IP Application Services Command Reference, Cisco IOS XE Release 3SE (Catalyst 3650 Switches)

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C O N T E N T S

A through C

carrier-delay (tracking)

To enable Enhanced Object Tracking (EOT) to consider the carrier-delay timer when tracking the status of an interface, use the **carrier-delay** command in tracking configuration mode. To disable EOT from considering the carrier-delay timer when tracking the status of an interface, use the **no** form of this command.

carrier-delay

no carrier-delay

Syntax Description   This command has no arguments or keywords.

Command Default   EOT does not consider the carrier-delay timer configured on an interface when tracking the status of the interface.

Command Modes   Tracking configuration (config-track)

Command History

Release	Modification
12.4(9)T	This command was introduced.
15.3(3)M	This command was integrated into Cisco IOS Release 15.3(3)M.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines   If a link fails, by default there is a two-second timer that must expire before an interface and the associated routes are declared down. If a link goes down and comes back up before the carrier delay timer expires, the down state is effectively filtered, and the rest of the software on the switch is not aware that a link-down event occurred. You can configure the **carrier-delay** *seconds* command in interface configuration mode to extend the timer up to 60 seconds.

When Enhanced Object Tracking (EOT) is configured on an interface, the tracking may detect the interface is down before a configured carrier-delay timer has expired. This is because EOT looks at the interface state and does not consider the carrier-delay timer.

Examples   The following example shows how to configure the tracking module to wait for the interface carrier-delay timer to expire before notifying clients of a state change:

```
Router(config)# track 101 interface ethernet1/0 line-protocol
Router(config-track)# carrier-delay
```

Related Commands

Command	Description
carrier-delay	Sets the carrier delay on an interface.
show track	Displays information about objects that are tracked by the tracking process.
track interface	Configures an interface to be tracked and to enter tracking configuration mode.
track ip route	Tracks the state of an IP route and enters tracking configuration mode.
track ip sla	Tracks the state of a Cisco IOS SLAs operation and enters tracking configuration mode.
track list	Specifies a list of objects to be tracked and the thresholds to be used for comparison.
track resolution	Specifies resolution parameters for a tracked object.
track timer	Specifies the interval that a tracking process polls a tracked object.

clear ip wccp

To remove IPv4 Web Cache Communication Protocol (WCCP) statistics (counts) maintained on the router for a particular service, use the **clear ip wccp** command in privileged EXEC mode.

clear ip wccp [**vrf** *vrf-name*] [*service-number*] [**web-cache**] [**default**]

Syntax Description

vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding (VRF) instance to associate with a service group.
service-number	(Optional) Number of the cache service to be removed. The number can be from 0 to 254.
web-cache	(Optional) Directs the router to remove statistics for the web cache service.

Command Default   WCCP statistics are not removed.

Command Modes   Privileged EXEC (#)

Command History

Release	Modification
11.1CA	This command was introduced for Cisco 7200 and 7500 platforms.
11.2P	Support for this command was added to a variety of Cisco platforms.
12.0(3)T	This command was expanded to be explicit about service using the **web-cache** keyword and the *service-number* argument.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
15.0(1)M	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
12.2(33)SRE	This command was modified. The **vrf** keyword and *vrf-name* argument were added.

Release	Modification
12.2(50)SY	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

Use the **show ip wccp** and **show ip wccp detail** commands to display WCCP statistics. If Cisco Cache Engines are used in your service group, the reverse proxy service is indicated by a value of 99.

Use the **clear ip wccp** command to clear the WCCP counters for all WCCP services in all VRFs.

Examples

The following example shows how to clear all statistics associated with the web cache service:

```
Router# clear ip wccp web-cache
```

Related Commands

Command	Description
clear platform software wccp	Clears WCCPv2 statistics on the Cisco ASR 1000 Series Routers.
ip wccp	Enables support of the specified WCCP service for participation in a service group.
show ip wccp	Displays global statistics related to the WCCP.

default-state

To set the default state for a stub object, use the **default-state** command in tracking configuration mode. To reset the default state to its internal default state, use the **no** form of this command.

default-state {**up**| **down**}

no default-state {**up**| **down**}

Syntax Description

up	Sets the current default state of a stub object to up.
down	Sets the current default state of a stub object to down.

Command Default

Internal default state is the default.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.4(2)T	This command was introduced.
12.2(31)SB3	This command was integrated into Cisco IOS Release 12.2(31)SB3.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

Use the **default-state** command to set the default state of a stub object that has been created by the **track stub** command. The stub object can be tracked and manipulated by an external process, Embedded Event Manager (EEM).

EEM is a distributed, scalable, and customized approach to event detection and recovery offered directly in a Cisco IOS device. EEM offers the ability to monitor events and take informational or corrective action when the monitored events occur or when a threshold is reached. An EEM policy is an entity that defines an event and the actions to be taken when that event occurs.

Examples

The following example shows how to create a stub object and configure a default state for the stub object:

```
Router(config)# track 2 stub
Router(config-track)# default-state up
```

Related Commands

Command	Description
show track	Displays tracking information.
track stub	Creates a stub object to be tracked.

delay (tracking)

To specify a period of time to delay communicating state changes of a tracked object, use the **delay** command in tracking configuration mode. To disable the delay period, use the **no** form of this command.

delay {**up** *seconds*| [**down** *seconds*]| **up** *seconds*| [**down** *seconds*]}

no delay {**up** *seconds*| [**down** *seconds*]| **up** *seconds*| [**down** *seconds*]}

Syntax Description

up	Specifies the time to delay the notification of an up event.
seconds	Delay value, in seconds. The range is from 0 to 180. The default is 0.
down	Specifies the time to delay the notification of a down event.

Command Default

No delay time for communicating state changes is configured.

Command Modes

Tracking configuration (config-track)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)B.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.3(3)M	This command was integrated into Cisco IOS Release 15.3(3)M.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

This command is available to all tracked objects.

If you specify, for example, **delay up 10 down 30**, then if the object state changes from down to up, clients tracking that object are notified after 10 seconds. If the object state changes from up to down, then clients tracking that object are notified after 30 seconds.

Examples

In the following example, the tracking process is tracking the IP-route threshold metric. The delay period to communicate the tracked object state changing to down is set to 30 seconds.

```
Router(config)# track 1 ip route 10.22.0.0/16 metric threshold
Router(config-track)# threshold metric up 16 down 20
Router(config-track)# delay down 30
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.
threshold metric	Sets a threshold metric.
track ip route	Tracks the state of an IP route.

ip accounting through ip sctp authenticate

-

ip directed-broadcast

To enable the translation of a directed broadcast to physical broadcasts, use the **ip directed-broadcast** interface configuration command. To disable this function, use the **no** form of this command.

ip directed-broadcast [*access-list-number*| *extended access-list-number*]

no ip directed-broadcast [*access-list-number*| *extended access-list-number*]

Syntax Description

access-list-number	(Optional) Standard access list number in the range from 1 to 199. If specified, a broadcast must pass the access list to be forwarded.
extended access-list-number	(Optional) Extended access list number in the range from 1300 to 2699.

Command Default   Disabled; all IP directed broadcasts are dropped.

Command Modes   Interface configuration (config-if)

Command History

Release	Modification
10.0	This command was introduced.
12.0	The default behavior changed to directed broadcasts being dropped.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines   An IP directed broadcast is an IP packet whose destination address is a valid broadcast address for some IP subnet, but which originates from a node that is not itself part of that destination subnet.

A router that is not directly connected to its destination subnet forwards an IP directed broadcast in the same way it would forward unicast IP packets destined to a host on that subnet. When a directed broadcast packet reaches a router that is directly connected to its destination subnet, that packet is "exploded" as a broadcast on the destination subnet. The destination address in the IP header of the packet is rewritten to the configured IP broadcast address for the subnet, and the packet is sent as a link-layer broadcast.

The **ip directed-broadcast** command controls the explosion of directed broadcasts when they reach their target subnets. The command affects only the final transmission of the directed broadcast on its ultimate destination subnet. It does not affect the transit unicast routing of IP directed broadcasts.

If **directed broadcast** is enabled for an interface, incoming IP packets whose addresses identify them as directed broadcasts intended for the subnet to which that interface is attached will be exploded as broadcasts on that subnet. If an access list has been configured with the **ip directed-broadcast** command, only directed broadcasts that are permitted by the access list in question will be forwarded; all other directed broadcasts destined for the interface subnet will be dropped.

If the **no ip directed-broadcast** command has been configured for an interface, directed broadcasts destined for the subnet to which that interface is attached will be dropped, rather than being broadcast.

Note Because directed broadcasts, and particularly Internet Control Message Protocol (ICMP) directed broadcasts, have been abused by malicious persons, we recommend that security-conscious users disable the **ip directed-broadcast** command on any interface where directed broadcasts are not needed and that they use access lists to limit the number of exploded packets.

Examples The following example enables forwarding of IP directed broadcasts on Ethernet interface 0:

```
Router(config)# interface ethernet 0
Router(config-if)# ip directed-broadcast
```

Related Commands

Command	Description
ip forward-protocol	Specifies which protocols and ports the router forwards when forwarding broadcast packets.

ip tcp adjust-mss through ip wccp web-cache accelerated

ip vrf

To define a VPN routing and forwarding (VRF) instance and to enter VRF configuration mode, use the **ip vrf** command in global configuration mode. To remove a VRF instance, use the **no** form of this command.

ip vrf *vrf-name*

no ip vrf *vrf-name*

Syntax Description

vrf-name	Name assigned to a VRF.

Command Default

No VRFs are defined. No import or export lists are associated with a VRF. No route maps are associated with a VRF.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.1(1)SY	This command was integrated into Cisco IOS Release 15.1(1)SY.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

The **ip vrf** *vrf-name* command creates a VRF instance named *vrf-name*. To make the VRF functional, a route distinguisher (RD) must be created using the **rd** *route-distinguisher* command in VRF configuration mode. The **rd** *route-distinguisher* command creates the routing and forwarding tables and associates the RD with the VRF instance named *vrf-name*.

The **ip vrf default** command can be used to configure a VRF instance that is a NULL value until a default VRF name can be configured. This is typically before any VRF related AAA commands are configured.

Examples   The following example shows how to import a route map to a VRF instance named VPN1:

```
Router(config)# ip vrf vpn1
Router(config-vrf)# rd 100:2
Router(config-vrf)# route-target both 100:2
Router(config-vrf)# route-target import 100:1
```

Related Commands

Command	Description
ip vrf forwarding (interface configuration)	Associates a VRF with an interface or subinterface.
rd	Creates routing and forwarding tables for a VRF and specifies the default route distinguisher for a VPN.

ip wccp

To enable support of the specified Web Cache Communication Protocol (WCCP) service for participation in a service group, use the **ip wccp** command in global configuration mode. To disable the service group, use the **no** form of this command.

ip wccp vrf *vrf-name* {**web-cache**| *service-number*} [**accelerated**] [**service-list** *service-access-list*] [**mode** {**open**| **closed**}] [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** [**0**| **7**] *password*]

no ip wccp vrf *vrf-name* {**web-cache**| *service-number*} [**accelerated**] [**service-list** *service-access-list*] [**mode** {**open**| **closed**}] [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** [**0**| **7**] *password*]

Syntax Description

vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding instance (VRF) to associate with a service group.
web-cache	Specifies the web-cache service (WCCP Version 1 and Version 2). **Note** Web cache counts is one of the services. The maximum number of services, including those assigned with the *service-number* argument, is 256.
service-number	Dynamic service identifier, which means the service definition is dictated by the cache. The dynamic service number can be from 0 to 254. The maximum number of services is 256, which includes the web-cache service specified with the **web-cache** keyword. **Note** If Cisco cache engines are used in the cache cluster, the reverse proxy service is indicated by a value of 99.
accelerated	(Optional) This option applies only to hardware-accelerated routers. This keyword configures the service group to prevent a connection being formed with a cache engine unless the cache engine is configured in a way that allows redirection on the router to benefit from hardware acceleration.
service-list *service-access-list*	(Optional) Identifies a named extended IP access list that defines the packets that will match the service.
mode open	(Optional) Identifies the service as open. This is the default service mode.
mode closed	(Optional) Identifies the service as closed.

group-address *multicast-address*	(Optional) Specifies the multicast IP address that communicates with the WCCP service group. The multicast address is used by the router to determine which web cache should receive redirected messages.
redirect-list *access-list*	(Optional) Specifies the access list that controls traffic redirected to this service group. The *access-list* argument should consist of a string of no more than 64 characters (name or number) in length that specifies the access list.
group-list *access-list*	(Optional) Specifies the access list that determines which web caches are allowed to participate in the service group. The *access-list* argument specifies either the number or the name of a standard or extended access list.
password [**0** | **7**] *password*	(Optional) Specifies the message digest algorithm 5 (MD5) authentication for messages received from the service group. Messages that are not accepted by the authentication are discarded. The encryption type can be 0 or 7, with 0 specifying not yet encrypted and 7 for proprietary. The *password* argument can be up to eight characters in length.

Command Default WCCP services are not enabled on the router.

Command Modes Global configuration (config)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.1	This command replaced the **ip wccp enable**, **ip wccp redirect-list**, and **ip wccp group-list** commands.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(14)T	The maximum value for the *service-number* argument was increased to 254.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.4(11)T	The **service-list** *service-access-list* keyword and argument pair and the **mode open** and **mode closed** keywords were added.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
15.0(1)M	This command was modified. The **vrf** keyword and *vrf-name* argument pair were added.
12.2(33)SRE	This command was modified. The **vrf** keyword and *vrf-name* argument pair were added.
12.2(50)SY	This command was modified. The **vrf** keyword and *vrf-name* argument pair were added.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

WCCP transparent caching bypasses Network Address Translation (NAT) when Cisco Express Forwarding switching is enabled. To work around this situation, configure WCCP transparent caching in the outgoing direction, enable Cisco Express Forwarding switching on the content engine interface, and specify the **ip wccp web-cache redirect out** command. Configure WCCP in the incoming direction on the inside interface by specifying the **ip wccp redirect exclude in** command on the router interface facing the cache. This configuration prevents the redirection of any packets arriving on that interface.

You can also include a redirect list when configuring a service group. The specified redirect list will deny packets with a NAT (source) IP address and prevent redirection.

This command instructs a router to enable or disable support for the specified service number or the web-cache service name. A service number can be from 0 to 254. Once the service number or name is enabled, the router can participate in the establishment of a service group.

The **vrf** *vrf-name* keyword and argument pair is optional. It allows you to specify a VRF to associate with a service group. You can then specify a web-cache service name or service number.

The same service (web-cache or service number) can be configured in different VRF tables. Each service will operate independently.

When the **no ip wccp** command is entered, the router terminates participation in the service group, deallocates space if none of the interfaces still has the service configured, and terminates the WCCP task if no other services are configured.

The keywords following the **web-cache** keyword and the *service-number* argument are optional and may be specified in any order, but only may be specified once. The following sections outline the specific usage of each of the optional forms of this command.

ip wccp [**vrf** *vrf-name*] {**web-cache** | *service-number*} **group-address** *multicast-address*

A WCCP group address can be configured to set up a multicast address that cooperating routers and web caches can use to exchange WCCP protocol messages. If such an address is used, IP multicast routing must be enabled so that the messages that use the configured group (multicast) addresses are received correctly.

This option instructs the router to use the specified multicast IP address to coalesce the "I See You" responses for the "Here I Am" messages that it has received on this group address. The response is also sent to the group address. The default is for no group address to be configured, in which case all "Here I Am" messages are responded to with a unicast reply.

ip wccp [**vrf** *vrf-name*] {**web-cache** | *service-number*} **redirect-list** *access-list*

This option instructs the router to use an access list to control the traffic that is redirected to the web caches of the service group specified by the service name given. The *access-list* argument specifies either the number or the name of a standard or extended access list. The access list itself specifies which traffic is permitted to be redirected. The default is for no redirect list to be configured (all traffic is redirected).

WCCP requires that the following protocol and ports not be filtered by any access lists:

- UDP (protocol type 17) port 2048. This port is used for control signaling. Blocking this type of traffic will prevent WCCP from establishing a connection between the router and web caches.

- Generic routing encapsulation (GRE) (protocol type 47 encapsulated frames). Blocking this type of traffic will prevent the web caches from ever seeing the packets that are intercepted.

ip wccp [**vrf** *vrf-name*] {**web-cache** | *service-number*} **group-list** *access-list*

This option instructs the router to use an access list to control the web caches that are allowed to participate in the specified service group. The *access-list* argument specifies either the number of a standard or extended access list or the name of any type of named access list. The access list itself specifies which web caches are permitted to participate in the service group. The default is for no group list to be configured, in which case all web caches may participate in the service group.

> **Note** The **ip wccp** {**web-cache** | *service-number*} **group-list** command syntax resembles the **ip wccp** {**web-cache** | *service-number*} **group-listen** command, but these are entirely different commands. The **ip wccp group-listen** command is an interface configuration command used to configure an interface to listen for multicast notifications from a cache cluster. Refer to the description of the **ip wccp group-listen** command in the *Cisco IOS IP Application Services Command Reference*.

ip wccp [**vrf** *vrf-name*] **web-cache** | *service-number*} **password** *password*

This option instructs the router to use MD5 authentication on the messages received from the service group specified by the service name given. Use this form of the command to set the password on the router. You must also configure the same password separately on each web cache. The password can be up to a maximum of eight characters in length. Messages that do not authenticate when authentication is enabled on the router are discarded. The default is for no authentication password to be configured and for authentication to be disabled.

ip wccp *service-number* **service-list** *service-access-list* **mode closed**

In applications where the interception and redirection of WCCP packets to external intermediate devices for the purpose of applying feature processing are not available within Cisco IOS software, packets for the application must be blocked when the intermediary device is not available. This blocking is called a closed service. By default, WCCP operates as an open service, wherein communication between clients and servers proceeds normally in the absence of an intermediary device. The **service-list** keyword can be used only for closed mode services. When a WCCP service is configured as closed, WCCP discards packets that do not

have a client application registered to receive the traffic. Use the **service-list** keyword and *service-access-list* argument to register an application protocol type or port number.

When the definition of a service in a service list conflicts with the definition received via the WCCP protocol, a warning message similar to the following is displayed:

```
Sep 28 14:06:35.923: %WCCP-5-SERVICEMISMATCH: Service 90 mismatched on WCCP client 10.1.1.13
```

When there is service list definitions conflict, the configured definition takes precedence over the external definition received via WCCP protocol messages.

Examples The following example shows how to configure a router to run WCCP reverse-proxy service, using the multicast address of 239.0.0.0:

```
Router(config)# ip multicast-routing
Router(config)# ip wccp 99 group-address 239.0.0.0
Router(config)# interface ethernet 0
Router(config-if)# ip wccp 99 group-listen
```

The following example shows how to configure a router to redirect web-related packets without a destination of 10.168.196.51 to the web cache:

```
Router(config)# access-list 100 deny ip any host 10.168.196.51
Router(config)# access-list 100 permit ip any any
Router(config)# ip wccp web-cache redirect-list 100
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache redirect out
```

The following example shows how to configure an access list to prevent traffic from network 10.0.0.0 leaving Fast Ethernet interface 0/0. Because the outbound access control list (ACL) check is enabled, WCCP does not redirect that traffic. WCCP checks packets against the ACL before they are redirected.

```
Router(config)# ip wccp web-cache
Router(config)# ip wccp check acl outbound
Router(config)# interface fastethernet0/0
Router(config-if)# ip access-group 10 out
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# access-list 10 deny 10.0.0.0 0.255.255.255
Router(config-if)# access-list 10 permit any
```

If the outbound ACL check is disabled, HTTP packets from network 10.0.0.0 would be redirected to a cache, and users with that network address could retrieve web pages when the network administrator wanted to prevent this from happening.

The following example shows how to configure a closed WCCP service:

```
Router(config)# ip wccp 99 service-list access1 mode closed
```

Related Commands

Command	Description
ip wccp check services all	Enables all WCCP services.
ip wccp group listen	Configures an interface on a router to enable or disable the reception of IP multicast packets for WCCP.
ip wccp redirect exclude in	Enables redirection exclusion on an interface.

Command	Description
ip wccp redirect out	Configures redirection on an interface in the outgoing direction.
ip wccp version	Specifies which version of WCCP you want to use on your router.
show ip wccp	Displays global statistics related to WCCP.

ip wccp group-listen

To configure an interface on a router to enable or disable the reception of IP multicast packets for Web Cache Communication Protocol (WCCP), use the **ip wccp group-listen** command in interface configuration mode. To disable the reception of IP multicast packets for WCCP, use the **no** form of this command.

ip wccp [**vrf** *vrf-name*] {**web-cache**| *service-number*} **group-listen**

no ip wccp [**vrf** *vrf-name*] {**web-cache**| *service-number*} **group-listen**

Syntax Description

vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding (VRF) instance to associate with a service group.
web-cache	Directs the router to send packets to the web cache service.
service-number	WCCP service number; valid values are from 0 to 254.

Command Default No interface is configured to enable the reception of IP multicast packets for WCCP.

Command Modes Interface configuration (config-if)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.2(17d)SXB	Support was added for the Supervisor Engine 2.
12.2(18)SXD1	Support was added for the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
15.0(1)M	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
12.2(33)SRE	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
Cisco IOS XE Release 3.1S	This command was modified. The **vrf** keyword and *vrf-name* argument were added.

Release	Modification
12.2(50)SY	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

Note　To ensure correct operation on Catalyst 6500 series switches and Cisco 7600 series routers, you must enter the **ip pim** *mode* command in addition to the **ip wccp group-listen** command.

On Cisco 7600 series routers, the value for the *service-number* argument may be either one of the provided standard keyword definitions or a number representing a cache engine dynamically defined definition. Once the service is enabled, the router can participate in the establishment of a service group.

Note the following requirements on routers that are to be members of a service group when IP multicast is used:

  • Configure the IP multicast address for use by the WCCP service group.

  • Enable IP multicast routing using the **ip multicast-routing** command in global configuration mode.

  • Configure the interfaces on which the router wants to receive the IP multicast address with the **ip wccp** {**web-cache** | *service-number*} **group-listen** interface configuration command.

Examples　The following example shows how to enable multicast packets for a web cache with a multicast address of 224.1.1.100:

```
Router# configure terminal
Router(config)# ip multicast-routing
Router(config)# ip wccp web-cache group-address 224.1.1.100
Router(config)# interface ethernet 0
Router(config-if)# ip wccp web-cache group-listen
```

Related Commands

Command	Description
ip multicast-routing	Enables IP multicast routing.
ip wccp	Enables support of the WCCP service for participation in a service group.
ip wccp redirect	Enables WCCP redirection on an interface.
ipv6 multicast-routing	Enables multicast routing.

ip wccp redirect

To enable packet redirection on an outbound or inbound interface using the Web Cache Communication Protocol (WCCP), use the **ip wccp redirect** command in interface configuration mode. To disable WCCP redirection, use the **no** form of this command.

ip wccp [**vrf** *vrf-name*] {**web-cache**| *service-number*} **redirect** {**in**| **out**}

no ip wccp [**vrf** *vrf-name*] {**web-cache**| *service-number*} **redirect** {**in**| **out**}

Syntax Description

vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding (VRF) instance to associate with a service group.
web-cache	Enables the web cache service.
service-number	Identification number of the cache engine service group controlled by a router; valid values are from 0 to 254. If Cisco cache engines are used in the cache cluster, the reverse proxy service is indicated by a value of 99.
in	Specifies packet redirection on an inbound interface.
out	Specifies packet redirection on an outbound interface.

Command Default   Redirection checking on the interface is disabled.

Command Modes   Interface configuration (config-if)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.0(11)S	The **in** keyword was added.
12.1(3)T	The **in** keyword was added.
12.2(17d)SXB	Support was added for the Cisco 7600 series router Supervisor Engine 2.
12.2(18)SXD1	Support was added for the Cisco 7600 series router Supervisor Engine 720.

Release	Modification
12.2(18)SXF	This command was enhanced to support the Cisco 7600 series router Supervisor Engine 32.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2. **Note** The **out** keyword is not supported in Cisco IOS XE Release 2.2.
15.0(1)M	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
12.2(33)SRE	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
Cisco IOS XE Release 3.1S	This command was modified. The **vrf** keyword and *vrf-name* argument were added. Support for the **out** keyword was added.
12.2(50)SY	This command was modified. The **vrf** keyword and *vrf-name* argument were added.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines   WCCP transparent caching bypasses Network Address Translation (NAT) when Cisco Express Forwarding switching is enabled. To work around this situation, configure WCCP transparent caching in the outgoing direction, enable Cisco Express Forwarding on the content engine interface, and specify the **ip wccp web-cache redirect out** command. Configure WCCP in the incoming direction on the inside interface by specifying the **ip wccp redirect exclude in** command on the router interface facing the cache. This prevents the redirection of any packets arriving on that interface.

You can also include a redirect list when configuring a service group. The specified redirect list will deny packets with a NAT (source) IP address and prevent redirection. Refer to the **ip wccp** command for configuration of the redirect list and service group.

The **ip wccp redirect in** command allows you to configure WCCP redirection on an interface receiving inbound network traffic. When the command is applied to an interface, all packets arriving at that interface will be compared against the criteria defined by the specified WCCP service. Packets that match the criteria will be redirected.

The **ip wccp redirect out** command allows you to configure the WCCP redirection check at an outbound interface.

🔎

Tip   Be careful not to confuse the **ip wccp redirect** {**out** | **in** } interface configuration command with the **ip wccp redirect exclude in** interface configuration command.

Note   This command can affect the **ip wccp redirect exclude in** command behavior. (These commands have opposite functions.) If you have the **ip wccp redirect exclude in** command set on an interface and you subsequently configure the **ip wccp redirect in** command, the **ip wccp redirect exclude in** command will be overridden. The opposite is also true: Configuring the **ip wccp redirect exclude in** command will override the **ip wccp redirect in** command.

Examples   In the following configuration, the multilink interface is configured to prevent the bypassing of NAT when Cisco Express Forwarding switching is enabled:

```
Router(config)# interface multilink2
Router(config-if)# ip address 10.21.21.1 255.255.255.0
Router(config-if)# ip access-group IDS_Multilink2_in_1 in
Router(config-if)# ip wccp web-cache redirect out
Router(config-if)# ip nat outside
Router(config-if)# ip inspect FSB-WALL out
Router(config-if)# max-reserved-bandwidth 100
Router(config-if)# service-policy output fsb-policy
Router(config-if)# no ip route-cache
Router(config-if)# load-interval 30
Router(config-if)# tx-ring-limit 3
Router(config-if)# tx-queue-limit 3
Router(config-if)# ids-service-module monitoring
Router(config-if)# ppp multilink
Router(config-if)# ppp multilink group 2
Router(config-if)# crypto map abc1
```

The following example shows how to configure a session in which reverse proxy packets on Ethernet interface 0 are being checked for redirection and redirected to a Cisco Cache Engine:

```
Router(config)# ip wccp 99
Router(config)# interface ethernet 0
Router(config-if)# ip wccp 99 redirect out
```

The following example shows how to configure a session in which HTTP traffic arriving on Ethernet interface 0/1 is redirected to a Cisco Cache Engine:

```
Router(config)# ip wccp web-cache
Router(config)# interface ethernet 0/1
Router(config-if)# ip wccp web-cache redirect in
```

Related Commands

Command	Description
ip wccp	Enables support of the specified WCCP service for participation in a service group.
ip wccp redirect exclude in	Enables redirection exclusion on an interface.
show ip interface	Displays the usability status of interfaces that are configured for IP.
show ip wccp	Displays the WCCP global configuration and statistics.

ip wccp redirect exclude in

To configure an interface to exclude packets received on an interface from being checked for redirection, use the **ip wccp redirect exclude in** command in interface configuration mode. To disable the ability of a router to exclude packets from redirection checks, use the **no** form of this command.

ip wccp redirect exclude in

no ip wccp redirect exclude in

Syntax Description   This command has no arguments or keywords.

Command Default   Redirection exclusion is disabled.

Command Modes   Interface configuration (config-if)

Command History

Release	Modification
12.0(3)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines   This configuration command instructs the interface to exclude inbound packets from any redirection check. Note that the command is global to all the services and should be applied to any inbound interface that will be excluded from redirection.

This command is intended to be used to accelerate the flow of packets from a cache engine to the Internet and to allow for the use of the WCCPv2 packet return feature.

Examples
In the following example, packets arriving on Ethernet interface 0 are excluded from all WCCP redirection checks:

```
Router(config)# interface ethernet 0
Router(config-if)# ip wccp redirect exclude in
```

Related Commands

Command	Description
ip wccp	Enables support of the WCCP service for participation in a service group.
ip wccp redirect out	Configures redirection on an interface in the outgoing direction.

ip wccp version

To specify the version of Web Cache Communication Protocol (WCCP), use the **ip wccp version** command in global configuration mode.

ip wccp version {**1**| **2**}

Syntax Description

1	Specifies Web Cache Communication Protocol Version 1 (WCCPv1).
2	Specifies Web Cache Communication Protocol Version 2 (WCCPv2).

Command Default WCCPv2 is enabled.

Command Modes Global configuration (config)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2. Only WCCP version 2 is supported in Cisco IOS XE Release 2.2.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines Configuring this command does not have any impact on Cisco ASR 1000 Series Aggregation Services Routers because these routers support only WCCPv2. WCCPv2 is enabled by default on Cisco ASR 1000 Series Aggregation Services Routers when a service group is configured or a service group is attached to an interface.

Examples In the following example, the user changes the WCCP version from the default of WCCPv2 to WCCPv1:

```
Router(config)# ip wccp version 1
```

```
Router# show ip wccp
% WCCP version 2 is not enabled
```

Related Commands

Command	Description
ip wccp	Enables support of the WCCP service for participation in a service group.
show ip wccp	Displays the WCCP global configuration and statistics.

sctp through show ip sctp statistics

-

show debugging

To display information about the types of debugging that are enabled for your router, use the **show debugging** command in privileged EXEC mode.

show debugging

Syntax Description   This command has no arguments or keywords.

Command Modes   Privileged EXEC (#)

Command History

Release	Modification
11.1	This command was introduced.
12.3(7)T	The output of this command was enhanced to show TCP Explicit Congestion Notification (ECN) configuration.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.4(20)T	The output of this command was enhanced to show the user-group debugging configuration.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Examples   The following is sample output from the **show debugging** command. In this example, the remote host is not configured or connected.

```
Router# show debugging
!
TCP:
  TCP Packet debugging is on
  TCP ECN debugging is on
!
Router# telnet 10.1.25.234
!
Trying 10.1.25.234 ...
!
00:02:48: 10.1.25.31:11001 <---> 10.1.25.234:23 out ECN-setup SYN
00:02:48: tcp0: O CLOSED 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:02:50: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:02:50: cwnd from 1460 to 1460, ssthresh from 65535 to 2920
```

```
00:02:50: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:02:54: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:02:54: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:02:54: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:03:02: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:02: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:02: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 ECE CWR SYN  WIN 4128
00:03:18: 10.1.25.31:11001 <---> 10.1.25.234:23 SYN with ECN disabled
00:03:18: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:18: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:18: tcp0: O SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:20: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:20: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:20: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:24: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:24: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:24: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
00:03:32: 10.1.25.31:11001 <---> 10.1.25.234:23 congestion window changes
00:03:32: cwnd from 1460 to 1460, ssthresh from 2920 to 2920
00:03:32: tcp0: R SYNSENT 10.1.25.234:11001 10.1.25.31:23 seq 1922220018
        OPTS 4 SYN  WIN 4128
!Connection timed out; remote host not responding
```

The following is sample output from the **show debugging** command when user-group debugging is configured:

```
Router# show debugging
!
usergroup:
 Usergroup Deletions debugging is on
 Usergroup Additions debugging is on
 Usergroup Database debugging is on
 Usergroup API debugging is on
!
```

The following is sample output from the **show debugging** command when SNAP debugging is configured:

```
Router# show debugging
Persistent variable debugging is currently All
SNAP Server Debugging ON
SNAP Client Debugging ON
Router#
```

The table below describes the significant fields in the output.

Table 1: show debugging Field Descriptions

Field	Description
OPTS 4	Bytes of TCP expressed as a number. In this case, the bytes are 4.
ECE	Echo congestion experience.
CWR	Congestion window reduced.
SYN	Synchronize connections--Request to synchronize sequence numbers, used when a TCP connection is being opened.

Field	Description
WIN 4128	Advertised window size, in bytes. In this case, the bytes are 4128.
cwnd	Congestion window (cwnd)--Indicates that the window size has changed.
ssthresh	Slow-start threshold (ssthresh)--Variable used by TCP to determine whether or not to use slow-start or congestion avoidance.
usergroup	Statically defined usergroup to which source IP addresses are associated.

show ip sockets through show sockets

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show ip wccp

To display the IPv4 Web Cache Communication Protocol (WCCP) global configuration and statistics, use the **show ip wccp** command in user EXEC or privileged EXEC mode.

show ip wccp [**all**] [**capabilities**] [**summary**] [**interfaces** [**cef**| **counts**| **detail**]] [**vrf** *vrf-name*] [{**web-cache**| *service-number*} [**assignment**] [**clients**] [**counters**] [**detail**] [**service**] [**view**]]

Syntax Description

all	(Optional) Displays statistics for all known services.
capabilities	(Optional) Displays WCCP platform capabilities information.
summary	(Optional) Displays a summary of WCCP services.
interfaces	(Optional) Displays WCCP redirect interfaces.
cef	(Optional) Displays Cisco Express Forwarding interface statistics, including the number of input, output, dynamic, static, and multicast services.
counts	(Optional) Displays WCCP interface count statistics, including the number of Cisco Express Forwarding and process-switched output and input packets redirected.
detail	(Optional) Displays WCCP interface configuration statistics, including the number of input, output, dynamic, static, and multicast services.
vrf *vrf-name*	(Optional) Specifies a virtual routing and forwarding (VRF) instance associated with a service group to display.
web-cache	(Optional) Displays statistics for the web cache service.
service-number	(Optional) Identification number of the web cache service group being controlled by the cache. The number can be from 0 to 254. For web caches using Cisco cache engines, the reverse proxy service is indicated by a value of 99.
assignment	(Optional) Displays service group assignment information.

clients	(Optional) Displays detailed information about the clients of a service, including all per-client information. No per-service information is displayed.
counters	(Optional) Displays traffic counters.
detail	(Optional) Displays detailed information about the clients of a service, including all per-client information. No per-service information is displayed. Assignment information is also displayed.
service	(Optional) Displays detailed information about a service, including the service definition and all other per-service information.
view	(Optional) Displays other members of a particular service group, or all service groups, that have or have not been detected.

Command Modes User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
11.1CA	This command was introduced for Cisco 7200 and 7500 platforms.
11.2P	Support for this command was added to a variety of Cisco platforms.
12.0(3)T	The **detail** and **view** keywords were added.
12.3(7)T	The output was enhanced to display the bypass counters (process and Cisco Express Forwarding) when WCCP is enabled.
12.2(14)SX	Support for this command was added for the Supervisor Engine 720.
12.2(17d)SXB	Support for this command was added for the Supervisor Engine 2.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(14)T	The output was enhanced to display the maximum number of service groups.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	This command was enhanced to display information about the WCCP service mode.

Release	Modification
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
15.0(1)M	This command was modified. The **summary** keyword and the **vrf** *vrf-name* keyword and argument pair were added.
12.2(33)SRE	This command was modified. The **summary** keyword and the **vrf** *vrf-name* keyword and argument pair were added.
Cisco IOS XE Release 3.1S	This command was modified. The following keywords and arguments were added: **all**, **assignment**, **capabilities**, **clients**, **counters**, **full**, **id** *ip-address*, **service**, **summary**, and **vrf** *vrf-name*. The output was modified to display information about the WCCP client timeout interval and the redirect assignment timeout.
12.2(50)SY	This command was modified. The **summary** keyword and the **vrf** *vrf-name* keyword and argument pair were added.
15.2(3)T	This command was integrated into Cisco IOS Release 15.2(3)T.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

Use the **clear ip wccp** command to reset all WCCP counters.

Use the **show ip wccp** *service-number* **detail** command to display information about the WCCP client timeout interval and the redirect assignment timeout interval if those intervals are not set to their default value of 10 seconds.

Use the **show ip wccp summary** command to display the configured WCCP services and a summary of their current state.

On Cisco ASR 1000 Series Aggregation Services Routers, nonzero values can only be seen for platform-specific counters because Cisco ASR 1000 Series Routers implement all redirection in hardware. Configuring the **counters** keyword also displays counters received in hardware.

Examples

This section contains examples and field descriptions for the following forms of this command:

- **show ip wccp** *service-number* (service mode displayed)
- **show ip wccp** *service-number* **view**
- **show ip wccp** *service-number* **detail**
- **show ip wccp** *service-number* **clients**

- **show ip wccp interfaces**

- **show ip wccp web-cache**

- **show ip wccp web-cache counters**

- **show ip wccp web-cache detail**

- **show ip wccp web-cache detail** (bypass counters displayed)

- **show ip wccp web-cache clients**

- **show ip wccp web-cache service**

- **show ip wccp summary**

Examples

The following is sample output from the **show ip wccp** *service-number* command:

```
Router# show ip wccp 90

Global WCCP information:
    Router information:
        Router Identifier:                  209.165.200.225

    Service Identifier: 90
        Protocol Version:                   2.00
        Number of Service Group Clients:    2
        Number of Service Group Routers:    1
        Total Packets Redirected:           0
          Process:                          0
          CEF:                              0
        Service mode:                       Open
        Service Access-list:                -none-
        Total Packets Dropped Closed:       0
        Redirect access-list:               -none-
        Total Packets Denied Redirect:      0
        Total Packets Unassigned:           0
        Group access-list:                  -none-
        Total Messages Denied to Group:     0
        Total Authentication failures:      0
        Total GRE Bypassed Packets Received: 0
          Process:                          0
          CEF:                              0
```

The table below describes the significant fields shown in the display.

Table 2: show ip wccp service-number Field Descriptions

Field	Description
Router information	A list of routers detected by the current router.
Protocol Version	The version of WCCP being used by the router in the service group.
Service Identifier	Indicates which service is detailed.
Number of Service Group Clients	The number of clients that are visible to the router and other clients in the service group.

Field	Description
Number of Service Group Routers	The number of routers in the service group.
Total Packets Redirected	Total number of packets redirected by the router.
Service mode	Identifies the WCCP service mode. Options are Open or Closed.
Service Access-list	A named extended IP access list that defines the packets that will match the service.
Total Packets Dropped Closed	Total number of packets that were dropped when WCCP is configured for closed services and an intermediary device is not available to process the service.
Redirect access-list	The name or number of the access list that determines which packets will be redirected.
Total Packets Denied Redirect	Total number of packets that were not redirected because they did not match the access list.
Total Packets Unassigned	Number of packets that were not redirected because they were not assigned to any cache engine. Packets may not be assigned during initial discovery of cache engines or when a cache is dropped from a cluster.
Group access-list	Indicates which cache engine is allowed to connect to the router.
Total Messages Denied to Group	Indicates the number of packets denied by the *group-list* access list.
Total Authentication failures	The number of instances where a password did not match.
Total GRE Bypassed Packets Received	The number of generic routing encapsulation (GRE) packets that have been bypassed. Process and Cisco Express Forwarding are switching paths within Cisco IOS software.

Examples   The following is sample output from the **show ip wccp** *service-number* **view** command for service group 1:

```
Router# show ip wccp 90 view

WCCP Routers Informed of:
 209.165.200.225
 209.165.200.226
WCCP Clients Visible
```

```
 209.165.200.227
 209.165.200.228
WCCP Clients Not Visible:
 -none-
```

Note The number of maximum service groups that can be configured is 256.

If any web cache is displayed under the WCCP Cache Engines Not Visible field, the router needs to be reconfigured to map the web cache that is not visible to it.

The table below describes the significant fields shown in the display.

Table 3: show ip wccp service-number view Field Descriptions

Field	Description
WCCP Router Informed of	A list of routers detected by the current router.
WCCP Clients Visible	A list of clients that are visible to the router and other clients in the service group.
WCCP Clients Not Visible	A list of clients in the service group that are not visible to the router and other clients in the service group.

Examples The following example displays WCCP client information and WCCP router statistics that include the type of services:

```
Router# show ip wccp 91 detail

WCCP Client information:
 WCCP Client ID: 209.165.200.226
 Protocol Version: 2.0
 State:                 Usable
        Redirection:           L2
        Packet Return:         L2
        Assignment:            MASK
        Connect Time:          6d20h
        Redirected Packets:
          Process:             0
          CEF:                 0
        GRE Bypassed Packets:
          Process:             0
          CEF:                 0
        Mask Allotment:        32 of 64 (50.00%)
        Assigned masks/values: 1/32

        Mask  SrcAddr    DstAddr    SrcPort DstPort
        ----  -------    -------    ------- -------
        0000: 0x00000000 0x00001741 0x0000  0x0000

        Value SrcAddr    DstAddr    SrcPort DstPort
        ----- -------    -------    ------- -------
        0000: 0x00000000 0x00000001 0x0000  0x0000
        0001: 0x00000000 0x00000041 0x0000  0x0000
        0002: 0x00000000 0x00000101 0x0000  0x0000
        0003: 0x00000000 0x00000141 0x0000  0x0000
        0004: 0x00000000 0x00000201 0x0000  0x0000
        0005: 0x00000000 0x00000241 0x0000  0x0000
```

```
            0006: 0x00000000 0x00000301 0x0000  0x0000
            0007: 0x00000000 0x00000341 0x0000  0x0000
            0008: 0x00000000 0x00000401 0x0000  0x0000
            0009: 0x00000000 0x00000441 0x0000  0x0000
            0010: 0x00000000 0x00000501 0x0000  0x0000
            0011: 0x00000000 0x00000541 0x0000  0x0000
            0012: 0x00000000 0x00000601 0x0000  0x0000
            0013: 0x00000000 0x00000641 0x0000  0x0000
            0014: 0x00000000 0x00000701 0x0000  0x0000
            0015: 0x00000000 0x00000741 0x0000  0x0000
            0016: 0x00000000 0x00001001 0x0000  0x0000
            0017: 0x00000000 0x00001041 0x0000  0x0000
            0018: 0x00000000 0x00001101 0x0000  0x0000
            0019: 0x00000000 0x00001141 0x0000  0x0000
            0020: 0x00000000 0x00001201 0x0000  0x0000
            0021: 0x00000000 0x00001241 0x0000  0x0000
            0022: 0x00000000 0x00001301 0x0000  0x0000
            0023: 0x00000000 0x00001341 0x0000  0x0000
            0024: 0x00000000 0x00001401 0x0000  0x0000
            0025: 0x00000000 0x00001441 0x0000  0x0000
            0026: 0x00000000 0x00001501 0x0000  0x0000
            0027: 0x00000000 0x00001541 0x0000  0x0000
            0028: 0x00000000 0x00001601 0x0000  0x0000
            0029: 0x00000000 0x00001641 0x0000  0x0000
            0030: 0x00000000 0x00001701 0x0000  0x0000
            0031: 0x00000000 0x00001741 0x0000  0x0000


            WCCP Client ID:          192.0.2.11
            Protocol Version:        2.01
            State:                   Usable
            Redirection:             L2
            Packet Return:           L2
            Assignment:              MASK
            Connect Time:            6d20h
            Redirected Packets:
              Process:               0
              CEF:                   0
            GRE Bypassed Packets:
              Process:               0
              CEF:                   0
            Mask Allotment:          32 of 64 (50.00%)
            Assigned masks/values:   1/32

            Mask  SrcAddr    DstAddr    SrcPort DstPort
            ----  -------    -------    ------- -------
            0000: 0x00000000 0x00001741 0x0000  0x0000

            Value SrcAddr    DstAddr    SrcPort DstPort
            ----- -------    -------    ------- -------
            0000: 0x00000000 0x00000000 0x0000  0x0000
            0001: 0x00000000 0x00000040 0x0000  0x0000
            0002: 0x00000000 0x00000100 0x0000  0x0000
            0003: 0x00000000 0x00000140 0x0000  0x0000
            0004: 0x00000000 0x00000200 0x0000  0x0000
            0005: 0x00000000 0x00000240 0x0000  0x0000
            0006: 0x00000000 0x00000300 0x0000  0x0000
            0007: 0x00000000 0x00000340 0x0000  0x0000
            0008: 0x00000000 0x00000400 0x0000  0x0000
            0009: 0x00000000 0x00000440 0x0000  0x0000
            0010: 0x00000000 0x00000500 0x0000  0x0000
            0011: 0x00000000 0x00000540 0x0000  0x0000
            0012: 0x00000000 0x00000600 0x0000  0x0000
            0013: 0x00000000 0x00000640 0x0000  0x0000
            0014: 0x00000000 0x00000700 0x0000  0x0000
            0015: 0x00000000 0x00000740 0x0000  0x0000
            0016: 0x00000000 0x00001000 0x0000  0x0000
            0017: 0x00000000 0x00001040 0x0000  0x0000
            0018: 0x00000000 0x00001100 0x0000  0x0000
            0019: 0x00000000 0x00001140 0x0000  0x0000
            0020: 0x00000000 0x00001200 0x0000  0x0000
            0021: 0x00000000 0x00001240 0x0000  0x0000
            0022: 0x00000000 0x00001300 0x0000  0x0000
```

```
0023: 0x00000000 0x00001340 0x0000  0x0000
0024: 0x00000000 0x00001400 0x0000  0x0000
0025: 0x00000000 0x00001440 0x0000  0x0000
0026: 0x00000000 0x00001500 0x0000  0x0000
0027: 0x00000000 0x00001540 0x0000  0x0000
0028: 0x00000000 0x00001600 0x0000  0x0000
0029: 0x00000000 0x00001640 0x0000  0x0000
0030: 0x00000000 0x00001700 0x0000  0x0000
0031: 0x00000000 0x00001740 0x0000  0x0000
```

The table below describes the significant fields shown in the display.

Table 4: show ip wccp service-number detail Field Descriptions

Field	Description
Protocol Version	Indicates whether WCCPv1 or WCCPv2 is enabled.
State	Indicates whether the WCCP client is operating properly and can be contacted by a router and other clients in the service group. When a WCCP client has an incompatible message interval setting, the state of the client is shown as "NOT Usable," followed by a status message describing the reason why the client is not usable.
Redirection	Indicates the redirection method used. WCCP uses GRE or L2 to redirect IP traffic.
Assignment	Indicates the load-balancing method used. WCCP uses HASH or MASK assignment.
Connect Time	The amount of time the client has been connected to the router.
Redirected Packets	The number of packets that have been redirected to the content engine.

Examples

The following example displays WCCP client information and WCCP router statistics that include the type of services:

```
Router# show ip wccp 91 clients

WCCP Client information:
 WCCP Client ID: 10.1.1.14
 Protocol Version: 2.0
 State:                 Usable
      Redirection:          L2
      Packet Return:        L2
      Assignment:           MASK
      Connect Time:         6d20h
      Redirected Packets:
        Process:            0
        CEF:                0
      GRE Bypassed Packets:
        Process:            0
        CEF:                0
```

```
                   Mask Allotment:        32 of 64 (50.00%)

                   WCCP Client ID:        192.0.2.11
                   Protocol Version:      2.01
                   State:                 Usable
                   Redirection:           L2
                   Packet Return:         L2
                   Assignment:            MASK
                   Connect Time:          6d20h
                   Redirected Packets:
                     Process:             0
                     CEF:                 0
                   GRE Bypassed Packets:
                     Process:             0
                     CEF:                 0
                   Mask Allotment:        32 of 64 (50.00%)
```

The table below describes the significant fields shown in the display.

Table 5: show ip wccp service-number clients Field Descriptions

Field	Description
Protocol Version	Indicates whether WCCPv1 or WCCPv2 is enabled.
State	Indicates whether the WCCP client is operating properly and can be contacted by a router and other clients in the service group.
	When a WCCP client has an incompatible message interval setting, the state of the client is shown as "NOT Usable," followed by a status message describing the reason why the client is not usable.
Redirection	Indicates the redirection method used. WCCP uses GRE or L2 to redirect IP traffic.
Assignment	Indicates the load-balancing method used. WCCP uses HASH or MASK assignment.
Connect Time	The amount of time (in seconds) the client has been connected to the router.
Redirected Packets	The number of packets that have been redirected to the content engine.

Examples   The following is sample output from the **show ip wccp interfaces** command:

```
Router# show ip wccp interfaces

IPv4 WCCP interface configuration:
    FastEthernet2/1
        Output services: 0
        Input services:  1
        Mcast services:  0
        Exclude In:      FALSE
```

The table below describes the significant fields shown in the display.

Table 6: show ip wccp interfaces Field Descriptions

Field	Description
Output services	Indicates the number of output services configured on the interface.
Input services	Indicates the number of input services configured on the interface.
Mcast services	Indicates the number of multicast services configured on the interface.
Exclude In	Displays whether traffic on the interface is excluded from redirection.

Examples

The following is sample output from the **show ip wccp web-cache** command:

```
Router# show ip wccp web-cache

Global WCCP information:
    Router information:
        Router Identifier:                  209.165.200.225

    Service Identifier: web-cache
        Protocol Version:                   2.00
        Number of Service Group Clients:    2
        Number of Service Group Routers:    1
        Total Packets Redirected:           0
          Process:                          0
          CEF:                              0
        Service mode:                       Open
        Service Access-list:                -none-
        Total Packets Dropped Closed:       0
        Redirect access-list:               -none-
        Total Packets Denied Redirect:      0
        Total Packets Unassigned:           0
        Group access-list:                  -none-
        Total Messages Denied to Group:     0
        Total Authentication failures:      0
        Total GRE Bypassed Packets Received: 0
          Process:                          0
          CEF:                              0
        GRE tunnel interface:               Tunnel0
```

The table below describes the significant fields shown in the display.

Table 7: show ip wccp web-cache Field Descriptions

Field	Description
Service Identifier	Indicates which service is detailed.
Protocol Version	Indicates whether WCCPv1 or WCCPv2 is enabled.

Field	Description
Number of Service Group Clients	Number of clients using the router as their home router.
Number of Service Group Routers	The number of routers in the service group.
Total Packets Redirected	Total number of packets redirected by the router.
Service mode	Indicates whether WCCP open or closed mode is configured.
Service Access-list	The name or number of the service access list that determines which packets will be redirected.
Redirect access-list	The name or number of the access list that determines which packets will be redirected.
Total Packets Denied Redirect	Total number of packets that were not redirected because they did not match the access list.
Total Packets Unassigned	Number of packets that were not redirected because they were not assigned to any cache engine. Packets may not be assigned during initial discovery of cache engines or when a cache is dropped from a cluster.
Group access-list	Indicates which cache engine is allowed to connect to the router.
Total Messages Denied to Group	Indicates the number of packets denied by the *group-list* access list.
Total Authentication failures	The number of instances where a password did not match.

Examples

The following example displays web cache engine information and WCCP traffic counters:

```
Router# show ip wccp web-cache counters

WCCP Service Group Counters:
  Redirected Packets:
    Process:                    0
    CEF:                        0
  Non-Redirected Packets:
    Action - Forward:
      Reason - no assignment:
        Process:                0
        CEF:                    0
    Action - Ignore (forward):
      Reason - redir ACL check:
        Process:                0
        CEF:                    0
    Action - Discard:
```

```
          Reason - closed services:
              Process:              0
              CEF:                  0
      GRE Bypassed Packets:
        Process:                    0
      CEF:                          0
      GRE Bypassed Packet Errors:
        Total Errors:
          Process:                  0
          CEF:                      0

      WCCP Client Counters:
        WCCP Client ID:           192.0.2.12
          Redirected Packets:
            Process:                0
            CEF:                    0
          GRE Bypassed Packets:
            Process:                0
            CEF:                    0

        WCCP Client ID:           192.0.2.11
          Redirected Packets:
            Process:                0
            CEF:                    0
          GRE Bypassed Packets:
            Process:                0
            CEF:                    0
```

The table below describes the significant fields shown in the display.

Table 8: show ip wccp web-cache counters Field Descriptions

Field	Description
Redirected Packets	Total number of packets redirected by the router.
Non-Redirected Packets	Total number of packets not redirected by the router.

Examples   The following example displays web cache engine information and WCCP router statistics for the web cache service:

```
Router# show ip wccp web-cache detail

WCCP Client information:
        WCCP Client ID:           209.165.200.225
        Protocol Version:         2.0
        State:                    Usable
        Redirection:              GRE
        Packet Return:            GRE
        Assignment:               HASH
        Connect Time:             1w5d
        Redirected Packets:
          Process:                0
          CEF:                    0
        GRE Bypassed Packets:
          Process:                0
          CEF:                    0
        Hash Allotment:           128 of 256 (50.00%)
        Initial Hash Info:        00000000000000000000000000000000
                                  00000000000000000000000000000000
        Assigned Hash Info:       AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
                                  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

        WCCP Client ID:           192.0.2.11
        Protocol Version:         2.01
```

```
State:                  Usable
Redirection:            GRE
Packet Return:          GRE
Assignment:             HASH
Connect Time:           1w5d
Redirected Packets:
  Process:              0
  CEF:                  0
GRE Bypassed Packets:
  Process:              0
  CEF:                  0
Hash Allotment:         128 of 256 (50.00%)
Initial Hash Info:      0000000000000000000000000000000
                        0000000000000000000000000000000
Assigned Hash Info:     5555555555555555555555555555555
                        5555555555555555555555555555555
```

The table below describes the significant fields shown in the display.

Table 9: show ip wccp web-cache detail Field Descriptions

Field	Description
WCCP Client Information	The header for the area that contains fields for information on clients.
Protocol Version	The version of WCCP being used by the cache engine in the service group.
State	Indicates whether the cache engine is operating properly and can be contacted by a router and other cache engines in the service group.
Connect Time	The amount of time the cache engine has been connected to the router.
Redirected Packets	The number of packets that have been redirected to the cache engine.

Examples

The following example displays web cache engine information and WCCP router statistics that include the bypass counters:

```
Router# show ip wccp web-cache detail

WCCP Client information:
        WCCP Client ID:         209.165.200.225
        Protocol Version:       2.01
        State:                  Usable
        Redirection:            GRE
        Packet Return:          GRE
        Assignment:             HASH
        Connect Time:           1w5d
        Redirected Packets:
          Process:              0
          CEF:                  0
        GRE Bypassed Packets:
          Process:              0
          CEF:                  0
        Hash Allotment:         128 of 256 (50.00%)
        Initial Hash Info:      0000000000000000000000000000000
```

```
                                     00000000000000000000000000000000
          Assigned Hash Info:        AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
                                     AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

          WCCP Client ID:            209.165.200.226
          Protocol Version:          2.01
          State:                     Usable
          Redirection:               GRE
          Packet Return:             GRE
          Assignment:                HASH
          Connect Time:              1w5d
          Redirected Packets:
            Process:                 0
            CEF:                     0
          GRE Bypassed Packets:
            Process:                 0
            CEF:                     0
          Hash Allotment:            128 of 256 (50.00%)
          Initial Hash Info:         00000000000000000000000000000000
                                     00000000000000000000000000000000
          Assigned Hash Info:        55555555555555555555555555555555
                                     55555555555555555555555555555555
```

The table below describes the significant fields shown in the display.

Table 10: show ip wccp web-cache detail Field Descriptions

Field	Description
WCCP Client Information	The header for the area that contains fields for information on clients.
Protocol Version	The version of WCCP that is being used by the router in the service group.
State	Indicates whether the cache engine is operating properly and can be contacted by a router and other cache engines in the service group.
Connect Time	The amount of time the cache engine has been connected to the router.
Hash Allotment	The percent of buckets assigned to the current cache engine. Both a value and a percent figure are displayed.
Initial Hash Info	The initial state of the hash bucket assignment.
Assigned Hash Info	The current state of the hash bucket assignment.
Redirected Packets	The number of packets that have been redirected to the cache engine.
GRE Bypassed Packets	The number of packets that have been bypassed. Process and Cisco Express Forwarding are switching paths within Cisco IOS software.

Examples

The following example displays information about a service, including the service definition and all other per-service information:

```
Router# show ip wccp web-cache service

WCCP service information definition:
        Type:           Standard
        Id:             0
        Priority:       240
        Protocol:       6
        Flags:          0x00000512
          Hash:         DstIP
          Alt Hash:     SrcIP SrcPort
          Ports used:   Destination
        Ports:          80
```

Examples

The following example displays information about the configured WCCP services and a summary of their current state:

```
Router# show ip wccp summary

WCCP version 2 enabled, 2 services
Service     Clients   Routers   Assign      Redirect   Bypass
-------     -------   -------   ------      --------   ------
Default routing table (Router Id: 209.165.200.225):
web-cache   2         1         HASH        GRE        GRE
90          0         0         HASH/MASK   GRE/L2     GRE/L2
```

The table below describes the significant fields shown in the display.

Table 11: show ip wccp summary Field Descriptions

Field	Description
Service	Indicates which service is detailed.
Clients	Indicates the number of cache engines participating in the WCCP service.
Routers	Indicates the number of routers participating in the WCCP service.
Assign	Indicates the load-balancing method used. WCCP uses HASH or MASK assignment.
Redirect	Indicates the redirection method used. WCCP uses GRE or L2 to redirect IP traffic.
Bypass	Indicates the bypass method used. WCCP uses GRE or L2 to return packets to the router.

Related Commands

Command	Description
clear ip wccp	Clears the counter for packets redirected using WCCP.
ip wccp	Enables support of the WCCP service for participation in a service group.
ip wccp redirect	Enables packet redirection on an outbound or inbound interface using WCCP.
show ip interface	Lists a summary of the IP information and status of an interface.
show ip wccp global counters	Displays global WCCP information for packets that are processed in software.
show ip wccp *service-number* **detail**	Displays information about the WCCP client timeout interval and the redirect assignment timeout interval if those intervals are not set to their default value of 10 seconds.
show ip wccp summary	Displays the configured WCCP services and a summary of their current state.
show platform software wccp	Displays global statistics related to WCCP on Cisco ASR 1000 Series Aggregation Services Routers.

show ip wccp

show tcp through start-forwarding agent

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show track

To display information about objects that are tracked by the tracking process, use the **show track** command in privileged EXEC mode.

show track [*object-number* **[brief]**| **interface [brief]**| **ip sla[brief]**| **timer**]

Syntax Description

object-number	(Optional) Object number that represents the object to be tracked. The range is from 1 to 1000.
brief	(Optional) Displays a single line of information related to the preceding argument or keyword.
interface	(Optional) Displays tracked interface objects.
resolution	(Optional) Displays resolution of tracked parameters.
timers	(Optional) Displays polling interval timers.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.3(8)T	The output was enhanced to include the track-list objects.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.4(2)T	The output was enhanced to display stub objects.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(9)T	This command was enhanced to display information about the status of an interface when carrier-delay detection has been enabled.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
12.4(20)T	The output was enhanced to display IP SLAs information.

Release	Modification
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.
15.3(3)S	This command was modified. The output was enhanced to display IPv6 route information.
XE 3.10S	This command was modified. The output was enhanced to display IPv6 route information.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines
Use this command to display information about objects that are tracked by the tracking process. When no arguments or keywords are specified, information for all objects is displayed.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S, and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a device is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

Examples
The following example shows information about the state of IP routing on the interface that is being tracked:

```
Device# show track 1

Track 1
 Interface Ethernet0/2 ip routing
 IP routing is Down (no IP addr)
  1 change, last change 00:01:08
 Tracked by:
  HSRP Ethernet0/3 1
```
The following example shows information about the line-protocol state on the interface that is being tracked:

```
Device# show track 1

Track 1
 Interface Ethernet0/1 line-protocol
 Line protocol is Up
  1 change, last change 00:00:05
 Tracked by:
  HSRP Ethernet0/3 1
```
The following example shows information about the reachability of a route that is being tracked:

```
Device# show track 1

Track 1
 IP route 10.16.0.0 255.255.0.0 reachability
```

```
 Reachability is Up (RIP)
  1 change, last change 00:02:04
 First-hop interface is Ethernet0/1
 Tracked by:
  HSRP Ethernet0/3 1
```

The following example shows information about the threshold metric of a route that is being tracked:

```
Device# show track 1

Track 1
 IP route 10.16.0.0 255.255.0.0 metric threshold
 Metric threshold is Up (RIP/6/102)
  1 change, last change 00:00:08
 Metric threshold down 255 up 254
 First-hop interface is Ethernet0/1
 Tracked by:
  HSRP Ethernet0/3 1
```

The following example shows the object type, the interval in which it is polled, and the time until the next poll:

```
Device# show track timer

Object type    Poll Interval  Time to next poll
interface           1               0.844
ip route           15              expired
ip sla              5              expired
ipv6 route         15              expired
application         5               2.944
list              0.500            0.88
stub                1              expired
```

The following example shows the state of the IP SLAs tracking:

```
Device# show track 50

Track 50
  IP SLA 400 state
  State is Up
    1 change, last change 00:00:23
  Delay up 60 secs, down 30 secs
  Latest operation return code: Unknown
```

The following example shows whether a route is reachable:

```
Device# show track 3

Track 3
  IP SLA 1 reachability
  Reachability is Up
    1 change, last change 00:00:47
  Latest operation return code: over threshold
  Latest RTT (millisecs) 4
  Tracked by:
    HSRP Ethernet0/1 3
```

The table below describes the significant fields shown in the displays.

Table 12: show track Field Descriptions

Field	Description
Track	Object number that is being tracked.
Interface Ethernet0/2 ip routing	Interface type, interface number, and object that is being tracked.

Field	Description
IP routing is	State value of the object, displayed as Up or Down. If the object is down, the reason is displayed.
1 change, last change	Number of times that the state of a tracked object has changed and the time (in *hh:mm:ss*) since the last change.
Tracked by	Client process that is tracking the object.
First-hop interface is	Displays the first-hop interface.
Object type	Object type that is being tracked.
Poll Interval	Interval (in seconds) in which the tracking process polls the object.
Time to next poll	Period of time, in seconds, until the next polling of the object.

The following output shows that there are two objects. Object 1 has been configured with a weight of 10 "down," and object 2 has been configured with a weight of 20 "up." Object 1 is down (expressed as 0/10) and object 2 is up. The total weight of the tracked list is 20 with a maximum of 30 (expressed as 20/30). The "up" threshold is 20, so the list is "up."

```
Device# show track

Track 6
 List threshold weight
  Threshold weight is Up (20/30)
   1 change, last change 00:00:08
   object 1 Down (0/10)
   object 2 weight 20 Up (20/30)
  Threshold weight down 10 up 20
   Tracked by:
    HSRP Ethernet0/3 1
```
The following example shows information about the Boolean configuration:

```
Device# show track

Track 3
 List boolean and
 Boolean AND is Down
  1 change, last change 00:00:08
   object 1 not Up
   object 2 Down
 Tracked by:
  HSRP Ethernet0/3 1
```
The table below describes the significant fields shown in the displays.

Table 13: show track Field Descriptions

Field	Description
Track	Object number that is being tracked.
Boolean AND is Down	Each object defined in the list must be in a down state.
1 change, last change	Number of times that the state of a tracked object has changed and the time (in *hh:mm:ss*) since the last change.
Tracked by	Client process that is tracking the object; in this case, HSRP.

The following example shows information about a stub object that has been created to be tracked using Embedded Event Manager (EEM):

```
Device# show track

Track 1
  Stub-object
  State is Up
    1 change, last change 00:00:04, by Undefined
```
The following example shows information about a stub object when the **brief** keyword is used:

```
Device# show track brief

Track   Object                           Parameter        Value Last Change
1       Stub-object Undefined                              Up    00:00:12
```
The following example shows information about the line-protocol state on an interface that is being tracked and which has carrier-delay detection enabled:

```
Device# show track

Track 101
Interface Ethernet1/0 line-protocol
Line protocol is Down (carrier-delay)
1 change, last change 00:00:03
```
The table below describes the significant fields shown in the displays.

Table 14: show track brief Field Descriptions

Field	Description
Track	Object number that is being tracked.
Interface Ethernet1/0 line-protocol	Interface type, interface number, and object that is being tracked.
Line protocol is Down (carrier-delay)	State of the interface with the carrier-delay parameter taken into consideration.

Field	Description
last change	Time (in *hh:mm:ss*) since the state of a tracked object last changed.

The table below describes the significant fields shown in the displays.

Table 15: show track brief Field Descriptions

Field	Description
Track	Object number that is being tracked.
Object	Definition of stub object.
Parameter	Tracking parameters.
Value	State value of the object, displayed as Up or Down.
last change	Time (in *hh:mm:ss*) since the state of a tracked object last changed.

The following example shows sample output with respect to IPv6 routing:

```
Router# show track
Track 107
  Interface Ethernet0/0 ipv6 routing
  IPv6 routing is Down (ipv6 interface disabled)
    1 change, last change 00:03:53
  Delay up 70 secs
Track 108
  Interface Ethernet0/0 ipv6 routing
  IPv6 routing is Down (ipv6 interface disabled)
    1 change, last change 00:03:53
  Delay up 10 secs, down 30 secs
Track 111
  Interface Ethernet0/1 line-protocol
  Line protocol is Up
    1 change, last change 00:14:17
Track 601
  IPv6 route 2001:DB8::EEEE/64 metric threshold
  Metric threshold is Down (no ipv6 route)
    1 change, last change 00:10:21
  Metric threshold down 255 up 254
  First-hop interface is unknown
Track 607
  IPv6 route 2001:DB8::FFFF/64 metric threshold
  Metric threshold is Down (no ipv6 route)
    1 change, last change 00:10:21
  Metric threshold down 255 up 254
  First-hop interface is unknown
Track 608
  IPv6 route 2001:DB8::FFFF:AD45/64 metric threshold
  Metric threshold is Down (no ipv6 route)
    1 change, last change 00:10:21
  Metric threshold down 140 up 120
  First-hop interface is unknown
Track 612
  IPv6 route 2001:DB8:0000::FFFF/64 reachability
  Reachability is Down (no ipv6 route)
```

```
     1 change, last change 00:10:14
  Delay up 30 secs, down 20 secs
  First-hop interface is unknown
```

The following example shows sample output with respect to IPv6 routing in brief format:

```
Router# show track
Track Object                               Parameter          Value  Last Change
1     application                          home-agent         Up     00:14:25
101   interface    Ethernet0/0            ip routing         Up     00:14:25
107   interface    Ethernet0/0            ipv6 routing       Down   00:04:01
108   interface    Ethernet0/0            ipv6 routing       Down   00:04:01
111   interface    Ethernet0/1            line-protocol      Up     00:14:25
201   ip route     11.0.0.1/8            metric threshold   Down   00:14:25
211   ip route     21.0.0.1/8            reachability       Down   00:14:25
301   ip sla       1                     reachability       Down   00:14:25
302   ip sla       1                     reachability       Down   00:14:25
311   ip sla       1                     state              Down   00:14:25
312   ip sla       1                     state              Down   00:14:25
403   list                               boolean            Down   00:14:25
413   list                               boolean            Down   00:14:25
501   Stub-object  Undefined                                Up     00:11:01
502   Stub-object  Undefined                                Down   00:11:01
503   Stub-object  Undefined                                Down   00:11:01
601   ipv6 route   2001:DB8::EEEE/64     metric threshold   Down   00:10:29
607   ipv6 route   2001:DB8::FFFF/64     metric threshold   Down   00:10:29
608   ipv6 route   2001:DB8::FFFF:AD45/64 metric threshold  Down   00:10:29
612   ipv6 route   2001:DB8:0000::FFFF/64 reachability      Down   00:10:22
```

Related Commands

Command	Description
showtrack resolution	Displays the resolution of tracked parameters.
track interface	Configures an interface to be tracked and enters tracking configuration mode.
track interface	Configures an interface to be tracked and enters tracking configuration mode.
track ip route	Tracks the state of an IP route and enters tracking configuration mode.

threshold metric through track timer

threshold metric

To set a threshold metric, use the **threshold metric** command in tracking configuration mode. To remove the threshold metric value, use the **no** form of this command.

threshold metric {**up** *number* [**down** *number*]| **down** *number* [**up** *number*]}

no threshold metric

Syntax Description

up	Specifies the up threshold. The state is up if the scaled metric for that route is less than or equal to the up threshold.
number	Threshold value. The range is from 0 to 255. The up threshold default is 254, and the down threshold default is 255.
down	Specifies the down threshold. The state is down if the scaled metric for that route is greater than or equal to the down threshold.

Command Default   No threshold metric is set.

Command Modes   Tracking configuration (config-track)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.3(3)M	This command was integrated into Cisco IOS Release 15.3(3)M.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

This command is available only for IP-route threshold metric objects tracked by the **track ip route metric threshold** command in global configuration mode.

The default up and down threshold values are 254 and 255, respectively. With these values, IP-route threshold tracking gives the same result as IP-route reachability tracking.

Examples

In the following example, the tracking process is tracking the IP-route threshold metric. The threshold metric is set to 16 for the up threshold and to 20 for the down threshold. The delay period to communicate the changes of a down event of the tracked object to the client process is set to 20 seconds.

```
Router(config)# track 1 ip route 10.22.0.0/16 metric threshold
Router(config-track)# threshold metric up 16 down 20
Router(config-track)# delay down 20
```

Related Commands

Command	Description
track ip route	Tracks the state of IP routing and enters tracking configuration mode.

track

To configure an interface to be tracked where the Gateway Load Balancing Protocol (GLBP) weighting changes based on the state of the interface, use the **track** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* **interface** *type number* {**line-protocol**| **ip routing**}

no track *object-number* **interface** *type number* {**line-protocol**| **ip routing**}

Syntax Description

object-number	Object number in the range from 1 to 1000 representing the interface to be tracked.
interface *type number*	Interface type and number to be tracked.
line-protocol	Tracks whether the interface is up.
ip routing	Tracks whether IP routing is enabled, an IP address is configured on the interface, and the interface state is up, before reporting to GLBP that the interface is up.

Command Default   The state of the interfaces is not tracked.

Command Modes   Global configuration (config)

Command History

Release	Modification
12.2(14)S	This command was introduced.
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was modified. The valid range for the *object-number* argument increased to 1000.

Release	Modification
12.2(50)SY	This command was modified. The valid range for the *object-number* argument increased to 1000.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

Use the **track** command in conjunction with the **glbp weighting** and **glbp weighting track** commands to configure parameters for an interface to be tracked. If a tracked interface on a GLBP router goes down, the weighting for that router is reduced. If the weighting falls below a specified minimum, the router will lose its ability to act as an active GLBP virtual forwarder.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router is dependent upon variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects is dependent upon the available CPU. Testing should be conducted on site to ensure that the service works under the specific site traffic conditions.

Examples

In the following example, Fast Ethernet interface 0/0 tracks whether serial interfaces 2/0 and 3/0 are up. If either serial interface goes down, the GLBP weighting is reduced by the default value of 10. If both serial interfaces go down, the GLBP weighting will fall below the lower threshold and the router will no longer be an active forwarder. To resume its role as an active forwarder, the router must have both tracked interfaces back up, and the weighting must rise above the upper threshold.

```
Router(config)# track 1 interface serial 2/0 line-protocol
Router(config-track)# exit
Router(config)# track 2 interface serial 3/0 line-protocol
Router(config-track)# exit
Router(config)# interface FastEthernet 0/0
Router(config-if)# ip address 10.21.8.32 255.255.255.0
Router(config-if)# glbp 10 weighting 110 lower 95 upper 105
Router(config-if)# glbp 10 weighting track 1
Router(config-if)# glbp 10 weighting track 2
```

In the following example, Fast Ethernet interface 0/0 tracks whether serial interface 2/0 is enabled for IP routing, whether it is configured with an IP address, and whether the state of the interface is up. If serial interface 2/0 goes down, the GLBP weighting is reduced by a value of 20.

```
Router(config)# track 2 interface serial 2/0 ip routing
Router(config-track)# exit
Router(config)# interface FastEthernet 0/0
Router(config-if)# ip address 10.21.8.32 255.255.255.0
Router(config-if)# glbp 10 weighting 110 lower 95 upper 105
Router(config-if)# glbp 10 weighting track 2 decrement 20
```

Related Commands

Command	Description
glbp weighting	Specifies the initial weighting value of a GLBP gateway.
glbp weighting track	Specifies an object to be tracked that affects the weighting of a GLBP gateway.

track interface

To track an interface and to enter tracking configuration mode, use the **track interface** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* **interface** *type number* {**line-protocol**| **ip routing**| **ipv6 routing**}

no track *object-number* **interface** *type number* {**line-protocol**| **ip routing**| **ipv6 routing**}

Syntax Description

object-number	Object number that represents the interface to be tracked. The range is from 1 to 1000.
type number	Interface type and number to be tracked. No space is required between the values.
line-protocol	Tracks the state of the interface line protocol.
ip routing	Tracks whether IP routing is enabled, whether an IP address is configured on the interface, and whether the interface state is up before reporting to the tracking client that the interface is up.
ipv6 routing	Tracks whether IPv6 routing is enabled, whether an IPv6 address is configured on the interface, and whether the interface state is up before reporting to the tracking client that the interface is up.

Command Default   No interface is tracked.

Command Modes   Global configuration (config)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.3(11)T	This command was enhanced to allow the tracking of an IP address on an interface that was acquired through DHCP or PPP IPCP.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(18)SXF	This command was introduced on the Supervisor Engine 720.

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was integrated into Cisco IOS Release 15.1(1)S.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
15.3(3)M	This command was modified. The **ipv6 routing** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

This command reports a state value to clients. A tracked IP or IPv6 routing object is considered up when the following criteria exist:

- IP or IPv6 routing is enabled and active on the interface.

- The state of the interface line protocol is up.

- The interface address is known. The address is configured or received through the Dynamic Host Configuration Protocol (DHCP) or IP Control Protocol (IPCP) negotiation.

Interface IP or IPv6 routing goes down when one of the following criteria exist:

- IP or IPv6 routing is disabled globally.

- The state of the interface line protocol is down.

- The interface address is unknown. The address is not configured or received through DHCP or IPCP negotiation.

A space is not required between the *type* and *number* values.

Tracking the IP or IPv6 routing state of an interface can be more useful in some situations than tracking the interface-line-protocol state, especially on interfaces for which IP addresses are negotiated. For example, on a serial interface that uses the Point-to-Point Protocol (PPP), the line protocol could be up, which means that Link Control Protocol negotiated successfully, but IP could be down, which means that IPCP negotiation failed.

The **track interface** command supports the tracking of an interface with an IP or IPv6 address acquired through any of the following methods:

- Conventional IP address configuration

- PPP/IPCP

- DHCP

- Unnumbered interface

Examples

In the following example, the tracking process is configured to track the IP-routing capability of serial interface 1/0:

```
Router(config)# track 1 interface serial1/0 ip routing
Router(config-track)#
```

In the following example, the tracking process is configured to track the IPv6-routing capability of a GigabitEthernet interface 1/0/0:

```
Router(config)# track 1 interface GigabitEthernet 1/0/0 ipv6 routing
Router(config-track)#
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.

track ip route

To track the state of an IP route and to enter tracking configuration mode, use the **track ip route** command in global configuration mode. To remove the tracking, use the **no** form of this command.

track *object-number* {**ip**| **ipv6**} **route** *address*/*prefix-length* {**reachability**| **metric threshold**}

no track *object-number* {**ip**| **ipv6**} **route** *address*/*prefix-length* {**reachability**| **metric threshold**}

Syntax Description

object-number	Object number that represents the object to be tracked. The range is from 1 to 1000.
ip	Tracks an IP route.
ipv6	Tracks an IPv6 route.
address	IP or IPv6 subnet address to the route that is being tracked.
/*prefix-length*	Number of bits in the address prefix. A forward slash (/) is required.
reachability	Tracks whether the route is reachable.
metric threshold	Tracks the threshold metric. The default up threshold is 254, and the default down threshold is 255.

Command Default   The route to the subnet address is not tracked.

Command Modes   Global configuration (config)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Release	Modification
15.1(3)T	This command was modified. The valid range of the *object-number* argument increased to 1000.
15.1(1)S	This command was integrated into Cisco IOS Release 15.1(1)S.
12.2(50)SY	This command was integrated into Cisco IOS Release 12.2(50)SY.
15.3(3)M	This command was modified. The **ipv6** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

A tracked IP-route or IPv6-route object is considered up and reachable when a routing-table entry exists for the route and the route is not inaccessible.

To provide a common interface for tracking clients, route metric values are normalized to the range of 0 to 255, where 0 is connected and 255 is inaccessible. The resulting value is compared against threshold values to determine the tracking state as follows:

• State is up if the scaled metric for the route is less than or equal to the up threshold.

• State is down if the scaled metric for the route is greater than or equal to the down threshold.

The tracking process uses a per-protocol configurable resolution value to convert the real metric to the scaled metric. The metric value communicated to clients is always such that a lower metric value is better than a higher metric value.

Use the **threshold metric** tracking configuration command to specify a threshold metric.

As of Cisco IOS Release 15.1(3)T, 15.1(1)S, and 12.2(50)SY, a maximum of 1000 objects can be tracked. Although 1000 tracked objects can be configured, each tracked object uses CPU resources. The amount of available CPU resources on a router depends on variables such as traffic load and how other protocols are configured and run. The ability to use 1000 tracked objects depends on available CPU resources. Testing should be conducted to ensure that the service works under the specific site-traffic conditions.

Examples

In the following example, the tracking process is configured to track the reachability of 10.22.0.0/16:

```
Router(config)# track 1 ip route 10.22.0.0/16 reachability
```

In the following example, the tracking process is configured to track the threshold metric using the default threshold metric values:

```
Router(config)# track 1 ip route 10.22.0.0/16 metric threshold
```

In the following example, the tracking process is configured to track the threshold metric using the default threshold metric values for an IPv6 route:

```
Router(config)# track 2 ipv6 route 2001:DB8:0:ABCD::1/10 metric threshold
```

Related Commands

Command	Description
show track	Displays HSRP tracking information.
threshold metric	Sets a threshold metric.

track resolution

To specify resolution parameters for a tracked object, use the **track resolution** command in global configuration mode. To disable this functionality, use the **no** form of this command.

track resolution {**ip route**| **ipv6 route** | {**bgp**| **eigrp**| **isis**| **ospf**| **static**}| *resolution-value*}

no track resolution {**ip route**| **ipv6 route** | {**bgp**| **eigrp**| **isis**| **ospf**| **static**}| *resolution-value*}

Syntax Description

ip route	IP route for metric resolution for a specified track. The keywords and arguments are as follows:
	• **bgp** —BGP routing protocol. The *resolution-value* argument has a range from 256 to 40000000.
	• **eigrp** —EIGRP routing protocol. The *resolution-value* argument has a range from 256 to 40000000.
	• **isis** —ISIS routing protocol. The *resolution-value* argument has a range from 1 to 1000.
	• **ospf** —OSPF routing protocol. The *resolution-value* argument has a range from 1 to 1562.
	• **static** —Static route. The *resolution-value* argument has a range from 1 to 100000.

ipv6 route	IPv6 route for metric resolution for a specified track. The keywords and arguments are as follows:
	• **bgp** —BGP routing protocol. The *resolution-value* argument has a range from 256 to 40000000. The default value is 2560.
	• **eigrp** —EIGRP routing protocol. The *resolution-value* argument has a range from 256 to 40000000. The default value is 2560.
	• **isis** —ISIS routing protocol. The *resolution-value* argument has a range from 1 to 1000. The default value is 10.
	• **ospf** —OSPF routing protocol. The *resolution-value* argument has a range from 1 to 1562. The default value is 1.
	• **static** —Static route. The *resolution-value* argument has a range from 1 to 100000. The default value is 10.

Command Default   The default threshold metric values are used.

Command Modes   Global configuration (config)

Command History

Release	Modification
12.3(8)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
15.3(3)M	This command was modified. The **ipv6 route** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines The **track ip route** command causes tracking of a route in the routing table. If a route exists in the table, the metric value is converted into a number in the range of 0 to 255. The metric resolution for the specified routing protocol is used to do the conversion. There are default values for metric resolution, but the **track resolution** command can be used to change them.

Examples In the following example, the EIGRP routing protocol has a resolution value of 280.

```
Router(config)# track resolution ip route eigrp 280
```

Related Commands

Command	Description
show track	Displays tracking information.
threshold percentage	Specifies a threshold percentage for a tracked list.
threshold weight	Specifies a threshold weight for a tracked list.
track list threshold percentage	Specifies a percentage threshold for a tracked list.
track list threshold weight	Specifies a weight threshold for a tracked list.

track timer

To specify the interval that a tracking process polls a tracked object, use the **track timer** command in global configuration mode. To reset to the default polling interval, use the **no** form of this command.

track timer {**application**| **interface**| **ip** | {**route**| **sla**}| **ipv6 route**| **list**| **stub-object**} {*seconds*| **msec** *milliseconds*}

no track timer {**application**| **interface**| **ip** | {**route**| **sla**}| **ipv6 route**| **list**| **stub-object**} {*seconds*| **msec** *milliseconds*}

Syntax Description

application	Tracks the mobile IP application polling timer.
interface	Tracks the specified interface.
ip	Tracks the specified IP protocol.
route	Tracks the route polling timer.
sla	Tracks the route polling timer.
ipv6 route	Tracks the specified IPv6 protocol.
list	Tracks the boolean list polling timer.
stub-object	Tracks the Embedded Event Manager (EEM) stub polling timer.
seconds	Polling interval, in seconds. The range is from 1 to 3000. The default for interface polling is 1 second, and the default for IP-route polling is 15 seconds.
msec *milliseconds*	Specifies the polling interval in milliseconds. The range is 500 to 5000. All polling frequencies can be configured down to 500 milliseconds, overriding the minimum 1 second interval configured previously.

Command Default

If you do not use the **track timer** command to specify a polling interval, a tracked object will be tracked at the default polling interval, as described in the table below:

Object	Default Polling Interval (seconds)
Application	5
Interface	1

Object	Default Polling Interval (seconds)
IP route	15
IP SLA	5
IPv6 route	15
List	1
Stub-object	1

Command Modes   Global configuration (config)

Command History

Release	Modification
12.2(15)T	This command was introduced.
12.2(25)S	This command was integrated into Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
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 **list** and **sla** keywords were added.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.0(1)M	This command was modified. The **application** and **msec** keywords and the *milliseconds* argument were added.
12.2(33)SXI4	This command was integrated into Cisco IOS Release 12.2(33)SXI4.
15.3(3)M	This command was modified. The **ipv6** keyword was added.
Cisco IOS XE 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Examples   In the following example, the tracking process polls the tracked interface every 3 seconds:

```
Router# configure terminal
Router(config)# track timer interface 3
```

In the following example, the tracking process polls the tracked IPv6 route every 5 seconds:

```
Router# configure terminal
Router(config)# track timer ipv6 route 5
```