Bookmap

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CONTENTS

WCCP—Configurable Router ID

The WCCP—Configurable Router ID feature enables the configuration of a Web Cache Communication Protocol (WCCP) source interface. The IP address of this configured source interface is then used as the preferred WCCP router ID and WCCP GRE source address. When a WCCP router ID is manually configured, router IDs are no longer automatically generated when the current router ID is no longer valid and the router ID does not change when another IP address is added to the system.

Finding Feature Information

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

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Information About WCCP—Configurable Router ID

WCCP—Configurable Router ID Overview

WCCP uses a router ID in its control messages that a WCCP client can use to uniquely identify a particular WCCP server. The router ID is an IP address and is used as the source address of any WCCP-generated Generic Routing Encapsulation (GRE) frames. Prior to the WCCP—Configurable Router ID feature, WCCP selected a router ID using an automatic mechanism; the highest reachable IP address on the system (or the highest loopback IP address, if there is one) was used as the WCCP router ID. The highest IP address on the system is not always the best choice as the router ID or as the source address of GRE frames. A change in addressing information on the system may cause the WCCP router ID to change unexpectedly. During this changeover period, WCCP clients briefly advertise the existence of two routers (the old router ID and the new router ID) and GRE frames are sourced from a different address.

The WCCP—Configurable Router ID feature enables you to define a WCCP source interface from which the router ID will be obtained. The IP address of this configured source interface is then used as the preferred WCCP router ID and WCCP GRE source address. When a WCCP router ID is manually configured, the router ID does not change when another IP address is added to the system. The router ID changes only when a new router ID is manually configured using the **ip wccp source-address** or the **ipv6 wccp source-address** command, or when the address on the manually configured interface is no longer valid.

How to Configure WCCP—Configurable Router ID

Configuring a Preferred WCCP Router ID

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip wccp** [**vrf** *vrf-name*] **source-interface** *source-interface*
4. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip wccp** [**vrf** *vrf-name*] **source-interface** *source-interface* **Example:** `Device(config)# ip wccp source-interface GigabitEthernet 0/0/0`	Configures a preferred WCCP router ID.

	Command or Action	Purpose
Step 4	**exit** **Example:** `Device(config)# exit`	Exits global configuration mode and returns to privileged EXEC mode.

Configuration Examples for WCCP—Configurable Router ID

- Example: Configuring a Preferred WCCP Router ID, page 3

Example: Configuring a Preferred WCCP Router ID

The following example displays the configuration for a preferred WCCP router ID:

```
! Configure a preferred WCCP router ID
ip wccp source-interface GigabitEthernet 0/0/0
```

Feature Information for WCCP—Configurable Router ID

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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Table 1 Feature Information for WCCP—Configurable Router ID

Feature Name	Releases	Feature Information
WCCP—Configurable Router ID	15.1(1)SG 15.2(3)T Cisco IOS XE Release 3.1S Cisco IOS XE Release 3.3SG Cisco IOS XE Release 15.1(1)SY Cisco IOS XE Release 3.2SE	The WCCP—Configurable Router ID feature enables the configuration of a Web Cache Communication Protocol (WCCP) source interface. The IP address of this configured source interface is then used as the preferred WCCP router ID and WCCP GRE source address. When a WCCP router ID is manually configured, router IDs are no longer automatically generated when the current router ID is no longer valid and the router ID does not change when another IP address is added to the system. The following command was added: **ip wccp source-interface**.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

WCCP Version 2

The Web Cache Communication Protocol (WCCP) is a Cisco-developed content-routing technology that intercepts IP packets and redirects those packets to a destination other than that specified in the IP packet. Typically the packets are redirected from their destination web server on the Internet to a content engine that is local to the client. In some WCCP deployment scenarios, redirection of traffic may also be required from the web server to the client. WCCP enables you to integrate content engines into your network infrastructure.

The tasks in this document assume that you have already configured content engines on your network. For specific information on hardware and network planning associated with Cisco Content Engines and WCCP, see the Cisco Content Engines documentation at the following URL:

http://www.cisco.com/univercd/cc/td/doc/product/webscale/content/index.htm

Finding Feature Information

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Prerequisites for WCCP Version 2

- IP must be configured on the interface connected to the Internet and another interface must be connected to the content engine.
- The interface connected to the content engine must be a Fast Ethernet or Gigabit Ethernet interface.

Information About WCCP Version 2

WCCPv2 Overview

WCCP uses Cisco Content Engines (or other content engines running WCCP) to localize web traffic patterns in the network, enabling content requests to be fulfilled locally. Traffic localization reduces transmission costs and download time.

WCCP enables Cisco IOS XE routing platforms to transparently redirect content requests. The main benefit of transparent redirection is that users need not configure their browsers to use a web proxy. Instead, they can use the target URL to request content, and have their requests automatically redirected to a content engine. The word "transparent" in this case means that the end user does not know that a requested file (such as a web page) came from the content engine instead of from the originally specified server.

A content engine receiving a request attempts to service it from its own local cache. If the requested information is not present, the content engine issues its own request to the originally targeted server to get the required information. A content engine retrieving the requested information forwards it to the requesting client and caches it to fulfill future requests, thus maximizing download performance and substantially reducing transmission costs.

WCCP enables a series of content engines, called a content engine cluster, to provide content to a router or multiple routers. Network administrators can easily scale their content engines to manage heavy traffic loads through these clustering capabilities. Cisco clustering technology enables each cluster member to work in parallel, resulting in linear scalability. Clustering content engines greatly improves the scalability, redundancy, and availability of your caching solution. You can cluster up to 32 content engines to scale to your desired capacity.

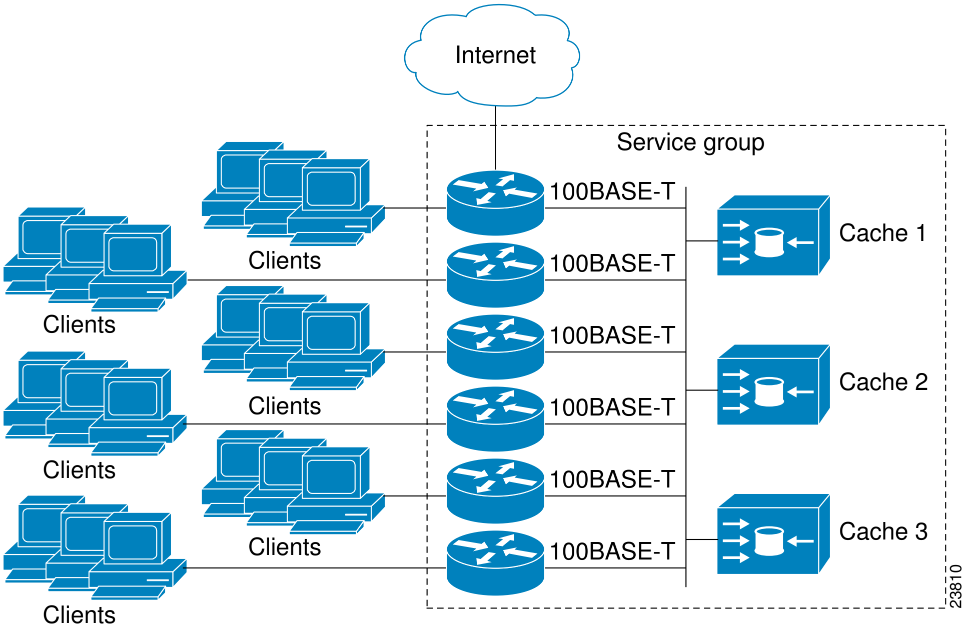
The WCCP Version 2 feature provides several enhancements and features to the WCCP protocol, including:

- The ability of multiple routers to service a content engine cluster.
- Redirection of traffic other than HTTP (TCP port 80 traffic), including a variety of UDP and TCP traffic.
- Optional authentication that enables you to control which routers and content engines become part of the service group using passwords and the HMAC MD5 standard.
- A check on packets that determines which requests have been returned from the content engine unserviced.
- Load adjustments for individual content engines to provide an effective use of the available resources while helping to ensure high quality of service (QoS) to the clients.

WCCPv2 Configuration

Multiple routers can use WCCPv2 to service a content engine cluster. In WCCPv1, only one router could redirect content requests to a cluster. The figure below illustrates a sample configuration using multiple routers.

Figure 1 Cisco Content Engine Network Configuration Using WCCPv2



The subset of content engines within a cluster and routers connected to the cluster that are running the same service is known as a service group. Available services include TCP and UDP redirection.

In WCCPv1, the content engines were configured with the address of the single router. WCCPv2 requires that each content engine be aware of all the routers in the service group. To specify the addresses of all the routers in a service group, you must choose one of the following methods:

- Unicast—A list of router addresses for each of the routers in the group is configured on each content engine. In this case the address of each router in the group must be explicitly specified for each content engine during configuration.
- Multicast—A single multicast address is configured on each content engine. In the multicast address method, the content engine sends a single-address notification that provides coverage for all routers in the service group. For example, a content engine could indicate that packets should be sent to a multicast address of 224.0.0.100, which would send a multicast packet to all routers in the service group configured for group listening using WCCP (see the **ip wccp group-listen** or the **ipv6 wccp group-listen** interface configuration command for details).

The multicast option is easier to configure because you need only specify a single address on each content engine. This option also allows you to add and remove routers from a service group dynamically, without needing to reconfigure the content engines with a different list of addresses each time.

The following sequence of events details how WCCPv2 configuration works:

1 Each content engine is configured with a list of routers.

2. Each content engine announces its presence and a list of all routers with which it has established communications. The routers reply with their view (list) of content engines in the group.
3. When the view is consistent across all content engines in the cluster, one content engine is designated as the lead and sets the policy that the routers need to deploy in redirecting packets.

WCCPv2 Support for Services Other Than HTTP

WCCPv2 allows redirection of traffic other than HTTP (TCP port 80 traffic), including a variety of UDP and TCP traffic. WCCPv1 supported the redirection of HTTP (TCP port 80) traffic only. WCCPv2 supports the redirection of packets intended for other ports, including those used for proxy-web cache handling, File Transfer Protocol (FTP) caching, FTP proxy handling, web caching for ports other than 80, and Real Audio, video, and telephony applications.

To accommodate the various types of services available, WCCPv2 introduced the concept of multiple *service groups*. Service information is specified in the WCCP configuration commands using dynamic services identification numbers (such as 98) or a predefined service keyword (such as **web-cache**). This information is used to validate that service group members are all using or providing the same service.

The content engines in a service group specify traffic to be redirected by protocol (TCP or UDP) and up to eight source or destination ports. Each service group has a priority status assigned to it. The priority of a dynamic service is assigned by the content engine. The priority value is in the range of 0 to 255 where 0 is the lowest priority. The predefined web-cache service has an assigned priority of 240.

WCCPv2 Support for Multiple Routers

WCCPv2 allows multiple routers to be attached to a cluster of cache engines. The use of multiple routers in a service group allows for redundancy, interface aggregation, and distribution of the redirection load. WCCPv2 supports up to 32 routers per service group. Each service group is established and maintained independently.

WCCPv2 MD5 Security

WCCPv2 provides optional authentication that enables you to control which routers and content engines become part of the service group using passwords and the Hashed Message Authentication Code—Message Digest (HMAC MD5) standard. Shared-secret MD5 one-time authentication (set using the **ip wccp** [**password** [**0** | **7**] *password*] global configuration command) enables messages to be protected against interception, inspection, and replay.

WCCPv2 Web Cache Packet Return

If a content engine is unable to provide a requested object it has cached due to error or overload, the content engine will return the request to the router for onward transmission to the originally specified destination server. WCCPv2 provides a check on packets that determines which requests have been returned from the content engine unserviced. Using this information, the router can then forward the request to the originally targeted server (rather than attempting to resend the request to the content engine cluster). This process provides error handling transparency to clients.

Typical reasons why a content engine would reject packets and initiate the packet return feature include the following:

- Instances when the content engine is overloaded and has no room to service the packets
- Instances when the content engine is filtering for certain conditions that make caching packets counterproductive (for example, when IP authentication has been turned on)

WCCPv2 Load Distribution

WCCPv2 can be used to adjust the load being offered to individual content engines to provide an effective use of the available resources while helping to ensure high quality of service (QoS) to the clients. WCCPv2 allows the designated content engine to adjust the load on a particular content engine and balance the load across the content engines in a cluster. WCCPv2 uses three techniques to perform load distribution:

- Hot spot handling—Allows an individual hash bucket to be distributed across all the content engines. Prior to WCCPv2, information from one hash bucket could go to only one content engine.
- Load balancing—Allows the set of hash buckets assigned to a content engine to be adjusted so that the load can be shifted from an overwhelmed content engine to other members that have available capacity.
- Load shedding—Enables the router to selectively redirect the load to avoid exceeding the capacity of a content engine.

The use of these hashing parameters prevents one content engine from being overloaded and reduces the potential for bottlenecking.

WCCP Troubleshooting Tips

CPU usage may be very high when WCCP is enabled. The WCCP counters enable a determination of the bypass traffic directly on the router and can indicate whether the cause is high CPU usage due to enablement of WCCP. In some situations, 10 percent bypass traffic may be normal; in other situations, 10 percent may be high. However, any figure above 25 percent should prompt a closer investigation of what is occurring in the web cache.

If the counters suggest that the level of bypass traffic is high, the next step is to examine the bypass counters in the content engine and determine why the content engine is choosing to bypass the traffic. You can log in to the content engine console and use the CLI to investigate further. The counters allow you to determine the percent of traffic being bypassed.

How to Configure WCCP Version 2

Configuring WCCP

Perform this task to configure WCCP.

Until you configure a WCCP service using the **ip wccp**{**web-cache** | *service-number*} global configuration command, WCCP is disabled on the router. The first use of a form of the **ip wccp** command enables WCCP. By default WCCPv2 is used for services, but you can use WCCPv1 functionality instead.

Use the **ip wccp web-cache password** command to set a password for a router and the content engines in a service group. MD5 password security requires that each router and content engine that wants to join a service group be configured with the service group password. The password must be up to eight characters in length. Each content engine or router in the service group will authenticate the security component in a received WCCP packet immediately after validating the WCCP message header. Packets failing authentication will be discarded.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** *password* [**0** | **7**]]
4. **interface** *type number*
5. **ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} **redirect** {**in** | **out**}
6. **exit**
7. **interface** *type number*
8. **ip wccp redirect exclude in**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** *password* [**0** | **7**]] **Example:** `Device(config)# ip wccp web-cache password password1`	Specifies a web-cache or dynamic service to enable on the router, specifies a VRF-name to associate with the service group, specifies the IP multicast address used by the service group, specifies any access lists to use, specifies whether to use MD5 authentication, and enables the WCCP service.
Step 4	**interface** *type number* **Example:** `Device(config)# interface ethernet0/0`	Targets an interface number for which the web cache service will run, and enters interface configuration mode.

	Command or Action	Purpose

Step 5	**ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} **redirect** {**in** | **out**}
	Example:
	`Device(config-if)# ip wccp web-cache redirect in`
		Enables packet redirection on an outbound or inbound interface using WCCP.
		• As indicated by the **out** and **in** keyword options, redirection can be specified for outbound interfaces or inbound interfaces.

Step 6	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode.
Step 7	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 0/2/0`	Targets an interface number on which to exclude traffic for redirection, and enters interface configuration mode.
Step 8	**ip wccp redirect exclude in** **Example:** `Device(config-if)# ip wccp redirect exclude in`	(Optional) Excludes traffic on the specified interface from redirection.

Verifying and Monitoring WCCP Configuration Settings

SUMMARY STEPS

1. **enable**
2. **show ip wccp** [**vrf** *vrf-name*] [**web-cache** |*service-number*] [**detail view**]
3. **show ip interface**
4. **more system:running-config**

DETAILED STEPS

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

	Command or Action	Purpose
Step 2	**show ip wccp** [**vrf** *vrf-name*] [**web-cache** |*service-number*] [**detail view**] **Example:** `Device# show ip wccp 24 detail`	Displays global information related to WCCP, including the protocol version running, the number of content engines in the router service group, which content engine group is allowed to connect to the router, and which access list is being used. • **vrf** *vrf-name*—(Optional) Virtual routing and forwarding (VRF) instance associated with a service group. • *service-number*—(Optional) Dynamic number of the web-cache service group being controlled by the content engine. The range is from 0 to 99. For web caches that use Cisco Content Engines, the reverse proxy service is indicated by a value of 99. • **web-cache**—(Optional) statistics for the web-cache service. • **detail**—(Optional) other members of a particular service group or web cache that have or have not been detected. • **view**—(Optional) information about a router or all web caches.
Step 3	**show ip interface** **Example:** `Device# show ip interface`	Displays status about whether any **ip wccp redirection** commands are configured on an interface; for example, “Web Cache Redirect is enabled / disabled.”
Step 4	**more system:running-config** **Example:** `Device# more system:running-config`	(Optional) Displays contents of the running configuration file (equivalent to the **show running-config** command).

Configuration Examples for WCCP Version 2

Example: Changing the Version of WCCP on a Router

The following example shows how to change the WCCP version from the default of WCCPv2 to WCCPv1, and enabling the web-cache service in WCCPv1:

```
Router# show ip wccp

% WCCP version 2 is not enabled
Router# configure terminal
```

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

Router(config)# end
Router# show ip wccp

% WCCP version 1 is not enabled
Router# configure terminal

Router(config)# ip wccp web-cache
Router(config)# end
Router# show ip wccp

Global WCCP information:
    Router information:
        Router Identifier:                  10.4.9.8
        Protocol Version:                   1.0
.
.
.
```

Example: Configuring a General WCCPv2 Session

```
Device# configure terminal
Device(config)# ip wccp web-cache group-address 224.1.1.100 password password1
Device(config)# ip wccp source-interface GigabitEthernet 0/1/0
Device(config)# ip wccp check services all
 Configures a check of all WCCP services.
Device(config)# interface GigabitEthernet 0/1/0
Device(config-if)# ip wccp web-cache redirect in
Device(config-if)# exit
Device(config)# interface GigabitEthernet 0/2/0
Device(config-if)# ip wccp redirect exclude in
Device(config-if)# exit
```

Example: Setting a Password for a Router and Content Engines

```
Router# configure terminal
Router(config)# ip wccp web-cache password password1
```

Example: Verifying WCCP Settings

The following example shows how to verify your configuration changes by using the **more system:running-config** command in privileged EXEC mode. The following example shows that both the web cache service and dynamic service 99 are enabled on the device:

```
Device# more system:running-config

    Building configuration...
    Current configuration:
    !
    version 12.0
    service timestamps debug uptime
    service timestamps log uptime
    no service password-encryption
    service udp-small-servers
    service tcp-small-servers
    !
    hostname router4
    !
    enable secret 5 $1$nSVy$faliJsVQXVPW.KuCxZNTh1
    enable password password1
    !
    ip subnet-zero
    ip wccp web-cache
    ip wccp 99
ip domain-name cisco.com
ip name-server 10.1.1.1
ip name-server 10.1.1.2
ip name-server 10.1.1.3
!
!
!
interface GigabitEthernet0/1/1
ip address 10.3.1.2 255.255.255.0
no ip directed-broadcast
ip wccp web-cache redirect in
ip wccp 99 redirect in
no ip route-cache
no ip mroute-cache
!
interface GigabitEthernet0/1/0
ip address 10.4.1.1 255.255.255.0
no ip directed-broadcast
ip wccp 99 redirect in
no ip route-cache
no ip mroute-cache
!
interface Serial0
no ip address
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
shutdown
!
interface Serial1
no ip address
no ip directed-broadcast
no ip route-cache
no ip mroute-cache
shutdown
!
ip default-gateway 10.3.1.1
ip classless
ip route 0.0.0.0 0.0.0.0 10.3.1.1
no ip http server
!
!
!
line con 0
transport input none
line aux 0
transport input all
line vty 0 4
password password1
login
!
end
```

The following example shows how to display global statistics related to WCCP:

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

WCCP Client information:
WCCP Client ID:      10.1.1.2
Protocol Version:    2.0
State:               Usable
Redirection:         L2
Packet Return:       L2
Packets Redirected:  0
Connect Time:        00:20:34
Assignment:          MASK
Mask  SrcAddr    DstAddr    SrcPort DstPort
----  -------    -------    ------- -------
0000: 0x00000000 0x00001741 0x0000  0x0000
Value SrcAddr    DstAddr   SrcPort DstPort CE-IP
----- -------    -------   ------- ------- -----
0000: 0x00000000 0x00000000 0x0000 0x0000 0x3C010102 (10.1.1.2)
0001: 0x00000000 0x00000001 0x0000 0x0000 0x3C010102 (10.1.1.2)
```

```
0002: 0x00000000 0x00000040 0x0000 0x0000 0x3C010102 (10.1.1.2)
0003: 0x00000000 0x00000041 0x0000 0x0000 0x3C010102 (10.1.1.2)
0004: 0x00000000 0x00000100 0x0000 0x0000 0x3C010102 (10.1.1.2)
0005: 0x00000000 0x00000101 0x0000 0x0000 0x3C010102 (10.1.1.2)
0006: 0x00000000 0x00000140 0x0000 0x0000 0x3C010102 (10.1.1.2)
```

For more information about the **show ip wccp web-cache** command, see the *Cisco IOS IP Application Services Command Reference*.

Additional References

Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	*IPv6 Configuration Guide*
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
IPv6 commands	Cisco IOS IPv6 Command Reference
Cisco IOS IPv6 features	Cisco IOS IPv6 Feature Mapping
Classifying Network Traffic	"Classifying Network Traffic" module

Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	*IPv6 RFCs*

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Command List, All Releases*
IP addressing services configuration tasks	*IP Addressing Services Configuration Guide*
IP application services configuration tasks	*IP Application Services Configuration Guide*
IP application services commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS IP Application Services Command Reference*
IP accounting	*Cisco IOS XE Flexible NetFlow Configuration Guide*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

RFCs

RFC	Title
RFC 791	*Internet Protocol*
RFC 792	*Internet Control Message Protocol*
RFC 1191	*Path MTU Discovery*

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for WCCP Version 2

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Table 2 Feature Information for WCCP Version 2

Feature Name	Releases	Feature Information
WCCP Version 2	Cisco IOS XE Release 2.2 Cisco IOS XE Release 3.3SG Cisco IOS XE Release 3.2SE	The WCCP Version 2 feature provides several enhancements and features to the WCCP protocol, including: • The ability of multiple routers to service a content engine cluster. • Redirection of traffic other than HTTP (TCP port 80 traffic), including a variety of UDP and TCP traffic. • Optional authentication that enables you to control which routers and content engines become part of the service group using passwords and the HMAC MD5 standard. • A check on packets that determines which requests have been returned from the content engine unserviced. • Load adjustments for individual content engines to provide an effective use of the available resources while helping to ensure high quality of service (QoS) to the clients. The following commands were introduced or modified by this feature: **clear ip wccp**, **ip wccp**, **ip wccp group-listen**, **ip wccp redirect**, **ip wccp redirect exclude in**, **ip wccp version**, **show ip wccp**.

and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

WCCP VRF Support

Finding Feature Information

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

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information About WCCP VRF Support

WCCP VRF Support

The WCCP VRF Support feature enhances the WCCPv2 protocol by implementing support for virtual routing and forwarding (VRF).

The WCCP VRF Support feature allows service groups to be configured on a per-VRF basis in addition to those defined globally.

Along with the service identifier, the VRF of WCCP protocol packets arriving at the router is used to associate cache-engines with a configured service group.

The same VRF must have the interface on which redirection is applied, the interface which is connected to cache engine, and the interface on which the packet would have left if it had not been redirected.

WCCP VRF Tunnel Interfaces

In Cisco IOS releases that support the WCCP VRF Support feature, the use of GRE redirection results in the creation of new tunnel interfaces. You can display these tunnel interfaces by entering the **show ip interface brief | include tunnel** command:

```
Device# show ip interface brief | include tunnel

Tunnel0                172.16.0.1      YES unset  up                    up
Tunnel1                172.16.0.1      YES unset  up                    up
Tunnel2                172.16.0.1      YES unset  up                    up
Tunnel3                172.16.0.1      YES unset  up                    up
Device#
```

The tunnel interfaces are automatically created in order to process outgoing GRE-encapsulated traffic for WCCP. The tunnel interfaces appear when a content engine connects and requests GRE redirection. The tunnel interfaces are not created directly by WCCP, but are created indirectly via a tunnel application programming interface (API). WCCP does not have direct knowledge of the tunnel interfaces, but can redirect packets to them, resulting in the appropriate encapsulation being applied to the packets. After the appropriate encapsulation is applied, the packet is then sent to the content engine.

Note The tunnel interfaces are not used to connect with incoming WCCP GRE return packets.

One tunnel is created for each service group that is using GRE redirection. One additional tunnel is created to provide an IP address that allows the other tunnel group interfaces to be unnumbered but still enabled for IPv4.

You can confirm the connection between the tunnels and WCCP by entering the **show tunnel groups wccp** command:

```
Device# show tunnel groups wccp

WCCP : service group 0 in "Default", ver v2, assgnmnt: hash-table
   intf: Tunnel0, locally sourced
 WCCP : service group 317 in "Default", ver v2, assgnmnt: hash-table
   intf: Tunnel3, locally sourced
 WCCP : service group 318 in "Default", ver v2, assgnmnt: hash-table
   intf: Tunnel2, locally sourced
```

You can display additional information about each tunnel interface by entering the **show tunnel interface** *interface-number* command:

```
Device# show tunnel interface t0

Tunnel0
   Mode:multi-GRE/IP, Destination UNKNOWN, Source 10.1.1.80
   Application ID 2: WCCP : service group 0 in "Default", ver v2, assgnmnt: hash-table
   Linestate - current up
   Internal linestate - current up, evaluated up

Device# show tunnel interface t1

Tunnel1
   Mode:multi-GRE/IP, Destination UNKNOWN, Source 172.16.0.1
   Application ID 2: unspecified
   Linestate - current up
   Internal linestate - current up, evaluated up

Device# show tunnel interface t2

Tunnel2
   Mode:multi-GRE/IP, Destination UNKNOWN, Source 10.1.1.80
   Application ID 2: WCCP : service group 318 in "Default", ver v2, assgnmnt: hash-table
   Linestate - current up
   Internal linestate - current up, evaluated up

Device# show tunnel interface t3

Tunnel3
   Mode:multi-GRE/IP, Destination UNKNOWN, Source 10.1.1.80
   Application ID 2: WCCP : service group 317 in "Default", ver v2, assgnmnt: hash-table
   Linestate - current up
   Internal linestate - current up, evaluated up
Device#
```

Note that the service group number shown in the examples is the internal tunnel representation of the WCCP service group number. Group 0 is the web-cache service. To determine the dynamic services, subtract 256 from the displayed service group number to convert to the WCCP service group number. For interfaces that are used for redirection, the source address shown is the WCCP router ID.

You can display information about the connected content engines and encapsulation, including software packet counters, by entering the **show adjacency** [*tunnel-interface*] [**encapsulation**] [**detail**] [**internal**] command:

```
Device# show adjacency t0

Protocol Interface                 Address
IP       Tunnel0                   10.1.1.82(3)

Device# show adjacency t0 encapsulation

Protocol Interface                 Address
IP       Tunnel0                   10.1.1.82(3)
  Encap length 28
  4500000000000000FF2F7D2B1E010150
  1E0101520000883E00000000
  Provider: TUNNEL
  Protocol header count in macstring: 3
    HDR 0: ipv4
       dst: static, 10.1.1.82
       src: static, 10.1.1.80
      prot: static, 47
       ttl: static, 255
        df: static, cleared
      per packet fields: tos ident tl chksm
    HDR 1: gre
      prot: static, 0x883E
      per packet fields: none
    HDR 2: wccpv2
       dyn: static, cleared
      sgID: static, 0
      per packet fields: alt altB priB

Device# show adjacency t0 detail

Protocol Interface                 Address
IP       Tunnel0                   10.1.1.82(3)
                                   connectionid 1
                                   0 packets, 0 bytes
                                   epoch 0
                                   sourced in sev-epoch 1
                                   Encap length 28
                                   4500000000000000FF2F7D2B1E010150
                                   1E0101520000883E00000000
                                   Tun endpt
                                   Next chain element:
                                    IP adj out of Ethernet0/0, addr 10.1.1.82
Device# show adjacency t0 internal

Protocol Interface                 Address
IP       Tunnel0                   10.1.1.82(3)
                                   connectionid 1
                                   0 packets, 0 bytes
                                   epoch 0
                                   sourced in sev-epoch 1
                                   Encap length 28
                                   4500000000000000FF2F7D2B1E010150
                                   1E0101520000883E00000000
                                   Tun endpt
                                   Next chain element:
                                    IP adj out of Ethernet0/0, addr 10.1.1.82
                                    parent oce 0x4BC76A8
                                    frame originated locally (Null0)
                                   L3 mtu 17856
                                   Flags (0x2808C4)
                                   Fixup enabled (0x40000000)
                                         GRE WCCP redirection
                                   HWIDB/IDB pointers 0x55A13E0/0x35F5A80
                                   IP redirect disabled
                                   Switching vector: IPv4 midchain adj oce
                                   IP Tunnel stack to 10.1.1.82 in Default (0x0)
                                    nh tracking enabled: 10.1.1.82/32
                                    IP adj out of Ethernet0/0, addr 10.1.1.82
                                   Adjacency pointer 0x4BC74D8
                                   Next-hop 10.1.1.82
Device#
```

How to Configure WCCP VRF Support

- Configuring WCCP, page 24

Configuring WCCP

Perform this task to configure WCCP.

Until you configure a WCCP service using the **ip wccp**{**web-cache** | *service-number*} global configuration command, WCCP is disabled on the router. The first use of a form of the **ip wccp** command enables WCCP. By default WCCPv2 is used for services, but you can use WCCPv1 functionality instead.

Use the **ip wccp web-cache password** command to set a password for a router and the content engines in a service group. MD5 password security requires that each router and content engine that wants to join a service group be configured with the service group password. The password must be up to eight characters in length. Each content engine or router in the service group will authenticate the security component in a received WCCP packet immediately after validating the WCCP message header. Packets failing authentication will be discarded.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** *password* [**0** | **7**]]
4. **interface** *type number*
5. **ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} **redirect** {**in** | **out**}
6. **exit**
7. **interface** *type number*
8. **ip wccp redirect exclude in**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. - Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} [**group-address** *multicast-address*] [**redirect-list** *access-list*] [**group-list** *access-list*] [**password** *password* [**0** | **7**]] **Example:** `Device(config)# ip wccp web-cache password password1`	Specifies a web-cache or dynamic service to enable on the router, specifies a VRF-name to associate with the service group, specifies the IP multicast address used by the service group, specifies any access lists to use, specifies whether to use MD5 authentication, and enables the WCCP service.
Step 4	**interface** *type number* **Example:** `Device(config)# interface ethernet0/0`	Targets an interface number for which the web cache service will run, and enters interface configuration mode.

Step 5	**ip wccp** [**vrf** *vrf-name*] {**web-cache** | *service-number*} **redirect** {**in** | **out**}
	Example:
	`Device(config-if)# ip wccp web-cache redirect in`
		Enables packet redirection on an outbound or inbound interface using WCCP.
		- As indicated by the **out** and **in** keyword options, redirection can be specified for outbound interfaces or inbound interfaces.

Step 6	**exit** **Example:** `Device(config-if)# exit`	Exits interface configuration mode.

	Command or Action	Purpose
Step 7	**interface** *type number* **Example:** `Device(config)# interface GigabitEthernet 0/2/0`	Targets an interface number on which to exclude traffic for redirection, and enters interface configuration mode.
Step 8	**ip wccp redirect exclude in** **Example:** `Device(config-if)# ip wccp redirect exclude in`	(Optional) Excludes traffic on the specified interface from redirection.

Configuration Examples for WCCP VRF Support

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*
Cisco ACNS software configuration information	• *Cisco ACNS Software Caching Configuration Guide, Release 4.2* • Cisco ACNS Software listing page on Cisco.com
IP access list overview, configuration tasks, and commands	*Cisco IOS Security Command Reference*
IP addressing and services commands and configuration tasks	• *Cisco IOS IP Addressing Services Configuration Guide* • *Cisco IOS IP Addressing Services Command Reference*
WCCP commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS IP Application Services Command Reference*

Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	—

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Additional References

Related Documents

Related Topic	Document Title
Cisco ACNS software configuration information	- Cisco ACNS Software Caching Configuration Guide, Release 4.2 - http://www.cisco.com/en/US/products/sw/conntsw/ps491/products_installation_and_configuration_guides_list.html - Cisco ACNS Software listing page on Cisco.com
Deploying and Troubleshooting WCCP on Cisco ASR 1000 Series Routers	Deploying and Troubleshooting Web Cache Control Protocol Version 2 on Cisco ASR 1000 Series Aggregation Services Routers
IP Access List overview, configuration tasks, and commands	- *Cisco IOS XE Security Configuration Guide: Securing the Data Plane* - *Cisco IOS Security Command Reference*
IP addressing and services commands and configuration tasks	- *Cisco IOS XE IP Addressing Services Configuration Guide* - *Cisco IOS IP Addressing Services Command Reference*
WCCP commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	*Cisco IOS IP Application Services Command Reference*

Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for WCCP VRF Support

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 3 Feature Information for WCCP VRF Support

Feature Name	Releases	Feature Information
WCCP VRF Support	12.2(33)SRE 12.2(50)SY 15.0(1)M Cisco IOS XE Release 3.1S Cisco IOS XE Release 3.2SE	The WCCP VRF Support feature provides enhancements to the existing WCCPv2 protocol, which supports VRF awareness. The following commands were introduced or modified: **clear ip wccpshow debug ip wccpshow ip wccpshow ip wccp group-listenshow ip wccp redirect show show ip wccp**.

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.