VitalQIP® DNS/DHCP & IP Management Software

ENUM MANAGER | RELEASE 1.3

USER'S GUIDE

190-409-067R1.3
ISSUE 2
NOVEMBER 2009

Apache

This product includes software developed by the Apache Software Foundation (http:// www.apache.org/).

Contents

About this document

Purpose

Welcome to VitalQIP® ENUM Manager, a centralized management solution enabling administration of ENUM domains and Naming Authority Pointer (NAPTR) records in VitalQIP and the Lucent DNS server. ENUM Manager provides the ability to administer ENUM records in the VitalQIP database and manage and update Lucent DNS servers. Alcatel-Lucent's DNS server resolves queries for telephone number to URI/URL translation.

Reason for reissue

The following table lists the change to ENUM Manager that required the *User's Guide* to be reissued.

Feature Name	Description	Feature Impact
Issue 2 change:		
Configuring SSL	Documented information about configuring SSL in ENUM Manager. Fixes ENUM00000350.	"To configure SSL" (p. 1-14)
Issue 1 change:		
ENUM Manager 1.3 certification with VitalQIP 7.2.	This manual was issued for ENUM Manager 1.3 certification with VitalQIP 7.2.	Title page was impacted.

How to use this information product

This manual is organized as follows:

Chapter 1, "ENUM Manager installation"	This chapter contains the information you need to install ENUM Manager.
Chapter 2, "ENUM overview"	This chapter provides a brief overview of ENUM Manager.

Chapter 3, “To use ENUM Manager”	This chapter describes how to access the product and manage NAPTR records and ENUM domains.
Chapter 4, “VitalQIP and ENUM Manager integration”	This chapter details where functionality in ENUM Manager and VitalQIP overlap.
Chapter 5, “ENUM Manager Command Line Interface”	This chapter contains descriptions of the CLI commands used to interact with ENUM Manager.
Appendix A, “ENUM Manager Troubleshooting”	This appendix contains troubleshooting information for ENUM Manager.
Appendix B, “ENUM Manager policy file”	This appendix describes the ENUM Manager policy file.
Appendix C, “Northbound interface”	This appendix contains information on the northbound interface that is used by one or more upstream systems to send NAPTR records to ENUM Manager.

Conventions used

The following table lists the typographical conventions used throughout this manual.

Typographical conventions

Convention	Meaning	Example
boldface	Names of items on screens. Names of commands and routines Names of buttons you should click. Uniform Resource Locators (URLs)	Select the **Client** check box. The **qip_getappllst** routine returns the entire list of existing applications. Click **OK**. The VitalQIP product site can be found at **http://www.alcatel-lucent.com/wps/portal/products**.
Helvetica bold	Names of keys on the keyboard to be pressed.	Press **Enter** to continue.
Letter Gothic	Output from commands, code listings, and log files	`# Name: Share shared-network _200_200_200_0`
Letter Gothic bold	Input that you should enter from your keyboard.	Run the following command: **`c:\setup.exe`**
<angle brackets>	Variables that you must substitute another value for.	*<debugfile>.bak.log*
italics	Manual and book titles. Directories, paths, file names, and e-mail addresses.	Refer to the *VitalQIP User’s Guide* for more information. A symbolic link must be created from */etc/named.conf* that points to *named.conf*.

Convention	Meaning	Example
bold italic	Emphasis	***Read-only***. The name of the service element.
click	Click the left button on your mouse once.	To delete the object, click **Delete**.
right-click	Click the right button on your mouse.	Right-click on a service.
double-click	Double-click the left button on your mouse.	Double-click the book icon.

Related information

The following documents are referenced in this manual:

- *VitalQIP Administrator Reference Manual* (part number: 190-409-042R7.2)

  This guide describes planning and configuring your network, information about the VitalQIP interface, advanced DNS and DHCP configurations, and troubleshooting.
- *VitalQIP Installation Guide* (part number: 190-409-043R7.2)

  This guide describes how to install the VitalQIP product.
- *VitalQIP Command Line Interface User's Guide* (part number: 190-409-044R7.2)

  This guide discusses and describes how to use the VitalQIP Command Line Interface.
- *VitalQIP User's Guide* (part number: 190-409-068R7.2)

  This guide describes how to set up and use the VitalQIP user interface.
- *VitalQIP Web Client User's Guide* (part number: 190-409-079R7.2)

  This guide describes how to use the VitalQIP web client interface.

Product Training Support

Alcatel-Lucent University offers cost-effective educational programs that support the VitalQIP product. Our offerings also include courses on the underlying technology for the VitalQIP products (for example, DNS and DHCP). Our classes blend presentation, discussion, and hands-on exercises to reinforce learning. Students acquire in-depth knowledge and gain expertise by practicing with our products in a controlled, instructor-facilitated setting. If you have any questions, please contact us at 1-888-LUCENT8, Option 2, Option 2.

Technical support

If you need assistance with ENUM Manager, you can contact the Technical Assistance Center for your region. Contact information is provided in the following table.

Region	Address	Contact information
North America	Alcatel-Lucent 400 Lapp Road Malvern, PA 19355 USA	Phone: 1-866-LUCENT8 (582-3688) Option 1, Option 2 Web: **https://support.lucent.com**
Europe, Middle East, and Africa	Alcatel-Lucent Voyager Place Shoppenhangers Road Maidenhead Berkshire SL6 2PJ UK	Phone: 00 800 00 LUCENT or +353 1 692 4579 E-mail: *emeacallcenter@alcatel-lucent.com* Web: **https://support.lucent.com**
Central and South America	Alcatel-Lucent Brasil S/A Avenida Marginal Direita Anchieta, 400 - Km 11,5 CEP: 04182-901 - Jardim Santa Cruz - Sao Paulo - SP Brazil	Phone: 0800 89 19325 or +55 11 3205 7626 For other local CALA numbers, consult the web site **https://support.lucent.com** or contact your local sales representative.
Asia Pacific	Alcatel-Lucent Australia 280 Botany Road Alexandria NSW 2015 Australia	Phone: 1800-458-236 (toll free from within Australia) (IDD) 800-5823-6888 (toll free from Asia Pacific - China, Hong Kong, Indonesia, South Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan, and Thailand) (613) 9614-8530 (toll call from any country) E-mail: *apactss@alcatel-lucent.com*

How to order

Customers can order additional VitalQIP documentation online at **http://www.lucentdocs.com/cgi-bin/CIC_store.cgi**. Select **VitalQIP** from the Product Line list and click **Go**.

How to comment

To comment on this document, go to the Online Comment Form (**http://www.lucent-info.com/comments/**) or e-mail your comments to the Comments Hotline (**comments@alcatel-lucent.com**).

1 ENUM Manager installation

Overview

Purpose

This chapter contains the information you need to install and configure ENUM Manager.

Contents

This chapter contains the following topics.

Installation prerequisites

The prerequisites for installing ENUM Manager are as follows:

- VitalQIP 7.2 must be installed.
- The VitalQIP database must be running.
- Perl 5.6.x or higher must be installed.

To install ENUM Manager

Purpose

This section provides detailed information on how to install ENUM Manager.

Before you begin

ENUM Manager must be installed on the VitalQIP Enterprise server.

Procedure

To install ENUM Manager, follow these steps.

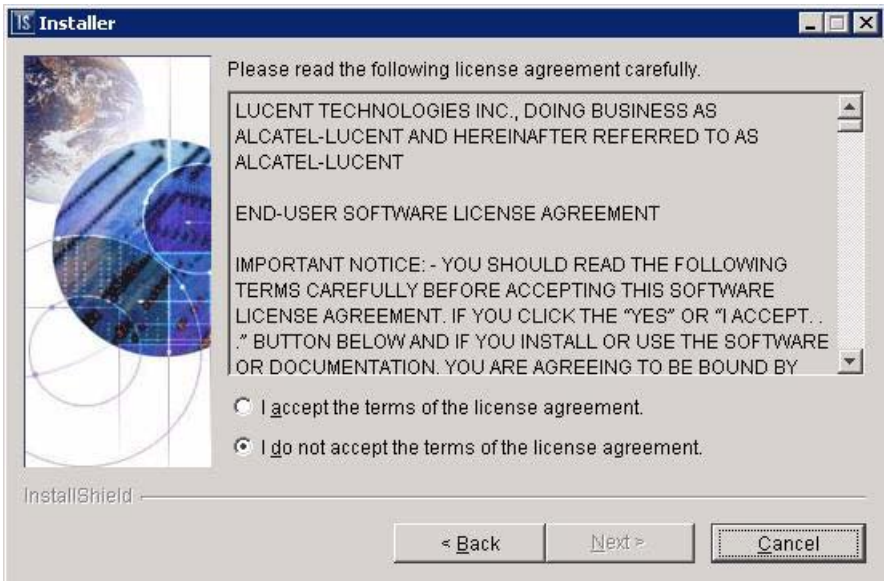
1 Enter the command to begin the installation:

Operating System	Command
Windows	**`enum13setupwin32.exe`**
Solaris	**`enum13SetupSolaris.bin`**

Result: The Welcome screen opens.

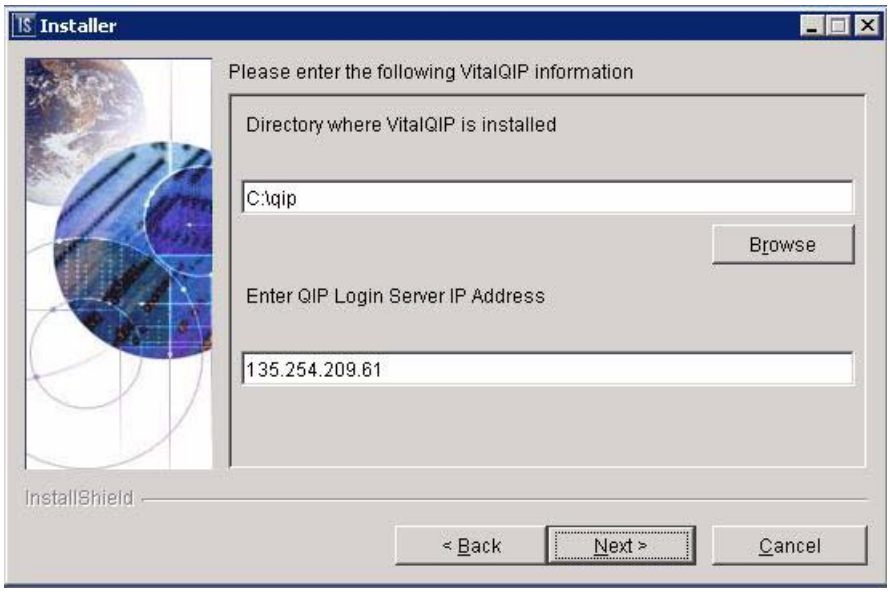
2 Click **Next** to continue.

Result: The License Agreement opens.



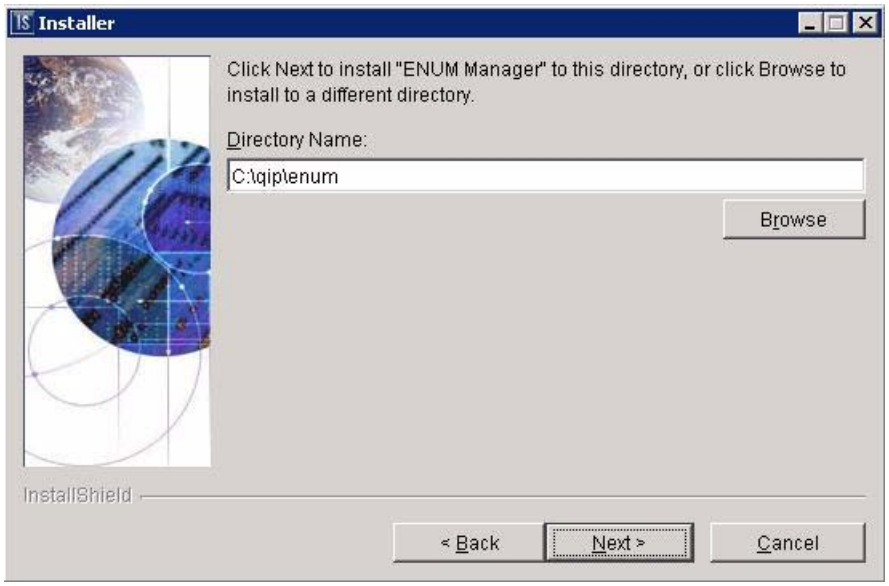
3 Accept the terms of the license agreement if you want to continue. Click **Next** to continue.

Result: The VitalQIP directory and Login Server address screen opens.



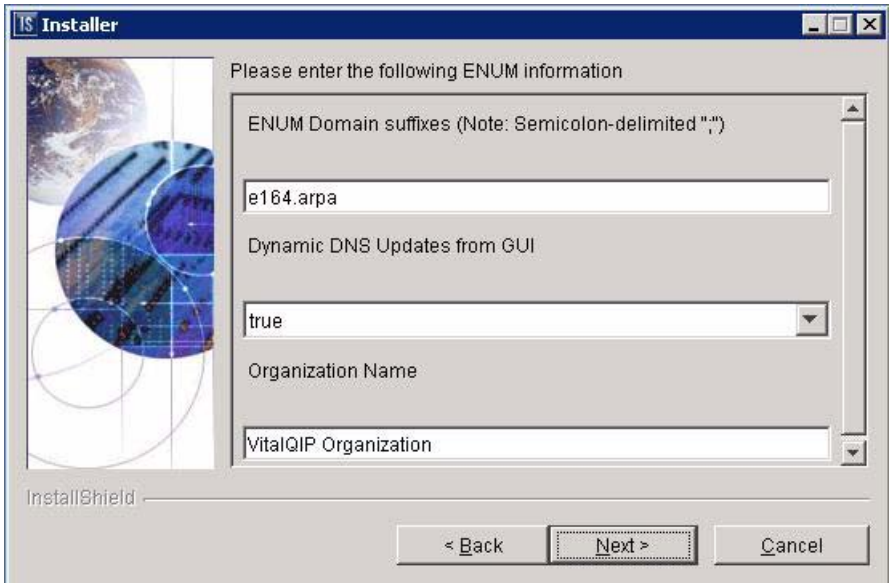
4 Enter the directory name where VitalQIP is installed and the IP address of the VitalQIP Login Server. Click **Next**.

Result: The ENUM Manager Installation Directory screen opens.



5 Click **Next** to accept the default directory where ENUM Manager is to be installed. To install ENUM Manager in a different location, click **Browse** and select a different directory.

Result: The ENUM Domain Suffixes and DNS Update Setting screen opens.

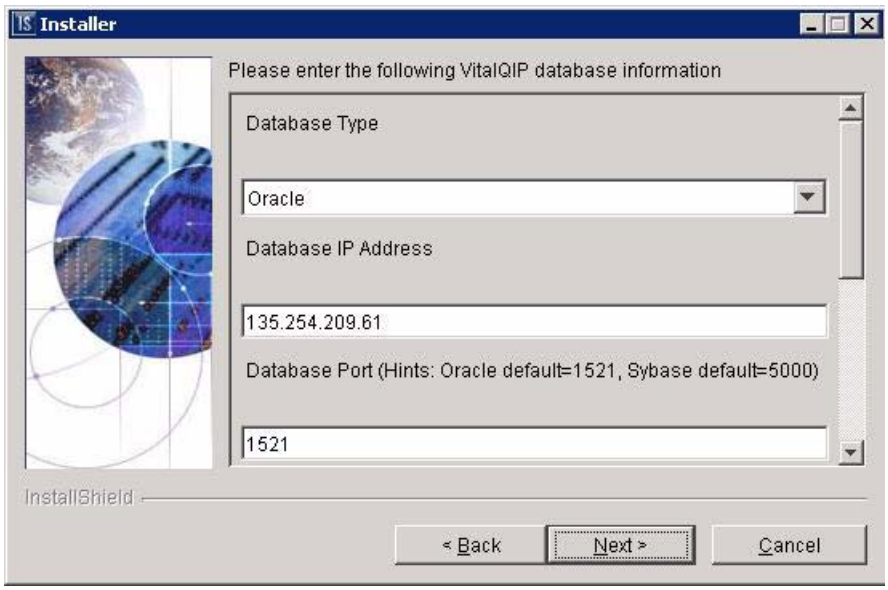


6 Enter the DNS Domain Name Suffixes, select a value for Dynamic DNS Updates from the GUI, and enter the Organization Name.

Note: See "ENUM Manager policy file" (p. B-1) if you need to add other domains later or reverse the DDNS update setting.

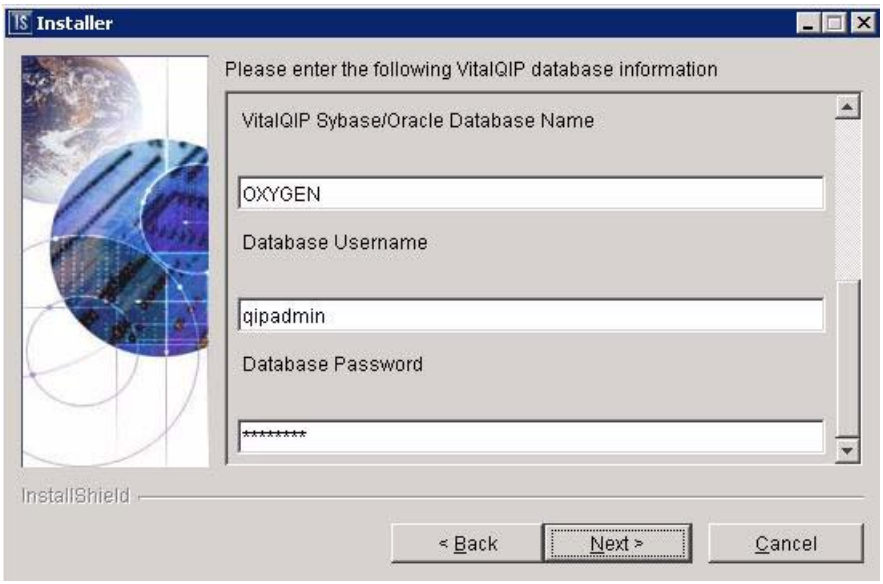
7 Click **Next** to continue.

Result: The VitalQIP Database Information screen opens.



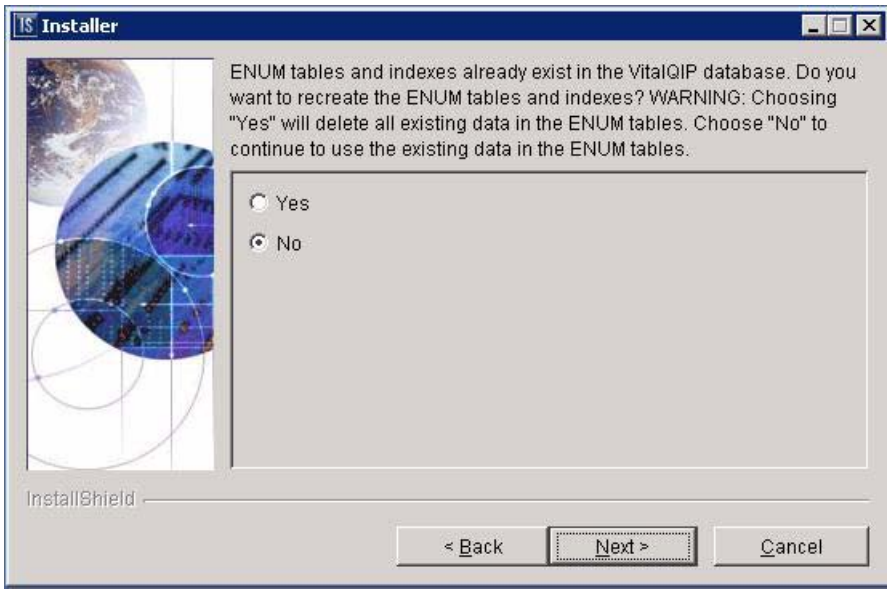
8 Select a database type, and enter the Database IP Address, and Database Port.

9 Scroll down to enter additional database information in the VitalQIP Database Information screen.



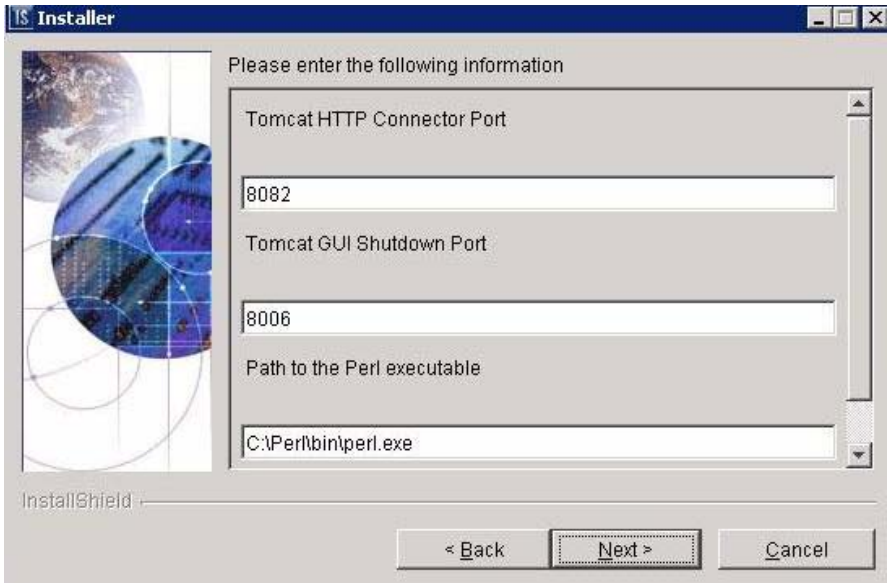
10 Enter the VitalQIP Sybase/Oracle database name, the database username and the database password. Click **Next**.

11 ***Reinstallation only.*** A warning screen opens if ENUM tables already exist in the database. If you are performing a new installation, proceed to step 13.



12 If you are reinstalling ENUM Manager, select **No**, or you will delete the existing ENUM Manager table in the VitalQIP database. Click **Next** to continue.

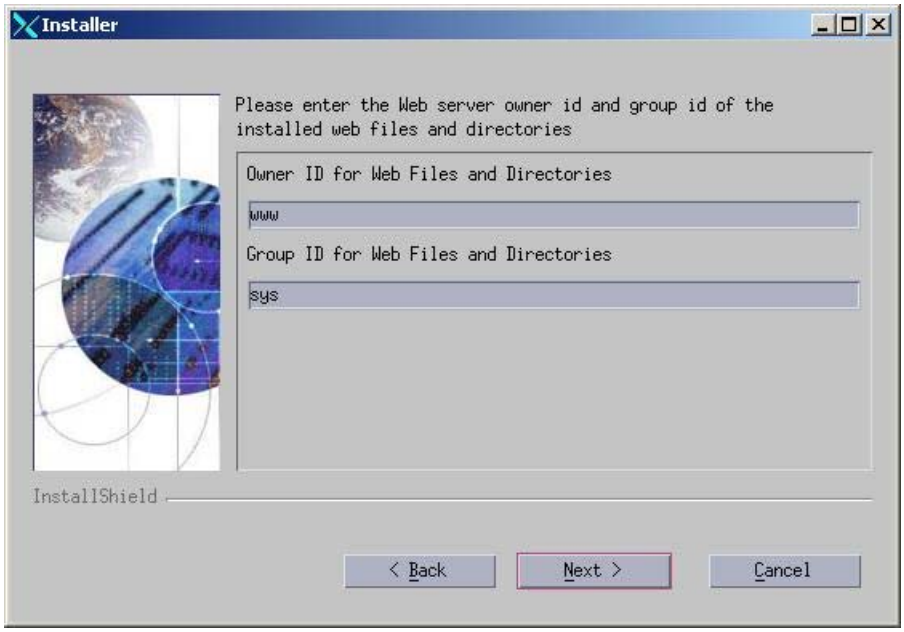
Result: The Port and Perl Information screen opens.



13 If necessary, change the Tomcat HTTP Connector port, Tomcat GUI Shutdown port , and the Path to the Perl executable.

14 To review or update other port information, scroll down.

15 Click **Next** to continue. If you are installing on a UNIX platform, the Webserver Information screen opens.



If you are installing on a Windows platform, the Company Name and Serial Number screen opens. Proceed to step 18.

16 ***UNIX only.*** Enter the owner ID and Group ID for web files and directories.

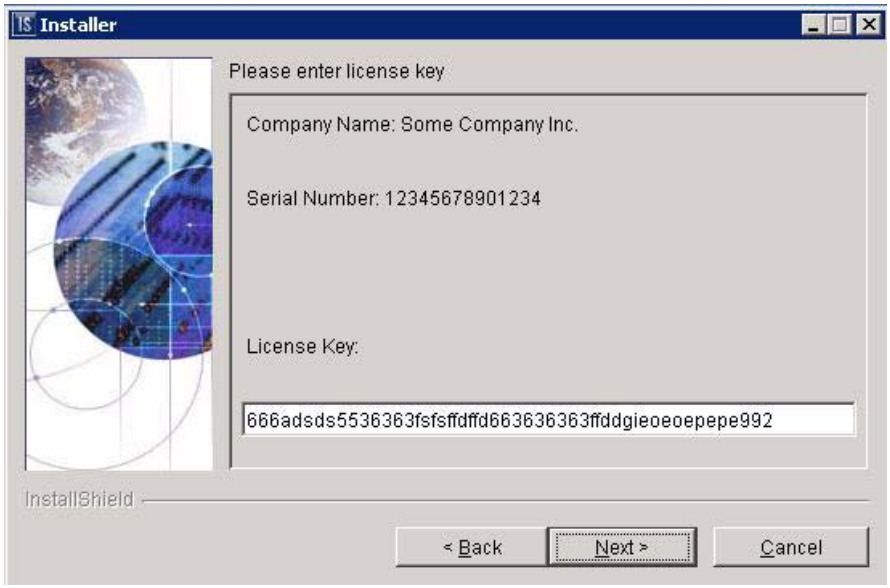
Note: The web client interface requires a “www” user and a “sys” group name. If a “www” user does not exist, the user must be created before beginning the installation. Refer to your system administrator for assistance with creating a “www” user.

17 Click **Next** to continue.

Result: The Company Name and Serial Number screen opens.

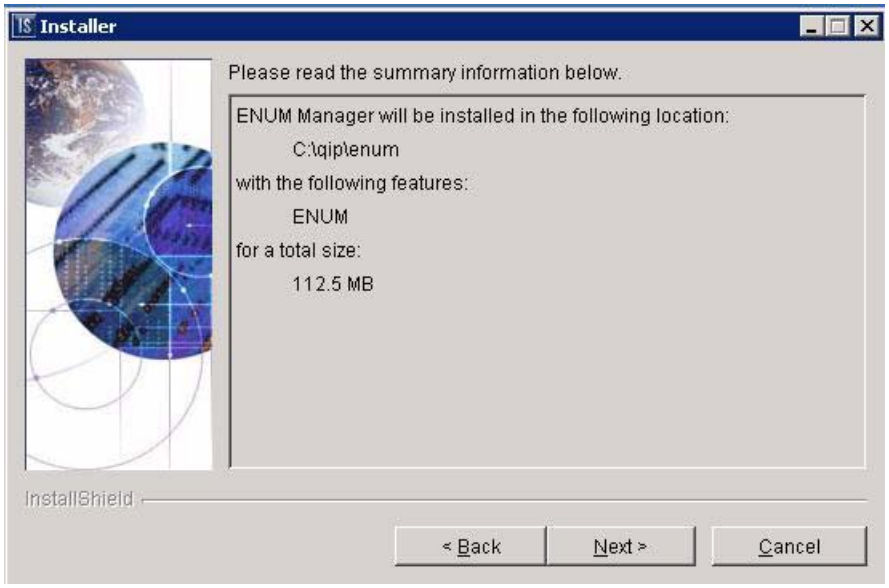
18 Enter your company name and serial number. Click **Next**.

Result: The License Key screen opens.



19 Enter the license key for this product. Click **Next**.

Result: The Summary Information screen opens.



20 Review the summary information and click **Next** to continue or **Back** to make changes.

21 ENUM Manager is installed on your system. When the installation is complete, click **Finish** to close the installation program.

Note: After ENUM Manager is installed on a Windows platform, ensure that ENUM Apache Tomcat 5.5 Server is displayed in the Services list (**Start|Programs|Administrative Tools|Services**).

END OF STEPS

To uninstall ENUM Manager

Purpose

This section describes how to remove ENUM Manager from your system.

Procedure

Follow these steps:

1 Open a command window and enter one of the following:

- Windows: **`%QIPHOME%\enum\_uninst\uninstaller.exe`**
- Solaris: **`$QIPHOME/enum/_uninst/uninstaller.bin`**

2 At the Uninstaller window, click **Next**. The Uninstall Preview window opens.

3 Click **Next** to begin the uninstall.

4 When completed, the Uninstall Summary window opens.

If there was an error, you should check the log file *%QIPHOME%\enum\log.txt* to determine what went wrong.

5 Click **Finish**.

END OF STEPS

To configure ENUM Manager

Before you begin

Before you can begin using ENUM Manager, you need to check that the Tomcat servlet container has started, and configure your browser to work properly with ENUM Manager.

To configure SSL

Purpose

This section describes how to configure SSL in ENUM Manager.

Procedure

Follow these steps:

1. Ensure that the environment variables ENUMHOME and CATALINA_HOME are set to the directory of ENUM Manager installation (example, **c:\qip\enum**) and the directory of Tomcat installation (example, **C:\qip\enum\tomcat**).

2. Navigate to any directory (example, **C:\qip\enum\ssl**) and create a certificate by executing the command below:

```
c:\qip\jre\bin\keytool -genkey -alias tomcat -keyalg RSA -keystore
   C:\qip\enum\ssl\keystore
```

3. Enter a keystore password (example, **qipman**) and retain other default values.

4. When prompted for confirmation, enter **yes**.

5. When prompted for the key password, enter the same password as the keystore password. (example, **qipman**).

6. Edit the *%CATALINA_HOME%/conf/server.xml* file and uncomment the lines mentioned below.

```
<!-- Uncomment to define a SSL HTTP/1.1 Connector on port 8443 -->
<Connector port="8443" maxHttpHeaderSize="8192"
   keystoreFile="C:\qip\enum\ssl\keystore"
keystorePass="qipman" maxThreads="150" minSpareThreads="25"
   maxSpareThreads="75"
enableLookups="false" disableUploadTimeout="true"
acceptCount="100" scheme="https" secure="true"
clientAuth="false" sslProtocol="TLS" />
```

Note: In this example, the keystore file path and keystore password have been entered as **`C:\qip\enum\ssl\keystore`** and **`qipman`** respectively.

7 Comment the lines in the *%CATALINA_HOME%/conf/server.xml* file to restrict non-SSL HTTP access as shown below.

```
<!-- Define a non-SSL HTTP/1.1 Connector on port 8080 -->
 <!--   <Connector port="8082"
maxHttpHeaderSize="8192"
maxThreads="150"
minSpareThreads="25"
maxSpareThreads="75"
enableLookups="false"
redirectPort="8443"
acceptCount="100"
connectionTimeout="20000"
disableUploadTimeout="true" /> -->
```

8 Restart the Tomcat server.

Note: Since the ENUM Manager Web GUI and ENUM Manager Northbound Interface use the same Tomcat server instance, both should be used through SSL, when SSL is configured.

END OF STEPS

To increase Sybase user connections

Purpose

To ensure smooth operation of ENUM Manager, Alcatel-Lucent recommends you increase the number of Sybase user connections from the default setting of 25 to 200.

Before you begin

The ENUM Manager GUI and the northbound interface each use five (5) user connections. You can configure this value with the `ConnPoolMaxPoolSize` property in the `JDBC Properties` section of the *enum.properties* file.

Procedure

Follow these steps:

1 Open a command line window and run the following:

```
isql -U sa -P <password>
1 > sp_configure 'number of user connections', 200
2> go
```

Note: Substitute **`isql.exe`** for **`isql`** if you are running the **`sp_configure`** command on a Windows platform.

2 Close the command line window. Since this is a dynamic command, there is no need to restart Sybase.

END OF STEPS

To start Tomcat Server on UNIX platforms

Purpose

This section describes how to start the Tomcat Server on a UNIX platform.

Procedure

Follow these steps:

1 Open a Command window.

2 Enter:

```
../shrc
$ENUMHOME/etc/startup.sh
```

3 Close the Command window.

END OF STEPS

To start Tomcat Server on Windows platforms

Purpose

This section describes how to start the Tomcat Server on a Windows platform.

Procedure

Follow these steps:

1. Open a Command window and enter the ENUM startup script,

   `%ENUMHOME%\StartENUMSvcs.bat`

   OR

   Choose **Start**|**Programs**|**Administrative Tools**|**Services**.

2. Scroll down the list of services and locate the following entries:

   `ENUM Apache Tomcat 5.5 Server`

3. Right-click on each entry and click **Start**.

4. Close the Services window.

END OF STEPS

To check Tomcat Server status on Windows platforms

Purpose

This section describes how Windows platform users can check that the Tomcat servlet container, and the VitalQIP Web Server have started.

Procedure

Follow these steps:

1. Choose **Start|Programs|Administrative Tools|Services**.

2. Scroll down the list of services and locate the following entry:

   `ENUM Apache Tomcat 5.5 Server`

3. Check that the **Status** column reads **Started**. If it is blank or reads **Stopped**, right-click on each entry and click **Start**.

4. Close the Services window.

END OF STEPS

To check Tomcat status on UNIX platforms

Purpose

This section describes how UNIX platform users can check that the Tomcat servlet container has started.

Procedure

Follow these steps:

1 Open a Command window, and change directory to *$ENUMHOME*.

2 To check if the Tomcat servlet container is running, enter:

```
ps -ef|grep apache
```

END OF STEPS

To enable JavaScript

You need to verify that JavaScript is enabled on web browsers connecting to the ENUM Manager server. The steps vary depending on your browser version.

Mozilla Firefox

If you are using Mozilla Firefox 2.0 or above, follow these steps:

1 Open Firefox and select **Options** from the **Tools** menu.

Result: The Options window opens.

2 Select the **Content** window.

3 Make sure that the **Enable JavaScript check box is checked.**

4 Click **OK** to save the setting.

END OF STEPS

Microsoft Internet Explorer

Javascript is typically enabled on Microsoft Internet Explorer. To verify that it is active on Microsoft Internet Explorer 7.x, follow these steps:

1 Open Internet Explorer.

2 From the **Tools** menu, click **Internet Options**. The Internet icon is highlighted by default.

3 From the **Security** tab, click **Custom Level**.

4 Scroll to **Scripting** and make sure that the **Active Scripting** setting is set to **Enable**.

5 Click **OK**.

6 Click **OK**.

7 Relaunch Internet Explorer.

END OF STEPS

To enable Cookies

Purpose

You need to verify that Cookies are enabled on the ENUM Manager server. The steps vary depending on your browser version.

Internet Explorer

If you are using Internet Explorer 7.x, follow these steps:

1. Open Internet Explorer and select **Tools|Internet Options**. The Internet Options window opens.
2. On the **Privacy** tab, make sure the privacy level is set to any setting except except **Block All Cookies**.
3. Click **OK** to save the setting.

END OF STEPS

Mozilla Firefox

If you are using Mozilla Firefox 2.0 or above, follow these steps:

1. Open Firefox and select **Options** from the **Tools** menu.
2. Select **Privacy** and make sure that the **Accept cookies from sites** check box is checked.
3. Click **OK** to save the setting.

END OF STEPS

To turn off the browser cache

Purpose

You need to turn the local browser cache off on web browsers connecting to the ENUM Manager web server.

Internet Explorer

If you are using Internet Explorer 7.0 or higher, follow these steps:

1. Open Internet Explorer and select **Tools|Internet Options**. The Internet Options window opens.

2. In the **General** tab, click **Settings...** in the "Temporary Internet files" section. The Settings window opens.

3. Check the **Every visit to page** check box and click **OK**.

4. Click **OK** to save your changes and close the Internet Options window.

END OF STEPS

2 ENUM overview

Overview

Purpose

This chapter provides a brief overview of ENUM Manager.

Contents

This chapter contains the following topics.

What is ENUM?

With today's increased focus on convergent technologies, IP Multimedia Subsystems (IMS) and the acceleration of Voice over IP (VoIP) and other IP-based services like IP Video, Voice Protocol for Internet Mail (VPIM), Instant Messaging and Internet Fax—fast, easy and reliable administering of IP Addresses and Domain Name System (DNS) services is quickly becoming a critical management issue.

One useful technology for administering DNS records associated with these services is known as ENUM. ENUM is defined in IETF RFC 3761. Although different sources define the ENUM acronym differently, the definition used here (and in the IETF) is "t**E**lephone **NU**mber **M**apping."

Essentially, ENUM specifies a method for storing information in DNS servers to map an E.164 number (otherwise known as a telephone number) to associated Uniform Resource Identifiers (URIs). The URIs provide contact information for a user, and could be for an Internet phone address, cell phone number, e-mail address, fax number, web page URL, Session Initiation Protocol (SIP) Proxy Server address, and so on. Each URI is stored in a Naming Authority Pointer (NAPTR) record, which is associated with an E.164 domain name.

One example of ENUM is to convert a phone number dialed on the Public Switched Telephone Network (PSTN) to a SIP address for a Voice over IP (VoIP) phone on the Internet. For example, an E.164 domain name for the phone number (212) 555-1212 is "2.1.2.1.5.5.5.2.1.2.1.e164.arpa.". Note that the digits in the E.164 domain name consist of a phone number in reverse order.

Alcatel-Lucent provides a centralized management solution enabling you to support the administration of ENUM domains (for example, the **e164.arpa** domain) and the NAPTR records in VitalQIP® and the Lucent DNS server. ENUM Manager provides the ability to administer ENUM records in the VitalQIP database and to manage and update Lucent DNS servers. Using the CLI utility provided with ENUM Manager, NAPTR records can be loaded into VitalQIP. ENUM Manager stores this data in the ENUM database, which is shared with VitalQIP. VitalQIP accesses this database, and uses the data in it to update DNS servers, either through Dynamic DNS updates or zone file pushes.

What happens to the dialed digits in ENUM calls

ENUM utilizes the dialed phone number in proper format to obtain a service URI (contact method) through DNS NAPTR records. The E.164 number is used as input to query the DNS for NAPTR records that contain available services. However, for ENUM to be used, the number must be translated into a format DNS understands. Below is the step-by-step process to convert a phone number in common format to the required DNS format.

1. Phone number is entered in normal format: 1-222-333-5555
2. Phone number is translated into a fully qualified E.164 address by adding the area/city and country codes. This becomes +1-222-333-5555
3. All non-number characters are removed. The number becomes 12223335555
4. The order of the digits is reversed. The example becomes 55553332221
5. Dots are placed between each digit. The example becomes 5.5.5.5.3.3.3.2.2.2.1
6. The domain “e164.arpa” is appended to the end of the string, which becomes 5.5.5.5.3.3.3.2.2.2.1.e164.arpa.

A NAPTR record consists of several fields which together define the service and how the record is to be processed. The primary NAPTR record fields are Order, Preference, Flag, Service, RegExp or Regular Expression and Replacement.

A sample NAPTR record is as follows:

```
IN NAPTR 10 100 "u" "E2U+sip" "!^.*$!sip:info@tele2.se!" .
```

where,

- Order Field = `10`
- Preference = `100`
- Flags = `u`
- Services = `E2U+sip`
- RegExp = `!^.*$!sip:info@tele2.se!`
- Replacement = **.**

The resulting string created in step 6 above is used as the owner portion of the NAPTR record. The result is an entry similar to the following sample records.

```
5.5.5.5.3.3.3.2.2.2.1.e164.arpa. IN NAPTR 10 100 "u" "E2U+sip"
   "!^.*$!sip:info@tele2.se!" .
5.5.5.5.3.3.3.2.2.2.1.e164.arpa. IN NAPTR 10 101 "u" "E2U+mailto"
   "!^.*$!mailto:info@tele2.se!" .
5.5.5.5.3.3.3.2.2.2.1.e164.arpa. IN NAPTR 10 102"u" "E2U+h323"
   "!^.*$!h323:info@tele2.se!" .
```

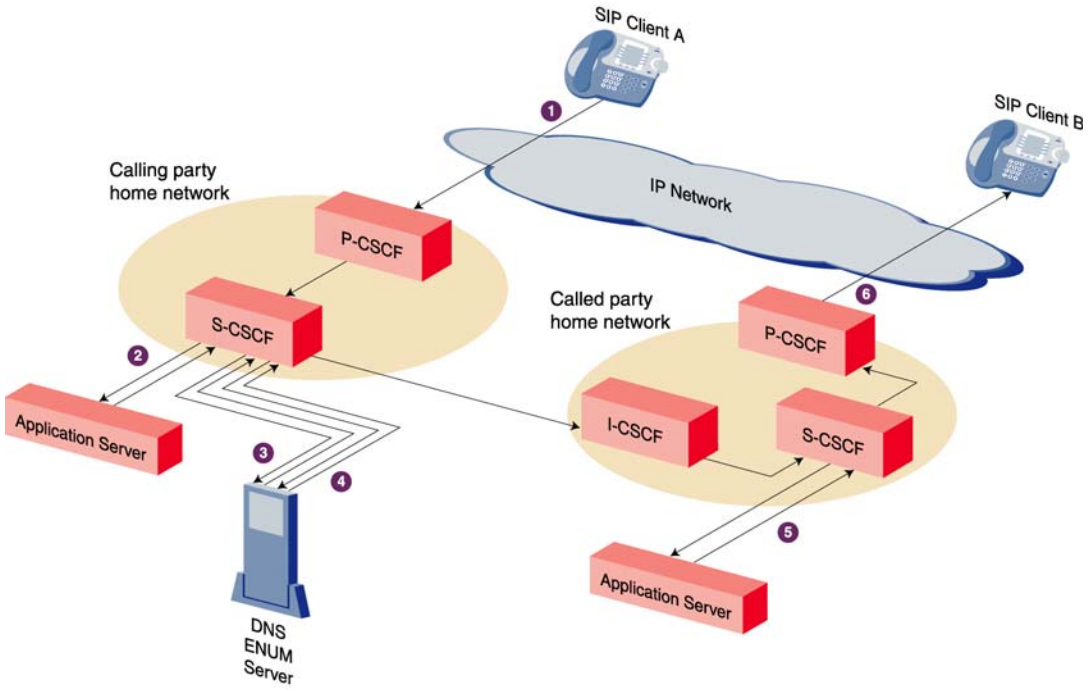
Starting from the left, the dialed phone number in reverse order with e.164.arpa. appended makes up the ENUM domain name (often called Owner in VitalQIP). Associated with the E.164 number are 3 NAPTR records, each containing the order, preference, flags, services,

regexp and replacement fields. All contact methods for the individual are mapped to the primary E.164 number. The Preference field indicates to an ENUM client that the user prefers to be contacted first by SIP, followed by the mail server and finally by h323.

Figure 2-1 illustrates a sample scenario in which a call is set up between two SIP-enabled phones on an IP Multimedia Subsystem (IMS) network.

1. SIP Client A requests E.164 number (for example, 1-222-333-4444) for the dialed call.
2. The network communicates with the Application server to provide subscriber services.
3. The DNS/ENUM server is queried based on the E.164 number and returns the SIP URI: **SIP:ClientB@home.com**.
4. The DNS/ENUM server is then queried for the IP address of the host **home.com** and returns 192.1.0.0
5. The called party's home network communicates with the Application Server to provide subscriber services.
6. The SIP ClientB phone receives the SIP Invite request and starts ringing.

Figure 2-1 IMS to IMS call setup



3 To use ENUM Manager

Overview

Purpose

This chapter provides an overview of ENUM Manager and describes how to access the product, manage NAPTR records and ENUM domains.

Contents

This chapter contains the following topics.

ENUM Manager Overview

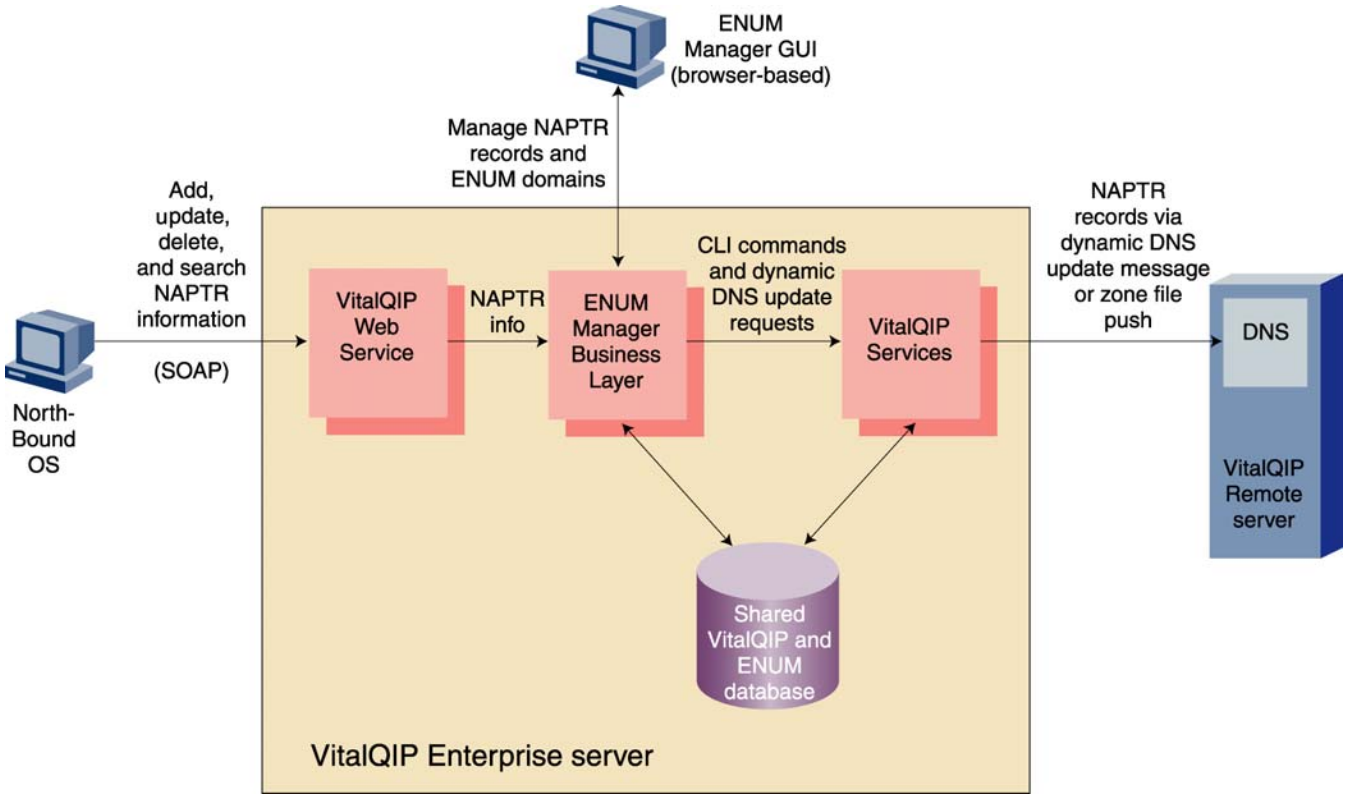
What is ENUM Manager?

ENUM Manager is a a centralized management solution that enables you to support the administration of ENUM domains (for example, the **e164.arpa** domain) and the NAPTR records in VitalQIP® and the Lucent DNS server. Using the CLI utility provided with ENUM Manager, NAPTR records can be loaded into VitalQIP. ENUM Manager stores this data in the ENUM database, which is shared with VitalQIP. VitalQIP accesses this database, and uses the data in it to update DNS servers, either through Dynamic DNS updates or zone file pushes.

ENUM Manager Architecture

The ENUM Manager overall architecture is shown in Figure 3-1.

Figure 3-1 ENUM Manager high-level architecture



Northbound OS

The "Northbound OS" is an upstream service order system or provisioning system, such as the enhanced Services Manager (eSM) system (an Alcatel-Lucent provisioning system).

SOAP

SOAP (Simple Object Access Protocol) is a simple XML-based messaging protocol for accessing services on the Web. It employs XML syntax to send text commands across the Internet using HTTP. The VitalQIP Web Service uses Apache Axis, a Java-based implementation of SOAP that supports both HTTP and HTTPS.

VitalQIP CLI Commands

The ENUM Manager GUI causes the following VitalQIP CLI commands to be invoked:

- qip-admin
- qip-getorganization
- qip-del (described on page 5-8)
- qip-splitmergeenum (described on page 5-10)

VitalQIP Services

The following VitalQIP Services are used by ENUM Manager:

- The ENUM Manager Business Layer sends Dynamic DNS Update Requests to the local Message Service, which uses a MessageRoute with a **DNSUpdateRR** (or **10**) Message ID to send the message to the DNS Update Service.
- The VitalQIP Message Service is also used to contact the VitalQIP Login Service, read *qip.pcy* and initiate a database connection.
- The VitalQIP Schedule Service is used to verify the license.

ENUM Manager Web GUI

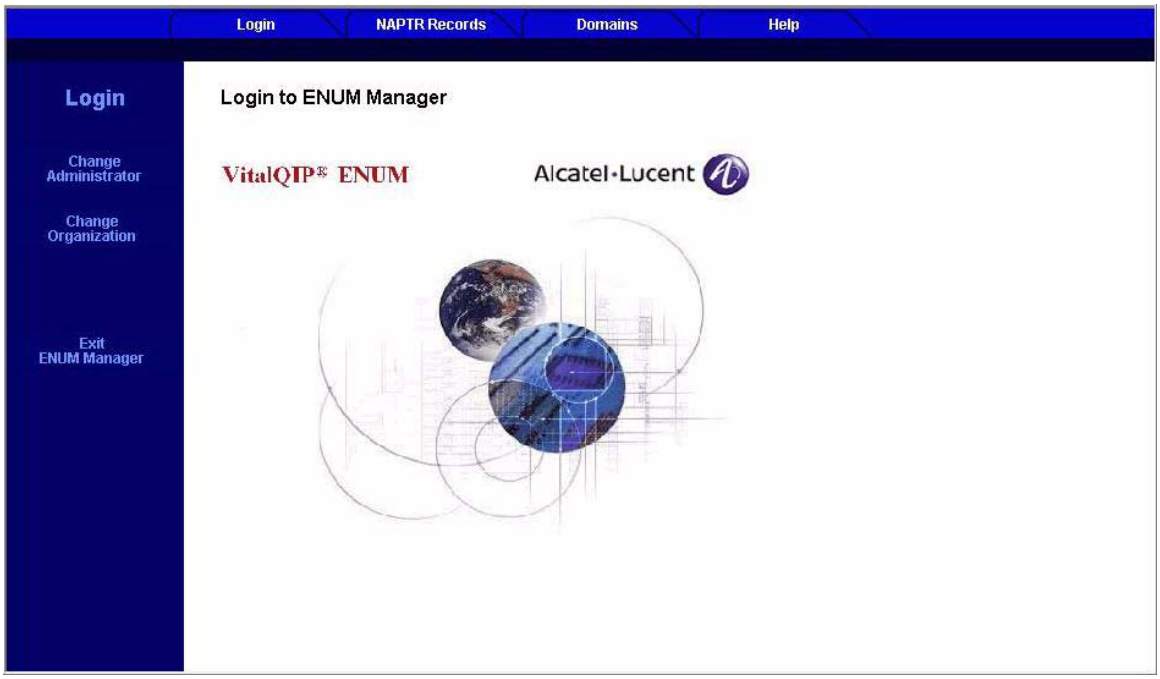
Administering the records is performed via a Web GUI. To manage the size of your ENUM domains, the ENUM manager features the ability to split and merge ENUM domains. The GUI also allows an administrator to create, update, delete, and search the NAPTR records.

To get started with ENUM Manager

Overview

To begin using ENUM Manager, log into the system. In addition to the login function, ENUM Manager has functions that allow you to change the organization you are working with, log in as a different administrator, and exit the product.

Figure 3-2 ENUM Manager Login tab



To log in to ENUM Manager

Purpose

This section describes how to log in to ENUM Manager.

Procedure

To log in to ENUM Manager, follow these steps:

1 Open your web browser.

2 In the address field, enter:

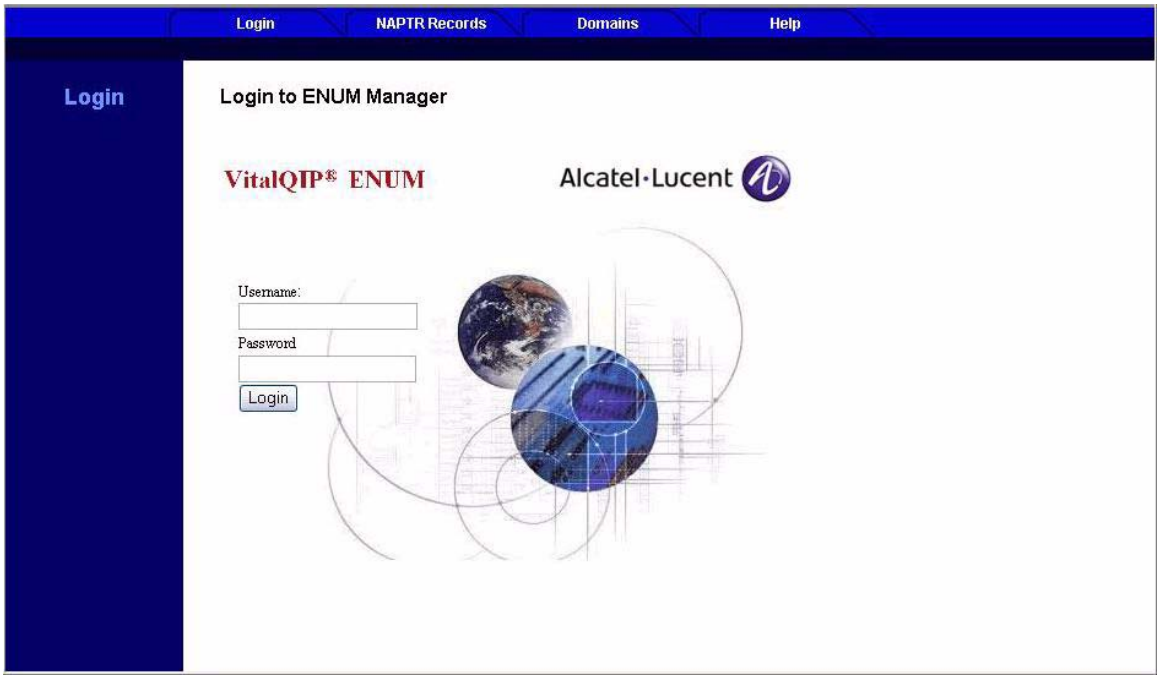
`http://<enterprise_server's_IP_address_or_hostname>`

OR

If the default port number 8082 was changed during the installation (step 12 on page 1-8), enter:

`http://<enterprise_server's_IP_address_or_hostname>:<port_number>`

Result: The Login to ENUM Manager window opens.

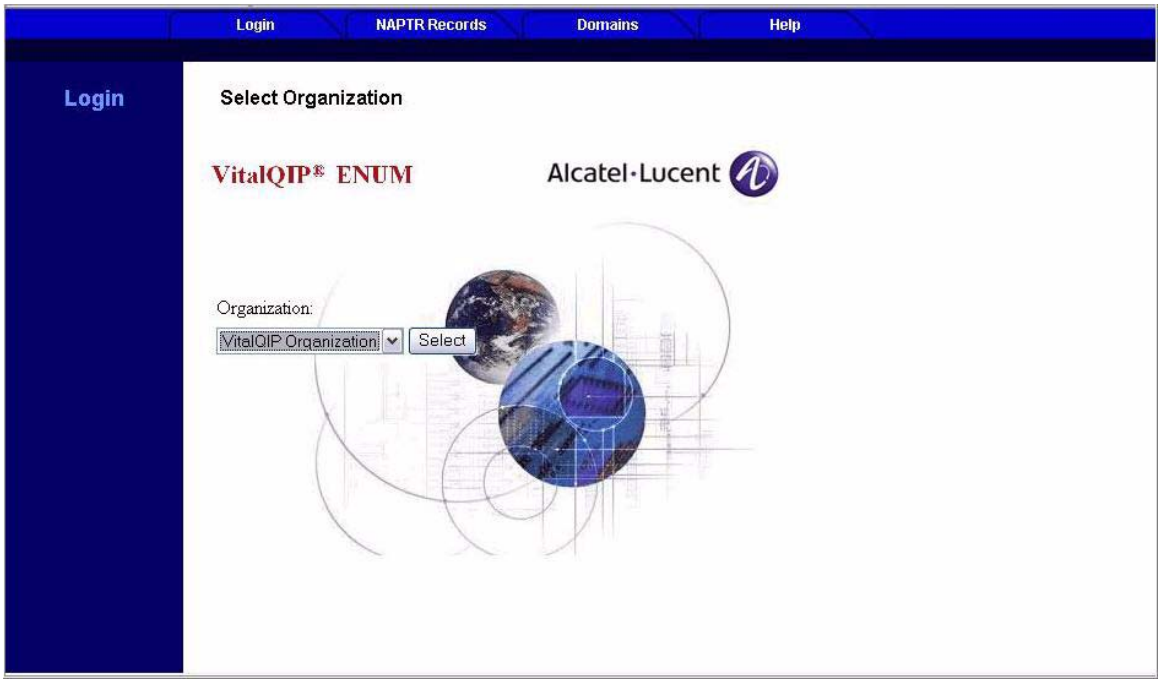


3 In the **Username** field, enter a VitalQIP Master administrator login, such as **`qipman`**. All VitalQIP Master administrator logins are valid.

4 In the **Password** field, type your administrator password.

5 Click **Login**.

Result: The Select Organization screen opens.



6 Select the organization you wish to work with from the **Organization** drop-down list and click **Select**.

END OF STEPS

To change an organization or administrator

Purpose

This section describes how to change the organization you selected when logging into ENUM Manager, or how to log in as a different administrator without starting another instance of the ENUM Manager.

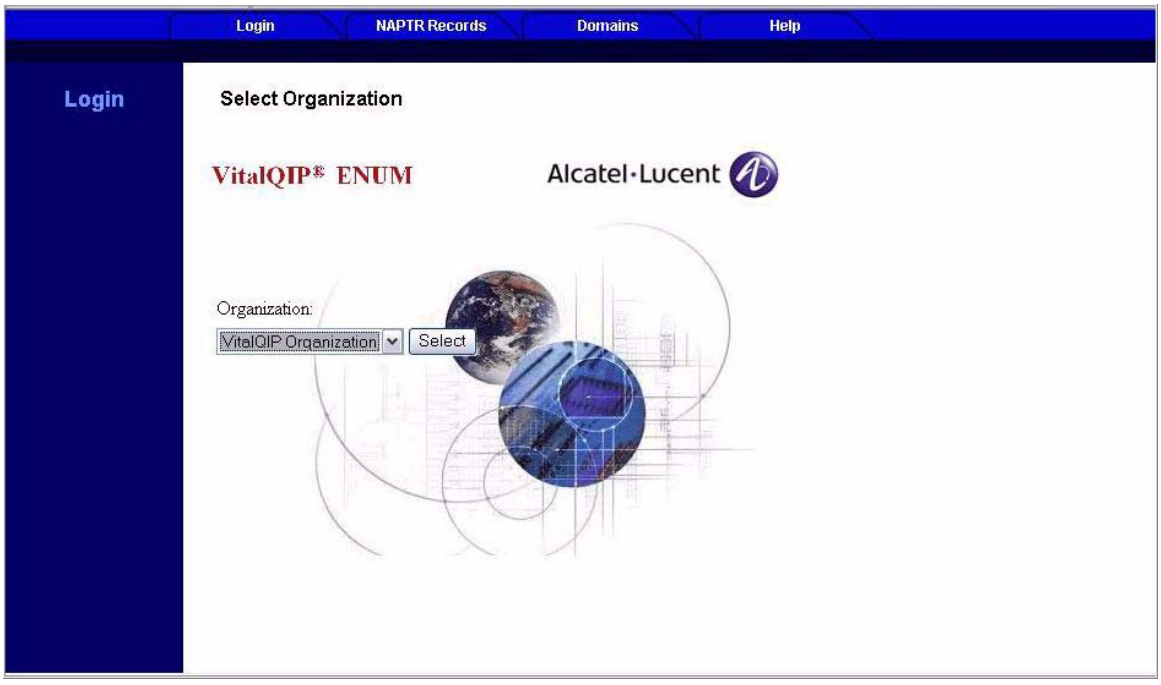
Change organization procedure

To change the organization you are currently logged into, follow these steps:

1 Click the **Login** tab.

2 Click **Change Organization**.

Result: The Select Organization screen opens.



3 Select the organization you wish to work with from the **Organization** drop-down list and click **Select**.

END OF STEPS

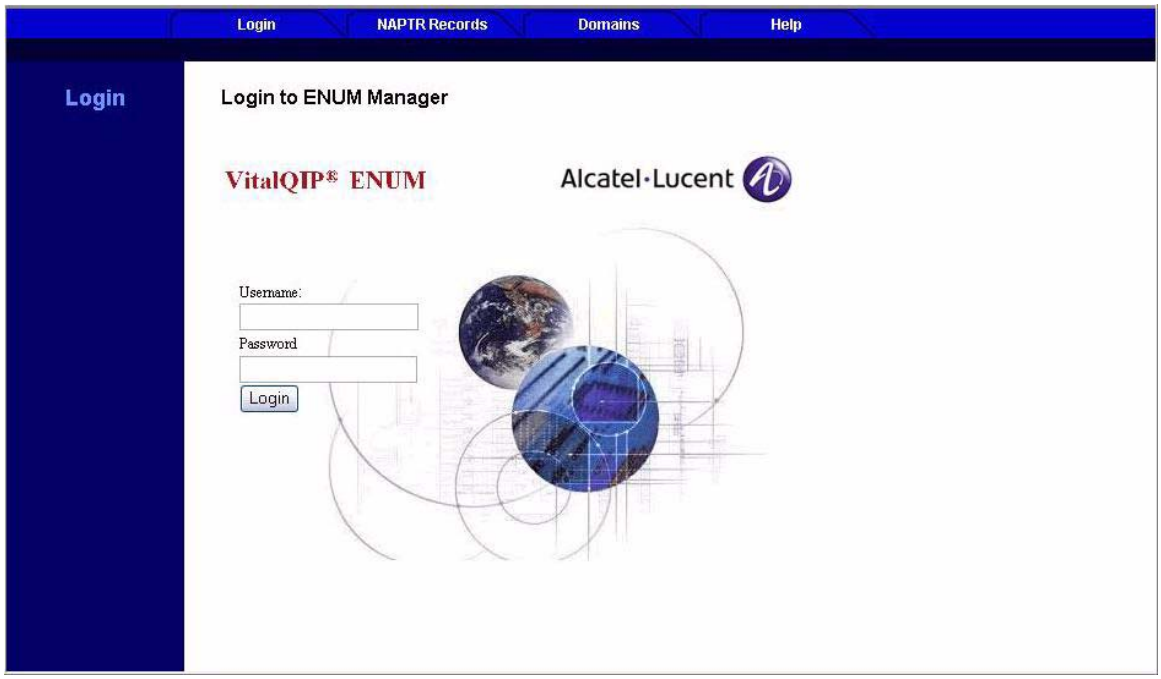
Change administrator procedure

To change the administrator name under which you are currently logged in, follow these steps:

1 Click the **Login** tab.

2 Click **Change Administrator**.

Result: The Login window opens.

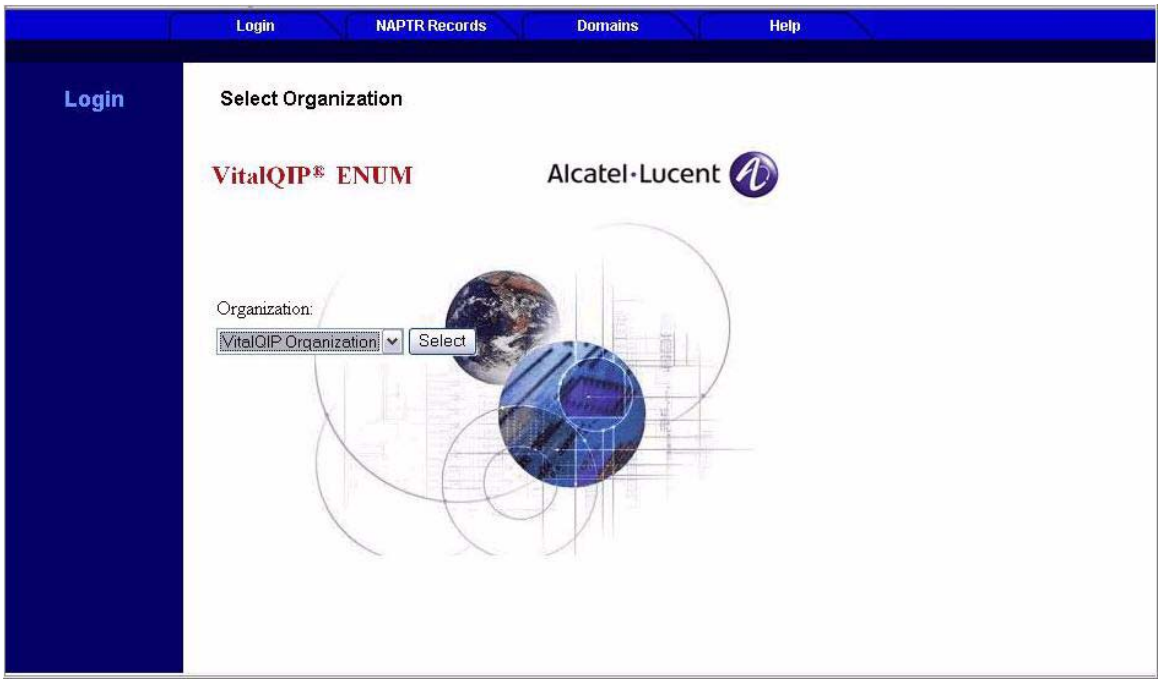


3 In the **Username** field, enter a VitalQIP Master administrator login, such as **`qipman`**. All VitalQIP Master administrator logins are valid.

4 In the **Password** field, type your administrator password.

5 Click **Login**.

Result: The Select Organization screen opens.



6 Select the organization you wish to work with from the **Organization** drop-down list and click **Select**.

END OF STEPS

To recover from a timeout

Purpose

Each time that you open ENUM Manager, your browser connects to the server with a unique session that remains connected as long as the browser sends requests. However, the session automatically times out after a predefined period of inactivity (default is 30 minutes).

Procedure

If this happens, you see the **Invalid Session – Please provide a username and password** dialog box. After you click **OK**, you are returned to the login screen. After you log in again, you see the Pending Request screen presenting you with options for processing the request:

- **Process Request** - You can process the blocked request immediately.
- **View Request** - You can view the parameters of the request in a table of name/value pairs and then process or cancel the request.
- **Cancel Request** - You can ignore the request (you see the Main Page) and make a different request.

To configure session timeouts

Purpose

You can configure the length of the inactivity period before ENUM Manager times out if you find that the 5-minute default is insufficient.

Procedure

To increase the length of the inactivity period before a timeout, follow these steps.

1 Open *%QIPHOME%\enum\defaultroot\WEB-INF\web.xml* in a text editor.

2 Add a **`<session-config>`** element to the file.

The following example has a time-out setting of 60 minutes (text added is shown in bold type):

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE web-app PUBLIC "-//Sun Microsystems, Inc.//DTD Web
   Application 2.3//EN" "http://java.sun.com/dtd/web-app_2_3.dtd">
<web-app>
  <servlet>
    <servlet-
   name>com.lucent.qtek.enm.ui.gui.ControllerServlet</servlet-
   name>
    <servlet-
   class>com.lucent.qtek.enm.ui.gui.ControllerServlet</servlet-
   class>
    <init-param>
      <param-name>properties</param-name>
      <param-value>/conf/enumgui.properties</param-value>
    </init-param>
    <init-param>
      <param-name>log4j_admin_properties</param-name>
      <param-value>/conf/enumgui_log4j.properties</param-value>
    </init-param>
    <init-param>
      <param-name>enum_bl_properties</param-name>
      <param-value>/conf/enum.properties</param-value>
    </init-param>
  </servlet>
  <servlet-mapping>
```

```
    <servlet-
   name>com.lucent.qtek.enm.ui.gui.ControllerServlet</servlet-
   name>
    <url-pattern>/ENUM</url-pattern>
  </servlet-mapping>
<session-config>
    <session-timeout>60</session-timeout>
  </session-config>
</web-app>
```

To view NAPTR record count/license limit

Purpose

You can check on the approximate number of NAPTR records in the ENUM database, as well as view the maximum number of NAPTR records supported in the ENUM Manager database, per the limit imposed by your current license. An approximate count of NAPTR records as a percentage of the maximum number is also displayed.

Procedure

To view the NAPTR record count and check the license limit, follow these steps:

1 Click the **Help** tab.

2 Click **About**.

Result: The Help About window opens.

Technical support information is available, as well as the NAPTR record and license limit information. To determine the build number of the installed version of ENUM Manager, run the **`vercheck`** command, as described on page 5-17.

Note: If you receive a warning that the number of NAPTR records has exceeded the license limit, functionality is limited. Please refer to "License limits exceeded" (p. A-2) for information on the steps you should take to resolve the problem.

To exit ENUM Manager

Purpose

This section describes how to exit ENUM Manager.

Procedure

To exit ENUM Manager, follow these steps:

1. Click the **Login** tab.
2. Click **Exit ENUM Manager**.
3. Click **Yes** at the confirmation prompt. The ENUM Manager program closes.

END OF STEPS

NAPTR records

Overview

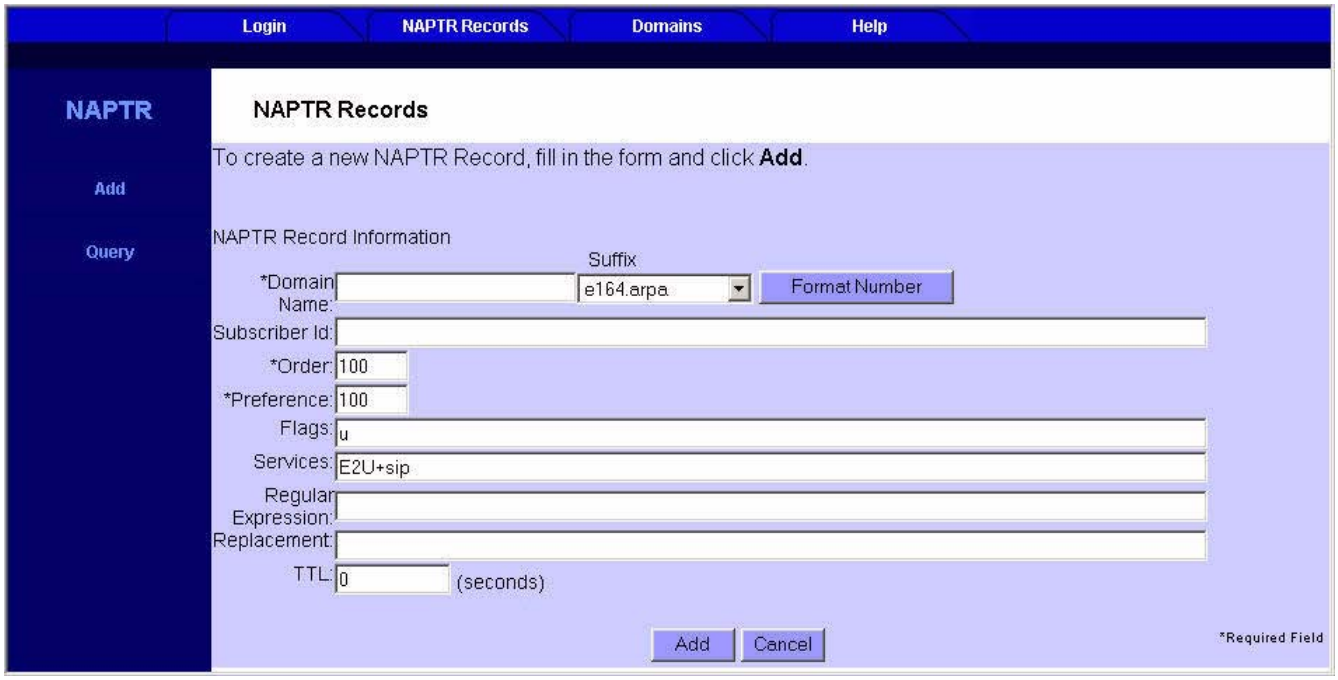
ENUM Manager contains the following features to allow you to manage NAPTR records. These records are stored in the ENUM database that is shared with VitalQIP.

- Add NAPTR records
- Modify NAPTR records
- Delete NAPTR records
- Search NAPTR records by domain or subscriber

Using the XML SOAP interface, you can load NAPTR records into ENUM Manager from provisioning systems, such as Alcatel-Lucent's enhanced Services Manager (eSM). Additionally, you can load records into ENUM Manager with the **setnaptr** CLI (described in Chapter 5). You can also create records manually with the Add NAPTR record function, as shown in Figure 3-3.

Note: Required fields are indicated by an asterisk (*).

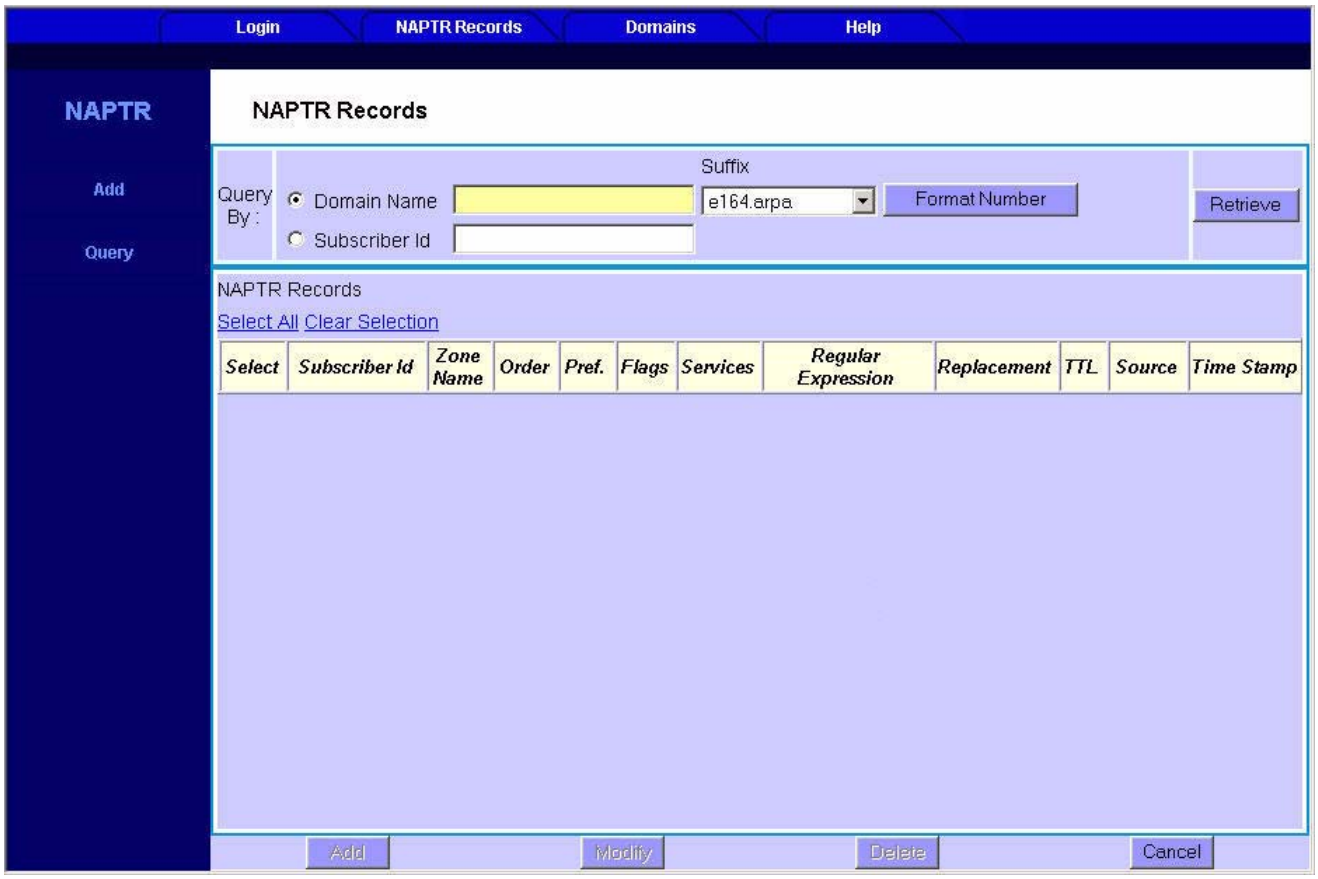
Figure 3-3 Create NAPTR record



Once NAPTR records are either manually created or the database populated through the various interface methods, the size of the ENUM database may grow rapidly as users add multiple associated services with their E.164 number. You need to be able to access their

NAPTR records quickly and easily so you can make additions, modifications and deletions. The Search NAPTR record function allows you to search NAPTR records by either exact domain name or subscriber, as shown in Figure 3-4.

Figure 3-4 Search NAPTR record



To create NAPTR records

Purpose

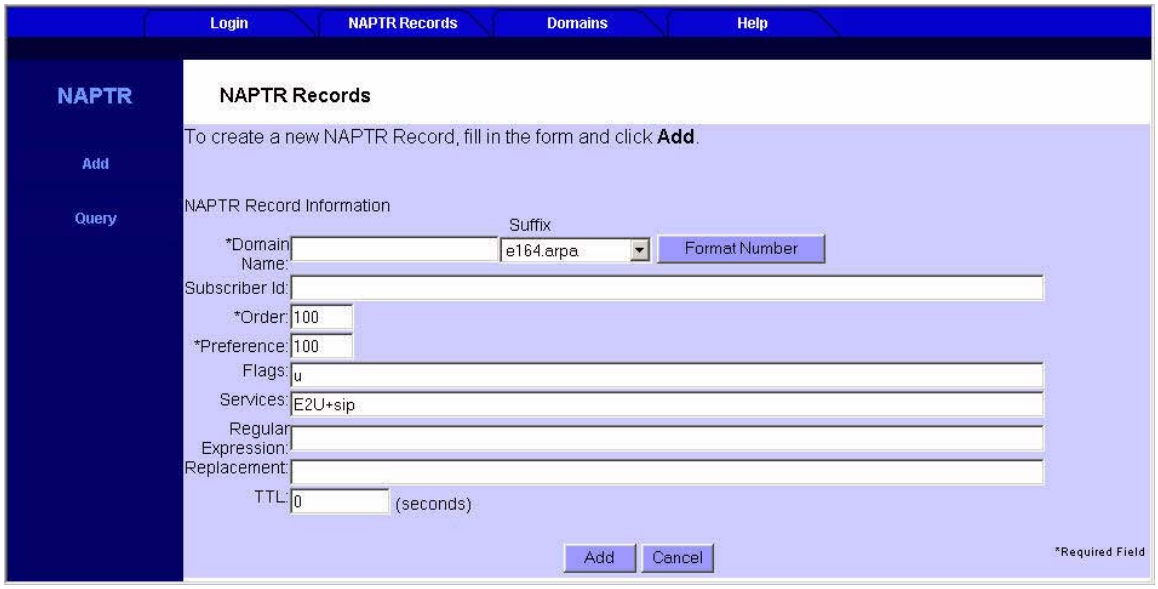
This section describes how to create a NAPTR record.

Procedure

To create a NAPTR record, follow these steps:

1 Click the **NAPTR Records** tab.

Result: The NAPTR Records window opens.



2 Fill in the fields using the values described in the following table.

Table 3-1 NAPTR record fields

Attribute	Type	Description
Domain Name	String	Defines the subscriber's ENUM Domain Name, for example, 2.1.2.1.2.2.7.0.1.6.1.e164.arpa. The field is a combination of a telephone number prefix and an ENUM domain name suffix. **Note:** Domain Name is more commonly known as resource record Owner in the VitalQIP database. If a dot at the end of the Domain Name prefix is missing, ENUM Manager adds it. If you are entering or pasting a regular phone number, click the **Format Number** button to: • Remove all occurrences of non-numeric characters • Reverse the order of the characters • Put a dot after each character For example, if you type "1 610-722-1212" in the prefix portion of the Domain Name field, after clicking **Format Number** the value in the field would be 2.1.2.1.2.2.7.0.1.6.1.
Subscriber Id	String	Uniquely identifies the subscriber in the upstream system. For example, the Subscriber Id could be an International Mobile Subscriber Identity (IMSI).
Order	Integer	An integer specifying the order in which the NAPTR records ***must*** be processed in order to accurately represent the ordered list of Rules. The ordering is from lowest to highest. If two records have the same order value then they are considered to be the same rule and should be selected based on the combination of the Preference values and Services offered. Valid value is an integer between 0 and 65535. The default value is 100. **Note:** A null value is not allowed.
Preference	Integer	An integer that specifies the order in which NAPTR records with equal Order values should be processed, low numbers being processed before high numbers. The important difference between Order and Preference is that once a match is found the client must not consider records with a different Order but they may process records with the same Order but different Preferences. Valid value is an integer between 0 and 65535. The default value is 100. **Note:** A null value is not allowed.

Attribute	Type	Description
Flags	String	A flag that signals when the Dynamic DDS algorithm has finished. The case of the alphabetic characters is not significant. At this time only one flag, “u”, is defined. This means that this rule is the last one and that the output of the rule is a URI. The field can be empty. ENUM Manager can accept this value either with or without surrounding double quotes. The default value is `u`.
Services	String	A character string that specifies the Service Parameters applicable down this rewrite path. ENUM Manager can accept this value either with or without surrounding double quotes. The string begins with “E2U” (E.164 to URI) (which is required and used to denote ENUM only Rewrite Rules so as to mitigate record collisions). It is followed by one or more ENUM services which indicate what class of functionality a given end point offers. Each ENUM service is indicated by an initial “+” character. The default value is `E2U+sip`.

Regular Expression	String	A string containing a substitution expression that is applied to the original string held by the client in order to construct the next domain name to look up.
		
		Either **Regular Expression** or **Replacement**, but not both, must be populated.
		
		If a leading double quote is absent, then ENUM Manager will add a prefix consisting of the following seven characters: **`"!^.*$!`**
		
		If a trailing double quote is absent, then ENUM Manager will add a suffix consisting of the following two characters: !”
		
		Two sample values are:
		
		`"!^.*$!sip:johndoe@sample.com!"`
		
		`sip:janedoe@sample.com`

Replacement	String	A <domain-name> which is the next domain-name to query, depending on the potential values found in the flags field. This field is used when the regular expression is a simple replacement operation. Any value in this field ***must*** be a fully qualified domain name. Either **Regular Expression** or **Replacement**, but not both, must be populated.
TTL	Integer	Time To Live attribute that is stored with each input NAPTR record. The default value for TTL is 0. This default is set in the *$ENUMHOME/defaultroot/conf/enum.properties* file.

3 Click **Add**.

END OF STEPS

To search NAPTR records

Purpose

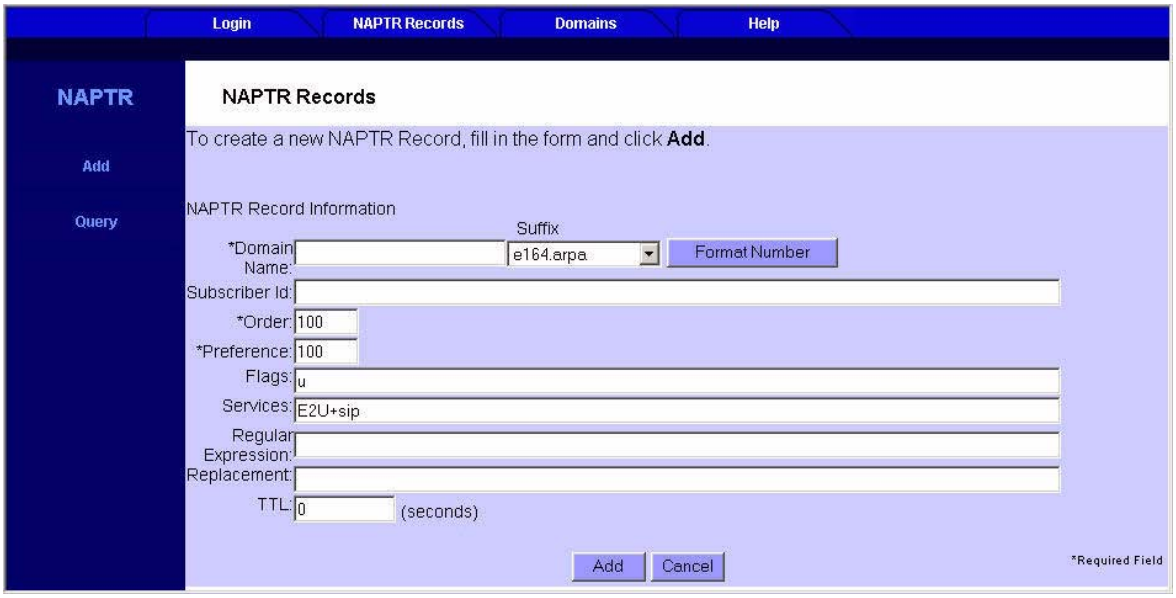
This section describes how to search NAPTR records in the shared ENUM Manager and VitalQIP database.

Procedure

To search NAPTR records, follow these steps:

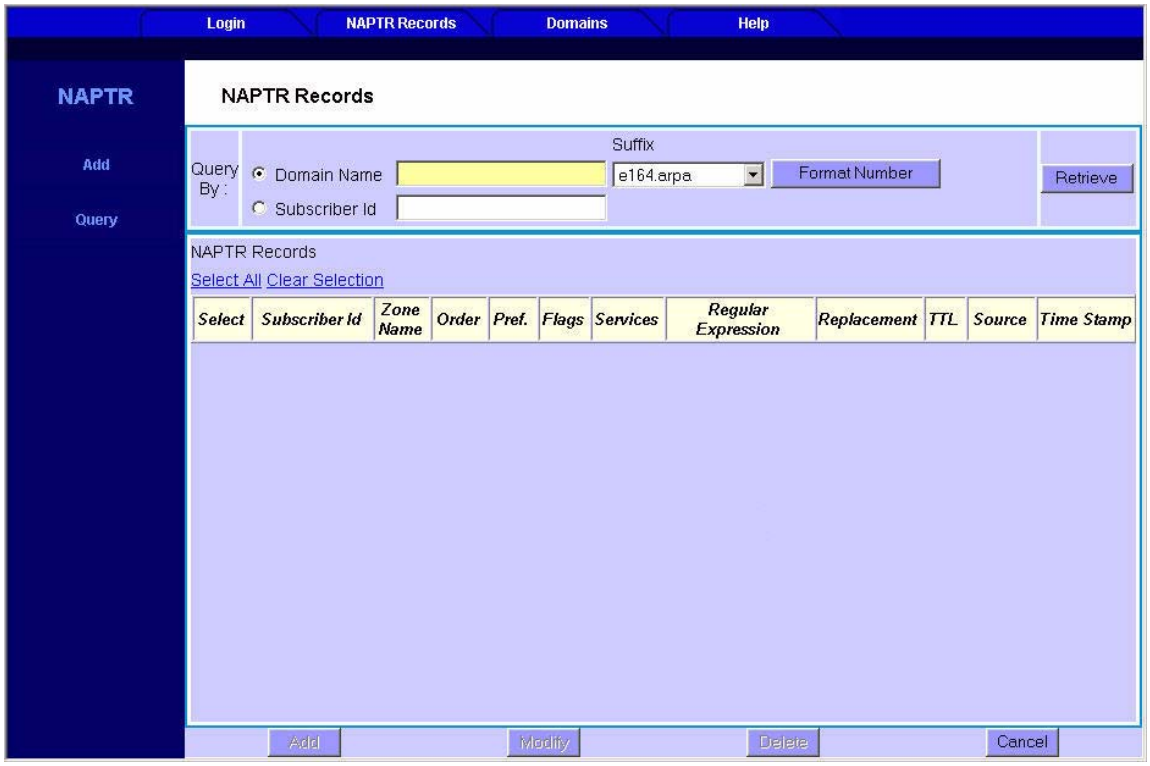
1 Click the **NAPTR Records** tab.

Result: The NAPTR Records window opens.



2 Click **Query**.

Result: The NAPTR Records Query window opens.



3 To search by Domain Name (or resource record Owner), enter the telephone number prefix (click **Format Number** to display the number in the correct format) and select a suffix from the drop-down list of ENUM domains.

To search by Subscriber Id, click the **Subscriber Id** option button and enter the subscriber Id you wish to find.

4 Click **Retrieve**.

Result: A list of matching records appears. The content of most of the columns is described in Table 3-1, “NAPTR record fields” (p. 3-19). Additional columns are described in the following table.

Table 3-2 NAPTR record query

Column name	Description
Zone Name	Indicates the zone name (for example, 0.1.6.1.e164.arpa) in which the NAPTR record resides.

Column name	Description
Source	Indicates whether the NAPTR record was added or last modified by a CLI, from a Northbound OS, or from the ENUM GUI. Records added or changed in the GUI or CLI include the administrator's username.
Time Stamp	Indicates the time that the NAPTR record was added to the ENUM database or was last modified. The time zone is that of the client operating system and is displayed in mm/dd/yyyy hh:mm format.

5 Choose from the following options.

If you want to …	Then …
Modify a record	1. Place a check in the **Select** column. 2. Click **Modify**
Delete one or more records	1. Place one or more checks in the Select column. 2. Click **Delete**.
Add a new record	Click **Add**.
Select all records	Click **Select All**.
Cancel a selection	Click **Clear Selection**.

END OF STEPS

To modify NAPTR records

Purpose

This section describes how to modify a NAPTR record.

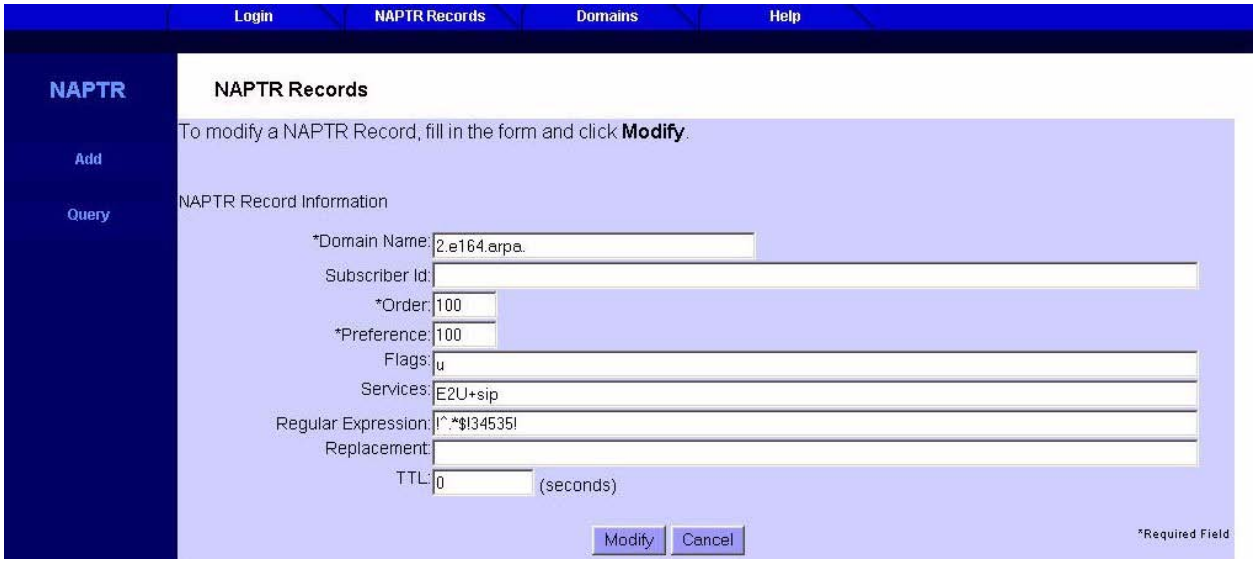
Procedure

To modify a NAPTR record, follow these steps:

1 Search for a specific record by following the steps in "To search NAPTR records" (p. 3-22).

2 Select the record you wish to change and click **Modify**.

Result: The NAPTR Records edit window opens.



3 Make your edits and click **Modify**.

Result: The Search results window appears again. The entry in the **Source** column indicates that you made the change in the GUI and the Time Stamp is updated.

If the **DDNSU** policy is set to True in the *enum.properties* file, a Dynamic DNS Update Message is sent to the DNS Update Service to update appropriate DNS servers. Otherwise, the update is made at the next DNS Generation from VitalQIP.

END OF STEPS

To delete NAPTR records

Purpose

This section describes how to delete a NAPTR record.

Procedure

To delete a NAPTR record, follow these steps:

1. Search for the record or records you want to delete by following the steps in "To search NAPTR records" (p. 3-22).

2. Place a check mark in the Select column for each record you want to delete. Click **Select All** to select every record.

3. Click **Delete**.

4. In the **Are You Sure?** dialog box, click **Yes**.

   If the **DDNSU** policy is set to True in the *enum.properties* file, a Dynamic DNS Update Message is sent to the DNS Update Service to update appropriate DNS servers. Otherwise the deletion is made at the next DNS Generation from VitalQIP.

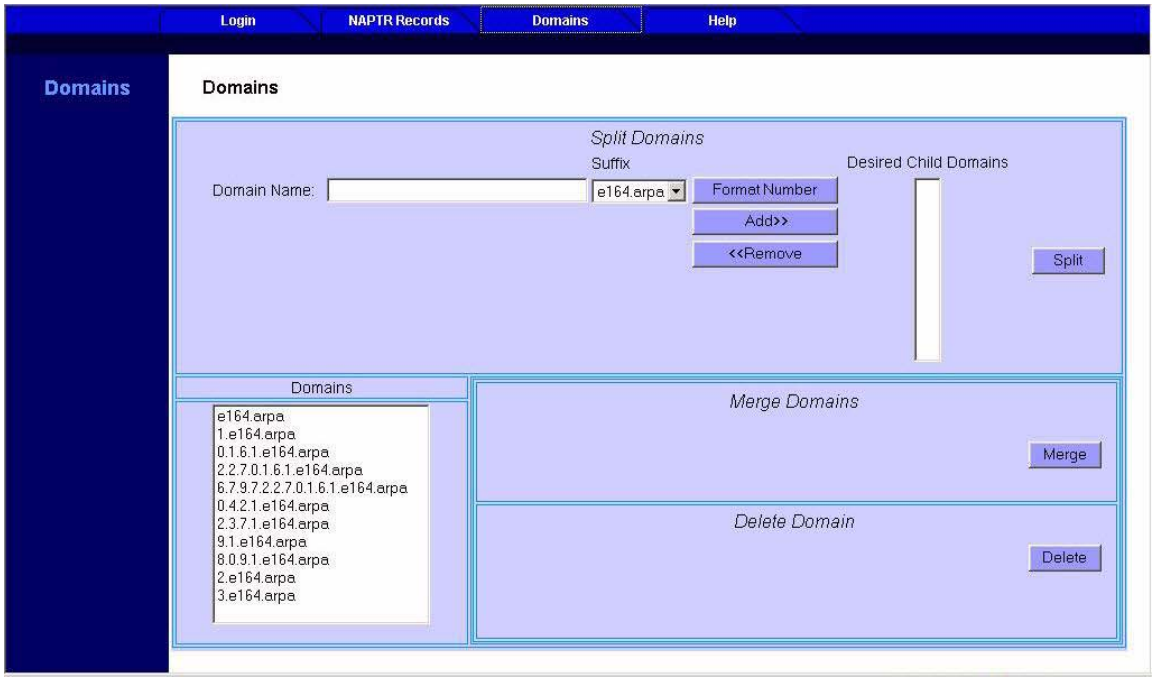
END OF STEPS

ENUM domains

Overview

ENUM Manager allows you to split and merge ENUM domains to manage their size. For example, one commonly accepted method to manage ENUM zones is to split the record into multiple zones at the country code, city code, area code, exchange and potentially between any digit in the E.164 number.

Figure 3-5 ENUM domains



To split ENUM domains

Purpose

This section describes how to create one or more new subdomains that originally existed as part of a higher-level ENUM domain.

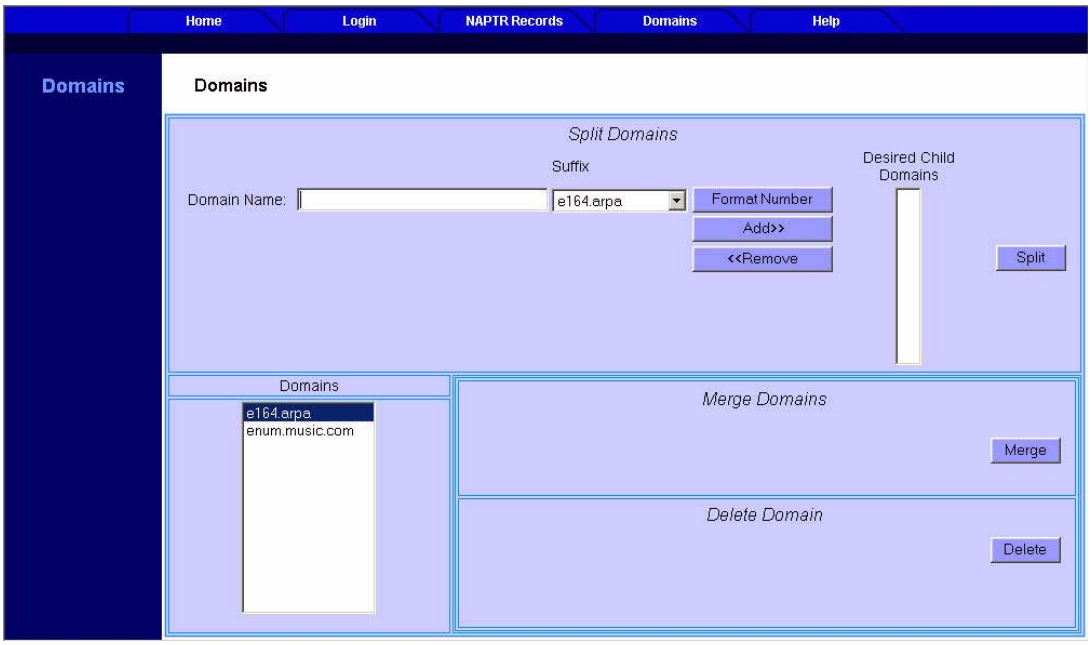
Note: Splits and merges should be done when no or few provisioning requests are being submitted from the GUI, the CLI, or the northbound interface. After a domain split or merge completes, it is highly recommended that you immediately perform zone file pushes of zones changed by the split or merge operation. This minimizes the amount of time that the DNS servers and the VitalQIP database are not synchronized.

Procedure

To split an ENUM domain, follow these steps:

1 Click the **Domains** tab.

Result: The Domains window opens.



2 Enter the prefix of the subdomain in the **Domain Name** field (click **Format Number** if necessary to achieve the correct format).

3 Select the ENUM domain you wish to split from the **Suffix** drop-down list.

4 Click **Add**. The subdomain appears in the **Desired Child Domains** list.

5 Repeat as needed for other subdomains. Click **Remove** if you need to remove a subdomain from the **Desired Child Domains** list.

6 Click **Split** to begin the split process. ENUM Manager selects the best parent source domain(s) to use. When completed, you are informed of how many NAPTR records were moved from the parent to the child domains.

Note: If you enter a subdomain name that already exists, a warning message indicates that the subdomain already exists. Click **Yes** to proceed only if you really want to move some NAPTR records from a parent domain to an existing child subdomain. After a domain split operation completes, it is highly recommended that you immediately perform zone file pushes of zones changed by the split operation.

END OF STEPS

To merge ENUM domains

Purpose

This section describes how to merge ENUM domains.

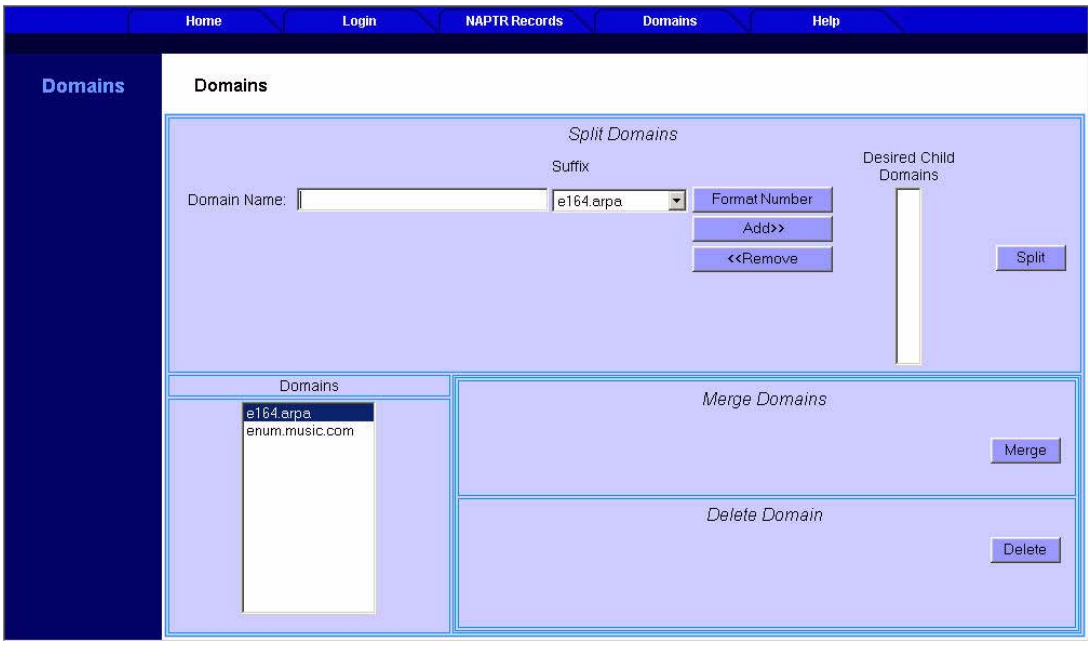
Note: Splits and merges should be done when no or few provisioning requests are being submitted from the GUI, the CLI, or the northbound interface. After a domain split or merge completes, it is highly recommended that you immediately perform zone file pushes of zones changed by the split or merge operation. This minimizes the amount of time that the DNS servers and the VitalQIP database are not synchronized.

Procedure

To merge ENUM domains, follow these steps:

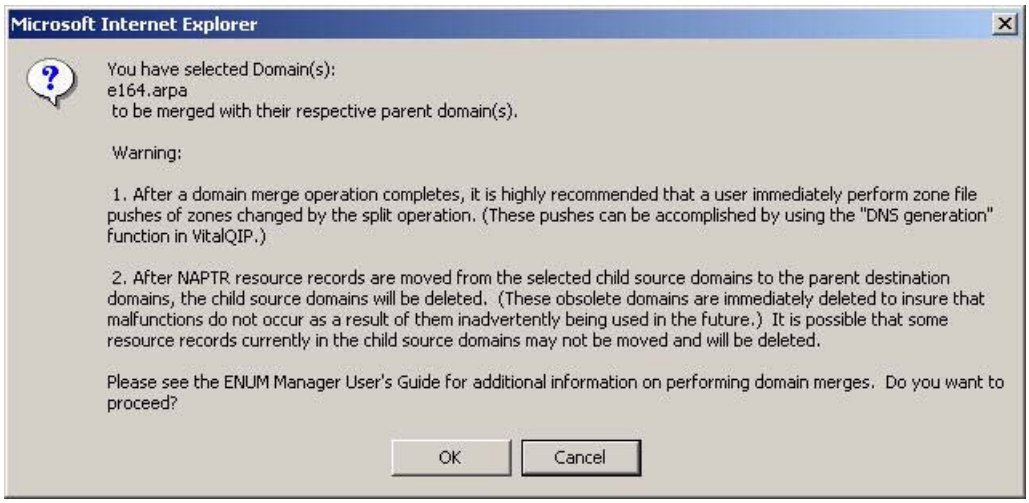
1 Click the **Domains** tab.

Result: The Domains window opens.



2 Select one or more domains in the Domains list to be merged. These do not have to be contiguous.

3 Click **Merge**. A list of the child domains that are to be merged and a warning message are displayed.



4 Click **OK** to continue. The merge process begins. ENUM Manager selects the best parent destination domain(s) to use. When completed, you are informed of how many records were moved from the child domains and to what domain they were moved. The child source domains are deleted in the VitalQIP database.

Note: After a domain merge completes, it is highly recommended that you immediately perform zone file pushes of zones changed by the merge operation.

END OF STEPS

To delete ENUM domains

Purpose

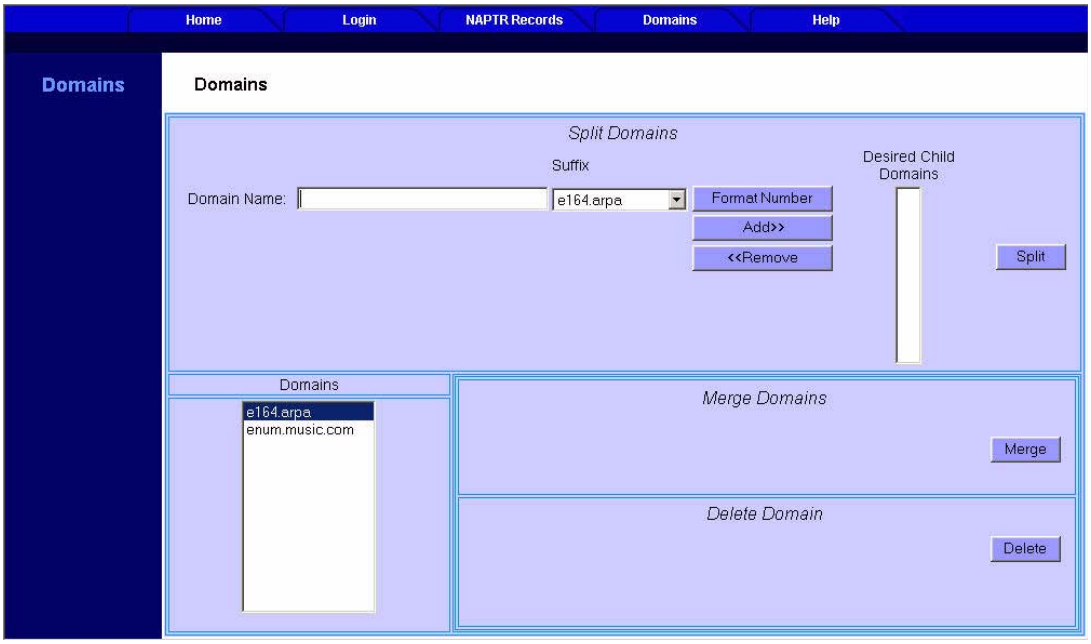
This section describes how to delete an ENUM domain.

Procedure

To delete an ENUM domain, follow these steps:

1 Click the **Domains** tab.

Result: The Domains window opens.



2 Select the domain you wish to delete.

3 Click **Delete**. A confirmation message appears.

4 If you are sure you want to proceed, click **OK**. When the domain is deleted the list of domains is updated to show that the domain no longer exists.

Note: If you delete all domains associated with a **Suffix** (including the Suffix domain), you also should manually remove the suffix from the **`ValidDomains`** list in the *enum.properties* policy file.

END OF STEPS

4 VitalQIP and ENUM Manager integration

Overview

Purpose

This chapter details where functionality in ENUM Manager and VitalQIP overlap.

Contents

This chapter contains the following topic.

ENUM domains in VitalQIP

For ENUM Manager and VitalQIP to work together, all high-level ENUM domains (for example, 1.e164.arpa.) must exist in the VitalQIP database and an identifying suffix (for example, e164.arpa) must also appear in the ENUM Manager policy file. You can add ENUM domains to the ENUM Domain suffixes list during installation or add them manually later on by adding them to the **`ValidDomains`** list in the *enum.properties* policy file (refer to "ENUM Manager policy file" (p. B-1) for more information). Once ENUM Domain suffixes are entered in the *enum.properties* policy file, they appear in the Domain Name Suffixes drop-down list in the NAPTR Records and Domains windows. ENUM Manager uses these suffixes to identify ENUM domains.

ENUM domain profile and zone options

You can view and modify domain profiles and associated zone options for ENUM domains using existing VitalQIP functionality. Although you can view ENUM domains and zone options in VitalQIP, you cannot view the NAPTR records in those domains that reside in the ENUM database. You can only view such records in the ENUM Manager GUI.

> **Note:** Although you can modify an ENUM domain in the VitalQIP domain profile, you will receive an error message if you try to add a CNAME record with an Owner that has the same value as a NAPTR record owner. You will also receive an error message if you try to add an alias in the **Object Profile Aliases** tab with the same name as that of the NAPTR Owner name.

Delete an ENUM domain in VitalQIP

You can delete an ENUM domain in the same way as you delete any other VitalQIP domain. If you delete all ENUM domains in VitalQIP associated with an ENUM suffix (including the suffix domain), you should also delete the corresponding suffix in the **`ValidDomains`** list in the *enum.properties* policy file.

> **Note:** Since deleting an ENUM domain in VitalQIP also removes associated NAPTR resource records, it is normally preferable to use the ENUM Manager domain merge function. That way, the NAPTR resource records are reassociated with the merged domain before the child domain is deleted in VitalQIP.

DNS updates

The ENUM Manager Business Layer (see Figure 3-1, “ENUM Manager high-level architecture” (p. 3-3)) sends Dynamic DNS Update Requests to the local Message Service, which uses a MessageRoute with a **`DNSUpdateRR`** (or **`10`**) Message ID to send the message to the DNS Update Service.

DNS Generation

When you select **DNS Generation** from the **Network Services** menu in VitalQIP to create zone files, the resulting files will contain NAPTR records. You can review the content of these files, including any NAPTR records that may be in them, in the DNS Generation Results window.

The following is a sample display from the VitalQIP DNS Generation Results window.

```
$TTL 86400
;=========================================================================
; Addresses and other host information for zone:
   6.7.9.7.2.2.7.0.1.6.1.e164.arpa
;=========================================================================
@  IN SOA qasn55.metal.music.com. enum.lucent.com. (
       36 ; Serial No.
       21600; Refresh
       3600; Retry
       604800; Expire
       600 ); Negative Cache TTL
;
       IN NS qasn55.metal.music.com.
       IN NS belzey-w2k.music.com.
belzey-w2k.music.com.IN A135.114.106.34
qasn55.metal.music.com.IN A10.55.0.5
;************************************
; Other object level resource records
;************************************
;************************************
; Other domain level resource records
;************************************
6.7.9.7.2.2.7.0.1.6.1.e164.arpa.0IN NAPTR100100 "u"  "E2U+sip"
   "!^.*$!belzey@lucent.com!"  .
```

Zone reports

You can also review NAPTR records in DNS Zone Reports. Additionally, you can select **NAPTR** from the **Resource Record Type** drop-down menu in the DNS Zone Report window.

5 ENUM Manager Command Line Interface

Overview

Purpose

This chapter contains descriptions of the CLI commands used to interact with ENUM Manager.

Contents

This chapter contains the following topics.

CLI commands

The CLI commands are executable from various directories, depending on the platform. Refer to the following table to determine where you should execute the CLI commands.

Table 5-1 Location for execution of CLI commands

Platform	Executable location
Windows server	*%QIPHOME%\cli*
UNIX enterprise server	*$QIPHOME/usr/bin*
Web Client on both Windows and UNIX	The *cgi-bin* directory where you installed VitalQIP cgi scripts

Before you begin

- ***Windows only***. The ENUMHOME environment variable must be set, as follows:
  a. From the **Start** menu, select **Run**, enter **`cmd`**, and click **OK**.
  b. Change to the directory where ENUM Manager is installed.
  c. Execute *cli.bat*.
- All data lines must end with a carriage return, or they are not imported.
- If you do not specify the [**`-s`** *`servername`*] [`-u` *`username`*] [`-p` *`password`*] parameters, the CLI looks in the *qip.pcy* file for the values. If you do not want to use values taken from the *qip.pcy* file, you must specify them on the command line. **setnaptr (cli.sh)** is an exception. It resides in the *$ENUMHOME* directory and does not use the *qip.pcy* file. See "setnaptr" (p. 5-12) for more infomation.
- The [`-o` *`organization`*] parameter is only applicable if you are running the CLI as a master administrator. The [`-o` *`organization`*] parameter is case sensitive for all CLI commands.
- All information passed on the command line must be surrounded with quotes if it contains a space. For example, passing the **`-f`** of *My File.txt* must be surrounded with quotes because it contains a space, therefore it would appear as **`-f "My File.txt"`**.
- Field names in input files are case-insensitive. Values, however, continue to be case-sensitive. For example,
  – Name=user1
  – name=user1
  – NAME=user1
  are all the same. However,
  – Name=user1

– Name=USER1

– Name=User1

are not the same.

Notation key

To make it easier for you to code the parameters, this manual uses the notations described in the following table when explaining the synopsis of each CLI command:

Table 5-2 Synopsis notation conventions

Notation	Description
Bold	Used for directories, filenames, commands, and parameters. Type the boldface term as it appears in the Synopsis. **Example:** Type **`qip-dbinit`** as: `qip-dbinit`
Italics	Used to show generic arguments and options; replace text in italics with your own values. **Example:** Type **`-i`** *`input_filename`* as: `-i input1.txt`
[ ]	Used to indicate optional elements in a description of syntax. Do not type the brackets themselves. **Example:** Type **`[-m]`** as: `-m`
|	Used in syntax descriptions to separate items for which only one alternative can be chosen at a time. **Example:** Type **`-t active|expired|all`** as: **`-t active`** or **`-t expired`** or **`-t all`**
`Constant width`	Used to show the contents of files or the output from commands.

Common arguments/parameters

The following table lists parameters that are valid for many CLI commands.

Table 5-3 CLI command parameters

Parameter	Explanation	Important notes
-g *loginserver*	Specifies the VitalQIP login server's IP address. This value is the equivalent of the LOGIN environment variable.	
-s *qip_dataserver*	Specifies the server on which to operate.	Optional if the appropriate value is defined in your policy file (*qip.pcy*) – refer to note following table.
-u *username*	Specifies the user ID for the database.	Optional if the appropriate value is defined in your policy file (*qip.pcy*) – refer to note following table.
-p *password*	Specifies the user password for the database.	Optional if the appropriate value is defined in your policy file (*qip.pcy*) – refer to note following table.
-f *input_filename*	Specifies the name of the input file that contains the command parameters or the import information.	
-? or **-h**	Displays the syntax of the command's parameters (to assist you in coding the command).	Enter **-?** or **-h** to display the syntax, without processing the command.
-v	Displays version information for the CLI command.	
-o *organization*	Specifies the user's organization. This parameter is ignored unless the user has system privileges (for example, qipman). The default is "VitalQIP Organization".	This parameter is only applicable if you are running the CLI as a master administrator. Also, this parameter is case sensitive for all CLI commands.

Note: A value must be provided. If the appropriate value is not defined in your policy file (*qip.pcy*), specify it in this parameter. If this parameter is omitted, the CLI looks for the value in the *qip.pcy* file.

CLI command usage

Overview

This section explains (in alphabetical sequence) the CLI commands used for functions in ENUM Manager.

qip-del

qip-del removes objects and unallocates addresses that have been reserved. This function can also be used to delete objects of various "Owner Types" (refer to Table 5-4 following).

Note: If you delete an ENUM domain (with the **-t domain** parameter), no warning message appears to alert you that NAPTR records in the domain will also be deleted. If you wish to preserve them, use the **qip-splitmergeenum** CLI to move such records out of the domain you wish to delete.

Note: An Object Range deleted by using **qip-del** does not delete objects associated with the Object Range. However, all ties with the Object Range are broken.

Synopsis

```
qip-del [-g loginserver] [-s servername] [-u username]
   [-p password] -n name|-a address [-o organization] [-r]
   [-l appl_name] [-m] [-t owner_type] [-c class]
```

Parameters

qip-del recognizes the following parameters:

-g *loginserver*	Specifies the VitalQIP login server's IP address. This value is the equivalent of the LOGIN environment variable.
-s *servername*	Specifies the VitalQIP database server. This value is the value of the QIPDATASERVER environment variable.
-u *username*	Specifies the VitalQIP administrator account to be used in establishing the database connection.
-p *password*	Specifies the password for the associated administrator account.
-o *organization*	Specifies the VitalQIP organization (corporation) name.
-n *name* | -a *address*	Specifies the fully-qualified name of the object, domain, contact ID, location ID or subnet IP of the object where the reserved object resides (**-n**), or the address ranges (**-a**).
-r	Unallocates previously reserved addresses on the subnet specified in the **-a** parameter.
-l *appl_name*	The application name for which the addresses were reserved.
-m	Deletes all names if the fully-qualified name is used and more than one object/subnet exists with that name. This parameter is only applicable when you specify the **-n** parameter.

-t *owner_type* Refer to Table 5-4 following.

-c *class* Specified policy or user-defined field class. Only valid for **-t Policy** and **-t Userfield**.

Table 5-4 Owner types

Owner_type	Description
Object	Deletes a used object or a reserved object.
Dhcp_server	Deletes the DHCP server by name
Dns_server	Deletes the DNS server by name.
Object_range	Deletes the object range.
Domain	Deletes the domain and detaches all associations.
Reverse_zone	Deletes the zone and detaches all associations.
Network	Deletes the network.
Subnet	Deletes all objects in the subnet.
Subnet_organization	Deletes the subnet organization.
Address_range	Deletes the administrator address range.
User	Deletes the user via loginID.
Contact	Deletes a contact. Pass the ContactID in the **-n** parameter. You can determine the contact ID with **qip-getcontactlst**.
Location	Deletes a location. Pass the LocationID in the **-n** parameter.
Policy	Deletes a Global Policy. Pass the Policy Class in the **-c** parameter (for example, General, Billing, DYNDNS, Oracle, Reports). Pass the Policy Name in the **-n** parameter.
Userfield	Deletes a User-Defined Field (UDF). Pass the UDF type in the **-c** parameter (for example, Domain, Object, Organization, Subnet, Reverse Zone, User). Pass the UDF Name in the **-n** parameter.

Command line input example

The following example deletes an ENUM domain:

```
qip-del -n 0.1.6.1.e164.arpa -t domain -s srv1 -u qipman
   -p passwd
```

qip-splitmergeenum

qip-splitmergeenum allows you to split zones from a parent zone into one or more child zones, and to merge one or more child zones into a parent zone. Regardless of whether you are splitting or merging zones, you only specify the child zones with this command. The parent zone is always selected by the system. This CLI reassociates NAPTR records with the appropriate split child zones or merged parent zones.

Note: Splits and merges should be performed when no or few provisioning requests are being submitted from the GUI, the CLI, or the northbound interface. After a domain split or merge completes, it is highly recommended that you immediately perform zone file pushes of zones changed by the split or merge operation. This minimizes the amount of time that the DNS servers and the VitalQIP database are not synchronized.

Synopsis

```
qip-splitmergeenum -fr domains|-to domains -g Login_Server
   -s servername -u UserName -p Password [-o Organization]
   [-f Output_File]
```

Parameters

qip-splitmergeenum recognizes the following parameters:

-fr|-to *domains* Specifies if you are merging one or more child domains to a parent domain (**-fr**) or splitting one or more child domains (**-to**) from a parent domain.

If you are merging child domains to a parent domain, the domains you specify must already exist. The merged child domains are deleted from VitalQIP. Any NAPTR records that fell in the merged zones using the DNS hierarchy are reassociated with the parent zone in which the child zone was merged.

If you are splitting one or more child domains from a parent domain, and if the domains do not exist, the CLI creates them. Any NAPTR records that fall in the new zone using the DNS hierarchy are reassociated with the newly created child zones. The split domains inherit the settings and DNS servers of their parent domain.

-g *Login_Server* Specifies the VitalQIP login server's IP address. This value is the equivalent of the LOGIN environment variable.

-s *servername* Specifies the VitalQIP database server. This value is the value of the QIPDATASERVER environment variable.

-u *UserName* Specifies the VitalQIP administrator account to be used in establishing the database connection.

-p *Password*	Specifies the VitalQIP administrator password to be used in establishing the database connection.
-o *Organization*	Specifies the VitalQIP organization (corporation) name.
-f *Output_File*	Specifies the directory and filename where the output data is to be placed.

Command line input examples

The following commands show a zone split and a zone merge.

Zone Split

The following example splits two child zones from a parent zone.

```
qip-splitmergeenum -to 0.1.6.1.e164.arpa,5.1.2.1.e164.arpa
-g myloginserver -s mydbsrvr -u qipman -p password
```

The output from the above line is as follows:

```
2 NAPTRs moved from: e164.arpa to: 0.1.6.1.e164.arpa
4 NAPTRs moved from: e164.arpa to: 5.1.2.1.e164.arpa
Please perform ASAP: the pushes of zones changed by the
   split/merge operation.
```

Zone Merge

The following example merges two child zones into their parent zone.

```
qip-splitmergeenum -fr 0.1.6.1.e164.arpa,5.1.2.1.e164.arpa
-g myloginserver -s mydbsrvr -u qipman -p password
```

The output from the above command is as follows:

```
4 NAPTRs moved from: 5.1.2.1.e164.arpa to: e164.arpa
2 NAPTRs moved from: 0.1.6.1.e164.arpa to: e164.arpa
Please perform ASAP: the pushes of zones changed by the
   split/merge operation.
```

setnaptr

setnaptr is a Java-based CLI that adds, updates, and deletes NAPTR records based on an input file. It is located in the *$ENUMHOME* directory and reads the logging values from the *$ENUMHOME/defaultroot/conf/enum_log4j.properties* file.

Invoke this command by typing **cli.sh** on UNIX platforms or **cli.bat** on Windows platforms.

Synopsis

```
cli.sh -f input_filename [-g loginserver] [-s servername]
   -u username -p password [-o organization] [-e errmsg_file]
```

Parameters

setnaptr recognizes the following parameters:

-f input_filename	Specifies the input filename that contains the NAPTR records. The fields for the input file are described in Table 5-5, "Input file values" (p. 5-13).
-g loginserver	Specifies the VitalQIP login server's IP address.
-s servername	Specifies the VitalQIP database server.
-u username	Specifies the VitalQIP administrator account to be used. **Note:** The username must have Master administrator privileges.
-p password	Specifies the password for the associated administrator account.
-o organization	Specifies the VitalQIP organization (corporation) name. Defaults to the value in the *enum.properties* file if not specified.
-e errmsg_file	Specifies the output filename where error messages will be written, if they occur. If not populated, error messages will be displayed on the user's screen.

Input file

The input file consists of records containing comma separated values, and uses two consecutive double quotes to represent a null value. The fields in an input file are described in Table 5-5. You must always enter a value between commas, even if the value is null, as shown in "Input file example" (p. 5-16). The add record, delete record, and the first row of an update record are as follows:

```
Action
DomainName
SubscriberID
Order
Preference
Flags
```

```
Services
RegularExpression
Replacement
```

For an update record, the first row identifies the record that must be updated. The order of values in the second row of an update record is as follows:

```
Null
newDomainName
newSubscriberID
newOrder
newPreference
newFlags
newServices
newRegularExpression
newReplacement
```

The second row of the update record has the following characteristics:

- It must appear on the row immediately following the first row.
- It must contain a complete record, since it is used to overwrite the original record. (In other words, the second row of an update record should not just contain fields in which values have changed.) This eliminates ambiguity in distinguishing an attribute that has no change with an attribute that should be updated with a value of null.
- The first field in the second row of the record is a filler field (null value), and must be populated with two consecutive double quotes (that is, “”). This first field is in the same column position as *Action*, which, in the update case, is specified in the first row of the record.

Table 5-5 Input file values

Field	Type	Description
Action	String	A - Add NAPTR record U - Update NAPTR record D - Delete NAPTR record X - Delete all NAPTR records with the given domain name.
DomainName	String	Defines the subscriber’s ENUM Domain Name, for example, 2.1.2.1.2.2.7.0.1.6.1.e164.arpa. The field is a combination of a telephone number prefix and an ENUM domain name suffix. **Note:** Domain Name is more commonly known as resource record Owner in the VitalQIP database. If a dot at the end of the Domain Name prefix is missing, ENUM Manager adds it.

Field	Type	Description
SubscriberId	String	Uniquely identifies the subscriber in the upstream system. For example, the Subscriber Id could be an International Mobile Subscriber Identity (IMSI) or Billing Account Number.
Order	Integer	An integer specifying the order in which the NAPTR records ***must*** be processed in order to accurately represent the ordered list of Rules. The ordering is from lowest to highest. If two records have the same order value then they are considered to be the same rule and should be selected based on the combination of the Preference values and Services offered. Valid value is an integer between 0 and 65535. **Note:** A null value is not allowed.
Preference	Integer	An integer that specifies the order in which NAPTR records with equal Order values should be processed, low numbers being processed before high numbers. The important difference between Order and Preference is that once a match is found the client must not consider records with a different Order but they may process records with the same Order but different Preferences. Valid value is an integer between 0 and 65535. **Note:** A null value is not allowed.
Flags	String	A flag that signals when the Dynamic DDS algorithm has finished. The case of the alphabetic characters is not significant. At this time only one flag, “u”, is defined. This means that this rule is the last one and that the output of the rule is a URI. The field can be empty. ENUM Manager can accept this value either with or without surrounding double quotes.
Services	String	A character string that specifies the Service Parameters applicable down this rewrite path. ENUM Manager can accept this value either with or without surrounding double quotes. The string begins with “E2U” (E.164 to URI), which is required and used to denote ENUM only Rewrite Rules so as to mitigate record collisions. It is followed by one or more ENUM services which indicate what class of functionality a given end point offers. Each ENUM service is indicated by an initial “+” character.

Field	Type	Description
Regular Expression	String	A string containing a substitution expression that is applied to the original string held by the client in order to construct the next domain name to look up. Either **Regular Expression** or **Replacement**, but not both, must be populated. If a leading double quote is absent, then ENUM Manager will add a prefix consisting of the following seven characters: **"!^.*$!** If a trailing double quote is absent, then ENUM Manager will add a suffix consisting of the following two characters: !" Two sample values are: "!^.*$!sip:johndoe@sample.com!" sip:janedoe@sample.com **Note:** Commas are not allowed in Regular Expression values since they are used to separate fields in input records.
Replacement	String	A <domain-name> which is the next domain-name to query, depending on the potential values found in the Flags field. This field is used when the regular expression is a simple replacement operation. Any value in this field ***must*** be a fully qualified domain name. Either **Regular Expression** or **Replacement**, but not both, must be populated.

NAPTR record keys

The record keys uniquely identify a NAPTR record in the database. When performing an Add operation, the keys must not be a duplicate of the keys of an existing record in the database (or an error will result.) For an Update or Delete operation, the record keys identify the record to operate on.

The keys of the NAPTR record consist of the combination of the following field names and their associated values:

- Domain Name (also known as Owner. For example, 4.3.2.1.2.2.7.0.1.6.1.e164.arpa.)
- Flags (can be null)
- Services (can be null)
- Regular Expression (can be null)
- Replacement (can be null)
- Organization

Note: Two records in the database cannot have identical keys.

Command line input example

The following is an example that calls an input file called *myrecords*.

cli.sh -u qipman -p passwd -f myrecords -e err_file -o org2

Input file example

The following is an example of an input file:

```
A,3.3.2.2.6.9.6.0.1.6.1.e164.arpa.,johndoe,100,10,u,"",!^.*$!sip:jdoe@exampl
   e.com!,""
D,3.3.2.2.6.9.6.0.1.6.1.e164.arpa.,johndoe,100,10,u,"",!^.*$!sip:jdoe@exampl
   e.com!,""
X,2.2.2.2.6.9.6.5.1.2.1.e164.arpa.
U,3.e164.arpa.,"",100,100,u,E2U+sip,!^.*$!3.!,.
"",3.e164.arpa.,johndoe,100,100,u,E2U+sip,!^.*$!sip:johndoe@example.com!,""
```

vercheck

The **vercheck** command lists the version number of every program in a specific directory (and its subdirectories). The resulting information can be displayed on the screen or output to a file and includes the filename, file size, date/time stamp, file type, version number, and the file's "checksum". Using this command helps you to maintain consistency between upgrades.

> **Note:** To run this command, you should have the Java Runtime Environment installed, and located in the execution path of your environment. If you do not, you will not be able to display the version of any Java-based Alcatel-Lucent product components.

Although the ENUM Manager release number can be viewed in the "About" screen, the build information can only be viewed by running the **vercheck** command on an ENUM Manager *.jar* or *.class* file, such as:

- Release 1.0 and above: *$ENUMHOME/defaultroot/WEB-INF/lib/enm.jar*
- Release 1.0: *$ENUMHOME/NB_Server.jar*
- Release 1.1 and above: *$ENUMHOME/defaultroot/WEB-INF/classes/com/lucent/qtek/NB_ServerVersion.class*

Synopsis

vercheck [**-d** ***directory***] [**-m** ***field_mask***] [**-j** ***java_FQN***] [**-c**] [**-e**] [**-z**] [**-5**] [***filename***]

Parameters

vercheck recognizes the following parameters:

-d ***directory*** Specifies the directory for which version information is to be obtained. The default is the current working directory.

-m *field_mask* Identifies the fields that are to be displayed by **vercheck**. The fields are identified using a field mask consisting of "**0**"s and "**1**"s. A "**1**" indicates that the field should be displayed, and a "**0**" indicates that the field should not be displayed. The fields, in order of specification, are:

- File Name
- File Size
- File Owner
- File Permissions
- File Creation Date
- File Modification Date
- File Type
- File Version
- File Checksum

If this parameter is omitted, all fields are displayed.

-j *java_FQN* This option allows you to specify the location (the fully-qualified file name) of the JAVA runtime executable (java on UNIX and *java.exe* on Windows) to be used to determine the version of the Java archive (JAR) file. If this parameter is not specified, the utility assumes that the directory containing the JAVA runtime executable is defined in the PATH environment variable. For example, on a UNIX system, you can determine the version of the *acmengine.jar* file using either of the following methods (this assumes Bourne Shell or K-Shell in this example):

```
# vercheck -z -j /usr/local/jdk1.3/bin/java
acmengine.jar
acmengine.jar: 1.1.5
```

or

```
# PATH=$PATH:/usr/local/jdk1.3/bin; export PATH
# vercheck -z acmengine.jar
acmengine.jar: 1.1.5
```

-c Outputs the information in CSV format.

-e Provides VitalQIP environment information.

-z Provides only the filenames and product version numbers.

-5 Searches only for VitalQIP 5.x versions. If this parameter is omitted, searches for all VitalQIP versions.

filename Provides information about the specified file. If this parameter is omitted, all files in the current directory or the directory specified by the **-d** option is processed. The subdirectories are also be processed.

Command line input example

```
# vercheck $ENUMHOME/defaultroot/WEB-
   INF/classes/com/lucent/qtek/NB_ServerVersion.class
```

Output example

Among other things, the **`vercheck`** command outputs the VERSION in the format `#.#.#`, where the first `#.#` consists of the Release, and the last `#` consists of the Build.

```
FILE=/qip/enum/defaultroot/WEB-
   INF/classes/com/lucent/qtek/NB_ServerVersion.class
      SIZE=744        OWNER=(0,0)     PERMS=-rw-rw-rw-        CDATE=Feb-10-
   2007 16:41 MDATE=Nov-13-2006 19:36 TYPE=Unknown VERSION=1.1.8
   CHECKSUM=fe3481d0279098f4e702ce798ce48320
```

In this example, the Release is 1.1, and the Build is 8.

A ENUM Manager Troubleshooting

Overview

Purpose

Appendix A contains troubleshooting information for ENUM Manager.

This appendix contains the following topics.

License limits exceeded

Purpose

If the number of NAPTR records exceeds the limit specified by the ENUM Manager license, functionality in ENUM Manager is limited to changing organizations, searching for NAPTR records and deleting them.

Note: You should contact your Alcatel-Lucent sales representative when you first see a warning that you are approaching your license limit. If you wish to change the limit from the default of 95%, modify the **`LicenseWarningLevel`** parameter in the *enum.properties* file (refer to "ENUM Manager policy file" (p. B-1)).

Procedure

To regain full functionality, you should follow these steps.

1. Delete excess NAPTR records.

2. Log out of ENUM Manager and contact your Alcatel-Lucent sales representative to arrange for your license limit to be increased.

3. After your limit has increased (or you have deleted sufficient NAPTR records to no longer exceed the limit), you can log in again after the NAPTR record count has been updated.

   Note: The time interval between record count updates is set by the `LicenseInterval` policy in the VitalQIP Schedule Service section of the *qip.pcy* file.

END OF STEPS

NAPTR add, update and delete records

Purpose

These errors can occur when processing NAPTR records.

Table A-1 NAPTR record processing problems

Problem	Description	Solution
Domain Name in Add request is not part of an existing domain in ENUM Manager.	This error occurs when the Domain Name suffix in the Add does not match an existing Domain in ENUM Manager. For example, this error would occur if the Domain Name was "2.1.2.1.2.2.7.0.1.6.1.privateenum.sample.com.", but the only domain in ENUM Manager was "e164.arpa.".	Create the needed domain in VitalQIP.
Record to be added contains a duplicate of the keys of an existing record in the ENUM database.	This error occurs if an incoming record is a duplicate of a record already in the ENUM database. The keys of the NAPTR record are as follows: • Domain Name (also known as Owner. For example, 4.3.2.1.2.2.7.0.1.6.1.e164.arpa.) • Flags (can be null) • Services (can be null) • Regular Expression (can be null) • Replacement (can be null) • Organization	If desired, modify the existing record in the database.
Domain Name of record to be added is the same as the Owner of a CNAME record in the zone.	This error occurs if the Domain Name of a record to be added has the same value as the Owner field of a Canonical Name (CNAME) record in the zone where the NAPTR record should be added.	If desired, delete the CNAME record.
New Domain Name in update request is not part of an existing domain in ENUM Manager.	This error occurs when the New Domain Name suffix in the Update does not match an existing Domain in ENUM Manager. For example, this error would occur if the New Domain Name was "2.1.2.1.2.2.7.0.1.6.1.privateenum.sample.com.", but the only domain in ENUM Manager was "e164.arpa.".	Create the needed domain in VitalQIP.

Problem	Description	Solution
Update request will result in a record with a duplicate of the keys of an existing record in the ENUM database.	This error occurs if an incoming update record would result in a duplicate of a record already in the ENUM database. The keys of the NAPTR record are as follows: • Domain Name (also known as Owner. For example, 4.3.2.1.2.2.7.0.1.6.1.e164.arpa.) • Flags (can be null) • Services (can be null) • Regular Expression (can be null) • Replacement (can be null) • Organization	Normally, no action is required because the existing record does not need to be updated.
Domain name in update request is the same as the Owner of a CNAME record in the zone.	This error occurs if the Domain Name (for example, 2.1.2.1.2.2.7.0.1.6.1.e164.arpa.) in the update request has the same value as the Owner field of a Canonical Name (CNAME) record in the zone where the updated NAPTR record would reside.	If desired, delete the CNAME record.
Domain Name used with action of X is not in the ENUM database.	Returns an error message. Note that the input Domain Name must fully match a Domain Name in one or more records in the ENUM Manager database. For example, an input Domain Name of “0.1.6.1.e164.arpa.” will not match “2.1.2.1.2.2.7.0.1.6.1.e164.arpa.”.	If desired, modify the delete request.
Regular Expression and Replacement fields are both present in Add, Update, or Delete.	If the operation is an Add, Update, or Delete, then do not perform the operation, and return an error message stating that either Regular Expression or Replacement, but not both, must be populated. A similar error occurs if newRegularExpression and newReplacement are both populated in an Update.	Edit the Regular Expression/Replacement fields as needed.
Regular Expression and Replacement fields are both unpopulated in Add, Update, or Delete.	If the operation is an Add, Update, or Delete, then do not perform the operation, and return an error message stating that either Regular Expression or Replacement, but not both, must be populated. A similar error shall be output if newRegularExpression and newReplacement are both unpopulated in an Update.	Edit the Regular Expression/Replacement fields as needed.

Problem	Description	Solution
Input fields in Update or Delete match multiple records in the ENUM Manager database.	Does not perform the operation, and returns an error message. (Note that this error condition does not apply to the Delete All operation.)	Use all key fields to uniquely identify a single record on which to operate.
An attribute not applicable to the operation was input.	Do not perform the operation, and return an error message. For example, this error would occur if newSubscriberID was input in an Add operation, or RegularExpression was input in a Delete All operation.	Remove irrelevant fields from the records and repeat the operation.

GUI problems

ENUM domain suffix missing from drop-down pick list

Problem

The user created an ENUM domain (for example, *0.1.6.1.privateenum.acme.com.*) in VitalQIP, but there is not an appropriate suffix for it in the drop-down pick list named Suffix in the Add and Search GUI screens.

Solution

Add an identifying suffix (for example, *1.privateenum.acme.com.*) to ValidDomains in the *enum.properties* file.

Tomcat

Problem

The servlet container is temporary unavailable or being upgraded

Solution

Check if the Tomcat service is running on Windows and Tomcat is running on Unix.

Login

Problem

Login returns an error from VitalQIP and you know your password is correct

Solution

Check if VitalQIP is up and running. Also, check if the Administrator Type of user is set to Master.

Empty pick list in NAPTR screen and Domain screen

Problem

Domain suffix pick list is empty in the NAPTR and Domain screen

Solution

Most likely the Business Layer is not connecting to the database. Check the database machine and login information input during install. Additionally, check *enum.log* for errors.

log4j

Problem

Logging needs to be increased

Solution

1. Open *$ENUMHOME/defaultroot/conf/enumgui_log4j.conf*.
2. Change the log4j.category.* entries (as needed) to DEBUG for maximum tracing.

Miscellaneous troubleshooting

DNS not getting updated

Problem

User performed add/update/delete NAPTR through GUI, CLI, or northbound interface, but no Dynamic DNS Updates occurred.

Possible causes

- The DDNSU, DDNSU_CLI, and DDNSU_NB are not set to true in the *enum.properties* file.
- VitalQIP services are not running.
- *named.conf* is absent or the zone is not in *named.conf*, especially if a **`qip-splitmergeenum`** CLI has been run and not followed up with a zone push.
- There is an incorrect MessageRoute in the local Message Service. Check that the MessageRoute with Message ID of **`DNSUpdateRR`** has the correct destination.

If none of the above is the cause, turn the "DEBUG" feature on for **`named`**, **`qip-msgd`**, and **`dnsupdated`**. Inspect *named.run* and the logs in *$QIPHOME/log/qip-msgd.log*, and *qip-dnsupdated.log.*

License key issues

If you get an invalid license error after acquiring a new licence, you must shutdown the GUI and restart loginD.

naptr_rrs table not created

After an uninstall of VitalQIP, check if create table was selected during a subsequent install. Also check *enum_table.sql* and *enum_index.sql* in the *$QIPHOME/script* directory.

Invalid database driver

Check the **`JdbcDriver`** property in the JDBC Properties section in *enum.properties* for the correct driver specification.

Cannot create database connection

Check *jconn2.jar* (Sybase) and *classes12.jar* (Oracle).

No VitalQIP domain defined

Check if the suffixes are in the **`ValidDomains`** property in *enum.properties*. Also, check if the domain names containing the suffixes exist in VitalQIP.

Unique key constraint violation

Only one owner/flag/services/regexp/replacement combination can exist in an organization.

REGEXP field

User needs to debug the syntax.

Log4j properties files

Output file must be specified in the correct UNIX syntax, that is */qip/enum/log/enum.log* ***not*** *d:\qip\enum\log\enum.log*.

setnaptr generates error

```
log4j:ERROR No appenders could be found for category
(com.lucent.qtek.enm.ui.cli.SetNaptr).
log4j:ERROR Please initialize the log4j system properly.
```

Resolution

Ensure the *enum.properties* file in *$ENUMHOME/defaultroot/conf* includes a valid entry for *Log4JConfigFile*, and that there are no trailing spaces following the *Log4JConfigFile* name. Also, check the *Log4JConfigFile* itself for any syntax or other errors.

Northbound interface troubleshooting

To increase logging

1. Access the *$ENUMHOME/defaultroot/conf/NB_Server_Log4J.properties* file.
2. Set the following entry to DEBUG for maximum tracing

`log4j.category.com.lucent.qtek.enm.nb.server.NB_Server=DEBUG`

Northbound system got AddDelUpd Response Message indicating success, but DNS Server was not updated dynamically

1. Check that the **`DDNSU_NB`** property is set to **`true`** in *$ENUMHOME/defaultroot/conf/enum.properties*
2. Turn on debug level logging and check the log for errors.
3. Note that although the outcome specified in the Response Message indicates success or error in VitalQIP ENUM Manager, it does not imply success or error in DNS servers downstream of VitalQIP. Check the steps indicated in "DNS not getting updated" (p. A-8).

Communication errors

If VitalQIP is unable to send an **`AddDelUpdResp`** message to the northbound system in response to an **`AddDelUpdReq`** message due to communication errors, the response is written to an AddDelUpd error log file. The filename is:

```
$ENUMHOME/defaultroot/log/AddDelUpd_<Source>_<YYYY-MM-
   DD>_<HH:mm:ss>_<UniqueString>
```

> **Note:** This log file is only available on the Solaris platform. The "log" directory is not created by default. You need to manually create it in *$ENUMHOME/defaultroot*.

The file contains one entry for each NAPTR record that errored and is intended to facilitate administering the interface. The VitalQIP Web Service log also contains an entry about an *AddDelUpdResp* file being created.

B ENUM Manager policy file

Overview

Purpose

Appendix B describes the ENUM Manager policy file.

This appendix contains the following topics.

ENUM policy file

Behavior of ENUM Manager is controlled by policies defined in the *enum.properties* policy file. These policies are described in the following table.

Table B-1 ENUM policies

Policy	Values	Description
ValidDomains	Default: `e164.arpa` Allowed: a semi-colon delimited list of ENUM domains	A manually populated list of ENUM domain name suffixes that is used to identify ENUM domains. The default value contains just one suffix, `e164.arpa`. The list is semi-colon (;) delimited for multiple entries (for example, `ValidDomains=e164.arpa;privateenum.acme.com`)
DDNSU	Default: True Allowed: True | False	Specifies whether DNS updates received from the ENUM Manager GUI are performed through Dynamic DNS Update Messages sent to the DNS Update Service. If Dynamic DNS Updates are not used, use DNS Generation from the Network Services menu in VitalQIP to perform zone file pushes to update DNS servers.
DDNSU_NB	Default: True Allowed: True | False	Specifies whether DNS updates received from the Northbound System are performed through Dynamic DNS Update Messages sent to the DNS Update Service. If Dynamic DNS Updates are not used, use DNS Generation from the Network Services menu in VitalQIP to perform zone file pushes to update DNS servers.
DDNS_CLI	Default: False Allowed: True | False	Specifies whether DNS updates received from the setnaptr CLI are performed through Dynamic DNS Update Messages sent to the DNS Update Service. If Dynamic DNS Updates are not used, use DNS Generation from the Network Services menu in VitalQIP to perform zone file pushes to update DNS servers.
TTL	Default: 0 Allowed: number of seconds	For NAPTR records received from the northbound interface and from a CLI command, specifies the Time To Live (TTL) attribute for each input NAPTR record. The default value is 0 (unlimited).
Class	Default: IN Allowed: valid IETF resource record classes	Specifies the Class attribute that is stored with each NAPTR record. The default value is “IN”.

Policy	Values	Description
Organization	Default: VitalQIP Organization Allowed: Any organization defined in the VitalQIP database	For NAPTR records received from the northbound interface, specifies the VitalQIP organization to be used. The default value for the organization is “VitalQIP Organization”.
LicenseWarning Level	Default: 95 Allowed: 1 - 99	Specifies the point at which license warning limits are displayed. This policy is expressed as a percentage of the count of NAPTR records specified in the customer’s ENUM Manager license.

Sample enum.properties policy file

The following *enum.properties* file shows all the policies discussed in this appendix. Your *enum.properties* file may differ from the example shown, due to your system configuration.

```
#                       Enum Persistence properties
#-------------------------------------------------------------------------

#-------------------------------------------------------------------------
#                ENUM application specific properties
#-------------------------------------------------------------------------
#default suffix, default to e164.arpa
ValidDomains=e164.arpa
#send dynamic update message
DDNSU=true
DDNSU_NB=true
DDNSU_CLI=false
#default resource record parameters
TTL=0
Class=IN
Organization=VitalQIP Organization
#Organization=REPLACE_DEFAULT_ORG
LicenseWarnLevel=95
#LicenseWarnLevel=REPLACE_WARNING_PERCENT

#-------------------------------------------------------------------------
#                            Logging Properties
#-------------------------------------------------------------------------

# Log4JConfigFile - Path of the Log4J configuration file
#Log4JConfigFile = $(QIPHOME)\log\enum.log
#ENUMHOME=c:\\qip\\enum
ENUMHOME=REPLACE_ENUMHOME
#Log4JConfigFile = $ENUMHOME\defaultroot\enum_log4j.properties
Log4JConfigFile = REPLACE_LOG4JCONFIG_PATH

#-------------------------------------------------------------------------
#                              JDBC Properties
#-------------------------------------------------------------------------

# DatabaseUrl         - URL specifying driver type and db location.
#                       NOTE: Must refer to the same machine as specified
#                       in the 'DestinationHost' parameter below
#     'jdbc:oracle:oci8:@<db name from tnsnames file>'
```

```
#         - use when Oracle client software has been installed
#     'jdbc:oracle:thin:@<host>:<port (eg 1521)>:<db name from tnsnames
   file>'
#         - use when Oracle is not installed
# DatabaseUser        - db user name used by the PS itself
# DatabasePassword    - db password used by the PS itself
# JdbcDriver          - The name of the JDBC driver class
#
# ConnPoolMinPoolSize - Minimum number of Conns in the database
#                       Conn pool at a given time.
# ConnPoolMaxPoolSize - Maximum number of pools maintained in the
#                       Conn pool simultaneously.

#DatabaseUrl          =
   jdbc:oracle:thin:@REPLACE_ORACLEDBIP:1521:REPLACE_DATASERVER
#DatabaseUrl  = jdbc:sybase:Tds:REPLACE_IP:REPLACE_PROT?CHARSET=iso_1
DatabaseUrl  = REPLACE_URL
DatabaseUser     = REPLACE_DBUSER
DatabasePassword = REPLACE_DBUSERPASSWORD
#JdbcDriver      = oracle.jdbc.driver.OracleDriver
#JdbcDriver = com.sybase.jdbc2.jdbc.SybDriver
JdbcDriver  = REPLACE_DRIVER


ConnPoolMinPoolSize   = 5
#ConnPoolMinPoolSize   = REPLACE_MIN
ConnPoolMaxPoolSize   = 10
#ConnPoolMaxPoolSize   = REPLACE_MAX
```

C Northbound interface

Overview

Purpose

Appendix C contains information on the northbound interface that is used by one or more upstream systems to send NAPTR records to ENUM Manager.

This appendix contains the following topics.

ENUM Manager northbound interface

Overview

The ENUM Manager northbound interface (known as the VitalQIP Web Service) is a SOAP-based web service that enables SOAP clients to add, update, delete and retrieve NAPTR records. The VitalQIP Web Service works in asynchronous and synchronous modes. In synchronous mode, the VitalQIP Web Service client waits until the VitalQIP Web Service has completed processing the request and then receives the result of the operation. In asynchronous mode, the northbound system (the VitalQIP Web Service client) just waits for an immediate synchronous acknowledgement. Later an asynchronous response is returned.

CAUTION

Service disruption hazard

As is typical of an asynchronous interface, if an upstream system sends in a series of asynchronous request messages for operations and there are errors in one or more intermediate operations, it is possible that one or more of the last operations will not function as intended. This could happen if the request messages are submitted, associated successful synchronous acknowledgement messages are returned, and then some asynchronous response messages are returned with error results.

One certain way to avoid the possibility of this happening is to use synchronous mode.

Operations available through northbound interface

The following operations and associated messages are available through the northbound interface.

- Login Operation
  - Login Request Message
  - Login Response Message
  - Fault Response Message
- Logout Operation
  - Logout Request Message
  - Logout Response Message
  - Fault Response Message
- AddDelUpd Operation (used to add, delete, and/or update NAPTR records)
  - AddDelUpd Request Message
  - AddDelUpd Response Message
  - Fault Response Message
- Search Operation (used to search NAPTR records)

  - Search Request Message
  - Search Response Message
  - Fault Response Message
- Heartbeat Operation (used by Northbound System to check connectivity to ENUM Manager)
  - Heartbeat Request Message
  - Heartbeat Response Message
  - Fault Response Message
- AddDelUpd Async Operation (used to provide asynchronous response to AddDelUpd request)
  - AddDelUpd Response Message (VitalQIP Web Service is client and sends this message)
  - AddDelUpd Async Acknowledgement Message (Northbound System is server and returns this message)
  - Fault Response Message

For more information on messages and programming a client to use the northbound interface, contact your Alcatel-Lucent sales representative to obtain the *VitalQIP ENUM Manager Northbound Interface Specification*. The northbound interface uses a Web Services Description Language (WSDL) document. WSDL is written in Extensible Markup Language (XML) and defines a SOAP interface to ENUM Manager. The WSDL document is located at:

http://<ServerIPAddress>:<WebServerport>/services/VQIPManagerPort?wsdl

Timeout

The VitalQIP Web Service supports timeouts through integration with the Apache TomCat servlet container. Timeout is defined in TomCat using the **`connectionTimeout`** parameter in the *server.xml* file at the connector level. Defining the timeout at the connector level allows the VitalQIP Web Service to set different timeout values depending on the specific requirements of various northbound systems. The default value for **`connectionTimeout`** is 60,000 milliseconds. In other words, if a request is not processed in 60,000 milliseconds, it times out and an error is returned to the client. Setting **`connectionTimeout`** value to **`-1`** disables the timeout.

In asynchronous mode, when the final response is being sent to the northbound system that initiated the request, VitalQIP Web Service assumes the role of a client. As a client, a configurable timeout value is set, after which the request initiated by VitalQIP Web Service terminates. The default timeout value is 60,000 milliseconds.

Logging

The VitalQIP Web Service uses Log4J software for logging data that can be used to debug and to get information on operations being performed by the service. Log4J supports various logging levels such as WARN, DEBUG and so on. These logging levels and other parameters can be configured per interface by setting them in interface-specific properties files. The default logging level is WARN. At the WARN level only faults are logged. If the logging level is DEBUG, incoming messages, key messages related to processing, and outgoing messages are logged, in addition to faults. For more information on log4j, refer to "Log4j properties" (p. C-8).

Northbound interface usage

Starting ENUM Manager northbound interface

The northbound interface can be started along with the rest of the ENUM Manager services by executing the following:

Solaris

```
../shrc
$ENUMHOME/etc/startup.sh
```

Windows

Select **ENUM Apache Tomcat 5.5 Server** from Services (**Start|Programs|Administrative Tools|Services**), and either select **Start** from the **Action** menu or right-click and select **Start**.

Stopping ENUM Manager northbound interface

The northbound interface can be stopped along with the rest of the ENUM Manager services by executing the following:

Solaris

```
../shrc
$ENUMHOME/etc/shutdown.sh
```

Windows

Select **ENUM Apache Tomcat 5.5 Server** from Services (**Start|Programs|Administrative Tools|Services**), and either select **Stop** from the **Action** menu or right-click and select **Stop**.

VitalQIP Web Service port

The port to which the VitalQIP Web Service listens is the same as the port to which the Tomcat Web Server listens. The Tomcat Web Server port number is defined in *$ENUMHOME/tomcat/conf/server.xml* on a line similar to the following:

```
Connector Port = 8082
```

By default, the port number is 8082. A northbound system that wants to communicate with ENUM Manager should send messages to this port.

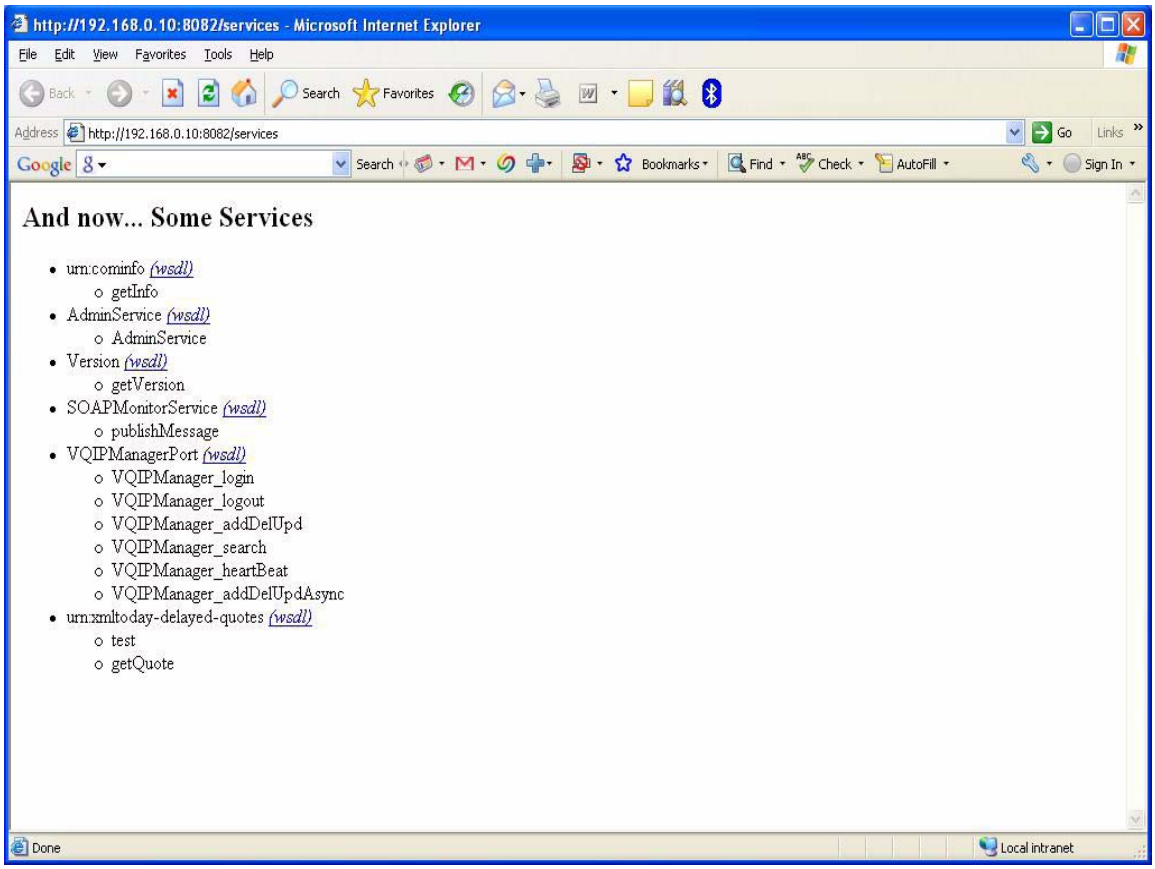
Checking status of ENUM Manager northbound interface

Check the availability of the northbound interface by accessing the following URL:

http://<ServerIPAddress>:<WebServerport>/services

where <Server_IP_Address> and <Port> are the IP address and port respectively being used by the ENUM Apache Tomcat 5.5 Server. If the Web Service is accessible, `VQIPManagerPort` appears in the list of services, as shown in Figure C-1.

Figure C-1 VitalQIP Web Service availability



Invoking ENUM Manager northbound interface

The ENUM Manager northbound interface is invoked by a northbound system. It cannot be invoked from the command line.

Northbound interface properties

$ENUMHOME/defaultroot/conf/NB_Server.properties is the properties file for the northbound interface. The properties that affect functionality are described in the following table.

Table C-1 Northbound server properties

Property	Value	Description
NumberOfThreads	Default: 5 Allowed: 20	Defines the maximum number of threads that the Web Service will spawn when invoked in asynchronous mode. Increase or decrease depending on workload and processing resources available.
CertFactory	Default: `org.apache.axis.components.net.SunFakeTrustSocketFactory` Allowed: Name of the class that implements the certificate factory being used by the Web Service in SSL mode.	This property is applicable in SSL mode. To use security certificates, the value for this property should be set to the appropriate class name.

Log4j properties

$ENUMHOME/defaultroot/conf/NB_Server_log4J.properties is the properties file for the northbound interface log file. This section only covers most commonly used properties. For example, to turn on detailed logging, change the `log4j.category.com.lucent.qtek.enm.nb.server.NB_Server` property to a more granular setting such as DEBUG. All properties are entered in property name=value format.

The following table describes the most commonly changed properties.

Table C-2 Log4j properties

Property name	Valid value	Description
log4j.rootCategory=WARN, RollingFile	WARN, RollingFile	This property causes WARN level messages to be sent to the RollingFile (logging output file) appender. If logging to the console is desired, add Console to the comma-delimited list.
log4j.category.com.lucent.<service>	DEBUG, INFO, WARN, ERROR, FATAL	The property specifies what level of output will be logged for various portions of the software. This is where to turn the logging levels up or down for the particular service or application. • DEBUG writes debugging messages that are typically not needed once an application is in production. • INFO writes messages similar to the "verbose" mode of many applications. • WARN writes warning messages that are logged but the application can continue without a problem. • ERROR writes application error messages which are also logged. • FATAL writes critical messages that are logged before the application quits abnormally.
log4j.appender.RollingFile.File	Alphanumeric	This property specifies name and location of the logging output files.
log4j.appender.RollingFile.MaxFileSize	Numeric	This property specifies the size that the logging output file can grow to before being "rolled-over" to a backup file (refer to `log4j.appender.RollingFile.MaxBackupIndex` property).

Property name	Valid value	Description
log4j.appender.RollingFile.MaxBackupIndex	Numeric	This property defines the number of rolled-over backup logs to keep. The most recent # number of files will be kept, where # is the value specified for this property.

Sample log4j.properties file

The following is a sample *NB_Server_log4j.properties* file. Your configuration may vary from the configuration shown in this sample file.

```
# Log4J Property Settings for NB Web Service

#-------------------------------------------------------------------------
   -
#    Default Settings
#-------------------------------------------------------------------------
   -

# This sets the default level and appender(s) for the application.  The
# level here supersedes any class specific level setting.  Therefore, if
# this is set to DEBUG, everything is DEBUG regardless of class setting.

#log4j.rootCategory=WARN, Console
log4j.rootCategory=DEBUG, RollingFile

#-------------------------------------------------------------------------
   -
#    Level Settings
#-------------------------------------------------------------------------
   -

# These lines set the level for specific packages and below

log4j.category.com.lucent=ERROR
log4j.category.com.lucent.qtek.enm=DEBUG


#
# Following entry will show the Actions requested by each user (start and
# finish times)
#
log4j.category.com.lucent.qtek.enm.nb.server.NB_Server=DEBUG



#-------------------------------------------------------------------------
   -
#    Console Settings
#-------------------------------------------------------------------------
   -
```

```
# Console is set to be a ConsoleAppender.
log4j.appender.Console=org.apache.log4j.ConsoleAppender
# Console uses PatternLayout
log4j.appender.Console.layout=org.apache.log4j.PatternLayout
# Here is the pattern - it displays time as elapsed ms
log4j.appender.Console.layout.ConversionPattern=%-4r [%t](%x) %-5p %c{1}:
   %m%n

#-------------------------------------------------------------------------
   -
#    RollingFile Settings
#-------------------------------------------------------------------------
   -

# RollingFile is set to be a RollingFileAppender
log4j.appender.RollingFile=org.apache.log4j.RollingFileAppender
log4j.appender.RollingFile.File=/opt/qip62/enum/log/NB_Server_test.log
log4j.appender.RollingFile.MaxFileSize=1000KB
log4j.appender.RollingFile.MaxBackupIndex=4
# Since the logfiles rollover, we want them to append
# If we didn't want this, we'd set the following
#log4j.appender.RollingFile.Append=false
# RollingFile uses PatternLayout
log4j.appender.RollingFile.layout=org.apache.log4j.PatternLayout
# Here is the pattern - it displays the date in ISO 8601 format
log4j.appender.RollingFile.layout.ConversionPattern=%d %-5p %c{1}: %m%n

#-------------------------------------------------------------------------
   -
#   Log4J Configuration Quick Reference:
#-------------------------------------------------------------------------
   -
#
#
#   Priority order is DEBUG < INFO < WARN < ERROR < FATAL
#
#
#   PatternLayout conversion characters:
#
#    %c   Category of the logging event
#    %C   Fully qualified class name of the caller
#    %d   Date of the logging event  (example: %d{HH:mm:ss,SSS} )
#    %F   File name where the logging request was issued (caution: extremely
   slow)
#    %l   Location information of the caller (caution: extremely slow)
```

```
#    %L   Line number from where the logging request was issued (caution:
  extremely slow)
#    %m   Application-supplied message
#    %M   Method name from where the logging request was issued (caution:
  extremely slow)
#    %n   Line separator
#    %p   Priority of the logging event
#    %r   Number of milliseconds since the start of the application
#    %t   Name of the thread that generated the logging event
#    %x   Nested diagnotic context associated with the thread
#    %%   A single percent sign
#
#   Format modifiers examples:
#
#    %20c     Left pad with spaces if category is less than 20 characters long
#    %-20c    Right pad with spaces if category is less than 20 characters
  long
#    %.30c    Truncate from the beginning if category is more than 30 chars
  long
#    %20.30c  Left pad 20 chars + truncate from beginning if more than 30
  chars
#    %-20.30c Right pad 20 chars + truncate from beginning if more than 30
  chars
#
#   Examples:  "%r [%t] %-5p %c %x - %m\n"
#              "%-6r [%15.15t] %-5p %30.30c %x - %m\n"
```

Log files

Northbound interface log files

When there are communication errors and the VitalQIP Web Service cannot send a response to the northbound system, two log files are created, a log4j file and an AddDelUpd file.

log4j log

The VitalQIP Web Service log is specified by the `log4j.appender.RollingFile.File` property (described in Table C-2, "Log4j properties" (p. C-8)), for example:

```
log4j.appender.RollingFile.File=/opt/qip62/enum/log/
   NB_Server_test.log
```

AddDelUpd log

If there are any errors implementing an `AddDelUpdResp` message to the northbound system in response to an `AddDelUpdReq` message, the response is written to an error log file. The filename is:

```
$ENUMHOME/defaultroot/log/AddDelUpd_<Source>_
   <YYYY-MM-DD>_<HH:mm:ss>_<UniqueString>
```

Note: This log file is only available on the Solaris platform. The "log" directory is not created by default. You need to manually create it in *$ENUMHOME/defaultroot*.

The file contains one entry for each NAPTR record that errored and is intended to facilitate administering the interface. For more information, refer to "Northbound interface troubleshooting" (p. A-10).

Note: When one of the above log files is created, an entry is also made in the VitalQIP Web Service log.

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