



Configuring the DNS Sticky Feature

This chapter provides an overview of the CSS Domain Name System (DNS) Sticky feature and describes how to configure it for operation. Information in this chapter applies to all CSS models, except where noted.



Note

The DNS Sticky feature requires the CSS Enhanced feature set license.

This chapter provides the following major sections:

- [Overview of DNS Sticky](#)
- [DNS Sticky Quick-Start Procedures](#)
- [Converting Content Rule-Based DNS to Zone-Based DNS](#)
- [Configuring DNS Sticky Parameters](#)
- [Displaying DNS Sticky Statistics](#)

Overview of DNS Sticky

Configure DNS Sticky on a CSS to ensure that e-commerce clients remain connected to a particular server for the duration of a transaction even when the client's browser refreshes the DNS mapping. While some browsers allow client connections to remain for the lifetime of the browser instance or for several hours, other browsers impose a connection limit of 30 minutes before requiring a DNS re-resolution. This may not be long enough for a client to complete an e-commerce transaction. A new DNS resolution could cause the client to connect to a server different from the original server and interrupt the transaction. DNS Sticky ensures that a client can complete a transaction if a DNS re-resolution occurs.

DNS Sticky extends the functionality of global server load balancing (GSLB) and Network Proximity by providing:

- **Stickiness on a per domain basis** - Allows you to configure DNS Sticky only on the domains you want.
- **Zone-based DNS** - Provides service for configured domains in a maximum of 256 zones using the roundrobin, preferlocal, least-loaded, or srcip (source IP address) load-balancing method.
- **Global Sticky Database (GSDB)** - Maintains a database of sticky mappings and provides appropriate responses to DNS Sticky queries from CSSs configured as authoritative DNS servers. The GSDB is a dedicated CSS 11150 with 256 MB of RAM configured as a sticky database. You configure a GSDB on a CSS configured as a Proximity Database (PDB) in each GSLB zone.

You can configure DNS Sticky in three different environments, depending on your current configuration and business needs as follows:

- [DNS Sticky Without a GSDB](#)
- [DNS Sticky with a GSDB](#)
- [DNS Sticky in a Network Proximity Environment](#)

DNS Sticky Without a GSDB

DNS Sticky without a GSDB in a GSLB environment provides a static, simple, and cost-effective solution to the DNS sticky problem. This solution:

- Allows you to configure DNS Sticky on the domains you want
- Uses the srcip load-balancing method to keep clients connected to a particular zone based on a srcip hash
- Provides services for domains in a maximum of 256 zones (using two tier2 levels)
- Does not require the configuration of a dedicated GSDB

In a GSLB sticky configuration without a GSDB, the CSS configured as an authoritative DNS server selects a server for a sticky domain request based on the srcip hash (regardless of the default load-balancing method) and the availability of the domain in the zone mesh. The use of the srcip hash ensures that the CSS selects a consistent zone for a given source IP address.

DNS Sticky with a GSDB

DNS Sticky with a GSDB in a GSLB environment provides a more robust sticky load-balancing solution than one without a GSDB. This solution includes all of the benefits of DNS Sticky without a GSDB, plus:

- A GSDB to keep track of sticky mappings and provide responses to requests for sticky-enabled domains
- Configuration of up to two GSDB interfaces on the authoritative CSS DNS server for redundancy purposes
- More effective sticky load balancing across all domain sites using the least-loaded load-balancing method



Note

If you configure a GSDB and any sticky domains in a particular zone, you must configure all sticky domains participating in the peer mesh in that same zone. Otherwise, the thrashing of the sticky zone index could cause DNS Sticky to fail. For details on configuring sticky domains, see the “[Configuring Domain Records](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

In a GSLB sticky configuration with a GSDB, a CSS configured as an authoritative DNS server sends a lookup request to the GSDB for a sticky domain requested by a client. If the GSDB finds an entry for the client's local DNS server IP address in its sticky database, it returns the sticky zone index to the CSS. The CSS uses the sticky zone index and keepalive information to send the appropriate IP address to the client. If the GSDB does not have an entry for the client's local DNS server IP address or the zone in the sticky zone index returned by the GSDB is unavailable, the CSS selects a zone in the mesh based on the configured load-balancing method and informs the GSDB about the selected zone.

**Note**

Configuring a GSDB requires the prior configuration of a Proximity Database (PDB) on the same CSS. For details on configuring a PDB, see the “[Configuring a Proximity Database](#)” section in [Chapter 5, Configuring Network Proximity](#).

DNS Sticky in a Network Proximity Environment

Configure DNS Sticky in a Network Proximity environment to add stickiness to your network. This solution adds all the benefits of DNS Sticky with a GSDB to your existing proximity configuration. In this case, you can specify critical e-commerce sites as sticky domains and use proximity for your other domains.

In a Network Proximity environment, you configure a GSDB on the CSS configured as a Proximity Database (PDB) and at least one GSDB interface on the Proximity Domain Name Server (PDNS) in each zone. The IP address of the primary **GSDB interface** is typically the same as the PDB IP address. In addition, you configure sticky domain records using the **dns-record** command.

When a CSS configured as a PDNS receives a client request for a sticky domain, the PDNS first consults the GSDB. If a sticky database entry exists for the client's local DNS server IP address, the PDNS sends the appropriate IP address to the client based on the zone index returned by the GSDB. If a sticky database entry does not exist for the client's local DNS server IP address, the PDNS consults the PDB for a Proximity-based answer. The PDNS formulates a response to the client based on the ordered zone index returned by the PDB and keepalive information. The PDNS informs the GSDB about the selected zone.

If neither the GSDB nor the PDB returns a suitable response, the PDNS selects a zone based on its configured default load-balancing method to formulate an appropriate response to the client and informs the GSDB about the selected zone.

For details on configuring Network Proximity, see [Chapter 5, Configuring Network Proximity](#).

DNS Sticky Quick-Start Procedures

The following sections provide the procedures required to configure DNS Sticky on a CSS.

Configuring DNS Sticky without a GSDB

[Table 2-1](#) provides a quick overview of the steps required to configure DNS Sticky on a CSS without a GSDB. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the DNS Sticky commands later in this chapter.

Table 2-1 *DNS Sticky Without a GSDB Configuration Quick Start*

| Task and Command Example |
|--|
| <ol style="list-style-type: none">1. On a CSS that you want to configure DNS Sticky without a GSDB, enter config mode. <pre># config (config)#</pre> |
| <ol style="list-style-type: none">2. Enable Application Peering Protocol (APP). See the “Configuring the Application Peering Protocol” section in Chapter 1, Configuring the CSS as a Domain Name System Server. <pre>(config)# app</pre> |
| <ol style="list-style-type: none">3. Configure the DNS server zone. Specify the zone, tier number, and an optional text description. Do not enter a Proximity Database (PDB) IP address. See the “Configuring DNS Server Zones” section in Chapter 1, Configuring the CSS as a Domain Name System Server. <pre>(config)# dns-server zone 0 tier1 "usa"</pre> |

Table 2-1 *DNS Sticky Without a GSDB Configuration Quick Start (continued)***Task and Command Example**

4. Configure APP sessions with other DNS servers (if any) that are participating in the peer mesh. The IP address you enter is a local interface address (circuit address) on the DNS server in another zone. See the “[Configuring the Application Peering Protocol](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# app session 172.27.16.5
```

5. Configure sticky domain records. See the “[Configuring Sticky Domain Records](#)” section later in this chapter.

```
(config)# dns-record a www.home.com 192.168.1.5 15 single kal-ap
172.27.25.4 50 sticky-enabled
(config)# dns-record ns www.work.com 192.168.12.7 15 single
kal-ap 172.27.33.3 100 default sticky-enabled
```

6. Configure the CSS to act as a DNS server. See the “[Configuring a DNS Server](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# dns-server
```

The following running-config example shows the results of entering the commands described in [Table 2-2](#).

```
!***** GLOBAL *****
 dns-server zone 0 tier1 "usa"
 dns-record a www.home.com 192.168.1.5 15 single kal-ap 172.27.25.4
50 sticky-enabled
 dns-record ns www.work.com 192.168.12.7 15 single kal-ap 172.27.33.3
100 default sticky-enabled
 dns-server

 app
 app session 172.27.16.5
```

Configuring DNS Sticky with a GSDB

The following sections describe the steps required to configure DNS Sticky with a GSDB. You can configure the GSDB and the DNS server in any order.

Global Sticky Database Configuration Quick Start

[Table 2-2](#) provides a quick overview of the steps required to configure the GSDB on a CSS. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the DNS Sticky commands later in this chapter.

Table 2-2 *Global Sticky Database Configuration Quick Start*

Task and Command Example

1. On a dedicated CSS 11150 with 256 MB of RAM that you want to configure as a Global Sticky Database (GSDB), enter config mode.

```
# config
(config)#
```

2. Enable the Application Peering Protocol-User Datagram Protocol (APP-UDP) to allow the GSDB to communicate with the CSS authoritative DNS server in the same zone. See the [“Configuring APP-UDP and APP”](#) section in [Chapter 5, Configuring Network Proximity](#).

```
(config)# app-udp
```

3. Enable the Application Peering Protocol (APP) to allow the GSDB to communicate with other GSDBs. See the [“Configuring the Application Peering Protocol”](#) section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# app
```

4. Configure APP sessions with other GSDBs that are participating in the peer mesh with this GSDB. The IP address you enter is a local interface address on another GSDB. See the [“Configuring the Application Peering Protocol”](#) section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# app session 172.27.16.3
```

Table 2-2 Global Sticky Database Configuration Quick Start (continued)**Task and Command Example**

5. Configure a Proximity Database (PDB) if not already configured. (To configure a GSDB, you must configure a PDB first.) For details on configuring a PDB, see the [“Configuring a Proximity Database”](#) section in [Chapter 5, Configuring Network Proximity](#).

```
(config)# proximity db 0 tier1 "usa"
```

6. Enable the GSDB.

```
(config)# gsdb
```

7. Optionally, configure the time-to-live (TTL) in seconds for the GSDB sticky entries. Enter an integer between 300 and 1000000. The default is 7200 seconds (2 hours).

```
(config)# gsdb ttl 14400
```

The following running-config example shows the results of entering the commands described in [Table 2-2](#).

```
!***** GLOBAL *****
app-udp

proximity db 0 tier1 "usa"
gsdb
gsdb ttl 14400

app
app session 172.27.16.3
```

DNS Server Configuration Quick Start

[Table 2-3](#) provides a quick overview of the steps required to configure the DNS Sticky feature on a CSS acting as an authoritative DNS server and using a GSDB. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the DNS Sticky commands later in this chapter.

Table 2-3 *DNS Server Configuration Quick Start*

Task and Command Example

1. On a CSS different from the GSDB, but in the same zone, enter config mode.

```
# config
(config)#
```

2. Enable APP-UDP to allow the CSS to communicate with the GSDB. See the “[Configuring APP-UDP and APP](#)” section in [Chapter 5, Configuring Network Proximity](#).

```
(config)# app-udp
```

3. Enable Application Peering Protocol (APP). See the “[Configuring the Application Peering Protocol](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# app
```

4. Configure up to two interfaces on the CSS to communicate with the GSDB. See the “[Configuring the Global Sticky Database Interface](#)” section later in this chapter.

```
(config)# gsdb-interface primary 192.168.68.12
(config)# gsdb-interface secondary 192.168.68.13
```

5. Configure the DNS server zone for zone-based DNS. Specify the zone, tier number, and an optional text description. Do *not* enter a PDB IP address. See the “[Configuring DNS Server Zones](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# dns-server zone 0 tier1 "usa"
```

Table 2-3 DNS Server Configuration Quick Start (continued)**Task and Command Example**

6. Configure the CSS to act as a DNS server. See the “Configuring a DNS Server” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# dns-server
```

7. Configure APP sessions with other DNS servers (if any) that are participating in the peer mesh with this zone. The IP address you enter is a local interface address on the DNS server in another zone. See the “Configuring the Application Peering Protocol” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

```
(config)# app session 172.27.16.5
```

8. Configure A-records and NS-records on the CSS. Use the **sticky-enabled** option for those domains that clients will use for e-commerce applications and any other applications requiring stickiness. See the “Configuring Sticky Domain Records” section later in this chapter.

```
(config)# dns-record a www.home.com 192.168.1.1 15 single kal-ap
172.27.25.4 50 sticky-enabled
(config)# dns-record ns www.work.com 192.172.12.1 15 single
kal-ap 172.27.33.3 100 default sticky-enabled
```

The following running-config example shows the results of entering the commands described in [Table 2-3](#).

```
!***** GLOBAL *****
app-udp

dns-server zone 0 tier1 "usa"
dns-record a www.home.com 192.168.1.1 15 single kal-ap 172.27.25.4
50 sticky-enabled
dns-record ns www.work.com 192.168.12.1 15 single kal-ap 172.27.33.3
100 default sticky-enabled
gsdb-interface primary 192.168.68.12
gsdb-interface secondary 192.168.68.13
dns-server

app
app session 172.27.16.5
```

Configuring DNS Sticky with Network Proximity

The following sections describe the steps required to configure DNS Sticky in an existing Network Proximity configuration. For details on configuring Network Proximity, see [Chapter 5, Configuring Network Proximity](#).

Global Sticky Database Configuration Quick Start

[Table 2-4](#) provides a quick overview of the steps required to configure the GSDB on a PDB. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the DNS Sticky commands later in this chapter.

Table 2-4 *Global Sticky Database Configuration Quick Start*

Task and Command Example

1. On a PDB (CSS 11150 with 256 MB of RAM configured as a Proximity Database) that you want to configure as a Global Sticky Database (GSDB), enter config mode.

```
# config
(config)#
```

2. Enable the GSDB.

```
(config)# gsdb
```

3. Optionally, configure the time-to-live (TTL) in seconds for the GSDB sticky entries. Enter an integer between 300 and 1000000. The default is 7200 (2 hours).

```
(config)# gsdb ttl 14400
```

DNS Server Configuration Quickstart

[Table 2-5](#) provides a quick overview of the steps required to configure the DNS Sticky feature on a PDNS. Each step includes the CLI command required to complete the task. For a complete description of each feature and all the options associated with the CLI commands, see the DNS Sticky commands later in this chapter.

Table 2-5 *DNS Server Configuration Quick Start*

| Task and Command Example |
|---|
| <p>1. On a CSS that you want to configure DNS Sticky, enter config mode.</p> <pre># config (config)#</pre> |
| <p>2. Configure up to two interfaces on the CSS to communicate with the GSDB. See “Configuring the Global Sticky Database Interface” later in this chapter.</p> <pre>(config)# gsdb-interface primary 192.168.68.1 (config)# gsdb-interface secondary 192.168.68.2</pre> |
| <p>3. Configure A-records and NS-records on the CSS. Use the sticky-enabled option for those domains that clients will use for e-commerce applications and any other applications requiring stickiness. See “Configuring Sticky Domain Records” later in this chapter.</p> <pre>(config)# dns-record a www.home.com 192.168.1.1 15 single kal-ap 172.68.25.1 50 sticky-enabled (config)# dns-record ns www.work.com 192.168.12.1 15 single kal-ap 172.92.33.1 100 default sticky-enabled</pre> |

Converting Content Rule-Based DNS to Zone-Based DNS

DNS Sticky requires a zone-based DNS configuration. If you currently have a content rule-based DNS configuration, use the following procedure to convert your DNS configuration to a zone-based DNS configuration.

1. Remove all rule-based DNS commands from the existing configuration by issuing the “no” form of the commands. For example:

```
(config)# no dns-peer interval
(config)# no dns-peer receive-slots
(config)# no dns-peer send-slots

(config-owner)# no dns

(config-owner-content)# remove dns
(config-owner-content)# no dns-balance
```

2. Use the **dns-server zone** command to create zone information for each network location. See the “[Configuring DNS Server Zones](#)” section in [Chapter 1, Configuring the DNS Sticky Feature](#).

Note the following:

- The *zone_index* value must be different for each zone.
 - You can select tier2 for up to 16 different zones (tier1 allows 6 zones).
 - Select the load-balancing method of your choice.
3. Create DNS records that point to VIPs that are currently associated with DNS names. See the “[Configuring Domain Records](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

For example, suppose you have the following owner configuration.

```
!***** OWNER *****
owner GLB

content rule1
  add service s1
  vip address 5.5.5.5
  add dns www.work.com
  active
```

You would need to add a record similar to the following.

```
(config)# dns-record a www.work.com 5.5.5.5 0 single kal-ap  
1.1.1.1
```

For details on configuring zone-based DNS, see the “Configuring a DNS Server” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

For details on configuring content rule-based DNS, see the “Configuring Content Rule-Based DNS on a CSS” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

Configuring DNS Sticky Parameters

The following sections describe the commands and their options and variables that you use to configure DNS Sticky.

Enabling the Global Sticky Database

The global sticky database comprises:

- Records of clients’ local DNS servers
- Sticky entry TTL values
- Sticky zone index

The sticky zone index contains a listing of configured sticky zones and IP addresses. If the GSDB has an entry for the requesting client’s local DNS server, the GSDB sends the sticky zone index to the CSS DNS server that made the GSDB lookup request. The CSS uses the sticky zone index and keepalive information to select the appropriate sticky zone and sends the IP address of the zone to the client’s local DNS server.



Note

Because the Global Sticky Database (GSDB) requires the configuration of a Proximity Database (PDB), you must configure a PDB before you enable the GSDB on the same CSS. For details on configuring a PDB, see the “[Configuring a Proximity Database](#)” section in [Chapter 5, Configuring Network Proximity](#).

To enable a GSDB on a dedicated CSS 11150 with 256 MB of RAM when you are configuring GSLB with a GSDB (see “[DNS Sticky with a GSDB](#)” earlier in this chapter) or when you are using DNS Sticky in a Network Proximity configuration (see “[DNS Sticky in a Network Proximity Environment](#)” earlier in this chapter), use the **gsdb** command.

**Note**

The **gsdb** command and its **show** and **no** versions are part of the PDB feature set and require the PDB license key.

**Note**

You do not need to configure a GSDB to use the basic DNS Sticky feature in a GSLB environment. However, a GSDB provides a more robust DNS Sticky and load-balancing configuration. For details on the available types of DNS Sticky configurations, see “[Overview of DNS Sticky](#)” earlier in this chapter.

The syntax for this global configuration mode command is:

```
gsdb
```

To disable a GSDB, enter:

```
(config)# no gsdb
```

Resetting the Global Sticky Database Statistics

Use the **gsdb zero** command to reset the Sticky Lookups and Sticky Sets statistics that are displayed by the **show gsdb** command. The syntax for this global configuration mode command is:

```
gsdb zero
```

Configuring the Global Sticky Database Interface

Use the **gsdb-interface** command on the CSS DNS server to create an interface for the CSS to communicate with a GSDB. A GSDB responds with a zone index to sticky queries from CSS DNS servers. All GSDBs participating in a peer mesh share sticky TTL and sticky zone information over APP.



Note The **gsdb-interface** command and its **no** version are part of the Enhanced feature set.

The syntax for this global configuration mode command is:

```
gsdb-interface [primary|secondary] ip_address
```

The variables and options are:

- **primary|secondary** - Specifies an interface for the primary or secondary GSDB. The CSS uses the primary GSDB for sticky requests unless it is unavailable, in which case it uses the secondary GSDB.
- *ip_address* - IP address of the GSDB. Enter the address in dotted-decimal notation (for example, 192.168.11.1).



Note In a Network Proximity configuration, the IP address of the primary GSDB interface is typically the same as the IP address of the PDB.

For example:

```
(config)# gsdb-interface primary 192.168.11.1
```

To delete a primary GSDB interface, enter:

```
(config)# no gsdb-interface primary
```

Resetting the Global Sticky Database Interface Statistics

Use the **gsdb-interface zero** command to reset the GSDB interface statistics that are displayed by the **show gsdb-interface** command. The syntax for this global configuration mode command is:

```
gsdb-interface zero
```

Configuring the Time to Live for Global Sticky Database Entries

Issue the **gsdb ttl** command on the GSDB to specify a time to live (TTL) for the GSDB sticky domain entries. The value you enter determines the length of time in seconds that GSDB entries are valid. Any new request from a D-proxy for a sticky domain that arrives before the timer expires, resets the timer.

The syntax for this global configuration mode command is:

```
gsdb ttl ttl_value
```

The variable is *ttl_value*, which specifies the length of time in seconds that GSDB entries are valid. Enter an integer between 300 and 1000000. The default is 7200 seconds (2 hours).

For example:

```
(config)# gsdb ttl 7200
```

Configuring Sticky Domain Records

Use the **dns-record** command to configure sticky domain records on the CSS configured as a DNS server. Domain records labeled as **sticky-enabled** indicate to the CSS that it should attempt to provide a sticky response before it answers the DNS query from the client.



Note

If you configure a GSDB and any sticky domains in a particular zone, you must configure all sticky domains participating in the peer mesh in that same zone. Otherwise, the thrashing of the sticky zone index could cause DNS Sticky to fail.

For details on configuring domain records, see the [“Configuring Domain Records”](#) section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

Configuring Server Zones for DNS Sticky

Use the **dns-server zone** command to configure DNS server zones in the CSS. This feature allows the CSS to respond to DNS requests based upon different balance criteria and domain availability within zones or locations. For details on configuring zones, see the “[Configuring DNS Server Zones](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

Displaying DNS Sticky Statistics

To display DNS Sticky statistics for the GSDB, GSDB interface, domain records, and DNS server zones, use the **show** commands in this section.

Displaying Global Sticky Database Statistics

Use the **show gsdb** command to display GSDB statistics. This command is part of the PDB feature set and is available in all modes. The syntax is:

```
show gsdb
```

[Table 2-6](#) describes the fields in the **show gsdb** output.

Table 2-6 *Field Descriptions for the show gsdb Command*

| Field | Description |
|---------------------|---|
| Sticky Lookups | The number of sticky requests received from a CSS DNS server. |
| Sticky Sets | The number of times the DNS server selected the sticky zone and informed the GSDB because the GSDB did not have the zone information in its database. |
| Sticky BLKs Present | The number of sticky blocks that are currently in the GSDB. The sticky blocks contain the zone and TTL information for sticky-enabled domains. |
| Sticky TTL | The time to live (in seconds) of a sticky entry in the GSDB. Values range from 300 to 1000000 seconds. The default is 7200 seconds (2 hours). |

Displaying GSDB Interface Statistics

Use the **show gsdb-interface** command to display statistics for the GSDB interface on the DNS server CSS. This command is part of the Enhanced feature set and is available in all modes.



Note

This command is not available on a PDB or a GSDB.

The syntax is:

```
show gsdb-interface
```

[Table 2-7](#) describes the fields in the **show gsdb-interface** output.

Table 2-7 *Field Descriptions for the show gsdb-interface Command*

| Field | Description |
|-----------------|--|
| Active GSDB | The GSDB that is currently being used: Primary or Secondary. |
| Primary Trans | The number of times the primary GSDB transitioned state between Up and Down. |
| Primary Req | The number of requests received by the primary GSDB from DNS servers. |
| Primary Rsp | The number of responses sent to DNS servers by the primary GSDB. |
| Secondary Trans | The number of times the secondary GSDB transitioned state between Up and Down. |
| Secondary Req | The number of requests received by the secondary GSDB from DNS servers. |
| Secondary Rsp | The number of responses sent to DNS servers by the secondary GSDB. |
| Total Req | The total number of requests sent by the DNS server to the GSDB. |
| Total Rsp | The total number of responses received by the DNS server from the GSDB. |

Displaying DNS Sticky Domain Record Statistics

Use the **show dns-record sticky** command to view statistics associated with sticky domain records. This command is part of the Enhanced feature set and is available in all modes. The syntax is:

```
show dns-record sticky {dns_name}
```

The variable is *dns_name*, which is the DNS name mapped to a domain record for which you want to display sticky domain statistics. Enter the name as a lower case unquoted text string with no spaces and a maximum of 63 characters.

[Table 2-8](#) describes the fields in the **show dns-record sticky** output.

Table 2-8 *Field Descriptions for the show dns-record sticky Command*

| Field | Description |
|----------------|---|
| Name | The name of the sticky domain associated with the record. |
| Last Zone | The zone index of the last zone that was selected either by the GSDB or by the DNS server's load-balancing method. |
| Last IP Used | The last source (D-proxy) IP address used as a key to make a sticky decision. |
| Sets | The number of times the DNS server selected the sticky zone and informed the GSDB because the GSDB did not have the zone information in its database. |
| GSDB Lookups | The number of times a DNS server sent a sticky lookup request to the GSDB for the specified domain. |
| GSDB Responses | The number of times the GSDB responded to GSDB Lookup requests from a DNS server for the specified domain. |

Displaying Domain Load Statistics

Use the **show dns-record load** command to display load information associated with domains. The syntax for this all configuration mode command is:

```
show dns-record load {dns_name}
```

The variable is *dns_name*, which is the DNS name mapped to a domain record for which you want to display load statistics. Enter the name as a lower case unquoted text string with no spaces and a maximum of 63 characters.

[Table 2-9](#) describes the fields in the **show dns-record load** output.

Table 2-9 *Field Descriptions for the show dns-record load Command*

| Field | Description |
|-------------|---|
| Name | The name of the domain associated with the record. |
| LeastLoaded | The zone index of the current least-loaded zone in the peer mesh. |
| Zone | The zone index of the zone or zones in which the record exists. An asterisk (*) indicates the zone index of the local zone. |
| Description | A text description of the zone. |
| Type | The record type: <ul style="list-style-type: none"> • A - Address record • NS - Name server record |
| IP Address | The IP address associated with the record for the returned zone. |
| Load | The load number, an integer from 2 to 255 indicating the zone's current burden for the specified domain. A load of 255 indicates that the service is offline. A dash (-) indicates an undefined load, that is, load reports are not being received. |
| MinRespTime | The response time of the fastest server associated with the zone. This parameter value is used to break ties when load numbers are similar. A dash indicates an undefined MinRespTime. |

Displaying DNS Record Statistics

Use the **show dns-record statistics** command to display statistics associated with the domain records configured locally and learned by the CSS from its peers. For details on displaying DNS record statistics, see the “[Displaying DNS Record Information](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

Displaying DNS Record Keepalives

Use the **show dns-record keepalive** command to display information about keepalives associated with DNS records. For details on displaying DNS record keepalives, see the “[Displaying DNS Record Keepalive Information](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).

Displaying Proximity and GSDB Metrics

Use the **show proximity metric** command to display GSDB and/or PDB metrics (in milliseconds) associated with a client’s local DNS server IP address. This command is available on a GSDB, a PDB, and a PDNS.

The syntax for this global configuration mode command is:

```
show proximity metric ip_address {ip_prefix {aggregate}}
```

The variables and options are:

- *ip_address* - IP address of the client’s local DNS server for which you want to display proximity metrics. Enter the address in dotted-decimal notation (for example, 192.168.11.1).
- *ip_prefix* - This optional parameter is used to map an IP prefix to an IP address allowing you to view metrics over a range of IP addresses. Enter the prefix as either:
 - A prefix length in CIDR bitcount notation (for example, /24).
 - A subnet mask in dotted-decimal notation (for example, 255.255.255.0).
- **aggregate** - This optional keyword allows you to view aggregated metrics that are available in both /16 and /8 subnet masks.



Note Probed metrics are statistically aggregated at the /8 and /16 prefix levels.

In the GSDB, the metrics are sorted by sticky zone index. In the PDB, the round-trip time (RTT) metrics are sorted by proximity zone. In the PDNS, the metrics are sorted by RTT. An asterisk next to a zone indicates the local zone where the command was issued.



Note The maximum value of an RTT metric is 3968 ms. A value of 4095 ms indicates that a client's local name server was unreachable or had an RTT value of more than 4 seconds.

For example, to view the PDB and /or GSDB metrics associated with the client IP address of 172.23.5.7 and an IP prefix of 24, enter:

```
(config)# show proximity metric 172.23.5.7/24
```

[Table 2-10](#) describes the fields in the **show proximity metric** output.

Table 2-10 *Field Descriptions for the show proximity metric Command*

| Field | Description |
|--------------|--|
| IP Address | The IP address of the client's local DNS server for which you want to display metrics. |
| IP Prefix | The IP prefix length or subnet mask associated with the IP address. |
| Index | The zone index number associated with the DNS zone. An asterisk (*) indicates the local zone where you issued the command. |
| Description | A logical name or text description of the zone. |
| Metric | The round-trip time (RTT) between the PDB and a referral-DNS server. The DNS server uses the RTT as the proximity metric for load-balancing decisions. |
| Sticky Value | The sticky zone index stored in the GSDB and returned to the PDNS after a sticky lookup. |
| TTL | For DNS Sticky configurations, the remaining time-to-live (TTL) in seconds for this GSDB entry. |

Displaying Server Zones for DNS Sticky

Use the **show zone command** to display information about DNS server zones communicating in a zone mesh. For details on displaying DNS server zones, see the “[Displaying DNS Server Zones](#)” section in [Chapter 1, Configuring the CSS as a Domain Name System Server](#).