

Oracle® Communications Diameter Signaling Router ENUM User Guide



Release 8.6

F54989-01

April 2022

The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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1. Select **2** for New Service Request.
2. Select **3** for Hardware, Networking and Solaris Operating System Support.
3. Select one of the following options:
 - For Technical issues such as creating a new Service Request (SR), select **1**.
 - For Non-technical issues such as registration or assistance with My Oracle Support, select **2**.

You are connected to a live agent who can assist you with My Oracle Support registration and opening a support ticket.

My Oracle Support is available 24 hours a day, 7 days a week, 365 days a year.

What's New in This Guide

This section lists the documentation updates for Release 8.6.0 in Oracle Communications Diameter Signaling Router ENUM User Guide.

Release 8.6.0 - F54989-01, April 2022

There are no updates in the document for this release.

1

Introduction

This document provides a brief description of the ENUM Support feature of the Oracle Communications Diameter Signaling Router. It contains the feature description, configurations, measurements, and troubleshooting details associated with the ENUM Support feature.

1.1 Locate Product Release Software on the Oracle Software Delivery Cloud Site

Oracle Communications software is available for electronic download at the Oracle Software Delivery Cloud site, <https://edelivery.oracle.com>. Only authorized customers with a valid password may download software from the site.

For directions on downloading the software and other information about using this site, click **FAQ** in the top right corner.

2

Feature Description

This chapter describes the ENUM Support feature.

2.1 Overview

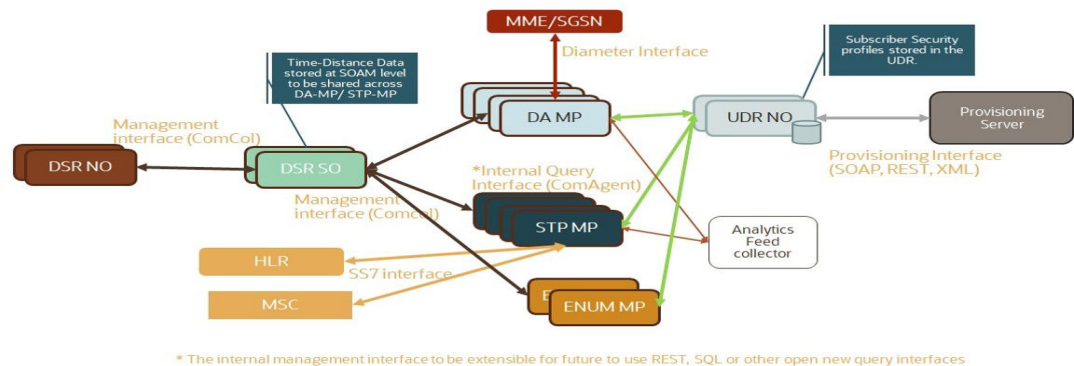
The ENUM Support feature enhances the capability to access the Unified Data Repository (UDR) database using the ENUM protocol. The ENUM application in DSR supports the ENUM interface on UDP with the bind9 software.

After receiving ENUM message from bind9 through the UDP interface, the ENUM application queries UDR with ComAgent Connection for the DN received in the message. After getting response from UDR, ENUM application generates the response and send it to bind9 through UDP interface. Bind9 forwards the response to the sender of the message.

ENUM Architecture with DSR

The following figure shows the overall system architecture for the ENUM feature with DSR:

Figure 2-1 ENUM Architecture with DSR



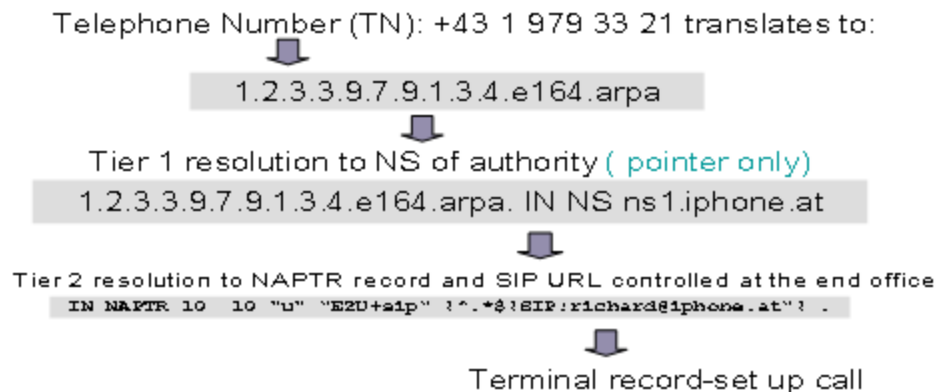
E.164 Number Mapping (ENUM)

E.164 Number Mapping (ENUM) is a Telephone Number Mapping standard defined for mapping of traditional PSTN numbers in E.164 format to IP-based format such as URI. ENUM uses a special DNS record type to translate a telephone number into a URI that can be used in an IP network. ENUM allows Internet-based services, such as E-mail, VoIP, and Voice Mail to be located based on the telephone number. ENUM accomplishes this by placing the telephone numbers into the global Domain Name System (**DNS**).

The following figure shows an example of the ENUM Tier resolution from a DNS perspective. The ENUM data format begins with a phone number, then reverses the digits, places a “.”

between each number, and adds an .e164.arpa root domain that is common across both ENUM and this feature.

Figure 2-2 ENUM Tier Record Resolution



ENUM implementation is based on a tiered architecture. At Tier 0 is the **RIPE NCC** which maintains the e164.arpa zone. Entries in the RIPE NCC DNS server correspond to country codes or portions of country codes and point to the Tier 1 Registry that is the authoritative DNS server for that country code or portion of country code. The Tier 1 Registry maintains records that indicate the authoritative DNS server for individual E.164 numbers in the country code or portion thereof. The Tier 2 Provider for an E.164 number maintains the actual **NAPTR** records that contain information for specific communication services.

2.2 ENUM Process

This feature supports up to 16 ENUM application per MP. Each MP operates independently.

The ENUM MP works as a standalone application. There is no HA role for ENUM MP.

By default, ENUM process remains off. You can enable the application from vSTP Graphical User Interface (GUI). For more information, see [GUI Configurations for ENUM Support](#).

vENUM shall not implement any load balancing mechanism between multiple ENUM MP. The BIND9 server manages load balancing of the queries between the various ENUM servers.

2.3 ENUM Application

The ENUM application task on each vENUM MP provides the following functions:

- Receive ENUM Query messages

- Verify client IP addresses
- Validate incoming ENUM Queries
- Perform lookups in UDR
- Create and send ENUM Response messages

2.4 About BIND9

ENUM uses BIND9 domain name server for interacting with the Domain Name System (DNS).

BIND is a suite of software for interacting with DNS. It acts as an authoritative name server for DNS zones and as well as a recursive resolver in the network.

BIND9 facilitates the following functions:

Access Control

Access Control Lists (ACLs) are the address match lists that give users control over who can access the name server. The ACLs can be configured using the DSR MMI or Graphical User Interface (GUI). You can select any of the following options for an address:

- Allowed
- Blocked

The Blocked ACLs take precedence over allowed ones. For example, if there are two subnets configured with some common IPs as follows:

```
acl allowed{
172.16.0.0/22;
};
acl blocked{
172.16.1.0/24;
};
```

In the above example, the subnet 172.16.0.0/22 is allowed, which means that all the IPs in the range 172.16.0.1 - 172.16.3.254 are allowed. And the subnet 172.16.1.0/24 is blocked, which means the IPs in the range 172.16.1.1 - 172.16.1.254 are blocked. As blocked takes precedence, all IPs in the range 172.16.1.1 - 172.16.1.254 are considered as blocked.

Forwarding queries from validated IPs to ENUM application

The configured `e164.arp` zone allows BIND9 to forward all these queries to vENUM servers.

Load balancing the queries between multiple ENUM MPs

BIND9 load balances the queries between the various vENUM servers. It uses response times from previous queries to select the server that is likely to respond the most quickly. Dynamic adjustment of the recorded response times ensures that all forwarders are queried, even those with slower response times.

Caching

BIND9 caches the responses. The advantages of caching responses are:

- Improvement in application performance
- Reduction in the load on the backend
- Reduction of database cost
- Elimination of database hotspots

3

Feature Configurations

This section provides procedures to perform the ENUM Support feature configurations.

The ENUM setup can be configured using ONE PUSH with the ENUM heat template.

Once the setup is complete, ENUM application can be configured using the ENUM managed objects and ENUM GUI. The MMI API contains details about the URI, an example, and the parameters available for each managed object.

3.1 Configurations

New Setup Configuration

Install and configure the ENUM application as mentioned in the following steps:

1. Configure the vSTP setup with ONE PUSH using the ENUM heat template. To refer the heat template, download *ENUM Heat Template.zip* file from [OHC](#).
2. Create Server group with Function id `STPENUM` and add `EnumMPs` (according to Requirement) under this Server Group for ENUM feature.
3. Configure the ENUM application using MMI API or ENUM GUI.

Upgrading Existing setup

To upgrade an existing SS7 setup (without ENUM MPs), perform the following steps:

1. Create new Enum MP(s) instance.
2. Create Server group with Function id `STPENUM` at C level.
3. Add the newly created MPs under the Server Group created in above step.

3.1.1 Configuring ENUM for UDR

Configuring ENUM feature for UDR involves adding vENUM MP(s) to UDR and then configuring UDR on the ComAgent server.

Assumptions:

- The user is aware of UDR and ComAgent functionality.
- UDR is already installed, and UDR topology is already configured.

Perform the following steps to configure ENUM for UDR:

1. Add details about the vENUM MP on the ComAgent Remote Servers screen as a client. Navigate to **Communication Agent**, select **Configuration**, select **Remote Servers**, and click **Insert** on an active OCUDR NOAMP.
2. Select the OCUDR server group from the *Available Local Server Groups* that need to communicate with vENUM MP.

3. From the active OCUDR GUI, navigate to **Communication Agent**, select **Maintenance**, select **Connection Status** and verify if the connection is `InService`.
4. From the active OCUDR GUI, navigate to **Communication Agent**, select **Maintenance**, select **Routed Services Status** and verify if the `STPDbSvc` status is `Normal`.
5. From an active DSR NOAM, navigate to **Communication Agent**, select **Configuration**, select **Remote Servers**, and click **Insert**.
6. Add the UDR NO IP in the ComAgent Remote Server screen as a Server.
7. Select the STP MP server group from the *Local* SG that needs to communicate with UDR.
8. Also, add the Standby and DR NOs to the Local SG.
9. Navigate to **Communication Agent**, select **Configuration**, select **Connection Groups**, select `STPSvcGroup` and click `Edit`.
10. Add all available UDR NO servers.
11. Navigate to **Communication Agent**, select **Maintenance**, then **Connection Status**, then the server name, and check the connection status.

Output: UDR Configuration: SOAP Provisioning Request for MSISDN

Steps to Enable ENUM Feature on UDR:

Enable ENUM feature on UDR by running the `enableEnumSec` loader on the Active NOAM Server console. Follow the below steps:

1. Go to the path: `/usr/TKLC/udr/prod/maint/loaders/upgrade`
2. On the path, run the `enableENUMSec` script.

For Subscriber data, user must configure Subscriber first and then add or attach **Entity Type** as `ENUM` with that Subscriber.

The following snippet provides an example of provisioning Subscriber data with the **Entity Type** as `ENUM`.

Subscriber Profile:

```
<subscriber>
  <field name="MSISDN">5555555555</field>
  <field name="CLDBL">1</field>
  <field name="CLNBL">1</field>
  <field name="PType">1</field>
  <field name="ASD">abcd</field>
  <field name="SPRNID"/>"685477777"</field>
  <field name="GRNID"/>12000"</field>
<![CDATA[<?xml version="1.0" encoding="UTF-8"?>
  <ENUM ID="ENUM">
    <ns_domain>ns.abcl.com</ns_domain>
    <cname_domain>abcl.com</cname_domain>
    <naptr1_order>100</naptr1_order>
    <naptr1_pref>50</naptr1_pref>
    <naptr1_flag>u</naptr1_flag>
    <naptr1_service>E2U+sip</naptr1_service>
    <naptr1_regex>!^.*$!sip:info@example.com!</naptr1_regex>
```

```

        <naptr1_domain> </naptr1_domain>
        <naptr2_order>10</naptr2_order>
        <naptr2_pref>50</naptr2_pref>
        <naptr2_service>PSTNSIP</naptr2_service>
        <naptr2_regex> </naptr2_regex>
        <naptr2_domain>Gw3.nptrexample.com</naptr2_domain >
    </ENUM>]}
</subscriber>

```

The following snippet provides an example of provisioning Entity data with ENUM.

Entity data:

```

<MnpSPRN>
  <Type>RN</Type>
  <EDigit>68547777</EDigit>
  <RI>0</RI>
  <PC>111-222-444</PC>
  <PCDom>ansi</PCDom>
  <SSN>3</SSN>
  <SRFIMSI>11111111</SRFIMSI>
  <DigAct>INSERTENTITYID</DigAct>
  <ns_domain>ns.abcl.com</ns_domain>
  <cname_domain>abcl.com</cname_domain>
  <naptr1_order>100</naptr1_order>
  <naptr1_pref>50</naptr1_pref>
  <naptr1_flag>u</naptr1_flag>
  <naptr1_service>E2U+sip</naptr1_service>
  <naptr1_regex>!^.*$!sip:info@example.com!</naptr1_regex>
  <naptr1_domain> </naptr1_domain>
  <naptr2_order>10</naptr2_order>
  <naptr2_pref>50</naptr2_pref>
  <naptr2_service>PSTNSIP</naptr2_service>
  <naptr2_regex> </naptr2_regex>
  <naptr2_domain>Gw3.nptrexample.com</naptr2_domain>
</MnpSPRN>

```

The following snippet provides an example of provisioning GRN data with ENUM.

GRN data:

```

<MnpGRN>
  <ns_domain>ns.abcl.com</ns_domain>
  <cname_domain>abcl.com</cname_domain>
  <naptr1_order>102</naptr1_order>
  <naptr1_pref>50</naptr1_pref>
  <naptr1_flag>u</naptr1_flag>
  <naptr1_service>E2U+voicemail:sip</naptr1_service>
  <naptr1_regex>!^.*$!tel:+1-215-555-0123!</naptr1_regex>
  <naptr1_domain>Gw3.nptrexample.com</naptr1_domain>
  <naptr2_order>101</naptr2_order>
  <naptr2_pref>51</naptr2_pref>
  <naptr2_flag>u</naptr2_flag>
  <naptr2_service>E2U+pstn:sip</naptr2_service>

```

```

    <naptr2_regex>!^.*$!sip:
+1-215-555-0123;npdi@gw.example.com;user=phone!</naptr2_regex>
    <naptr2_domain>Gw3.nptrexample.com</naptr2_domain>
</MnpGRN>]]>

```

3.1.2 UDR Redundancy

In cases where there is one Connection Group on **vENUM NO** (with default priority set to 10) and no provision to configure one interface as the priority route and another interface as the secondary (when the primary interface fails).

The Connection Group feature provides redundancy between the local site and remote site for ENUM, where the following three priorities are provided for the Connection group for UDR lookup on vENUM NO GUI:

- STPSvcGroup=30 (default value) indicates highest priority.
- STPSvcBackGroup=20 indicates a lesser priority.
- STPSvcSpareGroup=10 indicates a much lesser priority.

Figure 3-1 Priorities for Connection Group

STPDbSvc	3 Connection Groups	-
	- STPSvcGroup	30
	- STPSvcBackupGroup	20
	- STPSvcSpareGroup	10

ble Description: Connection Groups Table

Connection Group	Server
STPSvcBackupGroup	2 Servers <ul style="list-style-type: none"> Mul26Soam1-UDR00-xsi Mul26Soam1-UDR01-xsi
STPSvcGroup	2 Servers <ul style="list-style-type: none"> Mul26Soam1-UDR00-imi Mul26Soam1-UDR01-imi
STPSvcSpareGroup	2 Servers <ul style="list-style-type: none"> Palla1Soam1-UDR00-XSI2 Palla1Soam1-UDR01-XSI2
UDRSvcGroup	0 Servers

Operator can add UDR connected with primary route in the highest priority Connection Group. For redundancy, the other UDR can be added to other connection groups.



Note:

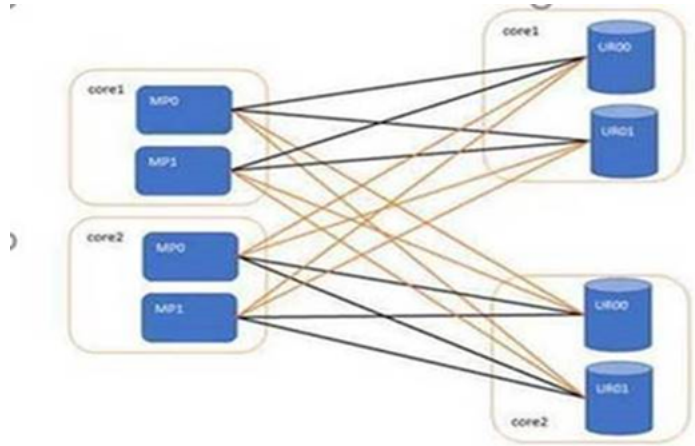
These priority values are hardcoded through the loader and cannot be modified. If all UDRs are added to the same Connection Group, the load is distributed between these UDRs.

For example:

To configure the IMI as the priority route, the UDR connected with this Interface must be added to STPSvcGroup (highest priority) Connection Group.

The UDR connected with another Interface(XSI2) can be added to another Connection Group (STPSvcBackGroup) for redundancy.

Figure 3-2 IMI as the Priority Route



⚠ Caution:

During connection group switch over, all UDRs in that connection group might go down, and this occurs when a message transfers from a UDR in one connection group to a UDR in another connection group. During such a switch over, message can be lost due to ComAgent limitation.

3.2 MMI Managed Objects for ENUM Support

MMI information associated with ENUM can be configured from a DSR NOAM or SOAM from **Main Menu**, and then **MMI API Guide**.

Once the *MMI API Guide* gets opened, use the application navigation to locate specific ENUM managed object information.

The following table lists the managed objects and operations supported for ENUM:

Managed Object Name	Supported Actions
Enum ACLs	POST, DELETE
Enum Options	PUT

Enum ACLs

The Enum ACLs MO supports the following parameters:

Table 3-1 Enum ACLs Parameters

Parameter Name	Description
ipAddress	IPv4 or IPv6 addresses which are to be allowed or blocked for ENUM feature. Valid entries are valid IPv6 and IPv4 addresses.
prefix	Specifies number of bits in netmask. Allowed values are: <ul style="list-style-type: none"> • 1-31 for IPv4 • 32,40,48,56,64 or 96 for IPv6
filter	Specifies whether the configured IP is to be allowed or blocked. Blocked filter takes precedence over Allowed, if an IP falls in both ranges.

Example- Insert

Create a file with following content to set values of the parameters. File name could be anything, for example option name can be used as filename:

```
{
"filter": "BLOCKED",
"ipAddress": "10.75.219.180",
"prefix": "24"
}
```

Execute the following command on Active SOAM to insert the data:

```
/venum/enumacsl/ -v POST -r <filename>.json
```

Execute the following command to display the content:

```
venum/enumacsl
{
"filter": "BLOCKED",
"ipAddress": "10.75.219.180",
"prefix": "24"
}
```

Enum Options

The Enum Options MO supports the following parameters:

Table 3-2 Enum Options Parameters

Parameter Name	Description
congestionNotification	Congestion Notification Flag for response, valid values are Yes, No

Table 3-2 (Cont.) Enum Options Parameters

Parameter Name	Description
congestionResCode	RCODE values in ENUM error response message to be sent due to congestion on ENUM application. Range [5,15] Default: 5
maxDnDigits	Max number of DN digits from an incoming ENUM query. Range [8,15] Default: 15
defaultProfileType	It identifies the profile used to generate the ENUM response for each resource record type.
defaultNaptrSrcv	Service parameter. This parameter specifies the supported ENUM services. This parameter is only valid for NAPTR response type.
defaultNSDomain	This parameter specifies the domain name of the name server in the NS record. This parameter is only valid for the NS response type.
defaultNaptrFlag	A containing flags to control aspects of the rewriting and interpretation of the fields in the record. This parameter is only valid for NAPTR response type.
defaultNaptrRegex	NAPTR Regex Response. This parameter is only valid for NAPTR response type.

Example- Update

Create a file with following content to set values of the parameters. File name could be anything, for example option name can be used as filename:

```
{
    "addRnContext": "No",
    "congestionNotification": "No",
    "congestionResCode": 5,
    "defaultNSDomain": "abc2.com",
    "defaultNaptrFlag": "U",
    "defaultNaptrRegex": "!^.*$!sip:info@example.com!",
    "defaultNaptrSrcv": "SIP",
    "defaultProfileType": "NAPTR",
    "maxDnDigits": 15
}
```

Execute the following command on Active SOAM to insert the data:

```
/venum/enumoptions -v PUT -r <filename>.json
```

Execute the following command to display the content:

```
venum/enumoptions{
    "addRnContext": "No",
    "congestionNotification": "No",
    "congestionResCode": 5,
    "defaultNSDomain": "abc2.com",
    "defaultNaptrFlag": "U",
    "defaultNaptrRegex": "!^.*$!sip:info@example.com!",
    "defaultNaptrSrv": "SIP",
    "defaultProfileType": "NAPTR",
    "maxDnDigits": 15
}
```

3.3 GUI Configurations for ENUM Support

The ENUM Support feature can be configured from Active System OAM (SOAM). Select **VENUM**, and then **Configuration** page.

3.3.1 ENUM ACLs

ENUM ACLs allow user to allow or block IPs from accessing the ENUM feature.

Select the **VENUM**, and then **Configuration**, and then **Enum ACLs** page. The page displays the elements on the **ENUM ACLs** View and Insert pages.

Table 3-3 Enum ACLs Elements

Element	Description	Data Input Notes
IP Address	IPv4 or IPv6 addresses which are to be allowed or blocked for ENUM feature. This is a mandatory field.	Valid IPv6 and IPv4 addresses
Prefix	Specifies number of bits in netmask.	Allowed values are <ul style="list-style-type: none"> • 1-31 for IPv4 • 32,40,48,56,64 or 96 for IPv6
Filter	Specifies whether the configured IP is to be allowed or blocked. Blocked filter takes precedence over Allowed, if an IP falls in both ranges. This is a mandatory field.	

You can perform add or delete tasks on **VENUMConfigurationEnum ACLs** page.

Adding Enum ACL

Perform the following steps to configure a new Enum ACL:

1. Click **Insert**.
2. Enter the applicable values.

3. Click **OK**, **Apply**, or **Cancel**

Deleting Enum ACL

Use the following procedure to delete a Enum ACL.



Note:

A Enum ACL will only be deleted if all delete validation checks pass.

1. Select the **Enum ACL** to be deleted.
2. Click **Delete**.
3. Click **OK** or **Cancel**.

3.3.2 Enum Options

The Enum Options are those configuration values that govern the overall Enum Application. There is a single instance of this resource, which contains each of the individual options that can be retrieved and set. Because there is no collection of instances, there is no collection GET action. No new Enum Options resource can be created, so there is no POST action, and the single instance cannot be removed, so there is no DELETE action. The single instance GET is used to retrieve the options, and PUT is used to update one or more values within the set of options. A name for this single, non-deletable instance is neither required nor expected.

Select the **VENUM**, and then **Configuration**, and then **Enum Options** page. The page displays the elements on the **Enum Options** View, Insert, and Edit pages.

Table 3-4 Enum Options Elements

Element	Description	Data Input Notes
Congestion Notification	Congestion Notification Flag for response	valid values are Yes, No
Congestion Result Code	RCODE values in ENUM error response message to be sent due to congestion on ENUM application.	Range [5,15] Default: 5
Max DN Digits	Max number of DN digits from an incoming ENUM query.	Range [8,15] Default: 15
Default Profile Type	It identifies the profile used to generate the ENUM response for each resource record type.	
Default NS Domain	This parameter specifies the domain name of the name server in the NS record. This parameter is only valid for the NS response type.	
Default Naptr Service	Service parameter. This parameter specifies the supported ENUM services. This parameter is only valid for NAPTR response type.	

Table 3-4 (Cont.) Enum Options Elements

Element	Description	Data Input Notes
Default Naptr Flag	A character-string containing flags to control aspects of the rewriting and interpretation of the fields in the record. This parameter is only valid for NAPTR response type.	
Default Naptr Regex	NAPTR Regex Response. This parameter is only valid for NAPTR response type.	

You can perform add, edit, or delete tasks on **VENUMConfigurationEnum Options** page.

Adding Enum Option

Perform the following steps to configure a new Enum Option:

1. Click **Insert**.
2. Enter the applicable values.
3. Click **OK**, **Apply**, or **Cancel**

Editing Enum Option

Use this procedure to change the field values for a selected Enum Option. (The **Enum Option Name** field cannot be changed.):

1. Select the **Enum Option** row to be edited.
2. Click **Edit**
3. Enter the updated values.
4. Click **OK**, **Apply**, or **Cancel**

Deleting Enum Option

Use the following procedure to delete a Enum Option.



Note:

A Enum Option will only be deleted if all delete validation checks pass.

1. Select the **Enum Option** to be deleted.
2. Click **Delete**.
3. Click **OK** or **Cancel**.

3.3.3 DNS Connection

DNS Connection allows user to establish connection to DNS through the ENUM feature.

Select the **VENUM**, and then **Configuration**, and then **DNS Connection** page. The page displays the elements on the DNS Connection View and Insert pages.

Table 3-5 DNS Connection Elements

Element	Description	Data Input Notes
Connection Name	Name of the DNS Connection. This is mandatory.	
IP Address	IPv4 or IPv6 of networks to run DNS. Valid entries are valid IPv6 and IPv4 addresses. This is mandatory.	
UDP Port	Port to listen on.	Default value: 53 Range: 1 to 65534

You can add or delete connections on **DNS Connection** page.

Adding a Connection

Perform the following steps to add a new connection:

1. Click **Insert**.
2. Enter the applicable values for **Connection name**, **IP Address**, and **UDP PORT**.
3. Click **OK**.

Deleting a Connection

Perform the following steps to delete an existing connection:

1. Select the connection from **Connection name** row to be deleted.
2. Click **Delete**.
3. Click **OK**.

3.3.4 DNS Zone Config

DNS Zone Config allows user to configure DNS Zone through the ENUM feature.

Select the **VENUM**, navigate to **Configuration**, then click **DNS Zone Config**. The **DNS Zone Config** page displays the elements on the DNS Zone Config View and Insert pages.

Table 3-6 DNS Zone Config Elements

Element	Description	Data Input Notes
Zone Name	Name of the zone.	

Table 3-6 (Cont.) DNS Zone Config Elements

Element	Description	Data Input Notes
Zone Type	<p>Specifies the zone type.</p> <ul style="list-style-type: none"> • ENUM: ENUM Zone a type of Forward Zone. • Forward: Forwards all requests for information about this zone to other nameservers. • Master: Designates the nameserver as authoritative for this zone. A zone should be set as the master if the zone's configuration files reside on the system. • Slave: Designates the nameserver as a slave server for this zone. Master server is specified in masters directive. • static-stub: Zone data is statically configured through the server-address. Only the NS records are replicated. <p>This is a mandatory field.</p>	<p>Valid values:</p> <ul style="list-style-type: none"> • ENUM • Forward • Master • Slave • static-stub
IP Address	<p>Specifies a valid IP address for nameservers to which the requests should be forwarded for resolution for Forward Zones or Master IP for Slave Zones. Also valid for static-stub zone IP Addresses.</p>	
Port	<p>Specifies port with the IP Address.</p>	<p>Range: 1 to 65534</p>
Forward	<p>Specifies the behavior of the forwarders directive. It accepts the following option:</p> <ul style="list-style-type: none"> • Only: When unable to query the nameservers listed in the forwarders directive, the server does not attempt to resolve the name on its own. <p>ENUM Zones can be configured to Forward Only.</p>	<p>Only</p>
File	<p>Specifies the name of the file in the named working directory that contains the zone's configuration data.</p>	

Table 3-6 (Cont.) DNS Zone Config Elements

Element	Description	Data Input Notes
Notify	Specifies whether to notify the secondary nameservers when a zone is updated. It accepts the following options: <ul style="list-style-type: none"> • Yes: The server notifies all secondary nameservers. • No: The server does not notify any secondary nameserver. • Master: The server notifies primary server for the zone only. 	Valid values: <ul style="list-style-type: none"> • Yes • No • Master
SOA Domain Name	Domain Name for SOA Record. Only for Master Zones.	
SOA Mail Id	Mail Id for SOA Record. Only for Master Zones.	
SOA IP Address	IP Address for A/AAAA record.	
SOA Refresh	Time in seconds to refresh for SOA Record. Only for Master Zones.	
SOA Retry	Time in seconds to retry for SOA Record. Only for Master Zones.	
SOA Expire	Time in seconds to expire for SOA Record. Only for Master Zones.	
SOA TTL	Time to Live in seconds for SOA Record. Only for Master Zones.	

You can perform add or delete tasks on **DNS Zone Config** page.

Adding a DNS Zone Config

Perform the following steps to add a new DNS Zone Config:

1. Click **Insert**.
2. Enter the applicable values.
3. Click **OK**.

Deleting a DNS Zone Config

Perform the following steps to delete an existing zone:

1. Select the Zone from **Zone name** row to be deleted.
2. Click **Delete**.
3. Click **OK**.

3.3.5 DNS Records

DNS Records allows user to view and configure DNS Records through the ENUM feature.

Select **VENUM**, navigate to **Configuration**, then click **DNS Records**. The **DNS Records** page displays the records on DNS to View and Insert pages.

Table 3-7 DNS Records Table Elements

Element	Description	Data Input Notes
Record Name	Record Name of the DNS Record. This is a mandatory field.	
Zone Name	Name of the zone associated with the DNS Record. This is a mandatory field.	Note: Valid zone names are the Master Zones added in the DNS Zone Config managed object.
Record Type	Indicates type of DNS Record. This is a mandatory field.	Valid values: <ul style="list-style-type: none"> • A • AAAA • NAPTR • NS • CNAME • SRV • PTR
Domain Name or Address	Domain Name or address of the DNS Record. This is a mandatory field for A/AAAA Records.	
TTL	Time to live in seconds for DNS record.	
RDATA	Resolving Data like IP, Hostname or Regex. This is a mandatory field.	

You can perform add or delete tasks on **DNS Records** page.

Adding a DNS Record

Perform the following steps to add a new DNS record:

1. Click **Insert**.
2. Enter the applicable values.
3. Click **OK**.

Deleting a DNS Record

Perform the following steps to delete an existing DNS record:

1. Select the Record from **Record Name** row to be deleted.
2. Click **Delete**.
3. Click **OK**.

3.3.6 DNS Server Options

The DNS Server Options provide those configuration values that allows to modify the DNS Server and Records.

Select the **VENUM**, navigate to **Configuration**, then click **DNS Server Options** page. The page displays the elements on the **DNS Server Options** View and Edit pages.

Table 3-8 DNS Server Options Elements

Element	Description	Data Input Values
Enable Empty Zone	Controls whether or not empty zones are created.	Valid values are Yes, No Default: Yes
Max Cache Size	Specifies the maximum amount of memory to be used for server caches in MB. When the limit is reached, the server causes records to expire prematurely so that the limit is not exceeded. In a server with multiple views, the limit applies separately to the cache of each view.	Default: 32MB
Max Cache TTL	Maximum time to live in seconds for cached responses.	
Recursion	Specifies whether to act as a recursive server.	Valid values are Yes, No Default: Yes

You can perform edit task on **DNS Server Options** page.

Editing DNS Server Option

Perform the following steps to change the field values for a selected DNS Server option:

1. Select the **DNS Server Option** row to be edited.
2. Click **Edit**.
3. Enter the updated values.
4. Click **Apply**.

3.4 Bulk Import or Export

All the MOs and their actions can also be executed using Bulk Import Export mechanism. This mechanism allows for tasks such as updating, provisioning and deleting entries using CSV files (according to the supported MO actions).

Note:

Bulk import or export takes time for large number of DNS records. Average time for adding a new DNS record is around "0.19" seconds.

Import

Bulk Import can be executed from **Diameter Common**, and then **Import** in GUI.

Figure 3-3 Import Page

Main Menu: Diameter Common -> Import

Tasks ▾

Table Description: Import Table

File Name	Line Count	Time Stamp
SO_NE1_032422-0245-EDT_VENUM_DnsZoneConfig.csv	11	2022-Mar-24 02:49:45
SO_NE1_040422-0406-EDT_VSTP_TtlOptions.csv	8	2022-Apr-04 04:07:59
SO_NE1_040422-0436-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 04:39:14
SO_NE1_040422-0443-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 04:44:07
SO_NE1_040422-0443-EDT_VENUM_EnumOptions_Failures.csv	2	2022-Apr-04 04:47:13
SO_NE1_040422-0451-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 04:52:19
SO_NE1_040422-0451-EDT_VENUM_EnumOptions_Failures.csv	2	2022-Apr-04 04:55:58
SO_NE1_040422-0457-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 04:58:41
SO_NE1_040422-0457-EDT_VENUM_EnumOptions_Failures.csv	2	2022-Apr-04 05:01:16
SO_NE1_040422-0502-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 05:06:51
SO_NE1_040422-0502-EDT_VENUM_EnumOptions_Failures.csv	2	2022-Apr-04 05:07:24
SO_NE1_040422-0511-EDT_VENUM_EnumOptions.csv	8	2022-Apr-04 06:40:15
SO_NE1_040422-0643-EDT_VENUM_EnumOptions.csv	9	2022-Apr-04 06:44:08
SO_NE1_040422-0718-EDT_VENUM_DnsServerOptions.csv	8	2022-Apr-04 07:20:48

*Files that have strict permissions may show "unknown" for line counts. These files can still be imported, but cannot be estimated on this screen.

Insert From CSV Update From CSV Delete From CSV **File Management** Abort On First Error

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Export

Bulk Import can be executed from **Diameter Common**, and then **Export** in GUI.

Figure 3-4 Export Page 1

Main Menu: Diameter Common -> Export Thu Jun 23 04:50:28 2022

Tasks ▾

Field	Value	Description
Export Application *	VENUM ▾	Application with which you want to export data [Default = n/a; Range = ALL; Diameter, IPFE, all activated DSR Applications] [A value is required]
Export Data	DNS Zone Config ▾	Data to be exported [Default = n/a; Range = ALL; configuration folders for Diameter (except Mediation folders), IPFE, or the selected DSR Application]
Output File Name	SO_NE1_062322-0450-EDT_VENUM_DnsZoneConfig	Name of this export file [Default file name format will be: NetName_Timestamp-TimeZone_ApplicationType_DataType.csv; Range = Alphanumeric characters, dashes ('-'), and underscores ('_')]
Task Name *	Configuration Export	Periodic export task name. [Default = Configuration Export; Range = Length should not exceed 24 characters. Valid characters are alphanumeric, minus sign, and spaces between first character must be an alpha character. Last character must not be a minus sign.] [A value is required]
Description		Periodic export task description. [Default = n/a; Range = Valid characters are alphanumeric, minus sign, and spaces between words. The first char alpha character. The last character must not be a minus sign. Length should not exceed 255 characters. May be empty]

Figure 3-5 Export Page 2

The screenshot shows a configuration window titled 'Tasks' with a sub-tab 'File Management'. It contains several sections for configuring export settings:

- Export Directory:** Radio buttons for 'Export Server Directory' and 'File Management Directory'. A text box explains that files exported to the Export Server Directory will be automatically copied to a remote server and deleted after transfer, while files in File Management will be imported locally. Default: Export Server Directory, Range: Export Server Directory, File Management Directory.
- Export Frequency:** Radio buttons for 'Once', 'Hourly', 'Daily', and 'Weekly'. A text box notes that 'Once' performs the operation immediately and that scheduling options are only available when provisioning is enabled. Default: Once, Range: Once, Hourly, Daily, Weekly.
- Minute:** A numeric input field set to '0'. A text box states it's for hourly frequency. Default: 0, Range: 0 to 59.
- Time of Day:** A time selector set to '12:00 AM'. A text box notes it's for daily/weekly frequency. Default: 12:00 AM, Range: HH:MM with AM/PM.
- Day of Week:** Radio buttons for 'Sunday', 'Monday', 'Tuesday', 'Wednesday', 'Thursday', 'Friday', and 'Saturday'. A text box notes it's for weekly frequency. Default: Sunday, Range: Days of the week.

Buttons for 'Ok' and 'File Management' are visible at the bottom.

3.5 Alarms and Measurements

Alarms and Events

The following table lists the alarms or events specific to the ENUM Support functionality for vSTP:

Alarm/Event ID	Alarm/Event Name
70462	ENUM Threshold - Level 2 exceeded
70464	ENUM card capacity exceeded
70467	UDR Enum DB unavailable
70474	ENUM Event Queue Utilization
70475	ENUM Udp Event Queue Utilization
70461	ENUM Threshold - Level1 exceeded
70468	enumMsgDecodeFailed
70469	enumRcvdInvalidMsg
70470	enumMpTpsExceeded
70472	enumDefaultProfQryTypeMismatch

For more details related to measurements, refer to *Diameter Signaling Router Alarms and KPIs Reference*.

Measurements

The following table lists the measurements specific to the ENUM Support functionality for vSTP:

Measurement ID	Measurement Name
22256	EnumQueryRx
22257	NaptrQueryRx
22258	NsQueryRx
22259	CnameQueryRx
22260	EnumQueryReject
22261	EnumQueryCongestionDiscard

Measurement ID	Measurement Name
22262	SuccessfulEnumTx
22263	EnumTxRC1
22264	EnumTxRC2
22265	EnumTxRC3
22266	EnumTxRC4
22267	EnumTxRC5
22268	EnumTxDefltProfile
22277	EnumUdrLookupFailure
22278	VstpEnumEventQueuePeak
22279	VstpEnumEventQueueAvg
22280	VstpEnumUdpEventQueuePeak
22281	VstpEnumUdpEventQueueAvg
22282	VstpEnumStackQueueFull
22283	VstpENUMUDPStackQueueFull
22284	VstpEnumMpCpuPeak
70468	enumMsgDecodeFailed
70469	enumRcvdInvalidMsg
70470	enumMpTpsExceeded
70472	enumDefaultProfQryTypeMismatch

For more details related to measurements, refer to *Diameter Signaling Router Measurement Reference*.

4

Troubleshooting

In case of the error scenarios, the ENUM measurements are pegged. For information related to ENUM measurements, see *Measurement Reference* guide.