Oracle® Communications EAGLE Query Server

User's Guide

Release 1.0

E83905 Revision 1

February 2017

ORACLE®

Table of Contents

List of Figures

List of Tables

Chapter

1

Introduction

Topics:

This chapter contains an overview of the information related to the EAGLE Query Server. Contents include sections on the scope and audience of the documentation, the organization of this guide, how to find related publications, and how to receive customer support assistance.

Overview

This user's guide contains information needed to configure the EAGLE Query Server. Topics include a general description of the Query Server, menu details, configuration information, and database schema information.

Scope and Audience

This user's guide is written for system administrators and persons responsible for configuring the EAGLE Query Server. The guide provides an overview of the Query Server and guidance in the task of configuration.

The guide assumes the system administrator is familiar with the current EPAP functionality.

Documentation Admonishments

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

Table 1: Admonishments

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

Manual Organization

This user's guide contains the following chapters and appendix:

- *Introduction* contains general information about the organization of the user's guide and a brief description of the EAGLE Query Server.
- *EAGLE Query Server Overview* provides an overview of the Query Server, including architecture information, hardware requirements, and the command line interface.
- *Configuring the EAGLE Query Server* describes how to configure the Master and Slave Query Server, including menu options and the MySQL Query Client menu.
- *EAGLE Query Server Database Schema* describes how users are able to use the MySQL database schema to access data, including EAGLE QS ASCII schema examples and table and field definitions.

My Oracle Support (MOS)

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

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

1. Select **2** for New Service Request
2. Select **3** for Hardware, Networking and Solaris Operating System Support
3. Select one of the following options:

    - For Technical issues such as creating a new Service Request (SR), Select **1**
    - For Non-technical issues such as registration or assistance with MOS, Select **2**

You will be connected to a live agent who can assist you with MOS registration and opening a support ticket.

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

Emergency Response

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

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

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

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

Related Specifications

For information about additional publications related to this document, refer to the Oracle Help Center site. See *Locate Product Documentation on the Oracle Help Center Site* for more information on related product publications.

Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training:

http://education.oracle.com/communication

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site:

www.oracle.com/education/contacts

Locate Product Documentation on the Oracle Help Center Site

Oracle Communications customer documentation is available on the web at the Oracle Help Center (OHC) site, *http://docs.oracle.com*. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at *http://www.adobe.com*.

1. Access the Oracle Help Center site at *http://docs.oracle.com*.
2. Click **Industries**.
3. Under the Oracle Communications subheading, click the **Oracle Communications documentation** link.
   The Communications Documentation page appears. Most products covered by these documentation sets will appear under the headings "Network Session Delivery and Control Infrastructure" or "Platforms."
4. Click on your Product and then the Release Number.
   A list of the entire documentation set for the selected product and release appears.

5. To download a file to your location, right-click the **PDF** link, select **Save target as** (or similar command based on your browser), and save to a local folder.

Chapter

2

EAGLE Query Server Overview

Topics:

This chapter provides an overview of the Query Server, including architecture information, hardware requirements, and the command line interface (CLI).

Overview

The EAGLE Query Server maintains a real-time copy of the PDBA database in order for the read access from the PDB to be permitted on the EAGLE Query Server. Introducing an EAGLE Query Server architecture allows offloading READ access from the EPAP PDB. The EAGLE Query Servers also offer standard query interfaces, such as MySQL, to access the data (Mobile Number Portability DB), which come in addition to the current PDBI interface available on the PDB.

There are two types of EAGLE Query Servers:

1. Master EAGLE QS
2. Slave EAGLE QS

The Master EAGLE QS communicates directly with the provisioning EPAP. The Slave EAGLE QS communicates with the Master EAGLE QS.

The following IP-based connections present on the EAGLE QS communicate externally:

1. Provisionable EPAP Network - The Provisioning EPAP Network is used to connect the Master QS with a Provisionable EPAP (either a mixed EPAP or Standalone PDB). The `epapconfig` utility at the EPAP server is used to configure the Master QS. The user is able to configure both IPv4 and IPv6 addresses on the Provisionable EPAP in order to establish a connection with the Master QS.
2. Slave EAGLE QS Network - This network is used to connect the Master QS with the Slave QS. The `qsconfig` utility on the Master QS is used to configure the Slave EAGLE QS. This configuration of the Slave QS is available on the Master EAGLE QS only. The user is able to configure both IPv4 and IPv6 addresses in order to establish a connection with the Slave QS.
3. MySQL Query Client Network - The `qsconfig` utility is used to configure the MySQL Query Client at the EAGLE QS so that a remote user is able to connect to the EAGLE QS MySQL and access the database. The user is able to configure both IPv4 and IPv6 addresses in order to establish a connection with the MySQL Query Client.

Architecture

The following image illustrates the EAGLE Query Server architecture:
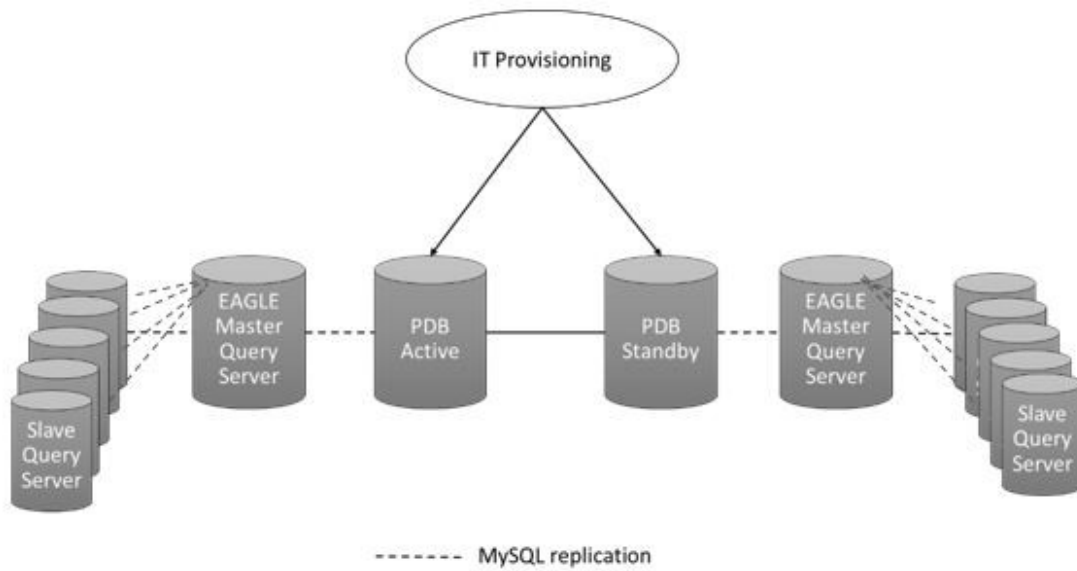
Figure 1: EAGLE Query Server Architecture

Hardware Considerations

The Master and Slave EAGLE QS has the following minimum hardware requirements:

Table 2: Hardware Setup Detail

Server Type	OS	Release	Arch	Processor	Number of Core	Available Disk Space for Application	Memory Size
VM	Oracle Linux/RHEL	6.7 or later	X86_64	Intel® Xeon® CPU L5410 @2.33GHz	16	500 GB	16 GB

Command Line Interface

The EAGLE Query Server configuration user created in *Create Non-Root User* executes the `qsui.pl` script, which allows the user to configure the EAGLE QS as either Master or Slave. The same utility is also used to configure the external servers like Slave EAGLE QS and MySQL Query clients. The main menu of the configuration utility is changed according to the configuration of the EAGLE QS as Master or Slave.

Appendix
A

Configuring the EAGLE Query Server

Topics:

This appendix provides detailed menu options, as well as configuration procedures to get the query server up-and-running.

Create Non-Root User

The EAGLE QS provides the "updatePrivilegesForUser.sh" script in order to create the admin user and configuration user for EAGLE QS. MySQL services are stopped on the EAGLE QS before the creation of the non-root users. This script is placed on the `/var/QS/bin` directory of the EAGLE QS. Execute the following command in order to create the non-root users:

```
# /var/QS/bin/updatePrivilegesForUser.sh
```

```
Enter the admin user :<admin_user>
New password :<password>
Retype new password :<password>
passwd: all authentication tokens updated successfully.
Enter the config user :<config_user>
New password :<password>
Retype new password :<password>
passwd: all authentication tokens updated successfully.
Enter the group name for <admin_user> and <config> :<group_name>
INFO: Updating the user privileges and changing directory permissions.
```

Initial EAGLE Query Server Configuration

The first time a configuration user logs in to the system, the initial configuration must be performed. A caution is displayed and the user enters **Y** to start the configuration; the EuiDB database is built. Execute the `# su - <config_user>` command for initial EAGLE Query Server Configuration. The following figure illustrates user-prompted action:

```
Caution: This is the first login of the text user interface.
         Failure to enter complete and accurate information at this
         time will have unpredictable results.

         You must be prepared to designate this QS as Master or Slave

Press return to continue...▮
```

Figure 2: Initial Configuration

Main Menu

The EAGLE Query Server Main Menu displays the following menu options for Master and Slave:

Master EAGLE QS Main Menu

```
Enter the EAGLE Query Server Type (1 for Master, 2 for Slave): 1


Master EAGLE Query Server
HostName: ORA-2-70
Software Version: 1_1.0
Mon Jan  2 14:07:19 IST 2017


 /-----EAGLE Query Server Configuration Menu-\
/--------------------------------------------\
|  1 | Configure Slave Query Server          |
|----|---------------------------------------|
|  2 | Configure MySQL Query Client          |
|----|---------------------------------------|
|  3 | Platform Menu                         |
|----|---------------------------------------|
|  e | Exit                                  |
\--------------------------------------------/


Enter Choice: █
```

Figure 3: Master EAGLE QS Main Menu

Slave EAGLE QS Main Menu

```
Slave EAGLE Query Server
HostName: ORA-2-71
Software Version: 1_1.2
Mon Jan  2 15:44:09 IST 2017


 /-----EAGLE Query Server Configuration Menu-\
/--------------------------------------------\
|  1 | Configure MySQL Query Client          |
|----|---------------------------------------|
|  2 | Platform Menu                         |
|----|---------------------------------------|
|  e | Exit                                  |
\--------------------------------------------/


Enter Choice: █
```

Figure 4: Slave EAGLE QS Main Menu

Platform Menu

The EAGLE Query Server Platform Menu displays the following menu options for Master and Slave:

Master EAGLE QS Platform Menu

```
Master EAGLE Query Server
HostName: ORA-2-70
Software Version: 1_1.0
Mon Jan  2 14:29:35 IST 2017


  /-----EAGLE Query Server Platform Menu-\
 /--------------------------------------\
 |  1 | Restore DB                      |
 |----|---------------------------------|
 |  2 | Create MASTER Snapshot          |
 |----|---------------------------------|
 |  3 | Reboot                          |
 |----|---------------------------------|
 |  e | Exit                            |
 \--------------------------------------/

Enter Choice: █
```

Figure 5: Master EAGLE QS Platform Menu

Slave EAGLE QS Platform Menu

```
Slave EAGLE Query Server
HostName: ORA-2-71
Software Version: 1_1.2
Mon Jan  2 15:48:50 IST 2017


  /-----EAGLE Query Server Platform Menu-\
 /--------------------------------------\
 |  1 | Restore DB                      |
 |----|---------------------------------|
 |  2 | Reboot                          |
 |----|---------------------------------|
 |  e | Exit                            |
 \--------------------------------------/

Enter Choice: █
```

Figure 6: Slave EAGLE QS Platform Menu

Restore DB Platform Menu

The **Restore DB** option is available on both the Master and Slave QS. The PDB snapshot is restored the Master QS. The ASCII format snapshot is restored on the Slave QS. The PDB snapshot is copied from the Provisionable EPAP. The ASCII format snapshot is created on the Master QS.

```
Enter Choice: 1

Are you sure you wish to continue? [N]: Y

Enter the filename with full path: /var/QS/free/pdb.tar.gz

Enter the IP address of Master server on which replication will start: 10.248.10.79

Enter the Password for replication user  [epaprepl]:
Re-enter the Password for replication user  [epaprepl]:
```

Figure 7: Restore DB Platform Menu

Create MySQL ASCII Snapshot Menu

The **Create MySQL ASCII Snapshot** option is only available on the Master EAGLE QS. This snapshot is present on the /var/QS/free directory. This snapshot is used to restore the ASCII DB on the Slave QS. The name and permission of the snapshot is as follows:

```
-rw-r--r-- 1 <config_user> <config_user>  112 Dec 11 12:55 snappos.sql
-rw-r--r-- 1 root root 4.5G Dec 11 13:47 ascii.tar.gz
```

```
        Enter Choice: 2

        Are you sure you want to create the Snapshot? [N]: Y
ascii/client-key.pem
ascii/ca-key.pem

DB Snapshot created successfully.
Press return to continue...
```

Figure 8: Create MySQL Snapshot Menu

Reboot Menu

This menu allows the user to reboot the EAGLE QS.

```
        Enter Choice: 3

        Are you sure to reboot the server? [N]: Y


        Broadcast message from root@ORA-2-70
                (/dev/pts/0) at 15:01 ...

        The system is going down for reboot NOW!

        INFO: The server is going down for reboot NOW!
```

Figure 9: Reboot Platform Menu

Note: After the reboot, all three MySQL services will start in run level 3, 4 and 5 only.

Configure the Slave EAGLE QS Network Menu

This menu allows the user to configure the Slave QS using IPv4 or IPv6 address on the Master QS. The Master QS supports the configuration of a maximum of 5 Slave QSs. The IP version of the Slave QS is the same as that of the Master QS IP version. The Master QS configured in dual stack configuration supports the configuration of multiple Slave QSs with a mix of IPv4 and IPv6 IPs.

```
Master EAGLE Query Server
HostName: ORA-2-70
Software Version: 1_1.0
Mon Jan  2 15:49:37 IST 2017


 /------Configure Slave EAGLE Query Server Menu-\
 /---------------------------------------------\
 |  1 | Display Slave EAGLE Query Server        |
 |----|----------------------------------------|
 |  2 | Add Slave EAGLE Query Server            |
 |----|----------------------------------------|
 |  3 | Remove Slave EAGLE Query Server         |
 |----|----------------------------------------|
 |  e | Exit                                    |
 \---------------------------------------------/

Enter Choice: █
```

Figure 10: Configure Slave EAGLE QS Network Menu

Display Slave EAGLE QS Menu

This menu displays the total number of Slave QSs configured on Master QSs with their respective IPs. It displays all the IPv4 or IPv6 configured IPs.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:43:21 IST 2017

 /-----Configure Slave EAGLE Query Server Menu-\
/------------------------------------------------\
|  1 | Display Slave EAGLE Query Server          |
|----|-------------------------------------------|
|  2 | Add Slave EAGLE Query Server              |
|----|-------------------------------------------|
|  3 | Remove Slave EAGLE Query Server           |
|----|-------------------------------------------|
|  e | Exit                                      |
\------------------------------------------------/

Enter Choice: 1

List of configured slaves:
        IP[1] : 10.248.2.70


Press return to continue...
```

Figure 11: Display Slave EAGLE QS Menu

Add Slave EAGLE QS Server Menu

The **Add Slave EAGLE Query Server Menu** allows the user to add the Slave QS along with its required configuration. The user is allowed to add a maximum of 5 Slave QSs on one Master QS. Slave QS IPs can either be IPv4 or IPv6 format. Add the IPv6 Slave QS on the Master QS configured in IPv6 or dual stack configuration.

```
Master EAGLE Query Server
HostName: ORA-2-70
Software Version: 1_1.0
Mon Jan  2 15:50:30 IST 2017

 /-----Configure Slave EAGLE Query Server Menu-\
/------------------------------------------------\
|  1 | Display Slave EAGLE Query Server          |
|----|-------------------------------------------|
|  2 | Add Slave EAGLE Query Server              |
|----|-------------------------------------------|
|  3 | Remove Slave EAGLE Query Server           |
|----|-------------------------------------------|
|  e | Exit                                      |
\------------------------------------------------/

Enter Choice: 2
```

```
Master EAGLE Query Server
HostName: ORA-2-70
Software Version: 1_1.0
Mon Jan  2 15:50:31 IST 2017


 /----- Add  Slave EAGLE Query Server Menu-\
/------------------------------------------\
|  1 | IPv4 Configuration                  |
|----|-------------------------------------|
|  2 | IPv6 Configuration                  |
|----|-------------------------------------|
|  e | Exit                                |
\------------------------------------------/


Enter Choice: 1

Slave Query Server IPv4 Address: 10.248.2.71

Enter Slave Query Server password of user  [qsrepl]:
Re-enter Slave Query Server password of user  [qsrepl]:
```

Figure 12: Add Slave EAGLE Query Server Menu

Remove Slave EAGLE Query Server Menu

The **Remove Slave EAGLE Query Server Menu** allows the user to remove an IP address from the list of Slave QS IP addresses. The **Slave Query Server IP Address to be deleted** field accepts both types of IPs, either IPv4 or IPv6.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:44:19 IST 2017

 /-----Configure Slave EAGLE Query Server Menu-\
/---------------------------------------------\
|  1 | Display Slave EAGLE Query Server       |
|----|----------------------------------------|
|  2 | Add Slave EAGLE Query Server           |
|----|----------------------------------------|
|  3 | Remove Slave EAGLE Query Server        |
|----|----------------------------------------|
|  e | Exit                                   |
\---------------------------------------------/

Enter Choice: 3

List of configured slaves:
        IP[1] : 10.248.2.70
Slave IP Address to be deleted: 10.248.2.70

WARNING: User deleted, but remains connected until 'stop slave' command has been executed on 10.248.2.70.
Slave IP 10.248.2.70 has been deleted
Press return to continue...
```

Figure 13: Remove Slave EAGLE Query Server Menu

Configure the MySQL Query Client Menu

This menu allows the user to configure the MySQL Query Clients using IPv4 or IPv6 addresses on both the Master and Slave EAGLE QS. The IP version of the MySQL Query Client is the same as that of the EAGLE QS IP version. The EAGLE QS configured in a dual stack configuration supports the configuration of multiple Query Clients with a mix of IPv4 and IPv6 IPs.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:45:07 IST 2017


 /-----Configure MySQL Query Client Menu-\
/------------------------------------------\
|  1 | Display MySQL Query Client           |
|----|-------------------------------------|
|  2 | Add MySQL Query Client               |
|----|-------------------------------------|
|  3 | Remove MySQL Query Client            |
|----|-------------------------------------|
|  e | Exit                                 |
\------------------------------------------/

Enter Choice: 1
```

Figure 14: Configure MySQL Query Client Menu

Display MySQL Query Client Menu

The **Display MySQL Query Client Menu** selection displays the total number of configured MySQL Query Client servers with their respective IPs. It displays all the IPv4 or IPv6 configured IPs.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:45:07 IST 2017


 /-----Configure MySQL Query Client Menu-\
/------------------------------------------\
|  1 | Display MySQL Query Client           |
|----|-------------------------------------|
|  2 | Add MySQL Query Client               |
|----|-------------------------------------|
|  3 | Remove MySQL Query Client            |
|----|-------------------------------------|
|  e | Exit                                 |
\------------------------------------------/


Enter Choice: 1

List of configured Query Clients:

        IP[1] : 127.0.0.1


Press return to continue...
```

Figure 15: Display MySQL Query Client Menu

Add MySQL Query Client Menu

The **Add MySQL Client Server Menu** allows the user to add the MySQL Query Client along with its required configuration. The user is allowed to add the MySQL Query Client IP in either IPv4 or IPv6 format. Add the IPv6 MySQL Query Client on both configured Master and Slave QSs if the query server uses either IPv6 or dual stack configuration. The maximum number of MySQL sessions on the EAGLE QS is 32; the maximum number of 32 MySQL Query Client IPs is added.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:46:13 IST 2017


  /-----Configure MySQL Query Client Menu-\
 /-------------------------------------------\
 |  1 | Display MySQL Query Client           |
 |----|--------------------------------------|
 |  2 | Add MySQL Query Client               |
 |----|--------------------------------------|
 |  3 | Remove MySQL Query Client            |
 |----|--------------------------------------|
 |  e | Exit                                 |
 \-------------------------------------------/


        Enter Choice: 2
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:46:14 IST 2017


 /----- Add MySQL Query Client Menu-\
 /----------------------------------\
 |  1 | IPv4 Configuration          |
 |----|-----------------------------|
 |  2 | IPv6 Configuration          |
 |----|-----------------------------|
 |  e | Exit                        |
 \----------------------------------/


Enter Choice: 1

MySQL Query Client IPv4 Address: 10.248.10.86

Enter MySQL Query Client password of user  [dbroot]:
Re-enter MySQL Query Client password of user  [dbroot]:
MySQL Query Client 10.248.10.86 has been added.

Press return to continue...
```

Figure 16: Add MySQL Query Client Menu

Remove MySQL Query Client Menu

The **Remove MySQL Query Client Menu** allows the user to remove an IP address from the list of MySQL Query Client IP addresses. The **MySQL Query Client IP Address to be deleted** field accepts both type of IPs, either IPv4 or IPv6.

```
Master EAGLE Query Server
HostName: ORA-2-141
Software Version: 1_1.1
Mon Jan  2 17:47:26 IST 2017


 /-----Configure MySQL Query Client Menu-\
/-----------------------------------------\
|  1 | Display MySQL Query Client          |
|----|------------------------------------|
|  2 | Add MySQL Query Client              |
|----|------------------------------------|
|  3 | Remove MySQL Query Client           |
|----|------------------------------------|
|  e | Exit                                |
\-----------------------------------------/


Enter Choice: 3



MySQL Query Client List

List of configured Query Clients:

        IP[1] : 10.248.10.86
        IP[2] : 127.0.0.1
MySQL Query Client IP Address to be deleted: 10.248.10.86



MySQL Query Client 10.248.10.86 has been deleted.
Press return to continue...
```

Figure 17: Remove MySQL Query Client Menu

EAGLE Query Server Database Schema

Topics:

This appendix provides details on how to use the MySQL database schema to access data, as well as EAGLE QS ASCII schema examples.

Overview

EAGLE Query Server users are able to access data using MySQL database schema. Each table schema in the ASCII database is defined individually.

EAGLE Query Server ASCII Database Schemas

The following are examples of ASCII Database schemas, using the following command:

```
# mysqldump --no-data --compact -uroot -peLapRoot -S
/var/QS/db/ascii/mysql.sock ascii > /tmp/QS_ascii_schema
```

```
CREATE TABLE `ASD` (
  `id` varchar(12) NOT NULL,
  `refCnt` bigint(20) unsigned NOT NULL,
  PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN` (
  `id` varchar(16) NOT NULL,
  `pt` tinyint(4) DEFAULT NULL,
  PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DNBLOCK` (
  `startId` varchar(16) NOT NULL,
  `endId` varchar(16) NOT NULL,
  `pt` tinyint(4) DEFAULT NULL,
  PRIMARY KEY (`startId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DNB_ASD` (
  `dnBSId` varchar(16) NOT NULL,
  `asdId` varchar(12) NOT NULL,
  PRIMARY KEY (`dnBSId`),
  KEY `asdId` (`asdId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DNB_BL` (
  `dnBSId` varchar(16) NOT NULL,
  `cgbl` tinyint(4) NOT NULL,
  `cdbl` tinyint(4) NOT NULL,
  PRIMARY KEY (`dnBSId`),
  KEY `dnBSId` (`dnBSId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DNB_DN` (
  `dnBSId` varchar(16) NOT NULL,
  `nsdn` varchar(16) DEFAULT NULL,
  `nsType` tinyint(4) NOT NULL,
```

```
  PRIMARY KEY (`dnBSId`),
  KEY `nsdn` (`nsdn`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DNB_NE` (
  `dnBSId` varchar(16) NOT NULL,
  `neId` varchar(16) NOT NULL,
  `neType` tinyint(3) unsigned NOT NULL,
  KEY `dnBSId` (`dnBSId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_ASD` (
  `dnId` varchar(16) NOT NULL,
  `asdId` varchar(12) NOT NULL,
  PRIMARY KEY (`dnId`),
  KEY `asdId` (`asdId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_BL` (
  `dnId` varchar(16) NOT NULL,
  `cgbl` tinyint(4) NOT NULL,
  `cdbl` tinyint(4) NOT NULL,
  PRIMARY KEY (`dnId`),
  KEY `dnId` (`dnId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_DN` (
  `dnId` varchar(16) NOT NULL,
  `nsdn` varchar(16) DEFAULT NULL,
  `nsType` tinyint(4) NOT NULL,
  PRIMARY KEY (`dnId`),
  KEY `nsdn` (`nsdn`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_IMSI` (
  `dnId` varchar(16) NOT NULL,
  `imsiId` varchar(16) NOT NULL,
  PRIMARY KEY (`dnId`),
  KEY `imsiId` (`imsiId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_NE` (
  `dnId` varchar(16) NOT NULL,
  `neId` varchar(16) NOT NULL,
  `neType` tinyint(3) unsigned NOT NULL,
  KEY `dnId` (`dnId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `DN_RANGE` (
  `bDnId` char(16) NOT NULL,
  `eDnId` char(16) NOT NULL,
  `numTrim` tinyint(3) unsigned NOT NULL,
  `newChars` char(16) NOT NULL,
```

```
   PRIMARY KEY (`bDnId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `IMEI` (
  `id` varchar(16) NOT NULL,
  `svn` tinyint(3) unsigned NOT NULL,
  `lists` set('white','gray','black') NOT NULL,
  PRIMARY KEY (`id`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `IMEIBLOCK` (
  `startId` varchar(16) NOT NULL,
  `endId` varchar(16) NOT NULL,
  `lists` set('white','gray','black') NOT NULL,
  PRIMARY KEY (`startId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `IMEI_IMSI` (
  `imeiId` varchar(16) NOT NULL,
  `imsiId` varchar(16) NOT NULL,
  KEY `imeiId` (`imeiId`),
  KEY `imsiId` (`imsiId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `IMSI_NE` (
  `imsiId` varchar(16) NOT NULL,
  `neId` varchar(16) NOT NULL,
  `neType` tinyint(3) unsigned NOT NULL,
  KEY `imsiId` (`imsiId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `IMSI_RANGE_NE` (
  `bImsiId` char(16) NOT NULL,
  `eImsiId` char(16) NOT NULL,
  `spId` char(16) NOT NULL,
  PRIMARY KEY (`bImsiId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;


CREATE TABLE `NE` (
  `id` varchar(16) NOT NULL,
  `type` tinyint(3) unsigned NOT NULL,
  `autoCreated` tinyint(3) unsigned DEFAULT NULL,
  `pc` int(10) unsigned DEFAULT NULL,
  `gc` char(3) DEFAULT NULL,
  `ri` tinyint(4) DEFAULT NULL,
  `ssn` smallint(6) DEFAULT NULL,
  `ccgt` tinyint(3) unsigned DEFAULT NULL,
  `ntt` smallint(6) DEFAULT NULL,
  `nnp` tinyint(4) DEFAULT NULL,
  `nnai` tinyint(4) DEFAULT NULL,
  `da` tinyint(3) unsigned DEFAULT NULL,
  `srfImsi` varchar(16) DEFAULT NULL,
  `numImsis` int(10) unsigned DEFAULT NULL,
  `numDNs` int(10) unsigned DEFAULT NULL,
  `numDNBlocks` int(10) unsigned DEFAULT NULL,
```

```
  PRIMARY KEY (`id`,`type`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

```
CREATE TABLE `PROVBL` (
  `bProvBLId` char(16) NOT NULL,
  `eProvBLId` char(16) NOT NULL,
  PRIMARY KEY (`bProvBLId`)
) ENGINE=InnoDB DEFAULT CHARSET=latin1 ROW_FORMAT=REDUNDANT;
```

Table and Field Descriptions

Note: See the EAGLE *Master Glossary* for all definitions and terms.

Table 3: ASD - Additional Subscriber Data Table

Used to store the ASD id and refCnt. The ASD data type offers the ability to store additional digit type data (e.g., Equal Access or Boundary Location Area).

Field	Description
id	Identity - a string with 1 to 10 characters, where each character must be a number from 0 to F
refCnt	Reference count - total number of DNs associated with this ASD

Table 4: DN - Directory Number Table

Used to stores the DN number. The DN data type is used by the INP, G-Port MNP, V-Flex and GSM Migration features, and optionally by the G-Flex vHLR feature.

Field	Description
id	Identity - a string with 5 to 15 characters, where each character must be a number from 0 to F
pt	Portability Type - used by G-Port, IS-41 GSM Migration and PPSMS only

Table 5: DNBLOCK - Directory Number Block Table

Used to store the ranges of DN numbers.

Field	Description
startId	Start Identity - a string with 5 to 15 characters, where each character must be a number from 0 to F
endId	End Identity - a string with 5 to 15 characters, where each character must be a number from 0 to F

Field	Description
pt	Portability Type - used by G-Port, IS-41 GSM Migration and PPSMS only

Table 6: DNB_ASD - Directory Number Block Additional Subscriber Data Table

Used to store the DN Block and its associated ASD.

Field	Description
dnBSId	Directory Number Block Subscriber Identity - a string with 5 to 15 characters, where each character must be a number from 0 to F
asdId	Additional Subscriber Data Identity - a string with 1 to 10 characters where each character must be a number from 0 to F

Table 7: DNB_BL - Directory Number Block Table

Used to store the blacklist DN Block.

Field	Description
dnBSId	Directory Number Block Subscriber Identity - a string with 5 to 15 characters, where each character must be a number from 0 to F
cgbl	(Initial Detection Point (IDP)) Calling Party Blacklist Values: no - IDP calling party blacklist is disabled (default = no) yes - IDP calling party blacklist is enabled
cdbl	(IDP) Called Party Blacklist Values: no - IDP called party blacklist is disabled (default = no) yes - IDP called party blacklist is enabled

Table 8: DNB_DN - Directory Number Block Directory Number Table

Used to store the DN Block and its associated DN.

Field	Description
DNbsiD	Directory Number Block Subscriber Identity - a string with 5 to 15 characters where each character must be a number from 0 to F

Field	Description
nsdn	Number Subscriber Directory Number - a string with 5 to 15 characters where each character must be a number from 0 to F.
nsType	Number Subscriber Type - a decimal number in the following range: 0 - public (default = public) 1 - private

Table 9: DNB_NE - Directory Number Block Network Entity Table

Used to store the DN Block and its associated NE.

Field	Description
dnBSId	Directory Number Block Subscriber Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
neId	Network Entity Identity - a string with 1 to 15 characters where each character must be a number from 0 to F
neType	Network Entity Type Values: SP - Signal Point RN - Routing Number. Gflex only customers would not use VMS - Voicemail Server. Used for V-Flex customers. GRN - Generic Routing Number

Table 10: DN_ASD - Directory Number Additional Subscriber Data Table

Used to store the DN and its associated ASD.

Field	Description
dnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
asdId	Additional Subscriber Data Identity - a string with 1 to 10 characters where each character must be a number from 0 to F

Table 11: DN_BL - Directory Number Block Table

Used to store the blacklist DN.

Field	Description
dnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
cgbl	(Initial Detection Point (IDP)) Calling Party Blacklist Values: no - IDP calling party blacklist is disabled (default = no) yes - IDP calling party blacklist is enabled
cdbl	(IDP) Called Party Blacklist Values: no - IDP called party blacklist is disabled (default = no) yes - IDP called party blacklist is enabled

Table 12: DN_DN - Directory Number Block Directory Number Table

Used to store the DN Block and its associated DN.

Field	Description
dnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
nsdn	Number Substitution Directory Number - a string with 5 to 15 characters where each character must be a number from 0 to F.
nsType	Number Subscriber Type - a decimal number in the following range: 0 - public (default = public) 1 - private

Table 13: DN_IMSI - Directory Number International Mobile Subscriber Identity Table

Used to store the IMSI and its associated DN.

Field	Description
dnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F

Field	Description
imsiId	International Mobile Subscriber Identity - a string with 5 to 15 characters where each character must be a number from 0 to F.

Table 14: DN_NE - Directory Number Network Entity Table

Used to store the DN Block and its associated NE.

Field	Description
dnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
neId	Network Entity Identity - a string with 1 to 15 characters where each character must be a number from 0 to F
neType	Network Entity Type Values: SP - Signal Point RN - Routing Number. Gflex only customers would not use VMS - Voicemail Server. Used for V-Flex customers. GRN - Generic Routing Number

Table 15: DN_RANGE - Directory Number Range Table

Used to store the range of DN number, used by SOG interface.

Field	Description
bDnId	Directory Number Identity - a string with 5 to 15 characters where each character must be a number from 0 to F
eDnId	Network Entity Identity - a string with 1 to 15 characters where each character must be a number from 0 to F
numTrim	Number of digits to delete
newChars	Digits to add

Table 16: IMEI - International Mobile Equipment Identity Table

Used to store the IMEI data type.

Field	Description
id	Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
svn	Software Version Number - a 2 digit number (0-9) Default is 0
lists	List can be one of the following: white Values: yes/no. (default = no). gray Values: yes/no. (default = no). black Values: yes/no. (default = no).

Table 17: IMEIBLOCK - International Mobile Equipment Identity Block Table

Used to store the range of IMEI data type.

Field	Description
startId	Start Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
endId	End Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
lists	List can be one of the following: white Values: yes/no. (default = no). gray Values: yes/no. (default = no). black Values: yes/no. (default = no).

Table 18: IMEI_IMSI - International Mobile Equipment Identity International Mobile Subscriber Identity Table

Used to store the IMEI and its associated IMSI.

Field	Description
imeiId	International Mobile Equipment Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
imsiId	International Mobile Subscriber Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F

Table 19: IMSI_NE - International Mobile Subscriber Identity Network Entity Table

Used to store the IMSI and NE associated with this IMSI.

Field	Description
imsiId	International Mobile Subscriber Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
neId	Network Entity Identity - a string with 1 to 15 characters where each character must be a number from 0 to F
neType	Network Entity Type Values: SP - Signal Point RN - Routing Number. Gflex only customers would not use VMS - Voicemail Server. Used for V-Flex customers. GRN - Generic Routing Number

Table 20: IMSI_RANGE_NE - International Mobile Subscriber Identity Range Network Entity Table

Used to store the range of IMSIs and associated spId.

Field	Description
bImsiId	Begin International Mobile Subscriber Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
eImsiId	End International Mobile Subscriber Identity - a string with 14 or 15 characters where each character is a (hex) number from 0 to F
spId	Signal Point ID - a string with 1 to 15 characters where each character must be a number from 0 to F

Table 21: NE - Network Entity Table

Used to store an entity object and its corresponding global title translation.

Field	Description
id	Network Entity Identity - a string with 1 to 15 characters where each character must be a number from 0 to F
type	Network Entity Type Values: SP - Signal Point RN - Routing Number. Gflex only customers would not use VMS - Voicemail Server. Used for V-Flex customers. GRN - Generic Routing Number
autoCreated	Automatically Created - Indicates if a particular RN is automatically created as part of DN provisioning
pc	Point Code Value - the valid values depend on the pctype parameter
gc	Group Code - optional parameter is part of the point code value Values: aa - zz
ri	Routing Indicator - this parameter indicates whether a subsequent global title translation is required. This field is required if the pctype of the NE is not none Values: GT = Global Title - indicates that a subsequent translation is required SSN = Subsystem Number - indicates that no further translation is required
ssn	New subsystem number - this parameter identifies the subsystem address that is to receive the message Values: 0, 2 - 255 none (default)
ccgt	Cancel Called Global Title Values: yes or no (default)

Field	Description
ntt	New Translation Type - this parameter identifies the translation type value to replace the received translation type value Values: 0 - 255 none (default)
nnp	New Numbering Plan Values: 0 - 15 none (default)
nnai	New Nature of Address Indicator Values: 0 - 127 none (default)
da	Digit action - this parameter specifies what changes, if any, to apply to the Called Party GTA
srfImsi	The IMSI returned by an SRF, indicating the Subscription Network of the subscripter. This parameter is only used by the G-Port features, and only for RNs
numImsis	Total Number of International Mobile Subscriber Identities
numDNs	Total Number of Directory Numbers
numDNBlocks	Total Number of Directory Number Blocks

Table 22: PROVEL

Used to store the provisioning blacklist data.

Field	Description
bProvBLId	Beginning Prov Blacklist Identity - a string with 5 to 15 characters where each character is a (hex) number from 0 to F.
eProvBLId	End Prov Blacklist Identity - a string with 5 to 15 characters where each character is a (hex) number from 0 to F.

Glossary

A

ASD

    Additional Subscriber Data

    Additional data that is associated with a subscriber (DN) or a range of subscribers.

C

CLI

    Calling Line Identification
    Command-line interface
    Custom LSMS Interface

D

DN

    Directory number

    A DN can refer to any mobile or wireline subscriber number, and can include MSISDN, MDN, MIN, or the wireline Dialed Number.

E

EPAP

    EAGLE Application Processor

G

G-Flex

    GSM Flexible numbering

    A feature that allows the operator to flexibly assign individual subscribers across multiple HLRs and route signaling messages, based on subscriber numbering, accordingly.

G-Port

    GSM Mobile Number Portability

    A feature that provides mobile subscribers the ability to change the GSM subscription network

G

within a portability cluster, while retaining their original MSISDN(s).

GSM

Global System for Mobile Communications

A second generation digital PCS mobile phone standard used in many parts of the world.

I

IDP

Initial Detection Point

IMEI

International Mobile Equipment Identifier

IMSI

International Mobile Subscriber Identity

International Mobile Station Identity

A unique internal network ID identifying a mobile subscriber.

IP

Intelligent Peripheral

Internet Protocol - IP specifies the format of packets, also called datagrams, and the addressing scheme. The network layer for the TCP/IP protocol suite widely used on Ethernet networks, defined in STD 5, RFC 791. IP is a connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.

IPv4

Internet Protocol version 4

Identifies an Internet Protocol version 4 address composed of 4

I

bytes in a dotted decimal format
(for example, nnn.nn.nnn.nn).

IPv6

Internet Protocol version 6

Identifies an Internet Protocol
version 6 address composed of 8
groups of colon-separated 4
hexadecimal digits.

IS-41

Interim Standard 41

Same as and interchangeable with
ANSI-41. A standard for
identifying and authenticating
users, and routing calls on mobile
phone networks. The standard also
defines how users are identified
and calls are routed when roaming
across different networks.

N

NE

Network Element

An independent and identifiable
piece of equipment closely
associated with at least one
processor, and within a single
location.

In a 2-Tiered DSR OAM system,
this includes the NOAM and all
MPs underneath it. In a 3-Tiered
DSR OAM system, this includes the
NOAM, the SOAM, and all MPs
associated with the SOAM.

The devices, servers, or functions
within a wireless network with
which Policy Management systems
interact.

Network Entity

P

PDB

Provisioning Database

P

PDBA

Provisioning Database Application

There are two Provisioning Database Applications (PDBAs), one in EPAP A on each EAGLE. They follow an Active/Standby model. These processes are responsible for updating and maintaining the Provisioning Database (PDB).

PDBI

Provisioning Database Interface

The interface consists of the definition of provisioning messages only. The customer must write a client application that uses the PDBI request/response messages to communicate with the PDBA.

PPSMS

Prepaid Short Message Service
Prepaid Short Message Service Intercept

Q

QS

Query Server
Query Service

R

RN

Routing Number

The number provided by the Freephone Service Provider (FSP) to the Access Service Provider (ASP) to enable a pre-determined routing of traffic to a specific network/carrier/customer.