DistributedDirector Boomerang Support

Note Effective with Cisco IOS Release 12.4(24)T, this feature is not available in Cisco IOS software.

Feature History

Release	Modification
12.2(8)T	Boomerang support was introduced.
12.4(24)T	This feature was removed.

This document describes boomerang support for DistributedDirector in Cisco IOS Release 12.2(8)T. It includes the following sections:

Feature Overview

Boomerang is a Director Response Protocol (DRP) metric for DistributedDirector. The boomerang server provides a way to select a content server with the fastest response time from a group of redundant content servers. Instead of relying on static maps, boomerang dynamically recognizes problems such as congestion and link failures and avoids them. The content server with the fastest response time, as determined by the priority of the configured metrics, is determined to be the best site.

When the boomerang metric is active, DistributedDirector instructs the DRP to send Domain Name System (DNS) responses directly back to the querying client. The DNS response contains the addresses of the sites associated with the particular DRP agent. All involved DRPs send back their DNS responses

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at the same time. The packet of the DRP that is closest to the client will arrive first. The client may take the first answer and ignore subsequent ones, a standard behavior of all local DNS server implementations. The DRP agent allows configuration for full boomerang support.

The boomerang metric may or may not be used by DistributedDirector. Whether the boomerang metric is used depends on whether other metrics are specified at higher priority (and therefore have a lower priority number) than the boomerang metric. If a metric at higher priority successfully determines the best site, then that is what DistributedDirector uses. DistributedDirector reaches the boomerang metric only if all other metrics of higher priority than boomerang are unable to determine the best site.

If and when the boomerang metric is reached, all other metrics after it (that is, metrics that have a lower priority and a higher priority number) are effectively ignored. They are ignored because the actual resolution of the best site is determined not by DistributedDirector but by which boomerang reply reaches the DNS client first. DistributedDirector is not made aware of the best site as determined by the boomerang metric.

The boomerang metric can be used alone or along with other metrics at the same or different priority levels. If boomerang is specified at the same priority as other metrics, then boomerang decides the best site. If boomerang is specified with other metrics at different priorities, then the higher-priority metrics are examined in turn until there is no tie among sites, with the result that the best site can be determined. If the consideration extends to the boomerang metric, then boomerang is the deciding metric. All other metrics of a higher priority number (lower priority) than boomerang are ignored. The concept of weight does not apply to the boomerang metric.

The DRP is a simple User Datagram Protocol (UDP)-based application developed by Cisco Systems. It enables the Cisco DistributedDirector product to query routers (DRP Server Agents) in the field for Border Gateway Protocol (BGP) and Interior Gateway Protocol (IGP) routing table metrics between distributed servers and clients. DistributedDirector, a separate standalone product, uses DRP to transparently redirect end-user service requests to the topologically closest responsive server. DRP enables DistributedDirector to provide dynamic, scalable, and “network intelligent” Internet traffic load distribution among multiple geographically dispersed servers.

DRP Server Agents are border routers (or peers to border routers) that support the geographically distributed servers for which DistributedDirector service distribution is desired. Note that, because DistributedDirector makes decisions based on BGP and IGP information, all DRP Server Agents must have access to full BGP and IGP routing tables.

Benefits

The boomerang metric provides a way to select a site with the fastest response time. Instead of relying on static maps, it dynamically recognizes congestion and link failures and avoids them.

Restrictions

Both DistributedDirector and the DRP agents should be able to communicate with each other using the boomerang protocol. Therefore, when DistributedDirector is upgraded to include the boomerang functionality, the DRP agents must be made aware of the presence of the boomerang protocol.

Related Features and Technologies

- Director Response Protocol
- User Datagram Protocol

- Border Gateway Protocol
- Interior Gateway Protocol

Related Documents

- *Boomerang Support in the DRP Agent*, Cisco IOS Release 12.2(8)T feature module
- "Configuring IP Services" chapter of *Cisco IOS Configuration Fundamentals Configuration Guide,* Release 12.2

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release.

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

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new MIBs are supported by this feature.

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

No new RFCs are supported by this feature.

Prerequisites

You must be using DistributedDirector with DRP metrics, including boomerang.

Configuration Tasks

See the following sections for configuration tasks for the boomerang metric feature. Each task in the list is identified as either required or optional.

- Setting DistributedDirector and DRP Clock Synchronization (optional)
- Configuring the Default Metric (optional)

- Specifying the Host Priority of the Boomerang Metric (required)

Setting DistributedDirector and DRP Clock Synchronization

To activate clock synchronization between of the DistributedDirector and the DRP clocks, use the **ip director drp synchronized** command.

Command	Purpose
`Router(config)# ip director drp synchronized`	Activates or deactivates clock synchronization between DistributedDirector and the DRP.

To deactivate clock synchronization between DistributedDirector and DRPs, use the **no ip director drp synchronized** command.

Command	Purpose
`Router(config)# no ip director drp synchronized`	Deactivates clock synchronization between DistributedDirector and the DRP.

Configuring the Default Metric

To set the boomerang metric as the default metric, use the **ip director default priorities boomerang** command.

Command	Purpose
`Router(config)# ip director default priorities boomerang 1`	Configures DistributedDirector to select a server using the boomerang metric at priority level *num*, where *num* is 1.

To remove boomerang as the default metric, use the **no ip director default priorities boomerang** command.

Command	Purpose
`Router(config)# no ip director default priorities`	Removes boomerang as the default metric.

Specifying the Host Priority of the Boomerang Metric

To configure the order in which DistributedDirector considers metrics when selecting a server, use the **ip director host priority** command.

Command	Purpose
`Router(config)# ip director host boom1 priority boomerang`	Configures DistributedDirector to select a server using the boomerang metric, where *hostname* is boom1.

To deactivate all priorities on all metrics associated with the defined hostname, use the **no** form of this command.

Command	Purpose
`Router(config)# no ip director host boom1 priority`	Deactivates all priorities on all metrics associated with the defined hostname, where *hostname* is boom1.

Verifying Boomerang Information

Step 1 To verify that the boomerang metric is configured, enter the **show running-config** command.

```
Router# show running-config

ip host boom1 172.22.2.10 172.22.2.20 172.22.2.30
ip director server 172.22.2.20 drp-association 172.24.4.2
ip director server 172.22.2.30 drp-association 172.24.4.3
ip director server 172.22.2.10 drp-association 172.24.4.1
ip director host boom1
no ip director cache
ip dns primary boom1 soa boom1 boom1@com
ip director host boom1 priority boomerang 1
no ip director drp synchronized
```

Step 2 To view information about all hosts, enter the **show ip director** command.

```
Router# show ip director

Distributed Director status:
Queries received: 0
Queries replied: 0
Queries received in the last second: 0
Queries received in the last minute: 0
Incomplete information selections: 0
TTL for reply RRs when sorted by DD: 0 secs
Queries awaiting processing by DD: 0
Queries awaiting metric info = 0
Director cache is on
Cache time for sort cache entries: 60 secs
Director sort cache hits = 0
Director Response Protocol:
  0 requests, 0 replies, 0 requeries, 0 bad replies
  Authentication key-chain "not defined"
  Output queue length = 0
  Maximum DRP query retry number = 2
  Timeout for each DRP lookup query = 1 secs
  Timeout for each DRP measurement query = 4 secs
```

Step 3 To view information about a specified host, enter the **show ip director host** command. The following command provides information about a host named boom1.

```
Router# show ip director host boom1

Host boom1 (A queries):
  Queries received: 0, queries replied: 0
  Servers:
    Server 172.22.2.10:
      Advertised 0 times as best server, last at never
      Server status: Untested, updated never
  Host specific priorities:
```

```
    Boomerang evaluation = 1
```

Configuration Examples

This section provides the following configuration examples:

- Setting DistributedDirector and DRP Clock Synchronization Example
- Configuring the Default Metric Example
- Specifying the Host Priority of the Boomerang Metric Example

Setting DistributedDirector and DRP Clock Synchronization Example

In the following example, DistributedDirector and DRP clock synchronization is activated:

```
Router(config)# ip director drp synchronized

Router# show running-config

ip host boom1 172.22.2.10 172.22.2.20 172.22.2.30
ip director server 172.22.2.20 drp-association 172.24.4.2
ip director server 172.22.2.30 drp-association 172.24.4.3
ip director server 172.22.2.10 drp-association 172.24.4.1
ip director host boom1
.
.
.
ip director drp synchronized
```

Configuring the Default Metric Example

In the following example, the boomerang metric is specified with a priority of 1:

```
Router(config)# ip director default priorities boomerang 1

Router# show running-config

ip host boom1 172.22.2.10 172.22.2.20 172.22.2.30
.
.
.
ip director host boom1
no ip director cache
ip dns primary boom1 soa boom1 boom1@com
ip director host boom1 priority boomerang 1
```

Specifying the Host Priority of the Boomerang Metric Example

The following example specifies the per-host priority of the metric, with a host named boom1, where the DRP internal metric is specified with a priority number of 1 and boomerang is specified with a priority number of 2:

```
Router(config)# ip director host boom1 priority drp-int 1 boomerang 2

Router# show running-config

ip host boom1 172.22.2.10 172.22.2.20 172.22.2.30
.
.
.
ip director host boom1
no ip director cache
ip dns primary boom1 soa boom1 boom1@com
ip director host boom1 priority drp-int 1 boomerang 2
```