

**Oracle® Communications  
Diameter Signaling Router**

MAP-Diameter Interworking Function User's Guide

**E53476 Revision 01**

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# Chapter 1

## Introduction

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### Topics:

- *Overview.....9*
- *Scope and Audience.....9*
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This section contains an overview of the available information for the DSR MAP-Diameter Interworking application.



## Overview

This document describes the features associated with the MAP-Diameter Interworking Function.

This document will also:

- Provide a conceptual overview of the MAP-Diameter Interworking Function's purpose, architecture, and functionality
- Describe the pages and elements on the MAP-Diameter Interworking Function GUI
- Provide procedures for using the the MAP-Diameter Interworking Function interface
- Explain the organization of and how to use this document

## Scope and Audience

This document is intended for anyone responsible for configuring and using the DSR MAP-Diameter Interworking Function. Users of this manual must have a working knowledge of telecommunications and network installations.

## Manual Organization





Information in this manual is organized into the following sections:

- *Introduction*
- *MAP-Diameter IWF Introduction*
- *MAP-Diameter Interworking Function Configuration*
- *MD-IWF Application Configuration*
- *DM-IWF Application Configuration*
- *Maintenance for MD-IWF*
- *Maintenance for DM-IWF*

## Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

Table 1: Admonishments

Icon	Description
 DANGER	<b>Danger:</b> (This icon and text indicate the possibility of <i>personal injury</i> .)
 WARNING	<b>Warning:</b> (This icon and text indicate the possibility of <i>equipment damage</i> .)
 CAUTION	<b>Caution:</b> (This icon and text indicate the possibility of <i>service interruption</i> .)
 TOPPLE	<b>Topple:</b> (This icon and text indicate the possibility of <i>personal injury and equipment damage</i> .)

## Related Publications

For information about additional publications that are related to this document, refer to the *Related Publications Reference* document, which is published as a separate document on the Oracle Technology Network (OTN) site. See [Locate Product Documentation on the Oracle Technology Network Site](#) for more information.

## My Oracle Support (MOS)

MOS (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support (CAS) can assist you with MOS registration.

Call the CAS main number at **1-800-223-1711** (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select **2** for New Service Request
2. Select **3** for Hardware, Networking and Solaris Operating System Support
3. Select **2** for Non-technical issue

You will be connected to a live agent who can assist you with MOS registration and provide Support Identifiers. Simply mention you are a Tekelec Customer new to MOS.

MOS is available 24 hours a day, 7 days a week, 365 days a year.

## Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at **1-800-223-1711** (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity/traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle.

## Locate Product Documentation on the Oracle Technology Network Site

Oracle customer documentation is available on the web at the Oracle Technology Network (OTN) site, <http://docs.oracle.com>. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at [www.adobe.com](http://www.adobe.com).

1. Log into the Oracle Technology Network site at <http://docs.oracle.com>.
2. Under **Applications**, click the link for **Communications**.  
The **Oracle Communications Documentation** window opens with Tekelec shown near the top.
3. Click **Oracle Communications Documentation for Tekelec Products**.
4. Navigate to your Product and then the Release Number, and click the **View** link (the **Download** link will retrieve the entire documentation set).
5. To download a file to your location, right-click the PDF link and select **Save Target As**.

## MAP-Diameter IWF Introduction

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### Topics:

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- *Diameter-to-MAP Transactions.....13*
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- *Address Translation.....15*
- *Request Routing with Chained DSR Applications.....17*
- *Transaction Metadata Recording for Integrated DIH (IDIH).....19*

This section introduces applications, key concepts, and basic functionality related to the MAP-Diameter Interworking Function.

The MAP-Diameter Interworking Function is a feature of the Diameter Signaling Router (DSR) product, which is part of the Oracle product line of signaling products. The MAP-Diameter Interworking Function allows the DSR to support the bi-directional interworking between Diameter and SS7 (GSM MAP) messages.

## Overview

The DSR MAP-Diameter Interworking Function feature allows the DSR to support bi-directional interworking between Diameter and SS7-MAP messages. This functionality is carried out by two applications: DM-IWF and MD-IWF.

DM-IWF is a DSR application that runs on each DA-MP. It manages Diameter transactions received from the Diameter network via DRL and MAP transactions received from SS7-MPs.

MD-IWF is a TCAP application which runs on each SS7-MP. It manages MAP transactions received from the SS7 network (via TCAP) and Diameter transactions received from DA-MPs.

The MAP-Diameter Interworking assumes the following things regarding the relationship between the two applications.

- All MAP-Diameter message and parameter interworking is performed on the SS7-MP.
- DM-IWF and MD-IWF exchange Diameter messages using ComAgent. No SS7/MAP message are exchanged between DA-MPs and SS7-MPs.
- When a transaction is initiated by either a DM-IWF or MD-IWF instance, it creates a Transaction ID which is unique to the DM-IWF/MD-IWF instance which is initiating the inter-MP transaction. The Transaction ID is sent that correlates the messages/responses exchanged between DM-IWF and MD-IWF associated with a transaction. When DM-IWF or MD-IWF sends a response to the request, it echoes the transaction ID from the Request to allow the recipient to correlate the response with the request it had previously sent.
- DM-IWF and MD-IWF will use ComAgent's Enhanced Routed Service for load sharing Request messages to MD-IWFs and DM-IWFs respectively. ComAgent Enhanced Routed Service self learns about the topology changes and enables deployment of transparent, elastic and scalable solutions.
- In this document, any reference to DM-IWF Routed Service or MD-IWF Routed Service implies ComAgent's Enhanced Routed Service for internal message exchange. It also indicates that the growth/degrowth of SS7-MPs and DA-MPs is non-impacting to MD-IWF and DM-IWF application instances and ensures guaranteed delivery.

**Note:** DM-IWF Routed Service and MD-IWF Routed Service is displayed as "DMIWFSvc" and "MDIWFSvc" respectively on the ComAgent maintenance screens. Each DM-IWF instance acts as a service provider for the DM-IWF Routed Service and as a service user for the MD-IWF Routed Service, and vice versa.

**Note:** Service users and providers can now dynamically register against the Routed Service. Service Providers publish their own provider status. ComAgent Routed Service accounts for each registered service provider's status and congestion level when selecting service providers to distribute Requests.

## Diameter-to-MAP Transactions

A Diameter-to-MAP transaction is a Diameter transaction that is initiated by a Diameter Node that is routed to a DSR for MAP-Diameter interworking. The operator is required to configure DRL ART rules which associate a Request message with the DM-IWF application.

## Processing Diameter-to-MAP Transactions

The processing of a Diameter-to-MAP transaction involves the following steps:

1. When DM-IWF receives a Request from DRL, it allocates a Pending Transaction Record (DM-IWF-PTR), starts a DM-IWF Pending Answer Timer and then forwards the unmodified Diameter Request message to a MD-IWF using the services of ComAgent.
2. When MD-IWF receives a Request message from a DM-IWF, it determines whether it can process the transaction and sends either a Success or Failure response to the ComAgent transaction.
3. If MD-IWF can process the transaction, it allocates a MD-IWF-PTR for storing the DA-MP's address and Transaction ID, converts the Diameter Request message into a MAP request message and attempts to open a MAP dialogue to the destination SS7 Node (e.g., HSS).
4. When MD-IWF receives the final MAP ack message closing the MAP dialogue, MD-IWF converts the MAP ack message to a Diameter Answer message. The Diameter Answer message and Transaction ID stored in the MD-IWF-PTR are sent to the DM-IWF which initiated the transaction using the services of ComAgent and the MD-IWF-PTR is deallocated.
5. When DM-IWF receives an Answer response, it uses the Transaction ID to find the DM-IWF-PTR for the transaction. If a DM-IWF-PTR is found, then DM-IWF forwards the Answer back to DRL for backward routing to the Diameter Node which initiated the transaction and the DM-IWF-PTR is deallocated. Otherwise, DM-IWF will discard the Answer.

**Note:** If ComAgent (DM-IWF Routed Service) encounters an error or fails to receive a reliable acknowledgment from the SS7-MP to which the Request was originally sent, ComAgent can retry sending the Request to another MD-IWF (SS7-MP).

## MAP-to-Diameter Transactions

A MAP-to-Diameter transaction starts as a MAP procedure that is initiated by a SS7 Node that is routed to a DSR SS7-MP for MAP-Diameter interworking.

## Processing MAP-to-Diameter Transactions

The processing of a MAP-to-Diameter transaction involves the following steps:

1. When an MD-IWF receives a MAP request message from an SS7 Node attempting to open a MAP dialogue that MD-IWF is able to process, it allocates a MD-IWF Pending Transaction Record (MD-IWF-PTR) for storing the MAP query message(s) for the MAP procedure.
2. MD-IWF converts one or more MAP request messages into a single Diameter Request message, starts a Diameter Transaction Timer and then forwards the Diameter Request message to a DM-IWF using the services of ComAgent.
3. When DM-IWF receives a Request message from an MD-IWF, it allocates a DM-IWF Pending Transaction Record (DM-IWF-PTR) for storing MD-IWF's address (used for sending the Answer response), and attempts to forward the Diameter Request message to DRL. DM-IWF does not start a DM-IWF Pending Answer Timer as the ownership of the transaction is transferred to DRL.
4. If DM-IWF successfully enqueues the Diameter Request message on DRL's Request Message Queue, it will send a Success Response to the ComAgent reliable transfer transaction. This frees the

ComAgent transaction. Otherwise, DM-IWF sends a Failure Response to the ComAgent transaction and DM-IWF processing of the transaction is complete

5. When an Answer is received from the peer Diameter node, it is received by DRL and forwarded to DM-IWF on the DA-MP. When DM-IWF receives a Diameter Answer message response from DRL, it forwards the Answer message to the MD-IWF SS7-MP which initiated the transaction and DM-IWF processing of the transaction is complete.
6. When MD-IWF receives the Diameter Answer response, it uses the Transaction ID to find the MD-IWF-PTR for the transaction. If a MD-IWF-PTR is found, it converts the Diameter Answer message into a MAP ack message response and the MAP dialogue is closed and the MD-IWF-PTR is deallocated. Otherwise, MD-IWF will discard the Answer.

## Address Translation

Address Translation is the process by which Diameter routing information is mapped to an SS7 network (for Diameter originated requests) or SS7 signaling data is mapped to a Diameter network (for MAP originated requests).

Diameter requests are mapped to the SS7 network by using the Destination-Host and Destination-Realm AVPs and a series of table look ups to derive an MTP3 layer OPC and DPC as well as the SCCP Called Party Address. The Destination-Host AVP is optional. If the Destination-Host is absent, the IMSI value from the User-Name AVP is used instead. The Origin-Host and Origin-Realm for the Diameter answer are derived from the SCCP Calling Party Address.

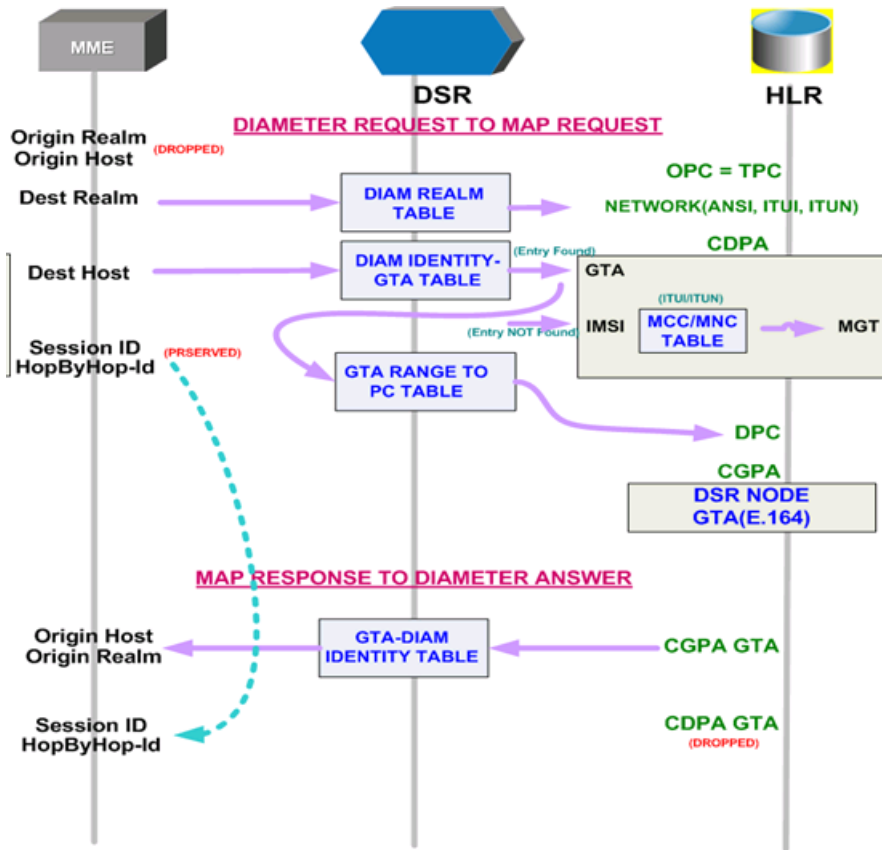


Figure 1: Diameter to MAP Requests

MAP requests are translated into the Diameter network by using the SCCP Calling Party Address to derive an Origin-Host and Origin-Realm AVP and using the SCCP Called Party Address to derive a Destination-Host and Destination-Realm AVP for the outgoing Diameter request. Address data from the MAP request is stored away for the life of the MAP Dialogue and used for populating the address information in the MAP response.



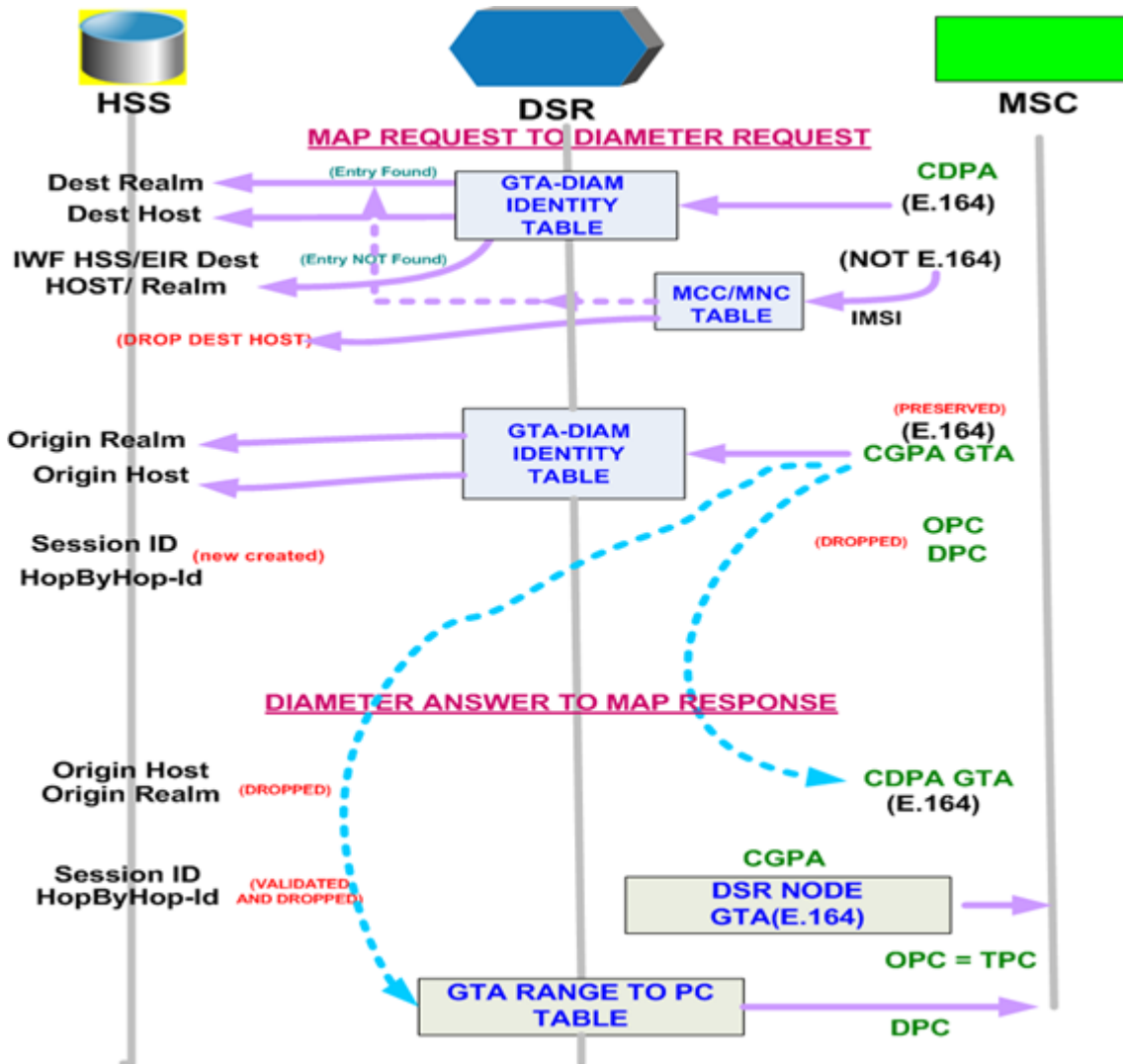


Figure 2: MAP to Diameter Requests

## Request Routing with Chained DSR Applications

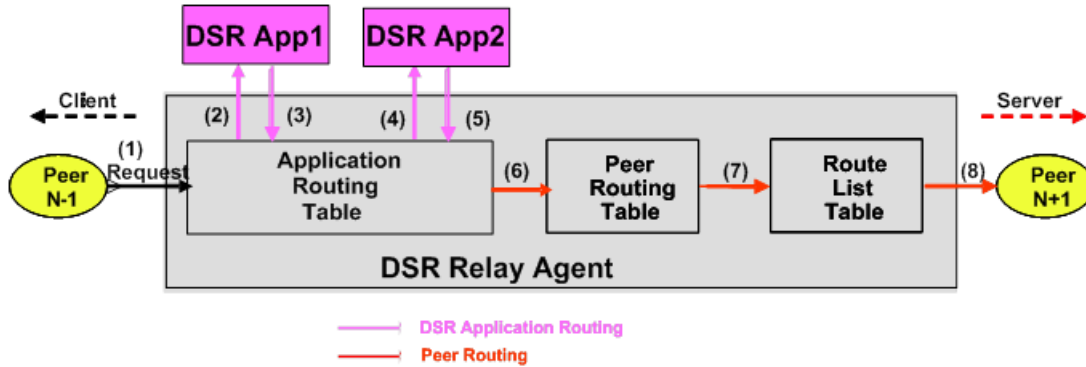
Application Chaining is a method for invoking multiple DSR Applications in sequence on the same DSR.

Figure 3: Request Processing with Multiple DSR Applications shows an example of Request processing for two DSR Applications executing in sequence. The Application Route Table in this example is executed three times:

1. When the Request enters the system at (1)
2. When DSR Application 1 sends the Request back to the Diameter Routing Function at (3)
3. when DSR Application 2 sends the Request back to the Diameter Routing Function at (5)

At (5) there is no matching Application Routing Rule for the Request, the Request is routed to Peer Route Table processing.

Figure 3: Request Processing with Multiple DSR Applications



- **Application Route Table (ART)**

Application Route Tables are used for routing Request messages to DSR Applications. An ART contains a prioritized list of user-configurable Application Routing Rules. Each Application Routing Rule associates Request message content with a DSR Application.

An ART is searched when a Request message is received from a Peer Node or a DSR Application. Searching an ART when a Request message is received from a DSR Application allows the operator to route the ingress Diameter transaction to multiple DSR Applications in sequence. The operator can create multiple ARTs to assign an ART to a Request message based upon a set of user-defined criteria.

- **Application Routing Rules**

An Application Route Table (ART) consists of a set of prioritized Application Routing Rules that the Diameter Routing Function searches with the content of a Request message, to determine whether the message should be forwarded to a DSR Application for processing.

One ART is searched each time a Request message is received from a Peer Node or a DSR Application. This method allows forwarding a Diameter transaction to one or more DSR Applications for processing.

However, the Diameter Routing Function does not allow a DSR Application to process a Diameter transaction more than once. (The Diameter Routing Function internally keeps track of which DSR Applications have already processing the message.) When the Diameter Routing Function is searching an ART and encounters an Application Routing Rule that is associated with a DSR Application that has already processed the transaction, that Application Routing Rule will be bypassed.

The system always contains a Default ART that cannot be removed using the configuration GUI. The user can create additional ARTs and then define, through configuration, which ART will be searched based on ART precedence selection rules.

Each time that a Request message is received from a Peer Node or DSR Application, the Diameter Routing Function selects an ART to search based on the following ART precedence selection rules (highest to lowest priority):

1. The ART provided by the DSR Application, if it exists (applies only when the Request message was received from a DSR Application)
2. The ART assigned to the ingress Peer Node from which the Request message was received, if it exists
3. The ART assigned to the Diameter Application ID in the Request message header, if it exists
4. The Default ART

The order of DSR Applications which can process an ingress Request message is determined by operator configuration of one or more Application Route Tables.

- Each time the Diameter Routing Function receives a Request message from a Peer Node or DSR Application, it searches the Application Route Tables to determine where to forward the message.
- The highest priority Application Routing Rule matched defines where to forward the message.
- If no Application Routing Rule match is found, the Diameter Routing Function begins Relay Agent routing to an upstream Peer Node.

When FABR or RBAR and the Diameter-MAP Interworking (DM-IWF) applications run in the same DA-MP, the same Diameter Request message can be processed by both applications.

For a Diameter-to-MAP Request message received from a Diameter Peer that needs to be processed by FABR or RBAR followed by DM-IWF, two Application Routing Rules are needed; one for routing the message first to FABR or RBAR and the second one to route the message to DM-IWF after FABR or RBAR processing is completed

- After the Request is received from the Peer, the Diameter Routing Function searches the Application Routing Rules for the highest priority matching rule. This rule contains the FABR or RBAR application name, and will result in the Request being routed to FABR or RBAR
- FABR or RBAR processes the message and returns it to the Diameter Routing Function.
- The Diameter Routing Function searches the Application Routing Rules for the highest priority matching rule (excluding all rules that would result in routing of the Request to FABR or RBAR again). This rule contains the DM-IWF application name, and will result in the Request being routed to DM-IWF.
- DM-IWF processes the message and sends it to an MD-IWF application (SS7-MP).

For a MAP-to-Diameter Request message received by DM-IWF from an MD-IWF application (SS7-MP) that needs to be processed by FABR or RBAR after DM-IWF processing, a single Application Routing Rule is needed for routing the message to FABR or RBAR after DM-IWF processing is completed.

- DM-IWF processes the message and sends it to the Diameter Routing Function.
- The Diameter Routing Function searches the Application Routing Rule for the highest priority matching rule (excluding all rules that would cause routing of the Request to DM-IWF again). This rule contains the FABR or RBAR application name, and will result in the Request being routed to FABR or RBAR for processing.
- FABR or RBAR returns the message to the Diameter Routing Function to complete the routing process.

## Transaction Metadata Recording for Integrated DIH (IDIH)

Integrated DIH (IDIH) can be used to capture detailed information about selected Diameter transactions, and transmit this information to DIH for further analysis.

The Diameter Routing Function and invoked DSR Applications record detailed information about each Diameter transaction - called transaction metadata. Each metadata record describes an important event in the lifetime of a Diameter transaction. Metadata appears in the Trace Transaction Record (TTR) in the order that the metadata-generating events actually occurred. Together, all of the metadata records combine to document the processing performed on the entire transaction, and can later be used to provide diagnostic information when performing troubleshooting. Metadata is recorded to a TTR for each transaction so that, even if the transaction is selected to be sent to DIH at an Answer Troubleshooting Trigger Point (TTP-IA or TTP-EA), the metadata for all of the messages in the transaction will be present.

The functions of IDIH are described in the *Integrated DIH User's Guide* and Help.

MD-IWF doesn't support Integrated DIH.

DM-IWF will record the Application-specific metadata events described in [Table 2: DM-IWF Metadata-Generating Events](#).

**Table 2: DM-IWF Metadata-Generating Events**

DM-IWF Event	Metadata Fields			When Recorded
	Type	Scope	Instance Data	
<b>Diameter-to-MAP Transactions</b>				
Sent Egress Request to SS7-MP	SS7-MP Request sent	App Data	Transaction ID (e.g. "45631") Payload	Immediately before the egress Request is sent to ComAgent.
D-to-M Request discarded	Message Discarded	App Data	Discard Reason (E.g. "DM-IWF PTR pool exhausted")	DM-IWF discards a Request message received from DRL.
Ingress Answer received from SS7-MP	SS7-MP Answer received	App Data	Transaction Id (e.g. "45631") SS7-MP IP address (E.g. "47.240.10.3") Payload	DM-IWF received an ingress Answer message from SS7-MP
A received Answer did not match a pending transaction	SS7-MP Answer Matching Failed	App Data	None	Immediately after PTR search fails
DM-IWF Routing Exception	DM-IWF Routing Exception	App Data	Routing Exception Type (E.g. "Internal Processing Error") Routing Exception Action (E.g. "Abandon Request")	When a routing exception is applied by DM-IWF

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MD-IWF Routing Exception	MD-IWF Routing Exception	App Data	None	When DM-IWF applies "Apply Unavailability Action" routing exception on behalf of MD-IWF.
<b>MAP-to-Diameter Transactions</b>				
Ingress Request received from SS7-MP	SS7-MP Request received	App Data	Transaction ID (e.g. "45631") SS7-MP address (E.g. "47.240.10.3") Payload	Immediately after a Request is received from SS7-MP.
Egress Answer sent to SS7-MP	SS7-MP Answer Sent	App Data	Transaction ID (e.g. "45631") SS7-MP address (E.g. "47.240.10.3") Payload	Immediately after DM-IWF sends a Diameter Answer to ComAgent successfully.
D-to-M Answer discarded	Message Discarded	App Data	Discard Reason (E.g. "Failed to create IWF Answer")	DM-IWF discards an Answer message received from DRL.

# Chapter 3

## MAP-Diameter Interworking Function Configuration

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- [Pre-Configuration Activities.....24](#)
- [Post-Configuration Activities.....27](#)

The **MAP-Diameter IWF > Configuration** GUI pages for MAP-Diameter components provide fields for entering the information needed to manage MAP-Diameter configuration in the DSR.

## MAP-Diameter IWF Configuration Overview

The **MAP-Diameter IWF > Configuration** GUI pages for MAP-Diameter components provide fields for entering the information needed to manage MAP-Diameter configuration in the DSR.

The DSR 3-tiered Operations, Administration, and Maintenance (OAM) topology is required for the MAP-Diameter Interworking Function application. 3-tiered OAM topology consists of the following tiers:

- A pair of NOAM servers running in active/standby redundancy  
OAM configuration is performed on the NOAM.  
Network-wide MAP-Diameter IWF configuration is performed on the NOAM.
- A pair or triplet of SOAM servers at each site running in active/standby, or active/standby/spare redundancy  
Diameter protocol configuration is done on the SOAM.  
Most of the OAM configuration components are viewable on the SOAM.  
Most DSR Application configuration is done on the SOAM.  
Site-specific configuration for MAP-Diameter Interworking Function is performed on the SOAM
- A set of MP servers, which can host signaling protocol stacks (for example, DA-MPs).

The MD-IWF application is configured on the NOAM. The DM-IWF application is configured on the SOAM.

An optional pair of Disaster Recovery NOAMs can be configured to manually take over in the event of loss of both the active and standby NOAMs

The three tiers allow configured data to be replicated down to the MP servers, and measurements, events, and alarms to be merged up to the OAM servers.

3-tiered topology allows administrators to access all DSR GUI pages from a single sign-on. An administrator can access the DSR SOAM when logged into the DSR NOAM, without needing to re-enter login credentials.

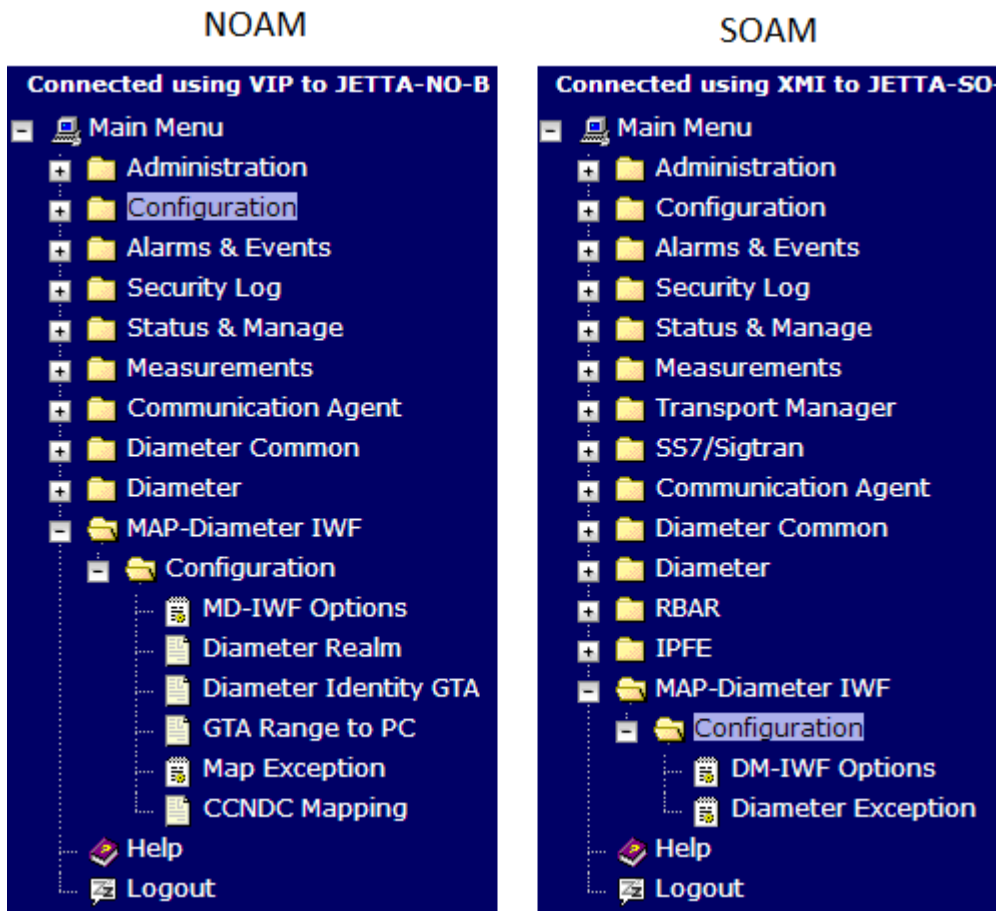


Figure 4: GUI Structure for 3-tiered DSR Topology with MAP-Diameter Interworking Function

## Pre-Configuration Activities

Before MAP-Diameter IWF configuration can be performed, the following activities need to be performed in the system:

- Verify that the following NOAM configuration is complete for MAP-Diameter IWF:
  - Server Groups
    - Select **Configuration > Server Groups**.
    - Click **Report** to generate a report about the configured Resource Domains
    - Click **Print** to print the report, or **Save** to save the report as a text file.
  - Places
    - Select **Configuration > Places**.
    - Click **Report** to generate a report about the configured Places.
    - Click **Print** to print the report, or **Save** to save the report as a text file.



- Gather component information that is required for Diameter, Diameter Common, and MAP-Diameter IWF configuration, including component item naming conventions and names, IP addresses, hostnames, and numbers of items to be configured.
- Configure Diameter Common components that are required for MAP-Diameter IWF configuration. See [Diameter Common Configuration for MAP-Diameter IWF](#) for more information.
- Configure Diameter Configuration components that are required for MAP-Diameter IWF configuration. See [Diameter Configuration for DM-IWF](#) for more information.

### Diameter Common Configuration for MAP-Diameter IWF

The following Diameter Common configuration must be done before Map-Diameter IWF configuration can be performed.

Use the explanations and procedures in the Diameter Common configuration help and the *Diameter Common User's Guide* to complete the Diameter Common configuration, including the Diameter Common components needed for use with Map-Diameter IWF.

#### SOAM Diameter Common Configuration

Diameter Common configuration for MCC Ranges Network Identifiers and MP Profile assignment for Map-Diameter IWF is done from the SOAM GUI in a 3-tiered DSR topology.

##### 1. MPs

Select **Diameter Common > MPs > Profile Assignments**, and verify that the correct DA-MP Profiles and SS7 MP profiles have been assigned for Map-Diameter IWF DA-MPs and SS7-MPs shown in the **DA-MP** and **SS7-MP** lists. If assignments need to be made or changed, use the **Diameter Common > MPs > Profile Assignments** page to assign the correct MP Profiles.

#### NOAM Diameter Common Configuration

Diameter Common configuration for MCCMNC and MCCMNC Mapping Network Identifiers for Map-Diameter IWF is done from the NOAM GUI in a 3-tiered DSR topology.

1. Use the **Diameter Common > Network Identifiers > MCCMNC [Insert]** page to configure **MCCMNC** entries.
2. Use the **Diameter Common > Network Identifiers > MCCMNC Mapping [Insert]** page to configure **MCCMNC Mapping** entries, using the configured **MCCMNC** entries.

### Diameter Configuration for DM-IWF

The following Diameter configuration must be done before DM-IWF configuration can be performed.

All Diameter Configuration for DM-IWF is done using the SOAM GUI in a 3-tiered DSR topology.

Use the explanations and procedures in the Diameter Configuration help and the *Diameter User's Guide* to complete the Diameter configuration, including the Diameter components needed for use with MAP-Diameter IWF.

##### 1. Application Ids

Use the **Diameter > Configuration > Application Ids [Insert]** page to define an Application Id from the **Application ID Value** pulldown list for each DSR application that will be used by DM-IWF in the system.

## 2. Command Codes

Diameter Command Codes must be configured prior to using them in DM-IWF. Use the **Diameter > Configuration > Command Codes [Insert]** page to configure Diameter Command Codes.

Configure any Command Codes that need to be handled by DM-IWF. The Command Codes are associated with the Diameter Applications supported by the Diameter Servers (for example, HSS, PCRF, OCFS, OCS, or AAA) which are the destination of Diameter Requests being routed by DM-IWF. For example, the combination of Application Id = S6a and Command Code = ULR/ULA might be relevant for HSS.

## 3. Local Nodes

Use the **Diameter > Configuration > Local Nodes [Insert]** page to configure the DM-IWF DA-MPs as Local Nodes in the system.

The pulldown list of **IP Addresses** contains the XSI addresses configured on DSR MP Servers.

## 4. Peer Nodes

Use the **Diameter > Configuration > Peer Nodes [Insert]** page to configure PCEFs, AFs, BBERFs, and any other types of nodes as Peer Nodes to the DM-IWF DA-MPs in the system

## 5. Connections

Use the **Diameter > Configuration > Connections [Insert]** page to configure new connections

## 6. Route Groups

Use the **Diameter > Configuration > Route Groups [Insert]** page to configure new route groups

## 7. Route Lists

Use the **Diameter > Configuration > Route Lists [Insert]** page to configure new route lists

## 8. Peer Route Tables

Use the **Diameter > Configuration > Peer Route Tables [Insert]** page to configure new **Peer Route Tables** if needed,

## 9. Peer Routing Rules

Peer Routing Rules can be added to the Default Peer Route Table (PRT) or to new Peer Route Tables.

## 10. Application Route Tables

Either use the default **Application Route Table** (always available), or use the **Diameter > Configuration > Application Route Tables > [Insert]** page to configure one or more **Application Route Tables** in addition to the default. **Application Route Tables** contain **Application Routing Rules** that direct messages to DM-IWF and other DSR Applications.

## 11. Application Routing Rules

On the **Diameter > Configuration > Application Route Tables** page, select an **Application Route Table Name** and click **View/Edit Rules**.

Use the **Viewing Rules for Application Route Table** page to insert or edit an **Application Routing Rule**. Configure the ART rules by ensuring the Diameter Application ID is supported (for example S6a, S6d, S13 or, S13a) and ensuring the DSR Application ID for these Requests is configured as DM-IWF, so that these Requests get forwarded to DM-IWF.

### Transport Manager Configuration

To properly use the MD-IWF application, it is necessary to configure the Transport Manager from the **Transport Manager > Configuration** GUI pages.

**Note:** Transport Manager must be configured prior to the configuration of the SS7 Networking.

Transport Manager configuration is performed on an Active SOAM.

The **Transport Manager > Configuration** GUI pages provide fields for entering the information needed to configure Adjacent Nodes, Configuration Sets, and Transports (SCTP associations with remote hosts over an underlying IP network).

Configured Adjacent Nodes and Configuration Sets are required in the configuration of Transports. Therefore, Adjacent Nodes and Configuration Sets must be configured before Transports can be configured.

For more detailed information on how to perform these tasks, refer to the *Transport Manager User's Guide* and help.

### SS7 Network Configuration

**Note:** Transport Manager must be configured prior to the configuration of the SS7 Networking.

To properly use the MD-IWF application, it is necessary to configure the SS7 Networking from the **SS7/Sigtran > Configuration** SOAM GUI pages.

The SS7 Networking components to be configured are:

- Adjacent Server Groups
- Local Signaling Points
- Local SCCP Users
- Remote Signaling Points
- Remote MTP3 Users
- Link Sets
- Links
- Routes
- SCCP Options

For more detailed information on how to perform these tasks, refer to the *SS7/Sigtran User's Guide* and help.

### Post-Configuration Activities

After MAP-Diameter Interworking configuration is complete, the following activities need to be performed to make the MD-IWF and DM-IWF applications fully operational in the system:

- Enable the MD-IWF and DM-IWF DSR applications on SS7-MPs and DA-MPs respectively
- Restart Servers
- Enable Diameter Connections with Peer Nodes
- Status Verification

## Enabling the MD-IWF and DM-IWF Applications

Use this task to enable the MD-IWF and DM-IWF applications.

1. From each active SOAM in a 3-tiered DSR topology or from the NOAM in a 2-tiered DSR topology, select **Diameter > Maintenance > Applications**.  
The **Diameter > Maintenance > Applications** page appears.
2. Under **DSR Application Name**, select each **MD-IWF** or **DM-IWF** row.  
To select more than one row, press and hold **Ctrl** while you click each row.
3. Click **Enable**.
4. Verify the application status on the page.  
The **Admin State**, **Operational Status**, **Operational Reason**, and **Congestion Level** in each of the selected rows should have changed respectively to **Enabled**, **Available**, **Normal**, and **Normal**.

## DSR Bulk Import and Export

The following documents describe the use and operation of DSR Bulk Import and Export functions:

- *Diameter Common User's Guide*,
- **Help > Diameter Common > DSR Bulk Import**
- **Help > Diameter Common > DSR Bulk Export**
- *Diameter User's Guide*, "Diameter Configuration", "DSR Bulk Import", "DSR Bulk Export"
- **Help > Diameter > Configuration > DSR Bulk Import**
- **Help > Diameter > Configuration > DSR Bulk Export**

The DSR Bulk Import and Export functions can be used to export Diameter, IPFE, and DSR Application configuration data in CSV files to a location outside the system, and to import the files (usually edited) into the system where the Import function is executed.

Configuration data refers to any data that is configured for one of the Export **Export Application** types (FABR, RBAR, PDRA, GLA, or CPA and SBR DSR Applications; IPFE; and the Diameter Configuration components).

Configuration data refers to any data that is configured for one of the Export **Export Application** types (FABR, RBAR, PDRA, GLA, MAPIWF, or CPA and SBR DSR Applications; IPFE; and the Diameter components). "Diameter" includes Diameter Configuration components and Diameter Common Network Identifiers and MPs components.

### DSR Bulk Export

The DSR Bulk Export operation creates ASCII Comma-Separated Values (CSV) files (.csv) containing Diameter, IPFE, and DSR Application configuration data. Exported configuration data can be edited and used with the DSR Bulk Import operations to change the configuration data in the local system without the use of GUI pages. The exported files can be transferred to and used to configure another DSR system.

Each exported CSV file contains one or more records for the configuration data that was selected for the Export operation. The selected configuration data can be exported once immediately, or exports can be scheduled to periodically occur automatically at configured times.

The following configuration data can be exported in one Export operation:

- All exportable configuration data in the system
- All exportable configuration data from the selected DSR Application, IPFE, or Diameter (each component's data is in a separate file)
- Exportable configuration data from a selected configuration component for the selected DSR Application, IPFE, or Diameter

Exported files can be written to the File Management Directory in the local File Management area (**Status & Manage > File** page), or to the Export Server Directory for transfer to a configured remote Export Server.

CSV files that are in the local File Management area can be used for Bulk Import operations on the local system.

The result of each Bulk Export operation is logged into a file with the same name as the exported file, but with extension .log. The log file appears in the File Management area. The log file contains the names of the selected configuration data components, the number of records exported for each configuration component, and either the first error or all errors that occurred during the Export operation.

If the export has any failures or is unsuccessful, the results of the export operation are logged to a log file with the same name as the exported file but with a ".log" extension. Successful export operations will not be logged.

### DSR Bulk Import

The DSR Bulk Import operations use configuration data in ASCII Comma-Separated Values (CSV) files (.csv), to insert new data into, update existing data in, or delete existing data from the configuration data in the system.

**Note:** Some configuration data can be imported only with the Update operation, and other data can be imported with Insert and Delete operations but not Update. Refer to the "DSR Bulk Import" section of the *Diameter Common User's Guide* or the **Diameter Common > Import** Help for valid Import operations.

**Note:** Some configuration data can be imported only with the Update operation, and other data can be imported with Insert and Delete operations but not Update. Refer to the "DSR Bulk Import" section of the *Diameter User's Guide* or the **Diameter > Configuration > Import** Help for valid Import operations.

Import CSV files can be created by using a DSR Bulk Export operation, or can be manually created using a text editor.

**Note:** The format of each Import CSV file record must be compatible with the configuration data in the DSR release that is used to import the file.

Files that are created using the DSR Bulk Export operation can be exported either to the local Status & Manage File Management Directory (**Status & Manage > Files** page), or to the local Export Server Directory.

CSV files that are in the local File Management area can be used for Bulk Import operations on the local system.

Files can be created manually using a text editor on a computer; the files must be uploaded to the File Management area of the local system before they can be used for Import operations on the local system.

The following Import operations can be performed:

- Insert new configuration data records that do not currently exist in the system
- Update existing configuration data in the system

## MAP-Diameter Interworking Function Configuration

- Delete existing configuration data from the system

Each Import operation creates a log file. If errors occur, a Failures CSV file is created that appears in the File Management area. Failures files can be downloaded, edited to correct the errors, and imported to successfully process the records that failed. Failures files that are unchanged for more than 14 days and log files that are older than 14 days are automatically deleted from the File Management area.

## MD-IWF Application Configuration

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### Topics:

- [MD-IWF Options Configuration.....32](#)
- [Diameter Realm Configuration.....39](#)
- [Diameter Identity GTA Configuration.....42](#)
- [GTA Range to PC Configuration.....46](#)
- [MAP Exception Configuration.....50](#)
- [CCNDC Mapping Configuration.....53](#)

The **MAP-Diameter IWF > Configuration** GUI pages for MD-IWF components provide fields for entering the configuration information for the MD-IWF application.

## MD-IWF Options Configuration

The **MAP-Diameter IWF > Configuration > MD-IWF Options** page is used to configure MD-IWF application Options.

**Note:** DM-IWF configuration can be performed only on Active SOAM servers.

The fields are described in [MD-IWF Options elements](#).

On the **MAP-Diameter IWF > Configuration > MD-IWF Options** page, you can:

- Modify current Options values, and click **Apply** to save the changes.
- Click **Cancel** to remove and not save any changes you have made.

### MD-IWF Options elements

*Table 3: MD-IWF Options Elements* describes the fields on the MD-IWF Options page.

**Table 3: MD-IWF Options Elements**

Field (* indicates a required field)	Description	Data Input Notes
*Diameter Response Timeout	Timeout value, in seconds, to use when sending a Diameter Request message to the Diameter network (through DM-IWF) and waiting for the Diameter Answer message to arrive. It is suggested that this timer be greater than the Diameter Routing Function's Transaction Lifetime configured under <b>Diameter &gt; Configuration &gt; Routing Option Sets</b> .  <b>Note:</b> If the Diameter Pending Answer Timer is less than this value, the Diameter Error Responses from the DSR will be seen.	Format: text box; numeric Range: 3-30 Default: 15
MAP Response Timeout	Timeout value, in seconds, to use when sending a MAP Request message to the SS7 network and waiting for the MAP Response message to arrive. This is the time from begin-dialog to close-dialog; it controls how long all of the dialogs within a transaction can continue until	Format: text box; numeric Range: 5-30 Default: 15



Field (* indicates a required field)	Description	Data Input Notes
	the dialog times out. It is suggested that this timer shall be greater than the Segmentation/Reassembly timeout value configured under the SCCP Options folder.	
EIR Host Name	When translating an incoming MAP-CheckIMEI (EIR) Request message to a Diameter Request message, the Destination-Host AVP will be populated with this FQDN value in the following situation: when the GTA that is derived from the SCCP Called Party Address cannot be mapped to a Diameter Host/Realm using Diameter Identity - GTA entries. If this value is not configured, then an error response is sent back to the SS7 network.	<p>Format: text box</p> <p>FQDN is a case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and a FQDN must be at most 255 characters long.</p> <p>Range: a valid FQDN or empty</p> <p>Default: N/A</p>
EIR Realm	When translating an incoming MAP-CheckIMEI (EIR) Request message to a Diameter Request message, the Destination-Realm AVP will be populated with this value in the following situation: when the GTA that is derived from the SCCP Called Party Address cannot be mapped to a Diameter Host/Realm using Diameter Identity - GTA entries. If this value is not configured, then an error response is sent back to the SS7 network.	<p>Format: text box</p> <p>Realm is a case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and a FQDN must be at most 255 characters long.</p> <p>Range: a valid Realm or empty</p> <p>Default: N/A</p>
EIR Destination GTA	When translating an incoming ECR (ME-Identity-Check) Diameter Request message to a MAP Request message, if the Destination-Host AVP is absent	<p>Format: text box; numeric</p> <p>Range: a valid Global Title Address in E.164 format, or empty</p>

Field (* indicates a required field)	Description	Data Input Notes
	<p>in the ECR message, then the SCCP Called Party GTA will be populated with this value in the following situation: Option " ECR Request Message with no Dest-Host AVP " is configured as ' Translate Using EIR Dest GTA '.</p>	<p>Default: N/A</p>
IWF HSS Destination Host	<p>When translating an incoming (non-EIR) MAP Request message to a Diameter Request message, the Destination-Host AVP will be populated with this FQDN value in the following situation: when the GTA that is derived from the SCCP Called Party Address cannot be mapped to a Diameter Host/Realm using Diameter Identity - GTA entries. If this value is not configured, then MD-IWF will not populate the Destination-Host AVP; it could be resolved on the DSR by FABR or RBAR, or by another upstream Peer.</p>	<p>Format: text box</p> <p>FQDN is a case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and a FQDN must be at most 255 characters long.</p> <p>Range: a valid FQDN or empty</p> <p>Default: N/A</p>
IWF HSS Destination Realm	<p>When translating an incoming (non-EIR) MAP Request message to a Diameter Request message, the Destination-Realm AVP will be populated with this value in the following situation: when the GTA that is derived from the SCCP Called Party Address cannot be mapped to a Diameter Host/Realm using Diameter Identity - GTA entries. If this value is not configured, then an error response is sent back to the SS7 network.</p>	<p>Format: text box Realm is a case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and a FQDN must be at most 255 characters long.</p> <p>Range: a valid Realm or empty</p> <p>Default: N/A</p>
*Shutdown Mode	<p>Allows the operator to specify the shutdown method used when the Admin State is changed to Disabled. The</p>	<p>Format: radio buttons</p> <p>Range: Forced or Graceful</p>

Field (* indicates a required field)	Description	Data Input Notes
	applicaton can be disabled using either a graceful or forced shutdown method. Graceful allows in-process transactions to continue for a configurable time period before disabling. Forced is an immediate shutdown.	
*Shutdown Timer	Number of seconds that the Shutdown Timer will run during a Graceful shutdown.	Format: text box, numeric Range: 1-30 Default: 15
<b>ECR Request Message with no Destination Host AVP</b>		
Action	<p>When translating an incoming ECR (ME-Identity-Check) Diameter Request message to a MAP Request message, this indicates the action to take if the Destination-Host AVP is absent in the ECR message. If the Destination-Host AVP is present, it is used in the translation to derive the SCCP Called Party GTA.</p> <ul style="list-style-type: none"> <li>• Discard: The Diameter to MAP transaction is discarded; a Diameter Answer message is NOT sent back to the Diameter network.</li> <li>• Send Answer: A Diameter Answer message with Experimental- Result AVP or Result-Code is sent back to the Diameter network.</li> <li>• Translate Using EIR: Translate the ECR message to a MAP Request message using the configured EIR Destination GTA as the SCCP Called Party GTA.</li> </ul>	Format: radio buttons Range: Discard, Send Answer, Translate using EIR
Response Result Code AVP	If the configured Action is Send Answer, this value is used in the Result-Code or Experimental-Result AVP of the Diameter Answer message	Format: text box, 4-digit numeric; or pulldown list of known Result Codes Range: 1000-5999

Field (* indicates a required field)	Description	Data Input Notes
Response Vendor ID	If zero, then a Result-Code AVP will be sent when the DSR Application is not Available. If non-zero, then an Experimental-Result AVP will be sent will the Vendor-Id AVP set to this value. Available when Send Answer is selected for the Action.	Format: text box; numeric Range: 0-4294967295
Response Error String	If a non-empty string, this configured string will be appended to the Error-Message AVP that is sent in the Diameter Answer message. Available when Send Answer is selected for the Unavailable Action field.	Format: text box; string of printable ASCII characters. Range 0-64 characters
<b>ECR Request Message with Dest-Host present but Not Found in mapping table</b>		
Action	<p>When translating an incoming ECR (ME-Identity-Check) Diameter Request message to a MAP Request message, this indicates the action to take if the Destination-Host AVP is absent in the ECR message. If the Destination-Host AVP is present, it is used in the translation to derive the SCCP Called Party GTA.</p> <ul style="list-style-type: none"> <li>• Discard: The Diameter to MAP transaction is discarded; a Diameter Answer message is NOT sent back to the Diameter network.</li> <li>• Send Answer: A Diameter Answer message with Experimental- Result AVP or Result-Code is sent back to the Diameter network.</li> <li>• Translate Using EIR: Translate the ECR message to a MAP Request message using the configured EIR Destination GTA as the SCCP Called Party GTA.</li> </ul>	Format: radio buttons Range: Discard, Send Answer, Translate using EIR

Field (* indicates a required field)	Description	Data Input Notes
Response Result Code AVP	If the configured Action is Send Answer, this value is used in the Result-Code or Experimental-Result AVP of the Diameter Answer message. Available when Send Answer is selected for the associated Action.	Format: text box, 4-digit numeric; or pull-down list of known Result Codes Range: 1000-5999
Response Vendor ID	If zero, then a Result-Code AVP will be sent when the DSR Application is not Available. If non-zero, then an Experimental-Result AVP will be sent with the Vendor-Id AVP set to this value. Available when Send Answer is selected for the Action.	Format: text box; numeric Range: 0-4294967295
Response Error String	If a non-empty string, this configured string will be appended to the Error-Message AVP that is sent in the Diameter Answer message. Available when Send Answer is selected for the Unavailable Action field.	Format: text box; string of printable ASCII characters. Range 0-65 characters
Shutdown Mode	Allows the operator to specify the shutdown method used when the Admin State is changed to Disabled. The application can be disabled using either a graceful or forced shutdown method. Graceful allows in-process transactions to continue for a configurable time period before disabling the application. Forced is an immediate shutdown.	Format: radio buttons Range: Forced, Graceful
*Shutdown Timer	Unique number of seconds that the Shutdown Timer will run during Graceful shutdown.	Format: text box, numeric Range 1-30 Default: 15
*DSR Node GTA (Place Name 1)	Global Title Address associated with the Place. When translating incoming Diameter Request messages to MAP Request messages, the SCCP Calling	Format: text box, numeric Range: a valid Global Title Address in E.164 format Default: empty

Field (* indicates a required field)	Description	Data Input Notes
	Party GTA is always populated with this value. Configuration is mandatory. The MD-IWF application cannot be enabled if this field is empty.	
*DSR Node GTA (Place Name 2)	Global Title Address associated with the Place. When translating incoming Diameter Request messages to MAP Request messages, the SCCP Calling Party GTA is always populated with this value. Configuration is mandatory. The MD-IWF application cannot be enabled if this field is empty.	Format: text box, numeric Range: a valid Global Title Address in E.164 format Default: empty
DSR Node GTA (Place Name 3)	Global Title Address associated with the Place. When translating incoming Diameter Request messages to MAP Request messages, the SCCP Calling Party GTA is always populated with this value. Configuration is mandatory. The MD-IWF application cannot be enabled if this field is empty.	Format: text box, numeric Range: a valid Global Title Address in E.164 format Default: empty
DSR Node GTA (Place Name 4)	Global Title Address associated with the Place. When translating incoming Diameter Request messages to MAP Request messages, the SCCP Calling Party GTA is always populated with this value. Configuration is mandatory. The MD-IWF application cannot be enabled if this field is empty.	Format: text box, numeric Range: a valid Global Title Address in E.164 format Default: empty

## Viewing MD-IWF Options Entries

Use this task to view all configured MD-IWF Options entries.

MD-IWF Options fields are described in [MD-IWF Options elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > MD-IWF Options**.

The **Diameter Common > Configuration > MD-IWF Options** page appears with a list of configured MD-IWF Options entries.

## Diameter Realm Configuration

The **MAP-Diameter IWF > Configuration > Diameter Realm** page on an NOAM server is used to configure Diameter Realms.

The fields are described in [Diameter Realm Elements](#).

On the **MAP-Diameter IWF > Configuration > Diameter Realm** page, you can:

- Filter the list of entries, to display only the desired entries.
- Sort the list entries in ascending or descending order by clicking the column heading. By default, the list is sort in ascending alphabetical order by Signaling Network.
- Click the **Insert** button.

The **MAP-Diameter IWF > Configuration > Diameter Realm [Insert]** page opens. You can add new Diameter Realms.

- Select a Diameter Realm entry in the list, and click the **Edit** button.

The **MAP-Diameter IWF > Configuration > Diameter Realm [Edit]** page opens. The selected Diameter Realm entry can be edited.

- Select a Diameter Realm entry in the list, and click the **Delete** button to remove the selected entry.

## Diameter Realm Elements

[Table 4: Diameter Realm Elements](#) describes the fields on the **MAP-Diameter IWF > Configuration > Diameter Realm** page. Data Input Notes apply to Insert and Edit pages; the View page is Read-only.

Table 4: Diameter Realm Elements

Field (* indicates a required field)	Description	Data Input Notes
*Diameter Realm	Realm that is specified in the Destination-Realm AVP of a Diameter Request message. This table describes the characteristics of the SS7 network that corresponds to a Diameter Realm. This information is used to translate a Diameter Request message to a MAP Request message that is sent to the SS7 network.	Format: text box  Case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and a Realm must be at most 255 characters long.  Range: A valid Realm

Field (* indicates a required field)	Description	Data Input Notes
		Default: N/A
Signaling Network	Signaling network (ITUI, ITUN or ANSI) of the SS7 network corresponding to the given Realm.	Format: radio buttons Range: ITUI, ITUN, or ANSI Default: N/A
Authentication Interworking Needed	Should be set to Yes if HLRs in the given Realm do not support LTE authentication procedures. If set to Yes, special authentication procedures will occur when translating Diameter messages to MAP messages.	Format: check box Default: No (Unchecked)
Default Access Point Name	Default Access Point Code Context Identifier to be used when Authentication Interworking Needed is set to Yes.	Format: text box Range: 1-50
MGT (E.214) Conversion Needed	Indicates whether the IMSI digits (User-Name AVP) need to be converted to MGT (E.214) format (using table MccMncMapping) when using these digits as the Called Party GTA in the MAP Request message. This is applicable for ITUI and ITUN only. If set to Yes (Checked), this treatment will be applied only if (1) Destination-Host AVP is not present in the Diameter Request message; or (2) fail to map the Destination-Host AVP to a GTA via table DiameterIdentity-GTA.	Format: check box Range = Yes, No, N/A Default: No (Unchecked) for ITU/ITUN; N/A for ANSI

## Viewing Diameter Realm Entries

Use this task to view all configured Diameter Realm entries.

**Diameter Realm** fields are described in [Diameter Realm Elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Realm**.

The **Diameter Common > Configuration > Diameter Realm** page appears with a list of configured **Diameter Realm** entries.



## Adding Diameter Realm Entries

Use this task to configure new **Diameter Realm** entries.

**Diameter Realm** fields are described in [Diameter Realm Elements](#).

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Realm**.

The **MAP-Diameter IWF > Configuration > Diameter Realm** page appears.

2. Click **Insert**.

The **MAP-Diameter IWF > Configuration > Diameter Realm [Insert]** page appears.

3. Enter a value for each field.

4. Click:

- **OK** to save the new entry and return to the **MAP-Diameter IWF > Configuration > Diameter Realm** page.
- **Apply** to save the new entry and remain on this page. The data displayed on the page is updated.
- **Cancel** to return to the **MAP-Diameter IWF > Configuration > Diameter Realm** page without saving any changes.

## Editing Diameter Realm Entries

Use this task to change **Diameter Realm** entries.

**Diameter Realm** fields are described in [Diameter Realm Elements](#).

When the **MAP-Diameter IWF > Configuration > Diameter Realm [Edit]** page opens, the fields are populated with the current configured values.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Realm**.

The **MAP-Diameter IWF > Configuration > Diameter Realm** page appears.

2. Select the **Diameter Realm** entry to be changed.

3. Click the **Edit** button.

The **MAP-Diameter IWF > Configuration > Diameter Realm [Edit]** page appears.

4. Edit the fields that need to be changed.

5. Click:

- **OK** to save the changes and return to the **MAP-Diameter IWF > Configuration > Diameter Realm** page.
- **Apply** to save the changes and remain on this page.
- **Cancel** to return to the **MAP-Diameter IWF > Configuration > Diameter Realm** page without saving any changes.

## Deleting Diameter Realm Entries

Use this task to delete an **Diameter Realm** entry.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Realm**.

The **MAP-Diameter IWF > Configuration > Diameter Realm** page appears.

2. Select the **Diameter Realm** entry to be deleted.
3. Click the **Delete** button.

A popup window appears to confirm the delete.

4. Click:

- **OK** to delete the **Diameter Realm** entry.
- **Cancel** to cancel the delete function and return to the **MAP-Diameter IWF > Configuration > Diameter Realm** page.

If **OK** is clicked and the selected **Diameter Realm** entry no longer exists (it was deleted by another user), an error message is displayed.

## Diameter Identity GTA Configuration

The **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page on an NOAM server is used to configure Diameter Identity GTAs.

A Diameter Identity GTA provides configuration to allow conversion between a Diameter identity (Diameter Host and Realm) in the Diameter network and a Global Title Address in the SS7 network. Its configuration is used to translate in both directions:

- Convert a Diameter Host/Realm to GTA while translating a Diameter message to a MAP message
- Convert a GTA to Diameter Host/Realm while translating a MAP message to a Diameter message

The fields are described in [Diameter Identity GTA Elements](#).

On the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page, you can:

- Filter the list of entries, to display only the desired entries.
- Sort the list entries in ascending or descending order by clicking the column heading. By default, the list is sorted in ascending alphabetical order.
- Click the **Insert** button.

The **MAP-Diameter IWF > Configuration > Diameter Identity GTA [Insert]** page opens. You can add new Diameter IDs to GTA mapping.

- Select a Diameter Realm entry in the list, and click the **Edit** button.

The **MAP-Diameter IWF > Configuration > Diameter Identity GTA [Edit]** page opens. The selected Diameter Identity GTA entry can be edited.

- Select a Diameter Identity GTA entry in the list, and click the **Delete** button to remove the selected entry.

## Diameter Identity GTA Elements

*Table 5: Diameter identity GTA Elements* describes the fields on the **MAP-Diameter IWF > Configuration > Diameter Realm** page. Data Input Notes apply to Insert and Edit pages; the View page is Read-only.

**Table 5: Diameter identity GTA Elements**

Field (* indicates a required field)	Description	Data Input Notes
*FQDN	Fully Qualified Domain Name of this Peer Node	Format: text box  Case-insensitive string consisting of a list of labels separated by dots, where a label may contain letters, digits, dashes ('-') and underscore ('_'). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores may be used only as the first character. A label must be at most 63 characters long and an FQDN must be at most 255 characters long.  Range: A valid FQDN  Default: N/A
*Realm	Diameter Realm that (along with the FQDN) is to be converted to/from a Global Title Address	Format: radio buttons  Range: A valid Realm  Default: N/A
*Global Title Address	Global Title Address in the SS7 network that is to be converted to/from a Diameter Host and Realm in the Diameter network.	Format: text box  Range: 1-21 digits  Default: N/A
Authentication Interworking Needed	If set to Yes or No, this setting overrides the Authentication Interworking configured for the selected Diameter Realm for this Diameter ID-to-GTA mapping. If set to Use Realm Setting, the value configured for the selected Diameter Realm is used for this Diameter ID-to-GTA mapping. Should be set to Yes if the applicable HLRs do not support LTE authentication procedures. When set to Yes, special	Format: radio buttons  Range: Yes, No, Use Realm Setting  Default: Use Realm Setting

Field (* indicates a required field)	Description	Data Input Notes
	authentication procedures will occur when translating Diameter AIR/AIA messages to MAP messages.	
Default Access Point Name	Default Access Point Code Context Identifier to be used when Authentication Interworking Needed is set to Yes. If a value is not configured, the APN value configured on the Diameter Realm screen will be used, otherwise this value will override the value configured on the Diameter Realm screen.	Format: text box Range: 1-50

## Viewing Diameter Identity GTA Entries

Use this task to view all configured Diameter Identity GTA entries.

Diameter Identity GTA fields are described in [Diameter Identity GTA Elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Identity GTA**.

The **Diameter Common > Configuration > Diameter Identity GTA** page appears with a list of configured **Diameter Identity GTA** entries.

## Adding Diameter Identity GTA Entries

Use this task to configure new **Diameter Identity GTA** entries.

**Diameter Identity GTA** fields are described in [Diameter Identity GTA Elements](#).

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Identity GTA**.

The **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page appears.

2. Click **Insert**.

The **MAP-Diameter IWF > Configuration > Diameter Identity GTA [Insert]** page appears.

3. Enter a value for each field.

4. Click:

- **OK** to save the new entry and return to the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page.
- **Apply** to save the new entry and remain on this page. The data displayed on the page is updated.
- **Cancel** to return to the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page without saving any changes.

## Editing Diameter Identity GTA Entries

Use this task to change **Diameter Identity GTA** entries.

**Diameter Identity GTA** fields are described in [Diameter Identity GTA Elements](#).

When the **MAP-Diameter IWF > Configuration > Diameter Identity GTA [Edit]** page opens, the fields are populated with the current configured values.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Identity GTA**.  
The **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page appears.
2. Select the **Diameter Identity GTA** entry to be changed.
3. Click the **Edit** button.  
The **MAP-Diameter IWF > Configuration > Diameter Identity GTA [Edit]** page appears.
4. Edit the fields that need to be changed.
5. Click:
  - **OK** to save the changes and return to the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page.
  - **Apply** to save the changes and remain on this page.
  - **Cancel** to return to the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page without saving any changes.

## Deleting Diameter Identity GTA Entries

Use this task to delete an **Diameter Identity GTA** entry.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Identity GTA**.  
The **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page appears.
2. Select the **Diameter Identity GTA** entry to be deleted.
3. Click the **Delete** button.  
A popup window appears to confirm the delete.
4. Click:
  - **OK** to delete the **Diameter Identity GTA** entry.
  - **Cancel** to cancel the delete function and return to the **MAP-Diameter IWF > Configuration > Diameter Identity GTA** page.

If **OK** is clicked and the selected **Diameter Identity GTA** entry no longer exists (it was deleted by another user), an error message is displayed.

## GTA Range to PC Configuration

The **MAP-Diameter IWF > Configuration > GTA Range to PC** page on an NOAM server is used to configure GTA Range to PCs.

A GTA Range to PC provides configuration to translate a Diameter Request message to a MAP Request message by identifying the destination Point Codes of the primary signaling Gateway (SGGTWY) and its mate SG corresponding to the derived Global Title Address.

The fields are described in [GTA Range to PC Elements](#).

On the **MAP-Diameter IWF > Configuration > GTA Range to PC** page, you can:

- Filter the list of entries, to display only the desired entries.
- Sort the list entries in ascending or descending order by clicking the column heading. By default, the list is sorted in ascending alphabetical order by Signaling Network.
- Click the **Insert** button.

The **MAP-Diameter IWF > Configuration > GTA Range to PC [Insert]** page opens. You can add new GTA Ranges to PC mapping.

- Select a Diameter Realm entry in the list, and click the **Edit** button.

The **MAP-Diameter IWF > Configuration > GTA Range to PC [Edit]** page opens. The selected GTA Range to PC entry can be edited.

- Select a GTA Range to PC entry in the list, and click the **Delete** button to remove the selected entry.

## GTA Range to PC Elements

describes the fields on the **MAP-Diameter IWF > Configuration > GTA Range to PC** page. Data Input Notes apply to Insert and Edit pages; the View page is Read-only.

**Table 6: GTA Range to PC Elements**

Field (* indicates a required field)	Description	Data Input Notes
Default Configuration	For each Signaling Network (ITU, ITUN, or ANSI), a default Point Code configuration can optionally be specified. The default Point Codes will be used if Global Title Address digits are queried but no 'GTA Range to PC' match is found.	Format: check box Range = Yes, No, N/A Default: No (Unchecked) for ITU/ITUN; N/A for ANSI
Global Title Start	Global Title Address (GTA) start digits. Along with the GTA End digits, this forms a GTA Range. The GTA Range (within a given Signaling Network) is mapped	Format: text box Range: 1-21 digits Default: N/A

## MD-IWF Application Configuration

Field (* indicates a required field)	Description	Data Input Notes
	to the Point Codes of the primary Signaling Gateway (SG) and the secondary (mate) SG. When translating a Diameter Request message to a MAP Request message, the configured GTA Ranges are queried to see if the derived GTA digits fall within a configured GTA Range.	
Global Title End	Global Title Address (GTA) end digits.	Format: text box Range: 1-21 digits Default: N/A
Signaling Network	Signaling Network (ITUI, ITUN, or ANSI) that the given GTA Range (or default configuration) applies to.	Format: text box Range: ITUI, ITUN, or ANSI Default: ITUI
*Primary Point Code	Point Code of the primary Signaling Gateway (SG) that is associated with the given GTA Range (or default configuration).	Format: text box ITU International (ITUI) Point Code format: J-NNN-J ITU International Point (ITUI) Code range: Each J can be 0-7, Each NNN can be 0-255 ITU National Point (ITUN) Code format: NNNNN ITU National (ITUN) Point Code range: NNNNN can be 0-16383 ANSI Point Code format: NNN-NNN-NNN ANSI Point Code range: Each NNN can be 0-255
Secondary Point Code	Point Code of the secondary (mate) Signaling Gateway (SG) that is associated with the given GTA Range (or default configuration).	Format: text box Range: A valid Point Code for the given Signaling Network type Default: N/A
Load Sharing	Load Sharing indicates, when translating Diameter Request messages, the algorithm to use when routing MAP messages to	Format: radio buttons Range: Active/Active, Active/Standby/ Solitary

Field (* indicates a required field)	Description	Data Input Notes
	<p>the Primary and Secondary (mate) Signaling Gateways.</p> <p>Active/Active (Round Robin): when routing the MAP Request messages, alternate between the Primary and Secondary Point Codes in round-robin fashion if both PCs are configured and available. If there is only one Point Code configured, or only one Point Code is available, then messages are routed to only that Point Code.</p> <p>Active/Standby: MAP Request messages are routed to the Primary Point Code if it is available. If the Primary Point Code is not available, the messages are routed to the Secondary Point Code (assuming it is configured and available). If there is only one Point Code configured, the messages are routed to only that Point Code.</p> <p>Solitary: MAP Request messages are routed to a single Point Code. This will be the Primary Point Code.</p>	<p>Default: Solitary</p>

### Viewing GTA Range to PC Entries

Use this task to view all configured GTA Range to PC entries.

GTA Range to PC fields are described in [GTA Range to PC Elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > GTA Range to PC**.

The **Diameter Common > Configuration > GTA Range to PC** page appears with a list of configured GTA Range to PC entries.

### Adding GTA Range to PC Entries

Use this task to configure new GTA Range to PC entries.

GTA Range to PC fields are described in [GTA Range to PC Elements](#).

1. On the NOAM, select **MAP-Diameter IWF > Configuration > GTA Range to PC**.



The **MAP-Diameter IWF > Configuration > GTA Range to PC** page appears.

2. Click **Insert**.

The **MAP-Diameter IWF > Configuration > GTA Range to PC [Insert]** page appears.

3. Enter a value for each field.
4. Click:
  - **OK** to save the new entry and return to the **MAP-Diameter IWF > Configuration > GTA Range to PC** page.
  - **Apply** to save the new entry and remain on this page. The data displayed on the page is updated.
  - **Cancel** to return to the **MAP-Diameter IWF > Configuration > GTA Range to PC** page without saving any changes.

### Editing GTA Range to PC Entries

Use this task to change **GTA Range to PC** entries.

**GTA Range to PC** fields are described in [GTA Range to PC Elements](#).

When the **MAP-Diameter IWF > Configuration > GTA Range to PC [Edit]** page opens, the fields are populated with the current configured values.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > GTA Range to PC**.  
The **MAP-Diameter IWF > Configuration > GTA Range to PC** page appears.
2. Select the **GTA Range to PC** entry to be changed.
3. Click the **Edit** button.  
The **MAP-Diameter IWF > Configuration > GTA Range to PC [Edit]** page appears.
4. Edit the fields that need to be changed.
5. Click:
  - **OK** to save the changes and return to the **MAP-Diameter IWF > Configuration > GTA Range to PC** page.
  - **Apply** to save the changes and remain on this page.
  - **Cancel** to return to the **MAP-Diameter IWF > Configuration > GTA Range to PC** page without saving any changes.

### Deleting GTA Range to PC Entries

Use this task to delete an **GTA Range to PC** entry.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > GTA Range to PC**.  
The **MAP-Diameter IWF > Configuration > GTA Range to PC** page appears.
2. Select the **GTA Range to PC** entry to be deleted.
3. Click the **Delete** button.

A popup window appears to confirm the delete.

4. Click:

- **OK** to delete the **GTA Range to PC** entry.
- **Cancel** to cancel the delete function and return to the **MAP-Diameter IWF > Configuration > GTA Range to PC** page.

If **OK** is clicked and the selected **GTA Range to PC** entry no longer exists (it was deleted by another user), an error message is displayed.

## MAP Exception Configuration

The **MAP-Diameter IWF > Configuration > MAP Exception** page on an NOAM server is used to configure MAP Exceptions.

The fields are described in [MD-IWF Map Exception elements](#).

MAP-Diameter IWF supports the following MAP Exception types:

- Internal Processing Errors (internal to the DSR) such as:
  - Resource Exhaustion
  - ComAgent Routed Service Error, timeout, or NACK immediate response
  - Unexpected software validation error (such as NULL pointer)
- Diameter to MAP Transaction Timeout (a timeout occurred waiting for a response from the SS7 network)
- Translation Error (an error occurred while performing Message Translation or Address Translation, or while translating between a TCAP User error cause value and a Diameter Result-Code)
- Congestion (MD-IWF congestion)

On the **MAP-Diameter IWF > Configuration > MAP Exception** page, you can:

- Modify current Options values, and click **Apply** to save the changes.
- Click **Cancel** to remove and not save any changes you have made.

## MD-IWF Map Exception elements

[Table 7: MD-IWF Map Exception Elements](#) describes the fields on the MD-IWF Map Exception page.

**Table 7: MD-IWF Map Exception Elements**

Field (* indicates a required field)	Description	Data Input Notes
<b>IWF Internal Processing Error</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard Send Error to SS7 Network

## MD-IWF Application Configuration

Field (* indicates a required field)	Description	Data Input Notes
Error Cause	If the configured Action is Send Answer, this Error Cause value is used in those cases where a TC-U-ERROR message is sent to the SS7 network.	Format: pulldown list Range: System Failure, Data Missing, Unexpected Data Value, Facility Not Supported, Incompatible Terminal, Resource Limitation
Abort Reason	If the configured Action is Send Answer, this Abort Reason value is used in those cases where a MAP-U-ABORT message is sent to the SS7 network.	Format: pulldown list Range: User Defined, Application Context Not Supported, Dialog Refused
Abort Choice	Abort Choice further qualifies the Abort action as either Specific Reason, Resource Limitation or Resource Unavailable when the reason is configured as User Defined.	Format: pulldown list Range: Resource Unavailable, User Specific Reason, Resource Limitation (Congestion)
Resource Unavailable Reason	Unavailable Reason provides additional detail regarding whether the 'Resource Unavailable' specified for the Abort Choice field is as a result of a short or long term limitation.	Format: pulldown list Range: Short Term or Long Term Limitation
<b>MAP to Diameter Transaction Timeout</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard Send Error to SS7 Network
Error Cause	If the configured Action is Send Answer, this Error Cause value is used in those cases where a TC-U-ERROR message is sent to the SS7 network.	Format: pulldown list Range: System Failure, Data Missing, Unexpected Data Value, Facility Not Supported, Incompatible Terminal, Resource Limitation
Abort Reason	If the configured Action is Send Answer, this Abort Reason value is used in those cases where a MAP-U-ABORT message is sent to the SS7 network.	Format: pulldown list Range: User Defined, Application Context Not Supported, Dialog Refused
Abort Choice	Abort Choice further qualifies the Abort action as either	Format: pulldown list

Field (* indicates a required field)	Description	Data Input Notes
	Specific Reason, Resource Limitation or Resource Unavailable when the reason is configured as User Defined.	Range: Resource Unavailable, User Specific Reason, Resource Limitation (Congestion)
Resource Unavailable Reason	Unavailable Reason provides additional detail regarding whether the 'Resource Unavailable' specified for the Abort Choice field is as a result of a short or long term limitation.	Format: pulldown list Range: Short Term or Long Term Limitation
<b>Translation Error</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard Send Error to SS7 Network
Error Cause	If the configured Action is Send Answer, this Error Cause value is used in those cases where a TC-U-ERROR message is sent to the SS7 network.	Format: pulldown list Range: System Failure, Data Missing, Unexpected Data Value, Facility Not Supported, Incompatible Terminal, Resource Limitation
Abort Reason	If the configured Action is Send Answer, this Abort Reason value is used in those cases where a MAP-U-ABORT message is sent to the SS7 network.	Format: pulldown list Range: User Defined, Application Context Not Supported, Dialog Refused
Abort Choice	Abort Choice further qualifies the Abort action as either Specific Reason, Resource Limitation or Resource Unavailable when the reason is configured as User Defined.	Format: pulldown list Range: Resource Unavailable, User Specific Reason, Resource Limitation (Congestion)
Resource Unavailable Reason	Unavailable Reason provides additional detail regarding whether the 'Resource Unavailable' specified for the Abort Choice field is as a result of a short or long term limitation.	Format: pulldown list Range: Short Term or Long Term Limitation
<b>Congestion</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard Send Error to SS7 Network

Field (* indicates a required field)	Description	Data Input Notes
Error Cause	If the configured Action is Send Answer, this Error Cause value is used in those cases where a TC-U-ERROR message is sent to the SS7 network.	Format: pulldown list Range: System Failure, Data Missing, Unexpected Data Value, Facility Not Supported, Incompatible Terminal, Resource Limitation
Abort Reason	If the configured Action is Send Answer, this Abort Reason value is used in those cases where a MAP-U-ABORT message is sent to the SS7 network.	Format: pulldown list Range: User Defined, Application Context Not Supported, Dialog Refused
Abort Choice	Abort Choice further qualifies the Abort action as either Specific Reason, Resource Limitation or Resource Unavailable when the reason is configured as User Defined.	Format: pulldown list Range: Resource Unavailable, User Specific Reason, Resource Limitation (Congestion)
Resource Unavailable Reason	Unavailable Reason provides additional detail regarding whether the 'Resource Unavailable' specified for the Abort Choice field is as a result of a short or long term limitation.	Format: pulldown list Range: Short Term or Long Term Limitation

## Viewing Map Exception Entries

Use this task to view all configured Map Exception entries.

Map Exception fields are described in [MD-IWF Map Exception elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > Map Exception**.

The **Diameter Common > Configuration > Map Exception** page appears with a list of configured **Map Exception** entries.

## CCNDC Mapping Configuration

The **MAP-Diameter IWF > Configuration > CCNDC Mapping** page is used to configure mapping of a Country Code (CC) plus National Destination Code (NDC) to a Diameter Realm in the MD-IWF application.

CCNDC Mapping is used when translating a MAP Request message to a Diameter Request message, when the MAP message Global Title Address (GTA) digits are in MGT format (for ITU, the SCCP CdPA Numbering Plan is E.214).

When a CCNDC Mapping entry matches the CCNDC in the GTA digits, the configured Diameter Realm from the entry is populated into the Destination-Realm AVP of the Diameter Request Message.

The fields are described in [CCNDC Mapping Elements](#).

On the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page, you can:

- Filter the list of entries, to display only the desired entries.
- Sort the list entries in ascending or descending order by clicking the column heading. By default, the list is sorted by **CCNDC** in ascending ASCII order.
- Click the **Insert** button.

The **Diameter Common > Network Identifiers > CCNDC Mapping [Insert]** page opens. You can add new CCNDC Mapping entries. If the maximum number of CCNDC Mapping entries (2500) already exists in the system, the **Diameter Common > Network Identifiers > CCNDC Mapping [Insert]** page will not open, and an error message is displayed.

- Select a CCNDC Mapping entry in the list, and click the **Edit** button.

The **Diameter Common > Network Identifiers > CCNDC Mapping [Edit]** page opens. The selected CCNDC Mapping entry can be edited.

- Select a CCNDC Mapping entry in the list, and click the **Delete** button to remove the selected entry.

## CCNDC Mapping Elements

[Table 8: CCNDC Mapping Elements](#) describes the fields on the **MAP-Diameter IWF > Configuration > CCNDC Mapping** pages. Data Input Notes apply to Insert and Edit pages; the View page is Read-only.

**Table 8: CCNDC Mapping Elements**

Field (* indicates a required field)	Description	Data Input Notes
*CCNDC	Country Code (CC) plus National Destination Code (NDC) that is used when translating a MAP message received with a E.214 Global Title Address	Format: text box; numeric string; valid digits are 0-999999999999999 Range: 0-15 digits
*Realm	Diameter Realm that is associated with the CCNDC.	Format: text box Case-insensitive string consisting of a list of labels separated by dots, where a label can contain letters, digits, dashes (-) and underscore (_). A label must start with a letter, digit or underscore and must end with a letter or digit. Underscores can be used only as the first character. A label can be at most 63 characters

Field (* indicates a required field)	Description	Data Input Notes
		long, and a Realm can be at most 255 characters long. Range: A valid Realm, or empty
Description	Optional description of the mapping, or a note.	Format: text box Range: 0-255 characters

## Viewing CCNDC Mapping Entries

Use this task to view all configured CCNDC Mapping entries.

CCNDC Mapping fields are described in [CCNDC Mapping Elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > CCNDC Mapping**.

The **Diameter Common > Configuration > CCNDC Mapping** page appears with a list of configured CCNDC Mapping entries.

## Adding CCNDC Mapping Entries

Use this task to configure new CCNDC Mapping entries.

CCNDC Mapping fields are described in [CCNDC Mapping Elements](#).

1. On the NOAM, select **MAP-Diameter IWF > Configuration > CCNDC Mapping**.

The **MAP-Diameter IWF > Configuration > CCNDC Mapping** page appears.

2. Click **Insert**.

The **MAP-Diameter IWF > Configuration > CCNDC Mapping [Insert]** page appears.

3. Enter a value for each field.

4. Click:

- **OK** to save the new entry and return to the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page.
- **Apply** to save the new entry and remain on this page. The data displayed on the page is updated.
- **Cancel** to return to the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page without saving any changes.

## Editing CCNDC Mapping Entries

Use this task to change CCNDC Mapping entries.

CCNDC Mapping fields are described in [CCNDC Mapping Elements](#).

When the **MAP-Diameter IWF > Configuration > CCNDC Mapping [Edit]** page opens, the fields are populated with the current configured values.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > CCNDC Mapping**.  
The **MAP-Diameter IWF > Configuration > CCNDC Mapping** page appears.
2. Select the **CCNDC Mapping** entry to be changed.
3. Click the **Edit** button.  
The **MAP-Diameter IWF > Configuration > CCNDC Mapping [Edit]** page appears.
4. Edit the fields that need to be changed.
5. Click:
  - **OK** to save the changes and return to the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page.
  - **Apply** to save the changes and remain on this page.
  - **Cancel** to return to the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page without saving any changes.

### Deleting CCNDC Mapping Entries

Use this task to delete an **CCNDC Mapping** entry.

1. On the NOAM, select **MAP-Diameter IWF > Configuration > CCNDC Mapping**.  
The **MAP-Diameter IWF > Configuration > CCNDC Mapping** page appears.
2. Select the **CCNDC Mapping** entry to be deleted.
3. Click the **Delete** button.  
A popup window appears to confirm the delete.
4. Click:
  - **OK** to delete the **CCNDC Mapping** entry.
  - **Cancel** to cancel the delete function and return to the **MAP-Diameter IWF > Configuration > CCNDC Mapping** page.

If **OK** is clicked and the selected **CCNDC Mapping** entry no longer exists (it was deleted by another user), an error message is displayed.



# Chapter 5

## DM-IWF Application Configuration

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### Topics:

- [DM-IWF Options Configuration.....58](#)
- [Diameter Exception Configuration.....60](#)

The **MAP-Diameter IWF > Configuration** SOAM GUI pages for DM-IWF components provide fields for entering the configuration information for the DM-IWF application.

## DM-IWF Options Configuration

The **MAP-Diameter IWF > Configuration > DM-IWF Options** page is used to configure DM-IWF application Options.

**Note:** DM-IWF configuration can be performed only on Active SOAM servers.

The fields are described in [DM-IWF Options elements](#).

On the **MAP-Diameter IWF > Configuration > DM-IWF Options** page, you can:

- Modify current Options values, and click **Apply** to save the changes.
- Click **Cancel** to remove and not save any changes you have made.

### DM-IWF Options elements

[Table 9: DM-IWF Options Elements](#) describes the fields on the DM-IWF Options page.

**Table 9: DM-IWF Options Elements**

Field (* indicates a required field)	Description	Data Input Notes
*Unavailable Action	Specifies what action to take if the DM-IWF application is unavailable	Format: pulldown list Range: Continue Routing, Send Answer, Default Route Default: Send Answer
Application Unavailable Route List	Specifies the name of a configured Route List. This Route List is used if the Unavailability Action is set as "Default Route" and the DM-IWF application is not available. In this case, this Route List will be used for routing the request messages and the PRT Rules will be bypassed.	Format: pulldown list Range: list of possible Route Lists Default: Not Selected
Application Unavailable Result Code	Given that the Unavailable Action must be Send Answer, if the DSR Application is not Available, then this value is used in the Result-Code or Experimental-Result AVP of the Answer message.	Format: text box, pulldown list Range: 1000-5999 Default: 3002 UNABLE_TO_DELIVER
Application Unavailable Vendor ID	If zero, then a Result-Code AVP will be sent when the DSR Application is not Available. If	Format: text box Range: 0-4294967295

## DM-IWF Application Configuration

Field (* indicates a required field)	Description	Data Input Notes
	non-zero, then an Experimental-Result AVP will be sent with the Vendor-Id AVP set to this value.	Default: 0
Application Unavailable Error Message	If a non-null string, then an Error-Message AVP will be sent in the Answer response containing this string when the DSR Application is not Available.	Format: text box Range: 0-64 characters Default: DM-IWF Unavailable
*DSR Application-Invoked AVP Insertion	If set to Yes, this AVP will be inserted into the Request message that is routed to prevent multiple invocations of the same DSR Application on different DSRs or MPs.	Format: radio buttons Range: Yes or No
*Shutdown Mode	Allows the operator to specify the shutdown method used when the Admin State is changed to Disabled. The application can be disabled using either a graceful or forced shutdown method. Graceful allows in-process transactions to continue for a configurable time period before disabling. Forced is an immediate shutdown.	Format: radio buttons Range: Forced or Graceful
*Shutdown Timer	Number of seconds that the Shutdown Timer will run during a Graceful shutdown.	Format: text box, 2-digit numeric Range: 1-30 seconds Default: 15 seconds
Realm	If the DM-IWF originates Answers, this value is used as Origin Realm. If no value is supplied the local node realm of the ingress connection is used. Realm and FQDN must either both be provisioned or must both be NULL. This applies to MAP to Diameter Requests only.	Format: text box Range: a valid Realm or empty
Fully Qualified Domain Name	If the DM-IWF originates Answers, this value is used as the Origin Host. If no value is supplied the local node FQDN of the ingress connection is used.	Format: text box Range: a valid FQDN or empty

Field (* indicates a required field)	Description	Data Input Notes
	Realm and FQDN must both be provisioned or must both be NULL.	
ART	Optional attribute which specifies which ART to search when DM-IWF forwards a Request message to DRL. If this value is NULL, DRL will select an ART to search based on a well-defined set of rules.	Format: pulldown list Default: N/A
PRT	Optional attribute which specifies which PRT to search if no ART rules match the content of the Request message forwarded from DM-IWF to DRL. If this value is NULL, DRL will select an PRT to search based on a well-defined set of rules.	Format: pulldown list Default: N/A

## Viewing DM-IWF Options Entries

Use this task to view all configured DM-IWF Options entries.

DM-IWF Options fields are described in [DM-IWF Options elements](#).

On the SOAM, select **MAP-Diameter IWF > Configuration > DM-IWF Options**.

The **Diameter Common > Configuration > DM-IWF Options** page appears with a list of configured DM-IWF Options entries.

## Diameter Exception Configuration

The **MAP-Diameter IWF > Configuration > Diameter Exception** page on an SOAM server is used to configure Diameter Exceptions.

The fields are described in [Diameter Exception elements](#).

MAP-Diameter IWF supports the following Diameter Exception types:

- Internal Processing Errors (internal to the DSR) such as:
  - Resource Exhaustion
  - Congestion
  - Unexpected software validation error

- Diameter to MAP Transaction Timeout (a timeout occurred waiting for a response from the SS7 network)
- Translation Error (an error occurred while performing Message Translation or Address Translation, or while translating between a TCAP User error cause value and a Diameter Result-Code)

On the **MAP-Diameter IWF > Configuration > Diameter Exception** page, you can:

- Modify current Options values, and click **Apply** to save the changes.
- Click **Cancel** to remove and not save any changes you have made.

## Diameter Exception elements

*Table 10: DM-IWF Diameter Exception Elements* describes the fields on the Diameter Exception page.

**Table 10: DM-IWF Diameter Exception Elements**

Field (* indicates a required field)	Description	Data Input Notes
<b>IWF Internal Processing Error</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard, Send Answer, or Apply Unavailability Action
Response Result Code AVP	If the configured Action is Send Answer, this value is used in the Result-Code or Experimental-Result AVP of the Diameter Answer message.	Format: text box, pulldown list Range: 1000-5999
Response Vendor ID	If zero, then a Result-Code AVP will be sent in the Diameter Answer message. If non-zero, then an Experimental-Result AVP will be sent with the Vendor-Id AVP set to this value.	Format: text box Range: 0-4294967295
Response Error String	If a non-empty string, this configured string will be appended to the Error-Message AVP that is sent in the Diameter Answer message.	Format: text box Range: 0-64 characters
<b>Diameter to MAP Transaction Timeout</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard, Send Answer, or Apply Unavailability Action
Response Result Code AVP	If the configured Action is Send Answer, this value is used in the Result-Code or	Format: text box, pulldown list Range: 1000-5999

Field (* indicates a required field)	Description	Data Input Notes
	Experimental-Result AVP of the Diameter Answer message.	
Response Vendor ID	If zero, then a Result-Code AVP will be sent in the Diameter Answer message. If non-zero, then an Experimental-Result AVP will be sent with the Vendor-Id AVP set to this value.	Format: text box Range: 0-4294967295
Response Error String	If a non-empty string, this configured string will be appended to the Error-Message AVP that is sent in the Diameter Answer message.	Format: text box Range: 0-64 characters
<b>Translation Error</b>		
Action	Indicates the action to take if the given exception occurs.	Format: radio buttons Range: Discard, Send Answer, or Apply Unavailability Action
Response Result Code AVP	If the configured Action is Send Answer, this value is used in the Result-Code or Experimental-Result AVP of the Diameter Answer message.	Format: text box, pulldown list Range: 1000-5999
Response Vendor ID	If zero, then a Result-Code AVP will be sent in the Diameter Answer message. If non-zero, then an Experimental-Result AVP will be sent with the Vendor-Id AVP set to this value.	Format: text box Range: 0-4294967295
Response Error String	If a non-empty string, this configured string will be appended to the Error-Message AVP that is sent in the Diameter Answer message.	Format: text box Range: 0-64 characters

## Viewing Diameter Exception Entries

Use this task to view all configured Diameter Exception entries.

**Diameter Exception** fields are described in [Diameter Exception elements](#).

On the NOAM, select **MAP-Diameter IWF > Configuration > Diameter Exception**.

The **Diameter Common > Configuration > Diameter Exception** page appears with a list of configured **Diameter Exception** entries.

# Chapter 6

## Maintenance for MD-IWF

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### Topics:

- *Overview.....64*
- *MD-IWF Administrative State and Operational Status.....64*
- *MD-IWF Alarms, KPIs, and Measurements.....65*

This section describes maintenance functions and information that can be used with the MD-IWF application.

## Overview

The MD-IWF application has no maintenance GUI pages of its own. The following Diameter > Maintenance GUI pages provide functions and information that can be used with the MD-IWF application:

- The **Diameter > Maintenance > Applications** page displays MD-IWF status information including Admin State, Operational Status, and Operational Reason. The page also provides functions to enable and disable the application. Refer to the *Diameter User Guide* and Help for explanations of the page and the status information.
- The **Communication Agent > Maintenance > Routed Services Status** page displays ComAgent Status information for MD-IWF Routed Service (MDIWFSvc) Service Providers and Users. Refer to the *Communication Agent User's Guide* for explanations of the page and status information.

## MD-IWF Administrative State and Operational Status

The MD-IWF application has an Administrative State and an Operational Status. The Administrative State (or Admin State - enabled or disabled) indicates the state that the operator desires the MD-IWF application to be in. The Admin State can be manually modified by the operator. The Operational Status indicates the actual status of the MD-IWF application.

*Table 11: MD-IWF Admin State and Operational Status* lists the MD-IWF Admin State and Operational Status related to the MD-IWF Routed Service State, MD-IWF Routed Service Congestion Level and MD-IWF (internal) congestion levels. It specifies the actions that MD-IWF will take in various situations.

ComAgent DM-IWF Routed Service presents an aggregated view of the all DM-IWF instances (one instance per DA-MP) that have registered as "service providers" for the DM-IWF Routed Service. ComAgent reports the DM-IWF Routed Service State and the DM-IWF Routed Service Congestion Level to each MD-IWF instance.

In the Diameter to MAP direction, the MD-IWF Operational Status and the DM-IWF Routed Service congestion level determine whether a given Request from DRL can be forwarded to an MD-IWF. The MD-IWF Operational Status is determined by multiple attributes including MD-IWF Admin State, MD-IWF (internal) congestion level, MD-IWF Routed Service State and MD-IWF Service Congestion Level. In *Table 11: MD-IWF Admin State and Operational Status*, MD-IWF Congestion Level is the maximum of the MD-IWF (internal) Congestion Level and MD-IWF Routed Service Congestion Level.

In *Table 11: MD-IWF Admin State and Operational Status*, the "MD-IWF Admin State," "DM-IWF ComAgent Provider Status," "MD-IWF Congestion State," and "SS7-MP isolated from SS7 network?" are the inputs for calculating the MD-IWF Operational Status, MD-IWF Operational Reason, and MD-IWF Operational Color.



Table 11: MD-IWF Admin State and Operational Status

MD-IWF Admin State	DM-IWF ComAgent Provider Status (rolled-up state of all DM-IWF providers)	MD-IWF Congestion State	SS7-MP isolated from SS7 network?	MD-IWF Operational Status	MD-IWF Operational Reason	MD-IWF Operational Color	MD-IWF ComAgent Provider Status (calculated on each SS7-MP)
N/A	N/A	N/A	N/A	Unavailable	Not Initialized	Orange	Unregistered
Disabled	N/A	N/A	N/A	Unavailable	Shut Down	Orange	Unregistered
Enabled	Down	N/A	No	Degraded	Diam Network Unavailable	Red	Available
Enabled	Degraded (CL1,CL2,CL3)	CL0	No	Degraded	Diam Network Degraded	Yellow	Available
Enabled	Degraded (CL1,CL2,CL3)	CL1,CL2,CL3	No	Degraded	Diam Network Degraded / Congested	Yellow	CL1,CL2,CL3
Enabled	Normal	CL1,CL2,CL3	No	Degraded	Congested	Yellow	CL1,CL2,CL3
Enabled	N/A	N/A	Yes	Unavailable	Isolated from SS7 network	Red	Unavailable
Enabled	Normal	CL0	No	Available	Normal	Gray	Available

## MD-IWF Alarms, KPIs, and Measurements

This section describes how to access alarm, KPI, and measurements information that is available for MD-IWF in the DSR GUI. For more detailed information, refer to the *Alarms, KPIs, and Measurements Reference*.

Active alarms and events, as well as alarm and event history can be displayed on the **Alarms & Events > View Active** and **Alarms & Events > View History** GUI pages.

Key Performance Indicators, or KPIs, provide a means to convey performance information to the user in near real-time. KPIs can be displayed on the **Status & Manage > KPIs** GUI page.

## Maintenance for MD-IWF

Measurements for MD-IWF are collected and reported in various measurement groups. A measurement report and measurement group can be associated with a one-to-one relationship. Measurement reports may be generated from the **Measurements > Report** GUI page.

## Maintenance for DM-IWF

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### Topics:

- *Overview.....68*
- *DM-IWF Administrative State and Operational Status.....68*
- *DM-IWF Alarms, KPIs, and Measurements.....69*

This section describes maintenance functions and information that can be used with the DM-IWF application.

## Overview

The DM-IWF application has no maintenance GUI pages of its own. The following Diameter > Maintenance GUI pages provide functions and information that can be used with the DM-IWF application:

- The **Diameter > Maintenance > Applications** page displays DM-IWF status information including Admin State, Operational Status, and Operational Reason. The page also provides functions to enable and disable the application. Refer to the *Diameter User Guide* and Help for explanations of the page and the status information.
- The **Diameter > Maintenance > DA-MPs** page displays status and connectivity information for the DA-MP that is running the DM-IWF application. Refer to the *Diameter User Guide* and Help for explanations of the page and the status information.
- The **Communication Agent > Maintenance > Routed Services Status** page displays ComAgent Status information for Service Providers and Users of DM-IWF Routed Service (DMIWFSvc) and MD-IWF Routed Service (MDIWFSvc). Refer to the *Communication Agent User's Guide* for explanations of the page and status information.

## DM-IWF Administrative State and Operational Status

The DM-IWF application has an Administrative State and an Operational Status. The Administrative State (or Admin State - enabled or disabled) indicates the state that the operator desires the DM-IWF application to be in. The Admin State can be manually modified by the operator. The Operational Status indicates the actual status of the DM-IWF application.

*Table 12: DM-IWF Admin State and Operational Status* lists the DM-IWF Admin State and Operational Status related to the MD-IWF Routed Service State, MD-IWF Routed Service Congestion Level and DM-IWF (internal) congestion levels. It specifies the actions that DM-IWF will take in various situations.

ComAgent MD-IWF Routed Service presents an aggregated view of the all MD-IWF instances (one instance per SS7-MP) that have registered as "service providers" for the MD-IWF Routed Service. ComAgent reports the MD-IWF Routed Service State and the MD-IWF Routed Service Congestion Level to each DM-IWF instance.

In the Diameter to MAP direction, the DM-IWF Operational Status and the MD-IWF Routed Service congestion level determine whether a given Request from DRL can be forwarded to an MD-IWF. The DM-IWF Operational Status is determined by multiple attributes including DM-IWF Admin State, DM-IWF (internal) congestion level, MD-IWF Routed Service State and MD-IWF Service Congestion Level. In *Table 12: DM-IWF Admin State and Operational Status*, DM-IWF Congestion Level is the maximum of the DM-IWF (internal) Congestion Level and MD-IWF Routed Service Congestion Level.

In *Table 12: DM-IWF Admin State and Operational Status*, the "DM-IWF Admin State," "DM-IWF Congestion State," "DM-IWF Shutting Down State," and the "MD-IWF Routed Service State" are used as inputs for calculating the DM-IWF Operational Status, DM-IWF Operational Reason, and DM-IWF Operational Reason Color.

Table 12: DM-IWF Admin State and Operational Status

DM-IWF Admin State	DM-IWF Congestion State	DM-IWF Shutting Down State	MD-IWF Routed Service State	DM-IWF Operational Status	DM-IWF Operational Reason	DM-IWF Operational Reason Color
Disabled	N/A	False	N/A	Unavailable	Shut down	Orange
Enabled	0	N/A	Available	Available	Normal	Gray
Enabled	1	N/A	Available	Available	Congested	Yellow
Enabled	2	N/A	Available	Degraded	Congested	Yellow
Enabled	3	N/A	Available	Unavailable	Congested	Red
Enabled	0	N/A	Degraded <sup>1</sup>	Available	SS7 Degraded	Yellow
Enabled	1	N/A	Degraded	Available	SS7 Degraded / Congested	Yellow
Enabled	2	N/A	Degraded	Degraded	SS7 Degraded / Congested	Yellow
Enabled	3	N/A	Degraded	Unavailable	SS7 Degraded / Congested	Red
Enabled	0	N/A	Unavailable	Unavailable	SS7 Unavailable	Red
Enabled	1, 2, 3	N/A	Unavailable	Unavailable	SS7 Unavailable / Congested	Red

## DM-IWF Alarms, KPIs, and Measurements

This section describes how to access alarm, KPI, and measurements information that is available for DM-IWF in the DSR GUI. For more detailed information, refer to the *Alarms, KPIs, and Measurements Reference*.

Active alarms and events, as well as alarm and event history can be displayed on the **Alarms & Events > View Active** and **Alarms & Events > View History** GUI pages.

Key Performance Indicators, or KPIs, provide a means to convey performance information to the user in near real-time. KPIs can be displayed on the **Status & Manage > KPIs** GUI page

<sup>1</sup> MD-IWF Route Service State of "Degraded" does not impact DM-IWF's Operational Status.

## Maintenance for DM-IWF

Measurements for DM-IWF are collected and reported in various measurement groups. A measurement report and measurement group can be associated with a one-to-one relationship. Measurement reports may be generated from the **Measurements > Report** GUI page.

## A

ART Application Routing Table

## 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.

## D

DA-MP Diameter Agent Message Processor  
A DSR MP (Server Role = MP, Server Group Function = Diameter Signaling Router). A local application such as CPA can optionally be activated on the DA-MP. A computer or blade that is hosting a Diameter Signaling Router Application.

DM-IWF Diameter –MAP Interworking DSR Application, which translates Diameter messages into MAP messages

## G

GUI Graphical User Interface  
The term given to that set of items and facilities which provide the user with a graphic means for manipulating screen data rather than being limited to character based commands.

## M

**M**

MAP  
 Mobile Application Part  
 An application part in SS7 signaling for mobile communications systems.

MD-IWF  
 MAP-Diameter Interworking SS7 Application, which translates MAP messages into Diameter messages

**N**

NOAM  
 Network Operations, Administration, and Maintenance

**O**

OAM  
 Operations, Administration, and Maintenance  
 The application that operates the Maintenance and Administration Subsystem which controls the operation of many products.

**P**

Peer Route Table  
 A set of prioritized Peer Routing Rules that define routing to Peer Nodes based on message content.

**S**

SOAM  
 System Operations, Administration, and Maintenance  
 Site Operations, Administration, and Maintenance

**T**

TCAP  
 Transaction Capabilities Application Part - A protocol in the SS7 protocol suite that enables the deployment of advanced intelligent network services by supporting non-circuit related information exchange between signaling points



**T**

using the Signaling Connection Control Part connectionless service. TCAP also supports remote control - ability to invoke features in another remote network switch.