



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

- [ip vrf, page 2](#)
- [ip wccp, page 4](#)
- [ip wccp group-listen, page 8](#)
- [ip wccp redirect, page 10](#)
- [ip wccp redirect exclude in, page 13](#)
- [ip wccp version, page 15](#)

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

<i>vrf-name</i>	Name assigned to a VRF.
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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.
15.4(3)S	This command was implemented on the Cisco ASR 901 Series Aggregation Services Router.

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 {**web-cache**| *service-number*} [**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 {**web-cache**| *service-number*} [**service-list** *service-access-list*] [**mode** {**open**| **closed**}] [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** [0| 7] *password*][**snmp-disabled**]

Syntax Description

web-cache	Specifies the web-cache service (WCCP Version 1 and Version 2). Note Web-cache counts as one of the services. The maximum number of services, including those assigned with the <i>service-number</i> argument, is 256.
<i>service-number</i>	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.
service-list <i>service-access-list</i>	(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 <i>multicast-address</i>	(Optional) Specifies the multicast IP address that communicates with the WCCP service group. The multicast address is used by the device to determine which web cache should receive redirected messages.
redirect-list <i>access-list</i>	(Optional) Specifies the access list that controls traffic redirected to this service group. The <i>access-list</i> argument should consist of a string of no more than 64 characters (name or number) in length that specifies the access list.

group-list <i>access-list</i>	(Optional) Specifies the access list that determines which web caches are allowed to participate in the service group. The <i>access-list</i> argument specifies either the number or the name of a standard or extended access list.
password [0 7] <i>password</i>	(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 <i>password</i> argument can be up to eight characters in length.
snmp-disabled	(Optional) Disables SNMP for the WCCP generic routing encapsulation (GRE) tunnel.

Command Default WCCP services are not enabled.

Command Modes Global configuration (config)

Command History	Release	Modification
	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 command instructs a device 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 device can participate in the establishment of a service group.

When the **no ip wccp** command is entered, the device 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 {**web-cache** | *service-number*} **group-address** *multicast-address*

A WCCP group address can be configured to set up a multicast address that cooperating devices 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 device 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.

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 device 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.



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 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 device to run WCCP reverse-proxy service, using the multicast address of 239.0.0.0:

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

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

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

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

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

The following example shows how to configure multiple parameters as a single command:

```
Device(config)# ip wccp 61 group-address 10.0.0.1 password 0 password mode closed
redirect-list 121
```

Related Commands

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

<i>vrf vrf-name</i>	(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.
<i>service-number</i>	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 <i>vrf-name</i> argument were added.
12.2(33)SRE	This command was modified. The vrf keyword and <i>vrf-name</i> argument were added.
Cisco IOS XE Release 3.1S	This command was modified. The vrf keyword and <i>vrf-name</i> argument were added.

Release	Modification
12.2(50)SY	This command was modified. The vrf keyword and <i>vrf-name</i> 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 <i>vrf-name</i>	(Optional) Specifies a virtual routing and forwarding (VRF) instance to associate with a service group.
web-cache	Enables the web cache service.
<i>service-number</i>	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 <i>vrf-name</i> argument were added.
12.2(33)SRE	This command was modified. The vrf keyword and <i>vrf-name</i> argument were added.
Cisco IOS XE Release 3.1S	This command was modified. The vrf keyword and <i>vrf-name</i> argument were added. Support for the out keyword was added.
12.2(50)SY	This command was modified. The vrf keyword and <i>vrf-name</i> 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.