Oracle ASAP™ Cartridge 1.0 for VLR

Ericsson VLR Cartridge Guide

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Cartridge Overview

ASAP cartridges are discrete software components that are developed for the ASAP product. An ASAP cartridge offers specific domain behavior on top of the core ASAP software, and provides the configuration that supports a set of services on a network element (NE).

An ASAP cartridge is not a stand-alone component, but operates in conjunction with the ASAP core product. ASAP cartridges offer the following benefits:

- **Reduced Time to Market**—time to market of new services is reduced through simplified development, implementation, and extension of cartridges on customer sites.
- **Extendable**—cartridges can be extended to include additional services and components that deliver business value, without requiring changes to the original cartridge.
- **Simplified Effort**—the effort and technical knowledge that is required to perform customizations is reduced.
- **Ease of Installation**—cartridges can be installed into an ASAP environment without interfering with the existing install base.

An ASAP cartridge can be used to configure ASAP to provision the following:

- NEs from a specific vendor, such as Nortel or Lucent.
- Technologies, such as Asynchronous Transfer Mode (ATM) and Frame Relay switches, or Internet Protocol (IP) routers.
- Services that are supported on the NE, such as ATM, IP Virtual Private Networks (VPN), Wireless, or Optical.

Cartridges are designed for a specific technology, software load, and service.

An ASAP cartridge supports a particular set of services on an NE. These services are independent of customer-specific service definitions. Professional Services or systems integrators can perform extensions to the cartridge to support customer-specific requirements.

For more information on extending a cartridge, refer to the *ASAP Cartridge Development Guide for Service Activation*.

Cartridge content

An ASAP cartridge contains the following:

- An interface to the NE
- A set of scripts, such as State Tables or Java methods
- A set of atomic actions in the form of Atomic Service Description Layer (ASDL) commands
- A set of Common Service Description Layer (CSDL) commands that form meaningful services
- Sample work orders
- Installation scripts

Prerequisites

System integrators such as managers, designers, programmers, and testers who are responsible for the adaptation and integration of ASAP-based solutions should use this manual as a reference. It assumes that readers possess the following skills:

- A knowledge of ASAP programming concepts
- A good working knowledge of the UNIX operating system
- A thorough understanding of service and network provisioning
- Familiarity with telecommunications

About this guide

This guide provides a detailed description of the Ericsson VLR (Visiter Location Register) cartridge. It contains overview and technical information to assist with extending and integrating the cartridge into a customer environment.

The scope of this guide includes ASAP as it pertains to this cartridge. It is not a complete ASAP reference guide.

For additional ASAP information when using this cartridge, refer to the following supporting documentation:

- **ASAP documentation set**—for detailed information on the ASAP core product.
- **ASAP Cartridge Development Guide for Service Activation**—for information on how to extend a cartridge.

The Ericsson VLR cartridge provides the ASAP service configuration and network element (NE) interface to activate VLR services on Ericsson AXE HLR NEs.

Services, features, and options

Table 1: Services provided in the cartridge

Service	Service Description
Add VLR	Add a VLR definition (VLR name, address, Map version to use, and Location Area Identities (LAI)).
Delete VLR	Delete a VLR definition (Delete the LAIs belonging to VLR. When all the LAIs are deleted, the VLR definition is automatically removed).
Modify VLR	Modify a VLR definition (Change VLR address and / or Map version used).
Reset VLR	Reset a VLR.
Query VLR	Query a VLR (The VLR name, address, and Map version; the LAIs are obtained).

Hardware and software requirements

The following sections contain the high-level software and hardware environment requirements for provisioning VLR services using this cartridge, including:

- Network element (NE) interface
- ASAP version
- Operating environment

Network element (NE) interface

This cartridge operates with the following:

- Ericsson AXE HLR NE with software load R9-1.

ASAP version

This cartridge was developed and tested using ASAP 4.6.4.

Operating environment

This version of ASAP operates in conjunction with the cartridge using the following operating environments:

- Operating System—Sun Solaris 2.8 or/and HP-UX 11.0i

- Database Management System—Oracle 9i
- Third-Party Software—Not applicable
- J2EE platform—BEA WebLogic 7.0.4

Connecting to the NE

The Ericsson VLR cartridge interfaces with Ericsson AXE HLR NEs using the telnet protocol over TCP/IP.

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Installing and Testing the Cartridge

This chapter describes the following procedures related to installing and testing the cartridge:

- Downloading the cartridge
- Installing the cartridge
- Uninstalling the cartridge
- Testing the cartridge installation

Starting ASAP

Before downloading the cartridge, ensure that ASAP is running.

To start ASAP

1. To start ASAP, execute the following script:

   ```
   start_asap_sys
   ```

2. Ensure the ASAP Daemon (DAM_$ENV_ID) is running by checking the ASAP status using the ASAP script “status”.
3. Check whether the WebLogic instance for this ASAP environment is running. If not, start the WebLogic instance.

The *ASAP System Configuration and Management Guide* contains more information on starting ASAP, the ASAP Daemon, and WebLogic.

Downloading the cartridge

Before you can install the cartridge, you must use the internet to download the cartridge's TAR file from Oracle's Customer Portal.

Use the following instructions to download, then unTAR the TAR file.

To download the TAR file

1. Login to Oracle MetaLink internet home page (http://www.metalink.oracle.com).
2. Download the cartridge patch to your workstation.

To unTAR the TAR file

1. On you workstation, create a repository directory—the naming of which is your choice.

   ```
   mkdir <repository dir>
   ```

2. Untar ERICSSON_HLR_9_1_VLR_1_0.tar.

   ```
   tar xvf ERICSSON_HLR_9_1_VLR_1_0.tar
   ```

3. Copy the resulting /ERICSSON_HLR_9_1_VLR directory and its contents to the repository directory.

   ```
   cp -rf /ERICSSON_HLR_9_1_VLR <repository_dir>
   ```

The directory structure in the repository directory should look like the following illustration. (this illustration describes the minimum required structure; you can enhance this directory structure with additional directories based on your requirements and deliverables).

```
<repository_directory>
   ERICSSON_HLR_9_1_VLR
      /README
      /installCartridge
      /uninstallCartridge
      /ERICSSON_HLR_9_1_VLR_1_0.sar
```

Installing the cartridge

Run the installation script installCartridge to install the cartridge. You will find this script under /ERICSSON_HLR_9_1_VLR. The script executes the following tasks:

- Configures the Ericsson VLR-specific NE using the SACT.
- Deploys the Ericsson VLR cartridge service model (only if the Ericsson VLR service model is not yet deployed) using the Service Activation Deployment Tool (SADT).
- Copies the Ericsson VLR-specific jar files and the cpp library file to the ASAP environment.
- Loads the sample work orders to the SRP database.

For information on the SACT and the SADT, refer to the *ASAP System Configuration and Management Guide*.

To install the cartridge

1. Run the installCartridge script from /ERICSSON_HLR_9_1_VLR. At the prompt, type:

   ```
   installCartridge ERICSSON_HLR_9_1_VLR_1_0.sar
   ```

2. The script prompts you for the values of the following WebLogic login parameters:

   - WebLogic Hostname
   - WebLogic HTTP Port
   - WebLogic Login User ID
   - WebLogic Login Password

   The script loads the NEP-NE configuration and the CSDL-ASDL configuration to the SARM database, and loads sample work orders to the SRP database. The script also copies the cartridge-specific jar files and cpp library file to the ASAP environment.

3. Restart ASAP to upload the cartridge configuration into ASAP.

Uninstalling the cartridge

Run the uninstallation script uninstallCartridge to uninstall the Ericsson VLR cartridge. This script is located under ERICSSON_HLR_9_1_VLR. The script executes the following tasks:

- Unconfigures Ericsson VLR-specific NEs using the SACT.
- Undeploys the Ericsson VLR cartridge service model (only if the Ericsson VLR service model is already deployed) using the Service Activation Deployment Tool (SADT).
- Removes the Ericsson VLR-specific jar files and cpp library file from the ASAP environment.

For more information on the SACT and the SADT, refer to the *ASAP System Configuration and Management Guide*.

To uninstall the cartridge

1. Run the uninstallCartridge script from /ERICSSON_HLR_9_1_VLR. At the prompt, type

   ```
   uninstallCartridge ERICSSON_HLR_9_1_VLR_1_0.<date>.<time>.sar
   ```

2. The script prompts you for the values of the following parameters:
   - WebLogic Hostname
   - WebLogic HTTP Port
   - WebLogic Login User ID
   - WebLogic Login Password

The script unloads the NEP-NE configuration and CSDL-ASDL configuration from SARM database. It also removes the cartridge specific jar files and cpp library file from the ASAP environment.

Testing the cartridge installation

To test this cartridge installation, you need to know about the network element (NE), services, and basic ASAP configuration. You may need to perform adjustments to provision a service for a specific NE, network, or connectivity configuration.

You can test the cartridge installation using one of the following methods:

- **Loopback mode**—does not actually connect to or send commands to the NE.
- **Live mode**—connects to and sends commands to a live NE.

Configuring loopback and live mode parameters

The following sections tell you which variables you must configure in ASAP.cfg to use the loopback and live testing modes.

Loopback mode

The following table details the parameters that you must set to test the cartridge in loopback mode.

Table 2: Loopback Mode Parameter Settings

Configuration Variable	Parameter Settings	Location in ASAP.cfg
LOOPBACK_ON	1 (default setting)	Global section (Loopback at the NEP)

The following are the list of NE configuration parameters:

Table 3: NE configuration parameters

Parameters	Default value	Description
HOST_IPADDR	172.28.144.120	The IP address for the remote NE host.
PORT	5000	Port number on the remote NE host to connect to.
HOST_USERID	aomp	Login user name.
HOST_PASSWORD	telce101	Login password.
OPEN_TIMEOUT	20	Connection timeout in seconds.
READ_TIMEOUT	30	Read timeout in seconds.
PROMPT	<	HLR Provisioning prompt.
RESPONSELOG	TRUE	Flag to enable the response log. Acceptable values are TRUE or FALSE.
USER_ERROR_ TYPES_FAIL	/config/Ericsson_ HLR9_1_VLR_ UserExitTypes.cfg	The configuration file containing the map between NE responses and user exit types.

Live mode

The following table details the parameters that you must set in ASAP.cfg to test the cartridge in live mode.

Table 4: Live Mode Parameter Settings

Configuration Variable	Parameter Settings	Location in ASAP.cfg
LOOPBACK_ON	0	Global section (Live)

Modifying eric_vlr_ne_config.xml

Use the following procedure to modify eric_vlr_ne_config.xml.

To modify eric_vlr_ne_config.xml

1. Create a new source directory under /ERICSSON_HLR_9_1_VLR. You can give this directory any appropriate, meaningful name you want to.

```
mkdir <new_source_directory>
```

2. Copy ERICSSON_HLR_9_1_VLR_1_0.sar to this new source directory.

   ```
   cp ERICSSON_HLR_9_1_VLR_1_0.sar ./<new_source_directory>
   ```

3. Change directory to <new_source_directory>.

   ```
   cd <new_source_directory>
   ```

4. Un-jar ERICSSON_HLR_9_1_VLR_1_0.sar This extracts the contents of the sar file (see Figure 1 on page 11 for an example of the resulting file structure).

   ```
   jar xvf ERICSSON_HLR_9_1_VLR_1_0.sar
   ```

5. Edit <new_source_directory>/ERICSSON_HLR_9_1_VLR/common/application_config/eric_vlr_ne_config.xml with the appropriate changes.

6. Create a new sar file at the <new_source_directory> level.

   ```
   CreateSar $PWD
   ```

7. Uninstall the cartridge using ERICSSON_HLR_9_1_VLR_1_0.sar in /ERICSSON_HLR_9_1_VLR (That is, use the original sar file that you copied in Step 2 above—see "Uninstalling the cartridge" on page 7 for uninstallation instructions).

8. After you uninstall the cartridge, rename the sar file in /ERICSSON_HLR_9_1_VLR so you have a backup copy of it.

9. Copy the new sar file from <new_source_directory> to /ERICSSON_HLR_9_1_VLR.

10. Reinstall the cartridge (see "Installing the cartridge" on page 7 for installation instructions).

```
META-INF/activation-model.xml
Ericsson/
   HLR_9_1_VLR/
      common/
         application_config/
         control/
            PLSQL/
         cpp/
            lib/
         java/
            lib/
         nep/
            PLSQL/
         sarm/
            ne_progs/
            PLSQL/
         scripts/
         service_model/
      vlr/
         control/
            PLSQL/
         cpp/
            lib/
         java/
            classes/
            lib/
            src/
         nep/
            PLSQL/
         sample_wo/
         sarm/
            ne_progs/
            PLSQL/
         service_model/{at least one .xml file}
```

Figure 1: File Structure of the Un-Jared .sar File

Testing the installation

The following procedure describes the steps required to test the cartridge installation in loopback mode. We recommend that you perform the initial cartridge installation test in loopback mode.

To test in loopback mode

1. Stop ASAP by typing the following command at the UNIX prompt:

   ```
   stop_asap_sys
   ```

2. Ensure loop back mode is on. See "Loopback mode" on page 8 for a description of how to set the loop back parameter to "On".

3. Start ASAP by typing:

   ```
   start_asap_sys
   ```

4. Send the sample work orders through the SRP Emulator by typing:

   ```
   run_suite $SRP <ctrl_password> <suite name>
   ```

   You can locate the suite names in /ERICSSON_HLR_9_1_VLR/Ericsson/HLR_9_1_VLR/vlr/sample_wo by typing:

   ```
   grep   SUITE * | grep -v END
   ```

   A list of all available suites appears.

   To see the sample work orders, refer to Viewing the sample work orders, below.

   For more information on the SRP Emulator, refer to the *ASAP System Configuration and Management Guide*.

5. Verify the status of the sample work orders by typing:

   ```
   asap_utils l
   ```

   All successful work orders return the 104 state.

   To view the sample work orders provided with this cartridge, refer to the Ericsson VLR cartridge source.

Viewing the sample work orders

You find the sample work orders under the sample_wo directory in the sar file. The following procedure describes how to view the sample work orders.

To view the sample work orders

1. If necessary, create a repository directory under /ERICSSON_HLR_9_1_VLR, copy the sar file to the new directory and un-jar the sar file, as described by Step 1 through Step 4 in "Modifying eric_vlr_ne_config.xml" on page 9.

2. Locate and view the sample work order files under ERICSSON_HLR_9_1_VLR/Ericsson/HLR_9_1_VLR/vlr/sample_wo.

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Atomic Service Description Layer (ASDL) Commands

ASDL commands represent a set of atomic actions that ASAP can perform on a network element (NE). ASAP can combine ASDLs to create meaningful services (CSDLs) within a cartridge.

This chapter presents detailed information on the ASDL parameters that we provide with this cartridge. The following table lists and describes the type of parameter information that is included.

Table 5: ASDL parameter information

Item	Description
Parameter Name	Identifies the parameter that is configured for the stated service.
Description	Describes the parameter.
Range	Describes or lists the range of values that can be used to satisfy this parameter.
Default Value	Configures a default value for the parameter so that it is not mandatory for the upstream system to provide a value.

Table 5: ASDL parameter information

Item	Description
Type	Indicates one of the following parameter types: ◆ S—Scalar, specifies the parameter label transmitted on the ASDL command. Scalar parameters are conventional name-value pair parameters. ◆ C—Compound, specifies the base name of the compound parameter transmitted on the ASDL command. A compound parameter contains structures or arrays of information that are represented by a particular structure name or compound parameter name. Each compound parameter can contain a large number of elements. If you use compound parameters, you only require a single entry in the ASAP translation tables to call the compound parameter and all its associated parameter elements. ◆ I—Indexed, identifies a parameter that contains a sequential numerical index value to tell the SARM that it should execute the same operation (for example, an ASDL command) for all occurrences of that index. Consequently, if there are several options on a particular CSDL command (OPT1, OPT2, OPT3, etc.), you can specify the OPT parameter as an indexed parameter. When you specify the OPT parameter as an indexed parameter, the SARM generates several occurrences of that same ASDL command and each command has a different value for the option being transmitted to the NEP. For more information on parameter types, refer to the *ASAP Developer's Reference*.
Class	Indicates one of the following parameter classifications: ◆ R—Required scalar parameter ◆ O—Optional scalar parameter ◆ C—Required compound parameter ◆ N—Optional compound parameter ◆ M—Mandatory indexed parameter ◆ I—Optional indexed parameter ◆ S—Parameter count

For a detailed description of the Required and Optional parameter classifications, refer to the *ASAP System Configuration and Management Guide.*

VLR service pack

The Ericsson VLR cartridge provides the following ASDL commands to support VLR service on Ericsson AXE HLR NEs:

- A_ERIC-HLR_R9-1_ADD_VLR
- A_ERIC-HLR_R9-1_DELETE_VLR
- A_ERIC-HLR_R9-1_MODIFY_VLR
- A_ERIC-HLR_R9-1_QUERY_VLR
- A_ERIC-HLR_R9-1_RESET_VLR

A_ERIC-HLR_R9-1_ADD_VLR

Add a VLR definition. It is implemented by the Java method **com.metasolv.cartridge.oss.eric_vlr_r91.prov.VLRProvisioning.addVLR.**

Table 6: A_ERIC-HLR_R9-1_ADD_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MCLI	Remote network element name.			S	R
VLR	Visitor Location Register (VLR) symbolic name.			S	R
VLRADDR	Cooperating VLR address.			S	O
MAPV	MAP version.			S	O
LAI	Location Area Identities.			S	R

MML commands

```
MGCVI:VLR=vlr[,VLRADDR=vlraddr,MAPV=mapv],LAI=lai...;
```

Table 7: MML command parameters

Parameter	Description
LAI=lai	Location Area Identity.
MAPV=mapv	MAP protocol version.
VLR=vlr	Symbolic name of the cooperating VLR.

Table 7: MML command parameters

Parameter	Description
VLRADDR=vlraddr	Cooperating VLR address, expressed as **na-ai** where: **na**—Nature of address indicator, where: ◆ **3**—National number ◆ **4**—International number **ai**—Address information. It is a numeral of 5 to 15 decimal digits, and includes the country code.

Example 1

```
MGCVI:VLR=PATRAS,VLRADDR=3-468765,MAPV=MAP-1,LAI=054-32-8;
```

A VLR called PATRAS is defined as cooperating VLR. The address of the specified VLR is defined in national format. One location area connected to the MSC of the cooperating VLR is defined.

Example 2

```
MGCVI:VLR=PATRAS,LAI=054-32-9&&-11;
```

The VLR PATRAS is already defined as cooperating by the above mentioned command. Three new LAIs are added for this VLR.

Example 3

```
MGCVI:VLR=PARIS,VLRADDR=4-35868765,MAPV=MAP-1,LAI=250-83-8&250-83-14;
```

A VLR called PARIS is defined as cooperating VLR. The address of the specified VLR is defined in international format. Two location areas connected to the MSC of the cooperating VLR are defined.

A_ERIC-HLR_R9-1_DELETE_VLR

Delete a VLR definition. It is implemented by the Java method **com.metasolv.cartridge.oss.eric_vlr_r91.prov.VLRProvisioning.deleteVLR.**

Table 8: A_ERIC-HLR_R9-1_DELETE_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MCLI	Remote network element name.			S	R

Table 8: A_ERIC-HLR_R9-1_DELETE_VLR

Parameter Name	Description	Range	Default Value	Type	Class
VLR	VLR symbolic name.			S	R
LAI	Location Area Identities.			S	R

MML commands

```
MGCVE:VLR=vlr,LAI=lai...;
```

Table 9: MML command parameters

Parameter	Description
LAI=lai	Location Area Identity.
VLR=vlr	Symbolic name of the cooperating VLR.

Example

```
MGCVE:VLR=ATHENS,LAI=345-56-3&-4;
```

The location areas 345-56-3 and 345-56-4, defined for the VLR called ATHENS, are removed.

A_ERIC-HLR_R9-1_MODIFY_VLR

Modify a VLR definition. It is implemented by the Java method **com.metasolv.cartridge.oss.eric_vlr_r91.prov.VLRProvisioning.modifyVLR.**

Table 10: A_ERIC-HLR_R9-1_MODIFY_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MCLI	Remote network element name.			S	R
VLR	VLR symbolic name.			S	R
VLRADDR	Cooperating VLR address.			S	O
MAPV	MAP version.			S	O

MML Commands

```
              /                                  \
MGCVC:VLR=vlr+[,VLRADDR=vlraddr][,MAPV=mapv]+;
              \                                  /
```

Table 11: MML command parameters

Parameter	Description
MAPV=mapv	MAP protocol version.
VLR=vlr	Symbolic name of the cooperating VLR.
VLRADDR=vlraddr	Cooperating VLR address, expressed as **na-ai** where: **na**—Nature of address indicator. Either: ◆ **3**—National number ◆ **4**—International number **ai**—Address information. It is a numeral of 5 to 15 decimal digits, and includes the country code.

Example 1

```
MGCVC:VLR=ATHENS,VLRADDR=4-3023000;
```

The VLR address data for a cooperating VLR called ATHENS is changed. A new address is given in international format.

Example 2

```
MGCVC:VLR=ATHENS,MAPV=MAP-1;
```

The MAP version to be used for a cooperating VLR called ATHENS is changed. MAP version 1 is used for communication.

Example 3

```
MGCVC:VLR=ATHENS,VLRADDR=3-567930,MAPV=MAP-2;
```

The VLR address data and MAP version for a cooperating VLR called ATHENS is changed. A new address is given in national format. MAP version 2 is used for communication.

A_ERIC-HLR_R9-1_QUERY_VLR

Query a VLR. It is implemented by the Java method **com.metasolv.cartridge.oss.eric_vlr_r91.prov.VLRProvisioning.queryVLR.**

Table 12: A_ERIC-HLR_R9-1_QUERY_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MCLI	Remote network element name.			S	R
VLR	The symbolic name of the VLR to be queried.			S	R

MML commands

```
MGCVP:VLR=vlr;
```

Table 13: MML command parameters

Parameter	Description
VLR=vlr	Symbolic name of the cooperating VLR.

Example

```
MGCVP:VLR=ATHENS;
```

The data for cooperating VLR ATHENS will be printed.

A_ERIC-HLR_R9-1_RESET_VLR

Reset a VLR. It is implemented by the Java method **com.metasolv.cartridge.oss.eric_vlr_r91.prov.VLRProvisioning.resetVLR.**

Table 14: A_ERIC-HLR_R9-1_RESET_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MCLI	Remote network element name.			S	R

Table 14: A_ERIC-HLR_R9-1_RESET_VLR

Parameter Name	Description	Range	Default Value	Type	Class
VLRADDS	VLR address, address range, or a string "ALL", indicating that all VLRs registered need to be reset. VLR address number series is expressed as **na-ai** where: **na**=nature of address indicator. ◆ **3**=National significant number. ◆ **4**= International number. **ai**=Address information. ◆ Digit string 1-15 digits, where each digit is 0-9. **ALL**=All VLRs registered in the HLR.			S	R
REDHLR	Redundant Home Location Register (HLR) number indicator.	TRUE or FALSE		S	O

MML commands

```
                /       \
                |vlradds|
HGREI:VLRADDS=+       +[,REDHLR];
                |ALL    |
                \       /
```

Table 15: MML command parameters

Parameter	Description
REDHLR	Redundant Home Location Register (HLR) number indicator. Application system dependent parameter.

Table 15: MML command parameters

Parameter	Description
VLRADDS=vlradds	VLR address number series, expressed as **na-ai**, where: **na**—Nature of address indicator. Either: ◆ **3**—National significant number ◆ **4**—International number **ai**—Address information. Is a digit string of 1 to 15 digits, where each digit is 0 to 9. **ALL**—All VLRs registered in HLR.

Example 1

```
HGREI:VLRADDS=4-34086734652;
```

The MAP operation RESET is sent to the VLRs with addresses registered in the HLR, with international format, starting with the digits 34086734652.

Example 2

```
HGREI:VLRADDS=3-95;
```

The MAP operation RESET is sent to the VLRs with addresses registered in the HLR, with national format, starting with the digits 95.

Example 3

```
HGREI:VLRADDS=ALL;
```

The MAP operation RESET is sent to every VLR with addresses registered in the HLR.

Example 4

```
HGREI:VLRADDS=ALL,REDHLR;
```

The MAP operation RESET with the redundant HLR number is sent to every VLR, with an address registered in the HLR.

Example 5

```
HGREI:VLRADDS=4-19,REDHLR;
```

The MAP operation RESET with the redundant HLR number is sent to the VLRs with addresses registered in the HLR, with international format, starting with the digits 19.

User-defined exit types

The user defined exit types which maps to the NE response string are placed in file Ericsson_HLR9_1_VLR_UserExitTypes.cfg. The following table lists the contents of the file. The user has full control over this file. Additional error codes can be added to this file by the user as and when they are discovered. The user exit types defined in this file must exist in tbl_user_err and should be mapped to a ASAP exit type in tbl_user_err.

If this file is removed or path is incorrect, the user exit type will default to ERVLR_NO_MATCH and this maps to ASAP exit type FAIL.

Table 16: User-defined exit types

ERROR CODE	USER EXIT TYPE
NOT EXECUTED	ERVLR_NOT_EXECUTED
PARTLY EXECUTED	ERVLR_PART_EXECUTED
ORDERED	ERVLR_ORDERED
EXECUTED	SUCCEED
FUNCTION BUSY	ERVLR_FUNCTION_BUSY
FORMAT ERROR	ERVLR_FORMAT_ERROR
UNREASONABLE VALUE	ERVLR_UNREASON_VALUE
FAULT CODE 89	ERVLR_FCODE_89
FAULT CODE 90	ERVLR_FCODE_90
FAULT CODE 91	ERVLR_FCODE_91
FAULT CODE 92	ERVLR_FCODE_92
FAULT CODE 93	ERVLR_FCODE_93
FAULT CODE 94	ERVLR_FCODE_94
FAULT CODE 96	ERVLR_FCODE_96
FAULT CODE 97	ERVLR_FCODE_97
FAULT CODE 98	ERVLR_FCODE_98
FAULT CODE 99	ERVLR_FCODE_99
FAULT CODE 100	ERVLR_FCODE_100

Table 16: User-defined exit types

ERROR CODE	USER EXIT TYPE
FAULT CODE 101	ERVLR_FCODE_101
FAULT CODE 136	ERVLR_FCODE_136
FAULT CODE 162	ERVLR_FCODE_162
FAULT CODE 165	ERVLR_FCODE_165
ANSWER PRINTOUT	SUCCEED
NOT ACCEPTED	FAIL
END	SUCCEED
MT COOPERATING VLR DATA	SUCCEED

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Service Definition

The Ericsson VLR cartridge contains a set of CSDLs that map to one or more ASDL commands. You can also create additional CSDLs that map to existing and newly-created ASDLs. An upstream system can assemble any of these CSDL commands onto a work order for provisioning.

This chapter presents detailed information on the CSDL parameters that we provide in this cartridge. The following table lists and describes the type of parameter information that is included.

Table 17: CSDL parameter information

Item	Description
Parameter Name	Identifies the parameter that is configured for the stated service.
Description	Describes the parameter.
Range	Describes or lists the range of values that can be used to satisfy this parameter.
Default Value	Configures a default value for the parameter so that it is not mandatory for the upstream system to provide a value.

Table 17: CSDL parameter information

Item	Description
Type	Indicates one of the following parameter types: ◆ S—Scalar, specifies the parameter label transmitted on the CSDL command. Scalar parameters are conventional name-value pair parameters. ◆ C—Compound, specifies the base name of the compound parameter transmitted on the CSDL command. A compound parameter contains structures or arrays of information that are represented by a particular structure name or compound parameter name. Each compound parameter can contain a large number of elements. If you use compound parameters, you only require a single entry in the ASAP translation tables to call the compound parameter and all its associated parameter elements. ◆ I—Indexed, identifies a parameter that contains a sequential numerical index value to tell the SARM that it should execute the same operation (for example, an ASDL command) for all occurrences of that index. Consequently, if there are several options on a particular CSDL command (OPT1, OPT2, OPT3, etc.), you can specify the OPT parameter as an indexed parameter. When you specify the OPT parameter as an indexed parameter, the SARM generates several occurrences of that same ASDL command and each command has a different value for the option being transmitted to the NEP. For more information on parameter types, refer to the *ASAP Developer's Reference*.
Class	Indicates one of the following parameter classifications: ◆ R—Required scalar parameter ◆ O—Optional scalar parameter ◆ C—Required compound parameter ◆ N—Optional compound parameter ◆ M—Mandatory indexed parameter ◆ I—Optional indexed parameter ◆ S—Parameter count

For a detailed description of the Required and Optional parameter classifications, refer to the *ASAP System Configuration and Management Guide.*

Common Service Description Layer (CSDL) commands

This cartridge provides the following CSDL commands:

- C_ERIC-HLR_R9-1_ADD_VLR
- C_ERIC-HLR_R9-1_DELETE_VLR
- C_ERIC-HLR_R9-1_MODIFY_VLR
- C_ERIC-HLR_R9-1_QUERY_VLR
- C_ERIC-HLR_R9-1_RESET_VLR

C_ERIC-HLR_R9-1_ADD_VLR

Add a VLR definition.

Table 18: C_ERIC-HLR_R9-1_ADD_VLR

Parameter Name	Description	Range	Default Value	Type	Class
LAI	Location Area Identities.			S	R
MAPV	MAP version.			S	O
NE_ID_ERIC-HLR_R9-1_VLR	Remote network element name.			S	R
VLR	VLR symbolic name.			S	R
VLRADDR	Cooperating VLR address.			S	O

Mapping to ASDLs

The following table illustrates the CSDL to ASDL mapping for this service.

Table 19: CSDL to ASDL Mapping

CSDL	ASDL
C_ERIC-HLR_R9-1_ADD_VLR	A_ERIC-HLR_R9-1_ADD_VLR

C_ERIC-HLR_R9-1_DELETE_VLR

Delete a VLR definition.

Table 20: C_ERIC-HLR_R9-1_DELETE_VLR

Parameter Name	Description	Range	Default Value	Type	Class
LAI	Location Area Identities.			S	R

Table 20: C_ERIC-HLR_R9-1_DELETE_VLR

Parameter Name	Description	Range	Default Value	Type	Class
NE_ID_ERIC-HLR_R9-1_VLR	Remote network element name.			S	R
VLR	VLR symbolic name.			S	R

Mapping to ASDLs

The following table illustrates the CSDL to ASDL mapping for this service.

Table 21: CSDL to ASDL Mapping

CSDL	ASDL
C_ERIC-HLR_R9-1_DELETE_VLR	A_ERIC-HLR_R9-1_DELETE_VLR

C_ERIC-HLR_R9-1_MODIFY_VLR

Modify a VLR definition.

Table 22: C_ERIC-HLR_R9-1_MODIFY_VLR

Parameter Name	Description	Range	Default Value	Type	Class
MAPV	MAP version.			S	O
NE_ID_ERIC-HLR_R9-1_VLR	Remote network element name.			S	R
VLR	VLR symbolic name.			S	R
VLRADDR	Cooperating VLR address.			S	O

Mapping to ASDLs

The following table illustrates the CSDL to ASDL mapping for this service.

Table 23: CSDL to ASDL Mapping

CSDL	ASDL
C_ERIC-HLR_R9-1_MODIFY_VLR	A_ERIC-HLR_R9-1_MODIFY_VLR

C_ERIC-HLR_R9-1_QUERY_VLR

Query a VLR.

Table 24: C_ERIC-HLR_R9-1_QUERY_VLR

Parameter Name	Description	Range	Default Value	Type	Class
NE_ID_ERIC-HLR_R9-1_VLR	Remote network element name.			S	R
VLR	The symbolic name of the VLR to be queried.			S	R

Mapping to ASDLs

The following table illustrates the CSDL to ASDL mapping for this service.

Table 25: CSDL to ASDL Mapping

CSDL	ASDL
C_ERIC-HLR_R9-1_QUERY_VLR	A_ERIC-HLR_R9-1_QUERY_VLR

C_ERIC-HLR_R9-1_RESET_VLR

Reset a VLR.

Table 26: C_ERIC-HLR_R9-1_RESET_VLR

Parameter Name	Description	Range	Default Value	Type	Class
NE_ID_ERIC-HLR_R9-1_VLR	Remote network element name.			S	R
REDHLR	Redundant Home Location Register (HLR) number indicator.	TRUE or FALSE		S	O

Table 26: C_ERIC-HLR_R9-1_RESET_VLR

Parameter Name	Description	Range	Default Value	Type	Class
VLRADDS	VLR address, address range, or a string "ALL", indicating that all VLRs registered need to be reset. VLR address number series is expressed as **na-ai** where: **na**=nature of address indicator. ◆ 3=National significant number. ◆ 4= International number. **ai**=Address information. ◆ Digit string 1-15 digits, where each digit is 0-9. **ALL**=All VLRs registered in the HLR.			S	R

Mapping to ASDLs

The following table illustrates the CSDL to ASDL mapping for this service.

Table 27: CSDL to ASDL Mapping

CSDL	ASDL
C_ERIC-HLR_R9-1_RESET_VLR	A_ERIC-HLR_R9-1_RESET_VLR

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Configuring ASAP to Support Additional NE Instances

You can configure ASAP to support the Ericsson AXE HLR - NEP configuration using the Service Activation Configuration Tool (SACT). Refer to the *ASAP System Configuration and Management Guide* fore more information.

Below is an example of the activation configuration XML file (eric_vlr_ne_config.xml) for the Ericsson VLR cartridge.

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XML Spy v4.3 U (http://www.xmlspy.com) by Nortel Net-
  works (Nortel Networks) -->
<activationConfig xmlns="http://www.metasolv.com/ServiceActivation/
  2003/ActivationConfig" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
  instance" xsi:schemaLocation="http://www.metasolv.com/ServiceActi-
  vation/2003/ActivationConfig
C:\data\ASAP\4.6\xsd\ActivationConfig.xsd">
   <connectionPool name="ERVLRPOL">
      <device name="ericvlrr91_telnet_dev1">
         <environment>MY_ASAP_SYS</environment>
         <lineType>TELNET_CONNECTION</lineType>
      </device>
   </connectionPool>
   <element name="ERIC-HLR_R9-1_VLR-HOST">
      <technology>ERIC-HLR</technology>
      <softwareLoad>R9-1</softwareLoad>
      <nepServerName>$NEP</nepServerName>
      <primaryPool>ERVLRPOL</primaryPool>
      <maximumConnections>16</maximumConnections>
      <dropTimeout>2</dropTimeout>
      <spawnThreshold>10</spawnThreshold>
      <killThreshold>8</killThreshold>
      <routingElement name="ERIC-HLR_R9-1_VLR-HOST">
         <atomicService/>
      </routingElement>
      <communicationParameter>
         <label>HOST_IPADDR</label>
         <value>
            <value>172.28.144.120</value>
         </value>
         <description>The network IP Address for the NE host</descrip-
  tion>
         <deviceName>COMMON_DEVICE_CFG</deviceName>
         <lineType>TELNET_CONNECTION</lineType>
      </communicationParameter>
```

```
    <communicationParameter>
       <label>PORT</label>
       <value>
          <value>5000</value>
       </value>
       <description>Telnet port</description>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
    <communicationParameter>
       <label>OPEN_TIMEOUT</label>
       <value>
          <value>20</value>
       </value>
       <description>Connection timeout in seconds</description>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
    <communicationParameter>
       <label>READ_TIMEOUT</label>
       <value>
          <value>30</value>
       </value>
       <description>Read timeout in seconds</description>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
    <communicationParameter>
       <label>PROMPT</label>
       <value>
          <value>&lt;</value>
       </value>
       <description>HLR Provisioning prompt</description>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
    <communicationParameter>
       <label>RESPONSELOG</label>
       <value>
          <value>TRUE</value>
       </value>
       <description>Flag to turn on or off response logging</de-
scription>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
    <communicationParameter>
       <label>USER_ERROR_TYPES_FILE</label>
       <value>
          <value>/config/Ericsson_HLR9_1_VLR_UserExitTypes.cfg</
value>
       </value>
       <description>This is User Exit Types file. This file is rel-
ative to ASAP_BASE directory</description>
       <deviceName>COMMON_DEVICE_CFG</deviceName>
       <lineType>TELNET_CONNECTION</lineType>
    </communicationParameter>
```

```
        <communicationParameter>
           <label>LOGIN_PROMPT</label>
           <value>
              <value>login:</value>
           </value>
           <description>This is  the login prompt for NE</description>
           <deviceName>COMMON_DEVICE_CFG</deviceName>
           <lineType>TELNET_CONNECTION</lineType>
        </communicationParameter>
        <communicationParameter>
           <label>HOST_USERID</label>
           <value>
              <value>aomp</value>
           </value>
           <description>The login user name</description>
           <deviceName>COMMON_DEVICE_CFG</deviceName>
           <lineType>TELNET_CONNECTION</lineType>
        </communicationParameter>
        <communicationParameter>
           <label>PASSWORD_PROMPT</label>
           <value>
              <value>Password:</value>
           </value>
           <description>The password prompt for the NE</description>
           <deviceName>COMMON_DEVICE_CFG</deviceName>
           <lineType>TELNET_CONNECTION</lineType>
        </communicationParameter>
        <communicationParameter>
           <label>HOST_PASSWORD</label>
           <value>
              <value>telce101</value>
           </value>
           <description>The login password</description>
           <deviceName>COMMON_DEVICE_CFG</deviceName>
           <lineType>TELNET_CONNECTION</lineType>
        </communicationParameter>
     </element>
</activationConfig>
```

Extracting source files

Before you can access an XML file to modify it, you must extract it from the sar file. Use the following procedure to extract source files from the sar file.

To extract source files

1. If necessary, create a repository directory under /ERICSSON_HLR_9_1_VLR, copy the .sar file to the new directory and un-jar the sar file, as described by Step 2 through Step 4 in “Modifying eric_vlr_ne_config.xml” on page 9.
2. After you un-jar the sar file, you can access the XML files.

Loading a new XML file

When you finish modifying an XML, you must create a new sar file, then restart the cartridge using the new file.

Follow the instructions in "Modifying eric_vlr_ne_config.xml" on page 9 for directions on how to load a new XML file.