EAGLE® XG Diameter Signaling Router

Communication Agent

910-6575-001 Revision A

June 2012

Table of Contents

List of Tables

Chapter 1

Communication Agent Overview

Communication Agent (ComAgent) is a plug-in included with DSR 3.0 that includes infrastructure features and services for enabling inter-server communication. ComAgent provides the connection management, reliable routing services and software compatibility management, and supports mechanisms for exchange of StackEvents between stacks hosted on different Message Processors (MPs). ComAgent successfully routes messages between layers across processes and servers.

The **Communication Agent's** Routed Service provides a means by which local applications hosted on an MP can send traffic to applications on other MPs. The **Communication Agent's** Routed Service will have Connection Groups associated with the service assigned with different priorities. When an application sends events to other servers using a routed service, the **Communication Agent** chooses a connection in the highest priority group for that routed service and sends the event on that connection. The load-balancing accounts for:

- Connection Group status (an aggregation of member connection status)
- Connection availability status (same as server availability status)
- Connection Egress Congestion Level (CL)
    - Transport Connection Congestion Level (TCL)
    - MP Overload Level (OL) of peer server

Note: This release of ComAgent supports one Routed Service and one Connection Group per Routed Service.

The **Communication Agent** menu also provides you a means to monitor the operational status of High-Availability (HA) Services Sub-Resources. The HA Services enables a server application, such as

DSR (Charging) SBR, to load-share its active functions across a set of servers and to notify clients, such as DSR and CPA, of the placement of its active functions onto servers in a manner that allows the clients to send stack events to the active functions. The set of active functions is called a Resource and each active function instance is called a Sub-Resource.

Chapter 2

Configuration

Topics:

The ComAgent establishes connections automatically between all MPs under the same parent OA&M server pair. It also establishes connections to configured remote servers. The automatic and configured connections can be grouped together as Connection Groups. Inserting Remote Server entries establishes connections to the servers.

Connections between MPs having the same parent OA&M server pair are automatically established. Connections to Remote Servers are established from/to local MPs by manual configuration.

Remote Servers are configured using the Communication Agent Remote Server Configuration GUI. The most important attribute of a Communication Agent Remote Server is an IP Address that can be reached via a server's Internal Management Interface (IMI). The IP address uniquely identifies the Remote Server and provides the means by which Communication Agent can establish transport connections to/from the Remote Server. The Remote Server attributes include:

- Name
- IP Address
- Connection Mode: {client, server}
- Local Server Group: group of servers that should connect to the Remote Server

Note: Use **Communication Agent ➤ Configuration ➤ Remote Servers** and **Communication Agent ➤ Configuration ➤ Connection Group** to perform this configuration.

The **Communication Agent ➤ Configuration** pages provide a way for you to create and configure Remote Servers, Connection Groups, and assign a Connection Group to the services.

By default Communication Agent has the "Remote Servers" and "Connection Status" screens enabled. For example the DPs only need Remote Servers and Connection Status screens, while the DSR application needs the additional Connection Group and Routed Services screens.

The configuration should be performed in this order:

1. *Remote Servers*
2. *Connection Groups*
3. *Routed Services*

Note: Default configuration of Routed Services has a pre-defined Connection Group associated with it. This screen can be used to manage user-defined connection groups associated with the service.

Remote Servers

The **Communication Agent -> Configuration -> Remote Servers** page is used to configure connections to remote servers. A remote server is a server that has a different parent OA&M server-pair relative to a local MP server group. The remote servers will be associated with servers in a local server group. Connections are established between Remote Server and local servers in the specified server group. A Remote Server can be associated with a local server group.

The **Communication Agent -> Configuration -> Remote Servers** pages provide these actions to manage remote servers:

- Click **Insert**.

  The **Communication Agent -> Configuration -> Remote Servers [Insert]** page appears.You can create a Remote Server entry that is accessible from the Remote Server listing.

- Select a Remote Server and click **Edit**.

  The **Communication Agent -> Configuration -> Remote Servers [Edit]** page appears. You can change the mode of operation of a Remote Server.

- Select a Remote Server and click **Delete**.

  You can remove a Remote Server from the Remote Server listing. (A Remote Server cannot be deleted if it is in a Connection Group.)

Remote Servers elements

The **Remote Servers** pages display information in a tabular format. This table describes elements on the **Remote Servers** pages.

Table 1: Remote Servers Elements

Name	Description	Data Input Notes

Remote Server Name	The **Remote Server Name** is a unique name within the system.
	The **Remote Server Name** can be repeated to associate it with multiple local server groups.
		The name must meet these requirements:
		• Maximum length of 32 characters
		• Valid characters are
		  • Alphabetic (A through Z, uppercase or lowercase)
		  • Numeric (0 through 9)
		  • Underscore (_)
		• The name must contain at least one alphabetic character
		• The name can not start with a numeric character

Name	Description	Data Input Notes
Remote Server IP Address	The IPv4 address of the Remote Server.	Dot notation format (for example: 255.255.255.255).
Remote Server Mode	The Mode in which the Remote Server operates.	Format: Drop down list Range: Client, Server
Local Server Group	Identifies the Local Server Group associated with the Remote Server. The name of the group of local servers that establish connections with this Remote Server.	Format: Drop down list Range: All named C-level server groups

Insert

The **Communication Agent -> Configuration -> Remote Servers [Insert]** page is used to create a Remote Server Name and to insert that name into a Remote Server listing.

The fields are described in *Remote Servers elements*.

1. Select Communication Agent -> Configuration -> Remote Servers.

   The **Remote Servers** page appears.

2. Click **Insert**.

   The **Communication Agent -> Configuration -> Remote Servers [Insert]** page appears.

3. Enter a unique name for the remote server in the **Remote Server Name** field.

   The **Remote Server Name** should be a unique name within the system.

   Note: The **Remote Server Name** can be the same of an existing name but should be associated with a different local server group.

   The name must meet these requirements:

   - Maximum length of 32 characters
   - Valid characters are
     - Alphabetic (A through Z, uppercase or lowercase)
     - Numeric (0 through 9)
     - Underscore (_)
   - The name must contain at least one alphabetic character
   - The name can not start with a numeric character

4. Enter the IP address of the remote server in the **Remote Server IP Address** field.
   The IP Address should be a valid IPv4 address in dot notation format (for example: 255.255.255.255).
5. Choose a mode of operation from the **Remote Server Mode** drop down list.

   The Mode in which the Remote Server operates can be configured as a:

- **Client** – where the servers in the local server group will accept connections initiated by the remote server
- **Server** – where the servers in the local server group will each initiate a connection to the remote server

6. Perform one of these actions:

   - Click **OK** - If field validations succeed, the **Communication Agent -> Configuration -> Remote Servers** screen is displayed. An error message is displayed if:

     - The page contains any values that are not valid
     - A required field is empty (not entered)
     - The remote server IP address is not unique

   - Click **Apply** - If field validations succeed, the **Communication Agent -> Configuration -> Remote Servers [Insert]** is displayed. The fields shall display the applied values.
   - Click **Cancel** - to abort changes on this page and the previous page appears.

Edit

The **Communication Agent -> Configuration -> Remote Servers [Edit]** page is used to modify the mode of operation for the Remote Server.

The fields are described in *Remote Servers elements*.

1. Select **Communication Agent -> Configuration -> Remote Servers**.

   The **Remote Servers** page appears.

2. Click **Edit**.

   The **Communication Agent -> Configuration -> Remote Servers [Edit]** page appears.

   The **Remote Server Mode** field is the only available field for modification.

3. Choose a mode of operation from the **Remote Server Mode** drop down list

   The Mode in which the Remote Server operates can be configured as a:

   - **Client** – where the servers in the local server group will accept connections initiated by the remote server
   - **Server** – where the servers in the local server group will each initiate a connection to the remote server

4. Perform one of these actions:

   - Click **OK** - If field validations succeed, the **Communication Agent -> Configuration -> Remote Servers** screen is displayed. An error message appears if:

     - The page contains any values that are not valid
     - A required field is empty (not entered)
     - The remote server name is not unique

   - Click **Apply** - If field validations succeed, the **Communication Agent -> Configuration -> Remote Servers [Edit]** is displayed. The fields shall display the applied values.
   - Click **Cancel** - to abort changes on this page and the previous page appears.

Delete

The **Communication Agent -> Configuration -> Remote Servers** page **Delete** control displays a confirmation box to confirm or cancel **Remote Server** deletion.

The fields are described in *Remote Servers elements*.

1. Select **Communication Agent -> Configuration -> Remote Servers**.

   The **Remote Servers** page appears.
2. Select the remote server you want to delete.
3. Click on **Delete**.

   A confirmation pop up window appears.
4. Perform one of these actions:

   - Click **OK** - the remote server will be deleted.

     Note: If the remote server is associated with a Connection Group or it has a connection in Enabled state then it cannot be deleted.

   - Click **Cancel** - to abort the action.

Connection Groups

The **Communication Agent -> Configuration -> Connection Groups** page provides the means to group communication agent connections for the purpose of traffic load balancing. The **Connection Group** page lists the connection groups available and the servers within that group.

Note: There is at least one default predefined **Connection Group**

A **Connection Group** will be associated with many peer servers. These peer servers can be Remote Servers or they can be on routable remote networks.

The **Communication Agent -> Configuration -> Connection Groups** page provides the means to manage connection groups:

- Select a **Connection Group** then click on the **Edit** button to modify the list of servers in that group. Any Remote Server can be in the Connection Group.

Connection Group elements

The Connection Group pages display information in a tabular format. This table describes elements on the **Connection Group** pages.

Table 2: Connection Group Elements

Name	Description
Connection Group	The name of the **Connection Group** within the system.

Name	Description
Available Servers	List of Servers that can be included in this group. Remote Servers are listed by their names. Servers already in the group are not listed. Default: n/a;
Assigned Servers	List of Servers that are assigned to this group are listed by their names. Default: n/a;

Edit

The **Communication Agent -> Configuration -> Connection Groups [Edit]** page is used to modify the list of servers in that group. Any remote server can be in the connection group. The same server can be in many connection groups. The server name represents the connection to that server.

The fields are described in *Connection Group elements*.

1. Select Communication Agent -> Configuration -> Connection Groups.

   The **Connection Groups** page appears.

2. Select a **Connection Group** and click **Edit**.

   The **Communication Agent -> Configuration -> Connection Groups [Edit]** page appears. The fields **Available Servers in Network Element** and **Existing Servers in Connection Group** are modifiable.

3. Select a server name and transfer it To/From the **Available Servers in Network Element** or To/From the **Existing (Assigned) Connection Group**.

   A server can be in many connection groups. Server names assigned to the connection group (Assigned Servers) are not listed under "Available Servers."

4. Perform one of these actions:

   - Click **OK** - If field validations succeed, the **Communication Agent -> Configuration -> Connection Groups** screen is displayed.
   - Click **Apply** - If field validations succeed, the **Communication Agent -> Configuration -> Connection Groups [Edit]** is displayed. The fields shall display the applied values.

Routed Services

The **Communication Agent -> Configuration -> Routed Services** page displays all the configured Routed Services and their associated connection groups. Each connection group is linked to the appropriate configuration page where you can make changes.

The fields are described in *Routed Services elements*.

The **Communication Agent's** Routed Service provides a means by which local applications hosted on an MP can send traffic to applications on other MPs. The **Communication Agent's** Routed Service will have Connection Groups associated with the service assigned with different priorities. When an application sends events to other servers using a routed service, the **Communication Agent** chooses

a connection in the highest priority group for that routed service and sends the event on that connection. The load-balancing accounts for:

- Connection Group status (an aggregation of member connection status)
- Connection availability status (same as server availability status)
- Connection Egress Congestion Level (CL)
  - Transport Connection Congestion Level (TCL)
  - MP Overload Level (OL) of peer server

Note: This release of ComAgent supports one Routed Service and one Connection Group per Routed Service.

Routed Services elements

The Routed Services page displays information in a tabular format. This table describes elements on the **Routed Services** page.

Table 3: Routed Services Elements

Name	Description
Name	The name of the **Service** within the system.
Connection Group Name	**Summary View**: Shows the number of connection groups used by this routed service. **Detailed view**: Lists all the servers in this connection group. The individual list item is hyperlinked to "Main Menu: Communication Agent -> Configuration -> Connection Groups". The display is filtered to show only the connection group entry.
Priority	The priority of the connection group. The summary view displays "-" to indicate the data is not applicable in the summary view.

Chapter 3

Maintenance

Topics:

The **Communication Agent > Maintenance** pages allow you to view current status of groups and connections and provides the means to modify those connections.

Connection Status

The **Communication Agent -> Maintenance -> Connection Status** page shows the status of all connections to/from a local server. The un-expanded row will show Automatic and Configured connections from that server.

Select a Peer Server and you can toggle the Admin Connection State between

- **Enabled**: The administrator has enabled this connection. This is the default value.
- **Disabled**: The administrator has disabled this connection. System will not try to establish this connection.
- **Blocked**: Application data messages are not exchanged. However, ComAgent uses 'heartbeat' messages to monitor the health of connections and to share status.

The fields are described in *Connection Status elements*.

Connection Status elements

The **Connection Status** page displays information in a tabular format. This table describes elements on the **Connection Status** page.

Table 4: Connection Status main grid columns

Field Name	Description	
Server Name	Name of the local MP server.	
Automatic Connections Count	x of y in Service x = Number of Automatic Connections that are InService or Degraded y = Total number of Automatic Connections	
Configured Connections Count	x of y in Service x = Number of Configured Connections that are InService or Degraded y = Total number of Configured Connections	

Table 5: Connection Status sub-grid columns

Field Name	Description
Peer Server Name	All servers – local and remote – that have connections to this server are listed.

Field Name	Description
Peer Server IP Address	IP address of the peer server.
Connection Status	**Down** - Connection is down. **Forming** - Connection attempt has been made. **Aligning** - Connection Alignment is in progress. **LocallyBlocked** - Connection is locally blocked. **RemotelyBlocked** - Connection is blocked at remote side. **TotallyBlocked** - Connection is locally as well as remotely blocked. **InService** - Connection is InService and available to send user traffic. **Degraded** – Connection is available to send user traffic but is congested.
Admin Connection State	**Enabled**: The administrator has enabled this connection. This is the default value. **Disabled**: The administrator has disabled this connection. System will not try to establish this connection. **Blocked**: Connections in Blocked state do not exchange Communication Agent messages.
Connection Type	The type of connection to this server. **Auto**: This is an automatic connection. **Configured**: This is a connection to a configured remote server.
Date Last Updated	Time when the connection status was last updated.

Aggregate status of a Connection Group depends on the Operation Status of the connections in the group. Similarly, aggregate status of a collection of connection groups depends on the aggregate status of individual connection groups.

Table 6: Aggregate Status Color Coding

Admin State	Aggregate Status	Notes
Disabled	Unavailable	The Application is Disabled. Status is shown with an orange background.

Admin State	Aggregate Status	Notes
Enabled	Degraded	The status is shown in a yellow background.
Enabled	Unavailable	The status is shown with a red background.
Enabled	Available	The status is shown in clear background.

Enable

The **Communication Agent -> Maintenance -> Connection Status** page **Enable** button is used to administratively enable connections to/from a local server.

The fields are described in *Connection Status elements*.

1. Select **Communication Agent -> Maintenance -> Connection Status**.

   The **Connection Status** page appears.

2. Click the **+** indicatior on the desired local server name.

   The peer server(s) status appears.

3. Select a peer server and click **Enable**.

   A confirmation pop up window appears.

4. Perform one of these actions:

   - Click **OK** - The connections to/from a local server and the peer server are enabled allowing communications.
   - Click **Cancel** - to abort the action.

Disable

The **Communication Agent -> Maintenance -> Connection Status** page **Disable** button is used to administratively disable this connection. System will not try to establish this connection.

The fields are described in *Connection Status elements*.

1. Select **Communication Agent -> Maintenance -> Connection Status**.

   The **Connection Status** page appears.

2. Click the **+** indicatior on the desired local server name.

   The peer server(s) status appears.

3. Select a peer server and click **Disable**.

   A confirmation pop up window appears.

4. Perform one of these actions:

- Click **OK** - The connections to/from a local server and the peer server are disabled. System will not try to establish this connection.
- Click **Cancel** - to abort the action.

Block

The **Communication Agent -> Maintenance -> Connection Status** page **Block** button is used to administratively block connections with this server. Connections in Blocked state do not exchange Communication Agent messages.

The fields are described in *Connection Status elements*.

1. Select **Communication Agent -> Maintenance -> Connection Status**.

   The **Connection Status** page appears.

2. Click the **+** indicatior on the desired local server name.

   The peer server(s) status appears.

3. Select a peer server and click **Block**.

   A confirmation pop up window appears.

4. Perform one of these actions:

   - Click **OK** - Data traffic is administratively blocked at local end and connection is administratively enabled at remote end. System will not try to establish this connection.
   - Click **Cancel** - to abort the action.

Routed Services Status

The **Communication Agent's** Routed Service provides a means by which local applications hosted on an MP can send traffic to applications on other MPs. The **Communication Agent's** Routed Service will have Connection Groups associated with the service assigned with different priorities. When an application sends events to other servers using a routed service, the **Communication Agent** chooses a connection in the highest priority group for that routed service and sends the event on that connection. The load-balancing accounts for:

- Connection Group status (an aggregation of member connection status)
- Connection availability status (same as server availability status)
- Connection Egress Congestion Level (CL)
  - Transport Connection Congestion Level (TCL)
  - MP Overload Level (OL) of peer server

Note: This release of ComAgent supports one Routed Service and one Connection Group per Routed Service.

Note: Default configuration of Routed Services has a pre-defined Connection Group associated with it.

The fields are described in *Routed Services Status elements*.

Routed Services Status elements

The Routed Services page displays information in a tabular format. This table describes elements on the **Routed Services** page.

Table 7: Routed Services Status Main Grid

Field Name	Description
Routed Service	Name of the Routed Service
MPs using this Routed Service	Provides a summary of MPs in the form of 'x of y' where: x = Number of MPs using this routed service y = Total number of MPs in the system
Summary Status - Available	Provides a summary of MPs in Available status in the form of 'x of y' where: x = Number of MPs that have a Available status for this routed service y = Number of MPs using this routed service Routed Service status for that MP is Available when all connections in the connection groups associated with that service are Normal.
Summary Status - Degraded	Provides a summary of MPs in Degraded status in the form of 'x of y' where: x = Number of MPs that have a Degraded status for this routed service y = Number of MPs using this routed service Routed Service status for that MP is Degraded when at least one connection group used by that service has Available status.
Summary Status - Unavailable	Provides a summary of MPs in Unavailable status in the form of 'x of y' where: x = Number of MPs that have a Unavailable status y = Number of MPs using this routed service Routed Service status for that MP is Unavailable when none of the connection groups used by that service has Available status.

When the '+' sign is pressed to expand a Routed Service row, the status of each MP using that Routed Service is shown in a sub-grid.

Table 8: Routed Services Status Sub-Grid

Field Name	Description
MP Server Name	Name of the MP using this Routed Service
Connection Group	**Summary View**: Shows "n Connection Groups" where: n = Number of Connection Groups associated with this Routed Service. **Detailed View:** Lists the names of Connection Groups associated with this Routed Service hyperlinked to the Connection Group configuration screen filtered to show only this connection group.
Priority	**Summary View**: Displays '-'to show Not Applicable. **Detailed View**: Shows the configured Priority of that Connection Group.
Status	**Summary View**: Provides the Routed Service status at a server: Available: The active Connection Group is Available. Degraded: The active Connection Group is Degraded. Unavailable: No Connection Group is Available or Degraded. **Detailed view**: Shows the summary of status of connections in that connection group. Available: All connections in that connection group are InService. Degraded: At least one connection in the connection group is Degraded or at least one is InService and at least one is neither Degraded nor InService. Unavailable: None of the connections in that connection group is InService or Degraded.

HA Services Status

The HA Services Status page allows you to monitor the operational status of HA Service Sub-Resources.

A server application configures the High-Availability (HA) Framework to manage its Resources and Sub-Resources, and based upon the configuration and on the health scores of participating computers, the HA Framework assigns states to each Sub-Resource on each computer. If a Resource or Sub-Resource is "Active" on a given computer, then the server application on that computer is actively providing the software function associated with the Resource or Sub-Resource. If a Resource or Sub-Resource is"Standby" or "Spare" or "Observer" or "Out-of-Service", then the server application is not actively providing the function, but instead is waiting to be promoted to "Active" should the Resource or Sub-Resource be demoted from "Active" on some other server due to failures that reduce the other server's health score.

The HA Services Status screen shows the status as seen from a reporting server. The reporting server may be a provider of the HA Service or it may be a user of HA Services.

The fields are described in *HA Services Status elements*.

HA Services Status elements

The HA Services page displays information in a tabular format. These tables describe elements on the **HA Services** page.

- *Table 9: HA Services Status Summary View*
  - When the '**+**' sign is pressed to expand a reporting server that is acting as a Provider, the status sub-resources for that provider is shown in a sub-grid with elements as described in *Table 10: HA Service Provider Status Sub-Grid*.
  - When the '**+**' sign is pressed to expand a reporting server that is acting as a User, the status Sub-Resources for that provider is shown in a sub-grid with elements as described in *Table 11: HA Services User Status Sub-Grid*.
- *Table 10: HA Service Provider Status Sub-Grid*
- *Table 11: HA Services User Status Sub-Grid*
  - When the '**+**' sign is pressed to expand a reporting Sub-Resource ID, the details for the standby Sub-resource ID is shown in a sub-grid with elements as described in *Table 11: HA Services User Status Sub-Grid*.
- *Table 12: Aggregate Status Color Coding*

Table 9: HA Services Status Summary View

Field Name	Description
Reporting Server	Name of the server that has reported the status.
Resource Name	The HA Resource that is being reported.
Number of Sub-Resources	Number of Sub-Resources for which the server is reporting status.

Field Name	Description
User/Provider	**User:** This status is from the indicated reporting server acting as a user of the HA Service in the Resource Name column. **Provider:** This status is from the indicated reporting server acting as a provider of the HA Service in the Resource Name column.
Resource Routing Status	Applicable only to “User”; not “Provider”. This is the roll-up status of the sub-resources at the reporting server. Values are: • **Available**: All member Sub-Resources have the ‘Available’ routing state. • **Degraded**: Either at least one member Sub-Resource has the ‘Degraded’ routing state or at least one member has the ‘Available’ routing state and at least one has the ‘Unavailable’ routing state. **Note:** In the absence of congestion, this routing state means that some Sub-Resource are reachable and some Sub-Resources are unreachable. • **Unavailable**: All member Sub-Resources have the ‘Unavailable’ routing state.
Available Sub Resources	Applicable only to “User”; not “Provider”. The summary status is indicated as 'x of y' where: x = The number of active Sub-Resources as reported by this server. y = The Number of Sub resources.

When the ‘+’ sign is pressed to expand a reporting server that is acting as a Provider, the status Sub-Resources for that provider is shown in a sub-grid with elements as described in *Table 10: HA Service Provider Status Sub-Grid*.

Table 10: HA Service Provider Status Sub-Grid

Field Name	Description
Sub-Resource Id	The sub resource id is a 0-based index of the sub resources.

Field Name	Description
State	The state of the Sub-Resource at this reporting provider. The possible values are: • **OutOfSrvc** (Unavailable): Provider is not actively managing the Resource instance. When it begins managing the Resource, it will be promoted to some other state based upon the Resource's HA Policy. • **Observer** (Unavailable): User Layer is monitoring the Resource but is not actually providing the Resource. If there is data associated with the Resource, then this type of Resource Provider has a copy of the data, but has read-only access to the data, and is not typically eligible to be promoted to be Active. • **Spare** (Unavailable): Provider is eligible to be promoted to Standby, if the current Standby fails. Provider is eligible to be promoted to Active if both the Active and Standby Providers fail. • **Standby** (Unavailable): Provider has been pre-selected to become Active if the current Active Resource Provider fails. • **Active** (Available): Provider has the active instance of the Sub-Resource.
Date Last Updated	The timestamp when the sub resource status was last updated.

When the '+' sign is pressed to expand a reporting server that is acting as a User, the status Sub-Resources for that provider is shown in a sub-grid with elements as described in *Table 11: HA Services User Status Sub-Grid*.

When the '+' sign is pressed to expand a reporting Sub-Resource ID, the details for the standby Sub-Resource ID is shown in a sub-grid with elements as described in *Table 11: HA Services User Status Sub-Grid*.

Table 11: HA Services User Status Sub-Grid

Field Name	Description
Sub Resource Id	The 0-based id of the sub resource.
SR Routing State	The sub resource routing state is maintained on the reporting server and indicates if this Sub-Resource is available and providing service. Values are: • **Available**: There is an authoritative and active Resource Provider, and the connection to the

Field Name	Description
	server hosting the Resource Provider has congestion level CL0. • **Degraded**: There is an authoritative and active Resource Provider, and the connection to the server hosting the Resource Provider has congestion level greater than CL0. **Note:** In the current release this routing state means that the authoritative and active Resource Provider's server has become overloaded. • **Unavailable**: There is no authoritative and active Resource Provider. **Note:** An authoritative and active Resource Provider can become unreachable if the connection to it fails, is disabled, or is blocked. Connection congestion and MP overload does not make a Resource Provider unreachable.
Congestion Level	The congestion level of the connection to the Provider.
HA State	The HA state of the Sub-Resource advertised by the indicated provider to this server. The possible values are: • **OutOfSrvc** (Unavailable): Provider is not actively managing the Resource instance. When it begins managing the Resource, it will be promoted to some other state based upon the Resource's HA Policy. • **Observer** (Unavailable): User Layer is monitoring the Resource but is not actually providing the Resource. If there is data associated with the Resource, then this type of Resource Provider has a copy of the data, but has read-only access to the data, and is not typically eligible to be promoted to be Active. • **Spare** (Unavailable): Provider is eligible to be promoted to Standby, if the current Standby fails. Provider is eligible to be promoted to Active if both the Active and Standby Providers fail. • **Standby** (Unavailable): Provider has been pre-selected to become Active if the current Active Resource Provider fails. • **Active** (Available): Provider has the active instance of the Sub-Resource.

Field Name	Description
Provider	Name of the server that is the provider of the sub resource.
In Use	Indicates that this provider is being used for this Sub-Resource. Possible values are: • **Yes**: This provider is in use for this sub resource. • **No**: This provider is not in use.
Date Last Updated	Timestamp when the status for this Sub-Resource was updated at the provider.

Aggregate status of HA Service resource depends on the HA State of the Sub-Resources as described in *Table 12: Aggregate Status Color Coding*.

Table 12: Aggregate Status Color Coding

Admin State	Aggregate Status	Notes
Blocked	Unavailable	The Connection is Blocked by the Administrator or the Application is Disabled. Status is shown with an orange background.
Enabled	Degraded	The status is shown in a yellow background.
Enabled	Unavailable	The status is shown with a red background.
Enabled	Available	The status is shown in clear background.

Glossary

C

ComAgent	Communication Agent A common infrastructure component delivered as part of a common plug-in, which provides services to enable communication of message between application processes on different servers.
Communication Agent	See ComAgent.
CPA	Charging Proxy Application A local application running on the DSR.

D

DP	Data Processor The repository of subscriber data on the individual DSR node elements. The DP hosts the full address resolution database.
DSR	Diameter Signaling Router A set of co-located Message Processors which share common Diameter routing tables and are supported by a pair of OAM servers. A DSR Network Element may consist of one or more Diameter nodes.

M

MP	Message Processor The role of the Message Processor is to provide the application messaging protocol interfaces and processing. However, these servers also have OAM&P components.

M

	All Message Processors replicate from their Signaling OAM's database and generate faults to a Fault Management System.

S

SBR	Session Binding Repository A highly available, distributed database for storing Diameter session binding data.