Diameter Credit Control Application (DCCA)

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The Cisco Diameter Credit Control Application (DCCA) feature introduces support in Cisco IOS software for online, prepaid billing in a gateway general packet radio service (GPRS) support node (GGSN). The DCCA feature enables a service-aware GGSN, which tracks each user's access to services and compares the usage to predefined quotas and service levels. This information is used for billing and quota management.

Finding Feature Information in This Module

Your Cisco IOS software release may not support all of the features documented in this module. To reach links to specific feature documentation in this module and to see a list of the releases in which each feature is supported, use the "Feature Information for DCCA" section on page 30.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Contents

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Restrictions for DCCA

Before implementing the Diameter Credit Control Application feature, note the following:

- Diameter Credit Control Application is supported on the Catalyst 6500 and Cisco 7600 platforms only.
- In the current Cisco implementation, the DCCA state machine runs at the client (GGSN) and the authentication, authorization, and accounting (AAA) service provides the application programming interfaces (APIs) to encode and decode attributes of DCCA and to send the messages to the server.

Additional References

The following sections provide references related to DCCA.

Related Documents

Related Topic	Document Title
Detailed explanation of a service-aware GGSN, and configuration instructions	"Configuring Enhanced Service-Aware Billing" section of the *Cisco GGSN Release 5.2 Configuration Guide, Cisco IOS Release 12.3(14)YQ8*

Technical Assistance

Description	Link
The Cisco Technical Support & Documentation website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents new commands.

aaa group server diameter

To group different Diameter server hosts into distinct lists and distinct methods, enter the **aaa group server diameter** command in global configuration mode. To remove a group server from the configuration list, enter the **no** form of this command.

aaa group server diameter *group-name*

no aaa group server diameter *group-name*

Syntax Description

group-name	Character string used to name the group of servers.

Command Default

None

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

The **aaa group server diameter command** introduces a way to group existing server hosts. This command enables you to select a subset of the configured server hosts and use them for a particular service.

A group server is a list of server hosts of a particular type. Currently supported server host types are Diameter server hosts, RADIUS server hosts, and TACACS+ server hosts. A group server is used in conjunction with a global server host list. The group server lists the IP addresses of the selected server hosts.

Examples

The following example shows the configuration of a Diameter server group named dia_group_1 that comprises two member servers configured as Diameter peers:

```
aaa group server diameter dia_group_1
 server dia_peer_1
 server dia_peer_2
```

Note If a peer port is not specified, the default value for the peer port is 3868.

Related Commands

Command	Description
aaa accounting	Enables AAA accounting of requested services for billing or security purposes.
aaa authentication login	Sets AAA authentication at login.
aaa authorization	Sets parameters that restrict user access to a network.
server	Associates a Diameter server with a Diameter server group.

address ipv4

To configure the IP address of a Diameter peer, use the **address ipv4** command in Diameter peer configuration submode. To disable the configured address, use the **no** form of this command.

address ipv4 *ip-address*

no address ipv4 *ip-address*

Syntax Description

ip address	The IP address of the host.

Command Default

No IP address is configured.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Examples

The following example shows how to configure the IP address of a Diameter peer:

```
Router (config-dia-peer)# address ipv4 192.0.2.0
```

Related Commands

Command	Description
diameter peer	Defines a Diameter peer and enters Diameter peer configuration mode.

debug diameter

To display information about the Diameter Protocol, use the **debug diameter** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug diameter [**dcca | connection | error | packet | event | fsm | failover**]

no debug diameter [**dcca | connection | error | packet | event | fsm | failover**]

Syntax Description

dcca	(Optional) Enables debugging for Diameter-Credit Control Accounting.
connection	(Optional) Enables debugging output for the connection between two Diameter nodes.
error	(Optional) Enables debugging output for Diameter errors.
packet	(Optional) Enables debugging output for Diameter data packets.
event	(Optional) Enables debugging output for Diameter events.
fsm	(Optional) Enables debugging output for the finite state machine.
failover	(Optional) Enables debugging output for Diameter redundancy.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

Use this command to display information about any of the listed classes of information about the Diameter Protocol.

Examples

The following examples show output from the **debug diameter** command:

Peer configuration and peer connection after a peer is configured

```
Router# debug diameter all
*May  9 17:58:14.832: Dia Base: Diameter Peer configured. Allocate connection context.
*May  9 17:58:14.832: Dia Base: Allocate the peer connection context 50F63888, handle
C000000C *May  9 17:58:14.832: Dia Base: (C000000C): Received peer configuration event
*May  9 17:58:14.832: Dia Peer FSM (50F63888): input event START in state CLOSED *May  9
17:58:14.832: Dia Peer FSM (50F63888): Starting Connection timer *May  9 17:58:14.832: Dia
Peer FSM (50F63888): event START, state
CLOSED-->WAIT_CONN_ACK
*May  9 17:58:14.836: Dia Transport: socket 0 - connecting to 9.113.33.6
(3868)
*May  9 17:58:14.836: Dia Transport: socket 0 - connection in progress *May  9
17:58:14.836: Dia Transport: socket 0 - local address 9.113.33.5
(49214)
```

```
*May  9 17:58:14.836: Dia Transport: socket 0 - resume socket write - nothing to write
*May  9 17:58:14.836: Dia Base: (C000000C): Received peer connection event from transport
*May  9 17:58:14.836: Dia Peer FSM (50F63888): input event RCV_CONN_ACK in state
WAIT_CONN_ACK *May  9 17:58:14.836: Dia Base: Sending diameter message to peer "Unknown"
*May  9 17:58:14.836: DIAMETER:  CER message, ver=1, len=120, app=0,
[2328318322/2328318322]
*May  9 17:58:14.836: DIAMETER:  Origin-host-name              [264]
"host"                          (M)
*May  9 17:58:14.836: DIAMETER:  Origin-Realm                  [296]
"cisco"                         (M)
*May  9 17:58:14.836: DIAMETER:  Host-IP-address               [257]
9.113.33.5                      (M)
*May  9 17:58:14.836: DIAMETER:  Vendor-ID                     [266]   9
(M)
*May  9 17:58:14.836: DIAMETER:  Product-name                  [269]
"C7200-G8IS-M"
*May  9 17:58:14.836: DIAMETER:  Auth-Application-ID           [258]   4
(M)
*May  9 17:58:14.836: DIAMETER:  Firmware-Revision             [267]   1

50D0B710:          01000078 80000101 00000000      ...x........
50D0B720: 8AC75172 8AC75172 00000108 4000000C  .GQr.GQr....@...
50D0B730: 686F7374 00000128 4000000D 63697363  host...(@...cisc
50D0B740: 6F000000 00000101 4000000E 00010971  o.......@......q
50D0B750: 21050000 0000010A 4000000C 00000009  !.......@.......
50D0B760: 0000010D 00000014 43373230 302D4738  ........C7200-G8
50D0B770: 49532D4D 00000102 4000000C 00000004  IS-M....@.......
50D0B780: 0000010B 0000000C 00000001 00        .............
*May  9 17:58:14.836: Dia Base: Request message hash ctx created for
[2328318322/2328318322] *May  9 17:58:14.836: Dia Peer FSM (50F63888): Starting CER timer
*May  9 17:58:14.836: Dia Peer FSM (50F63888): event RCV_CONN_ACK, state
WAIT_CONN_ACK-->WAIT_CEA *May  9 17:58:14.836: Dia Transport: Dia Transport write message
event *May  9 17:58:14.836: Dia Transport: socket 0 - complete msg sent *May  9
17:58:14.840: Dia Transport: socket 0 - complete read of 20 bytes *May  9 17:58:14.840:
Dia Transport: complete header read from socket 0 *May  9 17:58:14.840: Dia Transport:
read msg (172) bytes from socket 0 *May  9 17:58:14.840: Dia Transport: socket 0 -
complete read of 172 bytes *May  9 17:58:14.840: Dia Base: Diameter message received from
the peer "Unknown"
*May  9 17:58:14.840: DIAMETER:  CEA message, ver=1, len=192, app=0,
[2328318322/2328318322]
*May  9 17:58:14.840: DIAMETER:  Result-code                   [268]
2001                            (M)
*May  9 17:58:14.840: DIAMETER:  Origin-host-name              [264]
"diameter2.cisco.com"           (M)
*May  9 17:58:14.840: DIAMETER:  Origin-Realm                  [296]
"cisco.com"                     (M)
*May  9 17:58:14.840: DIAMETER:  Host-IP-address               [257]
10.77.154.80                    (M)
*May  9 17:58:14.840: DIAMETER:  Vendor-ID                     [266]   9
(M)
*May  9 17:58:14.840: DIAMETER:  Product-name                  [269]
"Diameter-Server"
*May  9 17:58:14.840: DIAMETER:  Supported-Vendor-ID           [265]
10415                           (M)
*May  9 17:58:14.840: DIAMETER:  Supported-Vendor-ID           [265]
12645                           (M)
*May  9 17:58:14.840: DIAMETER:  Supported-Vendor-ID           [265]   9
(M)
*May  9 17:58:14.840: DIAMETER:  Supported-Vendor-ID           [265]   9
(M)
```

```
*May  9 17:58:14.840: DIAMETER:  Auth-Application-ID          [258]   4
(M)
65940780:          010000C0 00000101 00000000      ...@........
65940790: 8AC75172 8AC75172 0000010C 4000000C  .GQr.GQr....@...
659407A0: 000007D1 00000108 4000001B 6469616D  ...Q....@...diam
659407B0: 65746572 322E6369 73636F2E 636F6D00  eter2.cisco.com.
659407C0: 00000128 40000011 63697363 6F2E636F  ...(@...cisco.co
659407D0: 6D000000 00000101 4000000E 00010A4D  m.......@......M
659407E0: 9A500000 0000010A 4000000C 00000009  .P......@.......
659407F0: 0000010D 00000017 4469616D 65746572  ........Diameter
65940800: 2D536572 76657200 00000109 4000000C  -Server.....@...
65940810: 000028AF 00000109 4000000C 00003165  ..(/....@.....1e
65940820: 00000109 4000000C 00000009 00000109  ....@...........
65940830: 4000000C 00000009 00000102 4000000C  @...........@...
65940840: 00000004 00                          .....
*May  9 17:58:14.840: Dia Base: Request message hash ctx removed for
[2328318322/2328318322] *May  9 17:58:14.840: Dia Base: (C000000C): Received msg event
from message i/o *May  9 17:58:14.840: Dia Peer FSM (50F63888): input event RCV_CEA in
state WAIT_CEA *May  9 17:58:14.840: Dia Peer FSM (50F63888): Starting Watchdog timer *May
9 17:58:14.840: %DIABASE-4-DIA_PEER_UP: Diameter peer 9.113.33.6 port 3868 TCP UP *May  9
17:58:14.840: Dia Peer FSM (50F63888): event RCV_CEA, state WAIT_CEA-->OPEN
```

Periodic watch-dog message exchanges

```
*May  9 17:59:14.840: Dia Peer FSM (50F63888): input event TIMEOUT in
state OPEN
*May  9 17:59:14.840: Dia Base: Sending diameter message to peer
"diameter2.cisco.com"
*May  9 17:59:14.840: DIAMETER:  DWR message, ver=1, len=48, app=0,
[2328318323/2328318323]
*May  9 17:59:14.840: DIAMETER:  Origin-host-name             [264]
"host"                         (M)
*May  9 17:59:14.840: DIAMETER:  Origin-Realm                 [296]
"cisco"                        (M)
50D0B710:          01000030 80000118 00000000      ...0........
50D0B720: 8AC75173 8AC75173 00000108 4000000C  .GQs.GQs....@...
50D0B730: 686F7374 00000128 4000000D 63697363  host...(@...cisc
50D0B740: 6F000000 FD                          o...}
*May  9 17:59:14.840: Dia Base: Request message hash ctx created for
[2328318323/2328318323]
*May  9 17:59:14.840: Dia Peer FSM (50F63888): Starting Watchdog timer,
[60] left for next timeout*May  9 17:59:14.840: Dia Peer FSM (50F63888):
event TIMEOUT, state OPEN-->OPEN
*May  9 17:59:14.840: Dia Transport: Dia Transport write message event
*May  9 17:59:14.840: Dia Transport: socket 0 - complete msg sent
*May  9 17:59:14.840: Dia Transport: socket 0 - complete read of 20
bytes
*May  9 17:59:14.840: Dia Transport: complete header read from socket 0
*May  9 17:59:14.840: Dia Transport: read msg (60) bytes from socket 0
*May  9 17:59:14.840: Dia Transport: socket 0 - complete read of 60
bytes
*May  9 17:59:14.840: Dia Base: Diameter message received from the peer
"diameter2.cisco.com"
*May  9 17:59:14.840: DIAMETER:  DWA message, ver=1, len=80, app=0,
[2328318323/2328318323]
*May  9 17:59:14.840: DIAMETER:  Result-code                  [268]
2001                           (M)
*May  9 17:59:14.840: DIAMETER:  Origin-host-name             [264]
"diameter2.cisco.com"          (M)
```

```
*May  9 17:59:14.840: DIAMETER:  Origin-Realm                  [296]
"cisco.com"                    (M)
65940780:          01000050 00000118 00000000      ...P........
65940790: 8AC75173 8AC75173 0000010C 4000000C  .GQs.GQs....@...
659407A0: 000007D1 00000108 4000001B 6469616D  ...Q....@...diam
659407B0: 65746572 322E6369 73636F2E 636F6D00  eter2.cisco.com.
659407C0: 00000128 40000011 63697363 6F2E636F  ...(@...cisco.co
659407D0: 6D000000 00                          m....
*May  9 17:59:14.840: Dia Base: Request message hash ctx removed for
[2328318323/2328318323]
*May  9 17:59:14.840: Dia Base: (C000000C): Received msg event from
message i/o
*May  9 17:59:14.840: Dia Peer FSM (50F63888): input event RCV_DWA in
state OPEN
*May  9 17:59:14.840: Dia Peer FSM (50F63888): Starting Watchdog timer
*May  9 17:59:14.840: Dia Peer FSM (50F63888): event RCV_DWA, state
OPEN-->OPEN
```

Periodic connection attempt when the peer connection is broken

```
*May  9 18:07:18.472: Dia Transport: socket 0 READ event: UP->CLOSE due
to bytes read = 0
*May  9 18:07:18.472: Dia Base: (8600000E): Received peer disconnection
event from transport
*May  9 18:07:18.472: %DIABASE-4-DIA_PEER_DOWN: Diameter peer 9.113.33.6
port 3868 TCP DOWN
*May  9 18:07:18.472: Dia Peer FSM (2068FF44): input event PEER_DISC in
state OPEN
*May  9 18:07:18.472: Dia Peer FSM (2068FF44): Starting Reconnect timer
*May  9 18:07:18.472: Dia Peer FSM (2068FF44): event PEER_DISC, state
OPEN-->CLOSED
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): input event START in
state CLOSED
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): Starting Connection timer
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): event START, state
CLOSED-->WAIT_CONN_ACK
*May  9 18:07:48.472: Dia Transport: socket 0 - connecting to 9.113.33.6
(3868)
*May  9 18:07:48.472: Dia Transport: socket 0 - connection in progress
*May  9 18:07:48.472: Dia Transport: socket 0 - local address 9.113.33.5
(61122)
*May  9 18:07:48.472: Dia Transport: socket 0 - CONN_WAIT->CLOSE
*May  9 18:07:48.472: Dia Base: (8600000E): Received peer disconnection
event from transport
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): input event PEER_DISC in
state WAIT_CONN_ACK
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): Starting Reconnect timer
*May  9 18:07:48.472: Dia Peer FSM (2068FF44): event PEER_DISC, state
WAIT_CONN_ACK-->CLOSED
```

Peer disconnection when a peer configuration is removed

```
Ginger(config)#no diameter peer watch
Ginger(config)#
*May  9 18:05:02.812: Dia Base: Peer unconfigured, start peer
disconnection
*May  9 18:05:02.812: Dia Base: (C000000C): Received peer
unconfiguration event
*May  9 18:05:02.812: Dia Peer FSM (50F63888): input event STOP in state
OPEN
```

```
*May  9 18:05:02.812: Dia Base: Sending diameter message to peer
"diameter2.cisco.com"
*May  9 18:05:02.812: DIAMETER:  DPR message, ver=1, len=60, app=0,
[2328318329/2328318329]
*May  9 18:05:02.812: DIAMETER:  Origin-host-name              [264]
"host"                          (M)
*May  9 18:05:02.816: DIAMETER:  Origin-Realm                  [296]
"cisco"                         (M)
*May  9 18:05:02.816: DIAMETER:  Peer-disconnect-reason        [273]
Server-do-not-want-to-talk      (M)
653D1810:                    0100003C 8000011A          ...<....
653D1820: 00000000 8AC75179 8AC75179 00000108  .....GQy.GQy....
653D1830: 4000000C 686F7374 00000128 4000000D  @...host...(@...
653D1840: 63697363 6F000000 00000111 4000000C  cisco.......@...
653D1850: 00000002 00                          .....
*May  9 18:05:02.816: Dia Base: Request message hash ctx created for
[2328318329/2328318329]
*May  9 18:05:02.816: Dia Peer FSM (50F63888): Starting DPR timer
*May  9 18:05:02.816: Dia Peer FSM (50F63888): event STOP, state
OPEN-->CLOSING
*May  9 18:05:02.816: Dia Transport: Dia Transport write message event
*May  9 18:05:02.816: Dia Transport: socket 0 - complete msg sent
*May  9 18:05:02.816: Dia Transport: socket 0 - complete read of 20
bytes
*May  9 18:05:02.816: Dia Transport: complete header read from socket 0
*May  9 18:05:02.816: Dia Transport: read msg (60) bytes from socket 0
*May  9 18:05:02.816: Dia Transport: socket 0 - complete read of 60
bytes
*May  9 18:05:02.816: Dia Base: Diameter message received from the peer
"diameter2.cisco.com"
*May  9 18:05:02.816: DIAMETER:  DPA message, ver=1, len=80, app=0,
[2328318329/2328318329]
*May  9 18:05:02.816: DIAMETER:  Result-code                   [268]
2001                            (M)
*May  9 18:05:02.816: DIAMETER:  Origin-host-name              [264]
"diameter2.cisco.com"           (M)
*May  9 18:05:02.816: DIAMETER:  Origin-Realm                  [296]
"cisco.com"                     (M)
65913A20:                          01000050              ...P
65913A30: 0000011A 00000000 8AC75179 8AC75179  .........GQy.GQy
65913A40: 0000010C 4000000C 000007D1 00000108  ....@......Q....
65913A50: 4000001B 6469616D 65746572 322E6369  @...diameter2.ci
65913A60: 73636F2E 636F6D00 00000128 40000011  sco.com....(@...
65913A70: 63697363 6F2E636F 6D000000 00        cisco.com....
*May  9 18:05:02.816: Dia Base: Request message hash ctx removed for
[2328318329/2328318329]
*May  9 18:05:02.816: Dia Base: (C000000C): Received msg event from
message i/o
*May  9 18:05:02.816: Dia Peer FSM (50F63888): input event RCV_DPA in
state CLOSING
*May  9 18:05:02.816: Dia Base: (C000000C): Free the peer connection
context 50F63888
```

Related Commands

Command	Description
show diameter peer	Displays Diameter peer configuration information.

destination host

To configure the fully qualified domain name (FQDN) of a Diameter peer, use the **destination host** command in diameter peer configuration submode. To disable the configured FQDN, use the **no** form of this command.

destination host *string*

no destination host *string*

Syntax Description

string	The FQDN of the Diameter peer.

Command Default

No FQDN is configured.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Examples

The following example shows how to configure the destination host:

```
Router(config-dia-peer)# destination host host1.example.com.
```

Related Commands

Command	Description
destination realm	Configures the destination realm of a Diameter peer.
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.

destination realm

To configure the destination realm of a Diameter peer, use the **destination realm** command in diameter peer configuration submode. To disable the configured realm, use the **no** form of this command.

destination realm *string*

no destination realm *string*

Syntax Description

string	The destination realm (part of the domain @*realm*) in which a Diameter peer is located.

Command Default

No realm is configured.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

The realm might be added by the authentication, authorization, and accounting (AAA) client when sending a request to AAA. However, if the client does not add the attribute, then the value configured while in Diameter peer configuration submode is used when sending messages to the destination Diameter peer. If a value is not configured while in Diameter peer configuration submode, the value specified by the **diameter destination realm** global configuration command is used.

Examples

The following example shows how to configure the destination realm:

```
router (config-dia-peer)# destination realm example.com
```

Related Commands

Command	Description
diameter destination realm	Configures a global Diameter destination realm.
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.

diameter origin host

To configure the fully qualified domain name (FQDN) of the host of a Diameter node, use the **diameter origin host** command in global configuration mode. To disable the configured FQDN, use the **no** form of this command.

diameter origin host *string*

no diameter origin host *string*

Syntax Description

string	Character string that describes the FQDN for a specific Diameter node.

Command Default

No realm is configured.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

Because there is no host configured by default, it is mandatory to configure this information. The origin host information is sent in requests to a Diameter peer. Global Diameter protocol parameters are used if Diameter parameters have not been defined at a Diameter peer level.

Examples

The following example shows how to configure a Diameter origin host:

```
Router(config)# diameter origin host host1.example.com.
```

Related Commands

Command	Description
diameter origin realm	Configures origin realm information for a Diameter node.
diameter peer	Defines a Diameter peer and enters Diameter peer configuration mode.

diameter origin realm

To configure origin realm information for a Diameter node, use the **diameter origin realm** command in global configuration mode. To disable the configured realm information, use the **no** form of this command.

diameter origin realm *string*

no diameter origin realm *string*

Syntax Description

string	Character string that describes the realm information for a specific Diameter node.

Command Default

No realm is configured.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

Because there is no realm configured by default, it is mandatory to configure this information. Origin realm information is sent in requests to a Diameter peer.

Examples

The following example shows how to configure a Diameter origin realm:

```
Router (config)# diameter origin realm example.com
```

Related Commands

Command	Description
diameter origin host	Configures the FQDN of the host of a Diameter node.
diameter peer	Defines a Diameter peer and enters Diameter peer configuration mode.

diameter peer

To configure a device as a Diameter Protocol peer and enter the Diameter peer configuration submode, use the **diameter peer** command in global configuration mode. To disable Diameter Protocol configuration for a peer, use the **no** form of this command.

diameter peer *name*

no diameter peer *name*

Syntax Description

name	Character string used to name the peer node to be configured for the Diameter Credit Control Application (DCCA).

Command Default

No Diameter peer is configured.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

This command enables the Diameter peer configuration submode. From the submode, you can configure other DCCA parameters. The configuration is applied when you exit the submode.

Examples

The following example shows how to configure a Diameter peer:

```
Router (config)# diameter peer dia_peer_1
```

Related Commands

Command	Description
address ipv4	Defines a route to the host of the Diameter peer using IPv4.
destination host	Configures the FQDN of a Diameter peer.
destination realm	Configures the destination realm in which a Diameter peer is located.
ip vrf forwarding	Associates a VRF with a Diameter peer.
security ipsec	Configures IPSec as the security protocol for the Diameter peer-to-peer connection.
show diameter peer	Displays the Diameter peer configuration.
source interface	Configures the interface to connect to the Diameter peer.
timer	Configures Diameter base protocol timers for peer-to-peer communication.
transport {tcp} port	Configures the transport protocol for connections to the Diameter peer.

diameter redundancy

To enable the Diameter node to be a Cisco IOS Redundancy Facility (RF) client and track session states, use the **diameter redundancy** command in global configuration mode. To disable this feature, use the **no** form of this command.

diameter redundancy

no diameter redundancy

Syntax Description

This command has no arguments or keywords.

Command Default

Diameter redundancy is not configured.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

When you configure Diameter redundancy on a device, that device will not initiate any TCP connection while it is a standby node. Upon transition to active status, the device initiates a TCP connection to the Diameter peer.

Note This command is required for service-aware Packet Data Protocol (PDP) session redundancy. For more information about service-aware PDP session redundancy, see the "GTP-Session Redundancy for Service-Aware PDPs Overview" section of the *Cisco GGSN Release 5.2 Configuration Guide*.

Examples

The following example shows how to configure Diameter redundancy:

```
Router (config)# diameter redundancy
```

Related Commands

Command	Description
diameter origin host	Configures the FQDN of the host of this Diameter node.
diameter origin realm	Configures the realm of origin in which this Diameter node is located.
diameter timer	Configures Diameter base protocol timers to use if none have been configured at the Diameter peer level.
diameter vendor support	Configures a Diameter node to advertise the vendor AVPs it supports in capability exchange messages with Diameter peers.

diameter timer

To set either the frequency of transport connection attempts or the interval for sending watchdog messages, use the **diameter timer** command in global configuration mode. To return to the default values, use the **no** form of this command.

diameter timer {**connection** | **transaction** | **watch-dog**} *value*

no diameter timer {**connection** | **transaction** | **watch-dog**} *value*

Syntax Description

connection	Maximum interval, in seconds, for the Gateway General Packet Radio Service (GPRS) Support Node (GGSN) to attempt reconnection to a Diameter peer after being disconnected due to a transport failure. The range is from 1 to 1000. The default is 30. A value of 0 configures the GGSN not to attempt reconnection.
transaction	Maximum interval, in seconds, the GGSN waits for a Diameter peer to respond before trying another peer. The range is from 1 to 1000. The default is 30.
watch-dog	Maximum interval, in seconds, the GGSN waits for a Diameter peer response to a watchdog packet. The range is from 1 to 1000. The default is 30. **Note** When the watchdog timer expires, a device watchdog request (DWR) is sent to the Diameter peer and the watchdog timer is reset. If a device watchdog answer (DWA) is not received before the next expiration of the watchdog timer, a transport failure to the Diameter peer has occurred.
value	The valid range, in seconds, from 1 to 1000. The default is 30.

Command Default

The default value for each timer is 30 seconds.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

When configuring timers, the value for the transaction timer should be larger than the transmission-timeout value, and, on the Serving GPRS Support Node (SGSN), the values configured for the number of GPRS Tunneling Protocol (GTP) N3 requests and T3 retransmissions must be larger than the sum of all possible server timers (RADIUS, Diameter Credit Control Application (DCCA), and Cisco Content Services Gateway (CSG)). Specifically, the SGSN N3*T3 must be greater than 2 x RADIUS timeout + *N* x DCCA timeout + CSG timeout where:

- The factor *2* is for both authentication and accounting.
- The value *N* is for the number of Diameter servers configured in the server group.

Examples

The following examples show how to configure the Diameter timers:

```
Router config# diameter timer connection 20

Router config# diameter timer watch-dog 25
```

Related Commands

Command	Description
aaa group server diameter	Defines a Diameter AAA server group.
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.
timer	Configures the Diameter base protocol timers for a Diameter peer.

diameter vendor supported

To configure a Diameter node to advertise the vendor-specific attribute value pairs (AVPs) it recognizes, use the **diameter vendor supported** command in global configuration mode. To remove the supported vendor configuration, use the **no** form of this command.

diameter vendor supported {**Cisco** | **3gpp** | **Vodafone**}

no diameter vendor supported {**Cisco** | **3gpp** | **Vodafone**}

Syntax Description

Cisco	Configures the Diameter node to advertise support for the Cisco-specific AVPs.
3gpp	Configures the Diameter node to advertise support for the AVPs that support the Third-Generation Partnership Project (3GPP).
Vodafone	Configures the Diameter node to advertise support for the Vodafone-specific AVPs.

Command Default

No vendor identifier is configured.

Command Modes

Global configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

Individual vendors can define AVPs specific to their implementation of the Diameter Credit Control Application (DCCA), or for individual applications. You can configure multiple instances of this command, as long as each instance has a different vendor identifier.

Examples

The following example shows how to configure DCCA to advertise support for a the Cisco-specific AVPs:

```
Router (config)# diameter vendor supported Cisco
```

Related Commands

Command	Description
diameter origin host	Configures the FQDN of the host of this Diameter node.
diameter origin realm	Configures the realm of origin in which this Diameter node is located.
diameter redundancy	Enables the Diameter node to be a Cisco IOS RF client and track session states.
diameter timer	Configures Diameter base protocol timers to use if none have been configured at the Diameter peer level.

ip vrf forwarding

To associate a Virtual Private Network (VPN) routing and forwarding (VRF) instance with a Diameter peer, use the **ip vrf forwarding** command in Diameter peer configuration mode. To enable Diameter peers to use the global (default) routing table, use the **no** form of this command.

ip vrf forwarding *name*

no ip vrf forwarding *name*

Syntax Description

name	Name assigned to a VRF.

Command Default

Diameter peers use the global routing table.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

Use the **ip vrf forwarding** command to specify a VRF for a Diameter peer. If a VRF name is not configured for a Diameter server, the global routing table will be used.

If the VRF associated with the specified name has not been configured, the command will have no effect and this error message will appear: **No VRF found with the name** *name*.

Examples

The following example shows how to configure the VRF for a Diameter peer:

```
Router (config-dia-peer)# ip vrf forwarding diam_peer_1
```

Related Commands

Command	Description
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.
ip vrf forwarding (server-group)	Configures the VRF reference of an AAA RADIUS or TACACS+ server group.

security

To configure the security protocol for the Diameter peer connection, use the **security** command in Diameter peer configuration mode. To disable the configured protocol, use the **no** form of this command.

security {**ipsec** | **tls**}

no security {**ipsec** | **tls**}

Syntax Description

ipsec	IP security protocol.
tls	Transport layer security.

Command Default

IP security (IPsec) is the default security protocol for Diameter peer connections.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

If you dynamically change the security protocol for a Diameter peer, the connection to that peer is broken. When you exit the Diameter peer configuration submode, the connection is reestablished.

Examples

The following example shows how to configure IPsec for a Diameter peer:

```
Router (config-dia-peer)# security ipsec
```

Related Commands

Command	Description
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.
show diameter peer	Displays the Diameter peer configuration.

server

To associate a Diameter server with a Diameter authentication, authorization, and accounting (AAA) server group, use the **server** command in Diameter server group configuration submode. To remove a server from the server group, enter the **no** form of this command.

server *name*

no server *name*

Syntax Description

name	Character string used to name the Diameter server. **Note** The name specified for this command should match the name of a Diameter peer defined using the **diameter peer** command.

Command Default

No server is associated with a Diameter AAA server group.

Command Modes

Diameter server group configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

The **server** command allows you to associate a Diameter server with a Diameter server group.

Examples

The following example shows how to associate a Diameter server with a Diameter server group:

```
Router (config-sg-diameter)# server dia_peer_1
```

Related Commands

Command	Description
aaa accounting	Enables AAA accounting of requested services for billing or security purposes.
aaa authentication login	Set AAA authentication at login.
aaa authorization	Sets parameters that restrict user access to a network.
aaa group server diameter	Configures a server group for Diameter.

show diameter peer

To display the configuration and status of a specific Diameter peer, or all Diameter peers, use the **show diameter peer** command in privileged EXEC mode.

show diameter peer [*peer-name*]

Syntax Description

peer-name	Displays the configuration and status of the specified Diameter peer. **Note** If no peer name is specified, the command will display information for all configured Diameter peers.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

This command displays the peer status information, as well as counters, including:

- Total packets sent
- Total responses seen
- Packets with responses
- Packets without responses
- Average response delay (ms)
- Number of Diameter timeouts
- Buffer allocation failures

Examples

The following is a sample output from the **show diameter peer** command:

```
Router# show diameter peer iwan-view5

Peer information for iwan-view5
-------------------------------
Peer name: iwan-view 5
Peer type: Server
Peer transport protocol: TCP
Peer listening port: 3688
Peer security protocol: IPSEC
Peer connection timer value: 30 seconds
Peer watch dog timer value: 35 seconds
Peer vrf name: default
Peer connection status: UP
```

The fields shown above are self-explanatory.

Related Commands

Command	Description
debug diameter	Displays information about the Diameter protocol.

source interface

To configure the interface to be used for the Diameter peer connection, use the **source interface** command in Diameter peer configuration mode. To disable the interface configuration, use the **no** form of this command.

source interface {*interface*}

no source interface {*interface*}

Syntax Description

interface	Source address and port that initiate the TCP connection to the peer.

Command Default

No source interface is defined.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

The Diameter client uses the configured source address and port to initiate a TCP connection to the Diameter peer.

Examples

The following example shows how to configure a source address and port on the Diameter client:

```
Router (config-dia-peer)# source interface interface_01
```

Related Commands

Command	Description
diameter peer	Configures a Diameter peer and enters Diameter peer configuration submode.
show diameter peer	Displays the Diameter peer configuration.

timer

To configure the Diameter Credit Control Application (DCCA) for peer-to-peer communication, use the **timer** command in Diameter peer configuration mode. To disable the configured protocol, use the **no** form of this command.

timer {**connection** | **transaction** | **watchdog**} *value*

no timer {**connection** | **transaction** | **watchdog**} *value*

Syntax Description

connection	Maximum interval, in seconds, for the Gateway General Packet RadioService (GPRS) Support Node (GGSN) to attempt reconnection to a Diameter peer after after being disconnected because of a transport failure. The range is from 1 to 1000. The default is 30. A value of 0 configures the GGSN not to attempt reconnection.
transaction	Maximum interval, in seconds, the GGSN waits for a Diameter peer to respond before trying another peer. The range is from 1 to 1000. The default is 30.
watchdog	Maximum interval, in seconds, the GGSN waits for a Diameter peer response to a watchdog packet. The range is from 1 to 1000. The default is 30. **Note** When the watchdog timer expires, a device watchdog request (DWR) is sent to the Diameter peer and the watchdog timer is reset. If a device watchdog answer (DWA) is not received before the next expiration of the watchdog timer, a transport failure to the Diameter peer has occurred.
value	The valid range, in seconds, from 1 to 1000. The default is 30.

Command Default

The default for each timer is 30 seconds.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced.

Usage Guidelines

When configuring timers, the value for the transaction timer should be larger than the transmission-timeout value, and, on the Serving GPRS Support Node (SGSN), the values configured for the number of GPRS Tunneling Protocol (GTP) N3 requests and T3 retransmissions must be larger than the sum of all possible server timers (RADIUS, Diameter Credit Control Application (DCCA), and Cisco Content Services Gateway (CSG)). Specifically, the SGSN N3*T3 must be greater than 2 x RADIUS timeout + *N* x DCCA timeout + CSG timeout where:

- The factor *2* is for both authentication and accounting.
- The value *N* is for the number of Diameter servers configured in the server group.

Examples

The following example shows how to configure the Diameter base protocol timers for a Diameter peer:

```
Router (config-dia-peer)# timer connection 20
Router (config-dia-peer)# timer watchdog 25
```

Related Commands

Command	Description
diameter peer	Configures a Diameter peer and enters Diameter peer configuration sub-mode.
diameter peer timer	Configures the Diameter base protocol timers globally.

transport port

To configure the transport protocol for establishing a connection with the Diameter peer, use the **transport port** command in Diameter peer configuration mode. To block all sessions that are bound to the peer from using the connection, use the **no** form of this command.

transport tcp port *port-number*

no transport tcp port *port-number*

Syntax Description

tcp	Currently, TCP is the only supported transport protocol for establishing the connection with the Diameter peer.
port-number	Character string identifying the peer connection port.

Command Default

TCP is the default transport protocol.

Command Modes

Diameter peer configuration

Command History

Release	Modification
12.4(9)T	This command was introduced .

Examples

The following example configures TCP as the transport protocol and port 4100 as the peer connection port:

```
Router (config-dia-peer)# transport tcp port 4100
```

Related Commands

Command	Description
diameter peer	Defines a Diameter peer and enters Diameter peer configuration mode.

Feature Information for DCCA

Table 1 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

Cisco IOS software images are specific to a Cisco IOS software release, a feature set, and a platform. Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

Note Table 1 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 1 Feature Information for Diameter Credit Control Application

Feature Name	Releases	Feature Information
Diameter Credit Control Application	12.4(9)T	The Cisco Diameter Credit Control Application (DCCA) feature introduces support in Cisco IOS software for online, prepaid billing in a GGSN. In Cisco IOS Release 12.3(14)YQ5, this feature was introduced on the Cisco 7200 series Internet routers and Catalyst 6500 switches.