Configuring the Internet Protocol

This chapter provides information to configure the Internet Protocol (IP) for the CSS and contains the following major sections:

For information on configuring static routes for the Ethernet management port, refer to the *Cisco Content Services Switch Administration Guide*.

IP Configuration Quick Start

Table 6-1 provides a quick overview of the steps required to setup the IP configuration for the CSS. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI command, see the sections following Table 6-1.

Table 6-1 IP Configuration Quick Start

Task and Command Example
1. Configure an IP route for the CSS. You can configure a static route, default route, a blackhole route, or a firewall route. For example, to configure a static IP route, enter: `(config)# ip route 192.168.0.0 /16 192.167.1.1`
2. (Optional) If you do not want the CSS to start an implicit service for the next hop of a static route, specify that no implicit service is established to the next hop of the static route. By default the CSS establishes an implicit service for the gateway address when a static route is defined. `(config)# ip no-implicit-service`
3. (Optional) Enable box-to-box redundancy to provide chassis-level redundancy between two identically configured CSSs. `(config)# ip redundancy`
4. (Optional) Set the equal-cost multipath (ECMP) selection algorithm and the preferred reverse egress path. `(config)# ip ecmp address`
5. (Optional) Enable the CSS to forward subnet broadcast addressed frames. `(config)# ip subnet-broadcast`
6. (Recommended) Display IP information for the CSS. For example, to display IP routing information, enter: `# show ip routes`

The following running-configuration example shows the results of entering the commands in Table 6-1.

```
!************************** GLOBAL ***************************
  ip no-implicit-service
  ip redundancy
  ip subnet-broadcast

  ip route 192.168.0.0/16 192.167.1.1 1
```

Configuring an IP Route

A static route consists of a destination network address and mask, as well as the next hop to reach the destination. You can also specify a default static route (using 0.0.0.0 as the destination network address and a valid next hop address) to direct frames for which no other destination is listed in the routing table. Default static routes are useful for forwarding otherwise unrouteable packets by the CSS.

When you configure a static route, the CSS creates an internal service that periodically polls the configured next hop address with an ICMP echo (or ping) keepalive. The internal service is called an implicit service. If the router fails, the CSS removes any entries from the routing table that point to the failed router and stops sending network traffic to the failed router. When the router recovers, the CSS:

- Becomes aware of the router
- Reenters applicable routes into the routing table

The implicit service does not determine if the default or static route appears in the routing table. This decision is based on the CSS having a viable ARP entry for the next hop router IP address so the CSS can forward traffic to that destination. The CSS uses the ICMP keepalive as a means to ensure the next hop router MAC address is available and current. However, in certain situations, the next hop router may block ICMP message transmitted by the CSS, which results in a failed ICMP keepalive (the ICMP keepalive is in the Down state). As long as the CSS has the ARP entry of the next hop router the static route is still placed in the routing table.

Note The CSS allows you to disable the internal ICMP keepalive through the **ip-no-implicit service** command. In this case, if the MAC address for the next hop is not known to the CSS the address will not appear in the routing table.

Use the **ip route** command to configure an IP route. You can configure a static route, a default static IP route, a blackhole route (where the CSS drops any packets addressed to the route), or a firewall IP route. Each **ip route** command requires one of the following:

- An IP address and a subnet mask prefix; for example, 192.168.1.0 /24
- An IP address and a subnet mask; for example, 192.168.1.0 255.255.255.0

The syntax for this global configuration command is:

ip route *ip_address subnet_mask*[**blackhole**|*ip_address2*{*distance*|**originated-packets**}|**firewall** *index* {*distance*}]

The syntax and options for the command are as follows:

- *ip_address* - The destination network address. Enter the IP address in dotted-decimal notation (for example, 192.168.11.1).
- *subnet_mask* - The IP subnet mask. Enter the mask in either:
  - CIDR bitcount notation (for example, /24).
  - Dotted-decimal notation (for example, 255.255.255.0).
- **blackhole** - Instructs the CSS to drop any packets addressed to the destination.
- *ip_address2* - The next hop address for the route. Enter the IP address in dotted-decimal notation (for example, 192.168.11.1).
- *distance* - (Optional) The administrative distance. Enter an integer from 1 to 254. A smaller number is preferable. The default value is 1.
- **originated-packets** - Specifies that the route is used only by packets created using flows or sessions going to and from the CSS (for example, a Telnet session to the CSS). The route is not used by flows or sessions that go through the CSS (for example, between an attached server and a remote client).

Note A ping response and an SNMP responses do not use the originated-packets route. A ping *request* sent from the CSS uses the originated-packets route. A ping *response* sent from the CSS does not use the originated-packets route.

- **firewall** - Configures a firewall route. The **firewall** option instructs the CSS to use firewall load balancing for this route. You can optionally set the administrative distance.

Note The CLI prevents you from configuring IP static routes with identical destinations *and* identical administrative costs, for IP static routes that are firewall routes and IP static routes that are not firewall routes.

- *index* - An existing index number for the firewall route. For information on configuring a firewall index, see the **ip firewall** command (refer to the *Cisco Content Services Switch Security Configuration Guide*).

For example, to configure a static IP route to destination network address *192.168.0.0 /16* and a next hop address of *192.167.1.1*, enter:

```
(config)# ip route 192.168.0.0 /16 192.167.1.1
```

For example, to configure a default IP route using a destination address of *0.0.0.0 /0* and a next hop address of *192.167.1.1*, enter:

```
(config)# ip route 0.0.0.0 /0 192.167.1.1
```

For example, to configure a blackhole route, enter:

```
(config)# ip route 192.168.1.0 /24 blackhole
```

For example, to configure a firewall IP route with an index number of *3* and an administrative distance of *2*, enter:

```
(config)# ip route 192.168.1.0 /24 firewall 3 2
```

To remove a static route, enter:

```
(config)# no ip route 0.0.0.0 /0 10.0.1.1
```

To disable the dropping of packets to a blackhole route, enter:

```
(config)# no ip route 192.168.1.0 /24 blackhole
```

To remove a firewall route, enter:

```
(config)# no ip route 192.168.1.0 /24 firewall 3
```

Disabling an Implicit Service for the Static Route Next Hop

By default, the CSS establishes an implicit (or internal) service for the gateway address when a static route is defined. When you do not want the CSS to start an implicit service for the next hop of a static route, use the **ip no-implicit-service** command. The **ip no-implicit-service** command specifies that no implicit service is established to the next hop of the static route, which disables the internal service ICMP keepalive. In this case, if the ARP address for the next hop is not known to the CSS, the address will not appear in the routing table.

The purpose of the implicit service to the next hop of a static route is to monitor the availability of the next hop to forward data traffic. When the **ip no-implicit-service** command is in effect, traffic is forwarded to the next hop even when the next hop is unavailable. Because of the possibility of data being lost if the next hop becomes unavailable, use of the **ip no-implicit-service** command is strongly discouraged.

Note Static routes can sometimes appear in the CSS routing table even when you have an implicit service for the next hop address (the default setting) and the internal keepalive is down. When the CSS detects the ARP mapping for the next hop in the static route, the CSS continues to list that route in the routing table regardless of the state of the ICMP service keepalive (Down or Up).

When you implement the **ip no-implicit-service** global configuration command, this action does not affect previously configured static routes. The **ip no-implicit-service** command affects only those static routes added after you enable the command. We recommend you reboot the CSS after you modify the configuration to ensure all static routes are the same, which is useful for network monitoring and troubleshooting. If you wish to stop the implicit service for a previously configured static route, then you must delete and reconfigure the static route.

For example:

```
(config)# ip no-implicit-service
```

To reset the default setting, enter:

```
(config)# no ip no-implicit-service
```

Configuring an IP Source Route

To enable the CSS to process frames with information that overrides the default routing, use the **ip source-route** command. For example:

```
(config)# ip source-route
```

Caution Enabling the **ip source-route** command may pose a major security risk to your network. The IP source route specifies information that overrides the default routing a packet would normally take. The packet could then bypass a firewall. If this poses a problem, avoid using the **ip source-route** command.

The CSS does not load balance TCP or UDP packets with IP options that are destined to a VIP address. These packet types are dropped and the CSS returns an ICMP destination/port unreachable error. This behavior exists regardless of the state (enabled or disabled) of the **ip source-route** and **ip record-route** commands.

The CSS, however, does respond to ICMP packets that are destined to a VIP address. The CSS also responds to TCP or UDP packets that include IP options that are destined to a local circuit address, or require that a routing decision be made.

To disable the processing of frames with the IP source-route option (the default behavior), enter:

```
(config)# no ip source-route
```

Configuring the IP Record Route

To enable the CSS to process frames with the IP address of each router along a path, use the **ip record-route** command. For example:

```
(config)# ip record-route
```

Caution Enabling the **ip record-route** command could pose security risks to your network. The **ip record-route** command inserts the IP address of each router along a path into the IP header.

The CSS does not load balance TCP or UDP packets with IP options that are destined to a VIP address. These packet types are dropped and the CSS returns an ICMP destination/port unreachable error. This behavior exists regardless of the state (enabled or disabled) of the **ip record-route** and **ip source-route** commands.

The CSS, however, does respond to ICMP packets that are destined to a VIP address. The CSS also responds to TCP or UDP packets that include IP options that are destined to a local circuit address, or require that a routing decision be made.

To disable the processing of frames with the record-route option (the default behavior), enter:

```
(config)# no ip record-route
```

Configuring Box-to-Box Redundancy

Box-to-box redundancy provides chassis-level redundancy between two identically configured CSSs. Refer to the *Cisco Content Services Switch Redundancy Guide* for information about configuring box-to-box redundancy. Use the **ip redundancy** command to enable box-to-box redundancy.

The CSS does not support simultaneous box-to-box redundancy and VIP or interface redundancy configurations.

For example:

```
(config)# ip redundancy
```

To disable box-to-box redundancy, enter:

```
(config)# no ip redundancy
```

Configuring IP Equal-Cost Multipath

To set the equal-cost multipath (ECMP) selection algorithm and the preferred reverse egress path, use the **ip ecmp** command. The CSS supports a maximum of 15 ECMP paths.

The syntax for this global configuration command is:

ip ecmp [**address**|**no-prefer-ingress**|**roundrobin**]

The options for this global configuration mode command are as follows:

- **address** - Choose among alternate paths based on IP addresses. For example:

  ```
  (config)# ip ecmp address
  ```

- **no-prefer-ingress** - Do not prefer the ingress path of a flow for its reverse egress path. By default, the ingress path for a flow is the preferred egress path. This means that the preferred interface over which to reply to a client is the interface on which the CSS originally received the request from the client. Note that this command option has no effect on UDP traffic.

  For example:

  ```
  (config)# ip ecmp no-prefer-ingress
  ```

  To reset the ingress path of a flow for its preferred reverse egress path, enter:

  ```
  (config)# no ip ecmp no-prefer-ingress
  ```

- **roundrobin** - Alternate between equal paths in roundrobin fashion. For example:

  ```
  (config)# ip ecmp roundrobin
  ```

Note The CSS applies the ECMP selection algorithm for non-TCP/UDP packets (for example, ICMP) on a packet-by-packet basis. Multipath selection for TCP and UDP is performed on a per-flow basis, and all packets for a particular flow take the same path.

Forwarding IP Subnet Broadcast Addressed Frames

To enable the CSS to forward subnet broadcast addressed frames, use the **ip subnet-broadcast** command.

For example:

```
(config)# ip subnet-broadcast
```

To disable forwarding of subnet broadcast addressed frames (the default behavior), enter:

```
(config)# no ip subnet-broadcast
```

Caution Enabling the CSS to forward the subnet broadcast can make the subnet susceptible to "smurf" attacks; an attacker sends an ICMP echo request frame using a subnet broadcast address as a destination and a forged address as the source.

If a "smurf" attack is successful, all the destination subnet hosts reply to the echo and flood the path back to the source. By disabling subnet broadcast forwarding, the original echo never reaches the hosts.

Configuring IP Unconditional Bridging

By default, the routing table lookup of a destination path by the CSS on received packets overrides bridging decisions to be made for those packets. If the routing table specifies that the CSS use a different physical Ethernet port than what is specified for port bridging, the CSS ignores the bridging decision. If you have a network that you want to bridge through the CSS to an upstream router, you may want to force the CSS to make a bridging decision on the received packets instead of making a routing table decision.

Use the **ip uncond-bridging** global configuration command to always make a bridging decision on the received packets. With this command, the bridging decision always takes precedence over a routing table decision.

For example:

```
(config)# ip uncond-bridging
```

To restore the default behavior of the CSS, enter:

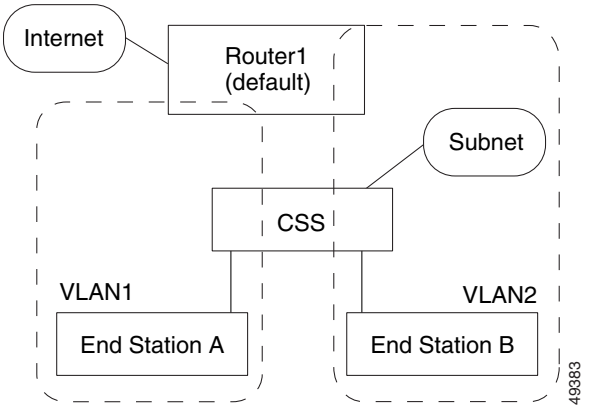
```
(config)# no ip uncond-bridging
```

Configuring IP Opportunistic Layer 3 Forwarding

The CSS opportunistic Layer 3 forwarding feature allows the CSS to reduce the number of network device hops for certain packets or flows. The CSS forwards packets at Layer 3 if the destination MAC address in the Ethernet header is the CSS MAC address. Use the **ip opportunistic** command to enable opportunistic Layer 3 forwarding and allow the CSS to make Layer 3 forwarding decisions even if the Layer 2 packet destination MAC address does not belong to the CSS.

For example, Figure 6-1 shows a CSS connected to VLAN1 and VLAN2. Each VLAN has an end station and an uplink to Router1. End stations A and B both point to Router1 as their default router. When End Station A transmits a packet to End Station B, it uses its default route to Router1. The packet contains Router1's destination MAC address. A traditional Layer 2 device forwards the packet to Router1, and Router1 forwards the packet to End Station B on VLAN2.

Figure 6-1 Example of Opportunistic Layer 3 Forwarding



Using opportunistic Layer 3 forwarding, the CSS inspects the IP packet header to determine the destination IP address. Instead of forwarding the packet to Router1, the CSS forwards the packet directly to End Station B. Because the CSS handles the packet only once, the router and uplink are not used and network resources are conserved.

The options for this global configuration mode command are as follows:

- **local (default)** - Applies opportunistic Layer 3 forwarding if the destination IP address belongs to a node that resides on one of the subnets directly attached to the CSS *and* the CSS is aware of an ARP resolution for that node. Because the local option is the default, use the **no ip opportunistic** command to reconfigure IP opportunistic Layer 3 forwarding to the local setting.
- **all** - Applies opportunistic Layer 3 forwarding if the destination IP address matches any entry in the CSS routing table. We do not recommend this option if the topology includes multiple routers and the CSS does not know all of the routes the routers are aware of.
- **disabled** - The CSS does not perform opportunistic Layer 3 forwarding. Regular Layer 3 forwarding is performed only for packets that contain the CSS destination MAC address.

For example, to configure IP opportunistic Layer 3 forwarding to **all**, enter:

```
(config)# ip opportunistic all
```

To reconfigure IP opportunistic Layer 3 forwarding to the default of **local** enter:

```
(config)# no ip opportunistic
```

When you configure **ip opportunistic all**, you can use the **ip route originated-packets** command (see the "IP Configuration Quick Start" section) to configure routes that the CSS uses to reach devices, but does not use as opportunistic routes for forwarding traffic. Routes created using the **ip route originated-packets** command apply only to packets that originate on the CSS. Packets and flows forwarded by the CSS do not use these routes.

For example:

```
(config)# ip route 0.0.0.0 /0 192.168.1.7 originated-packets
```

Configuring Advanced Route Remapping

To configure a CSS to remap flows using the best available route, use the **ip advanced-route-remap** command. The syntax of this global configuration mode command is:

ip advanced-route-remap

For example, enter:

```
(config)# ip advanced-route-remap
```

To disabled the remapping of flows using the best available route, enter:

```
(config)# no ip advanced-route-remap
```

Showing IP Configuration Information

Use the **show ip** command to display IP information for the CSS. This section includes the following topics:

- Showing IP Global Configuration Parameters
- Showing IP Interface Information
- Showing IP Routing Information
- Showing IP Statistics
- Showing a Summary of IP Global Statistics

Showing IP Global Configuration Parameters

Use the **show ip config** command to display IP global configuration parameters. These parameters show the state (enabled or disabled) of the source route option, forward IP broadcasts, record-route option, and IP route change logging. The **show ip config** command also shows the value for the orphaned route timer.

Table 6-2 describes the fields Zin the **show ip config** output.

Table 6-2 Field Descriptions for the show ip config Command

Field	Description
Source Route Option	Indicates whether processing of source-routed frames is enabled or disabled.
Forward IP Broadcasts	Indicates whether forwarding IP broadcasts is enabled or disabled.
Orphaned Route Timer	The setting for the orphaned route timer.
Record Route Option	Indicates whether processing with the record-route option is enabled or disabled.
Multiple Equal Cost Path Algorithm	The setting for the equal-cost multipath selection algorithm. The possible settings are as follows: • **Address** - Choose among alternate paths based on IP addresses • **Roundrobin** - Alternate between equal paths in roundrobin fashion
IP Route Change Logging	Indicates whether logging IP route changes is enabled or disabled.

Showing IP Interface Information

Use the **show ip interfaces** command to display configured IP interfaces on the CSS. The display includes the circuit state, IP address, broadcast address, Internet Control Message Protocol (ICMP) settings, and Router Discovery Program (RDP) settings.

Table 6-3 describes the fields in the **show ip interfaces** command output.

Table 6-3 Field Descriptions for the show ip interfaces Command

Field	Description
Circuit Name	The name of the circuit associated with the IP interface.
State	The state of the IP interface. The possible states are as follows: • **Active (1)** - Interface is up • **Disabled (2)** - Interface is disabled • **NoCircuit (3)** - Interface is waiting for an underlying circuit
IP Address	The IP address assigned to the circuit.
Network Mask	The network mask of the circuit.
Broadcast Address	The broadcast IP address associated with the IP interface. If left at zero, the all-ones host is used for numbered interfaces. 255.255.255.255 is always used for unnumbered interfaces.
Redundancy	Indicates whether the redundancy protocol is running on the interface. The default state is Disabled.
ICMP Redirect	Whether the transmission of Internet Control Message Protocol (ICMP) redirect messages is enabled or disabled. The default state is Enabled.
ICMP Unreachable	Whether the transmission of ICMP Destination Unreachable messages is enabled or disabled. The default state is enabled.
RIP	Whether RIP is enabled or disabled.

Showing IP Routing Information

Use the **show ip routes** command to display IP routing information. The syntax and options for this command are as follows:

- **show ip routes** - Displays the entire routing table, including host IP address, next hop, interface, route type, protocol, age (in seconds), and metric.
- **show ip routes firewall** - Displays all firewall routes.
- **show ip routes local** - Displays all local routes.
- **show ip routes ospf** - Displays all OSPF routes.
- **show ip routes rip** - Displays all RIP routes.
- **show ip routes static** - Displays all static routes.
- **show ip routes summary** - Displays the total number of OSPF routes (including a breakdown of Intra, Inter, and Ext routes), RIP routes, local routes, static routes, and firewall routes.
- **show ip routes** *ip_or_host* {**to** *ip_or_host* | *mask_or_prefix*} - Displays information about a route to a destination, a specific route, or routes in a range.

The variables are as follows:

- *ip_or_host* - The IP address of the host or network prefix. Enter an IP address in dotted-decimal notation (for example, 192.168.11.1). The IP address after the **to** keyword is the final IP address in a range.
- *mask_or_prefix* - Subnet address of the specific network. Enter the subnet address in mask or prefix notation (for example, /24).

To show all IP routes in the CSS, enter:

```
# show ip routes
```

Table 6-4 describes the fields in the **show ip routes** command output.

Table 6-4 Field Descriptions for the show ip routes Command

Field	Description
Prefix/length	The IP address and prefix length for the route.
Next hop	The IP address for the next hop.

Table 6-4 Field Descriptions for the show ip routes Command (continued)

Field	Description
If	The Index value that identifies the local interface through which the next hop of this route should be reached.
Type	The type of the route entry. The possible types are as follows: • local - Local interface • remote - Remote destination • mgmt - Management interface
Proto	The protocol for the route.
Age	The maximum age of the route.
Metric	The metric cost of the route.

Showing IP Statistics

Use the **show ip statistics** command to display aggregate TCP statistics for the CSS or module in a CSS 11503 or 11506 chassis. The syntax for this command is:

show ip statistics {*slot_number*}

The optional *slot_number* variable is the slot number for the module in the CSS. This variable allows you to display the statistics only for the module in the specified slot. If you do not specify a slot number, this command displays the statistics for all modules in the chassis.

Table 6-5 describes the fields in the **show ip statistics** output.

Table 6-5 Field Descriptions for the show ip statistics Command

Field	Description
UDP Statistics	
Input Datagrams	The total number of flow-related UDP datagrams delivered to UDP users.
No Port Errors	The total number of received UDP datagrams for which there was no application at the destination port.

Table 6-5 Field Descriptions for the show ip statistics Command (continued)

Field	Description
Output Datagrams	The total number of flow-related UDP datagrams sent from the CSS.
Input Errors	The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.
TCP Statistics	
Retransmit Algorithm	The algorithm used to determine the timeout value for retransmitting unacknowledged octets.
Max Retransmit Time	The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds.
Active Opens	The number of times TCP connections have made a direct transition to the SYN-SENT state from the Closed state.
Failed Attempts	The number of times TCP connections have made a direct transition to the Closed state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the Listen state from the SYN-RCVD state.
Established Conns	The number of TCP connections for which the current state is either Established or Close-Wait.
Output Segments	The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.
Input Errors	The total number of segments received in error (for example, bad TCP checksums).
Min Retransmit Time	The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds.
Max TCP Connections	The total number of TCP connections that the CSS supports.

Table 6-5 Field Descriptions for the show ip statistics Command (continued)

Field	Description
Passive Opens	The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.
Resets	The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE-WAIT state.
Input Segments	The total number of segments received, including those received in error. This count includes segments received on currently established connections.
Retransmit Segments	The total number of segments retransmitted; that is, the number of TCP segments transmitted containing one or more previously transmitted octets.
Output Resets	The number of TCP segments sent containing the RST flag.
ICMP Statistics	
Echo Requests In	The number of received ICMP Echo request messages. Typically, when the CSS receives the ICMP request, both the Echo Requests In and the Echo Replies Out counters increment as a pair for the ICMP request in and ICMP reply out packets.
Echo Replies In	The number of received ICMP Echo reply messages. Typically, when the CSS receives an ICMP reply, both the Echo Requests Out and the Echo Replies In counters increment as a pair for the ICMP reply in and ICMP request out packets.
Unreachable	The number of received ICMP Destination Unreachable messages.
Redirect	The number of received ICMP Redirect messages.
Router Solicit	The number of received ICMP router solicitation packets.
Param Problem	The number of received ICMP Parameter Problem messages.

Table 6-5 Field Descriptions for the show ip statistics Command (continued)

Field	Description
Timestamp Reply	The number of sent ICMP Timestamp Reply messages.
Information Reply	The number of received ICMP information reply packets.
Mask Reply	The number of received ICMP Address Mask Reply messages.
Echo Requests Out	The number of transmitted ICMP Echo request messages. Typically, when the CSS transmits an ICMP request, both the Echo Requests Out and the Echo Replies In counters increment as a pair for the ICMP request out and ICMP reply in packets.
Echo Replies Out	The number of transmitted ICMP Echo reply messages.Typically, when the CSS transmits an ICMP reply, both the Echo Requests In and the Echo Replies Out counters increment as a pair for the ICMP reply out and ICMP request in packets.
Source Quench	The number of received ICMP Source Quench messages.
Router Adv	The number of received ICMP router advertisement packets.
Time Exceeded	The number of received ICMP Time Exceeded messages.
Timestamp	The number of sent ICMP Timestamp (request) messages.
Information Request	The number of received ICMP information request packets.
Mask Request	The number of sent ICMP Address Mask Request messages.
Invalid	The number of received bad ICMP type packets.
ARP Statistics	
Requests In	The number of received ARP request packets.
Requests Out	The number of sending ARP request packets.

Table 6-5 Field Descriptions for the show ip statistics Command (continued)

Field	Description
Duplicate Addr	The number of received ARP packets with a detected duplicate IP address. The duplicate IP address can be the local IP address, VIP, or virtual interface.
Invalid	The number of invalid or bad ARP packets.
Replies In	The number of received ARP reply packets.
Replies Out	The sending ARP reply packet count.
In Off Subnet	The number of received ARP packets with sender or target addresses outside of the subnet range of the receiving interface.
Unresolved	The number of processed IP frames with unresolved next hop MAC addresses.

Resetting IP Statistics

To set the global IP (TCP/UDP) statistics for the CSS to zero, use the **zero ip statistics** command in any mode. This command sets the TCP/UDP statistics displayed by the **show ip statistics** command to zero. For more information about the show ip statistics command, see the "Showing IP Statistics" section.

Showing a Summary of IP Global Statistics

Use the **show ip summary** command to display a summary of IP global statistics. The statistics include data on reachable and total routes, reachable and total hosts, memory in use for each, and total IP routing memory in use.

Table 6-6 describes the fields in the **show ip summary** command output.

Table 6-6 Field Descriptions for the show ip summary Command

Field	Description
Reachable Routes	The current number of reachable routes.
Total Routes	The current number of routes maintained, both reachable and unreachable.
Reachable Hosts	The current number of reachable host entries.
Total Hosts	The current number of host entries, both reachable and unreachable.
Total Memory in use - IP Routing Memory Pool	The total amount of memory in bytes allocated for the IP routing table. When there are no additional free entries in the memory pool, more memory is allocated to the pool.