



Policy Builder Configuration

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Plug-in Configuration

Cisco Policy Builder provides core plug-ins for customizing and optimizing your installation.

- Configurations set at the system level are system-wide except as noted in the bullet items below.
- Configurations set at the cluster level apply to that cluster and the instances in it. A value set here overrides the same value set at the system level.
- Configurations set at the instance level apply to the instance only and override the same value set at the cluster or system level.

Select the **Create Child** action in a **Plug-in Configuration** node in the **Systems** tree to define them. You can change any of the variables from the default, or choose not to use a plug-in, as necessary.

When you create a system from the example, the following configuration stubs appear at the cluster and instance level:

Figure 1: Create Child Action



Threading Configuration

A threading configuration utility is provided for advanced users.

Click **Threading Configuration** in the right pane to add the threading configuration to the system. If you are planning to run the system with higher TPS, then you need to configure Threading Configuration. For further information, contact your Cisco Technical Representative.

The Threading Plug-in having thread pools controls the total number of threads in CPS vDRA that are executing at any given time. Each of these thread pools have a queue associated with it.

The following parameters can be configured under Threading Configuration:

Table 1: Threading Configuration Parameters

Parameter	Description
Thread Pool Name	Name of the thread pool. For more information on the thread pool names and recommended values that can be configured, refer to <i>Threading Configuration</i> section in the <i>CPS vDRA Advanced Tuning Guide</i> .
Threads	Number of threads to set in the thread pool.
Queue Size	Size of the queue before they are rejected.
Scale By Cpu Core	Select this check box to scale the maximum number of threads by the processor cores.

Async Threading Configuration

Click **Async Threading Configuration** in the right pane to add the configuration in the system.

Use the default values for the Async Threading Plug-in. The Async configuration controls the number of asynchronous threads.



Note Currently, CPS vDRA does not have any asynchronous threads. However, you must add “Async Threading Configuration” and keep this table empty.

The following parameters can be configured under Async Threading Configuration.

Table 2: Async Threading Configuration

Parameter	Description
Default Processing Threads	The number of threads that are allocated to process actions based on priority.
Default Action Priority	The priority assigned to an action if it is not specified in the Action Configurations table.
Default Action Threads	The number of threads assigned to process the action if it is not specified in the Action Configurations table.
Default Action Queue Size	The number of actions that can be queued up for an action if it is not specified in the Action Configurations table.
Default Action Drop	<p>DropOldestWhenFull: The oldest queued action is dropped from the queue when a new action is added to a full queue. Otherwise, the new action to add is ignored.</p> <p>DropWhenFull: A handler for rejected tasks that silently discards the rejected task. No execution for rejected tasks.</p> <p>DoNotDrop: A handler for rejected tasks that runs the rejected task directly in the calling thread of the execute method, unless the executor has been shut down, in which case the task is discarded.</p> <p>Default value is DropOldestWhenFull.</p>
Action Configurations Table	
Action Name	The name of the action. This must match the implementation class name.
Action Priority	The priority of the action. Used by the default processing threads to determine which action to execute first.
Action Threads	The number of threads dedicated to processing this specific action.
Action Queue Size	The number of actions that can be queued up.

Parameter	Description
Action Drop Oldest When Full	For the specified action only: When checked, the oldest queued action is dropped from the queue when a new action is added to a full queue. Otherwise, the new action to add is ignored.

Custom Reference Data Configuration

Configure your system, cluster, and instance for the first time to use Custom Reference Data Table plug-in. Then you can create as many tables as needed.

Click **Custom Reference Data Configuration** from right pane to add the configuration in the system.

- HA example:
 - Primary Database Host/IP Address: sessionmgr01
 - Secondary Database Host/IP Address: sessionmgr02
 - Database Port: 27717

The following parameters can be configured under Custom Reference Data Configuration.

Table 3: Custom Reference Data Configuration Parameters

Parameter	Description
Primary Database Host/IP Address	IP address or a host name of the sessionmgr database. For example, sessionmgr01.
Secondary Database Host/IP Address	(Optional) This field is the IP address or a host name of a secondary, backup, or failover sessionmgr database. For example, sessionmgr02.
Database Port	Port number of the sessionmgr. Note Make sure that the value for this field is same as filled in for both the Primary Database Host/IP Address and Secondary Database Host/IP Address fields. Default value is 27717.

Parameter	Description
Db Read Preference	<p>Describes how sessionmgr clients route read operations to members of a replica set. Select one of the following options from drop-down list:</p> <ul style="list-style-type: none"> • Primary: All operations read from the current replica set primary member. • PrimaryPreferred: In most situations, operations read from the primary database host. However, if this host is unavailable, operations read from the secondary database host. • Secondary: All operations read from the secondary members of the replica set. • SecondaryPreferred: In most situations, operations read from secondary members. However, if a secondary database host is unavailable, operations read from the primary database host. <p>Default value is Primary.</p> <p>For more information, see http://docs.mongodb.org/manual/core/read-preference/.</p>
Connection Per Host	<p>Number of connections that are allowed for each database host.</p> <p>Default value is 100.</p> <p>Connection Per Host is a performance tuning parameter and can be changed in case of a performance issue according to the call model and hardware.</p>

For more information on Custom Reference Data API Usage, see the *CPS Operations Guide* for this release.

DRA Configuration

Click **DRA Configuration** from the right pane in Policy Builder to add the configuration in the system.

Figure 2: DRA Configuration

D R A Configuration

*Stale Session Timer Minutes	Rate Limiter
<input type="text" value="1"/>	<input type="text" value="10"/>
Stale Session Expiry Count	*Binding DB Read Preference
<input type="text" value="6"/>	<input type="text" value="Nearest"/>
Stale Binding Expiry Minutes	Stale Binding Refresh Minutes
<input type="text" value="10080"/>	<input type="text" value="2880"/>

Binding DB Retries

Binding Creation, Primary Alternate System
<input type="text"/>
Binding Creation, Secondary Alternate System
<input type="text"/>
Binding Routing, Primary Alternate System
<input type="text"/>
Binding Routing, Secondary Alternate System
<input type="text"/>

The following parameters can be configured under DRA Configuration:

Table 4: DRA Configuration Parameters

Parameter	Description
Stale Session Timer Minutes	<p>Indicates the time after which the audit RAR should be generated (in the subsequent audit RAR process cycle that runs every minute in CPS vDRA) for sessions that are stale.</p> <p>Default: 180 minutes (recommended value)</p> <p>Minimum: 10 minutes</p> <p>Maximum: 10080 minutes</p>
Rate Limiter	<p>Indicates the number of audit RARs per second that should be sent out by CPS vDRA.</p> <p>Minimum: 1</p> <p>Maximum: 1000 (maximum number of RAR messages per second from vDRA to PCEF)</p> <p>For information on recommended value, refer to <i>Audit Rate Limiter</i> section in the <i>CPS vDRA Advanced Tuning Guide</i>.</p>

Parameter	Description
Stale Session Expiry Count	<p>Specifies the number of retries vDRA should do for a stale session if there is no response of audit RAR or if there is Result-Code in RAA (for audit RAR) other than 5002 or 2001.</p> <p>Default: 6</p> <p>Minimum: 0 (Session deleted without sending RAR)</p> <p>Maximum: 10</p> <p>For information on recommended value, refer to <i>Audit Rate Limiter</i> section in the <i>CPS vDRA Advanced Tuning Guide</i>.</p>
Binding DB Read Preference	<p>Used to select the mode when reading from Binding DB. Use "nearest" mode for better performance of traffic that needs only read operation on Binding DB.</p> <p>Default: Nearest</p> <p>For information on recommended value, refer to <i>Audit Rate Limiter</i> section in the <i>CPS vDRA Advanced Tuning Guide</i>.</p>
Stale Binding Expiry Minutes	<p>Duration after which a binding record is validated against a session record to see if the binding should be deleted because it is stale</p> <p>The timer is initialized when the session is created.</p> <p>The records are deleted when binding expiry time is reached and no active session is found. Otherwise, the timer is updated so the binding record can be audited after another Stale Binding Expiry Minutes.</p> <p>Default: 10080 minutes (168 hours or one week) (recommended value)</p> <p>Minimum: 10 minutes</p> <p>Maximum: 43200 minutes (28 days)</p>
Stale Binding Refresh Minutes	<p>Duration for which the expiry time of the binding database records is refreshed.</p> <p>Default: 2880 minutes (48 hours or 2 days - recommended value).</p> <p>Minimum: 10 minutes</p> <p>Maximum: 10080 minutes (one week)</p> <p>Note Stale Binding Refresh Minutes should be greater than Stale Session Timer Minutes.</p> <p>Important Stale Binding Refresh Minutes parameter has been deprecated from CPS 19.5.0 and later releases. It is recommended to not set this value as zero.</p>

Parameter	Description
Binding Creation, Primary Alternative System	Name of vDRA system to retry Gx CCR-i When vDRA tries to route a Gx CCR-i request, but is unable to reach the database, the configured values of first the primary, then the secondary systems are used to route the Gx CCR-i to a different vDRA to try the database. The retry is stopped if that vDRA also cannot reach the database.
Binding Creation, Secondary Alternative System	Name of secondary vDRA system to retry Gx CCR-i
Binding Routing, Primary Alternative System	Name of vDRA system to retry Rx AAR When vDRA tries to route a Rx AAR request, but is unable to reach the database, the configured values of first the primary, then the secondary systems are used to route the Rx AAR to a different vDRA to try the database. The retry is stopped if that vDRA also cannot reach the database.
Binding Routing, Secondary Alternative System	Name of secondary vDRA system to retry Rx AAR
Settings	Refer to Settings.
Rate Limits	Refer to Rate Limits.
DRA Feature	Refer to DRA Feature.
DRA Inbound Endpoints	Refer to DRA Inbound Endpoints, on page 15 .
Relay Endpoints	Refer to Relay Endpoints, on page 17 .

Settings

Click **Settings** check box to open the configuration pane.

The following parameters can be configured under **Settings**:

Table 5: DRA Configuration - Settings Parameters

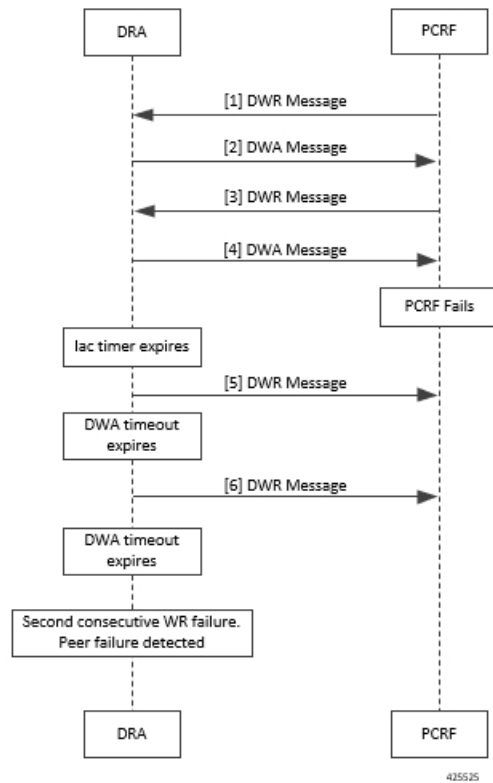
Parameter	Description
Stop Timeout Ms	Determines how long the stack waits for all resources to stop. The delay is in milliseconds. Default: 10000 ms (recommended value) Minimum: 1000 ms Maximum: 60000 ms (one minute)

Parameter	Description
Cea Timeout Ms	<p>Determines how long it takes for CER/CEA exchanges to timeout if there is no response. The delay is in milliseconds.</p> <p>Default: 10000 ms (recommended value)</p> <p>Minimum: 1000 ms</p> <p>Maximum: 60000 ms (one minute)</p>
Iac Timeout Ms	<p>Determines how long the stack waits before initiating a DWR message exchange on a peer connection from which no Diameter messages have been received. The timeout value is in milliseconds.</p> <p>Default: 5000 ms (recommended value)</p> <p>Minimum: 1000 ms</p> <p>Maximum: 30000 ms (30 seconds)</p>
Dwa Timeout Ms	<p>Determines how long the stack waits for a DWA message in response to a DWR message. If no Diameter message (DWA or other message) is received on the peer connection during the first timeout period, the stack counts a failure, sends another DWR message, and restarts the Dwa timer. If no Diameter messages are received during the second timeout period, the stack counts a second failure. After two consecutive failures, the stack considers the peer connection as failed, and closes the connection.</p> <p>The delay is in milliseconds.</p> <p>Default: 10000 ms (recommended value)</p> <p>Minimum: 1000 ms</p> <p>Maximum: 60000 ms (one minute)</p>
Dpa Timeout Ms	<p>Determines how long it takes for a DPR/DPA exchange to timeout if there is no response. The delay is in milliseconds.</p> <p>Default: 5000 ms (recommended value)</p> <p>Minimum: 1000 ms</p> <p>Maximum: 30000 ms (30 seconds)</p>

Parameter	Description
Rec Timeout Ms	<p>Determines how long it takes for the reconnection procedure to timeout. The delay is in milliseconds.</p> <p>Default: 10000 ms (recommended value)</p> <p>Minimum: 1000 ms</p> <p>Maximum: 60000 ms (one minute)</p>
Drain Timeout Ms	<p>Indicates the time that a peer connection remains open for responses to be sent to peers even if DPR is sent or received by vDRA.</p> <p>If a DPR is sent or received by vDRA, vDRA does not route requests to the disconnecting peer connection via any routing (Dest-Host, SRK, Binding, Table-Driven). However, responses and in-flight requests sent to the corresponding peers till the duration of Drain Timeout. This allows vDRA to gracefully shut down when any remote peer sends a DPR so as to minimize the diameter message loss.</p> <p>Default: 2000 ms</p> <p>Maximum: Must be less than Dpa timeout Ms</p> <p>Note When vDRA initiates DPR and the remote end PCRF/PGW disconnects TCP connection immediately after sending DPA, response for the in-flight requests are dropped before reaching the configured drain timeout value.</p>

The following figure illustrates the timers in peer detection:

Figure 3: vDRA Peer Detection Failure



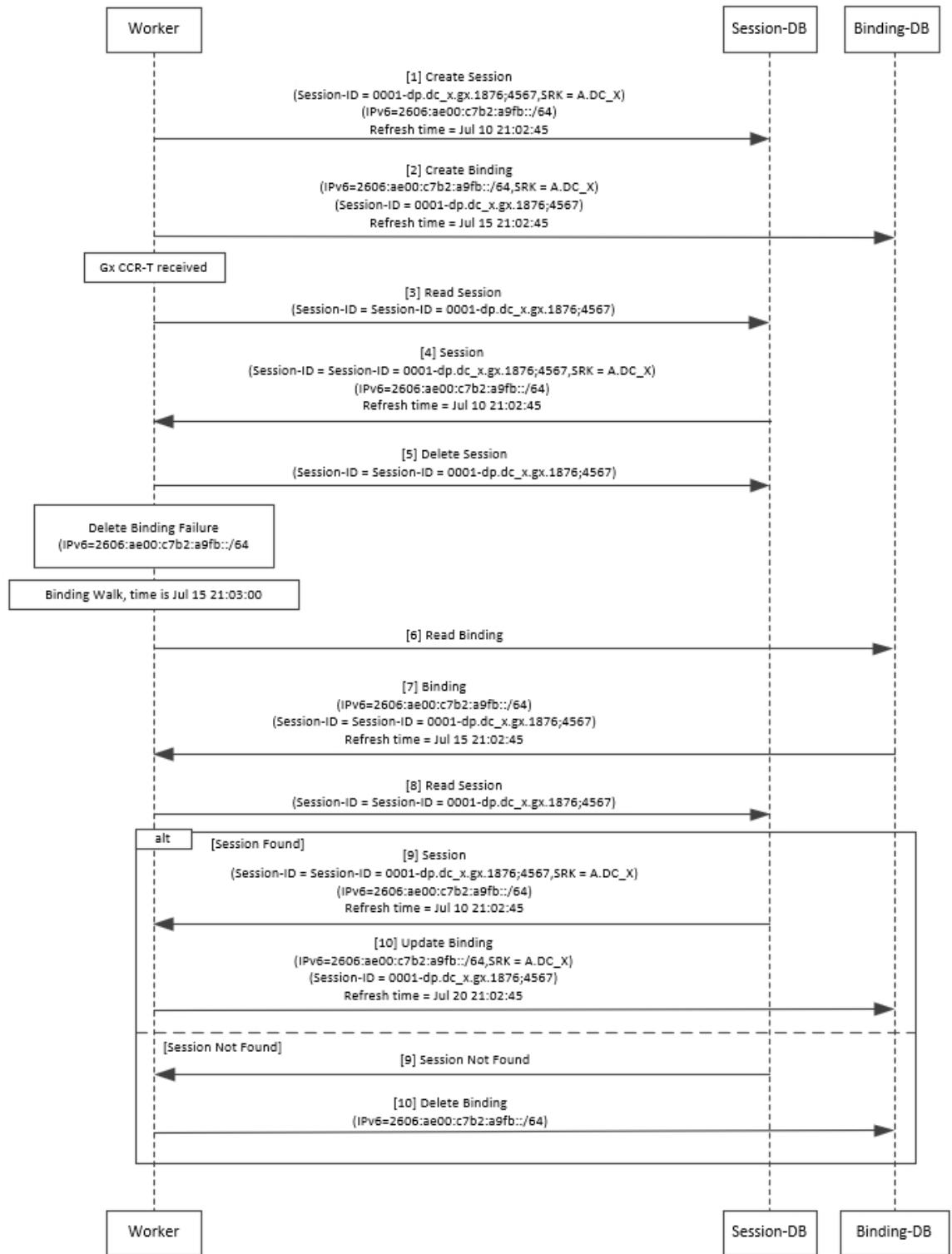
Binding DB Audit

The Binding DB Audit automatically deletes stale records from the binding DBs. When a Gx session record is created, binding records for the session binding keys are also created. When each binding record is created, the binding record expiry time is initialized to the sum of the session creation time and the Stale Binding Expiry Minutes (that you can configure in Policy Builder).

A binding record is deleted when the corresponding session record is deleted. A binding may become stale if it cannot be deleted when its associated session record is deleted (this occurs typically due to database communication failures). The binding records are audited using a binding audit background process. If the audit process finds a binding record with an expiry time in the past, the binding record is checked for staleness by checking the session database for the corresponding session record. If an active session record is found, the binding record expiry time is updated with sum of current time and the Stale Binding Expiry Minutes. If an active session is not found, the binding is considered stale and is deleted. Note that the binding audit process does not perform any Diameter signaling with the GW before deletion.

The following figures illustrate the working of binding DB:

Figure 4: DRA Binding Audit, Stale Binding Cleanup



Rate Limits

Rate limit per process instance on Policy Director (lb) VM can be managed using this configuration.

Default is unchecked, that is, no rate limits for Diameter traffic (recommended setting).

If enabled, the following parameters can be configured under **Rate Limits**:

Table 6: DRA Configuration - Rate Limits

Parameter	Description
Rate Limit per Instance on Policy Director	<p>Allowable TPS on a single instance of policy server (QNS) process running on the Policy Director.</p> <p>Minimum: 1</p> <p>Maximum: 5000</p> <p>Note Contact your Cisco representative for usecase-specific recommended values.</p>
Result-Code in Response	<p>Indicates the error code that must be used while rejecting requests, due to rate limits being reached.</p> <p>Default: 3004</p>
Error Message in Response	<p>Select the check box to drop the rate-limited messages without sending error response.</p> <p>If the check box is not selected, then the rate limited message are dropped with error response as configured.</p>

Parameter	Description
Drop Requests Without Error Response	<p>Select the check box to drop rate limited messages without sending error response.</p> <p>If the check box is unchecked, then the rate limited messages are dropped with error response as configured.</p> <p>To accommodate configuration to either drop the request or send an error response, a column <i>Discard Behavior</i> can be added under Peer Rate Limit Profile. The column may have one of the two possible values:</p> <ul style="list-style-type: none"> • Send Error Response • Drop Message <p>Default: Unchecked (recommended setting)</p> <p>For more information, refer to Peer Rate Limit.</p> <p>Important If both Rate Limit Error Code and Rate Limit Error String are provided along with Rate Limit Action as "Drop Message", the Rate Limit Action will take precedence and the other two fields will be ignored.</p>

Here is the list of the available combinations for rate limiting:

Table 7: Rate Limiting Combinations

Rate Limiting Type	With Error Code	With Error Code and Error Message	Without Error Code (Drop)
Instance Level	Yes	Yes	Yes
Peer Level Egress	Yes	Yes	Yes
Peer Level Egress with Message Level	Yes	Yes	Yes
Egress Message Level (No Peer Level RL)	Yes	Yes	Yes
Peer Level Ingress	Yes	Yes	Yes
Peer Level Ingress with Message Level	Yes	Yes	Yes
Ingress Message Level (No Peer Level RL)	Yes	Yes	Yes

DRA Feature

Click **DRA Feature** check box to open the configuration pane.

The following parameters can be configured under **DRA Feature**:

Table 8: DRA Features

Parameter	Description
Gx Session Tear Down On5065	<p>By default, Gx Session Tear Down On5065 flag is enabled (recommended setting).</p> <p>When the PCRF responds with a Experimental Result Code of 5065 in AAAnswer on Rx Interface, DRA deletes its internal binding and session created for the transaction. A RAR with appropriate Session-Release-Cause AVP will also be sent to the PCEF.</p> <p>Important When using this flag, there will always be a database query to fetch Gx session id. So this means that the database transactions will linearly increase with AAR traffic on Rx Interface.</p>
Update Time Stamp On Success R A A	<p>When this check box is selected, session timestamp will be updated on receipt of success RAA (Result-Code: 2001) from PCEF. ¹</p> <p>Default is checked (recommended setting).</p> <p>Important When using this flag, there will always be a database query to fetch Gx session id. So this means that the database transactions will linearly increase with AAR traffic on Rx Interface.</p>

¹ The time stamp is updated on generation of Stale RAR. Also, if a success RAR/RAA(2001) comes after generation of Stale RAR, then the Stale RAR counter is reset.

DRA Inbound Endpoints

The following parameters can be configured under **DRA Inbound Endpoints**:

Table 9: DRA Configuration - DRA Inbound Endpoints Parameters

Parameter	Description
Vm Host Name	Host Name of the VM that hosts this CPS vDRA endpoint.
Ip Address	Address on which this CPS vDRA endpoint should bind to.
Realm	Realm of the CPS vDRA endpoint.
Fqdn	Fully Qualified Domain Name of the CPS vDRA endpoint.

Parameter	Description
Transport Protocol	<p>Allows you to select either TCP' or 'SCTP' for the selected DRA endpoint.</p> <p>Default value is TCP.</p> <p>If the DRA/relay endpoint is to be configured for SCTP, the Transport Protocol should be selected as SCTP for those endpoints.</p>
Multi-Homed IPs	<p>This is a comma separated list of IP addresses that CPS vDRA will use to start the diameter stack with multi-homing enabled for SCTP transport. Diameter stack with TCP transport will still use the existing 'Local Bind Ip' field to specify any specific IP address for TCP stack.</p> <p>CPS vDRA will use the 'Local Bind Ip' to bring up SCTP stack and use it along with the 'Multi Homing Hosts' to start the SCTP transport with multi-homing support.</p> <p>Note While using SCTP multi-homing functionality review the Linux network and gateway configurations for supporting multiple networks on different subnets. CPS supports Centos 6 release and reverse path filtering kernel parameter (rp_filter) values can be set for allowing packets from different subnets on Policy Director VMs. The default behavior in Centos 6 is to discard the packets in such scenarios.</p> <p>The configuration for multi-homing is validated by netstat command on lb01:</p> <pre>netstat -apn grep 3898</pre>
Application	<p>Refers to 3GPP Application ID of the interface.</p> <p>You can select multiple applications on a peer connection.</p> <p>For example, S6a and SLg on a single IPv4/SCTP Multi-homed peer connection.</p>
Enabled	Check to enable the endpoint.
Base Port	Refers to the port on which the CPS vDRA listens for incoming connections.

An example configuration is shown below:

Figure 5: DRA Inbound Endpoints - Example Configuration

DRA Inbound Endpoints								
*Vm Host Name	*Ip Address	*Realm	*Fqdn	Transport Protocol	Multi-Homed IP's	*Application	*Enabled	*Base Port
lab	10.1.1.1	gx-dra1.cisco.com	gx-dra1	TCP		Gx Application	<input type="checkbox"/>	3868
lab	10.1.1.1	gx-dra2.cisco.com	gx-dra2	TCP		Gx Application	<input type="checkbox"/>	3869
lab	10.1.1.1	gx-dra3.cisco.com	gx-dra3	TCP		Gx Application	<input checked="" type="checkbox"/>	3870
lab	10.1.1.1	rx-dra1.cisco.com	rx-dra1	TCP		Rx Application	<input type="checkbox"/>	4868
lab	10.1.1.1	rx-dra2.cisco.com	rx-dra2	TCP		Rx Application	<input checked="" type="checkbox"/>	4869
lab	10.1.1.1	sd-dra1.cisco.com	sd-dra1	TCP		Sd Application	<input checked="" type="checkbox"/>	6868

Relay Endpoints

The following parameters can be configured under **Relay Endpoints**:

Table 10: DRA Configuration - Relay Endpoints Parameters

Parameter	Description
Vm Host Name	Host Name of the VM that hosts this Relay endpoint.
Instance Id	Instance Identifier is the ID of the current Instance.
Ip Address	Address on which this DRA endpoint should bind to.
Port	Port is the listening port for this instance.
Fqdn	Fully Qualified Domain Name of the DRA end point.
Enabled	Check to enable endpoint.

An example configuration is shown below:

Figure 6: Relay Endpoints - Example Configuration

Relay Endpoints					
*Vm Host Name	*Instance Id	*Ip Address	*Port	*Fqdn	*Enabled
lab	3	10.10.1.1	4868	dra3.rx	<input checked="" type="checkbox"/>

Diameter Application

Sd Application

For Sd, an Application Routing table is used to map specific diameter command codes and CC-Request-Types to a table, typically, an Sd New Session table for routing Sd TSRs to a peer route. The Sd New Session CD table will choose a peer route based on the Destination-Realm. The peer route will then point to a Peer-Group which contains multiple peer connections to a TDF and the DRA will load balance among the TDF peer connections in the Peer Group.

An example configuration is shown below:

Figure 7: Diameter Application - Sd Application Example

Name	*Priority	*Command Code	Cc Request Type	*Destination Host	Action Tables
Sd-TSR	0	8388637	0	<input checked="" type="checkbox"/>	New Sd Session
Sd-CCR-I	0	272	1	<input checked="" type="checkbox"/>	New Sd Session
Sd-CCR-U	0	272	2	<input checked="" type="checkbox"/>	New Sd Session
Sd-CCR-T	0	272	3	<input checked="" type="checkbox"/>	New Sd Session
RAR	0	258	0	<input checked="" type="checkbox"/>	New Sd Session

The following parameters are configured under Sd Application:

Table 11: Sd Application Parameters

Parameter	Description
Name	Name of the Sd application.
Application Id	16777303, 3GPP specified Application Identifier for Sd interface.
Vendor Ids	Vendor Identifiers that are required to be supported on Sd interface.
Tgpp Application check box	If this check box is selected, indicates this is a 3GPP defined application interface.
Application Route table	
Name	Identifier of the route.
Priority	Indicates the priority of the route.
Command Code	Indicates value of command code AVP within the message.
Cc Request Type	Indicates if the Credit Control Request type is Initial(1)/Update(2) or Terminate(3).
Destination Host Null	If this check box is selected, indicates if Destination Host will be null in messages received for this application.
Action Tables	Identifies the request routing table for this interface and message.

Gx Application

For Gx, an Application Routing table is used to map specific diameter command codes and CC-Request-Types to a table. When “Destination Host Null” is checked, it means Destination-Host AVP is null. It will then check for table driven routing.

An example configuration is shown below:

Figure 8: Diameter Application - Gx Application Example

Diameter Application

Name: Gx Application *Application Id: 16777238

Vendor Ids: 8164, 9, 10415 Add Remove Tgpp Application

Name	*Priority	*Command Code	Cc Request Type	*Destination Host	Action Tables
Gx_Initial	1	272	1	<input checked="" type="checkbox"/>	New Gx Session
Gx Terminate	1	272	3	<input checked="" type="checkbox"/>	New Gx Session
Gx_Update	1	272	2	<input checked="" type="checkbox"/>	New Gx Session

Add Remove ↑ ↓

C-DRA attempts to do Dest-Host routing before doing table driven routing. If the Dest-Host AVP is absent, empty, or equal to the CDRA FQDN, then we skip Dest-Host routing altogether and proceed to Table-Driven routing.

The following parameters are configured under Gx Application:

Table 12: Gx Application Parameters

Parameter	Description
Name	Name of the Gx application.
Application Id	16777238, 3GPP specified Application Identifier for Gx interface.
Vendor Ids	Vendor Identifiers that are required to be supported on Gx interface.
Tgpp Application check box	If this check box is selected, indicates this is a 3GPP defined application interface.
Application Route table	
Name	Identifier of the route.
Priority	Indicates the priority of the route.
Command Code	Indicates value of command code AVP within the message.

Parameter	Description
Cc Request Type	Indicates if the Credit Control Request type is Initial(1)/Update(2) or Terminate(3).
Destination Host Null	If this check box is selected, indicates the message will contain a Destination-Host.
Action Tables	Identifies the request routing table for this interface and message.

Rx Application

Identifies the request routing table for this interface and message.

Figure 9: Diameter Application - Rx Application Example

Diameter Application

Name: Rx Application *Application Id: 16777236

Vendor Ids: 13019, 8164, 9 Add, Remove Tgpp Application

Name	*Priority	*Command Code	Cc Request Type	*Destination Host	Action Tables
Rx Initial	1	265	1	<input checked="" type="checkbox"/>	New Rx Session
Rx Termination	1	275	1	<input checked="" type="checkbox"/>	New Rx Session

Add, Remove, ↑, ↓

The following parameters are configured under Rx Application:

Table 13: Rx Application Parameters

Parameter	Description
Name	Name of the Rx application.
Application Id	16777236, 3GPP specified Application Identifier for Rx interface.
Vendor Ids	Vendor Identifiers that are required to be supported on Rx interface.
Tgpp Application check box	If this check box is selected, indicates this is a 3GPP defined application interface.
Application Route table	
Name	Identifier of the route.

Parameter	Description
Priority	Indicates the priority of the route.
Command Code	Indicates value of command code AVP within the message.
Cc Request Type	Not supported for Rx interface.
Destination Host Null	If this check box is selected, indicates if Destination Host will be null in messages received for this application.
Action Tables	Identifies the request routing table for this interface and message.

Routing AVP Definition

Gx Session

An example configuration is shown below:

Figure 10: Routing AVP Definition - Gx Session

Routing Avp Definition

Name
New Gx Session

Routing Avp Lookup

*Search Table Group
apn_mapping_table
TB_GX_NEW_SESSION

Add Remove ↑ ↓

215584

Rx Session

An example configuration is shown below:

Figure 11: Routing AVP Definition - Rx Session

Rx New Session Rules - CRD Table

An example configuration is shown below:

Figure 12: Rx New Session Rules - CRD Table

Gx New Session Rules - CRD Table

For Gx, an Application Routing table is used to map specific diameter command codes and CC-Request-Types to a table, typically, for routing Gx CCR-Is. The Gx CCR-I should be routed based on a logical APN and the Origin-Host attribute. Regular expression matching of logical APNs and Origin-Hosts can also be configured. The implementation should be flexible to allow CRDs to be configured for routing of other attributes such as Destination-Realm and Origin-Realm.

An example configuration is shown below:

Figure 13: Gx New Session Rules - CRD Table

Custom Reference Data Table Some or all columns in this table have been published and will be read only. Newly added columns will be editable.

***Name** TB_GX_NEW_SESSION **Display Name** Gx New Session Rules Cache Results

Activation Condition Gx Best Match ***Evaluation Order** 1

*Name	Display Name	*Use In Condit	*Type	Key	Required
peer_route	Peer Route	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
origin_realm	Origin Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
destination_realm	Destination Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
origin_host	Origin Host	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
logical_apn	Logical APN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
imsi	IMSI	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Valid values pulled from another table's column (Key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Blinding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field
 Bind to a result column from another table
 Bind to Diameter request AVP code

Matching Operator
eq

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Sd New Session Rules - CRD Table

An example configuration is shown below:

Figure 14: Sd New Session Rules - CRD Table

Custom Reference Data Table Some or all columns in this table have been published and will be read only. Newly added columns will be editable.

***Name** TB_SD_NEW_SESSION **Display Name** SD_NEW_SESSION Cache Results

Activation Condition Best Match ***Evaluation Order** 0

*Name	Display Name	*Use In Condit	*Type	Key	Required
peer_route	Peer Route	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
origin_realm	Origin Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
destination_realm	Destination Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
destination_host	Destination Host	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
logical_apn	Logical APN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
imsi	IMSI	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Valid values pulled from another table's column (Key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Blinding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field
 Bind to a result column from another table
 Bind to Diameter request AVP code

Matching Operator
all

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Logical APN List - CRD Table

An example configuration is shown below:

Figure 15: Logical APN List - CRD Table

The screenshot shows the configuration for a Custom Reference Data Table named 'Logical APN List'. The table has one column named 'logical_apn' with a display name 'Logical APN'. The table is configured with 'Cache Results' checked and 'Use In Condi' checked. The 'Valid Values' section is empty. The 'Validation' section is empty. The 'Runtime Binding' section is empty. The 'Matching Operator' is set to 'and'.

*Name	Display Name	Cache Results	Activation Condition
logical_apn_list	Logical APN List	<input checked="" type="checkbox"/>	select clear

*Name	Display Name	*Use In Condi*	Type	Key	Required
logical_apn	Logical APN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

Validation
Validation used by Control Center

Runtime Binding
Which rows match when a message is received

Matching Operator

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Dynamic AVP Retriever for Routing

DRA supports routing messages based on the following AVPs from request message:

- Destination-Host
- Destination-Realm
- Origin-Host
- Origin-Realm
- APN (from Called-Station-ID)
- IMSI (from Subscription-ID)
- MSISDN (from Subscription-ID)

Regular-expression matching and combinations of AVPs is supported. This requirement is not applicable across all messages on different interfaces. The following table shows applicability of the AVP's at a message and interface level.

Table 14: Regular-expression Matching and Combinations of AVPs

Interface	Message	Origin Host	Origin Realm	Destination Host	Destination Realm	APN (Called-Station-ID)	IMSI	MSISDN
Gx	CCR-I	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	CCR-U	No	No	No	No	No	No	No
	RAR	No	No	Yes	No	No	No	No

Interface	Message	Origin Host	Origin Realm	Destination Host	Destination Realm	APN (Called-Station-ID)	IMSI	MSISDN
Sd	TSR	Yes	Yes	Yes	Yes	No	No	No
	CCR-I	Yes	Yes	Yes	Yes	No	No	No
	CCR-U/T	No	No	Yes	No	No	No	No
	RAR	No	No	Yes	No	No	No	No
Rx	RAR	No	No	Yes	No	No	No	No

Dynamic AVP Retrievers are used mostly used in Custom Reference Data where data has to be fetched from messages at runtime.

Configure Dynamic AVP Retriever

The following sample configuration shows how to retrieve the AVP and bind it to a Key Column in the CRD.

Procedure

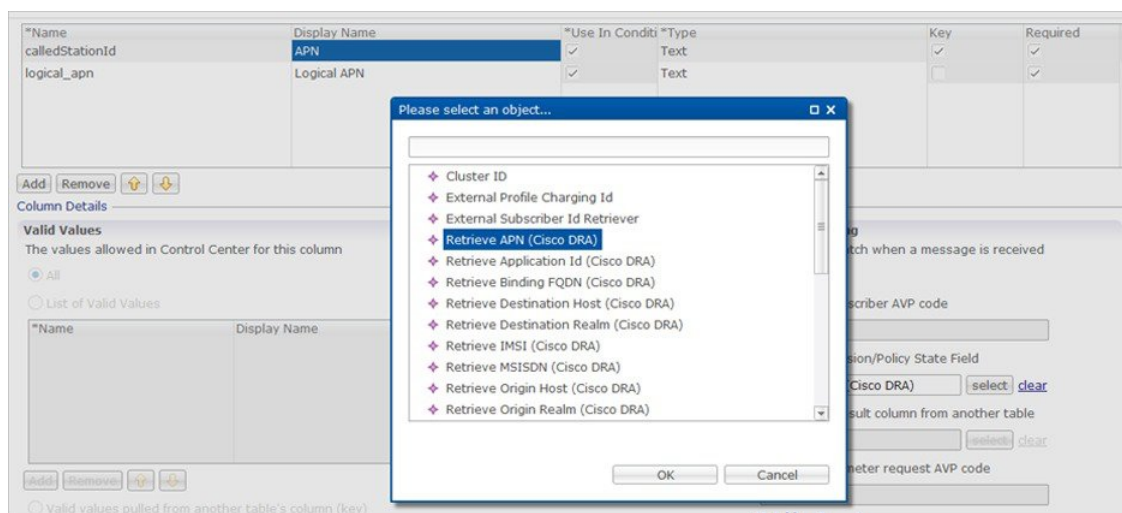
Step 1 Select the column name from the **Columns** table and click **select** near **Bind to Session/Policy State Field** to open the **Please select an object...** dialog box.

Note

You can use **Bind to Session/Policy State Field** only for those columns in the **Columns** table where **Key** column has been selected.

Step 2 Select the required object from the dialog box and click **OK**.

Figure 16: Adding AVPs



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Step 3 Repeat these steps to add additional AVPs.

Custom Reference Data Tables

Search Table Groups

Peer Rate Limit Profile

This is a Search Table Group whose key columns are Peer Group, Peer FQDN or Origin Host in the message and Message Direction.

Using this search table group, the user can configure a maximum rate for each of the configured and defined diameter peers. It also allows the user to configure a maximum rate for each server process.

The peer rate limit is shown below:

Figure 17: Peer Rate Limit - STG

The screenshot shows the configuration for a Custom Reference Data Table (Read Only) named "peer_rate_limit_profile". The configuration includes the following sections:

- Name and Display Name:** Name is "peer_rate_limit_profile", Display Name is "Peer Rate Limit Profile".
- Cache Results:** Checked.
- Activation Condition:** "Best Match" is selected.
- Evaluation Order:** Set to 0.
- Columns:** A table listing columns with their names, display names, and properties.

*Name	Display Name	*Use In Conditio	*Type	Key	Required
peer_group	Peer Group	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
peer_fqdn	Peer FQDN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
direction	Message Direction	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
rate_limit_profile	Rate Limit Profile	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
peer_rate_limit	Peer Rate Limit	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input type="checkbox"/>
discard_behavior	Discard Behavior	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>
- Column Details:**
 - Valid Values:** "All" is selected.
 - Validation:** Fields for "Regular Expression" and "Regular Expression Description" are present.
 - Runtime Binding:** "None" is selected.
 - Matching Operator:** A dropdown menu is present.

- **Peer Group:** This is the group of peers classified together using Peer Group and Peer Group Peer values initiating the message.
- **Peer FQDN:** The origin host of the peer. A specific diameter peer with its Fully Qualified Domain Name can be specified in this field or use wildcards specified by * in this field for any peer or matching peers like hss*.
- **Direction:** Message direction (Ingress and Egress).

- Ingress: Any diameter messages received by CPS vDRA from diameter peer. The routing decision by CPS vDRA will be taken after the ingress side rate limiting has been applied.
- Egress: Any diameter messages forwarded/routed by CPS vDRA to diameter peer. The egress side rate limiting will be applied after the routing decision has been taken by CPS vDRA.
- Peer Rate Limit: This field is to specify the threshold in TPS above which the diameter messages are discarded. This can be left empty if none of the messages are to be dropped or only message level rate limit is to be applied.
- Rate Limit Profile: Profile Name applicable for this Peer Group and Peer, if specified. This profile maps to Rate Limiting at message level. This field enables the rate limit at per message/command code level. See [Message Rate Limit Profile](#) for more details.
- Rate Limit Result Code: The result code sent by CPS vDRA for response message towards diameter peer when Discard Behavior is configured as Send Error Answer. In case Discard Behavior is configured as Drop Message, this field is ignored.
- Error String: The string specified in this field is populated by CPS vDRA in AVP Error Message for response message towards diameter peer when Discard Behavior is configured as Send Error Answer. In case Discard Behavior is configured as Drop Message, this field is ignored. This is an optional field when Discard Behavior is configured as Send Error Answer.



Note If both Rate Limit Error Code and Rate Limit Error String are provided along with Rate Limit Action as "Drop Message", the Rate Limit Action takes precedence and the other two fields will be ignored.

For more information, see [Peer Rate Limit Profile](#).

Peer Group Mapping

Figure 18: Peer Group Mapping - STG

Custom Reference Data Table (Read Only)

***Name** **Display Name** Cache Results

Activation Condition Best Match ***Evaluation Order**

***Columns**

*Name	Display Name	*Use In Conditic	*Type	Key
realm_pattern	Realm Pattern	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>
fqdn_pattern	FQDN Pattern	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>
peer_group	Peer Group	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>
weight	Weight	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>

Column Details

Valid Values	Validation	Runtime Binding				
The values allowed in Control Center for this column <input checked="" type="radio"/> All <input type="radio"/> List of Valid Values <table border="1"> <thead> <tr> <th>*Name</th> <th>Display Name</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	*Name	Display Name			Validation used by Control Center Regular Expression <input type="text"/> Regular Expression Description <input type="text"/>	Which rows match when a message <input checked="" type="radio"/> None <input type="radio"/> Bind to Subscriber AVP code <input type="text"/> <input type="radio"/> Bind to Session/Policy State File <input type="text"/>
*Name	Display Name					

For more information, see [Peer Group Mapping](#).

Message Retry Profile

Message retry profile has been added.

Figure 19: Message Retry Profile - STG

Custom Reference Data Table Some or all columns in this table have been published and will be read only. Newly added columns will be editable.

***Name** message_retry_profile **Display Name** Message Retry Profile Cache Results

Activation Condition Best Match ***Evaluation Order** 0

*Columns	*Name	Display Name	*Use In Condi	*Type	Key	Required
	peer_group	Peer Group	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	app_id	Application Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	cmd_code	Command Code	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	rc_in_resp	Result Code	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	exp_rc	Experimental RC	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input type="checkbox"/>
	num_retries	Number Of Retries	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All

List of Valid Values

*Name	Display Name
-------	--------------

Valid values pulled from another table's column (key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None

Bind to Subscriber AVP code

Bind to Session/Policy State Field

Bind to a result column from another table

Bind to Diameter request AVP code

Matching Operator

- Peer Group: Peer group for which the retry has to be happen.
- Application Id: Application Id of the diameter applications.
- Command Code: Command Code of the message.
- Result Code: Result code received from PCRF for timeout. The value is 7000.
- Experimental RC: Indicates whether result code is experimental or not. This is for future purpose and value in this has no effect on the message retry functionality.
- Number of Retries: Number of retries for the message.

For more information, see [Message Retry Profile](#).

Message Mediation Profile

The message mediation profile is used to provide support for mediation of AVPs in Diameter request and answer.

- For Diameter requests, only remove is supported.
- For Diameter answers, the following actions are supported:

- "remove" meaning remove all matching AVPs in the request.
- "copy" meaning copy from the request if no AVPs are present in the answer.
 - If the AVP is present in answer, no action is performed.
- "overwrite" meaning first remove and then copy from the request.
 - Check if the AVP is present in answer, if so remove and add from request.
 - If AVP is not present in answer, copy from request.

A new **Message Mediation Profile** STG has been added:

Figure 20: Message Mediation Profile - STG

Custom Reference Data Table (Read Only)

*Name: message_mediation_profile Display Name: Message Mediation Profile Cache Results

Activation Condition: Best Match *Evaluation Order: 0

*Name	Display Name	*Use In Condit	*Type	Key	Required
app_id	Application Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
cmd_code	Command Code	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
msg_type	Message Type	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
avp_code	Avp Code	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
vendor_id	Avp Vendor Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
avp_action	Avp Action	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name
-------	--------------

Valid values pulled from another table's column (key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field
 Bind to a result column from another table
 Bind to Diameter request AVP code

Matching Operator

- Application Id: Application ID of the Diameter applications.
- Command Code: Command code of the message.
- Message Type : Request/Answer for which the rule has to be applied.
- Avp Code : AVP code of the Diameter message.
- Vendor Id : AVP vendor ID.
- Avp Action : Provides options for copy/remove/overwrite.



Note Application ID, Command Code, AVP Code and Vendor Id are used as key, so no duplicate rows could be defined for this combination and the same AVP action. For example, you cannot define both "remove" and "Copy from request" for the same set of Application ID, Command Code, AVP Code and Vendor Id.

Best Match check box needs to be checked if you want to use the wildcard feature.

For more information, see Message Mediation Profile in Custom Reference Data Tables chapter.

Peer Group Answer Timeout

New search table Peer Group Answer Timeout has been added.

Figure 21: Peer Group Answer Timeout - STG

Custom Reference Data Table (Read Only)

*Name: peer_group_answer_timeout Display Name: Peer Group Answer Timeout Cache Results

Activation Condition: Best Match *Evaluation Order: 0

*Name	Display Name	*Use In Conditio	*Type
peer_group	Peer Group	<input checked="" type="checkbox"/>	Text
app_id	Application Id	<input checked="" type="checkbox"/>	Text
cmd_code	Command Code	<input checked="" type="checkbox"/>	Text
answer_timeout	Timeout Milliseconds	<input checked="" type="checkbox"/>	Text

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

- Application Id: Application Id of the diameter applications.
- Peer Group: Peer group for which the timeout is applied.
- Command code (to enable different timeouts for different Diameter commands)
- Timeout: Timeout in milliseconds.

For more information, see [Peer Group Answer Timeout](#).

Error Result Code Profile

Error result code profile can be used to map errors to Result-Code value and an error message string for the Error-Message AVP. It also provides support for configurable error result codes.

Figure 22: Error Result Code Profile - STG

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results

Activation Condition: Best Match *Evaluation Order:

*Columns

*Name	Display Name	*Use In Conditio	*Type	Key	Required
app_id	Application Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
internal_err	Error	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
rc_in_resp	Result Code	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
exp_rc_in_resp	Exp Result Code	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
exp_vendor_id	Vendor Id	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
err_msg	Err Msg	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name
-------	--------------

Valid values pulled from another table's column (key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code

Bind to Session/Policy State Field

Bind to a result column from another table

Bind to Diameter request AVP code

Matching Operator

Valid values is the place where all the valid error values can be configured in STG so that they are visible in CRD drop-down.

- ApplicationId: Application ID for which the mapping of Result-Code has to be done.
- Error: Internal error list.
- ResultCode: Result Code to be sent in answer.
- ExpResultCode: Experimental result code to be sent in answer. Vendor-Id will be sent in Answer only for Experimental result-Code.
- ErrMsg: Error message AVP sent in answer.



Note Experiment result code will be sent when Result-Code is not configured. If both Result-Code and experimental Result-Code are present, Result-Code would take precedence.

For more information, see [Error Result Code Profile](#).

Gx Session Routing

Gx Session Routing table is required for "table driven routing". Here an example for Gx New Session Rules is provided. If table driven routing is required for Rx or Sd, user needs to create similar tables for Sd and Rx as well.

Figure 23: Gx Session Routing

Custom Reference Data Table Some or all columns in this table have been published and will be read only. Newly added columns will be editable.

***Name** **Display Name** Cache Results

Activation Condition Best Match ***Evaluation Order**

***Columns**

*Name	Display Name	*Use In Conditio	*Type	Key	Required
logical_apn	Logical APN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
origin_host	Origin Host	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
peer_route	Peer Route	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
origin_realm	Origin Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
destination_host	Destination Host	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
destination_realm	Destination Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field
 Bind to a result column from another table
 Bind to Diameter request AVP code

For more information, see [Gx New Session Rules](#).

Custom Reference Data Tables

APN Mapping

This table provides information related to APN Mapping. The read-only APN Mapping are shown below:

Figure 24: APN Mapping - CRD Table

Custom Reference Data Table Some or all columns in this table have been published and will be read only. Newly added columns will be editable.

***Name** **Display Name** Cache Results

Activation Condition Best Match ***Evaluation Order**

***Columns**

*Name	Display Name	*Use In Conditio	*Type	Key	Required
called_station_id	Called Station Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
logical_apn	Logical APN	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field
 Bind to a result column from another table
 Bind to Diameter request AVP code

- Called-Station-Id: This is the AVP from which APN is derived. This also is the key column for this table. It is bound to the session or Policy State field as shown in the snapshot.
- Logical_APN: This is the mapped logical name that is used for referencing and processing the message within the system.



Note For sample data configuration, refer the *CPS Control Center Interface Guide for Full Privilege Administrators* for this release.

Peer Access Control List

You can use the Peer Access Control List to specify the list of peers (by realm, FQDN, and applications) that can establish peer connections to vDRA so that unknown peers are not permitted to create Diameter peer connections.

Figure 25: Peer Access Control List

Custom Reference Data Table (Read Only)

***Name**: peer_access_control_list

Display Name: Peer Access Control List

Cache Results

Activation Condition:

Best Match

***Evaluation Order**: 0

*Name	Display Name	*Use In Conditic	*Type	Key	Required
origin_host	Origin Host	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
origin_realm	Origin Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
auth_action	Authorization Action	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>
error_code	Authorization Action Deny - Result Code	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input type="checkbox"/>
error_msg	Authorization Action Deny - Error Message	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
application_id	Application Id	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All

List of Valid Values

*Name	Display Name

Validation
Validation used by Control Center

Regular Expression:

Regular Expression Description:

Runtime Binding
Which rows match when a message is received

None

Bind to Subscriber AVP code

Bind to Session/Policy State Field

Peer Routes

This tables provides the information related to Peer Routes available in the system. The read-only peer routes are shown below:

Figure 26: Peer Routes - CRD Table

The screenshot shows the configuration for a Custom Reference Data Table (CRD) named 'peer_route'. The table has the following columns: *Name (peer_route), Display Name (Peer Routes), *Use In Condi (checked), *Type (Text), Key (checked), and Required (checked). Below the table, there are three main sections: 'Valid Values' (set to 'All'), 'Validation' (with fields for Regular Expression and Regular Expression Description), and 'Runtime Binding' (set to 'None').

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Peer Group SRK Mapping

This table provides the information related to Peer Groups in the system. The read-only peer groups are shown below:

Figure 27: Peer Group - CRD Table

The screenshot shows the configuration for a Custom Reference Data Table (CRD) named 'peer_group_srk_mapping'. The table lists the following entries:

*Name	Display Name	*Use In Condi	*Type	Key	Required
peer_group	Peer Group	checked	Text	checked	checked
session_routing_key	Session Routing Key	checked	Text		
dest_host_routing_rule	Destination Host Routing Rule	checked	Text		checked
dest_host_replace_rule	Destination Host Replace	checked	Text		checked
dest_realm_replace_rule	Destination Realm Replace	checked	Text		

Below the table, there are sections for 'Valid Values' (set to 'All'), 'Validation' (with fields for Regular Expression and Regular Expression Description), 'Runtime Binding' (set to 'None'), and 'Matching Operator'.

- Peer Group: Name of the peer group.
- Session Routing Key: Routing token for this Peer Group.
- Destination Host Routing Rule: Defines Routing behavior of this group.

Peer Routing

This table provides the information related to peer routing in the system. The read-only peer routings are shown below:

Figure 28: Peer Routing - CRD Table

Custom Reference Data Table (Read Only)

*Name: peer_routing Display Name: Peer Routing Cache Results Activation Condition:

*Name	Display Name	*Use In Condi*	Type	Key	Required
peer_route	Peer Route	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
system_id	System Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
peer_group	Peer Group	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
precedence	Precedence	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>
weight	Weight	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All

List of Valid Values

*Name	Display Name

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None

Bind to Subscriber AVP code

Bind to Session/Policy State Field

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- Peer Route: Identifier of this Peer Route.
- System ID: System Identifier for this VM.
- Peer Group: Identifier of the Peer group on this peer Route.
- Precedence: of the peer group on this Peer Route.
- Weight: Weight of the peer group on this Peer Route.

Binding Key Profile

This table provides the information related to binding key profile in the system. The read-only keys are shown below:

Figure 29: Binding Key Profile - CRD Table

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

***Columns**

*Name	Display Name	*Use In Conditio	*Type	Key	Required
profile_name	Profile Name	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
imsi_apn	IMSI APN Key Enabled	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input type="checkbox"/>
msisdn_apn	MSISDN APN Key Enabled	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input type="checkbox"/>
framed_ipv6_prefix	Framed IPv6 Enabled	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input type="checkbox"/>
framed_ipv4	Framed IPv4 Enabled	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name

Valid values pulled from another table's column (key)

Actions
Copy:

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field

 Bind to a result column from another table

 Bind to Diameter request AVP code

Matching Operator

- Profile Name: This is the name given to the Bind profile that is associated with keys that are either enabled and/or disabled.
- MSI APN Key Enabled: Enabling this field would mean that bindings will be stored in IMSI APN collections in bindings database.
- MSISDN APN Key Enabled: Enabling this field would mean that bindings will be stored in MSISDN APN collections in bindings database.
- Framed IPv6 Enabled: Enabling this would mean binding data would be stored in “ipv6bindings” collection.
- Framed IPv4 Enabled: Enabling this would mean binding data getting stored in “ipv4bindings” collection.

Refer to [Binding Key Profile](#) for configuration in Control Center.

Appld Key Profile Mapping

This table stores the mapping between Application Identifiers and Bind Key Profile Names. The Application Identifiers are pre-provisioned for two Application Identifiers as Gx and Rx. Similarly, the BindingKeyProfile is also tied to the Profile Name column of the “BindingKeyType_Profile” table:

Figure 30: AppId Key Profile Mapping- CRD Table

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

*Name	Display Name	*Use In Conditio	*Type	Key	Required
application_id	Application Id	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
profile_name	Profile Name	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name
-------	--------------

Valid values pulled from another table's column (key)

Actions
Copy:

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field

 Bind to a result column from another table

 Bind to Diameter request AVP code

Matching Operator

Message Rate Limit Profile

This table gives a provision to configure Message Rate Limits at a profile level.

Figure 31: Message Rate Limit Profile - CRD Table

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

*Name	Display Name	*Use In Conditio	*Type	Key	Required
profile_name	Rate Limit Profile Name	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
app_id	Application Identifier	<input checked="" type="checkbox"/>	Number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
command_code	Command Code	<input checked="" type="checkbox"/>	Number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
mesg_type	Message/Request Type	<input checked="" type="checkbox"/>	Number	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
rate_limit	Message Rate Limit	<input checked="" type="checkbox"/>	Number	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Column Details

Valid Values
The values allowed in Control Center for this column

All
 List of Valid Values

*Name	Display Name
-------	--------------

Valid values pulled from another table's column (key)

Validation
Validation used by Control Center

Regular Expression

Regular Expression Description

Runtime Binding
Which rows match when a message is received

None
 Bind to Subscriber AVP code
 Bind to Session/Policy State Field

 Bind to a result column from another table

 Bind to Diameter request AVP code

- Profile Name: Unique Identifier for a profile.
- Application ID: Application Identifier for this row. 3GPP App Ids only are allowed here.

- **Command Code:** Command Code of the message that is applicable on the said interface specified by Application Id above.
- **Message Type:** Initial/Update/Terminate or None for messages that do not have them. The message request type should be same as specified for the command code in Policy Builder under Diameter Application.
- **Rate Limit:** This field is to specify the threshold in TPS above which the diameter messages are discarded. This value should be more than the Peer Rate Limit in order for message level rate limit to be applied.
- **Profile Name:** Unique Identifier for a profile.

Refer to Message Rate Limit Profile for configuration in Control Center.

Reserved IMSI

You can configure the Reserved IMSI CRD table to validate a parsed IMSI for SLF routing against a configured list of reserved MCC ranges.

The CRD has two main columns : MCC Start range and MCC End Range. The MCC consists of the first three digits of an IMSI.

If the IMSI matches a reserved IMSI, the value is ignored for SLF routing.

You can provide support up to ten distinct (non-overlapping) MCC ranges as Reserved IMSIs.

The DRA/SLF ignores AVPs that contain such IMSIs, and continues searching other AVPs in the Diameter request, for a valid address to be used for address resolution.

The following image shows a sample Reserved IMSI configuration:

Figure 32: Reserved IMSI

The screenshot shows a configuration window titled "Custom Reference Data Table (Read Only)". It contains a table with the following columns: *Name, Display Name, *Use In Condition, and *Type. The table has three rows: reserved_mcc, MCC Start, and MCC End. The *Use In Condition column has checkboxes for 'MCC Start' and 'MCC End'. The *Type column has 'Number' for both 'MCC Start' and 'MCC End'. Below the table, there are sections for "Column Details", "Valid Values", "Validation", and "Runtime Binding".

*Name	Display Name	*Use In Condition	*Type
reserved_mcc	Reserved MCC	<input checked="" type="checkbox"/>	
mcc_start	MCC Start	<input checked="" type="checkbox"/>	Number
mcc_end	MCC End	<input checked="" type="checkbox"/>	Number

Trusted Realm Profile

Trusted Realm Profile is used for topology hiding. The CRD includes the following columns:

- **Trusted Profile Name:** Profile Name having a trusted realm mapped to it.
- **Trusted Realm:** Realm for which Topology Hiding is not required.

Figure 33: Trusted Realm Profile

The screenshot shows the configuration for a Custom Reference Data Table (Read Only) for a Trusted Realm Profile. The configuration includes the following fields and options:

- Name:** trusted_realm_profile
- Display Name:** Trusted Realm Profile
- Cache Results:**
- Activation Condition:** (empty field) with **Save** and **Clear** buttons.
- Save CRD Data:**
- Rest Match:**
- Evaluation Order:** 0
- Columns:**

*Name	Display Name	*Use In Condit	*Type	Key	Required
profile_name	Trusted Profile Name	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>
trusted_realm	Trusted Realm	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Protected Realm Trusted Profile Mapping

Protected Realm Trusted Profile Mapping is used for topology hiding. The CRD includes the following columns:

- Protected Realm: Realm that is protected (topology hiding is required).
- Profile Name: Profile having realms that are trusted for this protected realm and that do not require topology hiding.

Figure 34: Protected Realm Trusted Profile Mapping

The screenshot shows the configuration for a Custom Reference Data Table (Read Only) for Protected Realm Trusted Profile Mapping. The configuration includes the following fields and options:

- Name:** protected_realm_trusted_profile
- Display Name:** Protected Realm Trusted Profile
- Cache Results:**
- Activation Condition:** (empty field) with **Save** and **Clear** buttons.
- Save CRD Data:**
- Rest Match:**
- Evaluation Order:** 0
- Columns:**

*Name	Display Name	*Use In Condit	*Type	Key	Required
protected_realm	Protected Realm	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>
profile_name	Trusted Profile Name	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>

MME Alias Map

MME Alias Map is used for topology hiding. The CRD includes the following columns:

- MME FQDN: FQDN of MME that requires topology hiding.
- Alias1: Mandatory. An alias identity used for the protected host that belongs to an MME in the network.
- Alias 2: Optional. Alternate Alias that can be used for Topology Hiding for the given MME FQDN.
- Alias 3: Optional. Alternate Alias that can be used for Topology Hiding for the given MME FQDN.

Figure 35: MME Alias Map

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

Show Crd Data

*Name	Display Name	*Use In Conditio	*Type	Key	Required
mme_host	MME FQDN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
alias1	Alias 1	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
alias2	Alias 2	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
alias3	Alias 3	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

HSS Aliases

HSS Aliases is used for topology hiding. The CRD includes the following columns:

- HSS Alias FQDN: Alias FQDN used to replace a protected HSS FQDN.
- Shared Alias: Boolean variable used to indicate whether the Alias FQDN is shared across multiple HSS servers or not.

Figure 36: HSS Aliases

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

Show Crd Data

*Name	Display Name	*Use In Conditio	*Type	Key	Required
hss_alias	HSS Alias FQDN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
is_shared_alias	Shared Alias	<input checked="" type="checkbox"/>	True/False	<input type="checkbox"/>	<input checked="" type="checkbox"/>

HSS Alias Map

HSS Alias Map is used for topology hiding. The CRD includes the following columns:

- HSS FQDN: FQDN of HSS peer.
- Alias1: Required field which is derived from HSS Alias CRD.
- Alias2: Optional. Alias for the HSS FQDN.
- Alias3: Optional. Alias for the HSS FQDN.

Figure 37: HSS Alias Map

Custom Reference Data Table (Read Only)

*Name: Display Name: Cache Results Activation Condition:

Sync Cnd Data

*Columns

*Name	Display Name	*Use In Condi*	*Type	Key	Required
hss_host	HSS FQDN	<input checked="" type="checkbox"/>	Text	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
alias1	Alias1	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input checked="" type="checkbox"/>
alias2	Alias2	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>
alias3	Alias3	<input checked="" type="checkbox"/>	Text	<input type="checkbox"/>	<input type="checkbox"/>

