



Release Notes for Cisco Content Routing Software, Release 1.1

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Note

The most current Cisco documentation for released products is available on Cisco.com at <http://www.cisco.com>. The online documents may contain updates and modifications made after the hardcopy documents were printed.

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Introduction

These release notes document new features and caveats for the Cisco Content Routing software, Release 1.1. The previous version of this software was called the Content Router 4400 software, Release 1.0. Cisco Content Routing software, Release 1.1 contains boomerang technology for the Content



Router 4430. Boomerang is a DNS-based content routing process utilized by the Content Router and systems, such as Content Engines, that have been configured to act as content routing agents for the Content Router.

Refer to the *Cisco Content Routing Software Configuration Guide and Command Reference, Release 1.1* for a description of the content routing process, for details on configuring Release 1.1 on the Content Router, and for a reference to all of the commands in Release 1.1.

For details on how to configure a system as a content routing agent, refer to the documentation associated with that system's software. The Content Routing software, Release 1.1 operates on the Content Router, not the content routing agent. As of the printing of these release notes, the following systems can be configured as content routing agents:

- 500 Series Cisco Cache Engines with Cisco Cache software, Release 2.5
- 500 Series Cisco Content Engines with Cisco Cache software, Release 2.5

System Requirements

Cisco Content Routing software, Release 1.1 is designed to operate on the Cisco Content Router 4430. It is compatible with the content routing agent software contained in Cisco Cache software, Release 2.5. It is *not* compatible with the content routing agent software contained in Cisco Cache software, Release 2.4.

Determining the Software Version



Note

We recommend that you install the most recent software version available for your model of the Content Router.

To determine the version of the software currently running on the Cisco Content Router, log on to the Content Router and enter the **show version EXEC** command.

Downloading Content Router Software

Content Router software can be downloaded from the Cisco Systems Software Center at the following URL:

<http://www.cisco.com/cgi-bin/tablebuild.pl/content-router>

Upgrading to a New Software Release

Two types of Content Router software files are available on Cisco.com to download: files with the .pax suffix and files with the .bin suffix. The .pax file contains the full-image software with the graphical user interface (GUI) and is the file routinely installed. The .bin file software is for recovery situations that require booting from the network, or restoring Flash memory. Refer to the section “Recovering the Content Router System Software” in Chapter 3 of the *Cisco Content Routing Software Configuration Guide and Command Reference, Release 1.1* for instructions on loading your system image with the .bin file.

To install the software from the .pax file:

Step 1 Use an FTP client to transfer the .pax file to the */local* directory of your Content Router.

Step 2 Log on to the Content Router, and at the privileged level EXEC command prompt enter:

```
install filename.pax
```

where *filename* is the name of the .pax file.

Step 3 Follow the command-line interface instructions as prompted. At the following prompt, enter *y*:

```
Copy new image to flash memory?[yes]:
```

After the Content Router has rebooted, use the **show version** command to display the current software version.

New and Changed Information

This section includes:

- [New Hardware Features in Release 1.1, page 3](#)
- [New Software Features in Release 1.1, page 3](#)
- [New Commands in Release 1.1, page 5](#)
- [Changed Commands in Release 1.1, page 10](#)

New Hardware Features in Release 1.1

There are no new hardware features in this release of the software.

New Software Features in Release 1.1

This release includes the following new software features:

- [Support for up to 200 Content Routing Agents](#)
- [Denial of Service Attack Resistance and Data](#)
- [DNS Race Winner Database](#)
- [Agent List Configuration](#)

Support for up to 200 Content Routing Agents

This release of the software provides support for up to 200 content routing agents. This support is provided by a process called *simulated annealing*. With simulated annealing, the first DNS server to send a request to the Content Router receives ten DNS responses from ten randomly selected agents, by default. This is called the “DNS race” because the first agent response received is the winner of the race and is therefore the site to which the user will connect. When the next request from the same DNS server occurs, the Content Router routes responses from the winner of the first race plus nine other randomly selected agents. The third time the same DNS server sends a request, the last two winners plus eight

random agents are used. By default, the Content Router uses no more than three previous DNS race winners and a total of ten agents in each race. However, you can configure the maximum number of previous winners and the total number of agents used in each DNS race.

For more information about this feature, see the [“boomerang annealing Command” section on page 6](#).

Denial of Service Attack Resistance and Data

Denial-of-service (DoS) attacks can disable a host or a network by consuming critical resources, altering configuration information, or by destroying a physical network components.

Multiple mechanisms are included in this software to prevent the Content Router from being used in a DoS attack. For example, any packets with a source IP address representing a broadcast, multicast, or loopback address are discarded. Multiple DNS requests sent by the same server to the same domain within the same second are now rejected. If a possible DoS attack occurs, the following syslog message is displayed:

```
possible Denial-of-Service attack from 127.2.2.1 on domain www.mydomain.com; ignoring DNS query!
```

For more information about this feature, see the [“show boomerang Command” section on page 11](#).

DNS Race Winner Database

The Content Router uses asynchronous probing of the requesting DNS server in order to determine which content routing agent’s response reached the server first. This information is logged in two different files. One file is a time-stamped archive of the results of the asynchronous probing. This file is `/var/log/archive.txt`.

The second file contains a record of the eight previous DNS race winners for each DNS server that made a request in each domain. This text file (`/local/boom.db`) is stored in memory. It is generated by the **boomerang database dump** command. A total of 131072 (1024 x 128k) entries can be stored in the boom.db. After you reboot the Content Router, you can use the **boomerang database restore** command to restore the previous boom.db file contents.

For more information about this feature, see the [“boomerang database Command” section on page 8](#).

Agent List Configuration

A new form of agent configuration has been created to accommodate the scaling of agent support. The new **boomerang client-list** configuration mode allows you to create lists of content routing agents, which you can reuse when you configure other domains. To reuse a client-list, use the **client-group** command in domain configuration mode.

For more information about this feature, see the following sections:

- [“boomerang client-list Command” section on page 7](#)
- [“client-group Command” section on page 10](#)
- [“show boomerang Command” section on page 11](#)
- [“show running-config Command” section on page 14](#)

New Commands in Release 1.1

This section describes the new commands included in Release 1.1:

- [boomerang annealing Command, page 6](#)
- [boomerang client-list Command, page 7](#)
- [boomerang database Command, page 8](#)
- [boomerang timing Command, page 9](#)
- [client-group Command, page 10](#)

boomerang annealing Command

To configure the maximum number of previous winners and total number of content routing agents that can be used in each DNS race, use the **boomerang annealing** command.

boomerang annealing past-winners *win-number* **agent-count** *agent-number*

Syntax Description		
	past-winners	Specifies maximum number of previous DNS race winners that can be used in the next DNS race.
	<i>win-number</i>	Number of previous winners (0 to 8).
	agent-count	Specifies total number of agents that can participate in each DNS race.
	<i>agent-number</i>	Number of agents (1 to 40).

Defaults The default **past-winners** value is 3. The default **agent-number** value is 10.

Command Modes Global configuration

Usage Guidelines Use the **boomerang annealing** command to configure the number of maximum number of previous winners and the total number of agents used in each DNS race. For example, if *agent-number* is 20, the first DNS server to send a request to the Content Router receives 20 DNS responses from 20 randomly selected agents. This is called the “DNS race.” The first agent response received is the winner of the DNS race and therefore is the site to which the user will connect. When the same DNS server sends another request, the Content Router routes responses from the winner of the first race plus 19 other randomly selected agents. The third time the same DNS server sends a request, the last two race winners, plus 18 random agents are used, and so on. If *win-number* is set at 3, three is the maximum number of previous race winners that can be included in the race.

To configure the Content Router to send out as many random DNS replies as possible (up to 40), use the **no** command. For example:

```
Console (config-domain)# no boomerang annealing
```



Note

The **no boomerang annealing** command does not set boomerang annealing to default values. Instead, it allows the Content Router to send out as many random DNS replies as possible, up to 40.

Examples Console (config)# **boomerang annealing past-winners 5 agent-number 9**

boomerang client-list Command

To enter client-list configuration mode in order to edit or create a new list of content routing agents, use the **boomerang client-list** global configuration command.

boomerang client-list *list-name*

Syntax Description	<i>list-name</i> Name of client list (list of agents).
Defaults	No default behavior or values
Command Modes	Global configuration
Usage Guidelines	Use this command to enter client-list configuration mode. Use <i>list-name</i> to specify the name of the list of content routing agents that you want to edit or to specify a new name for a new list. After using this command, use the client command to create or edit a client list.
Examples	Console (config)# boomerang client-list List_A
Related Commands	client client-group

boomerang database Command

To generate a database file of recent DNS race winners, use the boomerang database EXEC command.

```
boomerang database {dump | restore}
```

Syntax Description	Command	Description
	dump	Generates a database of recent DNS race winners in the text file /local/boom.db.
	restore	Restores previous boom.db file contents after the system reboots.

Defaults No default behaviors or values

Command Modes EXEC

Usage Guidelines Use the **boomerang database dump** command to generate a record of the eight previous DNS race winners for each DNS server that made a request in each domain. If the same agent won more than one of the eight previous races, you will see fewer than eight agents listed. This text file (/local/boom.db) is stored in memory. A total of 131072 (1024 x 128k) entries can be stored in the boom.db file. After you reboot the Content Router, you can use the **boomerang database restore** command to restore the previous boom.db file contents.

Examples

```
Console# boomerang database dump
Console# boomerang database restore
```


boomerang timing Command

To configure the decay and sample frequency values of a domain, use the **boomerang timing** global configuration command.

```
boomerang timing {decay decayvalue}{sample-freq samp-freqvalue}
```

Syntax Description	Parameter	Description
	decay	Specifies how to weight the latest round trip time (RTT) measurement. A lower decay value gives higher priority to recent measurements.
	<i>decayvalue</i>	Decay value (1 to 10). The default value is 2.
	sample-freq	Sets how many times per minute to sample the delay between the Content Router and the content routing agent.
	<i>samp-freqvalue</i>	Sample frequency value in number of times per minute (1 to 600). The default value is 6.

Defaults

The default **decay** value is 2. The default **samp-freq** value is 6.

Command Modes

Global configuration

Examples

```
Console (config)# boomerang timing decay 5  
Console (config)# boomerang sample-freq 24
```

client-group Command

To assign a client list (list of content routing agents) to a domain, use the **client-group** domain configuration mode command.

client-group *list-name*

Syntax Description	<i>list-name</i>	Name of client-list.
--------------------	------------------	----------------------

Defaults	No default behaviors or values
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Command Modes	Domain configuration
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Usage Guidelines	To use a client list for another domain, use the boomerang dns domain command to enter domain configuration mode for the domain, and then use the client-group command to specify the client list you want to use.
------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Examples To reuse client list List_A for domain www.mydomain.com, enter the following commands:

```
Console (config)# boomerang dns domain www.mydomain.com
Console (config-domain)# client-group List_A
```

Changed Commands in Release 1.1

This section describes the commands that have changed since the Content Router 4400 software, Release 1.0.

boomerang dns domain Command

The **decay** and **sample-freq** command options have been incorporated into the new **boomerang timing** command option.

client Command

The **client** command consists of the same syntax used in Release 1.0, but in Release 1.1 it is now a client-list configuration mode command. Use this command to assign content routing agents to the client list specified by the **boomerang client-list** command. For example:

```
Console (config)# boomerang client-list List_A
Console (config-client-lis)# client 10.2.3.4
Console (config-client-lis)# client 10.2.5.7
Console (config-client-lis)# client 10.2.6.8
Console (config-client-lis)# client 10.2.7.9
```

To remove a client from a list, use the **no** command in client-list configuration mode. For example:

```
Console (config-client-lis)# no client 10.2.3.4
```

show boomerang Command

The **show boomerang** EXEC command output has been modified to support new features in this release. Content routing agents are displayed according to their assigned list, and associated client groups are displayed under each domain name. (Agents are described as “clients” in the output.) The **show boomerang** command also displays new denial-of-service prevention data. In addition, new command options have been added.

For context, the entire **show boomerang** command is described below.

```
show boomerang {all / client-list list-name / domain domain-name / global}
```

Syntax Description	boomerang	Displays boomerang-specific configuration information.
	all	Displays all of the show boomerang information.
	client-list	Displays configuration information for specified client list.
	<i>list-name</i>	Name assigned to a list of content routing agents with the boomerang client-list command.
	domain	Displays configuration information for specified domain.
	<i>domain-name</i>	Name of domain (for example, www.foo.com).
	global	Displays boomerang global DNS statistics.

Defaults No default behavior or values

Command Modes EXEC

Usage Guidelines On a Content Router, this command displays the current average latency between the Content Router and its content routing agents. (Agents are described as “Boomerang Clients” in the output.) If the agent is repeatedly unreachable, the word “unknown” is displayed instead of a number. See [Table 0-1 on page 13](#) for a breakdown of the information displayed by the show boomerang command.



Note The delay time for agents may differ from one domain to another because of updates during the execution of the command.

Denial-of-Service Attack Prevention

This command also shows the number of DNS packets received that have a bogus IP source address. Packets bearing these source addresses are typically used with the intention of using the Content Router in a denial-of-service attempt, or to overload the Content Router. Packets with these source addresses are discarded by the Content Router in direct mode, and reinserted into the original packet stream in WCCP mode. Bogus IP source addresses include the following:

- Global broadcast (255.255.255.255)
- 16-bit broadcast (x.y.255.255)

- 24-bit broadcast (x.y.z.255.255)
- Directed broadcast
- Multicast (Class D) (239.255.255.255 to 244.0.0.0)
- Loopback (127.0.0.0 to 127.255.255.255)
- Experimental (240.0.0.0 to 255.255.254)
- Content Router's own IP address
- IP addresses of multiple DNS requests sent by the same server to the same domain within the same second



Note

If a possible denial-of-service attempt occurs, the following syslog message is displayed:

```
possible Denial-of-Service attack from 127.2.2.1 on domain www.mydomain.com; ignoring DNS query!
```

Examples

```
Console# show boomerang all
```

```
DNS packets with unknown domain:0
Number of PTR Type requests (valid/invalid/total):15/0/15
```

Domain or Alias	A pkts	SOA pkts	MX pkts	Unsupported
www.boomexample.com	28	4	5	0
www.boomtest.org	14	1	7	0

```
Client Group:list1
Maximum Configured Delay: 500 msec
23 queries sent to resolvers, 12 responses received
```

Client List:list1	One-way Delay (msec)	Probe Timeouts	Races Won	
10.2.3.4	23.741	0%	5	21.7%
10.2.4.4	303.908	0%	0	0.0%
10.2.5.4	63.695	0%	2	8.6%
10.2.6.4	83.718	0%	2	8.6%
10.2.7.4	103.544	0%	0	0.0%
10.2.8.6	203.620	0%	0	0.0%

Client List:list2	One-way Delay (msec)	Probe Timeouts	Races Won	
10.2.8.7	203.646	0%	0	0.0%
10.2.8.8	203.636	0%	0	0.0%
10.2.8.9	202.965	0%	0	0.0%
10.2.8.10	unknown	100%	0	0.0%

```
1 minute input rate 0 requests/sec, output rate 0 services/sec
5 minute input rate 0 requests/sec, output rate 0 services/sec
10 minute input rate 0 requests/sec, output rate 0 services/sec
current counts:50 requests, 44 fulfills, 0 fails
23 queries sent to resolvers, 12 responses received
0 bogus source address, 0 bogus length
0 bogus client source address, 0 no buffer
2 elements in dproxy-domain database, 5 denial-of-service attempts
```

Table 0-1 describes the fields in the display.

Table 0-1 show boomerang Field Descriptions

Field	Description
DNS packets with unknown domain	Number of DNS packets received in which the domain has not been configured on the system.
Number of PTR Type requests	Number of PTR Type requests.
Domain or Alias	Name or alias of the current domain.
A pkts	Number of DNS Address packets received.
SOA pkts	Number of DNS Start of Authority packets received.
MX pkts	Number of DNS Mail eXchange (MX) packets received.
Unsupported	Number of DNS requests other than A, SOA, or MX packets. (These unsupported packets are discarded.)
Client group	Name of client list assigned to this domain.
Maximum Configured Delay	Configured maximum one-way delay. (One-way delays greater than this value are reduced to this value.)
Queries sent to resolvers	Number of DNS queries sent to resolvers.
Responses received	Number of DNS responses received.
Client list	Name of client list. The agents in the client list are listed below this heading.
One-way Delay	Observed delay in packets sent from the Content Router to the agent. Calculated by dividing the round trip time by 2.
Probe Timeouts	Percentage of keepalive probes sent to the agent for which a response was not received.
Races won	Number of DNS races this agent won.
input rate	Average number of valid DNS requests received per second over the past 1, 5, and 10 minutes.
output rate	Average number of valid DNS requests serviced per second over the past 1, 5 and 10 minutes.
current counts	DNS request counts.
requests	Total number of valid DNS requests.
fulfills	Total number of valid DNS requests sent to agents.
fails	Total number of valid DNS requests that failed to be serviced. (Usually due to lack of memory.)
bogus source addresses	Number of bogus source addresses received. (See the show boomerang “Usage Guidelines” section.)
bogus length	Number of times a packet of the wrong length was received.
no buffer	Number of times a free packet was requested when none were available.

Table 0-1 show boomerang Field Descriptions (continued)

Field	Description
elements in dproxy-domain database	Number of elements in the dproxy (DNS server) domain database. (There is one element for every unique combination of DNS server and content routing domain.)
denial-of-service attempts	Number of times denial-of-service attempts were detected.

show running-config Command

A new **boomerang** command option has been added to the **show running-config EXEC** command. This option allows you to request client-list-specific and domain-specific configuration information. The full **show running-config** command is described below.

```
show running-config [boomerang {client-list list-name | domain domain-name}]
```

Syntax Description	
boomerang	(Optional.) Displays boomerang-specific configuration information.
client-list	Displays configuration information for specified client list.
<i>list-name</i>	Name assigned to a list of agents with the boomerang client-list command.
domain	Displays configuration information for specified domain.
<i>domain-name</i>	Name of domain (for example, www.foo.com).

Defaults No default behavior or values

Command Modes EXEC

Usage Guidelines Use this command in conjunction with the **show startup-config** command to compare the information in running memory to the startup configuration used during bootup.

Examples

```
Console# show running-config
Building configuration...
Current configuration:
!
!
!
user add admin uid 0 capability admin-access
!
!
!
hostname CR4430
!
interface ethernet 0
ip address 10.2.2.8 255.255.255.0
ip broadcast-address 10.2.2.255
exit
!
```

```

interface ethernet 1
  exit
!
ip default-gateway 10.2.2.1
ip name-server 10.2.2.6
ip route 0.0.0.0 0.0.0.0 10.2.2.1
cron file /local/etc/crontab
!
!
!
!
boomerang dns enable direct-mode
!
boomerang dns domain www.boomexample.com
  key 7 15060elf10
  origin-server 10.2.2.6 boomexample.com
  client-group list1
!
boomerang client-list list1
  client 10.2.3.4
  client 10.2.4.4
  client 10.2.5.4
  client 10.2.6.4
  client 10.2.7.4
  client 10.2.8.6
!
boomerang client-list list2
  client 10.2.8.7
  client 10.2.8.8
  client 10.2.8.9
  client 10.2.8.10

```

Installation Notes

Before upgrading your Content Router to Release 1.1, upgrade any associated content routing agents to software that is compatible with Content Routing software, Release 1.1. For example, if you are using Content Engines as content routing agents, upgrade them to Cisco Cache software, Release 2.5 before installing a new Content Router.



Caution

There is no supported path for downgrading to Release 1.0 after you upgrade to Release 1.1. Remember to save a backup copy of your Release 1.0 configuration.



Note

Cisco Content Routing software, Release 1.1 is not compatible with Cisco Cache software, Release 2.4.

Important Notes

All communications between the Content Router and the content routing agents take place on UDP port 1304.

Caveats

Open Caveats - Release 1.1

- CSCds44289

Symptom: If you configure a nonexistent content routing agent on the Content Router, the **show boomerang** command may display a delay value for the nonexistent agent.

Probable Cause: This can occur when a Content Router is trying to reach a nonexistent agent that, if it existed, would be behind a firewall. Because the firewall answers the Content Router probe, the Content Router erroneously indicates connection with the nonexistent agent.

Workaround: During configuration, be sure to enter the correct IP addresses of the content routing agents.

- CSCds44283

Symptom: The command-line interface (CLI) freezes and the Content Router becomes unusable if the Content Router is experiencing a load beyond its capacity.

Workaround: When this freeze occurs, unplug the Ethernet cable and then plug it back in.

Related Documentation

Cisco Content Routing Software Configuration Guide and Command Reference, Release 1.1

Cisco Cache Software Command Reference, Release 2.5.0

Cisco Cache Software Configuration Guide, Release 2.5.0

Release Notes for Cisco Cache Software, Release 2.5.0

Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

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<http://www.cisco.com/go/subscription>
- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

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Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-9883

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<http://www.cisco.com>

Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

<http://www.cisco.com/register/>

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

<http://www.cisco.com/tac/caseopen>

Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.
- P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

This document is to be used in conjunction with the documents listed in the “Related Documentation” section.

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