which the DFP manager must receive an update from the DFP agent. The valid range is 0 to 65535 seconds. The default is 0 seconds, which means there is no timeout.
<i>retry-count</i>	(Optional) Number of times the DFP manager attempts to establish the TCP connection to the DFP agent. The valid range is 0 to 65535 times. The default is 0 retries, which means there are infinite retries.
<i>retry-interval</i>	(Optional) Interval, in seconds, between retries. The valid range is 1 to 65535 seconds. The default is 180 seconds.

### Command Default

The default timeout is 0 seconds (no timeout). The default retry count is 0 (infinite retries). The default retry interval is 180 seconds.

### Command Modes

SLB DFP configuration (config-slb-dfp)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

A DFP agent collects status information about the load capability of a server and reports that information to a load manager. The DFP agent may reside on the server, or it may be a separate device that collects and consolidates the information from several servers before reporting to the load manager.

The password specified in the **ip slb dfp** command for the DFP manager must match the password specified in the **password** command for the DFP agent.

You can configure up to 1024 agents.

### Examples

The following example sets the DFP password to Password1 (to match the DFP agent's password), sets the timeout to 360 seconds, enters DFP configuration mode, and enables IOS SLB to connect to the DFP agent with IP address 10.1.1.1 and port number 2221:

```
Router(config)# ip slb dfp password Password1 360
Router(config-slb-dfp)# agent 10.1.1.1 2221 30 0 10
```

### Related Commands

Command	Description
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and enters DFP agent configuration mode.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and enters DFP configuration mode.

## apn

To configure an ASCII regular expression string to be matched against the access point name (APN) for general packet radio service (GPRS) load balancing, use the **apn** command in SLB GTP map configuration mode. To delete the APN string, use the **no** form of this command.

**apn** *string*

**no apn** *string*

### Syntax Description

<i>string</i>	<p>ASCII regular expression string to be matched against the APN.</p> <p>For information about regular expressions and how to use them in Cisco IOS software configurations, refer to the Understanding Regular Expressions section of the <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> .</p>
---------------	--

### Command Default

None

### Command Modes

SLB GTP map configuration (config-slb-gtp-map)

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Usage Guidelines

For a given IOS SLB GTP map, you can configure up to 100 **apn** commands. However, we recommend you configure no more than 10 **apn** commands per map.

### Examples

The following example specifies that, for IOS SLB GTP map **2**, string **.cisco\*** is to be matched against the APN:

```
Router(config)# ip slb map 2 gtp
Router(config-slb-gtp-map)# apn cisco*
```

### Related Commands

Command	Description
<b>ip slb map</b>	Configures an IOS SLB protocol map and enters SLB map configuration mode.

Command	Description
show ip slb map	Displays information about IOS SLB protocol maps.

# bindid

To configure a bind ID, use the **bindid** command in SLB server farm configuration mode. To remove a bind ID from the server farm configuration, use the **no** form of this command.

**bindid** [ *bind-id* ]

**no bindid** [ *bind-id* ]

## Syntax Description

<i>bind-id</i>	(Optional) Bind ID number. The default bind ID is 0.
----------------	--

## Command Default

The default bind ID is 0.

## Command Modes

SLB server farm configuration (config-slb-sfarm)

## Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

You can configure one bind ID on each **bindid** command.

The bind ID allows a single physical server to be bound to multiple virtual servers, and to report a different weight for each one. Thus, the single real server is represented as multiple instances of itself, each having a different bind ID. Dynamic Feedback Protocol (DFP) uses the bind ID to identify for which instance of the real server a given weight is specified.

In general packet radio service (GPRS) load balancing, bind IDs are not supported. Therefore do not use the **bindid** command in a GPRS load-balancing environment.

**Examples**

The following example configures bind ID 309:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# bindid 309
```

**Related Commands**

Command	Description
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and enters DFP configuration mode.
<b>show ip slb serverfarms</b>	Displays information about the IOS SLB server farms.

## calling-station-id

To configure an ASCII regular expression string to be matched against the calling station ID attribute for RADIUS load balancing, use the **calling-station-id** command in SLB RADIUS map configuration mode. To delete the calling station ID match string, use the **no** form of this command.

**calling-station-id** *string*

**no calling-station-id** *string*

### Syntax Description

<i>string</i>	<p>ASCII regular expression string to be matched against the calling station ID attribute in the RADIUS payload.</p> <p>For information about regular expressions and how to use them in Cisco IOS software configurations, refer to the Understanding Regular Expressions section of the <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> .</p>
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### Command Default

None

### Command Modes

SLB RADIUS map configuration (config-slb-radius-map)

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Usage Guidelines

For a given IOS SLB RADIUS map, you can configure a single **calling-station-id** command or a single **username** (IOS SLB) command, but not both.

### Examples

The following example specifies that, for IOS SLB RADIUS map **1**, string **.919\*** is to be matched against the calling station ID attribute in the RADIUS payload:

```
Router(config)# ip slb map 1 radius
Router(config-slb-radius-map)# calling-station-id .919*
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb map</b>	Configures an IOS SLB protocol map and enters SLB map configuration mode.
<b>show ip slb map</b>	Displays information about IOS SLB protocol maps.
<b>username</b>	Configures an ASCII regular expression string to be matched against the username attribute in the RADIUS payload.



## clear fm slb counters

To clear Feature Manager (FM) IOS Server Load Balancing (IOS SLB) counters, use the **clear fm slb counters** command in privileged EXEC mode.

**clear fm slb {inband|purge} counters**

### Syntax Description

<b>inband</b>	Clears FM IOS SLB inband counters.
<b>purge</b>	Clears FM IOS SLB purge counters.

### Command Default

FM IOS SLB counters are not cleared.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.2(18)SXF5	This command was introduced.

### Examples

The following example clears the FM IOS SLB inband counters:

```
Router# clear fm slb inband counters
```

### Related Commands

Command	Description
<b>show fm slb counters</b>	Displays information about the Feature Manager (FM) IOS Server Load Balancing (IOS SLB) counters.

## clear ip slb connections

To clear the IP IOS Server Load Balancing (IOS SLB) connections, use the **clear ip slb connections** command in privileged EXEC mode.

**clear ip slb connections** [**firewallfarm** *firewall-farm*] **serverfarm** *server-farm*] **vserver** *virtual-server*]

### Syntax Description

<b>firewallfarm</b> <i>firewall-farm</i>	(Optional) Clears the IOS SLB connection database for the specified firewall farm.
<b>serverfarm</b> <i>server-farm</i>	(Optional) Clears the IOS SLB connection database for the specified server farm.
<b>vserver</b> <i>virtual-server</i>	(Optional) Clears the IOS SLB connection database for the specified virtual server.

### Command Default

The IOS SLB connection database is cleared for all firewall farms, server farms, and virtual servers.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.1(1)E	This command was introduced as part of the <b>clear ip slb</b> command.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(11b)E	This command was separated from the <b>clear ip slb</b> command.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

In general packet radio service (GPRS) load balancing, the **clear ip slb connections** command clears connections, but does not clear sessions.

**Examples**

The following example clears the connection database of server farm FARM1:

```
Router# clear ip slb connections serverfarm FARM1
```

The following example clears the connection database of virtual server VSERVER1:

```
Router# clear ip slb connections vserver VSERVER1
```

**Related Commands**

Command	Description
<b>show ip slb conns</b>	Displays information about active IOS SLB connections.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb serverfarms</b>	Displays information about the IOS SLB server farms.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.

## clear ip slb counters

To clear the IP IOS Server Load Balancing (IOS SLB) counters, use the **clear ip slb counters** command in privileged EXEC mode.

**clear ip slb counters [kal-ap]**

### Syntax Description

<b>kal-ap</b>	(Optional) clears only IP IOS SLB KeepAlive Application Protocol (KAL-AP) counters.
---------------	---

### Command Default

IP IOS SLB counters are not cleared.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.1(1)E	This command was introduced as part of the <b>clear ip slb</b> command.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(11b)E	This command was separated from the <b>clear ip slb</b> command.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The <b>kal-ap</b> keyword was added.

### Examples

The following example clears the IP IOS SLB counters:

```
Router# clear ip slb counters
```

### Related Commands

Command	Description
<b>show ip slb stats</b>	Displays IOS SLB statistics.

# clear ip slb sessions

To clear the IP IOS Server Load Balancing (IOS SLB) sessions database, use the **clear ip slb sessions** command in privileged EXEC mode.

**clear ip slb sessions** [**firewallfarm** *firewall-farm*| **serverfarm** *server-farm*| **vserver** *virtual-server*]

## Syntax Description

<b>firewallfarm</b> <i>firewall-farm</i>	(Optional) Clears the IOS SLB session database for the specified firewall farm.
<b>serverfarm</b> <i>server-farm</i>	(Optional) Clears the IOS SLB session database for the specified server farm.
<b>vserver</b> <i>virtual-server</i>	(Optional) Clears the IOS SLB session database for the specified virtual server.

## Command Default

If no optional keywords or arguments are specified, the IOS SLB sessions database is cleared of all firewall farms, server farms, and virtual servers.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following example clears the session database of server farm FARM1:

```
Router# clear ip slb sessions serverfarm FARM1
```

The following example clears the session database of virtual server VSERVER1:

```
Router# clear ip slb sessions vserver VSERVER1
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show ip slb firewallfarm</b>	Displays information about the IOS SLB firewall farms.
<b>show ip slb sessions</b>	Displays information about sessions handled by IOS SLB.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.

## clear ip slb sticky asn msid

To clear an entry from an IOS Server Load Balancing (IOS SLB) Access Service Network (ASN) Mobile Station ID (MSID) sticky database, use the **clear ip slb sticky asn msid** command in privileged EXEC mode.

**clear ip slb sticky asn msid** *msid*

### Syntax Description

<i>msid</i>	Clears the entry associated with the specified MSID from the IOS SLB ASN MSID sticky database.
-------------	--

### Command Default

None

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.2(33)SRE	This command was introduced.

### Usage Guidelines

When you use this command to clear an entry from the IOS SLB ASN MSID sticky database, the session is not cleared; it lingers until it times out. (The session timeout is configured by using the **idle** command in SLB virtual server configuration mode; the default timeout is 60 seconds.) To clear the session manually, use the **clear ip slb sessions** command in privileged EXEC mode.

### Examples

The following example clears the entry associated with MSID 001646013fc0 from the IOS SLB ASN MSID sticky database:

```
Router# clear ip slb sticky asn msid 001646013fc0
```

### Related Commands

Command	Description
<b>show ip slb sticky</b>	Displays information about the IOS Server Load Balancing (IOS SLB) sticky database.

## clear ip slb sticky gtp imsi

To clear entries from an IOS Server Load Balancing (IOS SLB) general packet radio service (GPRS) Tunneling Protocol (GTP) International Mobile Subscriber ID (IMSI) sticky database, use the **clear ip slb sticky gtp imsi** command in privileged EXEC mode.

**clear ip slb sticky gtp imsi** [*id imsi*]

### Syntax Description

<b>id</b> <i>imsi</i>	Clears only the entry associated with the specified IMSI from the IOS SLB GTP IMSI sticky database.
-----------------------	---

### Command Default

If you enter this command without the optional IMSI ID, all entries are cleared from the IOS SLB GTP IMSI sticky database.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.2(18)SXE	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

When you use this command to clear an entry from the IOS SLB GTP IMSI sticky database, the session is not cleared; it lingers until it times out. (The session timeout is configured by using the **idle** command in SLB virtual server configuration mode; the default timeout is 30 seconds.) If the same user tries to create a new Packet Data Protocol (PDP) context before the session times out, using the same Network Service Access Point Identifier (NSAPI) but a different access point name (APN), IOS SLB forwards the request to the old server farm, even though the new APN should lead to a different server farm. To avoid this problem, clear the session manually by using the **clear ip slb sessions** command in privileged EXEC mode.

### Examples

The following example clears all entries from the IOS SLB GTP IMSI sticky database:

```
Router# clear ip slb sticky gtp imsi
```

### Related Commands

Command	Description
<b>show ip slb sticky</b>	Displays information about the IOS Server Load Balancing (IOS SLB) sticky database.



# clear ip slb sticky radius

To clear entries from a IOS Server Load Balancing (IOS SLB) RADIUS sticky database, use the **clear ip slb sticky radius** command in privileged EXEC mode.

```
clear ip slb sticky radius {calling-station-id [id string]| framed-ip [framed-ip [ netmask ]]}
```

## Syntax Description

<b>calling-station-id</b>	Clears entries from the IOS SLB RADIUS calling-station-ID sticky database.
<b>id string</b>	(Optional) Calling station ID of the entry to be cleared.
<b>framed-ip</b>	Clears entries from the IOS SLB RADIUS framed-IP sticky database.
<i>framed-ip</i>	(Optional) Framed-IP address of entries to be cleared.
<i>netmask</i>	(Optional) Subnet mask specifying a range of entries to be cleared.

## Command Default

If no optional arguments are specified, all entries are cleared from the IOS SLB RADIUS calling-station-ID sticky database or framed-IP sticky database.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)ZA5	The <b>calling-station-id</b> and <b>id</b> keywords and <i>string</i> argument were added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

When you use this command to clear an entry from the IOS SLB RADIUS calling-station-ID sticky database, the session is not cleared; it lingers until it times out. (The session timeout is configured by using the **idle** command in SLB virtual server configuration mode; the default timeout is 30 seconds.) If the same user tries

to create a new Packet Data Protocol (PDP) context before the session times out, using the same Network Service Access Point Identifier (NSAPI) but a different access point name (APN), IOS SLB forwards the request to the old server farm, even though the new APN should lead to a different server farm. To avoid this problem, clear the session manually by using the **clear ip slb sessions** command in privileged EXEC mode.

### Examples

The following example clears all entries from the IOS SLB RADIUS framed-IP sticky database:

```
Router# clear ip slb sticky radius framed-ip
```

### Related Commands

Command	Description
<b>show ip slb sticky</b>	Displays information about the IOS SLB sticky database.

## client (virtual server)

To define which clients are allowed to use the virtual server, use the **client** command in Server Load Balancing (SLB) virtual server configuration mode. To remove a client definition from the SLB configuration, use the **no** form of this command.

**client** {*ipv4-address netmask* [**exclude**] **gtp carrier-code** [*code* ]}

**no client** {*ipv4-address netmask* [**exclude**] **gtp carrier-code** [*code* ]}

### Syntax Description

<i>ipv4-address</i>	Client IPv4 address. The default is 0.0.0.0 (all clients).
<i>netmask</i>	Client IPv4 network mask. The default is 0.0.0.0 (all subnets).
<b>exclude</b>	(Optional) Ignores connections initiated by the client IPv4 address from the load-balancing scheme.
<b>gtp carrier-code</b>	For general packet radio service (GPRS) Tunneling Protocol (GTP) cause code inspection, configures the virtual server to accept Packet Data Protocol (PDP) context creates only from the specified International Mobile Subscriber Identity (IMSI) carrier code.
<i>code</i>	(Optional) For GTP cause code inspection, identifies the IMSI carrier code from which this virtual server is to accept PDP context creates. The code has the format:  <b>mcc</b> <i>mcc-code</i> <b>mnc</b> <i>mnc-code</i> where: <ul style="list-style-type: none"> <li>• <i>mcc-code</i> is the Mobile Country Code (MCC)</li> <li>• <i>mnc-code</i> is the Mobile Network Code (MNC)</li> </ul> If you do not specify a <i>code</i> , the virtual server accepts PDP context creates from any IMSI carrier code.

### Command Default

The default client IPv4 address is 0.0.0.0 (all clients). The default client IPv4 network mask is 0.0.0.0 (all subnets). Taken together, the default is client 0.0.0.0 0.0.0.0 (allows all clients on all subnets to use the virtual server). If you specify **gtp carrier-code** and you do not specify a *code*, the virtual server accepts PDP context creates from any IMSI carrier code.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

**Command History**

Release	Modification
12.0(7)XE	This command was introduced.
12.1(1)E	The <b>exclude</b> keyword was added.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>gtp carrier-code</b> keyword and <i>code</i> argument were added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

You can use more than one client command to define more than one client.

The *netmask* value is applied to the source IPv4 address of incoming connections. The result must match the *ipv4-address* value for the client to be allowed to use the virtual server.

If you configure probes in your network, you must also do one of the following:

- Configure the **exclude** keyword on the **client** command on the virtual server to exclude connections initiated by the client IPv4 address from the load-balancing scheme.
- Configure IPv4 addresses on the IOS SLB device that are Layer 3-adjacent to the real servers used by the virtual server.

Configure separate **client** commands to specify the clients that can use the virtual server, and to specify the IMSI carrier code from which the virtual server is to accept PDP context creates.

Dual-stack support for GTP load balancing does not support this command.

**Examples**

The following example allows clients from only 10.4.4.0 access to the virtual server:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# client 10.4.4.0 255.255.255.0
```

**Related Commands**

Command	Description
<b>show ip slb vserver</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual (virtual server)</b>	Configures the virtual server attributes.

## credentials (HTTP probe)

To configure basic authentication values for the HTTP IOS Server Load Balancing (IOS SLB) probe, use the **credentials** command in HTTP probe configuration mode. To remove a **credentials** configuration, use the **no** form of this command.

**credentials** *username* [*password* ]

**no credentials** *username* [*password* ]

### Syntax Description

<i>username</i>	Authentication username of the HTTP probe header. The character string is limited to 15 characters.
<i>password</i>	(Optional) Authentication password of the HTTP probe header. The character string is limited to 15 characters.

### Command Default

Basic authentication values for the HTTP IOS SLB probe are not configured.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures an HTTP probe named PROBE2, enters HTTP probe configuration mode, sets the HTTP authentication to username Username1, and sets the password to develop:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# credentials Username1 develop
```

### Related Commands

Command	Description
<b>show ip slb probe</b>	Displays information about an IOS Server Load Balancing (IOS SLB) probe.



## delay (firewall farm TCP protocol)

To change the amount of time the IOS Server Load Balancing (IOS SLB) maintains TCP connection context after a connection has terminated, use the **delay** command in firewall farm TCP protocol configuration mode. To restore the default delay timer, use the **no** form of this command.

**delay** *duration*

**no delay**

### Syntax Description

<i>duration</i>	Delay timer duration in seconds. The valid range is 1 to 600 seconds. The default value is 10 seconds.
-----------------	--

### Command Default

The default duration is 10 seconds.

### Command Modes

Firewall farm TCP protocol configuration (config-slb-fw-tcp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The delay timer allows out-of-sequence packets and final acknowledgments (ACKs) to be delivered after a TCP connection ends. Do not set this value to zero (0).

If you are configuring a delay timer for HTTP flows, choose a low number such as 5 seconds as a starting point.

### Examples

The following example specifies that IOS SLB maintains TCP connection context for 30 seconds after a connection has terminated:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol tcp
Router(config-slb-fw-tcp)# delay 30
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>protocol tcp</b>	Enters firewall farm TCP protocol configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.



## delay (virtual server)

To change the amount of time IOS Server Load Balancing (IOS SLB) maintains TCP connection context after a connection has terminated, use the **delay** command in SLB virtual server configuration mode. To restore the default delay timer, use the **no** form of this command.

**delay** {*duration*| **radius framed-ip** *duration*}

**no delay** {*duration*| **radius framed-ip** *duration*}

### Syntax Description

<i>duration</i>	Delay timer duration for TCP connection context, in seconds. The valid range is 1 to 600 seconds. The default value is 10 seconds.
<b>radius framed-ip</b> <i>duration</i>	Delay timer for RADIUS framed-ip sticky database, in seconds. The valid range is 1 to 43200 seconds. The default value is 10 seconds.

### Command Default

The default duration for the TCP connection context is 10 seconds. The default duration for the RADIUS framed-ip sticky database is 10 seconds.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(18)E	The <b>radius</b> and <b>framed-ip</b> keywords and the <i>duration</i> argument were added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The TCP connection context delay timer allows out-of-sequence packets and final acknowledgments (ACKs) to be delivered after a TCP connection ends. Do not set this value to zero (0).

If you are configuring a TCP connection context delay timer for HTTP flows, choose a low number such as 5 seconds as a starting point.

For the Home Agent Director, the **delay** command has no meaning and is not supported.

### Examples

The following example specifies that IOS SLB maintains TCP connection context for 30 seconds after a connection has terminated:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# delay 30
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.

## expect

To configure a status code or regular expression to expect information from the HTTP probe, use the **expect** command in HTTP probe configuration mode. To restore the default settings, use the **no** form of this command.

**expect** [**status** *status-code*] [**regex** *expression*]

**no expect** [**status** *status-code*] [**regex** *expression*]

### Syntax Description

<b>status</b> <i>status-code</i>	(Optional) Configures the expected HTTP status code. The valid range is 100 to 599. The default expected status code is 200.
<b>regex</b> <i>expression</i>	(Optional) Configures the regular expression expected in the HTTP response.  For information about regular expressions and how to use them in Cisco IOS software configurations, refer to the Understanding Regular Expressions section of the <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> .

### Command Default

The default expected status code is 200. There is no default expected regular expression.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.1(3a)E	The <b>regex</b> keyword and <i>expression</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The **expect** command configures the expected status code or regular expression to be received from the servers. A real server is considered to have failed and is taken out of service if any of the following events occurs:

- A status number other than the expected one is received.

- The expected regular expression is not received in the first 2920 bytes of probe output. (IOS Server Load Balancing [IOS SLB] searches only the first 2920 bytes for the expected status code or regular expression.)
- The server fails to respond.

For IOS SLB firewall load balancing, configure the HTTP probe to expect status code 401.

### Examples

The following example configures an HTTP probe named PROBE2, enters HTTP configuration mode, and configures the HTTP probe to expect the status code 401 and the regular expression Copyright:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# expect status 401 regex Copyright
```

### Related Commands

Command	Description
<b>ip slb probe http</b>	Configures an HTTP probe name and enters HTTP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## failaction (firewall farm)

To configure the IOS Server Load Balancing (IOS SLB) feature's behavior when a firewall fails, use the **failaction** command in firewall farm configuration mode.

### failaction purge

#### Syntax Description

<b>purge</b>	Enables IOS SLB to automatically remove connections to failed firewalls from the connection database even if the idle timers have not expired.
--------------	--

#### Command Default

If you do not specify the **failaction** command, IOS SLB does not automatically remove connections to failed firewalls.

#### Command Modes

Firewall farm configuration (config-slb-fw)

#### Command History

Release	Modification
12.1(9)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

#### Usage Guidelines

This command is useful for applications that do not rotate the source port (such as Internet Key Exchange [IKE]), and for protocols that do not have ports to differentiate flows (such as Encapsulation Security Payload [ESP]).

#### Examples

In the following example, IOS SLB removes all connections to failed firewalls in firewall farm FIRE1:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# failaction purge
```

## failaction (server farm)

To configure IOS Server Load Balancing (IOS SLB) feature's behavior when a real server fails, use the **failaction** command in server farm configuration mode. To restore the default settings, use the **no** form of this command.

**failaction** {purge| asn purge| gtp purge| radius reassign}

**no failaction** {purge| asn purge| gtp purge| radius reassign}

### Syntax Description

<b>purge</b>	Enables IOS SLB to automatically remove connections to failed real servers from the connection database even if the idle timers have not expired.
<b>asn purge</b>	Enables IOS SLB to automatically remove objects associated with failed real servers from the Access Service Network (ASN) sticky database, even if the idle timers have not expired.
<b>gtp purge</b>	Enables IOS SLB to automatically remove objects associated with failed real servers from the general packet radio service (GPRS) Tunneling Protocol (GTP) International Mobile Subscriber ID (IMSI) sticky database, even if the idle timers have not expired.
<b>radius reassign</b>	Enables IOS SLB to automatically reassign to a new real server RADIUS sticky objects that are destined for a failed real server.

### Command Default

If you do not specify the **failaction** command, IOS SLB does not perform the following actions:

- Remove connections to failed real servers
- Remove connections to objects associated with failed real servers
- Remove ASN or GPRS sticky objects (IOS SLB continues to assign new session requests to the failed real servers)
- Reassign RADIUS sticky objects

### Command Modes

Server farm configuration (config-slb-sfarm)

**Command History**

Release	Modification
12.1(9)E	This command was introduced.
12.1(11b)E	The <b>radius reassign</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	The <b>gtp purge</b> keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	The <b>asn purge</b> keywords were added.

**Usage Guidelines**

This command is useful for applications that do not rotate the source port (such as Internet Key Exchange [IKE]), and for protocols that do not have ports to differentiate flows (such as Encapsulation Security Payload [ESP]).

You can specify **no failaction purge**, but it has no effect on the connection database.

If you specify **failaction radius reassign**, IOS SLB reassigns RADIUS sticky objects without seeing any new RADIUS messages. The assumption is that, in the event of a failure, the RADIUS proxy gateways can handle user flows without seeing the RADIUS messages. If the RADIUS proxy gateways cannot do so, do not specify the **failaction radius reassign** command.

**Examples**

In the following example, IOS SLB removes all connections to failed real servers in server farm PUBLIC:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# failaction purge
```

## faildetect (custom UDP probe)

To specify the number of consecutive unacknowledged custom User Datagram Protocol (UDP) probes that constitute failure of the real server, use the **faildetect** command in custom UDP probe configuration mode. To restore the default values that indicate a server failure, use the **no** form of this command.

**faildetect** *number-of-probes*

**no faildetect**

### Syntax Description

<i>number-of-probes</i>	Number of consecutive unacknowledged custom UDP probes allowed before a real server is considered to have failed. Valid range is 1 to 65535. The default value is one (1) unacknowledged custom UDP probe.
-------------------------	--

### Command Default

The default value is one (1) unacknowledged probe.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Examples

In the following example the unacknowledged custom UDP probe threshold is set to 16:

```
Router(config)# ip slb probe PROBE6 custom udp
Router(config-slb-probe)# faildetect 16
```

### Related Commands

Command	Description
<b>ip slb probe custom udp</b>	Configures a custom User Datagram Protocol (UDP) probe name and enters custom UDP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS Server Load Balancing (IOS SLB) probe.



## faildetect (DNS probe)

To specify the conditions that indicate a server failure, use the **faildetect** command in DNS probe configuration mode. To restore the default values that indicate a server failure, use the **no** form of this command.

**faildetect** *number-of-probes*

**no faildetect**

### Syntax Description

<i>number-of-probes</i>	Number of consecutive unacknowledged Domain Name System (DNS) probes allowed before a real server is considered to have failed. Valid range is 1 to 65535. The default value is three (3) unacknowledged DNS probes.
-------------------------	--

### Command Default

The default value is three (3) unacknowledged DNS probes.

### Command Modes

DNS probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

In the following example the unacknowledged DNS probe threshold is set to 16:

```
Router(config)# ip slb probe PROBE4 dns
Router(config-slb-probe)# faildetect 16
```

### Related Commands

Command	Description
<b>ip slb probe dns</b>	Configures a Domain Name System (DNS) probe name and enters DNS probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## faildetect (ping probe)

To specify the conditions that indicate a server failure, use the **faildetect** command in ping probe configuration mode. To restore the default values that indicate a server failure, use the **no** form of this command.

**faildetect** *number-of-pings*

**no faildetect**

### Syntax Description

<i>number-of-pings</i>	Number of consecutive unacknowledged pings allowed before a real server is considered to have failed. Valid range is 1 to 65535. The default is ten (10) unacknowledged pings.
------------------------	--

### Command Default

The default value is ten (10) unacknowledged pings.

### Command Modes

Ping probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

In the following example the unacknowledged ping threshold is set to 16:

```
Router(config)# ip slb probe PROBE1 ping
Router(config-slb-probe)# faildetect 16
```

### Related Commands

Command	Description
<b>ip slb probe ping</b>	Configures a ping probe name and enters ping probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## faildetect inband (real server)

To enable automatic server failure detection, use the **faildetect inband** command in real server configuration mode. To disable automatic server failure detection, use the **no** form of this command.

**faildetect inband**

**no faildetect inband**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Automatic server failure detection is enabled.

**Command Modes** Real server configuration (config-slb-real)

Command History	Release	Modification
	12.2(14)ZA4	This command was introduced.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** If you have configured all-port virtual servers (that is, virtual servers that accept flows destined for all ports except GTP ports), flows can be passed to servers for which no application port exists. When the servers reject these flows, Cisco IOS SLB might fail the servers and remove them from load balancing. This situation can also occur in slow-to-respond AAA servers in RADIUS load-balancing environments. To prevent this situation, you can disable automatic server failure detection using the **no faildetect inband** command.



**Note** If you disable automatic server failure detection using the **no faildetect inband** command, Cisco strongly recommends that you configure one or more probes. If you specify the **no faildetect inband** command, the **faildetect numconns** command is ignored, if specified.

**Examples** In the following example, automatic server failure detection is disabled:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-real)# no faildetect inband
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>faildetect numconns (real server)</b>	Specifies the conditions that indicate a real server failure.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.

## faildetect numconns (real server)

To specify the conditions that indicate a real server failure, use the **faildetect numconns** command in SLB real server configuration mode. To restore the default values that indicate a server failure, use the **no** form of this command.

**faildetect numconns** *number-of-conns* [**numclients** *number-of-clients*]

**no faildetect numconns** *number-of-conns* [**numclients** *number-of-clients*]

### Syntax Description

<i>number-of-conns</i>	Number of consecutive connection failures allowed before IOS Server Load Balancing (IOS SLB) fails the real server. The valid range is 1 to 255. The default value is 8.
<b>numclients</b> <i>number-of-clients</i>	(Optional) Number of unique client IP addresses that can experience connection failures before IOS SLB fails the real server. The valid range is 1 to 8. The default value is 2.  If there is only one client in your network (for example, one serving GPRS support node [SGSN] in a general packet radio service [GPRS] load-balancing environment), then you must specify <b>numclients 1</b> .  In RADIUS load balancing, for automatic session-based failure detection, specify <b>numclients 1</b> .

### Command Default

If you do not specify the **faildetect numconns** command, the default value of the connection failure threshold is 8. If you specify the **faildetect numconns** command but do not specify the **numclients** keyword, the default value of the client connection failure threshold is 2.

### Command Modes

SLB real server configuration (config-slb-real)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(9)E	This command was modified to support GPRS load balancing.

Release	Modification
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

If you specify the **no faildetect inband** command, the **faildetect numconns** command is ignored, if specified. IOS SLB does not fail the real server until both of the following conditions are met:

- There have been *number-of-conns* consecutive connection failures.
- There have been *number-of-clients* unique client connection failures.

That is, there can be many consecutive connection failures, but until there have also been *number-of-clients* unique client connection failures, IOS SLB does not fail the real server.

Similarly, there can be many unique client connection failures, but until there have also been *number-of-conns* consecutive connection failures, IOS SLB does not fail the real server.

GPRS load balancing has the following features:

- The **numconns** keyword specifies the number of consecutive Create Packet Data Protocol (PDP) requests allowed before IOS SLB fails the gateway GPRS support node (GGSN).
- The **numclients** keyword specifies the number of unique client Create PDP request failures allowed before IOS SLB fails the GGSN.

### Examples

In the following example, the **numconns** keyword is set to 10 and the **numclients** keyword is set to 3:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-real)# faildetect numconns 10 numclients 3
```

With those settings, IOS SLB will not fail the real server until there have been ten (10) consecutive connection failures and there have been three (3) unique client connection failures.

### Related Commands

Command	Description
<b>faildetect inband (real server)</b>	Enables automatic server failure detection.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.



# farm-weight

To specify a weight to be used by the IOS SLB KeepAlive Application Protocol (KAL-AP) agent when calculating the load value for a server farm, use the **farm-weight** command in server farm configuration mode. To restore the default weight value, use the **no** form of this command.

**farm-weight** *setting*

**no farm-weight**

## Syntax Description

<i>setting</i>	Weight setting to be used by the KAL-AP agent. Valid settings range from 1 to 4294967295.
----------------	---

## Command Default

If you do not configure a KAL-AP farm weight, IOS SLB calculates a relative weight.

## Command Modes

Server farm configuration (config-slb-sfarm)

## Command History

Release	Modification
12.2(33)SRC	This command was introduced.

## Usage Guidelines

Configuring a **farm-weight** enables KAL-AP to calculate loads more accurately when load balancing in a global server load balancing (GSLB) environment.

For best results, configure a **farm-weight** that is equal to the sum of the maximum DFP weights for the real servers in the server farm. (The maximum DFP weight for a real server is configured using the **gprs dfp max-weight** command in global configuration mode.) For example, if there are three real servers in a server farm, configured with maximum DFP weights of 100, 50, and 50, then configure a **farm-weight** of 200 (that is, 100 + 50 + 50). If a real server is added to or removed from the server farm, you must adjust the **farm-weight** accordingly.

## Examples

The following example specifies that a weight of 16 is to be used by the KAL-AP agent when calculating the load value for a server farm:

```
Router(config-slb-sfarm)# farm-weight 16
```



**Related Commands**

<b>Command</b>	<b>Description</b>
<b>gprs dfp max-weight</b>	Specifies the maximum weight sent to a DFP manager by a Gateway GPRS Support Node (GGSN) acting as a DFP agent.
<b>ip slb capp udp</b>	Enables the IOS SLB KeepAlive Application Protocol (KAL-AP) agent and enters SLB Content Application Peering Protocol (CAPP) configuration mode.
<b>ip slb serverfarm</b>	Identifies a server farm and enter SLB server farm configuration mode.

## gtp notification cac

To limit the number of times IOS SLB can reassign a session to a new real server for GGSN-IOS SLB messaging, use the **gtp notification cac** command in virtual server configuration mode. To restore the default limit, use the **no** form of this command.

**gtp notification cac** [ *reassign-count* ]

**no gtp notification cac**

### Syntax Description

<i>reassign-count</i>	(Optional) Number of times IOS SLB can reassign a session to a new real server. That is, the number of times that IOS SLB can reassign a rejected Create PDP Context to a new real GGSN.  The valid range is 1 to 20 reassignments. The default setting is 2 reassignments (that is, the initial real server assignment and 2 additional reassignments).
-----------------------	--

### Command Default

The default is 2 reassignments (that is, the initial real server assignment and 2 additional reassignments).

### Command Modes

Virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(17d)SXB1	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example specifies that IOS SLB can reassign a session up to 5 times:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# gtp notification cac 5
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).

Command	Description
virtual	Configures the virtual server attributes.

## gtp session (virtual server)

To enable IOS SLB to create general packet radio service (GPRS) Tunneling Protocol (GTP) load-balancing sessions, use the **gtp session** command in SLB virtual server configuration mode. To disable the creation of GTP sessions by IOS SLB, (the sticky-only load-balancing solution), use the **no** form of this command.

**gtp session**

**no gtp session**

**Syntax Description** This command has no arguments or keywords.

**Command Default** IOS SLB creates GTP load-balancing sessions. Sticky-only load-balancing is disabled.

**Command Modes** SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(33)SRE	This command was introduced.

### Usage Guidelines

Sticky-only load balancing is supported for all versions of GTP.

If sticky-only load balancing (**no gtp session**) is enabled for GTP:

- IOS SLB load-balances GTP Packet Data Protocol (PDP) create requests based on the sticky objects in the GTP International Mobile Subscriber ID (IMSI) sticky database.
- Sticky connections must also be enabled for the virtual server, using the **sticky (virtual server)** command.
- Automatic server failure detection (the **faildetect inband** command) is not supported. Instead, use probes to detect real server failures.

### Examples

The following example specifies that sticky-only load balancing is to be used for GTP:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# no gtp session
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.



## gw port (virtual server)

To specify the port that the Cisco Broadband Wireless Gateway (BWG) is to use to communicate with IOS SLB, use the **gw port** command in SLB virtual server configuration mode. To restore the default settings, use the **no** form of this command.

**gw port** *port*

**no gw port** *port*

### Syntax Description

<i>port</i>	Port number used by the Cisco BWG to communicate with IOS SLB. This port number must be unique across all virtual servers.  Valid port numbers are 1 to 65535.
-------------	--

### Command Default

No port number is defined.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(33)SRE	This command was introduced.

### Usage Guidelines

The Cisco BWG uses this port when sending delete notifications and NAI update messages to IOS SLB. If multiple communication ports are needed, the network administrator must identify multiple unique unused ports.

### Examples

The following example specifies that the Cisco BWG is to use port 63082 to communicate with IOS SLB:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# gw port 63082
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.

## hand-off radius

To change the amount of time IOS Server Load Balancing (IOS SLB) waits for an ACCT-START message from a new Mobile IP foreign agent in the event of a foreign agent hand-off, use the **hand-off radius** command in virtual server configuration mode. To restore the default hand-off timer, use the **no** form of this command.

**hand-off radius** *duration*

**no hand-off radius**

### Syntax Description

<i>duration</i>	Hand-off timer duration in seconds. The valid range is 1 to 43200 seconds.
-----------------	--

### Command Default

No default behavior or values.

### Command Modes

Virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(14)ZA2	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The hand-off radius timer is valid only for RADIUS virtual servers that have the **service radius** keywords specified on the **virtual** command.

### Examples

The following example specifies that IOS SLB waits for 30 seconds after a foreign agent hand-off:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# hand-off radius 30
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).
<b>virtual</b>	Configures the virtual server attributes.





# header

To configure the basic authentication values for the HTTP probe, use the **header** command in HTTP probe configuration mode. To remove a header HTTP probe configuration, use the **no** form of this command.

**header** *field-name* [*field-value* ]

**no header** *field-name* [*field-value* ]

## Syntax Description

<i>field-name</i>	Configures the name of the HTTP probe header. The character string is limited to 15 characters.
<i>field-value</i>	(Optional) Configures the value of the HTTP probe header.

## Command Default

The following headers are inserted in the request by default:

Accept: \*/\* Connection: close User-Agent: cisco-slb-probe/1.0 Host: *virtual IP address*

## Command Modes

HTTP probe configuration (config-slb-probe)

## Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

The **header** command in HTTP probe configuration mode configures the name and value parameters of the header.



### Note

The colon ( : ) separating the field name and field value is automatically inserted if not provided. Multiple headers with the same name are not supported.

**Examples**

The following example configures an HTTP probe named PROBE2, enters HTTP configuration mode, and configures the HTTP probe header name as HeaderName and value as HeaderValue:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# header HeaderName HeaderValue
```

**Related Commands**

Command	Description
<b>ip slb probe http</b>	Configures an HTTP probe name and enters HTTP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## idle (firewall farm datagram protocol)

To specify the minimum time IOS Server Load Balancing (IOS SLB) maintains connection information in the absence of packet activity, use the **idle** command in firewall farm datagram protocol configuration mode. To restore the default idle duration value, use the **no** form of this command.

*idle duration*

**no idle**

### Syntax Description

<i>duration</i>	Idle connection timer duration in seconds. Valid values range from 10 to 65535 seconds. The default is 3600 seconds (1 hour).
-----------------	---

### Command Default

The default idle duration is 3600 seconds.

### Command Modes

Firewall farm datagram protocol configuration (config-slb-fw-udp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example instructs IOS SLB to maintain connection information for an idle connection for 120 seconds:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol datagram
Router(config-slb-fw-udp)# idle 120
```

### Related Commands

Command	Description
<b>protocol datagram</b>	Enters firewall farm datagram protocol configuration mode.

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

## idle (firewall farm TCP protocol)

To specify the minimum time IOS Server Load Balancing (IOS SLB) maintains connection information in the absence of packet activity, use the **idle** command in firewall farm TCP protocol configuration mode. To restore the default idle duration value, use the **no** form of this command.

*idle duration*

**no idle**

### Syntax Description

<i>duration</i>	Idle connection timer duration in seconds. Valid values range from 10 to 65535 seconds. The default is 3600 seconds (1 hour).
-----------------	---

### Command Default

The default idle duration is 3600 seconds.

### Command Modes

Firewall farm TCP protocol configuration (config-slb-fw-tcp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

If a client sends a TCP packet that is not a sequence number (SYN) or reset (RST) packet, and IOS SLB does not have a TCP connection object in its table (possibly due to expiration of the idle timer), IOS SLB sends a TCP RST to the client.

If you are configuring an idle timer for HTTP flows, choose a low number such as 120 seconds as a starting point. A low number ensures that the IOS SLB connection database maintains a manageable size if problems at the server, client, or network result in a large number of connections. However, do not choose a value under 60 seconds; such a low value can reduce the efficiency of IOS SLB.

### Examples

The following example instructs IOS SLB to maintain connection information for an idle connection for 120 seconds:

```
Router(config)# ip slb firewallfarm FIRE1
```

```
Router(config-slb-fw)# protocol tcp  
Router(config-slb-fw-tcp)# idle 120
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>protocol tcp</b>	Enters firewall farm TCP protocol configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

## idle (virtual server)

To specify the minimum time the IOS Server Load Balancing (IOS SLB) maintains connection information in the absence of packet activity, use the **idle** command in SLB virtual server configuration mode. To restore the default idle duration value, use the **no** form of this command.

**idle** [*asn request duration*] **asn msid** *msid* **gtp imsi** *duration* [**query** [*max-queries* ]]] **gtp request** *duration* | **ipmobile request** *duration* | **radius** {**request** | **framed-ip**} *duration*

**no idle** [*asn request duration*] **asn msid** *msid* **gtp imsi** *duration* [**query** [*max-queries* ]]] **gtp request** *duration* | **ipmobile request** *duration* | **radius** {**request** | **framed-ip**} *duration*

### Syntax Description

<b>asn request</b>	(Optional) For load balancing across a set of Access Service Network (ASN) gateways, configures the duration for which IOS SLB keeps the session object. If a Mobile Station (MS) Pre-Attachment Ack is received before the timer expires, IOS SLB resets the timer.
<i>duration</i>	<p>Idle connection timer duration in seconds. Valid values range from 4 to 65535 seconds. For GTP IMSI, you can specify 0 to disable the timer and prevent GTP IMSI sticky database objects from timing out.</p> <p>The default values are:</p> <ul style="list-style-type: none"> <li>• 60 seconds in ASN load balancing.</li> <li>• 60 seconds for objects in the ASN MSID sticky database.</li> <li>• 0 seconds for objects in the GTP IMSI sticky database.</li> <li>• 10 seconds in the Home Agent Director.</li> <li>• 30 seconds in GPRS load balancing.</li> <li>• 30 seconds for RADIUS entries in the IOS SLB session database.</li> <li>• 7200 seconds for entries in the IOS SLB RADIUS framed-IP sticky database.</li> <li>• 3600 seconds (1 hour) in all other environments.</li> </ul>
<b>asn msid</b>	(Optional) For load balancing across a set of ASN gateways, configures the duration for objects in the ASN Mobile Station ID (MSID) sticky database.

<b>gtp imsi</b>	(Optional) For general packet radio service (GPRS) Tunneling Protocol (GTP) cause code inspection, configures the duration for objects in the GTP International Mobile Subscriber ID (IMSI) sticky database.
<b>query</b>	(Optional) Query the Cisco gateway GPRS support node (GGSN) before deleting any GTP IMSI sticky objects. The default is not to query the GGSN.
<i>max-queries</i>	(Optional) Maximum number of queries to send when there is no response from the GGSN. Valid range is 1 to 10 queries. The default value is 5 queries.
<b>gtp request</b>	(Optional) For general packet radio service (GPRS) Tunneling Protocol (GTP) cause code inspection, configures the duration for Packet Data Protocol (PDP) context create, update, or delete request messages to a real gateway GPRS support node (GGSN) to go unanswered, before IOS SLB cleans up the session object.
<b>ipmobile request</b>	(Optional) For Home Agent Director, configures the duration for IOS SLB to wait for a Mobile IP Registration Request (RRQ), before IOS SLB cleans up the session object.
<b>radius request</b>	(Optional) Configures the duration for RADIUS entries in the IOS SLB session database.
<b>radius framed-ip</b>	(Optional) Configures the duration for entries in the IOS SLB RADIUS framed-IP sticky database.

**Command Default**

The default idle duration is:

- 60 seconds in ASN load balancing.
- 60 seconds for objects in the ASN MSID sticky database.
- 0 seconds for objects in the GTP IMSI sticky database.
- 10 seconds in the Home Agent Director
- 30 seconds in GPRS load balancing
- 30 seconds for RADIUS entries in the IOS SLB session database
- 7200 seconds for entries in the IOS SLB RADIUS framed-IP sticky database
- 3600 seconds (1 hour) in all other environments

The default setting for the **query** keyword is no queries.



The default setting for the *max-queries* argument is 5 queries.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(9)E	This command was modified to support GPRS load balancing.
12.1(11b)E	This command was modified to support RADIUS load balancing.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>gtp request</b> keywords were added.
12.2(14)ZA2	The <b>ipmobile request</b> keywords were added.
12.2(18)SXE	The <b>gtp imsi</b> keywords were added.
12.2(18)SXF	The <b>query</b> keyword and <i>max-queries</i> argument were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC1	The <b>asn request</b> option was added.
12.2(33)SRE	The <b>asn msid</b> option was added.

### Usage Guidelines

If a client sends a TCP packet that is not a sequence number (SYN) or reset (RST) packet, and IOS SLB does not have a TCP connection object in its table (possibly due to expiration of the idle timer), IOS SLB sends a TCP RST to the client.

If you are configuring an idle timer for HTTP flows, choose a low number such as 120 seconds as a starting point. A low number ensures that the IOS SLB connection database maintains a manageable size if problems at the server, client, or network result in a large number of connections. However, do not choose a value under 60 seconds (except in GPRS load balancing); such a low value can reduce the efficiency of the IOS SLB feature.

In most environments, the idle timer times out data paths. However, in GPRS load balancing, it times out the session context for signaling paths (not data paths).

In GPRS load balancing without GTP cause code inspection enabled, you must specify an idle timer greater than the longest possible interval between PDP context requests on the serving GPRS support node (SGSN). The longest interval can be expressed using the following algorithm:

Longest interval =  $T3 \times 2(N3-2)$

where T3 is the SGSN's T3-RESPONSE counter value and N3 is the SGSN's N3-REQUESTS counter value. For example, if the T3-RESPONSE counter value is 3 and the N3-REQUESTS counter value is 6, then:

$$\text{Longest interval} = 3 \times 2(6-2) = 3 \times 2(4) = 3 \times 16 = 48 \text{ seconds}$$

Given those values, you must specify an idle timer of at least 49 seconds.

### Examples

The following example instructs IOS SLB to maintain sticky objects in the GTP IMSI sticky database for 120 seconds:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# idle gtp imsi 120
```

### Related Commands

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.

## inservice (DFP agent)

To enable the Dynamic Feedback Protocol (DFP) agent for communication with a DFP manager, use the **inservice** command in DFP agent configuration mode. To remove the DFP agent from service, use the **no** form of this command.

**inservice**  
**no inservice**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The DFP agent is inactive.

**Command Modes** DFP agent configuration (config-dfp)

### Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	This command was integrated into Cisco IOS Release 12.2(18)SXD.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** A DFP agent is inactive until both of the following conditions are met:

- The DFP agent has been enabled using the **inservice (DFP agent)** command.
- The client subsystem has changed the DFP agent's state to **ACTIVE**.

When you use the **no** form of this command to remove a DFP agent from service, the DFP agent closes all open connections, and no new connections are assigned.

### Examples

In the following example, the DFP agent is enabled for communication with a DFP manager:

```
Router(config)# ip dfp agent slb
Router(config-dfp)# inservice
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and initiates DFP agent configuration mode.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and initiates DFP configuration mode.

## inservice (firewall farm)

To enable the firewall farm for use by IOS Server Load Balancing (IOS SLB), use the **inservice** command in firewall farm configuration mode. To remove the firewall farm from service, use the **no** form of this command.

**inservice** [**standby** *group-name*]

**no inservice** [**standby** *group-name*]

### Syntax Description

<b>standby</b>	(Optional) Configures the Hot Standby Router Protocol (HSRP) standby firewall farm for use with stateless and stateful backup.
<i>group-name</i>	(Optional) HSRP group name with which the IOS SLB firewall farm is associated.

### Command Default

The firewall farm is defined to IOS SLB but is not used.

### Command Modes

Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

When you use the **no** form of this command to remove a firewall farm from service, the firewall farm acquiesces gracefully. No new connections are assigned, and existing connections are allowed to complete.

### Examples

In the following example, the firewall farm is enabled for use by the IOS SLB feature:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# inservice
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb firewallfarm</b>	Identifies a firewall by IP address farm and enters firewall farm configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

## inservice (firewall farm real server)

To enable the firewall for use by IOS Server Load Balancing (IOS SLB), use the **inservice** command in firewall farm real server configuration mode. To remove the firewall from service, use the **no** form of this command.

**inservice**

**no inservice**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The firewall is defined to IOS SLB but is not used.

**Command Modes** Firewall farm real server configuration (config-slb-fw-real)

Command History	Release	Modification
	12.1(3a)E	This command was introduced.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** IOS SLB firewall load balancing uses probes to detect failures. Therefore, if you have not configured a probe, the firewall is not placed in service.

When you use the **no** form of this command to remove a firewall from service, the firewall acquiesces gracefully. No new connections are assigned, and existing connections are allowed to complete.

**Examples** In the following example, the firewall is enabled for use by the IOS SLB feature:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# real 10.10.1.1
Router(config-slb-fw-real)# inservice
```

Related Commands	Command	Description
	<b>real (firewall farm)</b>	Identifies a firewall by IP address as a member of a firewall farm and enters real server configuration mode.

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb reals</b>	Displays information about the real servers.



## inservice (server farm real server)

To enable the real server for use by IOS Server Load Balancing (IOS SLB), use the **inservice** command in SLB server farm real server configuration mode. To remove the real server from service, use the **no** form of this command.

**inservice**

**no inservice**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The real server is defined to IOS SLB but is not used.

**Command Modes** SLB server farm real server configuration (config-slb-sfarm-real)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

In the following example, the real server is enabled for use by the IOS SLB feature:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-sfarm-real)# inservice
```

### Related Commands

Command	Description
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.

Command	Description
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.

## inservice (server farm virtual server)

To enable the virtual server for use by IOS Server Load Balancing (IOS SLB), use the **inservice** command in SLB server farm virtual server configuration mode. To remove the virtual server from service, use the **no** form of this command.

**inservice** [*standby group-name*] [**active**]

**no inservice** [*standby group-name*]

### Syntax Description

<b>standby</b>	(Optional) Configures the Hot Standby Router Protocol (HSRP) standby virtual server for use with stateless and stateful backup.
<i>group-name</i>	(Optional) HSRP group name with which the IOS SLB virtual server is associated.
<b>active</b>	(Optional) Enables the virtual server to stop answering Internet Control Message Protocol (ICMP) requests if all real servers associated with the virtual server are inactive.

### Command Default

The virtual server is defined to IOS SLB but is not used.

### Command Modes

SLB server farm virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(1)E	The <b>standby</b> keyword and <i>group-name</i> argument were added.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The <b>active</b> keyword was added.

**Usage Guidelines**

When you use the **no** form of this command to remove a virtual server from service, the virtual server acquiesces gracefully. No new connections are assigned, and existing connections are allowed to complete.

If the **active** keyword is configured, and all of the real servers that are associated with the virtual server are inactive, the following actions occur:

- The virtual server is placed in the INOP\_REAL state.
- An SNMP trap is generated for the virtual server's state transition.
- The virtual server stops answering ICMP requests.

**Examples**

In the following example, the virtual server is enabled for use by the IOS SLB feature:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# inservice
```

**Related Commands**

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers.
<b>virtual</b>	Configures the virtual server attributes.

## interval (custom UDP probe)

To configure a custom User Datagram Protocol (UDP) probe interval, use the **interval** command in custom UDP probe configuration mode. To remove a custom UDP probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 10 seconds.
----------------	--

### Command Default

The default custom UDP probe interval value is 10 seconds.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a custom UDP probe named PROBE6, enters custom UDP configuration mode, and configures the custom UDP probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE6 custom udp
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe custom udp</b>	Configures a custom User Datagram Protocol (UDP) probe name and enters custom UDP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

interval (custom UDP probe)

## interval (DFP agent)

To configure a Dynamic Feedback Protocol (DFP) agent weight recalculation interval, use the **interval** command in DFP agent configuration mode. To restore the default setting, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before recalculating weights for the DFP manager. The valid range is from 5 to 65535 seconds. The default is 10 seconds.
----------------	--

### Command Default

The default **interval** value is 10 seconds.

### Command Modes

DFP agent configuration (config-dfp)

### Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	This command was integrated into Cisco IOS Release 12.2(18)SXD.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The DFP agent sends a new weight to the DFP manager only if the new weight is different from the old weight. If the new weight is the same as the old weight, it is not sent to the DFP manager.

### Examples

The following example shows how to configure the DFP agent to recalculate weights every 11 seconds:

```
Router(config)# ip dfp agent slb
Router(config-dfp)# interval 11
```

### Related Commands

Command	Description
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.

Command	Description
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and enters DFP agent configuration mode.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and enters DFP configuration mode.



## interval (DNS probe)

To configure a DNS probe interval, use the **interval** command in DNS probe configuration mode. To remove a DNS probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 10 seconds.
----------------	--

### Command Default

The default DNS probe interval value is 10 seconds.

### Command Modes

DNS probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a DNS probe named PROBE4, enters DNS configuration mode, and configures the DNS probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE4 dns
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe dns</b>	Configures a DNS probe name and enters DNS probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## interval (HTTP probe)

To configure an HTTP probe interval, use the **interval** command in HTTP probe configuration mode. To remove an HTTP probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 8 seconds.
----------------	---

### Command Default

The default HTTP probe interval value is 8 seconds.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures an HTTP probe named PROBE2, enters HTTP configuration mode, and configures the HTTP probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe http</b>	Configures an HTTP probe name and enters HTTP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## interval (ping probe)

To configure a ping probe interval, use the **interval** command in ping probe configuration mode. To remove a ping probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 1 second.
----------------	--

### Command Default

The default ping probe interval value is 1 second.

### Command Modes

Ping probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a ping probe named PROBE1, enters ping configuration mode, and configures the ping probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE1 ping
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe ping</b>	Configures a ping probe name and enters ping probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## interval (TCP probe)

To configure a TCP probe interval, use the **interval** command in TCP probe configuration mode. To remove a TCP probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 10 seconds.
----------------	--

### Command Default

The default TCP probe interval value is 10 seconds.

### Command Modes

TCP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a TCP probe named PROBE5, enters TCP configuration mode, and configures the TCP probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE5 tcp
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe tcp</b>	Configures a TCP probe name and enters TCP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## interval (WSP probe)

To configure a Wireless Session Protocol (WSP) probe interval, use the **interval** command in WSP probe configuration mode. To remove a WSP probe interval configuration, use the **no** form of this command.

**interval** *seconds*

**no interval** *seconds*

### Syntax Description

<i>seconds</i>	Number of seconds to wait before reattempting the probe. Valid values range from 1 to 65535 seconds. The default interval is 8 seconds.
----------------	---

### Command Default

The default WSP probe interval value is 8 seconds.

### Command Modes

WSP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(5a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a ping probe named PROBE3, enters WSP probe configuration mode, and configures the WSP probe timer interval to send every 11 seconds:

```
Router(config)# ip slb probe PROBE3 wsp
Router(config-slb-probe)# interval 11
```

### Related Commands

Command	Description
<b>ip slb probe wsp</b>	Configures a WSP probe name and enters WSP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

# ip dfp agent

To identify a Dynamic Feedback Protocol (DFP) agent subsystem and enter DFP agent configuration mode, use the **ip dfp agent** command in global configuration mode. To remove the DFP agent identification, use the **no** form of this command.

**ip dfp agent** *subsystem-name*

**no ip dfp agent** *subsystem-name*

## Syntax Description

<i>subsystem-name</i>	<p>Character string used to identify the DFP agent subsystem:</p> <ul style="list-style-type: none"> <li>• <b>slb</b> for IOS SLB</li> <li>• <b>mobileip</b> for Mobile IP and the Home Agent Director</li> </ul> <p>The subsystem name enables the subsystem to send weights to a DFP manager. The subsystem name is limited to 15 characters.</p>
-----------------------	---

## Command Default

No DFP agent subsystem is defined.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	The <b>mobileip</b> subsystem name was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

To discover the subsystem names that are available in your network, enter the **ip dfp agent ?** command.

**Examples**

The following example identifies a DFP agent subsystem named **slb**:

```
Router(config)# ip dfp agent slb
Router(config-dfp)#
```

**Related Commands**

Command	Description
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and initiates DFP configuration mode.

## ip slb capp udp

To enable the IOS SLB KeepAlive Application Protocol (KAL-AP) agent and enter SLB Content Application Peering Protocol (CAPP) configuration mode, use the **ip slb capp udp** command in global configuration mode. To disable the KAL-AP agent feature, use the **no** form of this command.

**ip slb capp udp**

**no ip slb capp udp**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The KAL-AP agent is not enabled.

**Command Modes** Global configuration (config)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Examples

The following example enables the KAL-AP agent and enters CAPP UDP configuration mode:

```
Router(config)# ip slb capp udp
```

### Related Commands

Command	Description
<b>farm-weight</b>	Specifies a weight to be used by the IOS SLB KeepAlive Application Protocol (KAL-AP) agent when calculating the load value for a server farm.
<b>kal-ap domain</b>	Specifies a domain tag to be used by the IOS SLB KeepAlive Application Protocol (KAL-AP) agent when searching for a server farm.
<b>peer port</b>	Specifies the port to which the IOS SLB KeepAlive Application Protocol (KAL-AP) agent is to connect.
<b>peer secret</b>	Enables Message Digest Algorithm Version 5 (MD5) authentication for the IOS SLB KeepAlive Application Protocol (KAL-AP) agent.



## ip slb dfp

To configure Dynamic Feedback Protocol (DFP), supply an optional password, and enter DFP configuration mode, use the **ip slb dfp** command in global configuration mode. To remove the DFP configuration, use the **no** form of this command.

**ip slb dfp** [**password** [ *encrypt* ] *secret-string* [ *timeout* ]]

**no ip slb dfp**

### Syntax Description

<b>password</b>	(Optional) Password for Message Digest Algorithm Version 5 (MD5) authentication.
<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as <b>7</b> followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>(Optional) 1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p> <p>The <i>secret-string</i> must match the secret that is specified on the RADIUS client (for example, the gateway general packet radio service [GPRS] support node [GGSN]).</p>
<i>timeout</i>	(Optional) Delay period, in seconds, during which both the old password and the new password are accepted. The valid range is 0 to 65535 seconds. The default value is 180 seconds, if a password is specified.

**Command Default**

The default password encryption is 0 (unencrypted). The default password timeout is 180 seconds, if a password is specified.

**Command Modes**

Global configuration (config)

**Command History**

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(3a)E	The <b>0</b> and <b>7</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

The password specified in the **ip slb dfp** command for the DFP manager must match the password specified in the **password** command for the DFP agent.

The timeout option allows you to change the password without stopping messages between the DFP agent and its manager. The default value is 180 seconds.

During the timeout, the agent sends packets with the old password (or null, if there is no old password), and receives packets with either the old or new password. After the timeout expires, the agent sends and receives packets only with the new password; received packets that use the old password are discarded.

If you are changing the password for an entire load-balanced environment, set a longer timeout to allow enough time for you to update the password on all agents and servers before the timeout expires. Setting a longer timeout also prevents mismatches between agents and servers that have begun running the new password and agents, and servers on which you have not yet changed the old password.

If you are running IOS SLB as a DFP manager, and you specify a password on the **ip slb dfp** command, the password must match the one specified on the **password** command in DFP agent configuration mode in the DFP agent.

**Examples**

The following example configures DFP, sets the DFP password to Password1 and the timeout to 360 seconds, and enters DFP configuration mode:

```
Router(config)# ip slb dfp password Password1 360
Router(config-slb-dfp)#
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and enters DFP agent configuration mode.

## ip slb entries

To configure an initial allocation and a maximum value for IOS Server Load Balancing (IOS SLB) database entries, use the **ip slb entries** command in global configuration mode. To restore the default values, use the **no** form of this command.

```
ip slb entries [conn [init-conn [max-conn ]]] frag [init-frag [max-frag ]] lifetime timeout] gtp {gsn [init-gsn [max-gsn ]] nsapi [init-nsapi [max-nsapi ]]} | sticky [init-sticky [max-sticky ]]]
```

```
no ip slb entries [conn | frag [lifetime] | gtp {gsn| nsapi} | sticky]
```

### Syntax Description

<b>conn</b>	(Optional) Configures an initial allocation and a maximum value for IOS SLB connection database entries.
<i>init-conn</i>	(Optional) Initial allocation of connection database entries. When the number of available entries is reduced to less than half of the <i>init-conn</i> argument, IOS SLB begins allocating additional entries. The number of entries can grow dynamically up to the number specified by the <i>max-conn</i> argument.  Valid range is 1 to 1000000 connection database entries. The default is 8000 connection database entries.  <b>Note</b> Be careful when setting the <i>init-conn</i> argument to a very high value, such as 1000000, because IOS SLB immediately allocates those entries, which can cause the router or switch to pause indefinitely. Start with a lower value, such as 125000.
<i>max-conn</i>	(Optional) Maximum number of connection database entries that can be allocated.  Valid range is 1 to 8000000 connection database entries. The default is 8000000 connection database entries.
<b>frag</b>	(Optional) Configures an initial allocation and a maximum value for IOS SLB fragment database entries.

<i>init-frag</i>	<p>(Optional) Initial allocation of routing entries in the fragment database. When the number of available entries is reduced to less than half of the <i>init-frag</i> argument, IOS SLB begins allocating additional entries. The number of entries can grow dynamically up to the number specified by the <i>max-frag</i> argument.</p> <p>Valid range is 1 to 1000000 connection database entries. The default is 2000 connection database entries.</p> <p><b>Note</b> Be careful when setting the <i>init-frag</i> argument to a very high value, such as 1000000, because IOS SLB immediately allocates those entries, which can cause the router or switch to pause indefinitely. Start with a lower value, such as 125000.</p>
<i>max-frag</i>	<p>(Optional) Maximum number of fragment database entries that can be allocated.</p> <p>Valid range is 1 to 8000000 fragment database entries. The default is 32000 fragment database entries.</p>
<b>lifetime</b> <i>timeout</i>	<p>(Optional) Lifetime of an entry in the IOS SLB fragment database, in seconds.</p> <p>Valid range is 1 to 255 seconds. The default value is 10 seconds.</p>
<b>gtp</b>	<p>(Optional) Configures an initial allocation and a maximum value for IOS SLB general packet radio service (GPRS) Tunneling Protocol (GTP) database entries.</p>
<b>gsn</b>	<p>(Optional) Configures an initial allocation and a maximum value for IOS SLB GPRS support node (GSN) database entries.</p>
<i>init-gsn</i>	<p>(Optional) Initial allocation of GSN database entries. When the number of available entries is reduced to less than half of the <i>init-gsn</i> argument, IOS SLB begins allocating additional entries. The number of entries can grow dynamically up to the number specified by the <i>max-gsn</i> argument.</p> <p>Valid range is 1 to 5000 GSN database entries. The default is 200 GSN database entries.</p> <p><b>Note</b> Be careful when setting the <i>init-gsn</i> argument to a very high value, such as 5000, because IOS SLB immediately allocates those entries, which can cause the router or switch to pause indefinitely. Start with a lower value, such as 500.</p>

<i>max-gsn</i>	<p>(Optional) Maximum number of GSN database entries that can be allocated.</p> <p>Valid range is 1 to 20000 GSN database entries. The default is 20000 GSN database entries.</p>
<b>nsapi</b>	<p>(Optional) Configures an initial allocation and a maximum value for IOS SLB Network Service Access Point Identifier (NSAPI) database entries.</p>
<i>init-nsapi</i>	<p>(Optional) Initial allocation of NSAPI database entries. When the number of available entries is reduced to less than half of the <i>init-nsapi</i> argument, IOS SLB begins allocating additional entries. The number of entries can grow dynamically up to the number specified by the <i>max-nsapi</i> argument.</p> <p>Valid range is 1 to 1000000 NSAPI database entries. The default is 8000 NSAPI database entries.</p> <p><b>Note</b> Be careful when setting the <i>init-nsapi</i> argument to a very high value, such as 1000000, because IOS SLB immediately allocates those entries, which can cause the router or switch to pause indefinitely. Start with a lower value, such as 125000.</p>
<i>max-nsapi</i>	<p>(Optional) Maximum number of NSAPI database entries that can be allocated.</p> <p>Valid range is 1 to 8000000 NSAPI database entries. The default is 8000000 NSAPI database entries.</p>
<b>sticky</b>	<p>(Optional) Configures an initial allocation and a maximum value for IOS SLB sticky connection database entries.</p>
<i>init-sticky</i>	<p>(Optional) Initial allocation of sticky database entries. When the number of available entries is reduced to less than half of the <i>init-sticky</i> argument, IOS SLB begins allocating additional entries. The number of entries can grow dynamically up to the number specified by the <i>max-sticky</i> argument.</p> <p>Valid range is 1 to 1000000 sticky database entries. The default is 4000 sticky database entries.</p> <p><b>Note</b> Be careful when setting the <i>init-sticky</i> argument to a very high value, such as 1000000, because IOS SLB immediately allocates those entries, which can cause the router or switch to pause indefinitely. Start with a lower value, such as 125000.</p>

<i>max-sticky</i>	(Optional) Maximum number of sticky database entries that can be allocated. Valid range is 1 to 8000000 sticky database entries. The default is 8000000 sticky database entries.
-------------------	--

**Command Default**

For the connection database, the default initial allocation is 8000 connections, and the default maximum is 8000000 connections. For the fragment database, the default initial allocation is 2000 fragments, and the default maximum is 8000000 fragments. The default lifetime is 10 seconds. For the GSN database, the default initial allocation is 200 GSNs, and the default maximum is 20000 GSNs. For the NSAPI database, the default initial allocation is 8000 NSAPIs, and the default maximum is 8000000 NSAPIs. For the sticky connection database, the default initial allocation is 4000 sticky connections, and the default maximum is 3200 sticky connections.

**Command Modes**

Global configuration (config)

**Command History**

Release	Modification
12.1(2)E	This command was introduced.
12.1(11b)E	The <b>lifetime</b> keyword and <i>timeout</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>gsn</b> , <b>gtp</b> , and <b>nsapi</b> keywords and <i>init-gsn</i> , <i>init-nsapi</i> , <i>max-gsn</i> , and <i>max-nsapi</i> arguments were added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

Enter this command *before* entering the rest of your IOS SLB configuration. If you have already begun configuring IOS SLB before entering this command, you must reload ISO SLB after entering this command. If you configure an initial allocation value that exceeds the amount of available memory, memory might not be available for other features. In extreme cases, the router or switch might not boot properly. Therefore, be careful when you configure initial allocation values.

**Examples**

The following example configures an initial allocation of 128,000 connections, which can grow dynamically to a limit of 512,000 connections:

```
Router(config)# ip slb entries conn 128000 512000
```

**Related Commands**

Command	Description
<b>show ip slb conns</b>	Displays all connections handled by IOS SLB, or, optionally, only those connections associated with a particular virtual server or client.



## ip slb firewallfarm

To identify a firewall farm and enter firewall farm configuration mode, use the **ip slb firewallfarm** command in global configuration mode. To remove the firewall farm from the IOS Server Load Balancing (IOS SLB) configuration, use the **no** form of this command.

**ip slb firewallfarm** *firewall-farm*

**no ip slb firewallfarm** *firewall-farm*

### Syntax Description

<i>firewall-farm</i>	Character string used to identify the firewall farm. The character string is limited to 15 characters.
----------------------	--

### Command Default

No default behavior or values

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

Grouping real servers into firewall farms is an essential part of IOS SLB firewall load balancing. Using firewall farms enables IOS SLB to assign new connections to the real servers based on their weighted capacities, and on the load-balancing algorithms used.

### Examples

The following example identifies a firewall farm named FIRE1:

```
Router(config)# ip slb firewallfarm FIRE1
```

### Related Commands

Command	Description
<b>real (firewall farm)</b>	Identifies a firewall by IP address as a member of a firewall farm and enters real server configuration mode.



## ip slb map

To configure an IOS SLB protocol map and enter SLB map configuration mode, use the **ip slb map** command in global configuration mode. To delete the map, use the **no** form of this command.

```
ip slb map map-id {gtp| radius}
```

```
no ip slb map map-id {gtp| radius}
```

### Syntax Description

<i>map-id</i>	IOS SLB protocol map identifier. The valid range is from 1 to 255.
<b>gtp</b>	For general packet radio service (GPRS) load balancing, configures an IOS SLB GPRS Tunneling Protocol (GTP) map and enters SLB GTP map configuration mode.
<b>radius</b>	For RADIUS load balancing, configures an IOS SLB RADIUS map and enters SLB RADIUS map configuration mode.

### Command Default

No SLB protocol map is configured.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Usage Guidelines

You can configure up to 255 IOS SLB GTP or RADIUS maps. However, we recommend that you configure no more than 10 maps for a given virtual server.

Each map ID must be unique across all server farms associated with a given GTP or RADIUS virtual server. That is, you cannot configure more than one map with the same ID.

For each IOS SLB RADIUS map, you can configure a single **calling-station-id** command or a single **username** (IOS SLB) command, but not both.

Configure the **gtp** or **radius** keyword only on maps that are to be used with GTP or RADIUS virtual servers, respectively.

**Examples**

The following example configures IOS SLB RADIUS map 1 and enters SLB RADIUS map configuration mode:

```
Router(config)# ip slb map 1 radius
```

**Related Commands**

Command	Description
<b>calling-station-id</b>	Configures an ASCII regular expression string to be matched against the calling station ID attribute in the RADIUS payload.
<b>show ip slb map</b>	Displays information about IOS SLB protocol maps.
<b>username (IOS SLB)</b>	Configures an ASCII regular expression string to be matched against the username attribute in the RADIUS payload.

## ip slb maxbuffers frag

To configure the maximum number of buffers for the IOS Server Load Balancing (IOS SLB) fragment database, use the **ip slb maxbuffers frag** command in global configuration mode. To restore the default setting, use the **no** form of this command.

**ip slb maxbuffers frag** *buffers*

**no ip slb maxbuffers frag**

### Syntax Description

<i>buffers</i>	Maximum number of out-of-order trailing fragments to be buffered simultaneously in the IOS SLB fragment database, waiting for the leader fragment. This value can help prevent IOS SLB memory from being overrun in the event of a fragment attack.  Valid range is 0 to 65535 buffers. The default value is 100 buffers.
----------------	---

### Command Default

The default maximum is 100 buffers.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example sets the maximum number of buffers for the IOS SLB fragment buffer to 300:

```
Router(config)# ip slb maxbuffers frag 300
```

## ip slb natpool

To configure an IOS Server Load Balancing (IOS SLB) Network Address Translation (NAT) to create at least one client address pool, use the **ip slb natpool** command in global configuration mode. To remove an **ip slb natpool** configuration, use the **no** form of this command.

```
ip slb natpool pool start-ip end-ip [netmask netmask] prefix-length leading-1-bits] [entries init-address
[ max-address ]]
```

```
no ip slb natpool pool
```

### Syntax Description

<i>pool</i>	Character string used to identify this client address pool. The character string is limited to 15 characters.
<i>start-ip</i>	Starting IP address that defines the range of addresses in the address pool.
<i>end-ip</i>	Ending IP address that defines the range of addresses in the address pool.
<b>netmask</b> <i>netmask</i>	(Optional) Configures the mask for the associated IP subnet. Specifies the netmask of the network to which the pool addresses belong.
<b>prefix-length</b> <i>leading-1-bits</i>	(Optional) Specifies how many bits of the netmask are ones (that is, how many bits of the address indicate the network).
<b>entries</b>	(Optional) Configures an initial allocation and optional maximum value for IOS SLB client NAT address entries for the <i>pool</i> argument.
<i>init-address</i>	(Optional) Initial allocation of client NAT address entries. The number of client NAT address entries can grow dynamically: When the number of available client NAT address entries is less than half of the <i>init-address</i> argument, IOS SLB allocates additional client NAT address entries.  Valid range is 1 to 1000000 client NAT address entries. The default is 8000 client NAT address entries.

<i>max-address</i>	<p>(Optional) Maximum number of client NAT address entries that can be allocated. Valid range is 1 to 8000000 client NAT address entries.</p> <p>The default is the maximum number of ports that can be allocated within the IP address range specified for <i>pool</i>. For example, the following command:</p> <p><b>ip slb natpool 10.1.10.1 10.1.10.5 prefix-length 24 entries 8000</b></p> <p>has a default <i>max-address</i> of (10.1.10.1-10.1.10.1.5*54535, or 4*54535, or 218140.</p>
--------------------	---

**Command Default**

The default initial allocation is 8000 client NAT address entries. The default maximum number of client NAT address entries that can be allocated is the maximum number of ports that can be allocated within the IP address range.

**Command Modes**

Global configuration (config)

**Command History**

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

If you want to use client NAT, you must create at least one client address pool.

The range of IP addresses in the address pool, configured with the *start-ip* and *end-ip* arguments, must not overlap the IP address for a VLAN as specified on the **ip address** interface configuration command.

**Examples**

The following example configures an IOS SLB NAT server farm pool of addresses with the name *web-clients*, the IP address range from 10.1.10.1 to 10.1.10.5, and a subnet mask of 255.255.0.0:

```
Router(config)# ip slb natpool web-clients 10.1.10.1 10.1.10.5 netmask 255.255.0.0
```

**Related Commands**

Command	Description
<b>show ip slb natpool</b>	Displays information about the IOS SLB NAT configuration.

Command	Description
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.



## ip slb probe custom udp

To configure a custom User Datagram Protocol (UDP) probe name and enter custom UDP probe configuration mode, use the **ip slb probe custom udp** command in global configuration mode. To remove a custom UDP probe name, use the **no** form of this command.

**ip slb probe** *probe* **custom udp**

**no ip slb probe** *probe*

### Syntax Description

<i>probe</i>	Name of the custom UDP probe. The character string is limited to 15 characters.
--------------	---

### Command Default

No custom UDP probe is configured.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command configures the custom UDP probe name and application protocol and enters custom UDP configuration mode.

The custom UDP probe cannot be unconfigured while it is being used by the server farm or firewall farm.

You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.

### Examples

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE6, then enters custom UDP probe configuration mode:

```
Router(config)# ip slb probe PROBE6 custom udp
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>address (custom UDP probe)</b>	Configures an IP address to which to send custom UDP probes.
<b>interval (custom UDP probe)</b>	Configures a custom UDP probe interval.
<b>port (custom UDP probe)</b>	Specifies the port to which a custom UDP probe is to connect.
<b>request (custom UDP probe)</b>	Defines the payload of the UDP request packet to be sent by a custom UDP probe.
<b>response</b>	Defines the data string to match against custom UDP probe response packets.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## ip slb probe dns

To configure a Domain Name System (DNS) probe name and enter DNS probe configuration mode, use the **ip slb probe dns** command in global configuration mode. To remove a DNS probe name, use the **no** form of this command.

**ip slb probe** *probe* **dns**

**no ip slb probe** *probe*

### Syntax Description

<i>probe</i>	Name of the DNS probe. The character string is limited to 15 characters.
--------------	--

### Command Default

No DNS probe is configured.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

DNS probes send domain name resolve requests to real servers and verify the returned IP addresses. This command configures the DNS probe name and application protocol and enters DNS configuration mode. The DNS probe cannot be unconfigured while it is being used by the server farm or firewall farm. You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.

### Examples

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE4, then enters DNS probe configuration mode:

```
Router(config)# ip slb probe PROBE4 dns
```

**Related Commands**

Command	Description
show ip slb probe	Displays information about an IOS SLB probe.

## ip slb probe http

To configure an HTTP probe name and enter HTTP probe configuration mode, use the **ip slb probe http** command in global configuration mode. To remove an HTTP probe name, use the **no** form of this command.

**ip slb probe probe http**

**no ip slb probe probe**

### Syntax Description

<i>probe</i>	Name of the HTTP probe. The character string is limited to 15 characters.
--------------	---

### Command Default

No HTTP probe is configured.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command configures the HTTP probe name and application protocol and enters HTTP configuration mode.

The HTTP probe cannot be unconfigured while it is being used by the server farm or firewall farm.

You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.



#### Note

HTTP probes require a route to the virtual server. The route is not used, but it must exist to enable the sockets code to verify that the destination can be reached, which in turn is essential for HTTP probes to function correctly. The route can be either a host route (advertised by the virtual server) or a default route (specified using the **ip route 0.0.0.0 0.0.0.0** command, for example).

**Examples**

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE2, then enters HTTP probe configuration mode:

```
Router(config)# ip slb probe PROBE2 http
```

**Related Commands**

Command	Description
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

# ip slb probe ping

To configure a ping probe name and enter ping probe configuration mode, use the **ip slb probe ping** command in global configuration mode. To remove a ping probe name, use the **no** form of this command.

**ip slb probe** *probe* **ping**

**no ip slb probe** *probe*

## Syntax Description

<i>probe</i>	Name of the ping probe. The character string is limited to 15 characters.
--------------	---

## Command Default

No ping probe is configured.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

This command configures the ping probe name and application protocol and enters ping configuration mode.

The ping probe cannot be unconfigured while it is being used by the server farm or firewall farm.

You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.

## Examples

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE1, then enters ping probe configuration mode:

```
Router(config)# ip slb probe PROBE1 ping
```

## Related Commands

Command	Description
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.





# ip slb probe tcp

To configure a TCP probe name and enter TCP probe configuration mode, use the **ip slb probe tcp** command in global configuration mode. To remove a TCP probe name, use the **no** form of this command.

**ip slb probe** *probe* **tcp**

**no ip slb probe** *probe*

## Syntax Description

<i>probe</i>	Name of the TCP probe. The character string is limited to 15 characters.
--------------	--

## Command Default

No TCP probe is configured.

## Command Modes

Global configuration (config)

## Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Usage Guidelines

This command configures the TCP probe name and application protocol and enters TCP configuration mode.

The TCP probe cannot be unconfigured while it is being used by the server farm or firewall farm.

You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.

## Examples

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE5, then enters TCP probe configuration mode:

```
Router(config)# ip slb probe PROBE5 tcp
```

## Related Commands

Command	Description
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.



## ip slb probe wsp

To configure a Wireless Session Protocol (WSP) probe name and enter WSP probe configuration mode, use the **ip slb probe wsp** command in global configuration mode. To remove a WSP probe name, use the **no** form of this command.

**ip slb probe** *probe* **wsp**

**no ip slb probe** *probe*

### Syntax Description

<i>probe</i>	Name of the WSP probe. The character string is limited to 15 characters.
--------------	--

### Command Default

No WSP probe is configured.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(5a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command configures the WSP probe name and application protocol and enters WSP probe configuration mode.

The WSP probe cannot be unconfigured while it is being used by the server farm or firewall farm.

You can configure more than one probe, in any combination of supported types, for each server farm or for each firewall in a firewall farm.

### Examples

The following example configures an IOS Server Load Balancing (IOS SLB) probe named PROBE3, then enters WSP probe configuration mode:

```
Router(config)# ip slb probe PROBE3 wsp
```

**Related Commands**

Command	Description
show ip slb probe	Displays information about an IOS SLB probe.

## ip slb replicate slave rate

To set the replication message rate for IOS Server Load Balancing (IOS SLB) slave replication, use the **ip slb replicate slave rate** command in global configuration mode. To restore the default rate, use the **no** form of this command.

**ip slb replicate slave rate** *rate*

**no ip slb replicate slave rate** *rate*

### Syntax Description

<i>rate</i>	Replication message rate for IOS SLB slave replication, in messages per second. The valid range is 50 messages per second to 1000 messages per second. The default setting is 400 messages per second.
-------------	--

### Command Default

The default rate is 400 messages per second.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.2(14)ZA5	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command enables you to manage Interprocess Communication Channel (IPC) resources between two route processors. If there is congestion between the two route processors, use this command to set a lower rate.

If the replication rate is exceeded, IOS SLB issues an appropriate error message.

General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **ip slb replicate slave rate** command in global configuration mode.

The Home Agent Director does not support the **ip slb replicate slave rate** command in global configuration mode.

### Examples

The following example sets the replication message rate to 500 messages per second:

```
Router(config)# ip slb replicate slave rate 500
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>replicate casa (firewall farm)</b>	Configures a stateful backup of IOS SLB decision tables to a backup switch
<b>replicate interval (firewall farm)</b>	Sets the replication delivery interval for an IOS SLB firewall farm.
<b>replicate slave (firewall farm)</b>	Enables stateful backup of redundant route processors for an IOS SLB firewall farm.
<b>show ip slb replicate</b>	Displays the configuration of IOS SLB IP replication.
<b>show ip slb virtuals</b>	Displays information about the virtual servers defined to IOS SLB.

## ip slb route

To enable IOS Server Load Balancing (IOS SLB) to route packets using the RADIUS framed-IP sticky database, or to route packets from one firewall real server back through another firewall real server, use the **ip slb route** command in global configuration mode. To route packets normally, use the **no** form of this command.

**ip slb route** {**framed-ip deny**| *ip-address netmask* **framed-ip**| **inter-firewall**}

**no ip slb route** {**framed-ip deny**| *ip-address netmask* **framed-ip**| **inter-firewall**}

### Syntax Description

<b>framed-ip deny</b>	(Optional) Packets that do not match entries in the IOS SLB RADIUS framed-ip sticky database are not routed.
<i>ip-address</i>	(Optional) IP address of packets to be inspected.
<i>netmask</i>	(Optional) Subnet mask specifying a range of packets to be inspected.
<b>framed-ip</b>	(Optional) Packets are to be routed using the IOS SLB RADIUS framed-IP sticky database.
<b>inter-firewall</b>	(Optional) Enables IOS SLB to route packets from one firewall real server back through another firewall real server, if the flows to the destination IP would otherwise have been firewall load-balanced. This can be done within the same firewall farm or across different firewall farms.

### Command Default

Cisco IOS SLB cannot route packets using the RADIUS framed-IP sticky database, nor can it route packets from one firewall real server back through another firewall real server.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>inter-firewall</b> keyword was added.
12.2 (14)ZA6	The <b>framed-ip deny</b> keyword was added.

Release	Modification
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command enables IOS SLB to inspect packets whose source IP addresses match the specified IP address and subnet mask. IOS SLB then searches for the packet's source IP address in the RADIUS framed-IP sticky database. If the database contains a matching entry, IOS SLB routes the packet to the associated real server. If the database does not contain a matching entry, IOS SLB routes the packet normally.

The **inter-firewall** keyword is useful when traffic is arriving from an address behind a firewall, is destined for an address behind a firewall, and has a sticky entry to be routed via the routing table.

### Examples

The following example enables IOS SLB to inspect packets with the source IP address 10.10.10.1:

```
Router(config)# ip slb route 10.10.10.1 255.255.255.255 framed-ip
```

### Related Commands

Command	Description
<b>show ip slb sticky</b>	Displays the IOS SLB sticky database.



## ip slb serverfarm

To identify a server farm and enter SLB server farm configuration mode, use the **ip slb serverfarm** command in global configuration mode. To remove the server farm from the IOS Server Load Balancing (IOS SLB) configuration, use the **no** form of this command.

**ip slb serverfarm** *server-farm*

**no ip slb serverfarm** *server-farm*

### Syntax Description

<i>server-farm</i>	Character string used to identify the server farm. The character string is limited to 15 characters.
--------------------	--

### Command Default

No server farm is identified.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

Grouping real servers into server farms is an essential part of IOS SLB. Using server farms enables IOS SLB to assign new connections to the real servers based on their weighted capacities, and on the load-balancing algorithms used.

### Examples

The following example identifies a server farm named PUBLIC:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)#
```

**Related Commands**

Command	Description
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.

## ip slb static

To configure a real server's Network Address Translation (NAT) behavior and enter static NAT configuration mode, use the **ip slb static** command in global configuration mode. To restore the real server's default NAT behavior, use the **no** form of this command.

```
ip slb static {drop| nat {virtual| virtual-ip [per-packet| sticky]}}
```

```
no ip slb static {drop| nat {virtual| virtual-ip [per-packet| sticky]}}
```

### Syntax Description

<b>drop</b>	Indicates that IOS Server Load Balancing (IOS SLB) is to drop packets from this real server if the packets do not correspond to existing connections. This option is usually used in conjunction with the subnet mask or port number option on the <b>real</b> command in static NAT configuration mode, such that IOS SLB builds connections to the specified subnet or port, and drops all other connections from the real server.
<b>nat virtual</b>	Configures the real server to use server NAT, and to use the virtual IP address that is configured on the <b>real</b> command in static NAT configuration mode when translating addresses.
<b>nat virtual-ip</b>	Configures the real server to use server NAT, and to use the specified virtual IP address when translating addresses.
<b>per-packet</b>	(Optional) IOS SLB is <i>not</i> to maintain connection state for packets originating from the real server. That is, IOS SLB is to use server NAT to redirect packets originating from the real server.
<b>sticky</b>	(Optional) Indicates that IOS SLB is <i>not</i> to maintain connection state for packets originating from the real server, <i>unless</i> those packets match a sticky object. That is, if IOS SLB can find a matching sticky object, it builds the connection. Otherwise, IOS SLB does not build the connection.

### Command Default

If you do not specify either the **per-packet** or **sticky** keyword, IOS SLB maintains connection state for packets originating from the real server.

### Command Modes

Global configuration (config)

**Command History**

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

If you specify the *virtual-ip* argument and you do not specify the **per-packet** option, IOS SLB uses server port translation to distinguish between connection requests initiated by different real servers.

Static NAT with the **per-packet** option specified does not load-balance fragmented packets.

**Examples**

The following example specifies that the real server is to use server NAT and to use virtual IP address 10.1.10.1 when translating addresses, and that IOS SLB is not to maintain connection state for any packets originating from the real server:

```
Router(config)# ip slb static nat 10.1.10.1 per-packet
```

**Related Commands**

Command	Description
<b>show ip slb static</b>	Displays information about the static NAT configuration.

## ip slb timers gtp gsn

To change the amount of time IOS Server Load Balancing (IOS SLB) maintains sessions to and from an idle gateway general packet radio service (GPRS) support node (GGSN) or serving GPRS support node (SGSN), use the **ip slb timers gtp gsn** command in global configuration mode. To restore the default GPRS support node (GSN) idle timer, use the **no** form of this command.

**ip slb timers gtp gsn** *duration*

**no ip slb timers gtp gsn** *duration*

### Syntax Description

<i>duration</i>	<p>GSN idle timer duration in seconds, which defines how long IOS SLB is to allow a GGSN or SGSN to be idle (that is, to go without echoing or signaling through IOS SLB). When the timer expires, IOS SLB cleans up all sessions that are using the idle GGSN or SGSN.</p> <p>The valid range is 1 to 65535 seconds. The default value is 90 seconds.</p>
-----------------	--

### Command Default

The default duration is 90 seconds.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command sets the GSN idle timer for all IOS SLB virtual servers that are configured for GPRS Tunneling Protocol (GTP) cause code inspection. When the GSN idle timer expires, IOS SLB destroys all sessions to and from the idle GGSN or SGSN.

### Examples

The following example specifies that IOS SLB maintains sessions for 45 seconds after a GGSN or SGSN becomes idle:

```
Router(config)# ip slb timers gtp gsn 45
```

**Related Commands**

Command	Description
virtual	Configures the virtual server attributes.

## ip slb vsrver

To identify a virtual server and enter SLB virtual server configuration mode, use the **ip slb vsrver** command in global configuration mode. To remove a virtual server from the IOS Server Load Balancing (IOS SLB) configuration, use the **no** form of this command.

**ip slb vsrver** *virtual-server*

**no ip slb vsrver** *virtual-server*

### Syntax Description

<i>virtual-server</i>	Character string used to identify the virtual server. The character string is limited to 15 characters.
-----------------------	---

### Command Default

No virtual server is identified.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example identifies a virtual server named PUBLIC\_HTTP:

```
Router(config)# ip slb vsrver PUBLIC_HTTP
Router(config-slb-vsriver)#
```

**Related Commands**

Command	Description
<b>serverfarm</b>	Associates a real server farm with a virtual server, and optionally configures a backup server farm and specifies that sticky connections are to be used in the backup server farm.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).



## kal-ap domain

To enable the IOS SLB KeepAlive Application Protocol (KAL-AP) agent to look for a domain tag when reporting the load for a virtual server, use the **kal-ap domain** command in server farm configuration mode. To delete the domain tag, use the **no** form of this command.

**kal-ap domain** *tag*

**no kal-ap domain**

### Syntax Description

<i>tag</i>	1- to 64-character domain tag to be used by the KAL-AP agent. All characters are valid; case is significant.
------------	--

### Command Default

The KAL-AP agent does not look for a domain tag when reporting the load for a virtual server.

### Command Modes

Server farm configuration (config-slb-sfarm)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Usage Guidelines

Configure the **kal-ap domain** command on the server farm that is associated with the virtual server for which the KAL-AP agent is to report the load.

### Examples

The following example specifies that the KAL-AP agent is to look for domain tag **chicago.com**:

```
Router(config-slb-sfarm)# kal-ap domain chicago-com
```

### Related Commands

Command	Description
<b>ip capp udp</b>	Enables the IOS SLB KeepAlive Application Protocol (KAL-AP) agent and enters SLB Content Application Peering Protocol (CAPP) configuration mode.
<b>ip slb serverfarm</b>	Identifies a server farm and enter SLB server farm configuration mode.





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# lookup

To configure an IP address of a real server that a Domain Name System (DNS) server should supply in response to a domain name resolve request, use the **lookup** command in DNS probe configuration mode. To remove an IP address from the expected list, use the **no** form of this command.

**lookup** *ip-address*

**no lookup** *ip-address*

## Syntax Description

<i>ip-address</i>	IP address of a real server that a DNS server should supply in response to a domain name resolve request.
-------------------	---

## Command Default

No lookup IP address is configured.

## Command Modes

DNS probe configuration (config-slb-probe)

## Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following example configures a DNS probe named PROBE4, enters DNS probe configuration mode, and specifies 10.1.10.1 as the IP address to resolve:

```
Router(config)# ip slb probe PROBE4 dns
Router(config-slb-probe)# lookup 10.1.10.1
```

## Related Commands

Command	Description
<b>ip slb probe dns</b>	Configures a DNS probe name and enters DNS probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## manager (DFP agent)

This command has been removed. Its function is now performed by the **ip dfp agent** global configuration command, and by the following DFP agent configuration commands:

- **inservice (DFP agent)**
- **interval (DFP agent)**
- **password (DFP agent)**
- **port (DFP agent)**

See the description of these commands for more information.

## maxclients

To specify the maximum number of IOS Server Load Balancing (IOS SLB) RADIUS and GTP sticky subscribers that can be assigned to an individual virtual server, use the **maxclients** command in real server configuration mode. To remove the limit, use the **no** form of this command.

**maxclients** *maximum-number*

**no maxclients**

### Syntax Description

<i>maximum-number</i>	<p>Maximum number of IOS SLB RADIUS and GTP sticky subscribers that can be assigned to an individual virtual server:</p> <ul style="list-style-type: none"> <li>• If the <b>radius calling-station-id</b> keyword is specified in the <b>sticky</b> command for the virtual server (that is, if the virtual server is configured to create the IOS SLB RADIUS calling-station-ID sticky database), a sticky subscriber is an entry in the IOS SLB RADIUS calling-station-ID sticky database.</li> <li>• If the <b>radius framed-ip</b> keyword is specified in the <b>sticky</b> command for the virtual server (that is, if the virtual server is configured to create the IOS SLB RADIUS framed-IP sticky database), a sticky subscriber is an entry in the IOS SLB RADIUS framed-IP sticky database.</li> <li>• If the <b>radius username</b> keyword is specified in the <b>sticky</b> command for the virtual server (that is, if the virtual server is configured to create the IOS SLB RADIUS username sticky database), a sticky subscriber is an entry in the IOS SLB RADIUS username sticky database.</li> <li>• If both the <b>radius framed-ip</b> and <b>radius calling-station-id</b> keywords are specified in the <b>sticky</b> command for the virtual server, a sticky subscriber is an entry in the IOS SLB RADIUS calling-station-ID sticky database.</li> <li>• If both the <b>radius framed-ip</b> and <b>radius username</b> keywords are specified in the <b>sticky</b> command for the virtual server, a sticky subscriber is an entry in the IOS SLB RADIUS username sticky database.</li> </ul> <p>By default, there is no limit on the number of IOS SLB RADIUS and GTP sticky subscribers that can be assigned to an individual virtual server.</p>
-----------------------	--



**Command Default** There is no limit on the number of IOS SLB RADIUS and GTP sticky subscribers that can be assigned to an individual virtual server.

**Command Modes** Real server configuration (config-slb-real)

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.1(11b)E	This command was introduced.
	12.1(12c)E	This command was modified to support RADIUS load balancing for CDMA2000, a third-generation (3-G) version of Code Division Multiple Access (CDMA).
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples** The following example specifies that up to 10 IOS SLB RADIUS sticky subscribers can be assigned to an individual real server:

```
Router(config-slb-real)# maxclients 10
```

#### **Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb route</b>	Enables IOS SLB to inspect packets for RADIUS framed-IP sticky routing.
<b>show ip slb sticky</b>	Displays the IOS SLB sticky database.

## maxconns (firewall farm datagram protocol)

To limit the number of active datagram connections to the firewall farm, use the **maxconns** command in firewall farm datagram protocol configuration mode. To restore the default of 4294967295, use the **no** form of this command.

**maxconns** *maximum-number*

**no maxconns**

### Syntax Description

<i>maximum-number</i>	Maximum number of simultaneous active datagram connections using the firewall farm. Valid values range from 1 to 4294967295. The default is 4294967295.
-----------------------	---

### Command Default

The default maximum number of simultaneous active datagram connections using the firewall farm is 4294967295.

### Command Modes

Firewall farm datagram protocol configuration (config-slb-fw-udp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example limits the real server to a maximum of 1000 simultaneous active connections:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol datagram
Router(config-slb-fw-udp)# maxconns 1000
```

### Related Commands

Command	Description
<b>protocol datagram</b>	Enters firewall farm datagram protocol configuration mode.

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb reals</b>	Displays information about the real servers.

## maxconns (firewall farm TCP protocol)

To limit the number of active TCP connections to the firewall farm, use the **maxconns** command in firewall farm TCP protocol configuration mode. To restore the default of 4294967295, use the **no** form of this command.

**maxconns** *maximum-number*

**no maxconns**

### Syntax Description

<i>maximum-number</i>	Maximum number of simultaneous active TCP connections using the firewall farm. Valid values range from 1 to 4294967295. The default is 4294967295.
-----------------------	--

### Command Default

The default maximum number of simultaneous active TCP connections using the firewall farm is 4294967295.

### Command Modes

Firewall farm TCP protocol configuration (config-slb-fw-tcp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example limits the real server to a maximum of 1000 simultaneous active connections:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol tcp
Router(config-slb-fw-tcp)# maxconns 1000
```

### Related Commands

Command	Description
<b>protocol tcp</b>	Enters firewall farm TCP protocol configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

Command	Description
show ip slb reals	Displays information about the real servers.

## maxconns (server farm)

To limit the number of active connections to the real server, use the **maxconns** command in SLB server farm configuration mode. To restore the default of 4294967295, use the **no** form of this command.

**maxconns** *maximum-number* [**sticky-override**]

**no maxconns**

### Syntax Description

<i>maximum-number</i>	Maximum number of simultaneous active connections on the real server. Valid values range from 1 to 4294967295. The default is 4294967295.
<b>sticky-override</b>	(Optional) Allow sticky load balancing to exceed <i>maximum-number</i> for this real server.

### Command Default

The default maximum number of simultaneous active connections on the real server is 4294967295.

### Command Modes

SLB server farm configuration (config-slb-real)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(18)E	The <b>sticky-override</b> keyword was added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example limits the real server to a maximum of 1000 simultaneous active connections:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-real)# maxconns 1000
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb severfarms</b>	Displays information about the server farm configuration.

## mls aging slb normal

To configure the aging time for flows, use the **mls aging slb normal** command in global configuration mode. To restore the default setting, use the **no** form of this command.

**mls aging slb normal** *time*

**no mls aging slb normal** *time*

### Syntax Description

<i>time</i>	<p>Idle time, in milliseconds, before a flow is aged. The valid range is 1 milliseconds to 10000 milliseconds. The default setting is 2000 milliseconds.</p> <p><b>Note</b> Heavier-than-normal loads can age flows more aggressively than this time.</p>
-------------	---

### Command Default

The default aging idle time is 2000 milliseconds.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(8)E	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command is supported for Catalyst 6000 family switches only.

### Examples

The following example sets the idle time to 4000 milliseconds:

```
Router(config)# mls aging slb normal 4000
```

### Related Commands

Command	Description
<b>ip slb firewallfarm</b>	Identifies a firewall farm and initiates firewall farm configuration mode.
<b>ip slb serverfarm</b>	Associates a real server farm with a virtual server.



Command	Description
<b>ip slb vserver</b>	Identifies a virtual server.
<b>mls aging slb process</b>	Controls how often the aging process runs.

## mls aging slb process

To control how often the aging process runs, use the **mls aging slb process** command in global configuration mode. To restore the default setting, use the **no** form of this command.

**mls aging slb process** *time*

**no mls aging slb process** *time*

### Syntax Description

<i>time</i>	Aging process interval, in milliseconds. The valid range is 1 millisecond to 10000 milliseconds. The default setting is 2000 seconds.
-------------	---

### Command Default

The default aging process interval is 2000 milliseconds.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(8)E	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command is supported for Catalyst 6000 family switches only.

### Examples

The following example sets the aging process interval to 4000 milliseconds:

```
Router(config)# mls aging slb process 4000
```

### Related Commands

Command	Description
<b>ip slb firewallfarm</b>	Identifies a firewall farm and initiates firewall farm configuration mode.
<b>ip slb serverfarm</b>	Associates a real server farm with a virtual server.
<b>ip slb vserver</b>	Identifies a virtual server.

Command	Description
mls aging slb normal	Configures the aging time for flows.

## mls ip slb purge global

To specify protocol-level purging of MLS entries from active TCP and UDP flow packets, use the **mls ip slb purge global** command in global configuration mode. To disable purge throttling, use the **no** form of this command.

**mls ip slb purge global**

**no mls ip slb purge global**

**Syntax Description** This command has no arguments or keywords.

**Command Default** The default setting is for protocol-level purging.

**Command Modes** Global configuration (config)

### Command History

Release	Modification
12.2(1)SX	This command was introduced.
12.2(33)SRD2	The command was modified so that the default command no longer appears in the generated configuration.
12.2(33)SXI2	The command was modified so that the default command no longer appears in the generated configuration.
12.2(18)SXF17	The command was modified so that the default command no longer appears in the generated configuration.

### Examples

The following example disables purge throttling on TCP and UDP flow packets:

```
Router(config)# no mls ip slb purge global
```

The following example returns purge throttling on TCP and UDP flow packets to its default setting:

```
Router(config)# mls ip slb purge global
```

## mls ip slb search wildcard

To specify the behavior of IOS Server Load Balancing (IOS SLB) wildcard searches, use the **mls ip slb search wildcard** command in global configuration mode. To restore the default setting, use the **no** form of this command.

```
mls ip slb search {wildcard [pfc|rp]] icmp}
```

```
no mls ip slb search {wildcard [pfc|rp]] icmp}
```

### Syntax Description

<b>wildcard</b>	IOS SLB wildcard searches are to be performed by the Policy Feature Card (PFC). This value is the default setting.
<b>pfc</b>	(Optional) IOS SLB wildcard searches are to be performed by the Policy Feature Card (PFC). This value is the default setting.
<b>rp</b>	(Optional) IOS SLB wildcard searches are to be performed by the route processor.
<b>icmp</b>	<p>Disables ICMP handling by IOS SLB. (Pings to IOS SLB virtual IP addresses are still answered.) Use this command to reduce CPU usage when IOS SLB is configured in locations with a high volume of ICMP flows, such as in the network core.</p> <p><b>Note</b> Use of the <b>icmp</b> keyword can result in minor ICMP errors, such as flows returned to the client with no Network Address Translation (NAT).</p>

### Command Default

The default setting is for the PFC to perform IOS SLB wildcard searches.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(7)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

This command is supported for Catalyst 6500 family switches only.

If you configure IOS SLB and either input ACLs or firewall load balancing on the same Catalyst 6500 Family Switch, you can exceed the capacity of the TCAM on the PFC. To correct the problem, use the **mls ip slb search wildcard rp** command to reduce the amount of TCAM space used by IOS SLB. However, be aware that this command can result in a slight increase in route processor utilization.

**Examples**

The following example limits wildcard searches to the route processor:

```
Router(config)# mls ip slb search wildcard rp
```

**Related Commands**

Command	Description
<b>ip slb firewallfarm</b>	Identifies a firewall by IP address farm and enters firewall farm configuration mode.
<b>ip slb serverfarm</b>	Associates a real server farm with a virtual server.
<b>ip slb vserver</b>	Identifies a virtual server.

# nat

To configure Cisco IOS Server Load Balancing (IOS SLB) Network Address Translation (NAT) and specify a NAT mode, use the **nat** command in SLB server farm configuration mode. To remove a NAT configuration, use the **no nat** form of this command.

**nat** {*client pool*| *server*}

**no nat** {*client*| *server*}

## Syntax Description

<b>client</b> <i>pool</i>	Configures the client address in load-balanced packets using addresses from the client address pool. The pool name must match the <i>pool</i> argument from a previous <b>ip slb natpool</b> command.  This mode is commonly referred to as <i>directed client NAT</i> , or simply client NAT.
<b>server</b>	Configures the destination address in load-balanced packets sent to the real server as the address of the real server chosen by the server farm load-balancing algorithm.  This mode is commonly referred to as <i>directed server NAT</i> , or simply server NAT.

## Command Default

No IOS SLB NAT is configured.

## Command Modes

SLB server farm configuration (config-slb-sfarm)

## Command History

Release	Modification
12.1(1)E	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(2)E	The <b>client</b> keyword and <i>pool</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

The **no nat** command is allowed only if the virtual server was removed from service with the **no inservice** command.

**Examples**

The following example enters server farm configuration mode and configures NAT mode as server address translation on server farm FARM2:

```
Router# ip slb serverfarm FARM2
Router(config-slb-sfarm)# nat server
```

The following example configures the NAT mode on server farm FARM2 to client translation mode and, using the **real** command in server farm configuration mode, configures the real server IP address as 10.3.1.1:

```
Router(config-slb-sfarm)# nat client web-clients
Router(config-slb-sfarm)# real 10.3.1.1
```

**Related Commands**

Command	Description
<b>ip slb serverfarm</b>	Associates a real server farm with a virtual server.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.



## password (DFP agent)

To configure a Dynamic Feedback Protocol (DFP) agent password for Message Digest Algorithm Version 5 (MD5) authentication, use the **password** command in DFP agent configuration mode. To remove the DFP agent password, use the **no** form of this command.

```
password [0|7] password [ timeout ]
```

```
no password
```

### Syntax Description

0	(Optional) Indicates that the password is unencrypted. This is the default setting.
7	(Optional) Indicates that the password is encrypted.
<i>password</i>	Password value for MD5 authentication. <b>Note</b> This password must match the password configured on the host agent.
<i>timeout</i>	(Optional) Delay period, in seconds, during which both the old password and the new password are accepted. The valid range is from 0 to 65535. The default is 180.

### Command Default

The password encryption default is 0 (unencrypted). The password timeout default is 180 seconds.

### Command Modes

DFP agent configuration (config-dfp)

### Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	This command was integrated into Cisco IOS Release 12.2(18)SXD.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The password specified on this command must match the password specified on the DFP manager.

The timeout option allows you to change the password without stopping messages between the DFP agent and its manager. The default value is 180 seconds.

During the timeout, the agent sends packets with the old password (or null, if there is no old password), and receives packets with either the old or new password. After the timeout expires, the agent sends and receives packets only with the new password; received packets that use the old password are discarded.

If you are changing the password for an entire load-balanced environment, set a longer timeout. Setting a longer timeout allows enough time for you to update the password on all agents and servers before the timeout expires. It also prevents mismatches between agents and servers that have begun running the new password and agents, and servers on which you have not yet changed the old password.

If you are running IOS SLB as a DFP manager, and you specify a password on the **ip slb dfp** command in global configuration mode, the password must match the one specified on the **password** command in DFP agent configuration mode in the DFP agent.

### Examples

The following example sets the DFP agent password (unencrypted by default) to Password1 and the timeout to 360 seconds:

```
Router(config)# ip dfp agent slb
Router(config-dfp)# password Password1 360
```

### Related Commands

Command	Description
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and initiates DFP agent configuration mode.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and initiates DFP configuration mode.
<b>replicate casa (firewall farm)</b>	Configures a stateful backup of IOS SLB decision tables to a backup switch.
<b>replicate casa (virtual server)</b>	Configures a stateful backup of IOS SLB decision tables to a backup switch.

## peer port

To specify the port to which the IOS SLB KeepAlive Application Protocol (KAL-AP) agent is to connect, use the **peer port** command in SLB Content Application Peering Protocol (CAPP) configuration mode. To restore the default settings, use the **no** form of this command.

**peer** [ *ip-address* ] **port** *port*

**no peer** [ *ip-address* ] **port** *port*

### Syntax Description

<i>ip-address</i>	(Optional) IP address of the peer KAL-AP manager.
<i>port</i>	Content Application Peering Protocol (CAPP) User Datagram Protocol (UDP) port number to which the KAL-AP agent is to connect. Valid port numbers are 1 to 65535.

### Command Default

If you do not specify a port, the KAL-AP agent connects to port 5002.

### Command Modes

SLB CAPP configuration (config-slb-capp)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Usage Guidelines

Use this command to specify a port number, other than port 5002, to be used by the KAL-AP agent.

You can configure any number of **peer port** commands with the *ip-address* argument, but only one without the *ip-address* argument.

### Examples

The following example configures the KAL-AP agent to connect to port number 6000:

```
Router(config-slb-capp) # peer port 6000
```

### Related Commands

Command	Description
<b>ip capp udp</b>	Enables the IOS SLB KeepAlive Application Protocol (KAL-AP) agent and enters SLB Content Application Peering Protocol (CAPP) configuration mode.

## peer secret

To enable Message Digest Algorithm Version 5 (MD5) authentication for the IOS SLB KeepAlive Application Protocol (KAL-AP) agent, use the **peer secret** command in SLB Content Application Peering Protocol (CAPP) configuration mode. To disable MD5 authentication, use the **no** form of this command.

**peer** [ *ip-address* ] **secret** [ *encrypt* ] *secret-string*

**no peer** [ *ip-address* ] **secret** *secret-string*

### Syntax Description

<i>ip-address</i>	(Optional) IP address of the peer KAL-AP.
<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as 7 followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p> <p>The <i>secret-string</i> must match the secret that is specified on the KAL-AP client.</p>

### Command Default

The KAL-AP agent does not use MD5 authentication with IOS SLB.

### Command Modes

SLB CAPP configuration (config-slb-capp)

**Command History**

Release	Modification
12.2(33)SRC	This command was introduced.

**Usage Guidelines**

You can configure any number of **peer secret** commands with the *ip-address* argument, but only one without the *ip-address* argument.

**Examples**

The following example configures secret string SECRET\_STRING for the KAL-AP agent:

```
Router(config-slb-capp) # peer secret SECRET_STRING
```

**Related Commands**

Command	Description
<b>ip capp udp</b>	Enables the IOS SLB KeepAlive Application Protocol (KAL-AP) agent and enters SLB Content Application Peering Protocol (CAPP) configuration mode.

## port (custom UDP probe)

To specify the port to which a custom User Datagram Protocol (UDP) probe is to connect, use the **port** command in custom UDP probe configuration mode. To restore the default settings, use the **no** form of this command.

**port** *port*

**no port** *port*

### Syntax Description

<i>port</i>	UDP port number to which the custom UDP probe is to connect.
-------------	--

### Command Default

In dispatched mode, the port number is inherited from the virtual server. If port translation is configured for the real server, that port number is used. See the **real** (server farm) command for more details.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a custom UDP probe named PROBE6, enters custom UDP probe configuration mode, and configures the probe to connect to port number 8:

```
Router(config)# ip slb probe PROBE6 custom UDP
Router(config-slb-probe)# port 8
```

### Related Commands

Command	Description
<b>ip slb probe custom udp</b>	Configures a custom User Datagram Protocol (UDP) probe name and enters custom UDP probe configuration mode.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.

Command	Description
show ip slb probe	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

## port (DFP agent)

To define the port number to be used by the Dynamic Feedback Protocol (DFP) manager to connect to the DFP agent, use the **port** command in DFP agent configuration mode. To disable the port number definition and remove existing connections, use the **no port** form of this command.

**port** *port-number*

**no port** *port-number*

### Syntax Description

<i>port-number</i>	Port number used by a DFP manager to connect to a DFP agent. The valid range is from 1 to 65535.
--------------------	--

### Command Default

No port number is defined.

### Command Modes

DFP agent configuration (config-dfp)

### Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	This command was integrated into Cisco IOS Release 12.2(18)SXD.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

In the following example, the DFP manager is enabled to connect to the DFP agent using port number 2221:

```
Router(config)# ip dfp agent slb
Router(config-dfp)# port 2221
```

### Related Commands

Command	Description
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and initiates DFP agent configuration mode.



Command	Description
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and initiates DFP configuration mode.

## port (HTTP probe)

To specify the port to which an HTTP probe is to connect, use the **port** command in HTTP probe configuration mode. To restore the default settings, use the **no** form of this command.

**port** *port*

**no port** *port*

### Syntax Description

<i>port</i>	TCP or User Datagram Protocol (UDP) port number to which the HTTP probe is to connect.
-------------	--

### Command Default

In dispatched mode, the port number is inherited from the virtual server. If port translation is configured for the real server, that port number is used. See the **real**(server farm) command for more details.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures an HTTP probe named PROBE2, enters HTTP probe configuration mode, and configures the probe to connect to port number 8:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# port 8
```

### Related Commands

Command	Description
<b>ip slb probe http</b>	Configures an HTTP probe name and enters HTTP probe configuration mode.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.

Command	Description
show ip slb probe	Displays information about an IOS SLB probe.

## port (TCP probe)

To specify the port to which a TCP probe is to connect, use the **port** command in TCP probe configuration mode. To restore the default settings, use the **no** form of this command.

**port** *port*

**no port** *port*

### Syntax Description

<i>port</i>	TCP port number to which the TCP probe is to connect.
-------------	---

### Command Default

In dispatched mode, the port number is inherited from the virtual server. If port translation is configured for the real server, that port number is used. See the **real**(server farm) command for more details.

### Command Modes

TCP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a TCP probe named PROBE5, enters TCP probe configuration mode, and configures the probe to connect to port number 8:

```
Router(config)# ip slb probe PROBE5 tcp
Router(config-slb-probe)# port 8
```

### Related Commands

Command	Description
<b>ip slb probe tcp</b>	Configures a TCP probe name and enters TCP probe configuration mode.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.

Command	Description
show ip slb probe	Displays information about an IOS SLB probe.

# predictor

To specify the load-balancing algorithm for selecting a real server in the server farm, use the **predictor** command in SLB server farm configuration mode. To restore the default load-balancing algorithm of weighted round robin, use the **no** form of this command.

**predictor** [**roundrobin**| **leastconns**| **route-map** *mapname*]

**no predictor**

## Syntax Description

<b>roundrobin</b>	<p>(Optional) Uses the weighted round robin algorithm for selecting the real server to handle the next new connection for the server farm. See the Weighted Round Robin section for a detailed description of this algorithm. This algorithm is the default value.</p> <p>RADIUS load balancing requires the weighted round robin algorithm.</p> <p>General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled requires the weighted round robin algorithm.</p> <p>The Home Agent Director requires the weighted round robin algorithm.</p>
<b>leastconns</b>	<p>(Optional) Uses the weighted least connections algorithm for selecting the real server to handle the next new connection for this server farm. See the Weighted Least Connections section for a detailed description of this algorithm.</p>
<b>route-map</b> <i>mapname</i>	<p>(Optional) Uses IOS policy-based routing (PBR) for selecting the real server to handle the next new connection for this server farm. The <i>mapname</i> argument identifies the IOS PBR route map to be used. See the Route Map section for a detailed description of this algorithm.</p> <p>The route map algorithm is supported only for RADIUS load balancing accelerated data plane forwarding.</p>

## Command Default

If you do not enter a **predictor** command, or if you enter the **predictor** command without specifying a load-balancing algorithm, the weighted round robin algorithm is used.

**Command Modes** SLB server farm configuration (config-slb-sfarm)

**Command History**

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The <b>route-map</b> keyword and <i>mapname</i> argument were added.

**Usage Guidelines**

RADIUS load balancing requires the weighted round robin algorithm.

The route map algorithm is supported only for RADIUS load balancing accelerated data plane forwarding. When you specify the **predictor route-map** command, no further commands in SLB server farm configuration mode or real server configuration mode are allowed.

GPRS load balancing without GTP cause code inspection enabled requires the weighted round robin algorithm. A server farm that uses weighted least connections can be bound to a virtual server providing GPRS load balancing without GTP cause code inspection enabled, but you cannot place the virtual server INSERVICE. If you try to do so, Cisco IOS SLB) issues an error message.

The Home Agent Director requires the weighted round robin algorithm. A server farm that uses weighted least connections can be bound to a Home Agent Director virtual server, but you cannot place the virtual server INSERVICE. If you try to do so, Cisco IOS SLB issues an error message.

**Examples**

The following example specifies the weighted least connections algorithm:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# predictor leastconns
```

**Related Commands**

Command	Description
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.
<b>weight (server farm)</b>	Specifies the real server's capacity, relative to other real servers in the server farm.

## predictor hash address (firewall farm)

To specify the load-balancing algorithm for selecting a firewall in the firewall farm, use the **predictor hash address** command in firewall farm configuration mode. To restore the default load-balancing algorithm, use the **no** form of this command.

**predictor hash address [port]**

**no predictor**

### Syntax Description

<b>port</b>	(Optional) Uses the source and destination TCP or User Datagram Protocol (UDP) port numbers, in addition to the source and destination IP addresses, when selecting a firewall.
-------------	---

### Command Default

IOS Server Load Balancing (IOS SLB) uses the source and destination IP addresses when selecting a firewall.

### Command Modes

Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example specifies that source and destination IP addresses are to be used when selecting a firewall:

```
Router(config)# ip slb firewall FIRE1
Router(config-slb-fw)# predictor hash address
```

### Related Commands

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.



Command	Description
<b>weight (firewall farm real server)</b>	Specifies the firewall's capacity, relative to other firewalls in the firewall farm.

## probe (firewall farm real server)

To associate a probe with a firewall farm, use the **probe** command in firewall farm real server configuration mode. To remove the association, use the **no** form of this command.

**probe** *probe*

**no probe** *probe*

### Syntax Description

<i>probe</i>	Name of the probe to associate with this firewall farm.
--------------	---

### Command Default

No probe is associated with a firewall farm.

### Command Modes

Firewall farm real server configuration (config-slb-fw-real)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

You can configure more than one probe for each firewall in a firewall farm.

If you configure probes in your network, you must also do one of the following:

- Configure the **exclude** keyword on the **client** command on the virtual server, to exclude connections initiated by the client IP address from the load-balancing scheme.
- Configure IP addresses on the IOS Server Load Balancing (IOS SLB) device that are Layer 3-adjacent to the real servers used by the virtual server.

### Examples

The following example associates probe FireProbe with server farm FIRE1:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw-real)# probe FireProbe
```

**Related Commands**

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the server farm configuration.

## probe (server farm)

To associate a probe with a server farm, use the **probe** command in server farm configuration mode. To remove the association, use the **no** form of this command.

**probe** *probe*

**no probe** *probe*

### Syntax Description

<i>probe</i>	Name of the probe to associate with this server farm.
--------------	---

### Command Default

No probe is associated with a server farm.

### Command Modes

Server farm configuration (config-slb-sfarm)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

You can configure more than one probe for each server farm.

If you configure probes in your network, you must also do one of the following:

- Configure the **exclude** keyword on the **client** command on the virtual server, to exclude connections initiated by the client IP address from the load-balancing scheme.
- Configure IP addresses on the IOS Server Load Balancing (IOS SLB) device that are Layer 3-adjacent to the real servers used by the virtual server.

### Examples

The following example associates probe PROBE1 with server farm PUBLIC:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# probe PROBE1
```

**Related Commands**

Command	Description
show ip slb serverfarms	Displays information about the server farm configuration.

# protocol datagram

To enter firewall farm datagram protocol configuration mode, use the **protocol datagram** command in firewall farm configuration mode.

## protocol datagram

**Syntax Description** This command has no arguments or keywords.

**Command Default** No default behavior or values

**Command Modes** Firewall farm configuration (config-slb-fw)

Command History	Release	Modification
	12.1(11b)E	This command was introduced, replacing the <b>udp</b> command.
	12.1(12c)E	This command was integrated into Cisco IOS Release 12.1(12c)E, replacing the <b>protocol udp</b> command.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** Firewall farm datagram protocol configuration applies to the Encapsulation Security Payload (ESP), Generic Routing Encapsulation (GRE), IP in IP encapsulation, and User Datagram Protocol (UDP) protocols.

**Examples** The following example enters firewall farm datagram protocol configuration mode:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol datagram
```

## Related Commands

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

# protocol tcp

To enter firewall farm TCP protocol configuration mode, use the **protocol tcp** command in firewall farm configuration mode.

## protocol tcp

### Syntax Description

This command has no arguments or keywords.

### Command Default

Firewall farm TCP protocol configuration mode is not entered.

### Command Modes

Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.1(11b)E	This command was introduced, replacing the <b>tcp</b> command.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example enters firewall farm TCP protocol configuration mode:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol tcp
```

### Related Commands

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

## purge connection

To enable IOS SLB firewall load balancing to send purge requests for connections, use the **purge connection** command in firewall farm configuration mode. To prevent the sending of purge requests, use the **no** form of this command.

**purge connection**

**no purge connection**

**Syntax Description** This command has no arguments or keywords.

**Command Default** IOS SLB firewall load balancing sends purge requests for connections.

**Command Modes** Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.2(33)SRE	This command was introduced.

### Usage Guidelines

By default, IOS SLB firewall load balancing sends purge requests for connections. However, if a large number of purge requests are sent, the CPU might be impacted. To prevent this problem, use the **no** form of this command to prevent the sending of purge requests.

### Examples

The following example prevents the sending of purge requests for connections:

```
Router(config-slb-fw) # no purge connection
```

### Related Commands

<b>mls ip slb purge global</b>	Specifies protocol-level purging of MLS entries from active TCP and UDP flow packets.
<b>purge sticky</b>	TBD



## purge radius framed-ip acct on-off (virtual server)

To enable IOS SLB to purge entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting ON or OFF message, use the **purge radius framed-ip acct on-off command in virtual server** configuration mode. To disable this behavior, use the **no** form of this command.

**purge radius framed-ip acct on-off**

**no purge radius framed-ip acct on-off**

**Syntax Description** This command has no arguments or keywords.

**Command Default** IOS SLB purges entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting ON or OFF message.

**Command Modes** Virtual server configuration (config-slb-vserver)

Command History	Release	Modification
	12.1(11b)E	This command was introduced.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples** The following example prevents IOS SLB from purging entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting ON or OFF message:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# no purge radius framed-ip acct on-off
```

### Related Commands

Command	Description
<b>sticky (virtual server)</b>	Assigns all connections from a client to the same real server.

## purge radius framed-ip acct stop (virtual server)

To enable IOS Server Load Balancing to purge entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting-Stop message, use the **purge radius framed-ip acct stop in virtual server** configuration mode. To disable this behavior, use the **no** form of this command.

**purge radius framed-ip acct stop** {*attribute-number*| **26**| **vsa** {*vendor-ID*| **3gpp**| **3gpp2**} *sub-attribute-number*}

**no purge radius framed-ip acct stop** {*attribute-number*| **26**| **vsa** {*vendor-ID*| **3gpp**| **3gpp2**} *sub-attribute-number*}

### Syntax Description

<i>attribute-number</i>	RADIUS attribute number.
<b>26</b>	RADIUS attribute number 26.
<b>vsa</b>	Vendor-specific attribute number.
<i>vendor-ID</i>	Vendor ID.
<b>3gpp</b>	Third Generation Partnership Project (3GPP) vendor ID.
<b>3gpp2</b>	Third Generation Partnership Project 2 (3GPP2) vendor ID.
<i>sub-attribute-number</i>	Sub-attribute number.

### Command Default

IOS SLB purges entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting-Stop message.

### Command Modes

Virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(14)ZA5	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example prevents IOS SLB from purging entries in the IOS SLB RADIUS framed-ip sticky database upon receipt of an Accounting-Stop message:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# no purge radius framed-ip acct stop 44
```

**Related Commands**

Command	Description
<b>sticky (virtual server)</b>	Assigns all connections from a client to the same real server.

## purge sticky

To enable IOS SLB firewall load balancing to send purge requests for sticky connections when the sticky timer expires, use the **purge sticky** command in firewall farm configuration mode. To prevent the sending of purge requests when the timer expires, use the **no** form of this command.

**purge sticky**

**no purge sticky**

**Syntax Description** This command has no arguments or keywords.

**Command Default** IOS SLB firewall load balancing sends purge requests when the sticky timer expires.

**Command Modes** Firewall farm configuration (config-slb-fw)

Command History	Release	Modification
	12.2(33)SRE	This command was introduced.

**Usage Guidelines** By default, IOS SLB firewall load balancing sends purge requests for sticky connections when the sticky timer expires. However, large volumes of purge requests can impact the CPU. To prevent this problem, use the **no** form of this command to prevent the sending of purge requests when the sticky timer expires.

To configure a sticky timer for IOS SLB firewall load balancing, use the **sticky** command in either firewall farm datagram protocol or firewall farm TCP protocol configuration mode.

**Examples** The following example prevents the sending of purge requests for sticky connections:

```
Router(config-slb-fw) # no purge sticky
```

### Related Commands

<b>mls ip slb purge global</b>	Specifies protocol-level purging of MLS entries from active TCP and UDP flow packets.
<b>purge connection</b>	Enables IOS SLB firewall load balancing to send purge requests for connections.
<b>sticky (firewall farm datagram protocol)</b>	Assigns all connections from a client to the same firewall.
<b>sticky (firewall farm TCP protocol)</b>	Assigns all connections from a client to the same firewall.



## radius acct local-ack key

To enable a RADIUS virtual server to acknowledge RADIUS accounting messages, use the **radius acct local-ack key** command in SLB virtual server configuration mode. To restore the default behavior, use the **no** form of this command.

**radius acct local-ack key** [ *encrypt* ] *secret-string*

**no radius acct local-ack key** [ *encrypt* ] *secret-string*

### Syntax Description

<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as 7 followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p> <p>The <i>secret-string</i> must match the secret that is specified on the RADIUS client (for example, the gateway general packet radio service [GPRS] support node [GGSN]).</p>

### Command Default

By default, this command is not enabled. When this command is enabled, the RADIUS load balancing device, not the real server, acknowledges RADIUS accounting messages. If you configure this command but you do not specify the **7** keyword, the *secret-string* is stored in the plain text.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

**Command History**

Release	Modification
12.2(33)SRB	This command was introduced.

**Usage Guidelines**

Configure this command only on a RADIUS virtual server.

**Examples**

The following example shows how to enable RADIUS virtual server PUBLIC\_RADIUS to acknowledge RADIUS accounting messages with key SECRET\_PASSWORD.

```
Router(config)# ip slb vserver PUBLIC_RADIUS
Router(config-slb-vserver)# radius acct local-ack key SECRET_PASSWORD
```

**Related Commands**

Command	Description
<b>ip slb serverfarm</b>	Identifies a server farm and enters server farm configuration mode.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).
<b>virtual</b>	Configures the virtual server attributes.

## radius inject acct key

To configure a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding accounting virtual server, and to enable Message Digest Algorithm Version 5 (MD5) authentication for VSA correlation, use the **radius inject acct key** command in SLB virtual server configuration mode. To disable VSA correlation on this virtual server, use the **no** form of this command.

**radius inject acct** *group-number* **key** [ *encrypt* ] *secret-string*

**no radius inject acct** *group-number* **key** *secret-string*

### Syntax Description

<i>group-number</i>	VSA correlation group number to be used for VSA correlation in the RADIUS Accounting-Start packets.
<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as 7 followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p>

### Command Default

VSA correlation is disabled on this virtual server.

### Command Modes

SLB virtual server configuration (config-slb-vserver)



**Command History**

Release	Modification
12.2(33)SRC	This command was introduced.

**Usage Guidelines**

This command is valid only for VSA correlation accounting virtual servers.

**Examples**

The following example configures VSA correlation group 1 and configures plain text secret string SECRET\_STRING for VSA correlation:

```
Router(config-slb-vserver)# radius inject acct 1 key 0 SECRET_STRING
```

**Related Commands**

Command	Description
<b>radius inject auth</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, and specifies whether IOS SLB is to create VSA correlation entries based on RADIUS calling station IDs or RADIUS usernames.
<b>radius inject auth timer</b>	Configures a timer for vendor-specific attribute (VSA) correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.
<b>radius inject auth vsa</b>	Buffers vendor-specific attributes (VSAs) for VSA correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.

## radius inject auth

To configure a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, and to specify whether IOS SLB is to create VSA correlation entries based on RADIUS calling station IDs or RADIUS usernames, use the **radius inject auth** command in SLB virtual server configuration mode. To disable VSA correlation on this virtual server, use the **no** form of this command.

**radius inject auth** *group-number* {**calling-station-id**| **username**}

**no radius inject auth** *group-number* {**calling-station-id**| **username**}

### Syntax Description

<i>group-number</i>	VSA correlation group number.
<b>calling-station-id</b>	Specifies that IOS SLB is to create VSA correlation entries based on the RADIUS calling station ID attribute in the RADIUS payload when RADIUS Access-Request messages are exchanged.
<b>username</b>	Specifies that IOS SLB is to create VSA correlation entries based on the RADIUS username attribute in the RADIUS payload when RADIUS Access-Request messages are exchanged.

### Command Default

VSA correlation is disabled on this virtual server.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Usage Guidelines

For a given authentication virtual server, you can configure a single **radius inject auth** *group-number* **calling-station-id** command or a single **radius inject auth** *group-number* **username** command, but not both.

This command is valid only for VSA correlation authentication virtual servers.

### Examples

The following example configures VSA correlation group 1 and specifies that IOS SLB is to create VSA correlation entries based on the RADIUS calling station ID attribute:

```
Router(config-slb-vserver)# radius inject auth 1 calling-station-id
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>calling-station-id</b>	Configures an ASCII regular expression string to be matched against the calling station ID attribute in the RADIUS payload.
<b>radius inject acct key</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding accounting virtual server, and enables Message Digest Algorithm Version 5 (MD5) authentication for VSA correlation.
<b>radius inject auth timer</b>	Configures a timer for vendor-specific attribute (VSA) correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.
<b>radius inject auth vsa</b>	Buffers vendor-specific attributes (VSAs) for VSA correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.
<b>username</b>	Configures an ASCII regular expression string to be matched against the username attribute in the RADIUS payload.

# radius inject auth timer

To configure a timer for vendor-specific attribute (VSA) correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, use the **radius inject auth timer** command in SLB virtual server configuration mode. To delete the VSA correlation timer from the configuration, use the **no** form of this command.

**radius inject auth timer** *seconds*

**no radius inject auth timer**

## Syntax Description

<i>seconds</i>	Time, in seconds, that IOS SLB maintains an entry in the VSA correlation database. Valid range is 1 to 255.
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## Command Default

No VSA correlation timer is configured for the authentication virtual server.

## Command Modes

SLB virtual server configuration (config-slb-vserver)

## Command History

Release	Modification
12.2(33)SRC	This command was introduced.

## Usage Guidelines

This command is valid only for VSA correlation authentication virtual servers.

## Examples

The following example configures a VSA correlation timer of 45 seconds:

```
Router(config-slb-vserver)# radius inject auth timer 45
```

## Related Commands

Command	Description
<b>radius inject acct key</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding accounting virtual server, and enables Message Digest Algorithm Version 5 (MD5) authentication for VSA correlation.

Command	Description
<b>radius inject auth</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, and specifies whether IOS SLB is to create VSA correlation entries based on RADIUS calling station IDs or RADIUS usernames.
<b>radius inject auth vsa</b>	Buffers vendor-specific attributes (VSAs) for VSA correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.

## radius inject auth vsa

To buffer vendor-specific attributes (VSAs) for VSA correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, use the **radius inject auth vsa** command in SLB virtual server configuration mode.

**radius inject auth vsa** *vendor-id*

### Syntax Description

<i>vendor-id</i>	VSA to be buffered: <ul style="list-style-type: none"> <li><b>cisco</b> --Only the Cisco VSA can be buffered at this time.</li> </ul>
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### Command Default

VSAs are not buffered.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Usage Guidelines

This command is valid only for VSA correlation authentication virtual servers.

### Examples

The following example buffers the Cisco VSA:

```
Router(config-slb-vserver) # radius inject auth vsa cisco
```

### Related Commands

Command	Description
<b>radius inject acct key</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding accounting virtual server, and enables Message Digest Algorithm Version 5 (MD5) authentication for VSA correlation.

Command	Description
<b>radius inject auth</b>	Configures a vendor-specific attribute (VSA) correlation group for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server, and specifies whether IOS SLB is to create VSA correlation entries based on RADIUS calling station IDs or RADIUS usernames.
<b>radius inject auth timer</b>	Configures a timer for vendor-specific attribute (VSA) correlation for an IOS SLB RADIUS load balancing accelerated data plane forwarding authentication virtual server.

## rate

To specify the maximum number of connections allowed for a real server in a server farm, use the **rate** command in real server configuration mode. To remove the rate limit, use the **no** form of this command.

**rate** *maximum-rate* [**burst** *burst-rate*]

**no rate**

### Syntax Description

<i>maximum-rate</i>	Maximum number of connections allowed for the real server. Valid values range from 1 to 4294967295.
<b>burst</b> <i>burst-rate</i>	<p>(Optional) Maximum connection burst rate allowed for the real server. Configure a burst rate if you expect the real server to receive connection requests at random intervals.</p> <p>Valid values range from <math>(\textit{maximum-rate}/10) + 1</math> to <i>maximum-rate</i>. The default burst rate is <math>(\textit{maximum-rate}/10)</math> connections per second. We recommend that you specify a burst rate of at least <math>(\textit{maximum-rate}/4)</math>.</p> <p>For example, if <i>maximum-rate</i> is set to 3212, the valid range is 322 to 3212; the default burst rate is <math>(3212/10)</math>, or 321 connections per second; and we recommend a burst rate of at least <math>(3212/4)</math>, or 803 connections per second.</p>

### Command Default

There is no limit on the number of connection allowed for the real server. If you do not configure a burst rate, the default burst rate is  $(\textit{maximum-rate}/10)$  connections per second.

### Command Modes

Real server configuration (config-slb-real)

### Command History

Release	Modification
12.2(33)SRC	This command was introduced.

### Usage Guidelines

The **rate** command is valid only for real servers in server farms. It is not valid for real servers in firewall farms.



If the rate limit for a real server is exceeded, and a new connection request is received, IOS SLB assigns the new connection request to the next **rate**-configured real server in the server farm's queue. If no other **rate**-configured real server is available in the server farm, IOS SLB drops the connection request.

The rate limit also applies to sticky connections. That is, if the rate limit for a real server is exceeded, and a new sticky connection request is received, IOS SLB drops the sticky connection request.

IOS SLB uses slow start even if a real server has a rate limit configured.

### Examples

The following example specifies that up to 100 connections per second are allowed for the real server in a server farm, with a burst rate of 25 burst connections per second:

```
Router(config-slb-real) # rate 100 burst 25
```

## real (firewall farm)

To identify a firewall as a member of a firewall farm and enter real server configuration mode, use the **real** command in firewall farm configuration mode. To remove the firewall from the IOS Server Load Balancing (IOS SLB) configuration, use the **no** form of this command.

**real** *ip-address*

**no real** *ip-address*

### Syntax Description

<i>ip-address</i>	Real server IP address.
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### Command Default

No firewall is identified as a member of a firewall farm.

### Command Modes

Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

A firewall farm comprises a number of firewalls. The firewalls are the physical devices that provide the firewall load-balanced services.

### Examples

The following example identifies a firewall as a member of firewall farm FIRE1:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# real 10.1.1.1
```

### Related Commands

Command	Description
<b>inservice (firewall farm real server)</b>	Enables the firewall for use by IOS SLB.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.

Command	Description
show ip slb reals	Displays information about the real servers.

## real (server farm)

To identify a real server as a member of a server farm and enter real server configuration mode, use the **real** command in SLB server farm configuration mode. To remove the real server from the IOS Server Load Balancing (IOS SLB) configuration, use the **no** form of this command.

**real** *ipv4-address* [**ipv6** *ipv6-address*] [*port* ]

**no real** *ipv4-address* [**ipv6** *ipv6-address*] [*port* ]

### Syntax Description

<i>ipv4-address</i>	Real server IPv4 address.
<b>ipv6</b> <i>ipv6-address</i>	(Optional) For dual-stack, real server IPv6 address.
<i>port</i>	(Optional) Port translation for the server. Valid values range from 1 to 65535.

### Command Default

No real server is identified as a member of a server farm.

### Command Modes

SLB server farm configuration (config-slb-sfarm)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(2)E	The <i>port</i> argument was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
15.0(1)S	The <b>ipv6</b> keyword and <i>ipv6-address</i> argument were added.

### Usage Guidelines

A server farm comprises a number of real servers. The real servers are the physical devices that provide the load-balanced services.

In general packet radio service (GPRS) load balancing, this command identifies a gateway GPRS support node (GGSN) that is a member of the server farm. Also, remember that the Cisco GGSN IP addresses are virtual template IP addresses, not real interface IP addresses.

IOS SLB supports GPRS Tunneling Protocol (GTP) v0, v1, and v2 real servers. A GTP v2 real server can be either a Packet Data Network Gateway (PGW) or a serving gateway (SGW).

- A GTP v2 PGW can also manage GTP v0 and v1 requests.
- A GTP v2 SGW cannot manage GTP v0 or v1 requests.
- A GTP v0 or v1 real server cannot manage GTP v2 requests. Therefore, you must configure separate virtual servers for GTPv2 real servers and GTP v0 or v1 real servers.

IOS SLB supports dual-stack addresses for GTP load balancing only. To support dual-stack addresses, you must configure the real server as a dual-stack real server, with the IPv4 and IPv6 addresses, using this command.

In Virtual Private Network (VPN) server load balancing, this command identifies a real server acting as a VPN terminator.

## Examples

The following example identifies a real server as a member of the server farm:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.1.1.1
```

The following example identifies a dual-stack real server as a member of the server farm:

```
Router(config)# ip slb serverfarm DUAL-PUBLIC
Router(config-slb-sfarm)# real 10.1.1.1 ipv6 12AB:0000:0000:CD31:0000:0000:0000/64
```

## Related Commands

Command	Description
<b>inservice (server farm real server)</b>	Enables the real server for use by IOS SLB.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.

## real (static NAT)

To configure one or more real servers to use static Network Address Translation (NAT), use the **real** command in static NAT configuration mode. To restore the default behavior, use the **no** form of this command.

**real** *ip-address* [ *port* ]

**no real** *ip-address* [ *port* ]

### Syntax Description

<i>ip-address</i>	IP address of the real server that is to use static NAT.
<i>port</i>	(Optional) Layer 4 source port number, used by IOS Server Load Balancing (IOS SLB) to differentiate between User Datagram Protocol (UDP) responses from the real server and connections initiated by the real server.

### Command Default

No real server is configured to use static NAT.

### Command Modes

Static NAT configuration (config-slb-static)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

If no port number is specified, IOS SLB uses static NAT for all packets outbound from the real server.

### Examples

The following example configures real server 10.1.1.3 to use static NAT:

```
Router(config)# ip slb static nat
Router(config-slb-static)# real 10.1.1.3
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb static</b>	Configures a real server's NAT behavior and enters static NAT configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb static</b>	Displays information about the static NAT configuration.

## reassign

To specify the threshold of consecutive unacknowledged SYNchronize sequence numbers (SYNs) or Create Packet Data Protocol (PDP) requests that, if exceeded, result in an attempted connection to a different real server, use the **reassign** command in SLB real server configuration mode. To restore the default reassignment threshold, use the **no** form of this command.

**reassign** *threshold*

**no reassign**

### Syntax Description

<i>threshold</i>	<p>Number of unacknowledged TCP SYNs (or Create PDP requests, in general packet radio service [GPRS] load balancing) that are directed to a real server before the connection is reassigned to a different real server. An unacknowledged SYN is one for which no SYN or ACKnowledgment (ACK) is detected before the next SYN arrives from the client. IOS Server Load Balancing (IOS SLB) allows 30 seconds for the connection to be established or for a new SYN to be received. If neither of these occurs within that time, the connection is removed from the IOS SLB database.</p> <p>The 30-second timer is restarted for each SYN as long as the number of connection reassignments specified in the <b>faildetect numconns (real server)</b> command is not exceeded. See the <b>faildetect numconns (real server)</b> command for more information.</p> <p>Valid threshold values range from one 1 to 4. The default value is 3.</p>
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### Command Default

The default threshold value is 3.

### Command Modes

SLB real server configuration (config-slb-real)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.



Release	Modification
12.1(9)E	This command was modified to support general packet radio service (GPRS) load balancing.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)SX	Support for this command was introduced on the Cisco 7600 series routers that are configured with a Supervisor Engine 720.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

This command is not supported on Cisco 7600 series routers that are configured with a Supervisor Engine 2. IOS SLB does not reassign sticky connections if either of the following conditions is true:

- The real server is not OPERATIONAL or MAXCONNS\_THROTTLED.
- The connection is the first for this sticky connection.

In GPRS load balancing, this command specifies the number of consecutive unacknowledged Create PDP requests (not TCP SYNs) that are directed to a gateway GPRS support node (GGSN) before the connection is reassigned to a different GGSN. You must specify a reassign threshold less than the N3-REQUESTS counter value of the serving GRPS support node (SGSN).

### Examples

The following example shows how to set the threshold of unacknowledged SYNs to 2:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-real)# reassign 2
```

### Related Commands

Command	Description
<b>faildetect numconns</b>	Specifies the conditions that indicate a server failure.
<b>inservice (real server)</b>	Enables the real server for use by the IOS SLB feature.
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.



## replicate casa (firewall farm)

To configure a stateful backup of IOS Server Load Balancing (IOS SLB) decision tables to a backup switch, use the **replicate casa** command in firewall farm configuration mode. To remove a this configuration, use the **no** form of this command.

**replicate casa** *listen-ip remote-ip port* [ *interval* ] [**password** [ *encrypt* ] *secret-string* [ *timeout* ]]

**no replicate casa** *listen-ip remote-ip port*

### Syntax Description

<i>listen-ip</i>	Listening IP address for state exchange messages that are advertised.
<i>remote-ip</i>	Destination IP address for all state exchange signals.
<i>port</i>	TCP or User Datagram Protocol (UDP) port number or port name for all state exchange signals.
<i>interval</i>	(Optional) Maximum replication delivery interval from 1 to 300 seconds. The default value is 10 seconds.  <b>Note</b> While IOS SLB does accept the <i>interval</i> argument, the <b>replicate interval</b> command is the preferred means for setting the replication delivery interval. In fact, if you set the replication delivery interval using the <i>interval</i> argument, IOS SLB writes it into the configuration as a <b>replicate interval</b> command.
<b>password</b>	(Optional) Specifies the password for Message Digest Algorithm Version 5 (MD5) authentication.

<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as 7 followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>(Optional) 1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p> <p>The <i>secret-string</i> must match the secret that is specified on the RADIUS client (for example, the gateway general packet radio service [GPRS] support node [GGSN]).</p>
<i>timeout</i>	<p>(Optional) Delay period, in seconds, during which both the old password and the new password are accepted. The default value is 180 seconds.</p>

**Command Default**

The default interval is 10 seconds. The default password encryption is 0 (unencrypted). The default password timeout is 180 seconds.

**Command Modes**

Firewall farm configuration (config-slb-fw)

**Command History**

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The *timeout* option allows you to change the password without stopping messages between the backup and primary Layer 3 switches. The default value is 180 seconds.

During the timeout, the backup sends packets with the old password (or null, if there is no old password), and receives packets with either the old or new password. After the timeout expires, the backup sends and receives packets only with the new password.

When setting a new password timeout, remember the following considerations:

- If you are configuring a new backup, set the timeout to 0 (send packets with the new password immediately). This configuration prevents password mismatches between the new backup and its primary.
- If you are changing the password for an existing backup, set a longer timeout to allow enough time for you to update the password on the primary before the timeout expires. Setting a longer timeout also prevents mismatches between the backup and primary.

If you configure this command but you do not specify the **7** keyword, the secret-string is stored in the plain text.

### Examples

The following example configures a stateful backup Layer-3 switch with a listening IP address of 10.10.10.11 and a remote IP address of 10.10.11.12 over HTTP port 4231:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slbfw)# replicate casa 10.10.10.11 10.10.11.12 4231
```

### Related Commands

Command	Description
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb replicate</b>	Displays the configuration of IO SLB IP replication.

## replicate casa (virtual server)

To configure a stateful backup of IOS Server Load Balancing (IOS SLB) decision tables to a backup switch, use the **replicate casa** command in virtual server configuration mode. To remove this configuration, use the **no** form of this command.

**replicate casa** *listen-ip remote-ip port* [ *interval* ] [**password** [ *encrypt* ] *secret-string* [ *timeout* ]]

**no replicate casa** *listen-ip remote-ip port*

### Syntax Description

<i>listen-ip</i>	Listening IP address for state exchange messages that are advertised.
<i>remote-ip</i>	Destination IP address for all state exchange signals.
<i>port</i>	TCP or User Datagram Protocol (UDP) port number or port name for all state exchange signals.
<i>interval</i>	(Optional) Maximum replication delivery interval from 1 to 300 seconds. The default value is 10 seconds.  <b>Note</b> While IOS SLB does accept the <i>interval</i> argument, the <b>replicate interval</b> command is the preferred means for setting the replication delivery interval. In fact, if you set the replication delivery interval using the <i>interval</i> argument, IOS SLB writes it into the configuration as a <b>replicate interval</b> command.
<b>password</b>	(Optional) Specifies the password for Message Digest Algorithm Version 5 (MD5) authentication.

<i>encrypt</i>	<p>(Optional) Indicates how the <i>secret-string</i> is represented when the configuration is displayed (for example, <b>show run</b>), or how it is written to nonvolatile memory (for example, <b>write memory</b>).</p> <p>The possible values are <b>0</b> and <b>7</b>:</p> <ul style="list-style-type: none"> <li>• <b>0</b> --The <i>secret-string</i> is stored in plain text. This is the default setting.</li> <li>• <b>7</b> --The <i>secret-string</i> is encrypted before it is displayed or written to nonvolatile memory.</li> </ul> <p><b>Note</b> If your router is configured to encrypt all passwords, then the password is represented as 7 followed by the encrypted text. See the Cisco IOS <b>service</b> command for more details.</p>
<i>secret-string</i>	<p>(Optional) 1- to 64-character clear password value for MD5 authentication. All characters are valid; case is significant. This password must match the password configured on the host agent.</p> <p>The <i>secret-string</i> is always sent in plain text when the configuration is downloaded.</p> <p>The <i>secret-string</i> must match the secret that is specified on the RADIUS client (for example, the gateway general packet radio service [GPRS] support node [GGSN]).</p>
<i>timeout</i>	<p>(Optional) Delay period, in seconds, during which both the old password and the new password are accepted. The default value is 180 seconds.</p>

**Command Default**

The default interval is 10 seconds. The default password encryption is 0 (unencrypted). The default password timeout is 180 seconds.

**Command Modes**

Virtual server configuration (config-slb-vserver)

**Command History**

Release	Modification
12.1(2)E	This command was introduced.
12.1(3a)E	The <b>0</b> and <b>7</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The *timeout* option allows you to change the password without stopping messages between the backup and primary Layer 3 switches. The default value is 180 seconds.

During the timeout, the backup sends packets with the old password (or null, if there is no old password), and receives packets with either the old or new password. After the timeout expires, the backup sends and receives packets only with the new password.

When setting a new password timeout, remember the following considerations:

- If you are configuring a new backup, set the timeout to 0 (send packets with the new password immediately). This configuration prevents password mismatches between the new backup and its primary.
- If you are changing the password for an existing backup, set a longer timeout to allow enough time for you to update the password on the primary before the timeout expires. Setting a longer timeout also prevents mismatches between the backup and primary.

General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **replicate casa** command in virtual server configuration mode.

The Home Agent Director does not support the **replicate casa** command in virtual server configuration mode.

If you configure this command but you do not specify the **7** keyword, the secret-string is stored in the plain text.

### Examples

The following example configures a stateful backup Layer-3 switch with a listening IP address of 10.10.10.11 and a remote IP address of 10.10.11.12 over HTTP port 4231:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# replicate casa 10.10.10.11 10.10.11.12 4231
```

### Related Commands

Command	Description
<b>show ip slb replicate</b>	Displays the configuration of IOS SLB IP replication.
<b>show ip slb vserver</b>	Displays information about the virtual servers defined to IOS SLB.



## replicate interval (firewall farm)

To set the replication delivery interval for an IOS Server Load Balancing (IOS SLB) firewall farm, use the **replicate interval** command in firewall farm configuration mode. To restore the default interval, use the **no** form of this command.

**replicate interval** *interval*

**no replicate interval**

### Syntax Description

<i>interval</i>	<p>Maximum replication delivery interval, in seconds. Replication updates are sent to the peer device (CASA or slave) when the interval expires, or when the send buffer (1500 bytes) is full.</p> <p>The valid range is 1 to 300 seconds. The default value is 10 seconds.</p>
-----------------	---

### Command Default

The default interval is 10 seconds.

### Command Modes

Firewall farm configuration (config-slb-fw)

### Command History

Release	Modification
12.2(14)ZA5	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **replicate interval** command in firewall farm configuration mode.

The Home Agent Director does not support the **replicate interval** command in firewall farm configuration mode.

### Examples

The following example configures a replication interval of 20 seconds:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# replicate interval 20
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb replicate slave rate</b>	Sets the replication message rate for IOS Server Load Balancing (IOS SLB) slave replication.
<b>replicate casa (firewall farm)</b>	Configures a stateful backup of IOS Server Load Balancing (IOS SLB) decision tables to a backup switch
<b>replicate slave (firewall farm)</b>	Enables stateful backup of redundant route processors for an IOS Server Load Balancing (IOS SLB) firewall farm.
<b>show ip slb replicate</b>	Displays the configuration of IOS Server Load Balancing (IOS SLB) IP replication.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).

## replicate interval (virtual server)

To set the replication delivery interval for an IOS Server Load Balancing (IOS SLB) virtual server, use the **replicate interval** command in virtual server configuration mode. To restore the default interval, use the **no** form of this command.

**replicate interval** *interval*

**no replicate interval**

### Syntax Description

<i>interval</i>	<p>Maximum replication delivery interval, in seconds. Replication updates are sent to the peer device (CASA or slave) when the interval expires, or when the send buffer (1500 bytes) is full.</p> <p>The valid range is 1 to 300 seconds. The default value is 10 seconds.</p>
-----------------	---

### Command Default

The default interval is 10 seconds.

### Command Modes

Virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.2(14)ZA5	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **replicate interval** command in virtual server configuration mode.

The Home Agent Director does not support the **replicate interval** command in virtual server configuration mode.

### Examples

The following example configures a replication interval of 20 seconds:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# replicate interval 20
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb replicate slave rate</b>	Sets the replication message rate for IOS Server Load Balancing (IOS SLB) slave replication.
<b>replicate casa (virtual server)</b>	Configures a stateful backup of IOS Server Load Balancing (IOS SLB) decision tables to a backup switch
<b>replicate slave (virtual server)</b>	Enables stateful backup of redundant route processors for an IOS Server Load Balancing (IOS SLB) virtual server.
<b>show ip slb replicate</b>	Displays the configuration of IOS Server Load Balancing (IOS SLB) IP replication.
<b>show ip slb vserver</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).

# replicate slave (firewall farm)

To enable stateful backup of redundant route processors for an IOS Server Load Balancing (IOS SLB) firewall farm, if the slave device is present, use the **replicate slave** command in firewall farm configuration mode. To disable stateful backup of redundant route processors, use the **no** form of this command.

**replicate slave**

**no replicate slave**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Stateful backup of redundant route processors is disabled.

**Command Modes** Firewall farm configuration (config-slb-fw)

Command History	Release	Modification
	12.2(14)ZA5	This command was introduced.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **replicate slave** command in firewall farm configuration mode. The Home Agent Director does not support the **replicate slave** command in firewall farm configuration mode.

**Examples** The following example enables stateful backup of redundant route processors:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# replicate slave
```

## Related Commands

Command	Description
<b>ip slb replicate slave rate</b>	Sets the replication message rate for IOS SLB slave replication.
<b>replicate casa (firewall farm)</b>	Configures a stateful backup of IOS SLB decision tables to a backup switch

Command	Description
<b>replicate interval (firewall farm)</b>	Sets the replication delivery interval for an IOS SLB firewall farm.
<b>show ip slb replicate</b>	Displays the configuration of IOS SLB IP replication.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.

## replicate slave (virtual server)

To enable stateful backup of redundant route processors for an IOS Server Load Balancing (IOS SLB) virtual server, if the slave device is present, use the **replicate slave** command in virtual server configuration mode. To disable stateful backup of redundant route processors, use the **no** form of this command.

**replicate slave**

**no replicate slave**

**Syntax Description** This command has no arguments or keywords.

**Command Default** Stateful backup of redundant route processors is disabled.

**Command Modes** Virtual server configuration (config-slb-vserver)

Command History	Release	Modification
	12.2(14)ZA5	This command was introduced.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines** General packet radio service (GPRS) load balancing without GPRS Tunneling Protocol (GTP) cause code inspection enabled does not support the **replicate slave** command in virtual server configuration mode. The Home Agent Director does not support the **replicate slave** command in virtual server configuration mode. If you are using a single Supervisor with **replicate slave** configured, you might receive out-of-sync messages on the Supervisor.

**Examples** The following example enables stateful backup of redundant route processors:

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# replicate slave
```

### Related Commands

Command	Description
<b>ip slb replicate slave rate</b>	Sets the replication message rate for IOS SLB slave replication.

<b>Command</b>	<b>Description</b>
<b>replicate casa (virtual server)</b>	Configures a stateful backup of IOS SLB decision tables to a backup switch
<b>replicate interval (virtual server)</b>	Sets the replication delivery interval for an IOS SLB virtual server.
<b>show ip slb replicate</b>	Displays the configuration of IOS SLB IP replication.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.



## request (custom UDP probe)

To define the payload of the User Datagram Protocol (UDP) request packet to be sent by a custom UDP probe, use the **request** command in custom UDP probe configuration mode.

**request data** {*start-byte*| **continue**} *hex-data-string*

### Syntax Description

<b>data</b> <i>start-byte</i>	Identifies the payload offset at which the <i>hex-data-string</i> is to be placed into the packet.
<b>data continue</b>	String of characters represented by the <i>hex-data-string</i> argument is to be placed after the last defined byte in the request packet.
<i>hex-data-string</i>	Payload of the UDP request packet, up to 100 bytes of data in hexadecimal format.

### Command Default

The payload of the UDP request packet is not defined.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

You can enter more than one **request** command, to specify the entire UDP payload.

### Examples

The following example generates custom UDP probe PROBE6, with the specified 119-byte UDP payload.

```
Router(config)# ip slb probe PROBE6 custom UDP
Router(config-slb-probe)# request data 0 05 04 00 77 18 2A D6 CD 0A AD 53 4D F1 29 29 CF
C1 96 59 CB
Router(config-slb-probe)# request data 20 01 07 63 68 72 69 73 28 06 00 00 00 01 2C 0A 30
30 30 30 30
Router(config-slb-probe)# request data 40 30 30 42 07 06 00 00 00 07 1E 10 63 75 66 66 2E
63 69 73 63
Router(config-slb-probe)# request data 60 6F 2E 63 6F 6D 1F 0C 39 31 39 33 39 32 39 31 36
39 08 06 0A
Router(config-slb-probe)# request data 80 0A 01 01 2D 06 00 00 00 01 3D 06 00 00 00 05 05
```

```

06 00 00 00
Router(config-slb-probe)# request data 100 00 06 06 00 00 00 02 04 06 0A 0A 18 0A 29 06 00
00 00 00

```

**Related Commands**

Command	Description
<b>ip slb probe custom udp</b>	Configures the IOS SLB IP probe name.
<b>response</b>	Defines the data string to match against custom UDP probe response packets.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## request (HTTP probe)

To configure an HTTP probe to check the status of the real servers, use the **request** command in HTTP probe configuration mode. To remove a **request** configuration, use the **no** form of this command.

```
request [method {get| post| head| name name}] [url path]
```

```
no request [method {get| post| head| name name}] [url path]
```

### Syntax Description

<b>method</b>	(Optional) Configures the way the data is requested from the server.
<b>get</b>	Configures the Get method to request data from the server.
<b>post</b>	Configures the Post method to request data from the server.
<b>head</b>	Configures the header data type to request data from the server.
<b>name</b> <i>name</i>	Configures the name string of the data to send to the servers to request data. The character string is limited to 15 characters.
<b>url</b> <i>path</i>	(Optional) Configures the path from the server.

### Command Default

No HTTP probe is configured to check the status of the real servers.

### Command Modes

HTTP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

The **request** command configures the Cisco IOS Server Load Balancing (Cisco IOS SLB) HTTP probe method used to receive data from the server. Only one Cisco IOS SLB HTTP probe can be configured for each server farm.

If no values are configured following the **method** keyword, the default is Get.

If no URL path is set to the server, the default is /.

**Examples**

The following example configures an IOS SLB HTTP probe named PROBE2, enters HTTP probe configuration mode, and configures HTTP requests to use the post method and the URL /probe.cgi?all:

```
Router(config)# ip slb probe PROBE2 http
Router(config-slb-probe)# request method post url /probe.cgi?all
```

**Related Commands**

Command	Description
<b>ip slb probe http</b>	Configures the Cisco IOS SLB IP probe name.
<b>show ip slb probe</b>	Displays information about an Cisco IOS SLB probe.

## response

To define the data string to match against custom User Datagram Protocol (UDP) probe response packets, use the **response** command in custom UDP probe configuration mode.

**response** *clause-number* **data** *start-byte* *hex-data-string*

### Syntax Description

<i>clause-number</i>	Identifies the response clause that is being modified. Up to 8 response clauses can be specified, on individual <b>response</b> commands.
<b>data</b> <i>start-byte</i>	Byte in the UDP response packet at which the <i>hex-data-string</i> is to be matched.
<i>hex-data-string</i>	Up to 100 bytes of data, in hexadecimal format, that is to be matched against the UDP response packet payload. If the data does not match, the probe fails.

### Command Default

The data string to match against custom UDP probe response packets is not defined.

### Command Modes

Custom UDP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

You can enter up to 8 individual response commands, to parse up to 8 non-contiguous bytes of data.

### Examples

In the following example, if the 26th and 27th bytes of the response from *PROBE6* are not *FF FF*, and the 44th and 45th bytes are not *DD DD*, the probe fails.

```
Router(config)# ip slb probe PROBE6 custom UDP
Router(config-slb-probe)# response 1 data 26 FF FF
Router(config-slb-probe)# response 2 data 44 DD DD
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb probe custom udp</b>	Configures the IOS SLB IP probe name.
<b>request (custom UDP probe)</b>	Defines the payload of the UDP request packet to be sent by a custom UDP probe.
<b>show ip slb probe</b>	Displays information about an IOS SLB probe.

## retry (real server)

To specify how long to wait before a new connection is attempted to a failed server, use the **retry** command in SLB real server configuration mode. To restore the default retry value, use the **no** form of this command.

**retry** *retry-value*

**no** **retry**

### Syntax Description

<i>retry-value</i>	<p>Time, in seconds, to wait after the detection of a server failure before a new connection to the server is attempted.</p> <p>If the new connection attempt succeeds, the real server is placed in OPERATIONAL state. If the connection attempt fails, the timer is reset, the connection is reassigned, and the process repeats until it is successful or until the server is placed in the OUTFSERVICE state by the network administrator.</p> <p>Valid values range from 1 to 3600. The default value is 60 seconds.</p> <p>A value of 0 means do not attempt a new connection to the server when it fails.</p>
--------------------	--

### Command Default

The default retry-value is 60 seconds.

### Command Modes

SLB real server configuration (config-slb-real)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following example specifies that 120 seconds must elapse after the detection of a server failure before a new connection is attempted:

```
Router(config)# ip slb serverfarm PUBLIC
Router(config-slb-sfarm)# real 10.10.1.1
Router(config-slb-real)# retry 120
```

**Related Commands**

Command	Description
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.



## serverfarm

To associate an IPv4 server farm with a virtual server, and optionally configure an IPv4 backup server farm, an IPv6 server farm and backup server farm, and specify that sticky connections are to be used in the IPv4 backup server farm, use the **serverfarm** command in SLB virtual server configuration mode. To remove the server farm association from the virtual server configuration, use the **no** form of this command.

**serverfarm** *primary-farm* [**backup** *backup-farm* [**sticky**]] [**ipv6-primary** *ipv6-primary-farm* [**ipv6-backup** *ipv6-backup-farm*]] [**map** *map-id* **priority** *priority*]

**no serverfarm** *primary-farm* [**backup** *backup-farm* [**sticky**]] [**ipv6-primary** *ipv6-primary-farm* [**ipv6-backup** *ipv6-backup-farm*]] [**map** *map-id* **priority** *priority*]

### Syntax Description

<i>primary-farm</i>	Name of a primary server farm that has already been defined using the <b>ip slb serverfarm</b> command. <ul style="list-style-type: none"> <li>For IPv4 or dual-stack, name of the IPv4 server farm.</li> <li>For IPv6, name of the IPv6 server farm.</li> </ul>
<b>backup</b> <i>backup-farm</i>	(Optional) Name of a backup server farm that has already been defined using the <b>ip slb serverfarm</b> command. <ul style="list-style-type: none"> <li>For IPv4 or dual-stack backup, name of the IPv4 server farm.</li> <li>For IPv6 backup, name of the IPv6 server farm.</li> </ul>
<b>sticky</b>	(Optional) Specifies that sticky connections are to be used in the backup server farm.
<b>ipv6-primary</b> <i>ipv6-primary-farm</i>	(Optional) For dual-stack, name of the primary IPv6 server farm that has already been defined using the <b>ip slb serverfarm</b> command.
<b>ipv6-backup</b> <i>ipv6-backup-farm</i>	(Optional) For dual-stack, name of the backup IPv6 server farm that has already been defined using the <b>ip slb serverfarm</b> command.

<p><b>map</b> <i>map-id</i> <b>priority</b> <i>priority</i></p>	<p>(Optional) Associates an IOS SLB GPRS Tunneling Protocol (GTP) or RADIUS map with the server farm for general packet radio service (GPRS) or RADIUS load balancing.</p> <p>The map ID identifies a specific map that has already been defined using the <b>ip slb map</b> command.</p> <p>The priority specifies the order of preference of the specified map. A lower number indicates a higher priority. The range of priorities is 1 to 255.</p> <p>Priorities for different maps do not have to be contiguous. That is, you can have three maps with priorities 1, 5, and 10, respectively.</p> <p>When IOS SLB searches for a match, it does so on the basis of both the map ID and the map priority. Each map ID and each map priority must be unique across all server farms associated with the virtual server. That is, you cannot configure more than one map with the same ID or priority.</p>
---	--

**Command Default**

No real server farm is associated with a virtual server. If **backup** *backup-farm* is not specified, no IPv4 backup server farm is configured. If **backup** *backup-farm* is specified but the **sticky** keyword is not specified, sticky connections are not used in the IPv4 backup server farm. If **ipv6-primary** *ipv6-primary-farm* is not specified, no dual-stack backup server farm is configured. If **ipv6-backup** *ipv6-backup-farm* is not specified, no dual-stack backup server farm is configured.

**Command Modes**

SLB virtual server configuration (config-slb-vserver)

**Command History**

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(8a)E	The <b>backup</b> and <b>sticky</b> keywords and the <i>backup-farm</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRB	The <b>map</b> and <b>priority</b> keywords and the <i>map-id</i> and <i>priority</i> arguments were added.

Release	Modification
15.0(1)S	The <b>ipv6-primary</b> and <b>ipv6-backup</b> keywords and the <i>ipv6-primary-farm</i> and <i>ipv6-backup-farm</i> arguments were added.

### Usage Guidelines

RADIUS load balancing and the Home Agent Director do not support the **sticky** keyword.

You can associate more than one server farm with a given virtual server by configuring more than one **serverfarm** command, each with a unique map ID and a unique priority. (That is, each map ID and each map priority must be unique across all server farms associated with the virtual server.)

For GPRS load balancing, if a real server is defined in two or more server farms, each server farm must be associated with a different virtual server.

IOS SLB supports dual-stack addresses for GTP load balancing only.

All IPv4 or IPv6 server farms that are associated with the same virtual server must have the same NAT configuration.

If you associate a primary server farm with a backup server farm, then all of the server farm maps that use that primary server farm must also be configured to use that same backup serverfarm. You cannot configure a server farm map that uses that primary server farm and no backup server farm.

- For example, if you configure primary server farm SF1 with backup server farm SF2, then all of the server farm maps that are configured with SF1 as the primary serverfarm must also be configured with SF2 as the backup serverfarm, as follows:

```
ip slb vserver RADIUS
virtual 2.2.2.2 udp 0 service radius
serverfarm SF1 backup SF2 map 1 priority 1
serverfarm SF1 backup SF2
inservice
```

- Furthermore, if you configure primary server farm SF1 with backup server farm SF2, you cannot then configure a server farm map to use SF1 as the primary server farm with no backup server farm. That is, the following is not allowed:

```
ip slb vserver RADIUS
virtual 2.2.2.2 udp 0 service radius
serverfarm SF1 map 1 priority 1
serverfarm SF1 backup SF2
inservice
```

- The backup server farm associated with an IOS SLB protocol map cannot be associated as a backup server farm with any other map in a given virtual server.

### Examples

The following example shows how the **ip slb vserver**, **virtual**, and **serverfarm** commands are used to associate the real server farm named PUBLIC with the virtual server named PUBLIC\_HTTP.

```
Router(config)# ip slb vserver PUBLIC HTTP
Router(config-slub-vserver)# virtual 10.0.0.1 tcp www
Router(config-slub-vserver)# serverfarm PUBLIC
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb serverfarm</b>	Identifies a server farm and enters server farm configuration mode.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).
<b>virtual</b>	Configures the virtual server attributes.

# show fm slb counters

To display information about the Feature Manager (FM) IOS Server Load Balancing (IOS SLB) counters, use the **show fm slb counters** command in privileged EXEC mode.

**show fm slb counters**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

Command History	Release	Modification
	12.2(18)SXF5	This command was introduced.

**Examples** The following sample output from the **show fm slb counters** command shows counter information for virtual server 10.11.11.11:

```
Router# show fm slb counters
FM SLB Purge Counters:
Global Purges:      0
TCP Purges:         0
UDP Purges:         0
Virtual Purges:     0
Flow Purges:        0
FM SLB Netflow Install Counters
[Slot 6 ] Install Request Sent      3
The table below describes the fields shown in the display.
```

**Table 1: show fm slb counters Field Descriptions**

Field	Description
Global Purges	Number of global purges sent by FM IOS SLB.
TCP Purges	Number of TCP purges sent by FM IOS SLB.
UDP Purges	Number of UDP purges sent by FM IOS SLB.
Virtual Purges	Number of virtual purges sent by FM IOS SLB.
Flow Purges	Number of flow purges sent by FM IOS SLB.
Install Request Sent	Number of install requests sent by IOS SLB.

**Related Commands**

Command	Description
clear fm slb counters	Clears Feature Manager (FM) IOS Server Load Balancing (IOS SLB) counters.

# show ip dfp

To display information about Dynamic Feedback Protocol (DFP) agents and their subsystems, use the **show ip dfp** command in privileged EXEC mode.

**show ip dfp** [*agent subsystem-name*] [**detail**]

## Syntax Description

<b>agent</b> <i>subsystem-name</i>	(Optional) Displays information about the specified DFP agent, such as <b>slb</b> for IOS SLB.
<b>detail</b>	(Optional) Displays detailed DFP agent information.

## Command Default

If no options are specified, the command displays output for all DFP agents identified by **ip dfp agent** commands, regardless of whether those agents are currently in service (**Inservice: yes**) or active (**AppActive: yes**).

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(8a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)SXD	This command was integrated into Cisco IOS Release 12.2(18)SXD.

## Usage Guidelines

Detailed output for the **show ip dfp** command includes information about all DFP agents configured with **ip slb agent** commands, regardless of whether those agents are currently in service.

## Examples

The following example shows basic information for DFP agent slb:

```
Router# show ip dfp agent slb
Unexpected errors: 0
DFP Agent for service: SLB
  Port: 666 Interval: 10
  Current passwd: <none> Pending passwd: <none>
  Passwd timeout: 0
  Inservice: yes AppActive: yes
  Manager IP Address   Timeout
  -----
  172.16.45.27         0
```

The following example shows detailed information for DFP agent slb:

```
Router# show ip dfp agent slb detail
Unexpected errors: 0
DFP Agent for service: SLB
  Port: 666 Interval: 10
  Current passwd: <none> Pending passwd: <none>
  Passwd timeout: 0
  Inservice: yes AppActive: yes
  Manager IP Address   Timeout
  -----
172.16.45.27         0
Weight Table Report for Agent SLB
  Weights for Port: 80 Protocol: TCP
  IP Address          Bind ID Weight
  -----
10.1.1.1             0      65535
  Weights for Port: 0 (wildcard) Protocol: 0 (wildcard)
  IP Address          Bind ID Weight
  -----
10.0.0.0             65534  0
Bind ID Table Report for Agent SLB
  Bind IDs for Port: 80 Protocol: TCP
  Bind ID Client IP Client Mask
  -----
0          10.0.0.0  0.0.0.0
```

The table below describes the fields shown in the display.

**Table 2: show ip dfp Field Descriptions**

Field	Description
Port	TCP port number of the agent.
Interval	Number of seconds to wait before recalculating weights.
Current passwd	Current DFP password for Message Digest Algorithm Version 5 (MD5) authentication.
Pending passwd	Pending new DFP password for MD5 authentication.
Passwd timeout	Delay period, in seconds, during which both the current password and the new password are accepted.
Inservice	Indicates whether the DFP agent is enabled for communication with a DFP manager.
AppActive	Indicates whether the DFP agent is active.
Manager IP Address	IP address of the manager to which weights are being sent.
Timeout	Time period, in seconds, during which the DFP manager must receive an update from the DFP agent. A value of 0 means there is no timeout.



Field	Description
Weights for Port	Port for which the following weights are reported. 0 indicates a wildcard value.
Protocol	Protocol used for the port. 0 indicates a wildcard value.
IP Address	IP address for which weight is reported.
Bind ID	Bind ID associated with the IP address.
Weight	Weight calculated for the IP address.
Bind IDs for Port	Port for which the following bind IDs are reported.
Protocol	Protocol used for the port.
Bind ID	Bind ID of this instance of the real server.
Client IP	IP address of client using the virtual server.
Client Mask	IP network mask of client using the virtual server.

#### Related Commands

Command	Description
<b>agent</b>	Identifies a DFP agent to which IOS SLB can connect.
<b>ip dfp agent</b>	Identifies a DFP agent subsystem and initiates DFP agent configuration mode.
<b>ip slb dfp</b>	Configures DFP, supplies an optional password, and initiates DFP configuration mode.

## show ip slb conns

To display the active IOS Server Load Balancing (IOS SLB) connections (or sessions, in GPRS load balancing and the Home Agent Director), use the **show ip slb conns** command in privileged EXEC mode.

**show ip slb conns** [*vserver virtual-server*] **client** *ip-address* [**firewall** *firewall-farm*] [**detail**]

### Syntax Description

<b>vserver</b> <i>virtual-server</i>	(Optional) Displays only those connections (or sessions, in GPRS load balancing and the Home Agent Director) associated with the specified virtual server.
<b>client</b> <i>ip-address</i>	(Optional) Displays only those connections (or sessions, in GPRS load balancing and the Home Agent Director) associated with the specified client IP address.
<b>firewall</b> <i>firewall-farm</i>	(Optional) Displays only those connections (or sessions, in GPRS load balancing and the Home Agent Director) associated with the specified firewall farm.
<b>detail</b>	(Optional) Displays detailed information about the connection (or session, in GPRS load balancing and the Home Agent Director).

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(7)E	The <b>firewall</b> keyword and <i>firewall-farm</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

If no options are specified, the command displays output for all active IOS SLB connections (or sessions, in GPRS load balancing and the Home Agent Director).

**Examples**

The following is sample output from the **show ip slb conns** command:

```
Router# show ip slb conns
vserver      prot  client                    real                    state
-----
TEST         TCP   10.150.72.183:328        10.80.90.25:80         INIT
TEST         TCP   10.250.167.226:423      10.80.90.26:80         INIT
TEST         TCP   10.234.60.239:317       10.80.90.26:80         ESTAB
TEST         TCP   10.110.233.96:747       10.80.90.26:80         ESTAB
TEST         TCP   10.162.0.201:770        10.80.90.30:80         CLOSING
TEST         TCP   10.22.225.219:995       10.80.90.26:80         CLOSING
TEST         TCP   10.2.170.148:169       10.80.90.30:80         ZOMBIE
```

The table below describes the fields shown in the display.

**Table 3: show ip slb conns Field Descriptions**

Field	Description
vserver	Name of the virtual server associated with the connection (or session, in GPRS load balancing and the Home Agent Director).
prot	Protocol being used by the connection (or session, in GPRS load balancing and the Home Agent Director).
client	Client IP address associated with the connection (or session, in GPRS load balancing and the Home Agent Director).
real	Real server IP address associated with the connection (or session, in GPRS load balancing and the Home Agent Director).
state	Current state of the connection (or session, in GPRS load balancing and the Home Agent Director). <ul style="list-style-type: none"> <li>• CLOSING--The connection is closing.</li> <li>• ESTAB--The connection has been established and is operational.</li> <li>• INIT--The connection is being initialized.</li> <li>• ZOMBIE--The connection is currently pending destruction (awaiting a timeout or some other condition to be met).</li> </ul>

## show ip slb dfp

To display Dynamic Feedback Protocol (DFP) manager and agent information, such as passwords, timeouts, retry counts, and weights, use the **show ip slb dfp** command in privileged EXEC mode.

**show ip slb dfp** [*agent agent-ip port* | **manager manager-ip** | **detail** | **weights**]

### Syntax Description

<b>agent</b>	(Optional) Displays information about an agent.
<i>agent-ip</i>	(Optional) Agent IP address.
<i>port</i>	(Optional) Agent TCP or User Datagram Protocol (UDP) port number.
<b>manager</b>	(Optional) Displays information about the specified manager.
<i>manager-ip</i>	(Optional) Manager IP address.
<b>detail</b>	(Optional) Displays all data available.
<b>weights</b>	(Optional) Displays information about weights assigned to real servers for load balancing.

### Command Default

If no options are specified, the command displays summary information.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(5a)E	The <b>manager</b> keyword and <i>manager-ip</i> argument were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Usage Guidelines**

If no options are specified, the command displays summary information.

**Examples**

The following sample output from the **show ip slb dfp** command displays high-level information about all DFP agents and managers:

```
Router# show ip slb dfp
DFP Manager:
  Current passwd:NONE Pending passwd:NONE
  Passwd timeout:0 sec
Agent IP          Port      Timeout  Retry Count  Interval
-----
172.16.2.34      61936    0        0            180 (Default)
```

The table below describes the fields shown in the display.

**Table 4: show ip slb dfp Field Descriptions**

Field	Description
DFP Manager	Indicates that the following information applies to the DFP manager.
Current passwd	Current password for the DFP manager, if any.
Pending passwd	Pending password for the DFP manager, if any.
Passwd timeout	For the DFP manager, delay period, in seconds, during which both the current password and the pending password are accepted.
Agent IP	IP address of the agent about which information is being displayed.
Port	TCP or UDP port number of the agent. The valid range is 1 to 65535.
Timeout	Time period, in seconds, during which the DFP manager must receive an update from the DFP agent. A value of 0 means there is no timeout.
Retry Count	Number of times the DFP manager attempts to establish the TCP connection to the DFP agent. A value of 0 means there are infinite retries.
Interval	Interval, in seconds, between retries.

The following example displays detailed information about DFP agents and managers:

```
Router# show ip slb dfp detail
```

```
DFP Manager
  Current passwd <none> Pending passwd <none>
  Passwd timeout 0 sec
  Unexpected errors 0
% No DFP Agents configured
```

The table below describes the fields shown in the display.

**Table 5: show ip slb dfp detail Field Descriptions**

Field	Description
DFP Manager	Indicates that the following information applies to the DFP manager.
Current passwd	Current DFP password for MD5 authentication.
Pending passwd	Pending new DFP password for MD5 authentication.
Passwd timeout	Delay period, in seconds, during which both the current password and the pending password are accepted.
Unexpected errors	Number of unexpected errors encountered by the DFP manager.
No DFP Agents configured	Indicates that there are no DFP agents associated with the DFP manager.

The following example displays detailed information about DFP manager 10.0.0.0:

```
Router# show ip slb dfp manager 10.0.0.0
DFP Manager 10.0.0.0 Connection state Connected
  Timeout = 20
  Last message sent 033537 UTC 01/02/00
```

The table below describes the fields shown in the display.

**Table 6: show ip slb dfp manager Field Descriptions**

Field	Description
DFP Manager	Indicates that the following information applies to the DFP manager.
Connection state	Current connection state of the DFP manager.
Timeout	Time period, in seconds, during which the DFP manager must receive an update from the DFP agent. A value of 0 means there is no timeout.
Last message sent	Date and time of the last message sent by the DFP manager.

The following example displays detailed information about weights assigned to real servers for load balancing:

```
Router# show ip slb dfp weights
Real IP Address 10.0.10.10 Protocol TCP Port 22 Bind_ID 111 Weight 111
    Set by Agent 172.16.2.3458490 at 132241 UTC 12/03/99
Real IP Address 10.17.17.17 Protocol TCP Port www Bind_ID 1 Weight 1
    Set by Agent 172.16.2.3458490 at 132241 UTC 12/03/99
Real IP Address 10.68.68.68 Protocol TCP Port www Bind_ID 4 Weight 4
    Set by Agent 172.16.2.3458490 at 132241 UTC 12/03/99
Real IP Address 10.85.85.85 Protocol TCP Port www Bind_ID 5 Weight 5
    Set by Agent 172.16.2.3458490 at 132241 UTC 12/03/99
```

The table below describes the fields shown in the display.

**Table 7: show ip slb dfp weights Field Descriptions**

Field	Description
Real IP Address	IP address of the real server for which weight is reported.
Protocol	Protocol used for the port.
Port	Port for which the following bind ID is being reported.
Bind_ID	Bind ID of this instance of the real server.
Weight	Weight calculated for the real IP address.
Set by Agent	Agent that set the weight, and the date and time the weight was set.

# show ip slb firewallfarm

To display firewall farm information, use the **show ip slb firewallfarm** command in privileged EXEC mode.

**show ip slb firewallfarm [detail]**

## Syntax Description

<b>detail</b>	(Optional) Displays detailed information.
---------------	---

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following is sample output from the **show ip slb firewallfarm** command:

```
Router# show ip slb firewallfarm
firewall farm    hash      state      reals
-----
FIRE1           IPADDR    OPERATIONAL 2
The table below describes the fields shown in the display.
```

**Table 8: show ip slb firewallfarm Field Descriptions**

Field	Description
firewall farm	Name of the firewall farm.



Field	Description
hash	<p>Load-balancing algorithm used to select a firewall for the firewall farm:</p> <ul style="list-style-type: none"><li>• IPADDR--Uses the source and destination IP addresses in the algorithm.</li><li>• IPADDRPORT--Uses the source and destination TCP or User Datagram Protocol (UDP) port numbers, in addition to the source and destination IP addresses, in the algorithm.</li></ul> <p>See the <b>predictor hash address</b> (firewall farm)command for more details.</p>
state	<p>Current state of the firewall farm:</p> <ul style="list-style-type: none"><li>• OPERATIONAL--Functioning properly.</li><li>• OUTOFSERVICE--Removed from the load-balancing predictor lists.</li><li>• STANDBY--Backup firewall farm, ready to become operational if the active firewall farm fails.</li></ul>
reals	<p>Number of firewalls that are members of the firewall farm.</p>

# show ip slb fragments

To display information from the Cisco IOS Server Load Balancing (IOS SLB) fragment database, use the **show ip slb fragments** command in privileged EXEC mode.

**show ip slb fragments**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

Command History	Release	Modification
	12.1(11b)E	This command was introduced.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples** The following sample output from the **show ip slb fragments** command shows fragment information for virtual server 10.11.11.11:

```
Router# show ip slb fragments
ip src          id    forward          src nat          dst nat
-----
10.11.2.128    12   10.11.2.128     10.11.11.11     10.11.2.128
10.11.2.128    13   10.11.2.128     10.11.11.11     10.11.2.128
10.11.2.128    14   10.11.2.128     10.11.11.11     10.11.2.128
10.11.2.128    15   10.11.2.128     10.11.11.11     10.11.2.128
10.11.2.128    16   10.11.2.128     10.11.11.11     10.11.2.128
```

The table below describes the fields shown in the display.

**Table 9: show ip slb fragments Field Descriptions**

Field	Description
ip src	Source IP address of the fragment.
id	IP ID of the fragment, set by the packet originator.
forward	IP address to which the fragment is being forwarded.
src nat	If using Network Address Translation (NAT), new source IP address after NAT.

Field	Description
dst nat	If using NAT, new destination IP address after NAT.

## show ip slb gtp

To display IOS Server Load Balancing (IOS SLB) general packet radio service (GPRS) Tunneling Protocol (GTP) information, use the **show ip slb gtp** command in privileged EXEC mode.

```
show ip slb gtp {gsn [ gsn-ip-address ]| nsapi [ nsapi-key ] [detail]}
```

### Syntax Description

<b>gsn</b>	(Optional) Displays IOS SLB database information for the specified gateway GPRS support node (GGSN) or serving GPRS support node (SGSN).
<i>gsn-ip-address</i>	(Optional) IP address of the GGSN or SGSN for which information is to be displayed. If you do not specify a <i>gsn-ip-address</i> , IOS SLB displays information for all GGSNs and SGSNs.
<b>nsapi</b>	(Optional) Displays IOS SLB database information for the specified Network Service Access Point Identifier (NSAPI).
<i>nsapi-key</i>	(Optional) Key of the NSAPI for which information is to be displayed. If you do not specify an <i>nsapi-key</i> , IOS SLB displays information for all NSAPIs.
<b>detail</b>	(Optional) Displays additional, more detailed information.

### Command Default

If you specify **gsn** and you do not specify a *gsn-ip-address*, IOS SLB displays information for all GGSNs and SGSNs. If you specify **nsapi** and you do not specify an *nsapi-key*, IOS SLB displays information for all NSAPIs.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.1(13)E3	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

**Examples**

The following is sample output from the **show ip slb gtp gsn** command for a specific GGSN or SGSN:

```
Router# show ip slb gtp gsn 10.0.0.0
type ip                recovery-ie  purging
-----
SGSN 10.0.0.0 UNKNOWN      N
```

The table below describes the fields shown in the display.

**Table 10: show ip slb gtp gsn Field Descriptions**

Field	Description
type	Type of GSN (either GGSN or SGSN).
ip	IP address of the GGSN or SGSN.
recovery-ie	Last seen recovery IE for this GGSN or SGSN.
purging	Indicates whether Packet Data Protocol (PDP) contexts belonging to this GGSN or SGSN are being purged as a result of path failure: <ul style="list-style-type: none"> <li>• <b>Y (Yes)</b> --PDP contexts are being purged.</li> <li>• <b>N (No)</b> --PDP contexts are not being purged.</li> </ul>

The following is sample output from the **show ip slb gtp nsapi** command:

```
Router# show ip slb gtp nsapi
nsapi key      real                nsapi count session count
-----
1111111111111F1 172.16.0.0 1          1
```

The following is sample output from the **show ip slb gtp nsapi** command for a specific NSAPI key:

```
Router# show ip slb gtp nsapi 1111111111111F1
nsapi key      real                nsapi count session count
-----
1111111111111F1 172.16.0.0 1          1
```

The table below describes the fields shown in the display.

**Table 11: show ip slb gtp nsapi Field Descriptions**

Field	Description
nsapi key	Key for the session. This is the IMSI.
real	Real server to which the session is assigned.
nsapi count	Number of NSAPIs bound to the session. This is the number of PDP contexts (mobile sessions) on the GGSN associated with the IMSI.

Field	Description
session count	Number of sessions to which the NSAPI is currently bound. Normally, the NSAPI is bound to one session, but it is bound to two sessions in transition during an update.

The following is sample output from the **show ip slb gtp nsapi detail** command:

```
Router# show ip slb gtp nsapi detail
IMSI key = 1111111111111111F1, real = 172.16.0.1, nsapi count = 1, session count = 1
no vserver          key          client          state          seq
-----
5  SERVER1          0009E8810009E881 10.0.0.0:2123  GTP_INIT      0
```

The table below describes the fields shown in the display.

**Table 12: show ip slb gtp nsapi detail Field Descriptions**

Field	Description
IMSI key	IMSI key for the session.
real	Real server to which the session is assigned.
nsapi count	Number of NSAPIs bound to the session. This is the number of PDP contexts (mobile sessions) on the GGSN associated with this IMSI.
session count	Number of sessions to which the NSAPI is currently bound. Normally, the NSAPI is bound to one session, but it is bound to two sessions in transition during an update.
no	NSAPI number.
vserver	Name of the virtual server.
key	Session key.
client	SGSN IP address and port number.

Field	Description
state	State of the session. Possible states are: <ul style="list-style-type: none"><li>• <b>GTP_ESTAB</b> --The session has been established successfully.</li><li>• <b>GTP_INIT</b> --The PDP contexts have been deleted as a result of a delete request or a deletion in GGSN, and IOS SLB is waiting to destroy the session after the GTP_TIMEOUT.</li><li>• <b>GTP_REQ_CLIENT</b> --Waiting for a response from the real server.</li></ul>
seq	Sequence number in the last delete request.

# show ip slb map

To display information about IOS SLB protocol maps, use the **show ip slb map** command in privileged EXEC mode.

**show ip slb map** [ *id* ]

## Syntax Description

<i>id</i>	(Optional) Displays information about the specified map.
-----------	--

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.2(33)SRB	This command was introduced.

## Usage Guidelines

If no ID is specified, the command displays information about all maps.

## Examples

The following is sample output from the **show ip slb map** command:

```
Router# show ip slb map
ID: 1, Service: GTP
  APN: Cisco.com, yahoo.com
  PLMN ID(s): 11122, 444353
  SGSN access list: 100
ID: 2, Service: GTP
  PLMN ID(s): 67523, 345222
  PDP Type: IPv4, PPP
ID: 3, Service: GTP
  PDP Type: IPv6
ID: 4, Service: RADIUS
  Calling-station-id: "?919*"
ID: 5, Service: RADIUS
  Username: "..778cisco.*"
```

The table below describes the fields shown in the display.

**Table 13: show ip slb map Field Descriptions**

Field	Description
ID	Identifier of the map about which information is being displayed. Information about each map is displayed on a separate line.



Field	Description
Service	Protocol associated with the map. Valid protocols are: <ul style="list-style-type: none"> <li>• GTP--For general packet radio service (GPRS) Tunneling Protocol (GTP) maps</li> <li>• RADIUS--For RADIUS load balancing maps</li> </ul>
APN	One or more access point names (APNs) associated with the GTP map
PLMN ID(s)	One or more public land mobile networks (PLMNs) associated with the GTP map.
SGSN access list	Serving GPRS Support Node (SGSN) access list associated with the GTP map.
PDP Type	One or more packet data protocol (PDP) types associated with the GTP map.
Calling-station-id	String to be matched against the calling station ID attribute in the RADIUS payload.
Username	String to be matched against the username attribute in the RADIUS payload.

# show ip slb natpool

To display the IP Cisco IOS Server Load Balancing (IOS SLB) Network Address Translation (NAT) configuration, use the **show ip slb natpool** command in privileged EXEC mode.

**show ip slb natpool** [*name pool*] [*detail*]

## Syntax Description

<b>name</b> <i>pool</i>	(Optional) Displays the specified NAT pool.
<b>detail</b>	(Optional) Lists all the interval ranges currently allocated in the client NAT pool.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following is sample output from the default **show ip slb natpool** command:

```
Router# show ip slb natpool
nat client B 209.165.200.225 1.1.1.6 1.1.1.8 Netmask 255.255.255.0
nat client A 10.1.1.1 1.1.1.5 Netmask 255.255.255.0
```

The following is sample output from the **show ip slb natpool** command with the **detail** keyword:

```
Router# show ip slb natpool detail
nat client A 1.1.1.1 1.1.1.5 Netmask 255.255.255.0
  Start NAT      Last NAT      Count      ALLOC/FREE
  -----
  10.1.1.1:11001 10.1.1.1:16333 0005333   ALLOC
  10.1.1.1:16334 10.1.1.1:19000 0002667   ALLOC
  10.1.1.1:19001 10.1.1.5:65535 0264675   FREE
nat client B 1.1.1.6 1.1.1.8 Netmask 255.255.255.0
  Start NAT      Last NAT      Count      ALLOC/FREE
  -----
  10.1.1.6:11001 10.1.1.6:16333 0005333   ALLOC
  10.1.1.6:16334 10.1.1.6:19000 0002667   ALLOC
  10.1.1.6:19001 10.1.1.8:65535 0155605   FREE
```

The table below describes the fields shown in the display.

**Table 14: show ip slb natpool detail Field Descriptions**

<b>Field</b>	<b>Description</b>
Start NAT	Starting NAT address in a range of addresses in the client NAT pool.
Last NAT	Last NAT address in a range of addresses in the client NAT pool.
Count	Number of NAT addresses in the range.
ALLOC/FREE	Indicates whether the range of NAT addresses has been allocated or is free.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>ip slb natpool</b>	Configures the IOS SLB NAT.

# show ip slb probe

To display information about a Cisco IOS Server Load Balancing (IOS SLB) probe, use the **show ip slb probe** command in privileged EXEC mode.

**show ip slb probe** [*name probe*] [*detail*]

## Syntax Description

<b>name</b> <i>probe</i>	(Optional) Displays information about the specified probe.
<b>detail</b>	(Optional) Displays detailed information, including the SA Agent operation ID, which you can correlate with the output of the <b>show rtr operational-state</b> command.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(2)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following is sample output from the **show ip slb probe** command:

```
Router# show ip slb probe
Server:Port      State      Outages  Current  Cumulative
-----
10.10.4.1:0      OPERATIONAL  0  never   00:00:00
10.10.5.1:0      FAILED      1  00:00:06 00:00:06
```

The table below describes the fields shown in the display.

**Table 15: show ip slb probe Field Descriptions**

Field	Description
Server:Port	IP address and port of the real server.

Field	Description
State	<p>Operational state of the probe:</p> <ul style="list-style-type: none"><li>• <b>FAILED</b>--The probe has succeeded in the past but has currently failed.</li><li>• <b>OPERATIONAL</b>--The probe is functioning normally.</li><li>• <b>TESTING</b>--The probe has never succeeded, due to no response. IOS SLB keeps no counters or timers for this state.</li></ul> <p>For a detailed listing of real server states, see the <b>show ip slb reals</b> command.</p>
Outages	Number of intervals between successful probes.
Current	Time since the last probe success. That is, the duration (so far) of the current outage.
Cumulative	Total time the real server has been under test by the probe and has failed the probe test. This value is the sum of the Current time plus the total time of all previous outages.

## show ip slb reals

To display information about the real servers, use the **show ip slb reals** command in privileged EXEC mode.

**show ip slb reals** [*sfarm server-farm*] [**detail**]

### Syntax Description

<b>sfarm</b> <i>server-farm</i>	(Optional) Displays information about those real servers associated with the specified server farm or firewall farm.
<b>detail</b>	(Optional) Displays detailed information.

### Command Modes

Privileged EXEC (#)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(13)E	The <b>vserver</b> keyword and <i>virtual-server</i> argument were replaced with the <b>sfarm</b> keyword and <i>server-farm</i> argument.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The output for the <b>detail</b> keyword for a real server in a server farm was updated to display the configured maximum number of connections allowed (rate).
15.0(1)S	The output for the <b>detail</b> keyword for a real server in a server farm was updated to display the real server's IPv4, IPv6, or dual-stack address.

### Usage Guidelines

If no options are specified, the command displays information about all real servers.

In a configuration with stateful backup, if a probe changes state at the same time that the primary IOS SLB device fails over to the backup IOS SLB device, the output from the **show ip slb reals** command for the backup device displays the state of the probe before the failover, not the actual current state.

**Examples**

The following is sample output from the **show ip slb reals** command:

```
Router# show ip slb reals
real          farm name      weight  state         conns
-----
10.80.2.112   FRAG           8       OUTOFSERVICE  0
10.80.5.232   FRAG           8       OPERATIONAL   0
10.80.15.124  FRAG           8       OUTOFSERVICE  0
10.254.2.2    FRAG           8       OUTOFSERVICE  0
10.80.15.124  LINUX         8       OPERATIONAL   0
10.80.15.125  LINUX         8       OPERATIONAL   0
10.80.15.126  LINUX         8       OPERATIONAL   0
10.80.90.25   SRE            8       OPERATIONAL   220
10.80.90.26   SRE            8       OPERATIONAL   216
10.80.90.27   SRE            8       OPERATIONAL   216
10.80.90.28   SRE            8       TESTING       1
10.80.90.29   SRE            8       OPERATIONAL   221
10.80.90.30   SRE            8       OPERATIONAL   224
10.80.30.3    TEST          100      READY_TO_TEST 0
10.80.30.4    TEST          100      READY_TO_TEST 0
10.80.30.5    TEST          100      READY_TO_TEST 0
10.80.30.6    TEST          100      READY_TO_TEST 0
```

The table below describes the fields shown in the display.

**Table 16: show ip slb reals Field Descriptions**

Field	Description
real	IP address of the real server about which information is being displayed. Used to identify each real server. Information about each real server is displayed on a separate line.
farm name	Name of the server farm or firewall farm with which the real server is associated.
weight	Weight assigned to the real server. The weight identifies the real server's capacity, relative to other real servers in the server farm.

Field	Description
state	<p>Current state of the real server.</p> <ul style="list-style-type: none"> <li>• DFP_THROTTLED--The Dynamic Feedback Protocol (DFP) agent sent a weight of 0 for this real server (send no further connections to this real server).</li> <li>• FAILED--The real server has failed as a result of either no response or reset (RST) responses to client traffic. (See the <b>faildetect numconns</b>(real server) command for more information about controlling tolerance for no responses and RSTs.) The real server has been removed from use by the predictor algorithms. The retry timer has started.</li> <li>• MAXCONNS_THROTTLE--The number of connections on the real server exceeds the configured maximum number of simultaneous active connections (maxconns).</li> <li>• OPERATIONAL--The real server is functioning properly and is being used for load-balancing.</li> <li>• OPER_WAIT--The real server is waiting to become operational (waiting for a timeout or some other condition to be met).</li> <li>• OUTOFSERVICE--The real server was configured with <b>no inservice</b> and has been removed from the load-balancing predictor lists.</li> <li>• PROBE_FAILED--The probe has succeeded in the past but has currently failed. This failure might occur at the same time user connections fail, or it might not.</li> <li>• PROBE_TESTING--The probe has never succeeded, due to no response. The initial probe timed out waiting for a success.</li> </ul>



Field	Description
	<ul style="list-style-type: none"> <li>• <b>READY_TO_TEST</b>--The real server is queued for testing after being in <b>FAILED</b> state until the retry timer expired.</li> <li>• <b>TESTING</b>--The real server is queued for assignment. When a single user connection is assigned to a real server that is in <b>READY_TO_TEST</b> state, the real server is placed in <b>TESTING</b> state. If the test succeeds, the real server is placed back in <b>OPERATIONAL</b> state.</li> <li>• <b>TEST_WAIT</b>--The real server is waiting to begin testing (waiting for a timeout or some other condition to be met).</li> </ul>
conns	<p>Number of connections associated with the real server.</p> <p>In general packet radio service (GPRS) load balancing, number of sessions associated with the real server.</p> <p>In per-packet server load balancing, number of request packets that have been load balanced to each real server, using the connection count.</p>

The following is sample output from the **show ip slb reals detail** command for a dual-stack real server in a server farm:

```
Router# show ip slb reals detail
172.16.88.5, SF1, state = OPERATIONAL, type = server
  ipv6 = 2342:2342:2343:FF04:2388:BB03:3223:8912
  conns = 0, dummy_conns = 0, maxconns = 4294967295
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  reassign = 3, retry = 60
  failconn threshold = 8, failconn count = 0
  failclient threshold = 2, failclient count = 0
  total conns established = 0, total conn failures = 0
  server failures = 0
```

The following is sample output from the **show ip slb reals detail** command for a real server in a firewall farm:

```
Router# show ip slb reals detail
10.10.3.2, F, state = OPERATIONAL, type = firewall
  conns = 0, dummy_conns = 0, maxconns = 4294967295
  weight = 8, weight(admin) = 8, metric = 0, remainder = 0
  total conns established = 8377, hash count = 0
  server failures = 0
  interface FastEthernet1/0, MAC 0000.0c41.1063
```

The table below describes the fields shown in the above detail displays.

**Table 17: show ip slb reals detail Field Descriptions**

<b>Field</b>	<b>Description</b>
IPv4 or IPv6 address	IPv4 or IPv6 address of the real server about which information is being displayed. Used to identify each real server. Information about each real server is displayed on a separate line.
farm name	Name of the server farm or firewall farm with which the real server is associated.

Field	Description
state	

Field	Description
	<p>Current state of the real server.</p> <ul style="list-style-type: none"> <li>• DFP_THROTTLED--The Dynamic Feedback Protocol (DFP) agent sent a weight of 0 for this real server (send no further connections to this real server).</li> <li>• FAILED--The real server has failed as a result of either no response or reset (RST) responses to client traffic. (See the <b>faildetect numconns</b> (real server) command for more information about controlling tolerance for no responses and RSTs.) The real server has been removed from use by the predictor algorithms. The retry timer has started.</li> <li>• MAXCONNS_THROTTLE--The number of connections on the real server exceeds the configured maximum number of simultaneous active connections (maxconns).</li> <li>• OPERATIONAL--The real server is functioning properly and is being used for load-balancing.</li> <li>• OPER_WAIT--The real server is waiting to become operational (waiting for a timeout or some other condition to be met).</li> <li>• OUTOFSERVICE--The real server was configured with <b>no inservice</b> and has been removed from the load-balancing predictor lists.</li> <li>• PROBE_FAILED--The probe has succeeded in the past but has currently failed. This failure might occur at the same time user connections fail, or it might not.</li> <li>• PROBE_TESTING--The probe has never succeeded, due to no response. The initial probe timed out waiting for a success.</li> <li>• READY_TO_TEST--The real server is queued for testing after being in FAILED state until the retry timer expired.</li> <li>• TESTING--The real server is queued for assignment. When a single user connection is assigned to a real server that is in READY_TO_TEST state, the real server is placed in TESTING state. If the test succeeds, the real server is placed back in OPERATIONAL state.</li> <li>• TEST_WAIT--The real server is waiting to</li> </ul>

Field	Description
	begin testing (waiting for a timeout or some other condition to be met).
type	Indicates whether the real server is associated with a server farm (server) or firewall farm (firewall).
ipv6	IPv6 address of the real server about which information is being displayed, if dual-stack.
conns	Number of connections associated with the real server.  In general packet radio service (GPRS) load balancing, number of sessions associated with the real server.  In per-packet server load balancing, number of request packets that have been load balanced to each real server, using the connection count.
dummy_conns	Internal counter used in debugging.
maxconns	Maximum number of active connections allowed on the real server at one time.
weight	Weight assigned to the real server. The weight identifies the real server's capacity, relative to other real servers in the server farm. This value could be changed by DFP.
weight(admin)	Configured (or default) weight assigned to the real server.
metric	Internal counter used in debugging.
remainder	Internal counter used in debugging.
reassign	Total number of consecutive unacknowledged SYNchronize sequence numbers (SYNs) or Create Packet Data Protocol (PDP) requests since the last time the <b>clear ip slb counters</b> command was issued.
retry	Interval, in seconds, to wait between the detection of a failure on the real server and the next attempt to connect to the server.
rate	Maximum number of connections per second allowed on the real server.

Field	Description
failconn threshold	Maximum number of consecutive connection failures allowed before the real server is considered to have failed.
failconn count	Total number of consecutive connection failures since the last time the <b>clear ip slb counters</b> command was issued.
failclient threshold	Maximum number of unique client connection failures allowed before the real server is considered to have failed.
failclient count	Total number of unique client connection failures since the last time the <b>clear ip slb counters</b> command was issued.
total conns established	Total number of successful connection assignments since the last time the <b>clear ip slb counters</b> command was issued.
total conn failures	Total number of unsuccessful connection assignments since the last time the <b>clear ip slb counters</b> command was issued.
server failures	Total number of times this real server has been marked failed.
hash count	Total number of times the hash algorithm has been called.
interface	Type of interface.
MAC	MAC address of the firewall.

# show ip slb replicate

To display the Cisco IOS Server Load Balancing (IOS SLB) replication configuration, use the **show ip slb replicate** command in privileged EXEC mode.

**show ip slb replicate**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

Command History	Release	Modification
	12.1(2)E	This command was introduced.
	12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
	12.2(14)ZA5	This command was modified to support slave replication.
	12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following is sample output from the **show ip slb replicate** command:

```
Router# show ip slb replicate
VS1, state = NORMAL, interval = 10
Slave Replication: Enabled
Slave Replication statistics:
  unsent conn updates:      0
  conn updates received:   0
  conn updates transmitted: 0
  update messages received: 0
  update messages transmitted: 0
Casa Replication:
  local = 10.1.1.1 remote = 10.2.2.2 port = 1024
  current password = <none> pending password = <none>
  password timeout = 180 sec (Default)
Casa Replication statistics:
  unsent conn updates:      0
  conn updates received:   0
  conn updates transmitted: 0
  update packets received:  0
  update packets transmitted: 0
  failovers:                0
```

The table below describes the fields shown in the display.

**Table 18: show ip slb replicate Field Descriptions**

Field	Description
state	Current replication state of the virtual server: <ul style="list-style-type: none"> <li>• DUMPING--Dumping the connection table to the Hot Standby Router Protocol (HSRP) peer device.</li> <li>• NORMAL--Functioning properly.</li> <li>• PREEMPTING--Preparing to preempt the HSRP peer device and assume an active role.</li> </ul>
interval	Replication buffering interval, in seconds.
Slave Replication	Indicates whether Slave Replication is enabled or disabled.
unsent conn updates	Number of Slave Replication or CASA Replication connection updates waiting to be sent.
conn updates received	Number of Slave Replication or CASA Replication connection updates received.
conn updates transmitted	Number of Slave Replication or CASA Replication connection updates sent.
update packets received	Number of Slave Replication or CASA Replication connection update packets received.
update packets transmitted	Number of Slave Replication or CASA Replication connection update packets sent.
local	Listening IP address for CASA Replication state exchange messages that are advertised.
remote	Destination IP address for all CASA Replication state exchange signals.
port	TCP or User Datagram Protocol (UDP) port number or port name for all CASA Replication state exchange signals.
current password	Current CASA Replication password for Message Digest Algorithm Version 5 (MD5) authentication, if any.
pending password	Pending CASA Replication password for MD5 authentication, if any.



Field	Description
failovers	Number of CASA Replication failovers detected.

**Related Commands**

Command	Description
<b>request (HTTP probe)</b>	Configures an HTTP probe to check the status of the real servers.

# show ip slb serverfarms

To display information about the server farms, use the **show ip slb serverfarms** command in privileged EXEC mode.

**show ip slb serverfarms** [*name serverfarm-name*] [*detail*]

## Syntax Description

<b>name</b>	(Optional) Displays information about only a particular server farm.
<i>serverfarm-name</i>	(Optional) Name of the server farm.
<b>detail</b>	(Optional) Displays detailed server farm information.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The output for the <b>detail</b> keyword was updated to display RADIUS load balancing enhancements and information about the IOS SLB KeepAlive Application Protocol (KAL-AP) agent.
15.0(1)S	The output for the <b>detail</b> keyword was updated to display the real server's IPv4, IPv6, or dual-stack address.

## Examples

The following is sample output from the **show ip slb serverfarms** command:

```
Router# show ip slb serverfarms
server farm    predictor      nat    reals    bind id  interface(s)
GGSN           ROUNDROBIN    none   0        0       <any>
GGSN1         ROUNDROBIN    S      5        0       <any>
GGSN_IPV6     ROUNDROBIN    S      5        0       <any>
```

The table below describes the fields shown in the display.

**Table 19: show ip slb serverfarms Field Descriptions**

Field	Description
server farm	Name of the server farm about which information is being displayed. Information about each server farm is displayed on a separate line.
predictor	Type of load-balancing algorithm (ROUNDROBIN, LEASTCONNS, or ROUTEMAP) used by the server farm
nat	NAT setting for the server farm: <ul style="list-style-type: none"> <li>• <b>c</b> --Client NAT</li> <li>• <b>s</b> --Server NAT</li> <li>• <b>none</b> --NAT is not configured for the server farm</li> </ul>
reals	Number of real servers configured in the server farm
bind id	Bind ID configured on the server farm.
interface(s)	Interface used by the server farm

The following is sample output from the **show ip slb serverfarms detail** command, if RADIUS load balancing is configured with the route map predictor:

```
Router# show ip slb serverfarms detail
SF1, predictor = ROUNDROBIN, nat =SERVER, interface(s) = V188
  virtuals inservice: 1, reals = 1, bind id = 0
  Real servers:
    172.16.88.5, weight = 8, OPERATIONAL, conns = 0
    ipv6 = 2342:2342:2343:FF04:2388:BB03:3223:8912
  Total connections = 0
```

For RADIUS load balancing with the route map predictor configured, specifying the **detail** keyword displays:

- **predictor = ROUTE-MAP** --Indicates that the **route-map** keyword is configured on the **predictor** command in SLB server farm configuration mode.
- **routermap name** --Name of the IOS policy-based routing (PBR) route map. If the route map is invalid or is not present, IOS SLB also displays **Not Configured/Valid**.

The following is sample output from the **show ip slb serverfarms detail** command, if a KAL-AP request was received for this server farm:

```
SF, predictor = ROUNDROBIN, nat = SERVER, interface(s) = <any>
  virtuals inservice: 1, reals = 2, bind id = 0
  KAL-AP tag: "chicago.com", farm weight: 400
```

For the KAL-AP agent, specifying the **detail** keyword displays:

- **KAL-AP tag** --Domain tag to be used by the KAL-AP agent when searching for a server farm, if configured.
- **farm weight** --The weight to be used by the KAL-AP agent when calculating the load value for a server farm.

# show ip slb sessions

To display information about sessions handled by Cisco IOS Server Load Balancing (IOS SLB), use the **show ip slb sessions** command in privileged EXEC mode.

**show ip slb sessions** [**asn**| **gtp** [**ipv6**]| **gtp-inspect**| **ipmobile**| **radius**] [**vserver** *virtual-server*] [**client** *ipv4-address ipv4-netmask*] [**detail**]

## Syntax Description

<b>asn</b>	(Optional) Displays information about set of Access Service Network (ASN) gateways sessions being handled by IOS SLB.
<b>gtp</b>	(Optional) Displays IPv4 information about general packet radio service (GPRS) Tunneling Protocol (GTP) sessions being handled by IOS SLB.
<b>ipv6</b>	(Optional) Displays detailed information about the IPv6 sessions being handled by GTP load balancing.
<b>gtp-inspect</b>	(Optional) Displays information about GTP sessions being handled by IOS SLB that have GTP cause code inspection enabled.
<b>ipmobile</b>	(Optional) Displays information about Mobile IP sessions being handled by IOS SLB.
<b>radius</b>	(Optional) Displays information about RADIUS sessions being handled by IOS SLB.
<b>vserver</b> <i>virtual-server</i>	(Optional) Displays information about sessions being handled by the specified virtual server.
<b>client</b> <i>ipv4-address ipv4-netmask</i>	(Optional) Displays information about sessions associated with the specified client IPv4 address or subnet
<b>detail</b>	(Optional) Displays detailed information.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.1(11b)E	This command was introduced.

Release	Modification
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>gtp</b> and <b>gtp-inspect</b> keywords were added.
12.2(14)ZA2	The <b>ipmobile</b> keyword was added.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC1	The <b>asn</b> keyword was added.
15.0(1)S	The <b>ipv6</b> keyword was added.

### Examples

The following is sample output from the **show ip slb sessions** command for RADIUS sessions:

```
Router# show ip slb sessions radius
Source          Dest          Retry
Addr/Port      Addr/Port      Id Count  Real          Vserver
-----
10.10.11.1/1645 10.10.11.2/1812 15   1 10.10.10.1  RADIUS_ACCT
```

The table below describes the fields shown in the display.

**Table 20: show ip slb sessions radius Field Descriptions**

Field	Description
Source Addr/Port	Source IPv4 address and port number for the session.
Dest Addr/Port	Destination IPv4 address and port number for the session.
Id	RADIUS identifier for the session.
Retry Count	Number of times a RADIUS request was sent by a RADIUS client without receiving a response from the RADIUS server (proxy or otherwise).
Real	IPv4 address of the SSG RADIUS server (proxy or otherwise).
Vserver	Name of the virtual server whose sessions are being monitored and displayed.

The following example shows GTP IPv4 session data:

```
Router# show ip slb sessions gtp
vserver      key          client      real          state
```

```
-----
10.10.10.10      1234567890123456 10.5.5.5      10.10.1.1      GTP_ESTAB
The table below describes the fields shown in the display.
```

**Table 21: show ip slb sessions gtp Field Descriptions**

Field	Description
vserver	Name of the virtual server whose GTP sessions are being monitored and displayed. Information about each session is displayed on a separate line.
key	Network Service Access Point Identifier (NSAPI) key being used by the GTP session.
client	Client IPv4 address being used by the GTP session.
real	Real IPv4 address of the GTP session.
state	Current state of the GTP session: <ul style="list-style-type: none"> <li>• <b>GTP_ESTAB</b> --The session has been established successfully.</li> <li>• <b>GTP_INIT</b> --The Packet Data Protocol (PDP) contexts have been deleted as a result of a delete request or a deletion in gateway GPRS support node (GGSN), and IOS SLB is waiting to destroy the session after the GTP_TIMEOUT.</li> <li>• <b>GTPIO_REQ_CLIENT</b> --Waiting for a response from the real server.</li> </ul>

The following example shows GTP IPv6 session data:

```
Router# show ip slb sessions gtp ipv6
vserver = VS, key = 1112131415180030
  client = 3:3:3:3:3:3:9
  real = 4:4:4:4:4:4:4
  state = SLB_IPV6_GTP_ESTAB
```

The following example shows IOS SLB Mobile IP session data:

```
Router# show ip slb sessions ipmobile
vserver      NAI hash      client      real      retries
-----
VIRTUAL_HA  0xFFFF        10.1.1.1/434  10.10.1.1      1
```

The table below describes the fields shown in the display.

**Table 22: show ip slb sessions ipmobile Field Descriptions**

Field	Description
vserver	Name of the virtual server whose Mobile IP sessions are being monitored and displayed. Information about each session is displayed on a separate line.
NAI hash	Network access identifier (NAI) in the Registration Request (RRQ), used by Cisco IOS SLB as a unique identifier.
client	Client IPv4 address being used by the Mobile IP session.
real	Real IPv4 address of the Mobile IP session.
retries	Number of foreign agent retries for the Mobile IP session.

The following is sample output from the **show ip slb sessions asn** command for ASN sessions:

```
Router# show ip slb sessions asn
vserver      MSID          Base Station    real          state
-----
10.10.10.10  001646013fc0  5.5.5.5        10.10.1.1    ASN_REQ
```

The table below describes the fields shown in the display.

**Table 23: show ip slb sessions asn Field Descriptions**

Field	Description
vserver	Name of the virtual server whose ASN sessions are being monitored and displayed. Information about each session is displayed on a separate line.
MSID	Mobile Station Identifier (MSID), used by Cisco IOS SLB as a unique identifier.
Base Station	IPv4 address of the base station associated with the ASN session.
real	Real IPv4 address of the ASN session.



Field	Description
state	<p data-bbox="963 285 1317 317">Current state of the ASN session:</p> <ul data-bbox="1003 338 1516 716" style="list-style-type: none"><li data-bbox="1003 338 1516 401">• <b>ASN_ESTAB</b> --The session has been established successfully.</li><li data-bbox="1003 422 1516 642">• <b>ASN_INIT</b> --IOS SLB is waiting to destroy the session after timeouts in ASN_REQ or ASN_ESTAB state. If the base station is configured to send the ACK directly to the ASN gateway, and if <b>no faildetect inband</b> is configured, the session remains in ASN_REQ state until it is destroyed.</li><li data-bbox="1003 663 1516 716">• <b>ASN_REQ</b> --Waiting for a response from the real server.</li></ul>

# show ip slb static

To display the Cisco IOS Server Load Balancing (IOS SLB) server Network Address Translation (NAT) configuration, use the **show ip slb static** command in privileged EXEC mode.

## show ip slb static

**Syntax Description** This command has no arguments or keywords.

**Command Default** The default behavior is to display the entire IOS SLB server NAT configuration.

**Command Modes** Privileged EXEC (#)

Release	Modification
12.1(11b)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following is sample output from the **show ip slb static** command:

```
Router# show ip slb static
real          action          address          counter
-----
10.11.3.4     drop             0.0.0.0         0
10.11.3.1     NAT             10.11.11.11     3
10.11.3.2     NAT sticky     10.11.11.12     0
10.11.3.3     NAT per-packet 10.11.11.13     0
```

The table below describes the fields shown in the display.

**Table 24: show ip slb static Field Descriptions**

Field	Description
real	IP address of the real server.

Field	Description
action	<p>Action to be taken by the real server:</p> <ul style="list-style-type: none"> <li>• drop--The real server is configured to have its packets dropped by IOS SLB, if the packets do not correspond to existing connections.</li> <li>• NAT--The real server is configured to use server NAT, and to use its own virtual IP address when translating addresses.</li> <li>• NAT per-packet--The real server is configured to use server NAT and per-packet server load balancing.</li> <li>• NAT sticky--The real server is configured to use server NAT for sticky connections.</li> <li>• pass-thru--The real server is not configured to use server NAT.</li> </ul>
address	<p>Virtual IP address used by the real server when translating addresses using server NAT. Address 0.0.0.0 means the real server is not configured for server NAT.</p>
counter	<p>For actions drop and NAT per-packet, indicates the number of packets processed by the real server.</p> <p>For actions NAT and NAT sticky, indicates the number of packets received by, but not necessarily processed by, the real server.</p>

# show ip slb stats

To display IOS Server Load Balancing (IOS SLB) statistics, use the **show ip slb stats** command in privileged EXEC mode.

**show ip slb stats [kal-ap]**

## Syntax Description

<b>kal-ap</b>	(Optional) Displays information about the IOS SLB KeepAlive Application Protocol (KAL-AP) agent.
---------------	--

## Command Default

No default behavior or values.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(9)E	This command was modified to support general packet radio service (GPRS) load balancing.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The <b>kal-ap</b> keyword was added, and the output for the command was updated to display correlation inject failures for RADIUS load balancing accelerated data plane forwarding.
12.2(33)SRC1	The output for the command was updated to display packet fragment drops for Access Service Network (ASN) R6 load balancing.

## Examples

The following is sample output from the **show ip slb stats** command:

```
Router# show ip slb stats
Pkts via normal switching: 108247
```

```

Pkts via special switching: 4307026
Pkts via slb routing: 1376241
Pkts Dropped: 0
Connections Created: 933131
Connections Established: 350042
Connections Destroyed: 639323
Connections Reassigned: 0
Zombie Count: 0
Connections Reused: 0
Connection Flowcache Purges: 2665
Failed Connection Allocs: 0
Failed Real Assignments: 0
RADIUS framed-ip Sticky Count: 524288
RADIUS username Sticky Count: 0
RADIUS cstn-id Sticky Count: 0
GTP imsi Sticky Count: 0
Route Flows Created: 1691177
Failed Route Flow Allocs: 0
Failed Correlation Injects: 0
Pkt fragments drops in ssv: 0
ASN MSID sticky count: 1

```

The table below describes the fields shown in the display.

**Table 25: show ip slb stats Field Descriptions**

Field	Description
Pkts via normal switching	Number of packets handled by IOS SLB via normal switching since the last time counters were cleared. Normal switching is when IOS SLB packets are handled on normal IOS switching paths (CEF, fast switching, and process level switching).
Pkts via special switching	Number of packets handled by IOS SLB via special switching since the last time counters were cleared. Special switching is when IOS SLB packets are handled on hardware-assisted switching paths.
Pkts via slb routing	Number of packets handled by IOS SLB via SLB routing since the last time counters were cleared.

Field	Description
Pkts dropped	<p>Number of packets dropped or consumed by IOS SLB since the last time counters were cleared.</p> <p>The <b>Pkts dropped</b> field can increase for one or more of the following reasons:</p> <ul style="list-style-type: none"> <li>• Pings and other Internet Control Message Protocol (ICMP) packets addressed to a virtual IP address are dropped.</li> <li>• TCP data packets in which the <b>conn</b> entry is not available as a result of an idle timeout, failure of a probe, or failure of a real server, are dropped.</li> <li>• UDP traceroute packets addressed to a virtual IP address are dropped.</li> <li>• UDP packets addressed to a virtual IP address with a port number other than the one configured in the virtual server are dropped. If the virtual server uses the <b>any 0</b> port number, IOS SLB forwards the UDP packets to the real server.</li> <li>• Fragmented packets that cannot be reassembled are dropped.</li> </ul>
Connections Created	Number of connections (or sessions, in general packet radio service [GPRS] load balancing and the Home Agent Director) created since the last time counters were cleared.
Connections Established	Number of connections (or sessions, in GPRS load balancing and the Home Agent Director) created and that have become established since the last time counters were cleared.
Connections Destroyed	Number of connections (or sessions, in GPRS load balancing and the Home Agent Director) destroyed since the last time counters were cleared.
Connections Reassigned	Number of connections (or sessions, in GPRS load balancing and the Home Agent Director) reassigned to a different real server since the last time counters were cleared.
Zombie Count	Number of connections (or sessions, in GPRS load balancing and the Home Agent Director) that are currently pending destruction (awaiting a timeout or some other condition to be met).

Field	Description
Connections Reused	Number of zombie connections (or sessions, in GPRS load balancing and the Home Agent Director) reused since the last time counters were cleared. A zombie connection is reused if it receives a TCP SYNchronize sequence number (SYN) or User Datagram Protocol (UDP) packet and succeeds in connecting to a real server. The zombie connection becomes a real connection and the zombie count is decremented.
Connection Flowcache Purges	Number of times the connection flow cache was purged since the last time counters were cleared.
Failed Connection Allocs	Number of times the allocation of a connection (or session, in GPRS load balancing) failed since the last time counters were cleared.
Failed Real Assignments	Number of times the assignment of a real server failed since the last time counters were cleared.
RADIUS framed-ip Sticky Count	Number of entries in the RADIUS framed-IP sticky database.
RADIUS username Sticky Count	Number of entries in the RADIUS username sticky database.
RADIUS cstn-id Sticky Count	Number of entries in the RADIUS calling-station-ID sticky database.
GTP imsi Sticky Count	Number of entries in the GTP IMSI sticky database.
Route Flows Created	Number of route flows created.
Failed Route Flows Allocs	Number of failed route flow allocations.
Failed Correlation Injects	Number of failed correlation injects.
Pkt fragments drops in ssv	Number of packet fragments drops in the SSV.
ASN MSID sticky count	Number of sticky objects in the ASN MSID sticky database.

The following is sample output from the **show ip slb kal-ap stats kal-ap** command:

```
Router# show ip slb kal-ap stats kal-ap
KAL-AP Mgr: (default), Socket state: OPEN, Socket retry: 0
KAL-AP Mgr: 2.2.2.2, Socket state: FAILED, Socket retry: 10
  UDP Port: 5002, vrf: vrf1
KAL-AP Mgr: 10.77.161.34, Socket state: FAILED, Socket retry: 10
  UDP Port: 5002, Secret: test
```

```
KAL-AP Packet Statistics:
Packet Received:      84
Bytes Received:      3966
Packet Sent:         30
Bytes Sent:          1080
Encrypt Errors:      0
Recv Failures:       0
Sent Failures:       0
KAL-AP Manager:      2.2.2.2   Secret:      Yes
KAL-AP Manager:      3.3.3.3   Secret:      Yes
CAPP UDP Port:       5001
Pkt Recd:            100      Bytes Recd:  12345
Pkt Sent:            100      Bytes Sent:   12121
MD5 checksum failed: 0      Error packets: 0
```



# show ip slb sticky

To display the IOS Server Load Balancing (IOS SLB) sticky database, use the **show ip slb sticky** command in privileged EXEC mode.

```
show ip slb sticky [asn {msid msid| nai nai}| client ipv4-address ipv4-netmask| gtp imsi [ipv6] [id imsi]| radius calling-station-id [id string]| radius framed-ip [client ipv4-address ipv4-netmask]| radius username [name string]]
```

## Syntax Description

<b>asn</b> <i>msid</i> <i>msid</i>	(Optional) Displays only those sticky database entries associated with the specified Access Service Network (ASN) Mobile Station ID (MSID).
<b>asn</b> <b>nai</b> <i>nai</i>	(Optional) Displays only those sticky database entries associated with the specified ASN network address identifier (NAI).
<b>client</b> <i>ipv4-address ipv4-netmask</i>	(Optional) Displays only those sticky database entries associated with the specified client IPv4 address or subnet.
<b>gtp imsi</b>	(Optional) Displays only entries associated with the IOS SLB general packet radio service (GPRS) Tunneling Protocol (GTP) International Mobile Subscriber ID (IMSI) sticky database, and shows all of the Network Service Access Point Identifiers (NSAPIs) that the user has used as primary Packet Data Protocols (PDPs).
<b>ipv6</b>	(Optional) Displays only IPv6 entries associated with the IOS SLB GTP IMSI sticky database, and shows all of the NSAPIs that the user has used as primary PDPs.
<b>id</b> <i>imsi</i>	(Optional) Displays only those sticky database entries associated with the specified IMSI.
<b>radius calling-station-id</b>	(Optional) Displays only entries associated with the IOS SLB RADIUS calling-station-ID sticky database.
<b>id</b> <i>string</i>	(Optional) Displays only those sticky database entries associated with the specified calling station ID.
<b>radius framed-ip</b>	(Optional) Displays only entries associated with the IOS SLB RADIUS framed-IP sticky database.
<b>radius username</b>	(Optional) Displays only entries associated with the IOS SLB RADIUS username sticky database.

<b>name</b> <i>string</i>	(Optional) Displays only those sticky database entries associated with the specified username.
---------------------------	--

**Command Default** If no options are specified, the command displays information about all virtual servers.

**Command Modes** Privileged EXEC (#)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(11b)E	The <b>radius</b> keyword was added.
12.1(12c)E	The <b>framed-ip</b> , <b>username</b> , <b>name</b> , <b>netmask</b> , and <b>string</b> keywords and arguments were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)ZA5	The <b>calling-station-id</b> and <b>id</b> keywords and the <b>string</b> argument were added.
12.2(18)SX E	The <b>gtp imsi</b> and <b>id</b> keywords and the <b>imsi</b> argument were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	The <b>asn</b> , <b>msid</b> , and <b>nai</b> keywords and the <b>msid</b> and <b>nai</b> arguments were added.
15.0(1)S	The <b>ipv6</b> keyword was added. The output was updated to display the real server's GTP version and IPv4, IPv6, or dual-stack address.

### Examples

The following is sample output from the **show ip slb sticky** command:

```
Router# show ip slb sticky
client          netmask          group  real          conns
-----
10.10.2.12     255.255.0.0     4097  10.10.3.2     1
```

The table below describes the fields shown in the display.

**Table 26: show ip slb sticky Field Descriptions**

Field	Description
client	Client IPv4 address or subnet which is bound to this sticky assignment.
netmask	IPv4 subnet mask for this sticky assignment.
group	Group ID for this sticky assignment.
real	Real server used by all clients connecting with the client IPv4 address or subnet detailed on this line.
conns	Number of connections currently sharing this sticky assignment.

The following is sample output from the **show ip slb sticky gtp imsi** command:

```
Router# show ip slb sticky gtp imsi
-----
IMSI              Real          Ver  Group ID  vs_index  refcount  nsapi
-----
11111111111111FF  10.10.10.1    1    5         10        1         6
11123411111111FF  10.10.10.2    1    5         10        1         9
```

The table below describes the fields shown in the display.

**Table 27: show ip slb sticky gtp imsi Field Descriptions**

Field	Description
IMSI	IMSI bound to this sticky assignment in the IOS SLB GTP IMSI sticky database.
Real	IPv4 address of the GTP IMSI real server.
Ver	GTP version: v0, v1, or v2
Group ID	Group ID for this sticky assignment.
vs_index	Virtual index, out of a maximum of 500.
refcount	Number of NSAPIs used as primary PDPs.
nsapi	NSAPI used as a primary PDP. <b>Note</b> IOS SLB does not display the <b>nsapi</b> column for GTP v2 sessions.

The following is sample output from the **show ip slb sticky gtp imsi ipv6** command:

```
Router# show ip slb sticky gtp imsi ipv6
```

```

-----
IMSI           Real           Ver  Group Id  vs_index  refcount  NSAPIs
-----
11121314151800F0 21.21.21.1    2    4099     7         1         3
                2342:2342:2343:FF04:2342:AA03:2323:8912

```

The following is sample output from the **show ip slb sticky radius calling-station-id** command:

```

Router# show ip slb sticky radius calling-station-id
calling-station-id  group id      server real  framed-ips
-----
6228212            15           10.10.10.1  1

```

The table below describes the fields shown in the display.

**Table 28: show ip slb sticky radius calling-station-id Field Descriptions**

Field	Description
calling-station-id	Calling station ID bound to an SSG RADIUS proxy in the IOS SLB RADIUS calling-station-ID sticky database.
group id	Group ID for this sticky assignment.
server real	IPv4 address of the SSG RADIUS proxy server.
framed-ips	Number of IPv4 addresses bound to the SSG RADIUS proxy in the IOS SLB RADIUS framed-IP sticky database.

The following is sample output from the **show ip slb sticky radius framed-ip** command:

```

Router# show ip slb sticky radius framed-ip
framed-ip      group id      server real  route i/f
-----
1.1.1.1       15           10.10.10.1  <any>

```

The table below describes the fields shown in the display.

**Table 29: show ip slb sticky radius framed-ip Field Descriptions**

Field	Description
framed-ip	IPv4 address bound to a Cisco Service Selection Gateway (SSG) RADIUS proxy in the IOS SLB RADIUS framed-IP sticky database.
group id	Group ID for this sticky assignment.
server real	IPv4 address of the SSG RADIUS proxy server.
route i/f	Route interface.

The following is sample output from the **show ip slb sticky radius username** command:

```
Router# show ip slb sticky radius username
username          group id  server real  framed-ips
-----
9198783355       15       10.10.10.1   1
```

The table below describes the fields shown in the display.

**Table 30: show ip slb sticky radius username Field Descriptions**

Field	Description
username	Username bound to an SSG RADIUS proxy in the IOS SLB RADIUS username sticky database.
group id	Group ID for this sticky assignment.
server real	IPv4 address of the SSG RADIUS proxy server.
framed-ips	Number of IPv4 addresses bound to the SSG RADIUS proxy in the IOS SLB RADIUS framed-IP sticky database.

The following is sample output from the **show ip slb sticky asn** command:

```
Router# show ip slb sticky asn
MSID              Real      Group Id vs_index  NAI
-----
ABCD.12FE.3467   10.10.10.1  5           10      abc@cisco.com
2247.1130.8642   10.10.10.2  5           10      bcd@abc.com
```

The table below describes the fields shown in the display.

**Table 31: show ip slb sticky asn Field Descriptions**

Field	Description
MSID	MSID bound to this sticky assignment in the IOS SLB ASN sticky database.
Real	IPv4 address of the ASN real server.
Group ID	Group ID for this sticky assignment.
vs_index	Virtual index, out of a maximum of 500.
NAI	NAI bound to this sticky assignment in the IOS SLB ASN sticky database.

The following is sample output from the **show ip slb sticky asn nai abc@cisco.com** command:

```
Router# show ip slb sticky asn nai abc@cisco.com
MSID              Real      Group Id vs_index  NAI
```

```
-----
ABCD.12FE.3467 10.10.10.1 5 10 abc@cisco.com
```

The table below describes the fields shown in the display.

**Table 32: show ip slb sticky asn nai abc@cisco.com Field Descriptions**

Field	Description
MSID	MSID bound to this sticky assignment in the IOS SLB ASN sticky database.
Real	IPv4 address of the ASN real server.
Group ID	Group ID for this sticky assignment.
vs_index	Virtual index, out of a maximum of 500.
NAI	NAI bound to this sticky assignment in the IOS SLB ASN sticky database.

# show ip slb vservers

To display information about the virtual servers, use the **show ip slb vservers** command in privileged EXEC mode.

**show ip slb vservers** [*name virtual-server*] [**redirect**] [**detail**]

## Syntax Description

<b>name</b> <i>virtual-server</i>	(Optional) Displays information about the specified virtual server.
<b>redirect</b>	(Optional) Displays information about redirect virtual servers.
<b>detail</b>	(Optional) Displays detailed information.

## Command Modes

Privileged EXEC (#)

## Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(18)SXF	The output for this command was modified to reflect the GTP sticky query option on the <b>idle (virtual server)</b> command.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The output for the <b>detail</b> keyword was updated to display information about the IOS SLB KeepAlive Application Protocol (KAL-AP) agent.
12.2(33)SRC1	The output for the <b>detail</b> keyword was updated to display information about Access Service Network (ASN) virtual servers.
15.0(1)S	The output was updated to display the virtual server's IPv4 or dual-stack address.

**Usage Guidelines**

If no options are specified, the command displays information about all virtual servers.

**Examples**

The following is sample output from the **show ip slb vservers** command:

```
Router# show ip slb vservers
slb vserver      prot  virtual                               state      conns      interface(s)
-----
GGSN_SERVER1    UDP   4.3.2.1/32:0                          OPERATIONAL  0          <any>
                2342:2342:2343:FF04:2342:AA03:2323:8912/128
VS1              UDP   4.3.2.2/32:0                          OPERATIONAL  0          <any>
                2342:2342:2343:FF04:2343:AA03:2323:8912/128
VS2              UDP   4.3.2.3/32:0                          OPERATIONAL  0          <any>
                2342:2342:2343:FF04:2341:AA03:2323:8912/128
```

The table below describes the fields shown in the display.

**Table 33: show ip slb vservers Field Descriptions**

Field	Description
slb vserver	Name of the virtual server about which information is being displayed. Information about each virtual server is displayed on a separate line.
prot	Protocol being used by the virtual server.
virtual	Virtual IPv4 or dual-stack address of the virtual server, including the network mask, if configured.
state	Current state of the virtual server: <ul style="list-style-type: none"> <li>• FAILED--Real server represented by this virtual server has been removed from use by the predictor algorithms; retry timer started.</li> <li>• OPERATIONAL--Functioning properly.</li> <li>• OUTOFSERVICE--Removed from the load-balancing predictor lists.</li> <li>• STANDBY--Backup virtual server, ready to become operational if active virtual server fails.</li> </ul>
conns	Number of connections (or sessions, in general packet radio service [GPRS] load balancing and the Home Agent Director) associated with the virtual server.
interface	Type of interface.



The following sample output from the **show ip slb vservers detail** command shows detailed data for a virtual server with route health injection (advertise=TRUE):

```
Router# show ip slb vservers detail
VS, state = OPERATIONAL, v_index = 7, interface(s) = <any>
virtual = 3.3.3.3/32:2123, UDP, service = GTP, advertise = TRUE
ipv6 = 3:3:3:3:3:3:3:3/128
serverfarm maps:
  map 1: priority = 1, serverfarm = SF, backup serverfarm= SF3
        ipv6 serverfarm = SF1 ipv6 backup serverfarm = SF2
  map 2: priority = 2, serverfarm = SF3, backup serverfarm= SF
        ipv6 serverfarm = SF2 ipv6 backup serverfarm = SF1
serverfarm = <not assigned>, backup serverfarm = <not assigned>
backup_serverfarm_hits = 0
delay = 10, idle = 3600
gtp: request idle = 30
     slb notification retry = 2
     gtp sticky query: <disabled>
     max retries: 0
sticky: <none>
       group id = 0
synguard counter = 0, synguard period = 0
conns = 0, total conns = 0, syns = 0, syn drops = 0
standby group = None
```

The following sample output from the **show ip slb vservers name detail** command shows detailed data for virtual server GGSN\_SERVER with GTP sticky query enabled:

```
Router# show ip slb vservers name GGSN_SERVER detail
GGSN_SERVER, state = OPERATIONAL, v_index = 7, interface(s) = <any>
virtual = 10.10.195.1/32:0, UDP, service = GTP, advertise = TRUE
server farm = GGSN, delay = 10, idle = 3600
gtp: request idle = 30, slb notification retry = 2
gtp sticky query: <enabled>, max retries: 3
sticky: <none>
sticky: group id = 4097 <assigned>
synguard counter = 0, synguard period = 0
conns = 0, total conns = 17192, syns = 0, syn drops = 0
standby group = None
```

The table below describes the fields shown in the display.

**Table 34: show ip slb vservers name detail Field Descriptions**

Field	Description
GGSN_SERVER	Name of the virtual server about which information is being displayed (in this case, GGSN_SERVER).
state	Current state of the virtual server:  FAILED--Real server represented by this virtual server has been removed from use by the predictor algorithms; retry timer started.  OPERATIONAL--Functioning properly.  OUTFSERVICE--Removed from the load-balancing predictor lists.  STANDBY--Backup virtual server, ready to become operational if active virtual server fails.
v_index	Virtual index, out of a maximum of 500.

Field	Description
interface(s)	Type of interface.
virtual	Virtual IPv4 or dual-stack address of the virtual server, including the network mask, if configured.
UDP	Protocol being used by the virtual server (in this case, UDP).
service	Service, such as GTP, HTTP, or Telnet, associated with the virtual server (in this case, GTP).
advertise	Current state of host route advertisement for this virtual server: TRUE--Host route is being advertised. FALSE--Host route is not being advertised.
ipv6	For dual-stack, IPv6 address of the virtual server
server farm	Name of the server farm associated with the virtual server.
delay	Delay timer duration, in seconds, for this virtual server.
idle	Idle connection timer duration, in seconds, for this virtual server.
gtp request idle	GTP idle connection timer duration in seconds.
slb notification	Number of times IOS SLB can reassign a rejected Create PDP Context to a new real Cisco gateway GPRS support node (GGSN).
gtp sticky query	For GTP IMSI sticky, indicates whether IOS SLB is to query the GGSN before deleting any GTP IMSI sticky objects.
max retries	Maximum number of queries IOS SLB is to send to the GGSN when there is no response from the GGSN.
sticky	Indicates whether sticky connections are enabled for this virtual server.
sticky group id	Sticky group in which this virtual server is placed, for coupling of services.

Field	Description
synguard counter	Number of unacknowledged SYNchronize sequence numbers (SYNs) that are allowed to be outstanding to this virtual server.
synguard period	Interval, in milliseconds, for SYN threshold monitoring for this virtual server.
conns	Number of active connections currently associated with the virtual server.
total conns	Total number of connections that have been associated with the virtual server since coming INSERVICE.
syms	Number of SYNs handled by the virtual server in this period.
syn drops	Number of SYNs dropped by the virtual server in this period.
standby group	Hot Standby Router Protocol (HSRP) group name with which the virtual server is associated.

The following sample output from the **show ip slb vservers name detail** command shows detailed data for GTP virtual server GGSN\_SERVER with maps enabled:

```
Router# show ip slb vservers name GGSN_SERVER detail
GGSN_SERVER, state = OPERATIONAL, v_index = 9, interface(s) = <any>
virtual = 10.10.10.10/32:0, UDP, service = GTP, advertise = TRUE
serverfarm maps:
map 4: priority = 1, serverfarm = FARM4, backup = <none>
map 1: priority = 3, serverfarm = FARM1, backup = FARM2
map 5: priority = 4, serverfarm = FARM5, backup = <none>
server farm = <not assigned>, delay = 10, idle = 3600
gtp: request idle = 30, slb notification retry = 2
gtp sticky query: <disabled>, max retries: 0
sticky: <none>
sticky: group id = 0
synguard counter = 0, synguard period = 0
conns = 0, total conns = 0, syms = 0, syn drops = 0
standby group = None
```

The table below describes the fields shown in the display.

**Table 35: show ip slb vservers name detail Field Descriptions**

Field	Description
GGSN_SERVER	Name of the RADIUS virtual server about which information is being displayed (in this case, GGSN_SERVER).

Field	Description
state	Current state of the virtual server: FAILED--Real server represented by this virtual server has been removed from use by the predictor algorithms; retry timer started. OPERATIONAL--Functioning properly. OUTOFSERVICE--Removed from the load-balancing predictor lists. STANDBY--Backup virtual server, ready to become operational if active virtual server fails.
v_index	Virtual index, out of a maximum of 500.
interface(s)	Type of interface.
virtual	Virtual IPv4 or dual-stack address of the virtual server, including the network mask, if configured.
UDP	Protocol being used by the virtual server (in this case, UDP).
service	Service, such as GTP, HTTP, or Telnet, associated with the virtual server (in this case, GTP).
advertise	Current state of host route advertisement for this virtual server: TRUE--Host route is being advertised. FALSE--Host route is not being advertised.
serverfarm maps	List of IOS SLB server farm maps associated with this virtual server. Information about each map is displayed on a separate line.
priority	Priority of the map.
serverfarm	Server farm with which the map is associated.
backup	Backup server farm, if any.
server farm	Name of the server farm associated with the virtual server. Information about each server farm is displayed on a separate line.
map ID	Map associated with the server farm.
priority	Priority of the map.

Field	Description
delay	Delay timer duration, in seconds, for this virtual server.
idle	Idle connection timer duration, in seconds, for this virtual server.
gtp request idle	GTP idle connection timer duration in seconds.
slb notification	Number of times IOS SLB can reassign a rejected Create PDP Context to a new real Cisco gateway GPRS support node (GGSN).
gtp sticky query	For GTP IMSI sticky, indicates whether IOS SLB is to query the GGSN before deleting any GTP IMSI sticky objects.
max retries	Maximum number of queries IOS SLB is to send to the GGSN when there is no response from the GGSN.
sticky	Indicates whether sticky connections are enabled for this virtual server.
sticky group id	Sticky group in which this virtual server is placed, for coupling of services.
synguard counter	Number of unacknowledged SYNchronize sequence numbers (SYNs) that are allowed to be outstanding to this virtual server.
synguard period	Interval, in milliseconds, for SYN threshold monitoring for this virtual server.
conns	Number of active connections currently associated with the virtual server.
total conns	Total number of connections that have been associated with the virtual server since coming INSERVICE.
syms	Number of SYNs handled by the virtual server in this period.
syn drops	Number of SYNs dropped by the virtual server in this period.
standby group	Hot Standby Router Protocol (HSRP) group name with which the virtual server is associated.

The following sample output from the **show ip slb vservers name detail** command shows detailed data for an ASN virtual server:

```
Router# show ip slb vservers name ASN_VSERVER detail
ASN_VSERVER, state = OPERATIONAL, v_index = 10, interface(s) = <any>
  virtual = 2.2.2.2/32:0, UDP, service = ASNR6, advertise = TRUE
  server farm = SF, delay = 10, idle = 3600
  asn: request idle = 90
  asn: delete notif recvd = 2, nai-update notif recvd = 2
  asn: Notification Errors: Deletes = 1, nai-updates = 0
  sticky: <none>
  sticky: group id = 4097 <assigned>
  synguard counter = 0, synguard period = 0
  conns = 0, total conns = 156, syns = 0, syn drops = 0
  standby group = None
-----
Real commn: |      delete      |      nai-updates
port = 63082 |-----+-----+-----+
              | Recv | Errors | Recv | Errors
              +-----+-----+-----+
15.15.15.4   |    1    |    1    |    1    |    0
15.15.15.5   |    1    |    0    |    1    |    0
```

The table below describes the fields shown in the display.

**Table 36: show ip slb vservers name detail Field Descriptions**

Field	Description
ASN_VSERVER	Name of the ASN virtual server about which information is being displayed (in this case, ASN_VSERVER).
state	Current state of the virtual server: FAILED--Real server represented by this virtual server has been removed from use by the predictor algorithms; retry timer started. OPERATIONAL--Functioning properly. OUTFSERVICE--Removed from the load-balancing predictor lists. STANDBY--Backup virtual server, ready to become operational if active virtual server fails.
v_index	Virtual index, out of a maximum of 500.
interface(s)	Type of interface.
virtual	Virtual IPv4 or dual-stack address of the virtual server, including the network mask, if configured.
UDP	Protocol being used by the virtual server (in this case, UDP).
service	Service, such as GTP, HTTP, or Telnet, associated with the virtual server (in this case, ASNR6).

Field	Description
advertise	Current state of host route advertisement for this virtual server: TRUE--Host route is being advertised. FALSE--Host route is not being advertised.
server farm	Name of the server farm associated with the virtual server. Information about each server farm is displayed on a separate line.
delay	Delay timer duration, in seconds, for this virtual server.
idle	Idle connection timer duration, in seconds, for this virtual server.
asn: request idle	ASN idle connection timer duration in seconds.
asn: delete notif recvd	Number of delete notifications received.
asn: nai-update notif recvd	Number of NAI-update notifications received.
asn: Notification Errors: Deletes	Number of delete notification errors.
asn: Notification Errors: nai-updates	Number of NAI-update notification errors.
sticky	Indicates whether sticky connections are enabled for this virtual server.
sticky group id	Sticky group in which this virtual server is placed, for coupling of services.
synguard counter	Number of unacknowledged SYNchronize sequence numbers (SYNs) that are allowed to be outstanding to this virtual server.
synguard period	Interval, in milliseconds, for SYN threshold monitoring for this virtual server.
conns	Number of active connections currently associated with the virtual server.
total conns	Total number of connections that have been associated with the virtual server since coming INSERVICE.
syms	Number of SYNs handled by the virtual server in this period.

Field	Description
syn drops	Number of SYNs dropped by the virtual server in this period.
standby group	Hot Standby Router Protocol (HSRP) group name with which the virtual server is associated.
Real commn: port	Port used by the real server.



# show ip slb wildcard

To display information about the wildcard representation for virtual servers, use the **show ip slb wildcard** command in privileged EXEC mode.

**show ip slb wildcard**

**Syntax Description** This command has no arguments or keywords.

**Command Modes** Privileged EXEC (#)

Command History	Release	Modification
	12.2(33)SRE	This command was introduced.
	15.0(1)S	The output was updated to display the virtual server's IPv4, IPv6, or dual-stack address.

**Examples** The following is sample output from the **show ip slb wildcard** command:

```
Router# show ip slb wildcard
Interface Source Address      Port Destination Address      Port  Prot
ANY       0.0.0.0/0                   0     3.3.3.3/32                 2123  UDP
ANY       0.0.0.0/0                   0     3.3.3.3/32                 0     UDP
ANY       0.0.0.0/0                   0     0.0.0.0/0                  0     ICMP
Interface: ANY
Source Address [Port]: : /0[0]
Destination Address [Port]: 2342:2342:2343:FF04:2341:AA03:2323:8912/128[0]
Protocol: ICMPV6
Interface: ANY
Source Address [Port]: : /0[0]
Destination Address [Port]: 2342:2342:2343:FF04:2341:AA03:2323:8912/128[2123]
Protocol: UDP
```

## snmp-server enable traps slb

To enable IOS SLB traps for real- and virtual-server state changes, use the **snmp-server enable traps slb** command in global configuration mode. To disable the traps use the **no** form of this command.

**snmp-server enable traps slb** {real| virtual}

**no snmp-server enable traps slb** {real| virtual}

### Syntax Description

<b>real</b>	Enables traps for real server state changes.
<b>virtual</b>	Enables traps for virtual server state changes.

### Command Default

IOS SLB traps for real- and virtual-server state changes are not enabled.

### Command Modes

Global configuration (config)

### Command History

Release	Modification
12.1(11b)E	This command was introduced.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example enables IOS SLB traps for real server state changes:

```
Router(config)# snmp-server enable traps slb real
```

# sticky (firewall farm datagram protocol)

To assign all connections from a client to the same firewall, use the **sticky** command in firewall farm datagram protocol configuration mode. To remove the client/server coupling, use the **no** form of this command.

**sticky** *seconds* [**netmask** *netmask*] [**source**| **destination**]

**no sticky**

## Syntax Description

<i>seconds</i>	Sticky timer duration in seconds. Valid values range from 0 to 65535.
<b>netmask</b> <i>netmask</i>	(Optional) Places the virtual server as part of a sticky subnet, for coupling of services.
<b>source</b>	(Optional) Bases sticky on source IP address.
<b>destination</b>	(Optional) Bases sticky on destination IP address.

## Command Default

Virtual servers are not associated with any groups.

## Command Modes

Firewall farm datagram protocol configuration (config-slb-fw-udp)

## Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(12c)E	The <b>source</b> and <b>destination</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

## Examples

The following example specifies that if a client's subsequent request for a firewall farm is made within 60 seconds of the previous request, then the same firewall is used for the connection:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol datagram
Router(config-slb-fw-udp)# sticky 60
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>protocol datagram</b>	Enters firewall farm datagram protocol configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb sticky</b>	Displays information about the IOS SLB database.

## sticky (firewall farm TCP protocol)

To assign all connections from a client to the same firewall, use the **sticky** command in firewall farm TCP protocol configuration mode. To remove the client/server coupling, use the **no** form of this command.

**sticky** *seconds* [**netmask** *netmask*] [**source**| **destination**]

**no sticky**

### Syntax Description

<i>seconds</i>	Sticky timer duration in seconds. Valid values range from 0 to 65535.
<b>netmask</b> <i>netmask</i>	(Optional) Places the virtual server as part of a sticky subnet, for coupling of services.
<b>source</b>	(Optional) Bases sticky on source IP address.
<b>destination</b>	(Optional) Bases sticky on destination IP address.

### Command Default

Virtual servers are not associated with any groups.

### Command Modes

Firewall farm TCP protocol configuration (config-slb-fw-tcp)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(12c)E	The <b>source</b> and <b>destination</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example specifies that if a client's subsequent request for a firewall farm is made within 60 seconds of the previous request, then the same firewall is used for the connection:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# protocol tcp
Router(config-slb-fw-tcp)# sticky 60
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>protocol tcp</b>	Enters firewall farm TCP protocol configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb sticky</b>	Displays information about the IOS SLB database.

## sticky (virtual server)

To assign all connections from a client to the same real server, use the **sticky** command in SLB virtual server configuration mode. To remove the client/server coupling, use the **no** form of this command.

```
sticky {duration [group group-id] [netmask netmask] | asn msid [group group-id] | | gtp | imsi | [group group-id] | | radius | calling-station-id | | radius | framed-ip | [group group-id] | | radius | username | [msid-cisco] | [group group-id] }
```

```
no sticky {duration [group group-id] [netmask netmask] | asn msid [group group-id] | | gtp | imsi | [group group-id] | | radius | calling-station-id | | radius | framed-ip | [group group-id] | | radius | username | [msid-cisco] | [group group-id] }
```

### Syntax Description

<i>duration</i>	Sticky timer duration in seconds. Valid values range from 0 to 65535.
<b>group</b> <i>group-id</i>	(Optional) Places the virtual server in the specified sticky group, for coupling of services. All virtual servers that have the same sticky group ID share the sticky entry for a user. In essence, the <b>group</b> keyword and <i>group-id</i> argument tie multiple virtual servers together. Valid values range from 0 to 255.
<b>netmask</b> <i>netmask</i>	(Optional) Places the virtual server as part of the specified sticky subnet, for coupling of services. Client sessions whose source IP addresses fall within the <i>netmask</i> are directed to the same real server.
<b>asn msid</b>	Enables IOS SLB to load-balance Access Service Network (ASN) sessions to the same real server that processed all previous sessions for a given Mobile Station ID (MSID).
<b>gtp imsi</b>	Enables IOS SLB to load-balance general packet radio service (GPRS) Tunneling Protocol (GTP) Packet Data Protocol (PDP) context create requests to the same real server that processed all previous create requests for a given International Mobile Subscriber ID (IMSI).
<b>radius calling-station-id</b>	Enables IOS SLB to create the IOS SLB RADIUS calling-station-ID sticky database and direct RADIUS requests from a given calling station ID to the same service gateway.

<b>radius framed-ip</b>	Enables IOS Server Load Balancing (IOS SLB) to create the IOS SLB RADIUS framed-IP sticky database and direct RADIUS requests and non-RADIUS flows from a given end user to the same service gateway.
<b>radius username</b>	Enables IOS SLB to create the IOS SLB RADIUS username sticky database and direct RADIUS requests from a given end user to the same service gateway.
<b>msid-cisco</b>	(Optional) Enables IOS SLB to support Cisco PDSNs that provide MSID-based access (also known as MSID-based access, Cisco variant).

**Command Default**

Sticky connections are not tracked. Virtual servers are not associated with any groups.

**Command Modes**

SLB virtual server configuration (config-slb-vserver)

**Command History**

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(2)E	The <b>netmask</b> keyword and <i>netmask</i> argument were added.
12.1(11b)E	The <b>radius framed-ip</b> keywords were added.
12.1(12c)E	The <b>radius username</b> and <b>msid-cisco</b> keywords were added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)ZA5	The <b>radius calling-station-id</b> keywords were added.
12.2(18)SX E	The <b>gtp imsi</b> keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRE	The <b>asn msid</b> keywords were added.

**Usage Guidelines**

The last real server that was used for a connection from a client is stored for the set *duration* seconds. If a new connection from the client to the virtual server is initiated during that time, the same real server that was



used for the previous connection is chosen for the new connection. If two virtual servers are placed in the same group, coincident connection requests for those services from the same IP address are handled by the same real server.

In Virtual Private Network (VPN) server load balancing, remember the following requirements:

- For IPsec flows, you must specify a sticky connection between the User Datagram Protocol (UDP) virtual server and the Encapsulation Security Payload (ESP) virtual server.
- For PPTP flows, you must specify a sticky connection between the TCP virtual server and the Generic Routing Encapsulation (GRE) virtual server.
- You must specify a *duration* of at least 15 seconds.

In general packet radio service (GPRS) load balancing and the Home Agent Director, the **sticky** command is not supported.

In RADIUS load balancing, remember the following requirements:

- If you configure the **sticky radius framed-ip** command, you must also configure the **virtual** command with the **service radius** keywords specified.
- If you configure the **sticky radius calling-station-id** command or the **sticky radius username** command, you must also configure the **virtual** command with the **service radius** keywords specified, and you must configure the **sticky radius framed-ip** command.
- You cannot configure both the **sticky radius calling-station-id** command and the **sticky radius username** command on the same virtual server.
- If you configure the **sticky radius calling-station-id** command, you must configure all RADIUS maps to match against the RADIUS calling station ID attribute.
- If you configure the **sticky radius username** command, you must configure all RADIUS maps to match against the RADIUS username attribute.

For GTP load balancing:

- IOS SLB creates a sticky database object when it processes the first GTP PDP create request for a given IMSI. IOS SLB removes the sticky object when it receives a notification to do so from the real server, or as a result of inactivity. When the last PDP belonging to an IMSI is deleted on the GGSN, it sends a notification to IOS SLB to remove the sticky object.
- If you configure the **sticky gtp imsi** command, you must also configure the **virtual** command with the **service gtp** keywords specified.

For ASN load balancing, if you configure the **sticky asn msid** command, you must also configure the **virtual** command with the **service asn** keywords specified.

## Examples

The following example specifies that if a client's subsequent request for a virtual server is made within 60 seconds of the previous request, then the same real server is used for the connection. This example also places the virtual server in group 10.

```
Router(config)# ip slb vserver VS1
Router(config-slb-vserver)# sticky 60 group 10
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>show ip slb sticky</b>	Displays information about the IOS SLB database.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.

## synguard (virtual server)

To limit the rate of TCP SYNchronize sequence numbers (SYNs) handled by a virtual server to prevent a SYN flood denial-of-service attack, use the **synguard** command in SLB virtual server configuration mode. To remove the threshold, use the **no** form of this command.

**synguard** *syn-count* [ *interval* ]

**no synguard**

### Syntax Description

<i>syn-count</i>	Number of unacknowledged SYNs that are allowed to be outstanding to a virtual server. Valid values range from 0 (off) to 4294967295. The default is 0.
<i>interval</i>	(Optional) Interval, in milliseconds, for SYN threshold monitoring. Valid values range from 50 to 5000. The default is 100 milliseconds (ms).

### Command Default

The default number of unacknowledged SYNs that are allowed to be outstanding to a virtual server is 0 (off). The default interval is 100 ms.

### Command Modes

SLB virtual server configuration (config-slb-vserver)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

In general packet radio service (GPRS) load balancing and the Home Agent Director, the **synguard** command has no meaning and is not supported.

**Examples**

The following example sets the threshold of unacknowledged SYNs to 50:

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# synguard 50
```

**Related Commands**

Command	Description
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS SLB.
<b>virtual</b>	Configures the virtual server attributes.

## timeout (custom UDP probe)

To set a timeout for custom User Datagram Protocol (UDP) probes, use the **timeout** command in custom UDP probe configuration mode. To restore the default timeout, use the **no** form of this command.

**timeout** *seconds*

**no timeout**

### Syntax Description

<i>seconds</i>	Time, in seconds, that IOS SLB waits for a response packet from the server after sending a custom UDP probe request packet. Valid range is 1 to 255. The default value is 30 seconds.
----------------	---

### Command Default

The default custom UDP probe timeout is 30 seconds.

### Command Modes

Custom UDP probe configuration

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Examples

In the following example the custom UDP probe timeout is set to 20 seconds:

```
Router(config)# ip slb probe PROBE6 custom udp
Router(config-slb-probe)# timeout 20
```

### Related Commands

Command	Description
<b>ip slb probe custom udp</b>	Configures a custom User Datagram Protocol (UDP) probe name and enters custom UDP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

## url (WSP probe)

To specify the URL path that a Wireless Session Protocol (WSP) probe is to request from the server, use the **url** command in WSP probe configuration mode. To restore the default settings, use the **no** form of this command.

**url** [ *path* ]

**no url** [ *path* ]

### Syntax Description

<i>path</i>	(Optional) Path from the server. This argument is case-sensitive.
-------------	---

### Command Default

If no URL path is specified, the default is /.

### Command Modes

WSP probe configuration (config-slb-probe)

### Command History

Release	Modification
12.1(5a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example configures a ping probe named PROBE3, enters WSP probe configuration mode, and configures the probe to request URL path `http://localhost/test.txt`:

```
Router(config)# ip slb probe PROBE3 wsp
Router(config-slb-probe)# url http://localhost/test.txt
```

### Related Commands

Command	Description
<b>ip slb probe wsp</b>	Configures a Wireless Session Protocol (WSP) probe name and enters WSP probe configuration mode.
<b>show ip slb probe</b>	Displays information about an IOS Server Load Balancing (IOS SLB) probe.

## username (IOS SLB)

To configure an ASCII regular expression string to be matched against the username attribute for RADIUS load balancing, use the **username (IOS SLB)** command in SLB RADIUS map configuration mode. To delete the username match string, use the **no** form of this command.

**username** *string*

**no username** *string*

### Syntax Description

<i>string</i>	<p>ASCII regular expression string to be matched against the username attribute in the RADIUS payload.</p> <p>For information about regular expressions and how to use them in Cisco IOS software configurations, refer to the Understanding Regular Expressions section of the Using the Cisco IOS Command-Line Interface chapter of the <i>Cisco IOS Configuration Fundamentals Configuration Guide</i> .</p>
---------------	---

### Command Default

None

### Command Modes

SLB RADIUS map configuration (config-slb-radius-map)

### Command History

Release	Modification
12.2(33)SRB	This command was introduced.

### Usage Guidelines

For a given IOS SLB RADIUS map, you can configure a single **calling-station-id** command or a single **username (IOS SLB)** command, but not both.

### Examples

The following example specifies that, for IOS SLB RADIUS map **1**, string **...?525\*** is to be matched against the username attribute in the RADIUS payload:

```
Router(config)# ip slb map 1 radius
Router(config-slb-radius-map)# username ...?525*
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>calling-station-id</b>	Configures an ASCII regular expression string to be matched against the calling station ID attribute in the RADIUS payload.
<b>ip slb map</b>	Configures an IOS SLB protocol map and enters SLB map configuration mode.
<b>show ip slb map</b>	Displays information about IOS SLB protocol maps.



# virtual

To configure virtual server attributes, use the **virtual** command in SLB virtual server configuration mode. To remove the attributes, use the **no** form of this command.

## Encapsulation Security Payload (ESP) and Generic Routing Encapsulation (GRE) Protocols

**virtual** *ipv4-address* [*ipv4-netmask* **group**] {**esp**|**gre**|*protocol*}

**no virtual** *ipv4-address* [*ipv4-netmask* **group**] {**esp**|**gre**|*protocol*}

## TCP and User Datagram Protocol (UDP)

**virtual** *ipv4-address* [*ipv4-netmask* **group**] [**ipv6** *ipv6-address* [**prefix** *ipv6-prefix*]] {**tcp**|**udp**} [*port* **any**] [*service service*]

**no virtual** *ipv4-address* [*ipv4-netmask* **group**] [**ipv6** *ipv6-address* [**prefix** *ipv6-prefix*]] {**tcp**|**udp**} [*port* **any**] [*service service*]

### Syntax Description

<i>ipv4-address</i>	IPv4 address for this virtual server instance, used by clients to connect to the IPv4 real servers through the IPv4 server farm.
<i>ipv4-netmask</i>	(Optional) IPv4 network mask for transparent web cache load balancing. The default is 0.0.0.0 (all subnets).
<b>group</b>	(Optional) Allows the virtual subnet to be advertised. If you do not specify the <b>group</b> keyword, the virtual subnet cannot be advertised.
<b>esp</b>	Performs load balancing for only Encapsulation Security Payload (ESP) connections.
<b>gre</b>	Performs load balancing for only Generic Routing Encapsulation (GRE) connections.
<i>protocol</i>	Protocol for which load balancing is performed. The valid range is 2 to 127.
<b>ipv6</b> <i>ipv6-address</i>	(Optional) For dual-stack, IPv6 address for this virtual server instance, used by IPv6 clients to connect to IPv6 real servers through the IPv6 server farm.
<b>prefix</b> <i>ipv6-prefix</i>	(Optional) For dual-stack, IPv6 prefix.
<b>tcp</b>	Performs load balancing for only TCP connections.
<b>udp</b>	Performs load balancing for only User Datagram Protocol (UDP) connections.

<i>port</i>	<p>(Optional) IOS Server Load Balancing (IOS SLB) virtual port (the TCP or UDP port number or port name). If specified, only the connections for the specified port on the server are load-balanced. The ports and the valid name or number for the <i>port</i> argument are as follows:</p> <ul style="list-style-type: none"> <li>• All ports: <b>any 0</b></li> <li>• Access Service Network (ASN): <b>asn 2231</b></li> <li>• Connectionless secure Wireless Session Protocol (WSP): <b>wsp-wtls 9202</b></li> </ul>
<i>port</i> (continued)	<ul style="list-style-type: none"> <li>• Connectionless WSP: <b>wsp 9200</b></li> <li>• Connection-oriented secure WSP: <b>wsp-wtp-wtls 9203</b></li> <li>• Connection-oriented WSP: <b>wsp-wtp 9201</b></li> <li>• Domain Name System: <b>dns 53</b></li> <li>• File Transfer Protocol: <b>ftp 21</b></li> <li>• General packet radio service (GPRS) tunneling protocol (GTP) v0: <b>gtp 3386</b></li> <li>• GTP v1 or v2: <b>gtp 2123</b></li> <li>• HTTP over Secure Socket Layer: <b>https 443</b></li> <li>• Internet Key Exchange (IKE): <b>isakmp 500</b></li> <li>• Mapping of airline traffic over IP, Type A: <b>matip-a 350</b></li> <li>• Network News Transport Protocol: <b>nntp 119</b></li> <li>• Post Office Protocol v2: <b>pop2 109</b></li> <li>• Post Office Protocol v3: <b>pop3 110</b></li> <li>• Simple Mail Transport Protocol: <b>smtp 25</b></li> <li>• Telnet: <b>telnet 23</b></li> <li>• X.25 over TCP (XOT): <b>xot 1998</b></li> <li>• World Wide Web (HTTP): <b>www 80</b></li> </ul> <p>Specify a port number of 0 to configure an all-port virtual server (that is, a virtual server that accepts flows destined for all ports except GTP ports)</p>
<b>any</b>	(Optional) Performs load balancing on all ports.

<b>service</b> <i>service</i>	<p>(Optional) Couples connections associated with a given service, such as HTTP or Telnet, so all related connections from the same client use the same real server. The following are the valid types of connection coupling:</p> <ul style="list-style-type: none"> <li>• <b>asn</b> --Enables ASN load balancing.</li> <li>• <b>ftp</b> --Couples FTP data connections with the control session that created them.</li> <li>• <b>gtp</b> --Enables GPRS load balancing without general packet radio service (GPRS) tunneling protocol (GTP) cause code inspection enabled, which allows load-balancing decisions to be made using Layer 5 information. You can balance UDP flows without awareness of GTP by omitting the <b>service gtp</b> keywords.</li> <li>• <b>gtp-inspect</b> --Enables GPRS load balancing with GTP cause code inspection enabled.</li> <li>• <b>ipmobile</b> --Enables the Home Agent Director.</li> <li>• <b>per-packet</b> --Does not maintain connection objects for packets destined for this virtual server.</li> <li>• <b>radius</b> --Enables IOS SLB to build RADIUS session objects for RADIUS load balancing.</li> </ul>
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**Command Default** No default behavior or values.

**Command Modes** SLB virtual server configuration (config-slb-vserver)

**Command History**

<b>Release</b>	<b>Modification</b>
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.1(5a)E	The <b>wsp</b> , <b>wsp-wtp</b> , <b>wsp-wtls</b> , and <b>wsp-wtp-wtls</b> keywords were added.
12.1(9)E	The <b>gtp</b> option was added as a new value on the <i>service</i> argument.

Release	Modification
12.1(11b)E	<p>The following keywords, arguments, and options were added:</p> <ul style="list-style-type: none"> <li>• The <b>esp</b>, <b>gre</b>, and <b>all</b> keywords</li> <li>• The <i>protocol</i> argument</li> <li>• The <b>isakmp</b> option on the <i>port</i> argument</li> <li>• The <b>per-packet</b> and <b>radius</b> options on the <i>service</i> argument</li> </ul> <p>The <b>wsp</b>, <b>wsp-wtp</b>, <b>wsp-wtls</b>, and <b>wsp-wtp-wtls</b> keywords were changed to options for the <i>port</i> argument.</p>
12.1(12c)E	The <b>group</b> keyword was added.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.1(13)E3	The <b>gtp-inspect</b> option was added as a new value on the <i>service</i> argument.
12.2(14)ZA2	The <b>immobile</b> option was added as a new value on the <i>service</i> argument.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRC	The <b>asn</b> option was added on the <i>service</i> argument.
15.0(1)S	The <b>ipv6</b> <i>ipv6-address</i> and <b>prefix</b> <i>ipv6-prefix</i> options were added.

### Usage Guidelines

The **no virtual** command is allowed only if the virtual server was removed from service by the **no inservice** command.

For some applications, it is not feasible to configure all the virtual server TCP or UDP port numbers for IOS SLB. To support such applications, you can configure IOS SLB virtual servers to accept flows destined for all ports. To configure an all-port virtual server, specify a port number of 0 or any.



#### Note

In general, you should use port-bound virtual servers instead of all-port virtual servers. When you use all-port virtual servers, flows can be passed to servers for which no application port exists. When servers reject these flows, IOS SLB might fail the server and remove it from load balancing.

Specifying port 9201 for connection-oriented WSP mode also activates the Wireless Application Protocol (WAP) finite state machine (FSM), which monitors WSP and drives the session FSM accordingly.

In RADIUS load balancing, IOS SLB maintains session objects in a database to ensure that re-sent RADIUS requests are load-balanced to the same real server.

IOS SLB supports general packet radio service (GPRS) Tunneling Protocol (GTP) v0, v1, and v2 real servers. A GTP v0 or v1 real server cannot manage GTP v2 requests. Therefore, you must configure separate virtual servers for GTPv2 real servers and for GTP v0 or v1 real servers.

IOS SLB supports dual-stack addresses for GTP load balancing only. To support dual-stack addresses:

- You must configure the virtual server as a dual-stack virtual server, with the virtual IPv4 and IPv6 addresses and the optional IPv6 prefix, using this command.
- You must associate an IPv6 server farm with the dual-stack virtual server.

### Examples

The following example specifies that the virtual server with the IPv4 address 10.0.0.1 performs load balancing for TCP connections for the port named www. The virtual server processes HTTP requests.

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# virtual 10.0.0.1 tcp www
```

The following example specifies that the virtual server with the IPv4 address 10.0.0.13 performs load balancing for UDP connections for all ports. The virtual server processes HTTP requests.

```
Router(config)# ip slb vserver PUBLIC_HTTP
Router(config-slb-vserver)# virtual 10.0.0.13 udp 0
```

### Related Commands

Command	Description
<b>ip slb vserver</b>	Identifies a virtual server.
<b>show ip slb vservers</b>	Displays information about the virtual servers defined to IOS Server Load Balancing (IOS SLB).

## weight (firewall farm real server)

To specify a real server's capacity, relative to other real servers in the firewall farm, use the **weight** command in firewall farm real server configuration mode. To restore the default weight value, use the **no** form of this command.

**weight** *setting*

**no weight**

### Syntax Description

<i>setting</i>	Weight setting to use for the real server predictor algorithm. Valid settings range from 1 to 255. The default weight setting is 8.
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### Command Default

The default setting to use for the real server predictor algorithm is 8.

### Command Modes

Firewall farm real server configuration (config-slb-fw-real)

### Command History

Release	Modification
12.1(3a)E	This command was introduced.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Examples

The following example specifies the relative weights of three real servers as 16, 8 (by default), and 24, respectively:

```
Router(config)# ip slb firewallfarm FIRE1
Router(config-slb-fw)# real 10.10.1.1
Router(config-slb-fw-real)# weight 16
Router(config-slb-fw-real)# inservice
Router(config-slb-fw-real)# exit
Router(config-slb-fw)# real 10.10.1.2
Router(config-slb-fw-real)# inservice
Router(config-slb-fw-real)# exit
Router(config-slb-fw)# real 10.10.1.3
Router(config-slb-fw-real)# weight 24
```

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb firewallfarm</b>	Displays information about the firewall farm configuration.
<b>show ip slb reals</b>	Displays information about the real servers.

## weight (real server)

To specify a real server's capacity, relative to other real servers in the server farm, use the **weight** command in SLB real server configuration mode. To restore the default weight value, use the **no** form of this command.

**weight** *setting*

**no weight**

### Syntax Description

<i>setting</i>	Weight setting to use for the real server predictor algorithm. Valid settings range from 1 to 255. The default weight setting is 8.
----------------	---

### Command Default

The default setting to use for the real server predictor algorithm is 8.

### Command Modes

SLB real server configuration (config-slb-sfarm)

### Command History

Release	Modification
12.0(7)XE	This command was introduced.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T.
12.2	This command was integrated into Cisco IOS Release 12.2.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(18)SXE	This command was integrated into Cisco IOS Release 12.2(18)SXE.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

### Usage Guidelines

The static weights you define using this command are overridden by the weights calculated by Dynamic Feedback Protocol (DFP). If DFP is removed from the network, IOS Server Load Balancing (IOS SLB) reverts to these static weights.

### Examples

The following example specifies the relative weights of three real servers as 16, 8 (by default), and 24, respectively:

```
Router(config)# ip slb serverfarm PUBLIC
!-----First real server
Router(config-slb-sfarm)# real 10.10.1.1
!-----Assigned weight of 16
```



```

Router(config-slb-real)# weight 16
!-----Enabled
Router(config-slb-real)# inservice
Router(config-slb-real)# exit
!-----Second real server
Router(config-slb-sfarm)# real 10.10.1.2
!-----Enabled with default weight
Router(config-slb-real)# inservice
Router(config-slb-real)# exit
!-----Third real server
Router(config-slb-sfarm)# real 10.10.1.3
!-----Assigned weight of 24, not enabled
Router(config-slb-real)# weight 24

```

### Related Commands

Command	Description
<b>real (server farm)</b>	Identifies a real server by IP address and optional port number as a member of a server farm and enters real server configuration mode.
<b>show ip slb reals</b>	Displays information about the real servers.
<b>show ip slb serverfarms</b>	Displays information about the server farm configuration.

weight (real server)