

Configuration Manual for Resource Activation

Ericsson Dynamic Activation 1

OPERATING INSTRUCTIONS

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1 Introduction

The information in this document is targeted to System and Network administrators. Use this document after installing the Ericsson Dynamic Activation (EDA) system.

1.1 Purpose and Scope

The purpose of this document is to describe how to configure application services for provisioning features in Dynamic Activation.

1.2 Target Group

The target group for this document is as follows:

- Network Administrator
- System Administrator

For detailed information about the target groups, see *Library Overview*, Reference [1].

1.3 Typographic Conventions

Typographic conventions are described in *Library Overview*, Reference [1].

For information about abbreviations used throughout this document refer to *Glossary of Terms and Acronyms*, Reference [2].

1.4 Prerequisites

To make full use of this document, the following prerequisites must be met:

- Knowledge about the Dynamic Activation product.
- Knowledge regarding the applications that need to be provisioned.



2 General Configuration

Throughout this document, there are instructions on configuration procedures for each application service in Dynamic Activation.

For more generic configuration details, see *User Guide for Resource Activation*, Reference [3].

It is possible to load predefined default configurations. The predefined default Network Elements (NE) Groups are loaded according to Table 5, Table 6, Table 7 and, Table 8, and routing according to Table 9.

For more information on how to load the predefined configurations, see section **Load Default NE Groups and Routing Methods** in the *System Administrators Guide for Native Deployment*, Reference [4].

3 Configuration for HLR/AUC/MNP/M2M Provisioning

To provision HLR/AUC/MNP/M2M, the Centralized User Database (CUDB) and HLR/AUC/MNP/M2M-FEs need to be configured as described in the following subchapters.

3.1 CUDB Configuration

The CUDB is configured by configuring the NE, Network Element Group (NE Group), and Routing. Figure 1 illustrates the CUDB configuration.

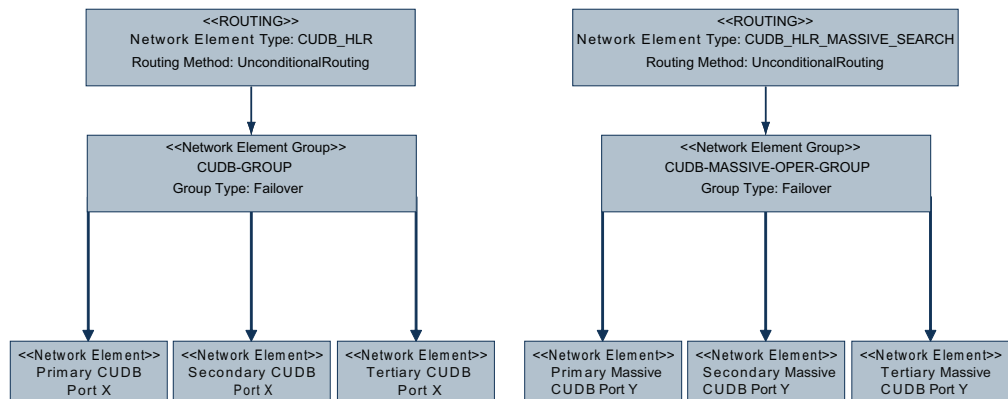


Figure 1 Configuration of CUDB for HLR Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB NE must be configured as separate NE.

How an NE needs to be configured depends on the purpose of using the NE. For each CUDB, several NEs can be configured with different configuration settings. For example, the time to wait for a response after sending a request differs depending on if Individual Provisioning and Massive Updates are used, or if Massive Search is used. For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: LDAP

Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in *Failover* mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.

For CUDB *UnconditionalRouting* method is used.

Configure the routing according to Section 22 on page 64.

3.2 HLR/AUC/MNP/M2M-FE Configuration

The HLR/AUC/MNP/M2M-FEs are configured by configuring an NE, NE Group, and Routing. Figure 2 illustrates the HLR/AUC/MNP/M2M-FEs configuration.

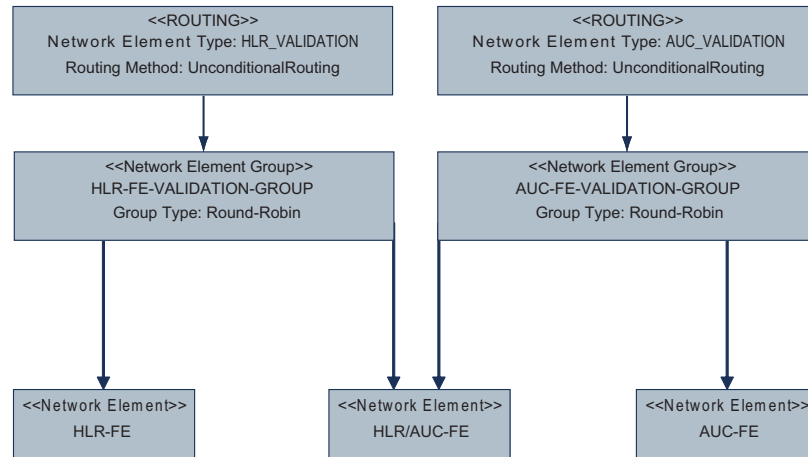


Figure 2 Example of Configuration of HLR/AUC-FE for HLR/AUC Validation

The following FE deployment scenarios are supported:

- Same FEs provide HLR/AUC/MNP/M2M functionality
All FEs must be configured using respective NE types and NE groups.
- Dedicated FEs provide HLR/AUC/MNP/M2M functionality respectively
All FEs must be configured using respective NE types and NE groups.

For more information about the deployment scenario, see *Function Specification Layered Machine to Machine*, Reference [5].

Network Element

An NE must be defined and configured for each HLR/AUC/MNP/M2M-FE that Dynamic Activation is connected to. For further instructions, see Section 19 on page 62.

Supported protocols are: TELNET and SSH

Network Element Group

The configured NEs are grouped in an NE Group configured in Round-Robin mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 19 on page 62.



The same NE can be assigned to several NE Groups. For example, an AUC server that is colocated with HLR can share connections.

Routing

Routing is needed to find an NE Group from the business logic.

When HLR N+1 Redundancy is used, it is configured with the `RegularExpressionRouting` method.

The `RegularExpressionRouting` decision for N+1 is based on the parameter `PrimaryHLRId`. N+1 Redundancy and `PrimaryHLRId` is not supported when using the MML interface.

The parameter has the following format, `<1-15>-<1-32>`. The first part identifies the HLR Redundancy Group and the last part identifies a specific HLR Identity in a Redundancy Group.

Each HLR Redundancy Group has a standby HLR-FE node. This means that the NE Type (`HLR_RED`, and `M2M_HLR_RED`) must be able to route to every HLR-FE node depending on the parameter `PrimaryHLRId`.

For more detailed information regarding N+1 redundancy, see *Function Specification Layered HLR*, Reference [6].

Configure the Routing according to Section 22 on page 64.

3.3 Create User

Create a client application user according to instructions in Section 24 on page 76.

3.4 Administration Domain

An Administration Domain must have restrictions for the key parameter `Region ID (RID)`, `IMSI`, and `MSISDN`. Restriction rules for other attributes can also be applied.

For more information regarding Administration Domains and restriction rules, see *Function Specification Administration of Multi Regions and BSS Capacity*, Reference [7].

Note: If Mobile Number Portability (MNP) is used, then `MSISDN` cannot be specified in the Administration Domain.

3.4.1 Enabling of Administration Domain

To enable the **Administration Domains** function, two actions are required:



- Configure the parameters `NEType` and `RootDN` shown in Table 1.
- Enable `CUDB Lookup` in the **Dynamic Activation GUI**.

This is performed in the **System > Options** tab. Beneath the **Administrations of Multi-region** property, enable the `CUDB Lookup` check box. For more information, see *User Guide for Resource Activation*, Reference [3].

Table 1 Parameters

Parameter	Data Type	Default Value	Description
<code>NEType</code>	String	<code>CUDB_HLR</code>	The NE Type is the connection between the Activation Logic and Routing. If the NE Type is chosen to be different from default, it needs to be changed.
<code>RootDn</code> (1)	String	<code>dc=operator,dc=com</code>	The root DN is the top level of the LDAP directory tree and is used to access objects in CUDB from the Dynamic Activation system. ⁽²⁾ If the Root DN for the CUDB is chosen to be different from default, it needs to be changed.

(1) This parameter is not necessary to change if the **Change All RootDN's To:** parameter has been set. For more information, see *User Guide for Resource Activation*, Reference [3]

(2) The Dynamic Activation configuration must match the CUDB configuration. The `RootDn` parameter is case-sensitive.

To set and get the `NEType` and `RootDn` parameters, use the template files located in `/opt/dve/tools/jmxbatchclient/templates/`

The `jmxbatchclient` tool makes it possible to access JMX through the Command-Line Interface. Use this tool to set the `RootDn` and `NEType` attribute. It is located in the `/opt/dve/tools/jmxbatchclient/` directory.

To execute `jmxbatchclient` tool issue the following command:

```
$ sudo -u actadm /opt/dve/tools/jmxbatchclient/jbc-rmi.sh
-Aadmin:admin service:jmx:rmi://<PG_JMX_Server_IP
>:8995/jndi/rmi://<PG_JMX_Server_IP>:8100/connector
/opt/dve/tools/jmxbatchclient/templates/<XML-file with JMX
data>
```

To get `RootDn` and `NEType`, use `CUDB-lookup-get.xml`.

To set the `RootDn` and `NEType`, run the `jmxbatchclient` tool with the modified `CUDB-lookup-set.xml`.



3.4.2 Create Administration Domains

This is performed in the **Access Control > Administration Domains - Add - Step 1/2, General** subtab in the **Dynamic Activation** GUI. For further information, see *User Guide for Resource Activation*, Reference [3].

A system administrator role with no rules defined is created.

Note: Always specify the `IMSI` and `RID` parameters. If MNP is not used in the network, `MSISDN` needs to be specified. If there is no `MSISDN` rule specified, then there is a performance impact on the provisioning flow. An extra CUDB lookup of `IMSI` based on `MSISDN` is performed.

Apart from the `IMSI`, `RID` and `MSISDN` parameters, it is possible to define rules for other parameters as well. The `RID` parameter is normally set to a single value.

The following attributes are restricted if their corresponding attribute is restricted:

If the `IMSI` attribute is restricted, then the `NIMSI`, `IMSI`, `IMSIALL`, and `NIMSIALL` attributes are also restricted with the same restriction.

If the `MSISDN` attribute is restricted, then the `AMSI`, `MSISDN`, `MSISDNS`, and `MSISDNALL` attributes are also restricted with the same restriction.

These rules are valid for each request except for the following - `IMSI`, `IMSIALL`, `NIMSIALL`, `MSISDNS`, and `MSISDNALL` are not checked if it is a CLI request and `RID` is provided.

The following is an example of an Administration Rules file:



3 Administration Domains
1 IMSI number range and 1 MSISDN number range per Admin Domain
MNP is not used

The following is configured in the PG GUI.

Admin Domain 1:

RID=1

IMSI>= 123456700 AND IMSI <= 123456799

MSISDN >= 765432100 AND MSISDN <= 765432199

Admin Domain 2:

RID=2

IMSI>= 123456800 AND IMSI <= 123456899

MSISDN >= 765432200 AND MSISDN <= 765432299

Admin Domain 3:

RID=3

IMSI>= 123456900 AND IMSI <= 123456999

MSISDN >= 765432300 AND MSISDN <= 765432399

Example 1 Administration Rules

The **Dynamic Activation** GUI views from the preceding example are shown in Figure 3, Figure 4, and Figure 5.

Activation Logic Network Elements System Access Control Walkthroughs

Users Policies Attribute Rules Administration Domains

Administration Domains - View - Admin Domain 1

Done View | View Admin Domain 2

General

Property	Value
Name	Admin Domain 1
Description	
Min sustainable CSO/sec	0.0
Sysadm	false
Add RID to Subscriber Profile	false

Rules

Property	Value
rid	rid = 1
imsi	imsi >= 123456700 & imsi <= 123456799
msisdn	msisdn >= 765432100 & msisdn <= 765432199

Change This... Remove This Done

Figure 3 Admin Domain 1



Activation Logic Network Elements System **Access Control** Walkthroughs

Users Policies Attribute Rules **Administration Domains**

Administration Domains - View - Admin Domain 2

[Done](#) [← View Admin Domain 1](#) | [View Admin Domain 3 →](#)

General

Property	Value
Name	Admin Domain 2
Description	
Min sustainable CSO/sec	0.0
Sysadm	false
Add RID to Subscriber Profile	false

Rules

Property	Value
rid	rid = 2
imsi	imsi >= 123456800 & imsi <= 123456899
msisdn	msisdn >= 765432200 & msisdn <= 765432299

[Change This...](#) [Remove This](#) [Done](#)

Figure 4 Admin Domain 2

Activation Logic Network Elements System **Access Control** Walkthroughs

Users Policies Attribute Rules **Administration Domains**

Administration Domains - View - Admin Domain 3

[Done](#) [← View Admin Domain 2](#) | [View Domain1 →](#)

General

Property	Value
Name	Admin Domain 3
Description	
Min sustainable CSO/sec	0.0
Sysadm	false
Add RID to Subscriber Profile	false

Rules

Property	Value
rid	rid = 3
imsi	imsi >= 123456900 & imsi <= 123456999
msisdn	msisdn >= 765432300 & msisdn <= 765432399

[Change This...](#) [Remove This](#) [Done](#)

Figure 5 Admin Domain 3



3.4.3 Assign the Administration Domain to a User

This is performed in the > **Access Control** > **Users** submenu in the **Dynamic Activation** GUI.

It is not possible to assign an administration domain during the creation of the user. An administration domain is assigned when editing the created user.

A **sysadm** user must be connected to the `sysadm` administration domain. A **sysadm** user is to be connected to all other administration domains that are possible to target in the provisioning requests sent by the user.

3.5 Configuration of Access Capacity

Access capacity can be divided in three parts:

- Max MML connections
- Max CAI3G sessions
- Min HLR sustainable CSOs/sec

The following limits must be considered when configuring the system:

- 160 PG MML connections per payload node

Note: This is a default limit that can be changed. For information, see *System Administrators Guide for Native Deployment*, Reference [4].

- 25000 CAI3G sessions per cluster
- 300 CSOs/second per PL node in the cluster
- 250 CAI connections per port and blade.

3.5.1 MML Connections

The MML connections are defined either when adding or editing a user in the **Dynamic Activation** GUI. For more information about user configuration, see *User Guide for Resource Activation*, Reference [3].

If the use of MML connections in the system needs to be limited, then the limit must be configured per user. The MML connections must be divided between the users of the system. The number of users are divided per Administration Domains. The system administrator must track the number of users per Administration Domains.



5 Admin Domains
 4 node PG cluster with 2 payload nodes => Max $160 \times 2 = 320$ PG MML connections for the system
 Each Admin Domain has 10 users, that is in total 50 users
 Therefore in this example the MML sessions parameter in the Dynamic Activation GUI.
 could be set to 3 and there will still be spare MML connections

Example 2 Evenly Divided MML Connections per Administration Domains, Same Number of Users per Administration Domains

It is possible to set different values on each user. The system administrator must track total number of MML connections and the current number of MML connections per Administration Domains.

5 Admin Domains
 4 node PG cluster with 2 payload nodes => Max $160 \times 2 = 320$ PG MML connections for the system
 Admin Domain 1 has 1 user
 Admin Domain 2 has 2 users
 Admin Domain 3 has 3 users
 Admin Domain 4 has 4 users
 Admin Domain 5 has 5 users
 The number of MML connections should be equally spread between the Admin Domains.
 Therefore in this example the MML sessions parameter in the Dynamic Activation GUI.
 could be set to the following (there will still be spare MML connections):

- the user in Admin Domain 1 is set to 30 MML connection;
- the users in Admin Domain 2 is set to 15 MML connections each;
- the users in Admin Domain 3 is set to 10 MML connections each;
- the users in Admin Domain 4 is set to 7 MML connections each;
- the users in Admin Domain 5 is set to 6 MML connections each.

Example 3 Evenly Divided MML Connection per Administration Domains, Different Number of Users per Administration Domains

3.5.2

CAI3G Sessions

The CAI3G sessions are defined either when adding or editing a user in the **Dynamic Activation** GUI. For more information about user configuration, see *User Guide for Resource Activation*, Reference [3].

If the use of the CAI3G sessions in the system needs to be limited, then the limit must be configured per user. The CAI3G sessions must be divided between the users of the system. The number of users is divided per Administration Domains. The system administrator must track the number of users per Administration Domains.



5 Admin Domains
4 node PG cluster with 2 payload nodes => Max 25000 CAI3G sessions for the system
Each Admin Domain has 10 users, that is in total 50 users.
Therefore in this example the CAI3G sessions parameter in the Dynamic Activation GUI.
could be set to 500 per user.

Example 4 *Evenly Divided CAI3G Sessions per Administration Domains, Same Number of Users per Administration Domains*

It is possible to set different values on each user. The system administrator must track the total number of CAI3G sessions and the current number of CAI3G sessions per Admin Domain.

5 Admin Domains
4 node PG cluster with 2 payload nodes => Max 25000 CAI3G sessions for the system
Admin Domain 1 has 1 user
Admin Domain 2 has 2 users
Admin Domain 3 has 3 users
Admin Domain 4 has 4 users
Admin Domain 5 has 5 users
The number of CAI3G sessions should be equally spread between the Admin Domains.
Therefore in this example the CAI3G sessions parameter in the GUI could be set to the following (there will still be spare MML connections):

- the user in Admin Domain 1 is set to 5000 CAI3G sessions;
- the users in Admin Domain 2 is set to 2500 CAI3G sessions each;
- the users in Admin Domain 3 is set to 1600 CAI3G sessions each;
- the users in Admin Domain 4 is set to 1200 CAI3G sessions each;
- the users in Admin Domain 5 is set to 1000 CAI3G sessions each.

Example 5 *Evenly Divided CAI3G Sessions per Administration Domains, Different Number of Users per Administration Domains*

3.5.3

CSOs Rate Limit

The CSO limitation can be set on user level, on Administration Domains level or on both levels. For more information about user and Administration Domains configuration, see *User Guide for Resource Activation*, Reference [3].

Configuration of CSOs can be done both on user level and Administration Domains level. The users connected to the Administration Domains share the configured number of CSOs for the Administration Domains. Configuration of CSOs on user level can be used to limit or extend the number of CSOs for a specific user.



5 Admin Domains
 4 node PG cluster with 2 payload nodes => Max $300 \times 2 = 600$ CSOs/sec for the system
 So in this example the Max CSOs/sec parameter in the Dynamic Activation GUI for each administration domain should be set to 120.
 Each user should be connected to an administration domain.

Example 6 *Evenly Divided Number of CSOs per Administration Domains, Evenly Divided Number of CSOs per User*

5 Admin Domains
 4 node PG cluster with 2 payload nodes => Max $300 \times 2 = 600$ CSOs/sec for the system
 Each Admin Domain has 3 users with this division of CSOs.
 User 1 should have 5 CSOs/sec
 User 2 should have 10 CSO/sec
 User 3 should have the rest (105 CSOs/sec) for the Admin Domain.
 This means that the following should be configured in the PG:
 - the Max CSOs/sec parameter in the Dynamic Activation GUI for each administration domain should be set to 120 CSOs;
 - the Max CSOs/sec parameter in the Dynamic Activation GUI for user 1 should be set to 5 CSOs;
 - the Max CSOs/sec parameter in the Dynamic Activation GUI for user 2 should be set to 10 CSOs.
 Note that it is not necessary to set the parameter for user 3.
 Each user should be connected to an administration domain.

Example 7 *Evenly Divided Number of CSOs per Administration Domains, Not Evenly Divided Number of CSOs per User*

3.6 Blocking CUDB for Backup

To ensure consistency during CUDB backup, certain provisioning operation towards CUDB needs to be blocked. For detailed information, see Section 25 on page 76.

3.7 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for HLR/AUC/MNP/M2M provisioning.

- HLR-Subscriber
 - AUTHDMAND



- DisabledPrintoutSuds
 - MaxRetries
 - RootDN
 - HLRNotificationPendBlock
 - HLRNotificationNumberOfRetries
 - HLRNotificationRetryFactor
 - HLRNotificationWaitTime
 - HLRNotificationTimeout
 - NPOwnNetworkPrefix
- **HLR-Massive**
 - DisabledPrintoutSuds
 - MaxParallelRequests
 - MaxRetries
 - RootDN
 - HLRNotificationPendBlock
 - HLRNotificationNumberOfRetries
 - HLRNotificationRetryFactor
 - HLRNotificationWaitTime
 - HLRNotificationTimeout
- **HLR-Profile, HLR-Service-Associated-Data**
 - MaxRetries
 - RootDN
- **AUC-Subscriber**
 - CSPSMAND
 - MaxRetries
 - RootDN
- **AUC-Massive**
 - MaxParallelRequests



- MaxRetries
 - RootDN
- MNP
 - MaxParallelRequests
 - MaxRetries
 - RootDN
- M2M, M2M-Service-Profile
 - MaxParallelRequests
 - MaxRetries
 - RootDN

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3].

3.8 Configuration for Massive Change Operation

The massive change operation distributes multi Notify Subscriber Data Change (NSDC) notifications to different HLR-FE nodes, the result triggers overall Core Network updates. When many NSDC notifications are sent to a specific HLR-FE, the network is affected.

If multiple HLR-FE nodes are deployed in the network of the operator and the massive change CLI command is used, it is recommended to do the following steps:

1. Define Network Element Groups in PG with these HLR-FE nodes.
2. Use a load-distribution strategy (such as Round-Robin) for Network Element Groups to distribute the notification loads towards HLR-FE nodes.

The parameter `MaxParallelRequests` also affects the massive change operation to specify how many subscribers in PG are updated in parallel.

3.9 Configuration for CAI3G Corresponding to MML Family

The CAI3G corresponding to MML family interface is by default disabled. It is possible to enable it in the Dynamic Activation GUI.

To enable the CAI3G corresponding to MML family interface, see chapter **Activation Logic Control > Options** in *User Guide for Resource Activation*, Reference [3].

4 Configuration for HSS Provisioning

To provision HSS, the CUDB and HSS-FEs need to be configured as described in the following subchapters.

4.1 Monolithic HSS/ISM Configuration

Monolithic HSS/ISM is configured by an NE or NE Group, NE routing, and **Activation Logics** property.

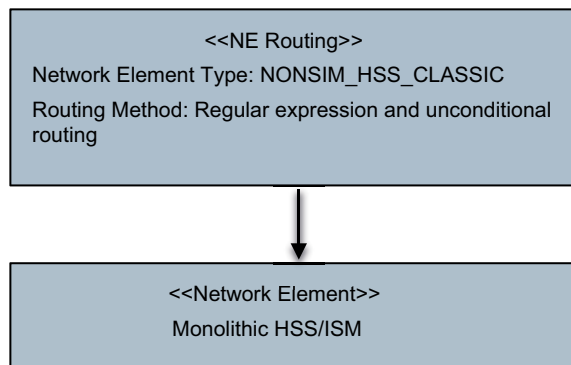


Figure 6 Single NE Configuration

Network Element

An NE must be defined and configured for each HSS/ISM node that Dynamic Activation is connected to.

NE configuration is performed in the **Network Elements > Network Elements** submenu. Select LDAP as **Protocol**.

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].



Routing

Routing is needed to find an NE from the business logic.

For HSS/ISM, the routing method `RegularExpressionRouting` and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

4.2 Layered HSS Provisioning

4.2.1 CUDB Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 7 illustrates the CUDB configuration.

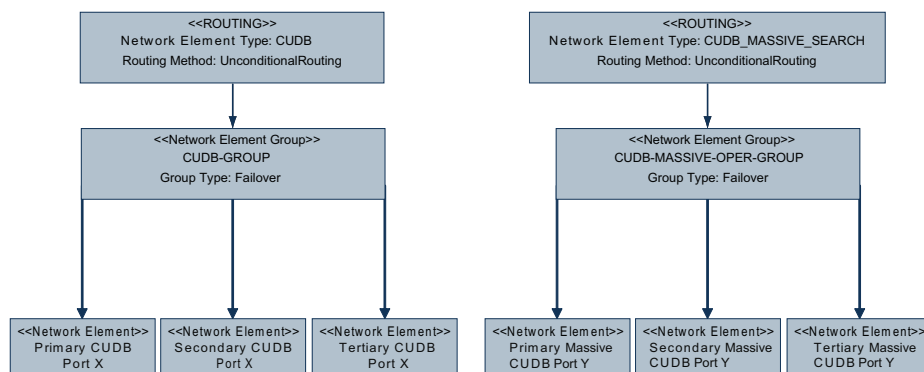


Figure 7 Configuration of CUDB for HSS Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB node must be configured as separate NE.

How an NE needs to be configured depends on the purpose of using the NE. For each CUDB, several NEs can be configured with different configuration settings. For example, the time to wait for a response after sending a request differs depending on if Individual Provisioning and Massive Updates are used, or if Massive Search is used. For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: LDAP

Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in `Failover` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.

For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

4.2.2

HSS Provisioning Notification Configuration

The HSS-FEs are configured by configuring an NE, NE Group, and Routing. Figure 8 illustrates HSS-FE configurations.

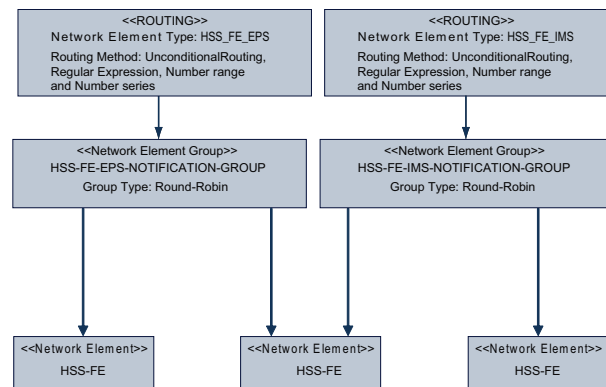


Figure 8 Configuration of HSS NE for HSS Notification

Network Element

An NE must be defined and configured for each HSS-FE that Dynamic Activation is connected to. For further instructions, see Section 20 on page 63.

Supported protocols are: `ProvisioningNotification`

Network Element Group

The configured NEs are grouped in an NE Group configured in `Round-Robin` mode. The NE Group is used by the business logic as a logical NE.



The configured NEs must be assigned to an NE Group, see Section 20 on page 63.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.

Configure the Routing according to Section 22 on page 64.

4.2.3 Blocking CUDB for Backup

To ensure consistency during backup, certain provisioning towards CUDB needs to be blocked. For detailed information, see Section 25 on page 76.

4.3 Creating User

Create a client application user according to instructions in Section 24 on page 76.

4.4 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for HSS provisioning.

- **IMS**
 - `ExMaxNumberOfContacts`
 - `ExAssociationId`
 - `ExValidation`
 - `RootDN`
 - `AllowSipUriWithoutDomain`
- **EPS-Massive**
 - `MaxParallelRequests`
 - `MaxRetries`
 - `RootDN`
- **EPS**
 - `ExARD`

- RootDN
- AVG
 - RootDN

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3]

5 Configuration for ECAS Provisioning

5.1 ECAS Configuration

Monolithic ECAS is configured by an NE or NE Group, NE routing, and **Activation Logics** property.

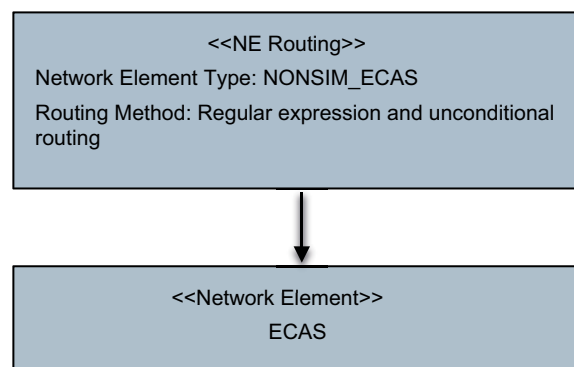


Figure 9 Single NE Configuration

Network Element

An NE must be defined and configured for each ECAS node that Dynamic Activation is connected to.



NE configuration is performed in the **Network Elements > Network Elements** submenu. Select HTTP as **Protocol**.

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Routing

Routing is needed to find an NE from the business logic.

For ECAS, the routing method `RegularExpressionRouting` and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

5.2 Creating User

Create a client application user according to instructions in Section 24 on page 76.

5.3 Activation Logics Properties

This section contains the configuration for setting the ECAS command.

- `IssuerDN`
- `SubjectDN`
- `EntityProfile`
- `CertProfile`
- `CertPEMFormat`
- `ProvisioningUri`

For detailed information about each property in the preceding list and how to change the configuration data, refer to *User Guide for Resource Activation*, Reference [3].



6 Configuration for Wi-Fi Calling

6.1 Wi-Fi Calling Configuration

Wi-Fi Calling configuration consists of the following NEs or NE groups, routing, and activation logics property configuration:

- Monolithic HSS/ISM configuration, see Section 4.1 on page 16
- IPWorks/AAA (NSD) configuration, see Section 9.1 on page 31
- ECAS configuration, see Section 5.1 on page 20

6.2 Creating User

Create a client application user according to instructions in Section 24 on page 76.

6.3 Activation Logics Properties

The following list shows the required Wi-Fi Calling activation logics configuration:

- IPWorks AAA (NSD) configuration, see Section 9.1 on page 31
- Monolithic HSS/ISM configuration, see Section 4.1 on page 16
- ECAS configuration, see Section 5.1 on page 20

The following list contains the Configuration Data of `VoWifi` activation logic:

- `HSSSubscriberFormat`
- `GenericEricssonNonSIMSolution`
- `RevokeCertificateByUserName`

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

6.4 IPWorks AAACluster Fault Management

The `AAACluster` provisioning aims to provision the same user subscription data in two separate AAA SS servers. The cluster logic sends AAA commands to two nodes defined in AAA groups in sequence and processes the two AAA



nodes provisioning by specific cluster strategy. For details, refer to *Solution Description Wi-Fi Calling*, Reference [14].

6.4.1 Error Log

Once the request sent to the second AAA NE fails, the system logs the request into the error log file. Only the `Create`, `Set`, and `Delete` operations can be logged.

1. The error log file is located in the following path on each PG NGN node.

```
/usr/local/pgngn/logs/failedrequests/aaa/
```

When the log file size is greater than 20MB, the file is renamed as follows, so that the system can continue to log the request into the file:

```
failedrequests.log:
failedrequests.log.0
failedrequests.log.1
...
```

2. Run the following command on the first VM instance to consolidate the error commands into one file.

```
$ /opt/dve/tools/nonsim/consolidateAAErrorCommand.sh -c
```

3. Run the following command to clear error logs on the first VM instance and alarms are auto ceased.

```
$ /opt/dve/tools/nonsim/consolidateAAErrorCommand.sh -d
```

```
Do you want to clear all error logs for all node.
Please enter 'yes/no': yes
```

6.4.2 Second AAA Inconsistent Data Handling

Once the error logs are generated during the provisioning process, a specific alarm is raised to OSS. For details on the alarm, refer to *Event and Alarm Handling*, Reference [13].

The following process must be performed to cope with the data inconsistency in the second AAA NE. It is suggested that the process is followed in the network spare time since it affects traffic.

1. Disable the AAA provisioning by setting `MaintenanceMode` to `YES` in AAA JDV logics.
2. Run the consolidation script to fetch all failed AAA commands in a file, see Section 6.4.1 on page 23. Once the error logs are successfully consolidated, the original error logs must be removed and the alarm is automatically ceased.

3. Run the AAA commands in bulk on the second AAA server and ensure the data consistency is fixed successfully. For more information, refer to IPWorks documentation.
4. Enable the AAA provisioning by setting `MaintenanceMode` to `NO` in AAA JDV logics.

7 Configuration for EIR Provisioning

To provision EIR, the CUDB needs to be configured as described in the following subchapters.

7.1 CUDB Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 10 illustrates the CUDB configuration.

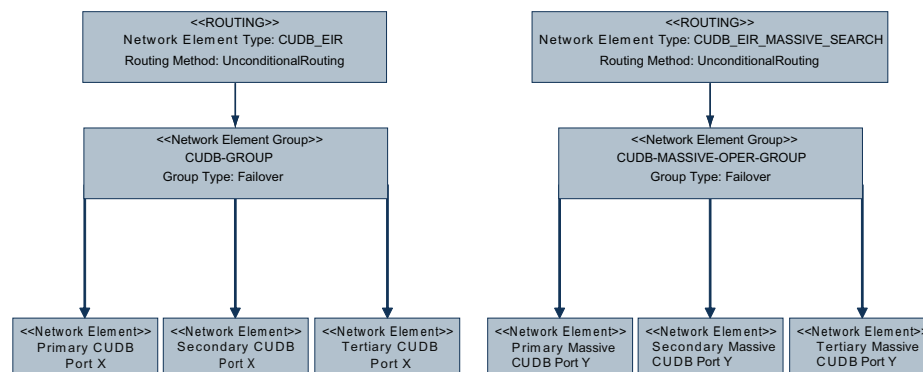


Figure 10 Configuration of CUDB for EIR Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB node must be configured as separate Network Elements (NE).

How an NE needs to be configured depends on the purpose of using the NE. For each CUDB, several NEs can be configured with different configuration settings. For example, the time to wait for a response after sending a request differs depending on if Individual Provisioning and Massive Updates are used,



or if Massive Search is used. For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: LDAP

Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in `Failover` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.

For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

7.2 Create User

Create a client application user according to instructions in Section 24 on page 76.

7.3 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for EIR provisioning.

- `CentralImeiDb`
- `NominationList`
- `RootDN`

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].



Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3]

8 Configuration for SAPC Provisioning

To provision SAPC, the CUDB or monolithic NE needs to be configured as described in the following subchapters.

8.1 Layered SAPC Provisioning Configuration

8.1.1 CUDB Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 11 illustrates the CUDB configuration.

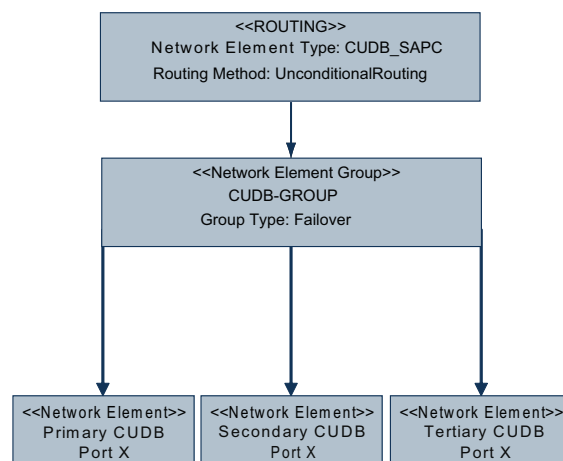


Figure 11 Configuration of CUDB for Layered SAPC Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.



Primary, secondary, and tertiary CUDB node must be configured as separate Network Elements (NE).

Supported protocols are: LDAP

Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in `Failover` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.

For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

8.1.2

SAPC-FE Configuration

The SAPC-FE are configured by configuring an NE, NE Group and Routing. Figure 12 illustrates the SAPC-FE configuration.

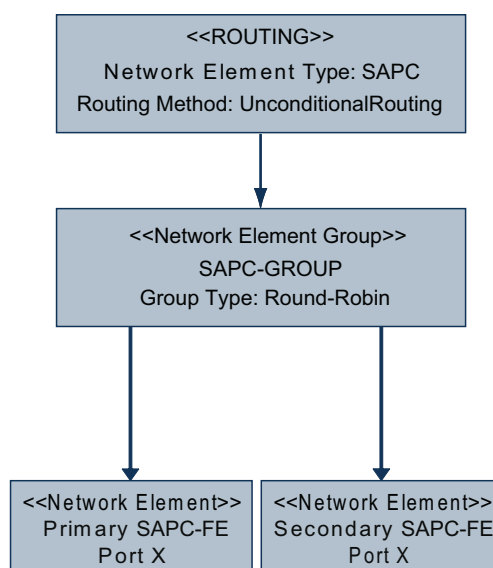


Figure 12 Configuration of SAPC-FE for Layered SAPC Provisioning



Network Element

An NE must be defined and configured for SAPC node that Dynamic Activation is connected to.

Primary and secondary SAPC node must be configured as separate Network Elements (NE).

NE configuration is performed in the **Network Elements > Network Elements** sub-menu. Select **CF-HTTP** in **Protocol**.

Note: When configuring this protocol parameter, `HeartBeat Uri` must be set to `/profiles/online-charging-system`, and `HeartBeat accepted response code` is 200. For more information about how to generate the Key store file, refer to section `Certificates Management` in *Security Management Guide*.

For more information about this configuration, refer to *User Guide for Resource Activation*, Reference [3].

Network Element Group

The configured NEs are grouped in an NE Group configured in `Round-Robin` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 21 on page 63.

The same NE can be assigned to several NE Groups.

Network Element

Routing is needed to find an NE from the business logic.

For SAPC-FE, the routing method `UnconditionalRouting` is used.

Configure the routing according to Section 22 on page 64.

8.1.3

Create User

Create a client application user according to instructions in Section 24 on page 76.

8.1.4

Blocking CUDB for Backup

To ensure consistency during backup, certain provisioning towards CUDB needs to be blocked. For detailed information, see Section 25 on page 76.



8.1.5 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for layered SAPC provisioning.

The parameters for SAPC-Layered-Resource-Provisioning are as follows:

- MaxRetries
- RootDN

The parameter for SAPC-Service-Provisioning is as follows:

- FamilyProvisionCUDBFirst

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3].

8.2 Monolithic SAPC Provisioning Configuration

8.2.1 NE Configuration

The monolithic SAPC NE is configured by configuring an NE and Routing. Figure 13 illustrates the NE configuration.

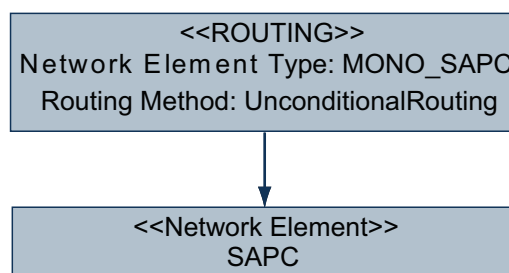


Figure 13 Configuration of NE for Monolithic SAPC Provisioning

Network Element

An NE must be defined and configured for monolithic SAPC node that Dynamic Activation is connected to.



NE configuration is performed in the **Network Elements > Network Elements** submenu. Select a protocol according to the following table in **Protocol**.

Table 2 Protocol for Different SAPC Versions

SAPC Version	Protocol	Protocol Parameter Version
Monolithic cSAPC 16B	LDAP	-
Monolithic SAPC 17A and later versions	CF-HTTP ⁽¹⁾	The SAPC NE version For example, 17A

(1) When configuring this protocol parameter, HeartBeat Uri must be set to /profiles/online-charging-system, and HeartBeat accepted response code is 200. For more information about how to generate the Key store file, refer to section Certificates Management in Security Management Guide.

For more information about this configuration, refer to *User Guide for Resource Activation*, Reference [3].

Routing

Routing is needed to find an NE from the business logic.

The routing method `UnconditionalRouting` must be used according to the deployment.

Configure the Routing according to Section 22 on page 64.

8.2.2 Create User

Create a client application user according to instructions in Section 24 on page 76.

8.2.3 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for monolithic SAPC provisioning.

For monolithic cSAPC 16B, the parameter for `CSAPC-Monolithic-Resource-Provisioning` is as follows:

- `RootDN`

Note: The default value of `RootDN` is `applicationName=EPC-EpcNode,nodeName=jambala` and must be changed to a value that matches the configured Root DN value. The `RootDn` parameter is case-sensitive.

For monolithic SAPC 17A, the parameter for `SAPC-Monolithic-Resource-Provisioning` is as follows:

- `OverwritingExistedSubscriber`



Note: The default value of `OverwritingExistedSubscriber` is NO.

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

9 Configuration for IPWorks/AAA Provisioning

To provision IPWorks/AAA, the CUDB needs to be configured as described in the following subchapters.

9.1 Monolithic IPWorks/AAA (NSD) Configuration

Monolithic IPWorks AAA (NSD) is configured by an NE or NE Group, NE routing, and **Activation Logics** property.

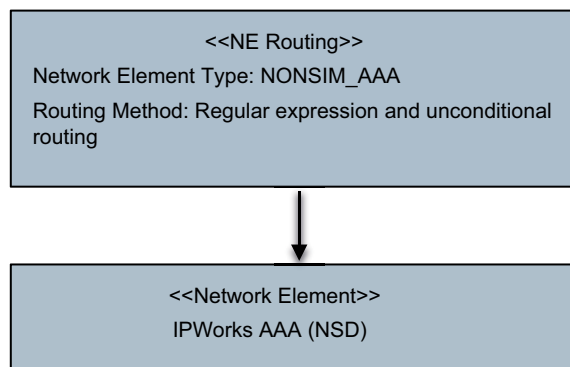


Figure 14 Single NE Configuration

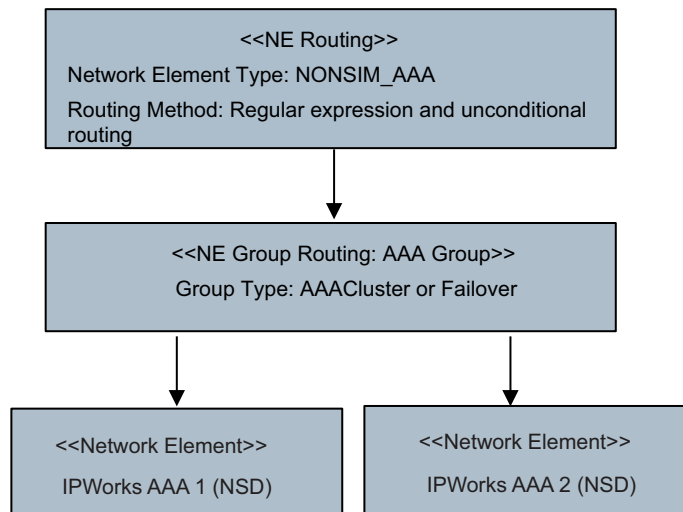


Figure 15 NE Group Configuration

Network Element

An NE must be defined and configured for each IPWorks/AAA (NSD) node that Dynamic Activation is connected to.

NE configuration is performed in the **Network Elements > Network Elements** submenu. Select **SSH** as **Protocol**.

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Network Element Group

The configured two IPWorks AAA NEs are grouped in an NE group configured in **Failover** mode or **AAACluster** mode. The NE group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group. For details, see Table 9.

For **Failover** NE group configuration, the AAA activation logics configuration data must be set properly. For more information, refer to *User Guide for Resource Activation*, Reference [3].

Routing

Routing is needed to find an NE from the business logic.

For IPWorks/AAA (NSD), the routing method **RegularExpressionRouting** and **UnconditionalRouting** are used according to the deployment.

Configure the routing according to Section 22 on page 64.



9.2 Layered IPWorks/AAA (NSD) Configuration

Layered IPWorks AAA (NSD) is configured by an NE or NE Group, NE routing, and **Activation Logics** property.

9.2.1 CUDB Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 16 illustrates the CUDB configuration.

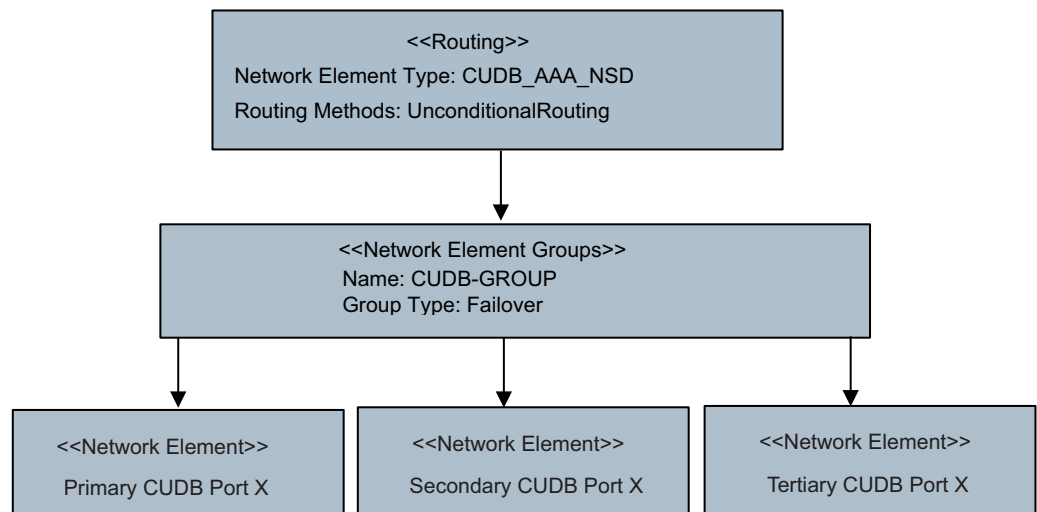


Figure 16 CUDB Configuration for AAA (NSD) Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB nodes must be configured as separate NEs.

How an NE needs to be configured depends on the purpose of using the NE. For each CUDB, several NEs can be configured with different configuration settings. For example, the time to wait for a response after sending a request differs depending on if Individual Provisioning and Massive Updates are used, or if Massive Search is used.

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3]

Supported protocols are: LDAP

9.2.2 Layered IPWorks AAA (NSD) Notification Configuration

The AAANSND-FEs are configured by configuring an NE, NE Group and Routing. Figure 17 illustrates AAANSND-FE configurations.

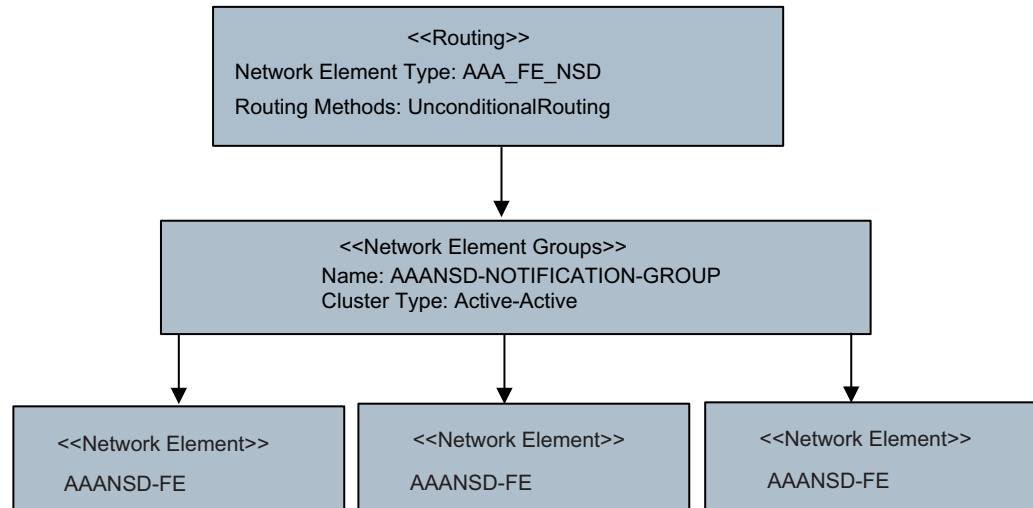


Figure 17 AAANSND NE Configuration for AAANSND Notification

Network Element

An NE must be defined and configured for each AAANSND-FE that Dynamic Activation is connected to. For further instructions, see Section 20 on page 63.

Supported protocols are: `ssh`

Network Element Group

The configured NEs are grouped in an NE group configured in `Active-Active` mode. The NE group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group. For details, see Section 20 on page 63.

The same NE can be assigned to several NE Groups.

All the NEs in the NE group receives the request.

Routing

Routing is needed to find an NE from the business logic.

Configure the routing according to Section 22 on page 64.



9.3 Layered IPWorks/AAA Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 18 illustrates the CUDB configuration.

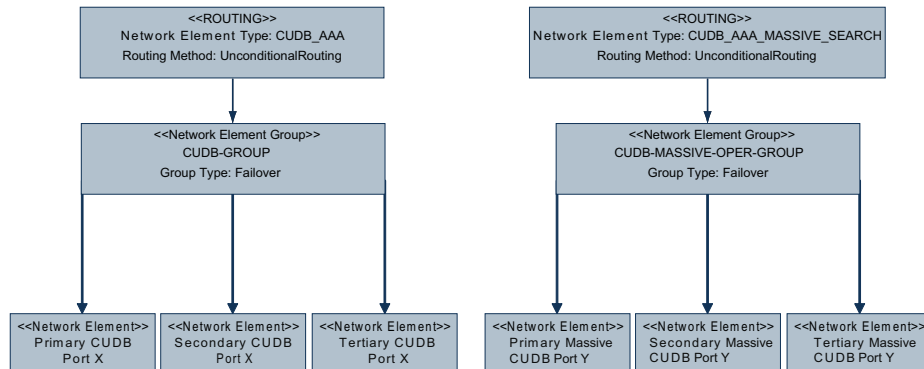


Figure 18 Configuration of CUDB for IPWorks/AAA Provisioning

Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB node must be configured as separate Network Elements (NE).

How an NE needs to be configured depends on the purpose of using the NE. For each CUDB, several NEs can be configured with different configuration settings. For example, the time to wait for a response after sending a request differs depending on if Individual Provisioning and Massive Updates are used, or if Massive Search is used. For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: LDAP

Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in *Failover* mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

Routing

Routing is needed to find an NE Group from the business logic.



For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

9.4 Create User

Create a client application user according to instructions in Section 24 on page 76.

9.5 Activation Logic Properties

9.5.1 Monolithic IPWorks AAA (NSD) Properties

This section contains the configuration for setting the AAA command retry function and AAA maintenance status.

AAA command retry function: AAA JDV logics can retry certain commands based on AAA error messages, retry times, and retry interval. Both the single AAA and AAA group configurations are applicable for this function.

The following configuration data properties are applicable:

- `MaxRetry`
- `RetryErrorMessage`
- `MaintenanceMode`
- `RetryInterval`

For detailed information about each property in the preceding list and how to change the configuration data, refer to *User Guide for Resource Activation*, Reference [3].

9.5.2 Layered IPWorks AAA (NSD) Properties

This section contains all the Configuration Data properties that are used for Layered IPWorks AAA (NSD) provisioning.

The following configuration data property is applicable:

- `RootDN`



Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the `Change All RootDN's To:` parameter. For details, refer to *User Guide for Resource Activation*, Reference [3].

9.5.3 Layered IPWorks AAA Properties

This section contains all the Configuration Data properties that are used for IPWorks/AAA provisioning.

The following configuration data property is applicable:

- `RootDN`

Note: Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the `Change All RootDN's To:` parameter. For details, refer to *User Guide for Resource Activation*, Reference [3].

For detailed information about each property in the preceding list and how to change the configuration data, refer to *User Guide for Resource Activation*, Reference [3].

9.6 Layered IPWorks/AAA AVP Configuration

The configurable file `AVPs.xml` includes two kinds of AVPs that are supported, `checklist` and `replylist`. Each AVP has attribute name and type. Four types of AVP are supported: `string`, `integer`, `ipaddr` (IPv4), and `IPv6`.

The following is an example of `AVPs.xml` with adding new AVP `Login-IP-Host`. It is possible to modify the AVP names and also to delete AVPs. To delete an AVP, remove the specific AVP row.



```
<?xml version="1.0" encoding="UTF-8"?>
<AVPs>
  <checklist>
    <AVP name="User-Name" type="string" />
    <AVP name="User-Password" type="string" />
    <AVP name="CHAP-Password" type="string" />
    <AVP name="NAS-IP-Address" type="string" />
    <AVP name="Login-IP-Host" type="ipaddr" />
  </checklist>
  <replylist>
    <AVP name="User-Name" type="string" />
    <AVP name="Service-Type" type="integer" />
    <AVP name="Framed-Protocol" type="integer" />
    <AVP name="Framed-IP-Address" type="ipaddr" />
    <AVP name="Framed-IP-Netmask" type="ipaddr" />
  </replylist>
</AVPs>
```

Example 8 AVPs.xml

9.6.1 AVP Loading

Note: The following steps must be performed on any of the SC nodes.

The following step-list describes the procedure on how to load the AVPs:

1. Create a temp directory, for example:

```
$ mkdir -p /tmp/AVP
```

```
$ cd /tmp/AVP
```

2. Transfer the `<Software_Package>.tar.gz` file, to the newly created `/tmp/AVP` directory.

For example:

```
$ cp /var/log/installfiles/<Software_Package>.tar.gz
/tmp/AVP/
```

3. Create a temp directory in `/tmp/AVP/`:

```
$ mkdir -p temp
```

4. Untar the `<Software_Package>.tar.gz` file:

```
$ tar -xvf <Software_Package>.tar.gz -C temp
```

5. Go to the `/temp/var/log/installfiles/<Prod_Number>-<Version>` directory:

```
$ cd temp/var/log/installfiles<Prod_Number>-<Version>
```

6. Create a `pg` directory:

```
$ mkdir -p pg
```

7. Untar the `CXP9026216-<version>.tar.gz` file:



- ```
$ tar -xvf CXP9026216-<version>.tar.gz -C pg
```
8. Go to the `/pg/home/bootloader/repository/` directory:
 

```
$ cd pg/home/bootloader/repository/
```
  9. Create a `jdv` directory:
 

```
$ mkdir -p jdv
```
  10. Untar the `jdv-udc-assembly-<version>.tar.gz` file:
 

```
$ tar -xvf jdv-udc-assembly-<version>.tar.gz -C jdv
```

All JDVs are now found in the `jdv` directory.
  11. Go to the `jdv` directory:
 

```
$ cd jdv
```
  12. Unpack the `JDV-AAA-Provisioning-<version>.jar` file:
 

```
$ jar -xvf JDV-AAA-Provisioning-<version>.jar
```
  13. Copy the configurable files to a suitable catalog structure in `/home/bootloader/CArepository/<JDV_Dir>`.
 

For example:

```
$ mkdir -p /home/bootloader/CArepository/JDV_AAA_Provisioning/com/ericsson/dve/jdv/aaa/common
```

```
$ cp ./META-INF/AVPs.xml /home/bootloader/CArepository/JDV_AAA_Provisioning/com/ericsson/dve/jdv/aaa/common
```
  14. Modify the `AVPs.xml` file.
 

Perform the modification as described in Section 9.6 on page 37.

Go to:

```
$ cd /home/bootloader/CArepository/JDV_AAA_Provisioning/com/ericsson/dve/jdv/aaa/common
```

Edit the file:

```
$ vi AVPs.xml
```
  15. Go to the `/home/bootloader/repository/` directory:
 

```
$ cd /home/bootloader/repository/
```
  16. Untar the `jdv-ca-properties-assembly-<version>.tar.gz` file:



```
$ tar -xvf jdv-ca-properties-assembly-<version>.tar.gz
-C ../CArepository
```

17. Go to the `/home/bootloader/CArepository/` directory:

```
$ cd /home/bootloader/CArepository/
```

18. Rename the `ca-template.properties` file to `ca.properties`.

For example:

```
$ mv ca-template.properties ca.properties
```

19. Edit the `ca.properties` file so that it points to the directory with the new file example.

Change the following line:

```
$com.ericsson.dve.jdv.aaa.common.AVPs.xml =
```

To:

```
com.ericsson.dve.jdv.aaa.common.AVPs.xml = file:${ca.re
pository}/JDV_AAA_Provisioning/com/ericsson/dve/jdv/
aaa/common/AVPs.xml
```

20. Create a `tar.gz` file, for example `MY_NEW_CA-<version>.tar.gz`, including the `ca.properties` file and the newly modified `AVPs.xml` file.

For example:

```
$ tar cvfz MY_NEW_CA-<version>.tar.gz ca.properties
JDV_AAA_Provisioning/
```

**Note:** The naming of the new `tar.gz` file, must have the following format: `<Name>-<version>.tar.gz`

21. Change the owner and the group of the new `tar.gz` files.

```
chown actadm:activation /home/bootloader/CArepository
/MY_NEW_CA-<version>.tar.gz
```

22. Add the new `tar.gz` file as a submodule to the `dve-application` module.

For example:

```
$ bootloader.py submodule add -n MY_NEW_CA-<version>.tar
.gz -t caConfig -p dve-application --host <hostname>
```

`<hostname>` is the hostname of the PL node to which the submodule is being added.



23. From an SC node, run the following command for all affected PL nodes, one by one, to activate the submodule.

---

### Warning!

Wait for each PL node to be activated before starting with the next one, otherwise traffic disturbances occur. Do not run `all`.

---

```
$ bootloader.py node activate --host <hostname>
```

<hostname> is the hostname of the PL node to which the submodule is being activated.

## 10 Configuration for DAE Provisioning

To provision DAE, the CUDB and DAE-FEs need to be configured as described in the following subchapters.

### 10.1 CUDB Configuration

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 19 illustrates the CUDB configuration.

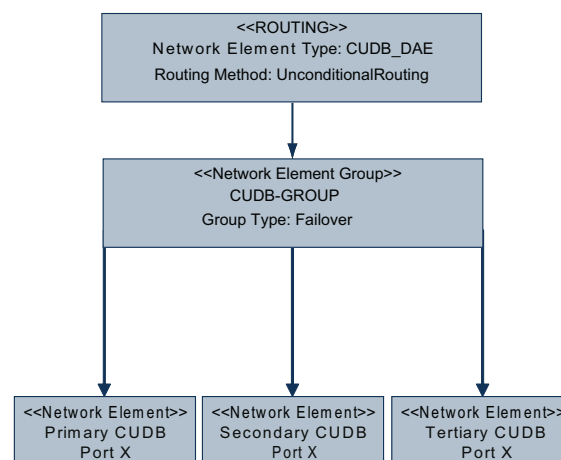


Figure 19 Configuration of CUDB for DAE Provisioning



### Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB node must be configured as separate Network Elements (NE).

Supported protocols are: LDAP

### Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in `Failover` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

### Routing

Routing is needed to find an NE Group from the business logic.

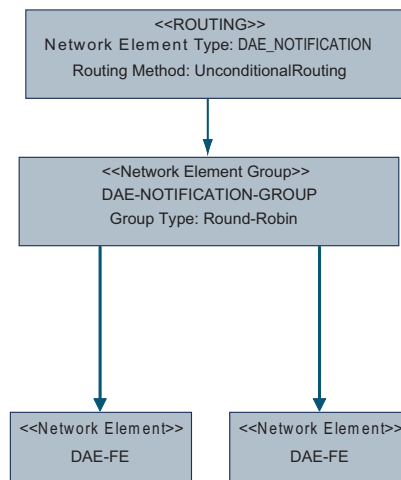
For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

## 10.2 DAE Provisioning Notification Configuration

The DAE-FEs are configured by configuring an NE, NE Group, and Routing. Figure 20 illustrates a DAE-FE configuration.





*Figure 20 Configuration of DAE NE for DAE Notification*

### Network Element

An NE must be defined and configured for each DAE-FE that Dynamic Activation is connected to. For further instructions, see Section 20 on page 63.

### Network Element Group

The configured NEs are grouped in an NE Group configured in *Round-Robin* mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 20 on page 63.

The same NE can be assigned to several NE Groups.

### Routing

Routing is needed to find an NE Group from the business logic.

Configure the Routing according to Section 22 on page 64.

## 10.3 Create User

Create a user according to instructions in Section 24 on page 76.

## 10.4 Blocking CUDB for Backup

To ensure consistency during backup, certain provisioning towards CUDB needs to be blocked. For detailed information, see Section 25 on page 76.



## 10.5 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for DAE provisioning.

- RootDN

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

**Note:** Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3]

## 11 Configuration for MTAS Provisioning

This section describes the configuration needed to enable provisioning of the following:

- Multimedia Telephony (MMTel) services in Multimedia Telephony Application Server (MTAS)
- SIP Trunking services in MTAS

For more information about the related provisioning operations, refer to *MTAS Provisioning over CAI3G*, Reference [9].

### 11.1 MTAS Configuration

The MTAS NE is configured by configuring an NE, NE Group, and routing. Figure 21 illustrates the MTAS configuration.

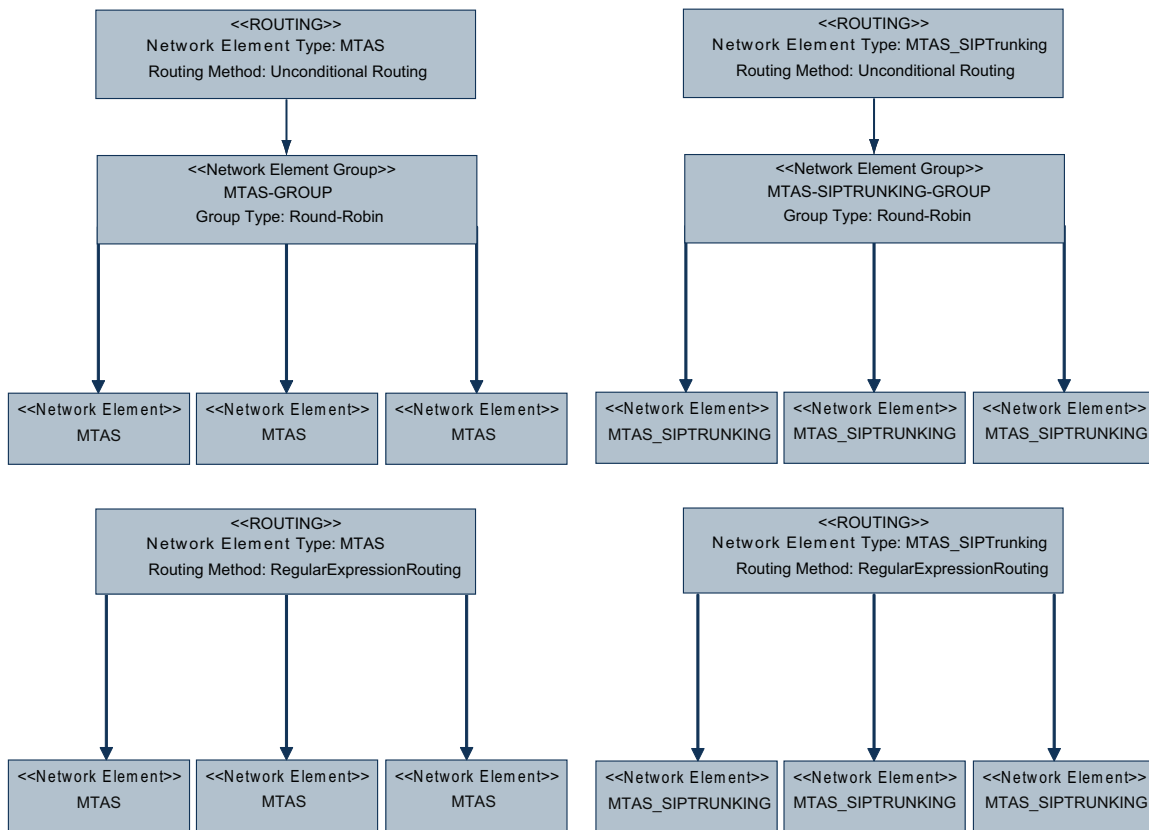


Figure 21 Configurations of MTAS for MMTel Provisioning and SIP Trunking Provisioning

## Network Element

An NE must be defined and configured for each MTAS or MTAS\_SIPTrunking node that Dynamic Activation is connected to. For further instructions, see Section 21 on page 63.

For MTAS NE, the request traffic URL, session control URL, are defined as `http://<ip>:<port>/axis2/services`. And the heartbeat URL is defined as `http://<ip>:<port>/axis2/services/CAI3G?wsdl`.

For MTAS\_SIPTrunking NE, the request traffic URL, session control URL, and heartbeat URL are defined as `http://<ip>:<port>/mtasstas`

Table 3 lists the Network Element advanced parameter version to be set for each corresponding version of MTAS node. If the version parameter is empty, it uses the 17B version by default.

Table 3 Network Element Parameter Versions

| MTAS Node Version | Network Element Advanced Parameter Version |
|-------------------|--------------------------------------------|
| MTAS 4.5 R6A      | 17A                                        |



| MTAS Node Version | Network Element Advanced Parameter Version |
|-------------------|--------------------------------------------|
| MTAS 4.6 R7A      | 17B                                        |
| vMTAS 1.6 R5A     | vMTAS1                                     |

Primary, secondary, and tertiary MTAS node must be configured as separate NEs. For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: CAI3G

### Network Element Group

The configured NEs are grouped in an NE Group configured in Round-Robin mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 21 on page 63.

**Note:** This is only applicable if `UnconditionalRouting` is used as routing method, not if `RegularExpressionRouting` is used.

The same NE can be assigned to several NE Groups.

### Routing

Routing is needed to find an NE group from the business logic.

For MTAS and MTAS\_SIPTrunking, the routing methods `UnconditionalRouting` and `RegularExpressionRouting` are used.

Configure the routing according to Section 22 on page 64.

## 11.2 Create User

Create a user according to instructions in Section 24 on page 76.

## 11.3 Activation Logic Properties

This section contains the **Configuration Data** properties that are configurable for MTAS provisioning.

- `ErrorCodeMapping`

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].



## 12 Configuration for BCE Provisioning

To provision Business Communication Enabler (BCE), configure the BCE as described in the following subchapters.

For more information about the related provisioning operations, refer to *BCE Provisioning over CAI3G*, Reference [11].

### 12.1 BCE Configuration

The BCE NE is configured by configuring an NE, NE Group, and routing. Figure 22 illustrates the BCE configuration.

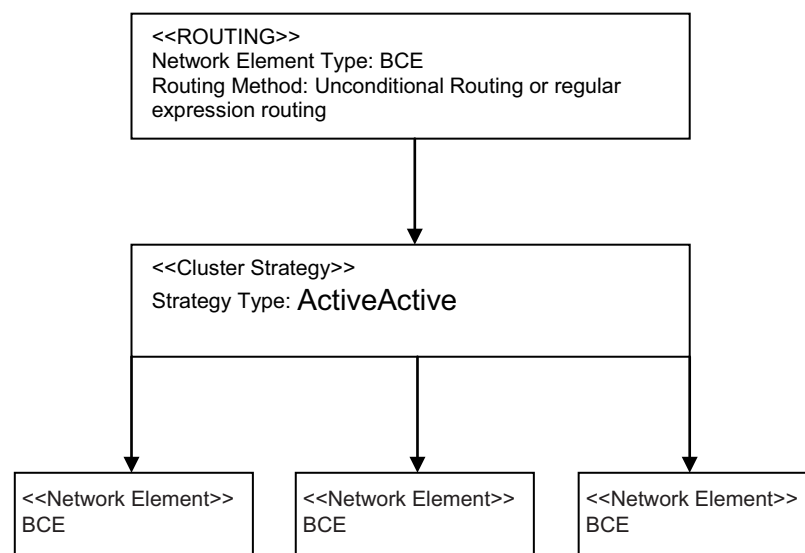


Figure 22 Configurations of BCE NE for BCE Provisioning

#### Network Element

Define and configure an NE for each BCE node that Dynamic Activation is connected to. For further instructions, see Section 21 on page 63.

NE configuration is performed in the **Network Elements >Network Elements** submenu. Select **HTTP** as **Protocol**.

Configure the **Content Encoding** and **Authentication Method** parameters as none, otherwise the link can be down.

Select **Customized Heartbeat** to perform HTTP post heartbeat, and configure **HTTP Post Body** as follows:



```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:up="http://schemas.ericsson.com/edible/up/"><soapenv:Header /><soapenv:Body><up:getAllServiceProviders /></soapenv:Body></soapenv:Envelope>
```

For more information about this configuration, refer to *User Guide for Resource Activation*, Reference [3].

Supported protocols are: HTTP

### Cluster Strategy

A cluster strategy instance is needed to be created. The strategy type is set to `ActiveActive`.

Assign the configured NEs to the cluster strategy instance. For instructions, refer to see *User Guide for Resource Activation*, Reference [3].

### Routing

Routing is used to find an NE Group from the Business Logic.

BCE NE supports both the unconditional routing and regular expression routing.

Configure the Routing according to Section 22 on page 64.

## 12.2 Create a User

For details on how to create a user, see Section 24 on page 76.

## 12.3 Activation Logic Properties

This section contains the following Configuration Data properties that are configurable for BCE provisioning:

- BCE-Resource
  - `CompanySettingName`
  - `GetCompanySetting`

For detailed information about each preceding property and how to change the configuration data, refer to *User Guide for Resource Activation*, Reference [3].



## 13 Configuration for PGM Provisioning

To provision Presence, Group and Data Management (PGM), configure the PGM as described in the following subchapters.

For more information about the related provisioning operations, refer to *PGM Provisioning over CAI3G*, Reference [12].

### 13.1 PGM Configuration for Document Service

The PGM NE for Document service is configured by configuring an NE and routing. Figure 23 illustrates the PGM NE Configuration for Document service.

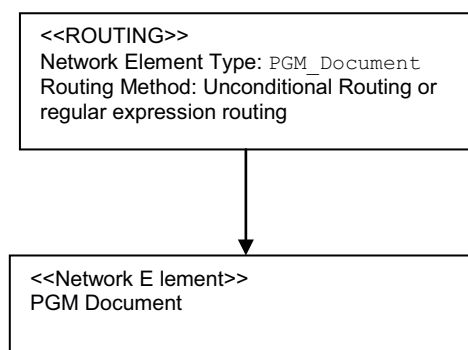


Figure 23 Configurations of PGM NE for Document Service in PGM Provisioning

#### Network Element

Define and configure an NE for each PGM node that Dynamic Activation is connected to.

PGM NE Configuration for Document service is performed in the **Network Elements >Network Elements** submenu. Select **HTTP** as **Protocol**.

For PGM NEs, configure mandatory parameters (marked with \*) only. It is not necessary to configure optional parameters.

For PGM NEs, configure the **Content Encoding** and **Authentication Method** parameters as `none`, otherwise the link can be down.

For more information about this configuration, refer to *User Guide for Resource Activation*, Reference [3].

Supported protocols are: HTTP

## Routing

The Routing is used to find an NE from the Business Logic.

PGM NE supports both the unconditional routing and regular expression of which the attribute name is `publicId`.

Configure the Routing according to Section 22 on page 64.

## 13.2 PGM Configuration for User Service

The PGM NE for User service is configured by configuring an NE and routing. Figure 22 illustrates the PGM NE configuration for User service.

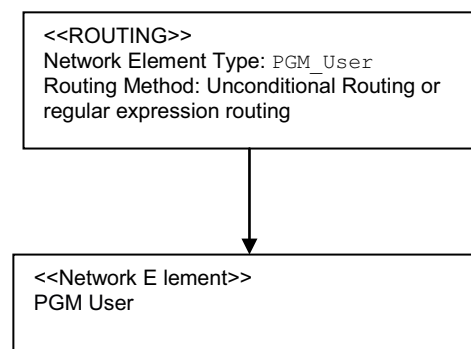


Figure 24 Configurations of PGM NE for User Service in PGM Provisioning

## Network Element

Define and configure an NE for each PGM node that Dynamic Activation is connected to.

PGM NE configuration for User service is performed in the **Network Elements >Network Elements** submenu. Select **CAI3G** as **Protocol**.

For PGM NEs, configure mandatory parameters (marked with \*) only. It is not necessary to configure optional parameters.

For more information about this configuration, refer to *User Guide for Resource Activation*, Reference [3].

Supported protocols are: CAI3G

## Routing

The Routing is used to find an NE from the Business Logic.

PGM NE supports both the unconditional routing and regular expression of which the attribute name is `publicId`.





Configure the Routing according to Section 22 on page 64.

### 13.3 Create a User

For details on how to create a user, see Section 24 on page 76.

### 13.4 Activation Logic Properties

This section contains the following Configuration Data properties that are configurable for PGM provisioning of Document service:

- BCE-Resource
  - X3GPPAssertedIdentity
  - Xcaproot

For detailed information about each preceding property and how to change the configuration data, refer to *User Guide for Resource Activation*, Reference [3].

## 14 Configuration for AIR Provisioning

This section describes the configuration needed to enable provisioning of the following:

- Account Information and Refill services in AIR

For more information about the related provisioning operations, refer to *Charging Provisioning over CAI3G*.

### 14.1 AIR Configuration

The AIR NE is configured by configuring an NE and routing. Figure 25 illustrates the AIR configuration.

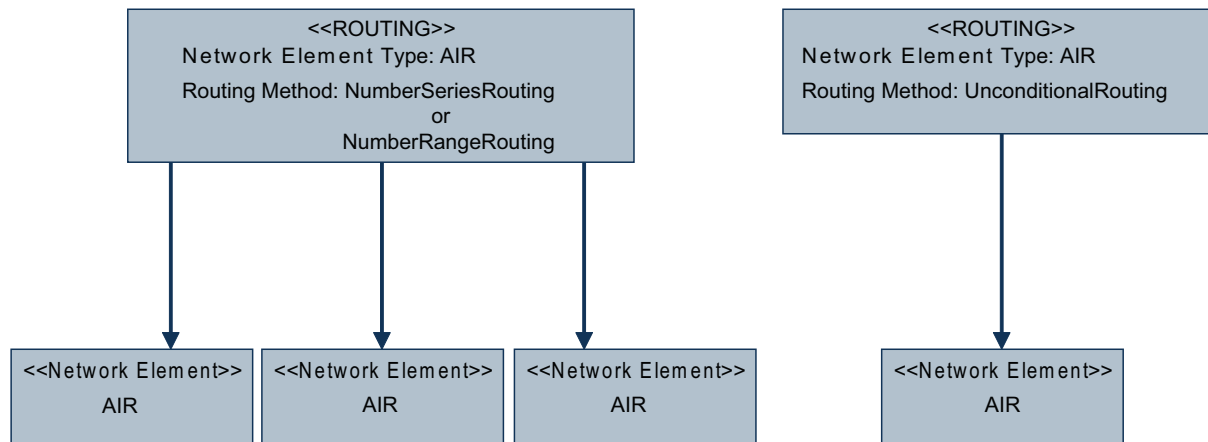


Figure 25 Configurations of AIR for AIR Provisioning

## Network Element

An NE must be defined and configured for each AIR node that Dynamic Activation is connected to.

NE configuration is performed in the **Network Elements > Network Elements** submenu. Select **AIR-Connector** as **Protocol**.

To perform HTTP post heartbeat, configure **HeartBeat Post Body** as follows:

```
<methodCall><methodName>GetCapabilities</methodName><params><param><value><struct></struct></value></param></params></methodCall>
```

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: **AIR-Connector**

## Network Element Group

The configured NEs are grouped in an NE Group configured in **Multiple AIR** mode. The NE Group is used by the Business Logic as a logical NE.

Assign the configured NEs to an NE Group according to Section 21 on page 63. The same NE can be assigned to several NE Groups.



## Routing

Routing is needed to find an NE from the business logic.

For AIR, the routing method `NumberSeriesRouting`, `NumberRangeRouting`, and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

## 14.2 Create User

Create a user according to instructions in Section 24 on page 76.

## 14.3 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for AIR provisioning.

- AIR-Monolithic-Resource

- `ProvisioningUri`

This parameter is mandatory when performing AIR provisioning.

- `ChargingTimeZone`

- `OriginOperatorID`

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

# 15 Configuration for AF Provisioning

This section describes the configuration needed to enable provisioning of the following:

- Account Finder services in AF

For more information about the related provisioning operations, refer to *Charging Provisioning over CAI3G*.

## 15.1 AF Configuration

The AF NE is configured by configuring an NE and routing. Figure 26 illustrates the AF configuration.

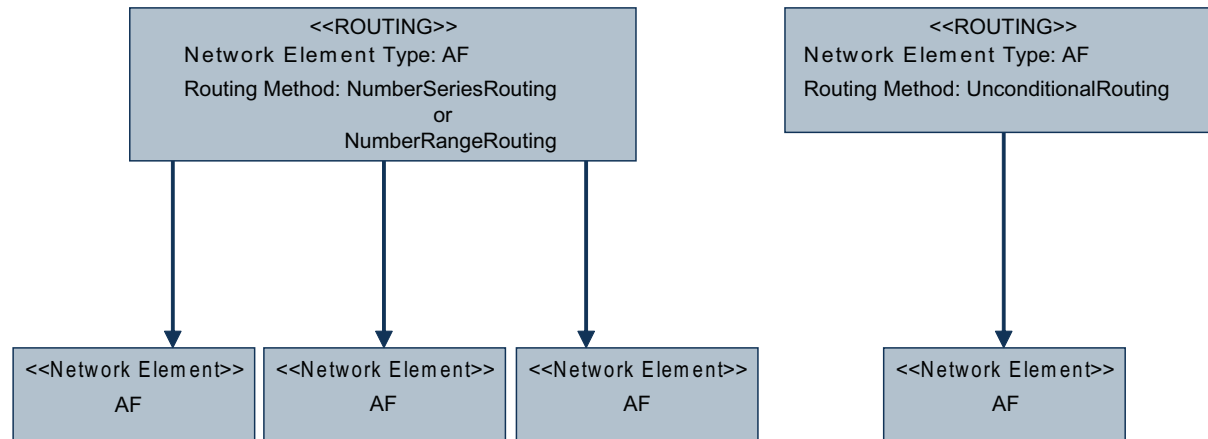


Figure 26 Configurations of AF for AF Provisioning

### Network Element

An NE must be defined and configured for each AF node that Dynamic Activation is connected to.

NE configuration is performed in the **Network Elements > Network Elements** submenu. Select DNS as **Protocol**.

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: DNS

### Routing

Routing is needed to find an NE from the business logic.

For AF, the routing method `NumberSeriesRouting`, `NumberRangeRouting`, and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

### 15.1.1 Create User

Create a user according to instructions in Section 24 on page 76.



### 15.1.2 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for AF provisioning.

- AF-Monolithic-Resource
  - TTL

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

## 16 Configuration for IPWorks/ENUM Provisioning

This section describes the configuration needed to enable provisioning of the following:

- ENUM records in IPWorks
- Management DNS domain in IPWorks

It is recommended to configure either layered or monolithic IPWorks/ENUM provisioning on a Dynamic Activation. If both are configured, the Dynamic Activation has a preference for the layered IPWorks/ENUM configuration over the monolithic one.

For more information about the related provisioning operations, refer to *IPWorks/ENUM Provisioning over CAI3G*, Reference [10].

### 16.1 Monolithic IPWorks/ENUM Configuration

The IPWorks NE is configured by configuring an NE and routing. Figure 27 illustrates the monolithic IPWorks/ENUM configuration.

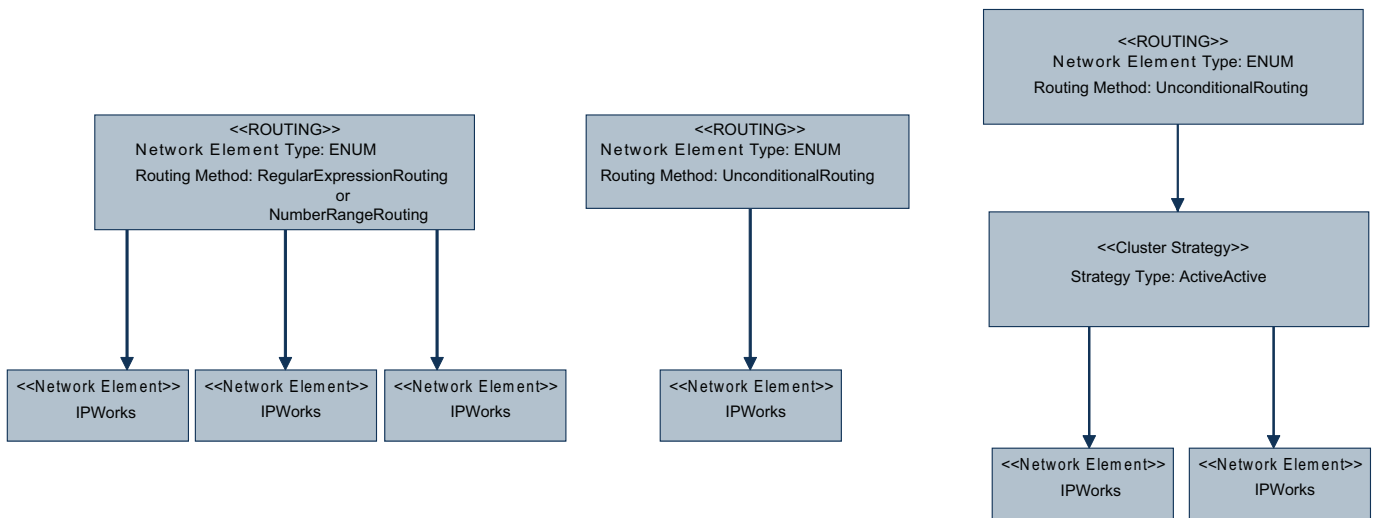


Figure 27 Configurations of IPWorks for Monolithic ENUM Provisioning

## Network Element

An NE must be defined and configured for each IPWorks node that Dynamic Activation is connected to.

NE configuration is performed in the **Network Elements > Network Elements** submenu. Select CF-SSH as **Protocol**.

The **Protocol** parameter version is mandatory for IPWorks. Table 4 lists the **Protocol** parameter version to be set for each version of IPWorks ENUM node.

Table 4 Protocol Parameter Versions

| IPWorks ENUM Version | Protocol Parameter Version |
|----------------------|----------------------------|
| 15B                  | 15B                        |
| 15B FD1              | 15BFD1                     |
| 16A                  | 16A                        |
| 1                    | 1                          |

For more information about this configuration, see *User Guide for Resource Activation*, Reference [3].

Supported protocols are: CF-SSH

## Cluster Strategy

A cluster strategy instance is needed to be created. The strategy type is set to **ActiveActive**.



Assign the configured NEs to the cluster strategy instance. For instructions, refer to see *User Guide for Resource Activation*, Reference [3].

## Routing

Routing is needed to find an NE from the business logic.

For IPWorks, the routing method `RegularExpressionRouting`, `NumberRangeRouting`, and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

## 16.2 Layered IPWorks/ENUM Configuration

To provision layered IPWorks/ENUM, the CUDB needs to be configured as described as follows.

The CUDB NE is configured by configuring an NE, NE Group, and Routing. Figure 28 illustrates the CUDB configuration.

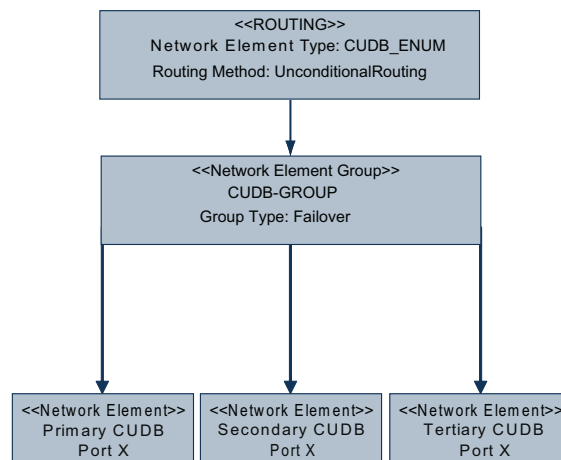


Figure 28 Configurations of CUDB for IPWorks/ENUM Provisioning

## Network Element

An NE must be defined and configured for each CUDB node that Dynamic Activation is connected to. For further instructions, see Section 18 on page 60.

Primary, secondary, and tertiary CUDB node must be configured as separate Network Elements (NE).



## Network Element Group

The configured primary, secondary, and tertiary NEs are grouped in an NE Group configured in `Failover` mode. The NE Group is used by the business logic as a logical NE.

The configured NEs must be assigned to an NE Group, see Section 18 on page 60.

The same NE can be assigned to several NE Groups.

## Routing

Routing is needed to find an NE Group from the business logic.

For CUDB `UnconditionalRouting` method is used.

Configure the Routing according to Section 22 on page 64.

## 16.3 Create User

Create a user according to instructions in Section 24 on page 76.

## 16.4 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for IPWorks/ENUM provisioning.

For both layered and monolithic IPWorks/ENUM provisioning:

DNSSubscription MO:

- `Routeuserphone`
- `Enumdomain`

For layered IPWorks/ENUM only:

- `MaxRetries`
- `RootDN`





**Note:** Root DN is always configured to `dc=operator,dc=com` by default and must be changed to a value that matches the configured Root DN value in CUDB. The `RootDn` parameter is case-sensitive.

The Root DN value can either be set individual per Activation Logic target component or set on all Activation Logic target components by use of the **Change All RootDN's To:** parameter, see *User Guide for Resource Activation*, Reference [3]

For monolithic IPWorks/ENUM only:

DNSDomains MO:

- `DnsDomainCreateCommands`

This parameter is mandatory when adding a DNS domain.

- `DnsDomainDeleteCommands`

This parameter is mandatory when removing a DNS domain.

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

## 17 Configuration for DSC/ILF Provisioning

To provision Diameter Signaling Controller (DSC) over the Individual Locator Function (ILF) CAI3G interface, configure DSC/ILF as described in the following sections.

For more information about the related provisioning operations, refer to *DSC/ILF Provisioning over CAI3G*, Reference [15].

### 17.1 DSC/ILF Configuration

The DSC/ILF NE is configured by configuring an NE and routing. The following figure illustrates the DSC/ILF configuration.

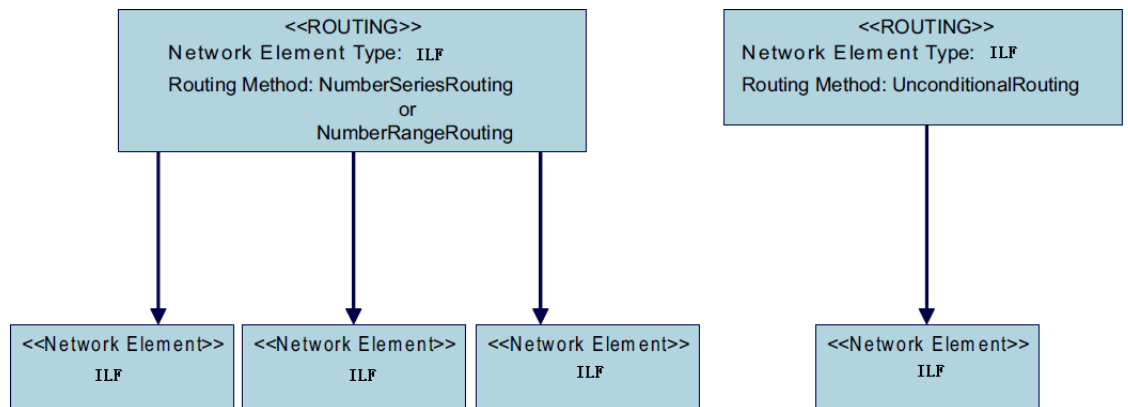


Figure 29 Configurations of DSC/ILF NE for DSC/ILF Provisioning

## Network Element

Configure the NEs through the Dynamic Activation GUI **Network Elements** > **Network Elements** submenu. Select **CAI3G** as **Protocol**.

Parameter **WS-Security Mode** is specialized for DSC/ILF NE. Configure the **SSL/TLS** and **WS-Security Mode** parameters as follows, otherwise the link can be down:

- For HTTP protocol, select **WS-Security Mode** and **authentication username/password digest**. Make sure that **SSL/TLS** is not selected.
- For HTTPs protocol, select **SSL/TLS**, **WS-Security Mode**, and **authentication username/password text** parameters.

For more information about the configuration, refer to *User Guide for Resource Activation*, Reference [3].

## Routing

Routing is used to find an NE group from the business logic.

For DSC/ILF, the routing method `NumberSeriesRouting`, `NumberRangeRouting`, and `UnconditionalRouting` are used according to the deployment.

Configure the routing according to Section 22 on page 64.

## 17.2 Create User

Create a user according to instructions in Section 24 on page 76.



## 18 CUDB Configuration

---



---

### Attention!

One Dynamic Activation system can only support one CUDB system.

---



---

NE configuration and NE Group configuration are performed in the **Network Elements > Network Elements** and **Network Elements > Network Element Groups** submenus of the **Dynamic Activation** GUI. For more detailed information about NE configuration, refer to *User Guide for Resource Activation*, Reference [3].

The recommended configuration of NE Groups is listed in Table 5. The same NE can be used in more than one NE Group.

Table 5 CUDB Configuration

| Network Element Group Name | Group Type |
|----------------------------|------------|
| CUDB-GROUP                 | Failover   |
| CUDB-MASSIVE-OPER-GROUP    | Failover   |
| CUDB-MASSIVE-UPDATE-GROUP  | Failover   |

### 18.1 Activation Logic Properties

This section contains all the **Configuration Data** properties that are configurable for CUDB provisioning.

- CUDB-IMSI-Changeover
  - AUTCHOVERMAND
  - RootDN
  - MaxRetries
  - MNCLength
- CUDB-SUBDEL
  - RootDN
  - MaxParallelRequests
- CUDB-Subscriber



- RootDN
- MaxRetries

For detailed information regarding each property presented in the preceding list and information on how to change the configuration data, see *User Guide for Resource Activation*, Reference [3].

## 19 Front End Configuration

NE configuration and NE Group configuration are performed in the **Network Elements > Network Elements** and **Network Elements > Network Element Groups** submenus of the **Dynamic Activation** GUI. For more detailed information about NE configuration, refer to *User Guide for Resource Activation*, Reference [3].

The recommended configuration of NE Groups is listed in Table 6. The same NE can be used in more than one NE Group.

*Table 6 HLR/AUC/MNP/M2M Configuration*

| Application | Network Element Group Name | Group Type  |
|-------------|----------------------------|-------------|
| AUC         | AUCFE-VALIDATION-GROUP     | Round-Robin |
| AUC         | AUCFE-MASSIVE-UPDATE-GROUP | Round-Robin |
| HLR         | HLRFE-GROUP                | Round-Robin |
| HLR         | HLRFE-MASSIVE-UPDATE-GROUP | Round-Robin |
| MNP         | HLRFE-VALIDATION-GROUP     | Round-Robin |
| HLR         | HLRFE-VALIDATION-GROUP     | Round-Robin |
| M2M         | M2M-HLR-VALIDATION-GROUP   | Round-Robin |
| M2M         | M2MFE-GROUP                | Round-Robin |
| SAPC        | SAPC-GROUP                 | Round-Robin |



## 20 Provisioning Notification NE Configuration

NE configuration and NE Group configuration are performed in the **Network Elements > Network Elements** and **Network Elements > Network Element Groups** submenus of the **Dynamic Activation** GUI. For more detailed information about NE configuration, refer to *User Guide for Resource Activation*, Reference [3].

The recommended configuration of NE Groups is listed in Table 7. The same NE can be used in more than one NE Group.

*Table 7 Provisioning Notification NE Configuration*

| Application | Network Element Group Name   | Group Type    |
|-------------|------------------------------|---------------|
| EPS         | HSSFE-EPS-NOTIFICATION-GROUP | Round-Robin   |
| IMS         | HSSFE-IMS-NOTIFICATION-GROUP | Round-Robin   |
| DAE         | DAE-NOTIFICATION-GROUP       | Round-Robin   |
| AAANS       | AAANS-NOTIFICATION-GROUP     | Active-Active |

## 21 Standalone NE Configuration

NE configuration and NE group configuration are performed in the **Network Elements > Network Elements** and **Network Elements > Network Element Groups** submenus of the **Dynamic Activation** GUI. For more detailed information about NE configuration, refer to *User Guide for Resource Activation*, Reference [3].

The recommended configuration of NE groups is listed in Table 8. The same NE can be used in more than one NE group.

*Table 8 Standalone NE Configuration*

| Application | Network Element Group Name | Group Type   |
|-------------|----------------------------|--------------|
| MTAS        | MTAS-GROUP                 | Round-Robin  |
|             | MTAS-SIPTRUNKING-GROUP     | Round-Robin  |
| AIR         | AIR-GROUP                  | Multiple AIR |



## 22 Routing Configuration

Routing is performed in the **Network Elements > Routing** submenu of the **Dynamic Activation** GUI. For more detailed information about routing, refer to *User Guide for Resource Activation*, Reference [3].

Routing is used to find a connection to an NE or NE Group from the business logic. Table 9 lists all NE Types. Routing method `UnconditionalRouting` is normally used, unless otherwise is stated.

Table 9 Routing Configuration

| NE   | Network Element Type        | Routing Method       | Recommended Destination   | Description                                                                   |
|------|-----------------------------|----------------------|---------------------------|-------------------------------------------------------------------------------|
| CUDB | CUDB                        | UnconditionalRouting | CUDB-GROUP                | Used for HSS CUDB operations, except conditional searches                     |
|      | CUDB_MASSIVE_SEARCH         | UnconditionalRouting | CUDB-MASSIVE-OPER-GROUP   | Used for HSS CUDB conditional search operations                               |
|      | CUDB_AAA                    | UnconditionalRouting | CUDB-GROUP                | Used for AAA CUDB operations, except conditional searches                     |
|      | CUDB_AAA_MASSIVE_SEARCH     | UnconditionalRouting | CUDB-MASSIVE-OPER-GROUP   | Used for AAA CUDB conditional search operations                               |
|      | CUDB_AAA_NSD                | UnconditionalRouting | CUDB-GROUP                | Used for layered IPWorks AAANS CUDB operations, except conditional searches   |
|      | CUDB_EIR                    | UnconditionalRouting | CUDB-GROUP                | Used for EIR CUDB operations, except conditional searches                     |
|      | CUDB_EIR_MASSIVE_SEARCH     | UnconditionalRouting | CUDB-MASSIVE-OPER-GROUP   | Used for EIR CUDB conditional search operations                               |
|      | CUDB_HLR                    | UnconditionalRouting | CUDB-GROUP                | Used for HLR CUDB operations, except conditional searches and massive updates |
|      | CUDB_HLR_MASSIVE_SEARCH     | UnconditionalRouting | CUDB-MASSIVE-OPER-GROUP   | Used for HLR CUDB conditional search operations                               |
|      | CUDB_HLR_MASSIVE_UPDATE     | UnconditionalRouting | CUDB-MASSIVE-UPDATE-GROUP | Used for HLR CUDB massive update operations                                   |
|      | CUDB_HLR_MNP                | UnconditionalRouting | CUDB-GROUP                | Used for MNP CUDB operations, except conditional searches                     |
|      | CUDB_HLR_MNP_MASSIVE_SEARCH | UnconditionalRouting | CUDB-MASSIVE-OPER-GROUP   | Used for MNP CUDB operations, except conditional searches                     |
|      | CUDB_SAPC                   | UnconditionalRouting | CUDB-GROUP                | Used for SAPC CUDB operations                                                 |
|      | CUDB_DAE                    | UnconditionalRouting | CUDB-GROUP                | Used for DAE CUDB operations                                                  |
|      | CUDB_ENUM                   | UnconditionalRouting | CUDB-GROUP                | Used for ENUM CUDB operations                                                 |



| NE          | Network Element Type | Routing Method                                                            | Recommended Destination                  | Description                                      |
|-------------|----------------------|---------------------------------------------------------------------------|------------------------------------------|--------------------------------------------------|
| HLR/AUC/MNP | AUC_VALIDATION       | UnconditionalRouting                                                      | AUCFE-VALIDATION-GROUP                   | Used for AUC validation operations               |
|             | AUC_MASSIVE_UPDATE   | UnconditionalRouting                                                      | AUCFE-MASSIVE-UPDATE-GROUP               | Used for AUC massive validation operations       |
|             | HLR_COMMON_DATA      | UnconditionalRouting                                                      | HLRFE-GROUP                              | Used for HLR common data operations              |
|             | HLR_MASSIVE_UPDATE   | UnconditionalRouting                                                      | HLRFE-MASSIVE-UPDATE-GROUP               | Used for HLR massive validation operations       |
|             | HLR_MNP              | UnconditionalRouting                                                      | HLRFE-VALIDATION-GROUP                   | Used for MNP validation operations               |
|             | HLR_RED              | RegularExpression                                                         | HLRFE-VALIDATION-GROUP                   | Used for HLR Redundancy validation operations    |
|             | HLR_VALIDATION       | UnconditionalRouting, Number Series, Number Ranges, or Regular Expression | HLRFE-VALIDATION-GROUP                   | Used for HLR validation operations               |
| M2M         | M2M_COMMON_DATA      | UnconditionalRouting                                                      | M2MFE-GROUP                              | Used for M2M common data operations              |
|             | M2M_HLR_RED          | RegularExpression                                                         | M2M-HLR-VALIDATION-GROUP                 | Used for M2M Redundancy validation operations    |
|             | M2M_HLR_VALIDATION   | UnconditionalRouting                                                      | M2M-HLR-VALIDATION-GROUP                 | Used for M2M validation operations               |
| HSS         | HSS_FE_EPS           | UnconditionalRouting, Regular Expression, Number Series, or Number Ranges | HSSFE-NE or HSSFE-EPS-NOTIFICATION-GROUP | Used for HSS EPS notifications                   |
|             | HSS_FE_IMS           | UnconditionalRouting, Regular Expression, Number Series, or Number Ranges | HSSFE-NE or HSSFE-IMS-NOTIFICATION-GROUP | Used for HSS IMS notifications                   |
|             | NOSIM_HSS_CLASSIC    | UnconditionalRouting or Regular Expression                                | -                                        | Used for monolithic HSS ISM IMPI data operations |
| ECAS        | NOSIM_ECAS           | UnconditionalRouting or Regular Expression                                | -                                        | Used for ECAS user operations                    |



| NE      | Network Element Type | Routing Method                                                                                          | Recommended Destination                | Description                                       |
|---------|----------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|
| DAE     | DAE_NOTIFICATION     | UnconditionalRouting                                                                                    | DAE-NOTIFICATION-GROUP                 | Used for DAE notifications                        |
| MTAS    | MTAS                 | UnconditionalRouting                                                                                    | MTAS-GROUP                             | Used for MTAS, MMTel operations                   |
|         | MTAS_SIPTrunking     | UnconditionalRouting                                                                                    | MTAS-SIPTRUNKING-GROUP                 | Used for MTAS, Sip Trunking operations            |
| BCE     | BCE                  | UnconditionalRouting, or RegularExpression                                                              | BCE-GROUP                              | Used for BCE operations                           |
| PGM     | PGM_Document         | UnconditionalRouting, or RegularExpression                                                              | PGM NE <sup>(1)</sup>                  | Used for PGM document operations                  |
|         | PGM_User             | UnconditionalRouting, or RegularExpression                                                              |                                        | Used for PGM user operations                      |
| AIR     | AIR                  | UnconditionalRouting, Number Series, or Number Ranges                                                   | AIR NE or AIR-GROUP                    | Used for AIR operations                           |
| AF      | AF                   | UnconditionalRouting, Number Series, or Number Ranges                                                   | AF NE                                  | Used for AF operations                            |
| IPWorks | ENUM                 | RegularExpression <sup>(2)</sup> , NumberRanges <sup>(3)</sup> , or UnconditionalRouting <sup>(2)</sup> | ENUM NE or MONO-IPWORKS-ENUM-GROUP     | Used for monolithic IPWorks ENUM operations       |
|         | NONSIM_AAA           | UnconditionalRouting, or Regular Expression                                                             | AAA NE NE group Failover or AAACluster | Used for monolithic IPWorks AAANS user operations |
|         | AAA_FE_NSD           | UnconditionalRouting                                                                                    | AAANS-NOTIFICATION-GROUP               | Used for layered IPWorks AAANS notification       |
| DSC/ILF | ILF                  | UnconditionalRouting, Number Series, or Number Ranges                                                   | DSC/ILF NE                             | Used for ILF operations                           |





| NE               | Network Element Type | Routing Method       | Recommended Destination | Description                         |
|------------------|----------------------|----------------------|-------------------------|-------------------------------------|
| Mono lithic SAPC | MONO_SAPC            | UnconditionalRouting | SAPC NE                 | Used for monolithic SAPC operations |
| SAPC             | SAPC                 | UnconditionalRouting | SAPC NE or SAPC-GROUP   | Used for SAPC-FE operations         |

(1) PGM does not support NE group.

(2) It is used for both msisdn and e164.

(3) It is only used for e164.

## 23 Connection Robustness

The expectation on robustness for HLR/AUC/MNP/M2M/HSS provisioning is different for different tasks.

For individual provisioning, for example, the client expects to have feedback as soon as possible so that an operation does not block the rest of the provisioning activity.

For massive operations, the client expects the operation to be successful.

When defining retries behavior, take such aspects into consideration. For more information regarding retries, see *Function Specification Resource Activation*, Reference [8].

### 23.1 Individual Provisioning of HLR Subscription in CUDB

The following is an example for individual provisioning of HLR subscription in CUDB:

```
HLR FE retries behavior:
Number of Retries: 3
Function Busy Timer: 1000 ms
Retry Factor: 2
```

```
HLR FE Individual Provisioning Validation Group retries behavior:
Number of HLR FE in the group: 4
Retry delay: 500 ms
Retry factor: 2
MAX_SEND_ATTEMPTS: 6
```

```
CUDB NE retries behavior:
Number of Retries: 3
```

Retry Time Interval: 1000 ms  
Retry Factor: 2

CUDB Individual Provisioning Group retries behavior:  
Number of CUDB in the group: 3  
Retry delay: 500 ms  
Retry factor: 2  
MAX\_SEND\_ATTEMPTS: 6

The diagram in Figure 30 shows the interaction between the involved Network Elements and delay between retries:

- CUDB 1 and 2 suffer from LDAP Busy, they are blacklisted after all three retries failed.
- CUDB group retries take effect to send the same operation towards the next not blacklisted CUDB in the group. The operation is successfully executed by CUDB 3.
- HLR FE 1, 2 and 3 suffer from Function Busy, they are blacklisted after all three retries failed.
- HLR FE group retries take effect to send the same operation towards the next not blacklisted HLR FE in the group. The operation is successfully executed by HLR FE 4.
- When subscriber data is updated in the CUDB, CUDB3 is directly used as CUDB1 and 2 are still blacklisted.

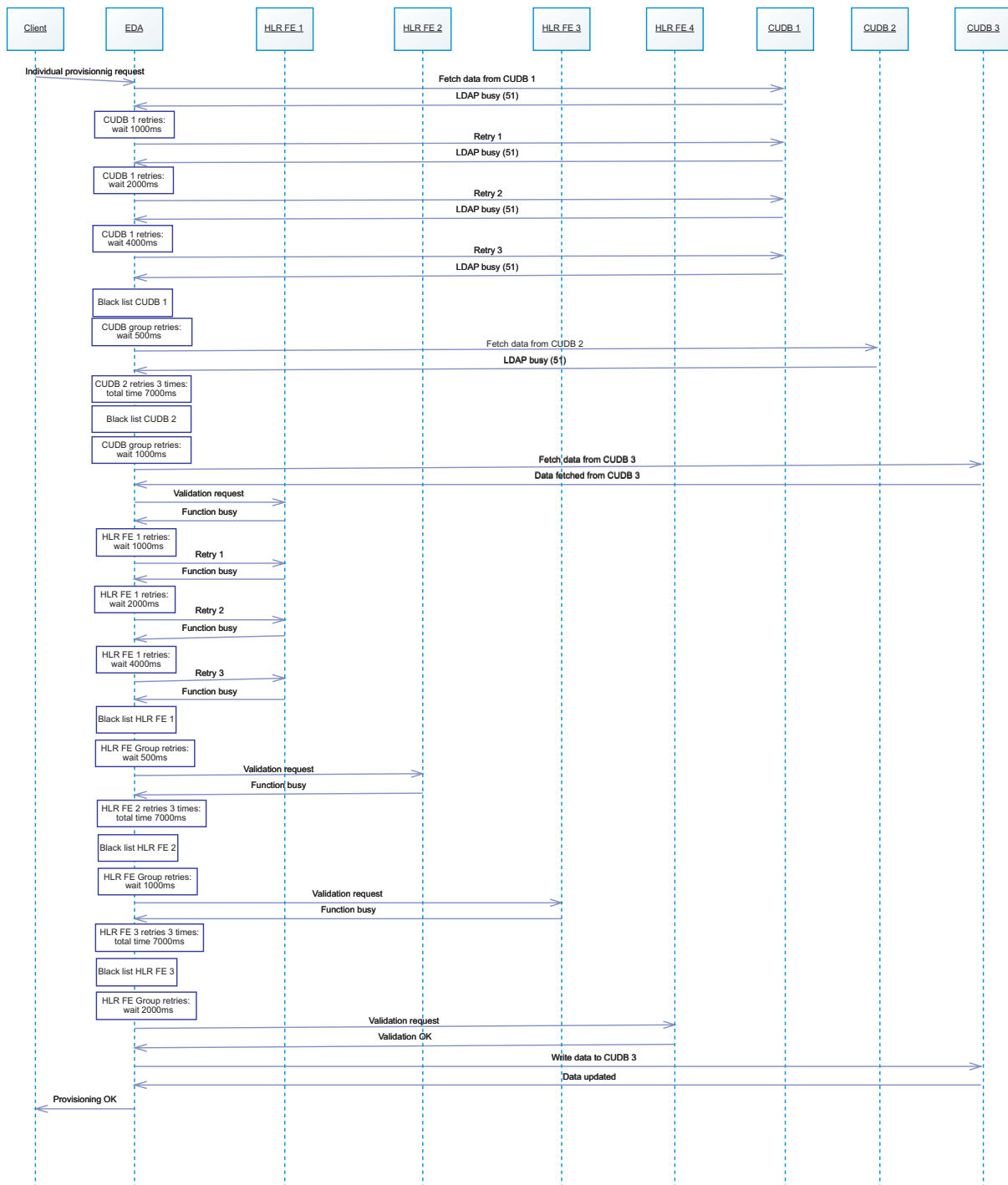


Figure 30 Individual Provisioning of HLR Subscription in CUDB

The calculations for this example setup are as follows:

- Data is fetched from CUDB after a total time of 15.5 seconds (7+0.5+7+1).

- Data validation is performed successful by HLR FE after a total time of 24.5 seconds ( $7+0.5+7+1+7+2$ ).

**Note:** If a previously blacklisted CUDB gets whitelisted while PG is retrying on another CUDB, then PG is able to retry again on the newly whitelisted CUDB if necessary. If all CUDBs in the NE group get blacklisted, then PG still applies the group level delay and delay factor and then check if one of the CUDBs has got whitelisted. This is repeated until the configured `MAX_SEND_ATTEMPTS` on NE group level has been reached. This applies to all provisioning types.

In the worst case of the preceding example, a request to the CUDB is retried six times on the NE group level. It takes 57.5 seconds ( $7+0.5+7+1+7+2+7+4+7+8+7$ ) for the CUDB to respond to that request.

## 23.2 Individual Provisioning of HLR Subscription in CUDB with Long Retry Time Interval

The following is an example for individual provisioning of HLR subscription in CUDB with Long Retry Time Interval:

**Note:** For other nodes, this sequence is the same towards CUDB without communication with HLR FE.

```
CUDB NE retries behavior:
Number of Retries: 3
Retry Time Interval: 1000 ms
Long Retry Time Interval: 15000 ms
Retry Factor: 2
```

The diagram in Figure 31 shows the interaction between the involved Network Elements and delay between retries:

- CUDB 1 suffers from LDAP Unwilling to perform.
- No failover and retry on CUDB group level.
- HLR FE 1 works.

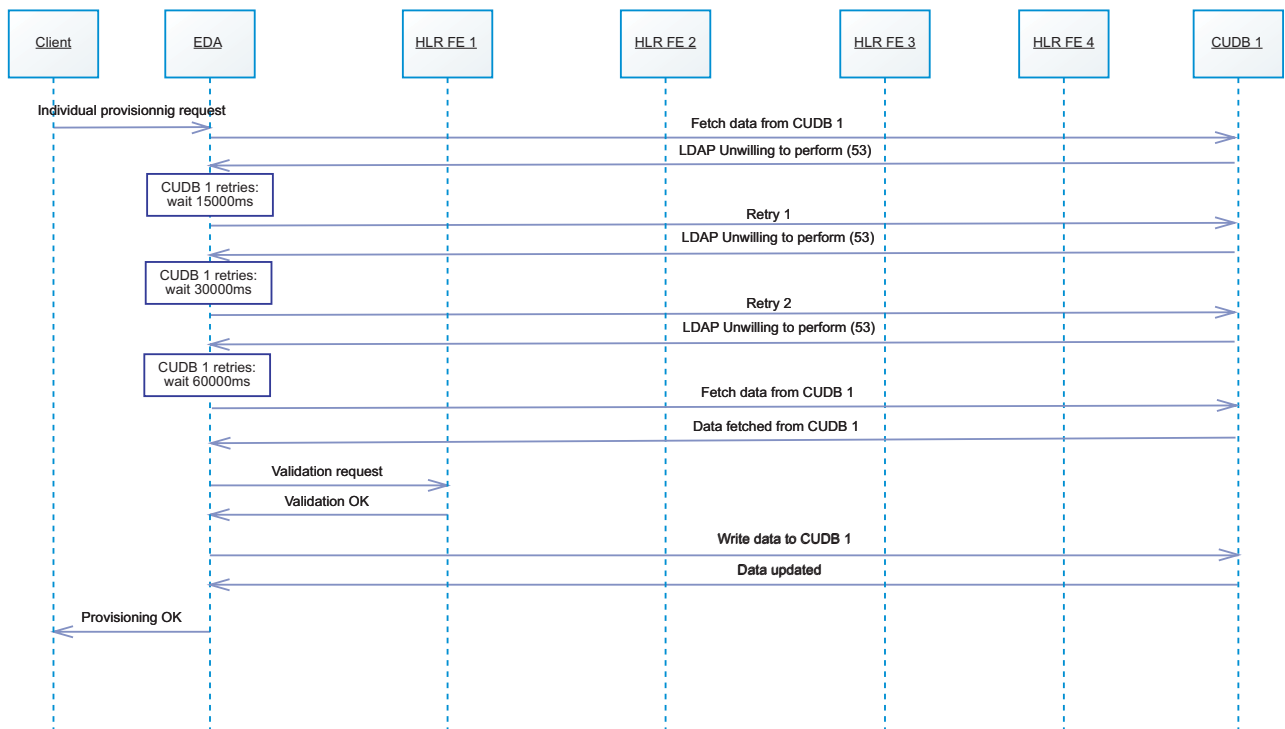


Figure 31 Individual Provisioning of HLR Subscription in CUDB with Long Retry Time Interval

The calculations for this example setup are as follows:

- Data is fetched from CUDB after a total time of 105 seconds (15+30+60).

## 23.3 HLR Massive Update

The following is an example for HLR massive update:

HLR FE retries behavior:

Number of Retries: 3

Function Busy Timer: 1000 ms

Retry Factor: 2

HLR FE Massive Update Validation Group retries behavior:

Number of HLR FE in the group: 7

Retry delay: 1000 ms

Retry factor: 4

MAX\_SEND\_ATTEMPTS: 6

CUDB retries behavior:

Number of Retries: 3

Retry Time Interval: 1000 ms

Retry Factor: 2

CUDB Massive Update Group retries behavior:



Number of CUDB in the group: 3  
Retry delay: 1000 ms  
Retry factor: 4  
MAX\_SEND\_ATTEMPTS: 6

The diagram in Figure 32 shows the interaction between the involved Network Elements and delay between retries. In this example:

- Massive update is an asynchronous operation. Execution duration is less sensitive for the client than for an individual subscriber provisioning client.
- Successful massive search is the prerequisite for massive update. If error occurs during massive search, the operation is ended, which means no retry is performed here.
- HLR FE retries and CUDB retries have the same behavior as that for individual provisioning.
- For both the HLR FE group and CUDB group longer retry delay and higher delay factor are used to overcome the temporary errors, thus, improve the probability for a successful operation.

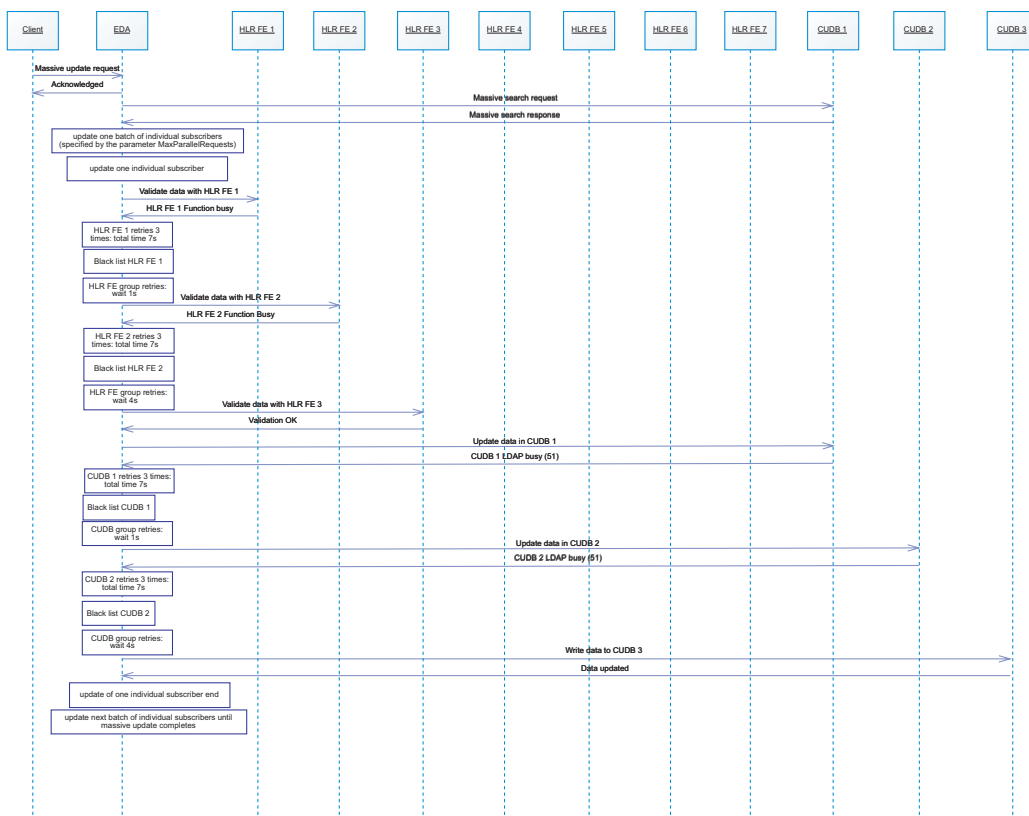


Figure 32 HLR Massive Update

The calculations for this example setup are as follows:

- Data is fetched from CUDB after a total time of 19 seconds (7+1+7+4).



- Data validation is performed successful by HLR FE after a total time of 19 seconds (7+1+7+4).

Consider one request to the CUDB and worst case when all the six attempts on NE group level are made. Then it takes 383 seconds (7+1+7+4+7+16+7+64+7+256+7) for the CUDB to respond to that request.

## 23.4 Configuration of Network Element Retry

To set the bootloader configuration parameter in Table 10, follow the instructions in the step-list as follows.

**Note:** The parameter described in Table 10 is shared for all NE Types.

*Table 10 Bootloader Configuration Parameter*

| Application | Parameter            | Description                                                                                                  |
|-------------|----------------------|--------------------------------------------------------------------------------------------------------------|
| HSS, MTAS   | HTTP_REQUEST_TIMEOUT | Time in milliseconds to wait for a response after sending an HTTP request.<br><br>Default value is 11000 ms. |

To set the bootloader configuration parameter, do the following:

1. On an SC node, log in as an administrator and execute the following command to set the parameter for a configuration:

```
$ bootloader.py config set --parameter @<parameter>@
--value <value>
```

For example:

```
$ bootloader.py config set --parameter @HTTP_REQUEST_TIMEOUT@
--value 5000
```

2. Restart the `dve-application` module, on all affected PL nodes, one by one, for the changes to take effect.

---

### Warning!

Wait for each PL node to be activated before starting with the next one, otherwise traffic disturbances occur. Do not run `all`.

---

From an SC node:

```
$ bootloader.py node activate --host <hostname>
```



`<hostname>` is the hostname of the PL node to activate.

3. To list configured bootloader configuration parameters, execute the following command:

```
$ bootloader.py config list --show_all
```

For more information about NE retry configuration, see *User Guide for Resource Activation*, Reference [3].

## 23.5 Configuration of Network Element Group Retry

To configure Network Element Group Retry, each PL node in the cluster needs to be configured according to the instructions in this section.

To disable Network Element Group Retry, set the bootloader configuration parameter `MAX_SEND_ATTEMPTS` to 1.

To set the bootloader configuration parameters in Table 11, follow the instructions in the step-list as follows.

**Note:** The parameters described in Table 11 are shared for all NE Types.

*Table 11 Bootloader Configuration Parameters*

| Application                                                    | Parameter                                  | Description                                                                |
|----------------------------------------------------------------|--------------------------------------------|----------------------------------------------------------------------------|
| HLR/AUC/<br>MNP/M2M,<br>HSS, DAE,<br>EIR, SAPC,<br>IPWorks/AAA | IndividualLDAPRetryDelay <sup>(1)</sup>    | The initial individual LDAP retry delay.<br><br>Default value is 500 ms.   |
| HLR/AUC/<br>MNP/M2M,<br>HSS, DAE,<br>EIR, SAPC,<br>IPWorks/AAA | IndividualLDAPRetryFactor <sup>(1)</sup>   | The individual LDAP retry factor.<br><br>Default value is 2.               |
| HLR/AUC/MNP<br>/M2M, HSS                                       | MassiveLDAPRetryDelay <sup>(1)</sup>       | The initial massive LDAP retry delay.<br><br>Default value is 1000 ms.     |
| HLR/AUC/MNP<br>/M2M, HSS                                       | MassiveLDAPRetryFactor <sup>(1)</sup>      | The massive LDAP retry factor.<br><br>Default value is 4.                  |
| HLR/AUC/MNP<br>/M2M                                            | IndividualTelnetRetryDelay <sup>(2)</sup>  | The initial individual Telnet retry delay.<br><br>Default value is 500 ms. |
| HLR/AUC/MNP<br>/M2M                                            | IndividualTelnetRetryFactor <sup>(2)</sup> | The individual Telnet retry factor.<br><br>Default value is 2.             |
| HLR/AUC/MNP<br>/M2M                                            | MassiveTelnetRetryDelay <sup>(2)</sup>     | The initial massive Telnet retry delay.<br><br>Default value is 1000 ms.   |





| Application                                                | Parameter                                | Description                                                                                           |
|------------------------------------------------------------|------------------------------------------|-------------------------------------------------------------------------------------------------------|
| HLR/AUC/MNP/M2M                                            | MassiveTelnetRetryFactor <sup>(2)</sup>  | The massive Telnet retry factor.<br>Default value is 4.                                               |
| HSS                                                        | IndividualSOAPRetryDelay <sup>(3)</sup>  | The initial individual NE Group retry delay.<br>Default value is 500 ms.                              |
| HSS                                                        | IndividualSOAPRetryFactor <sup>(3)</sup> | The initial individual NE Group retry factor.<br>Default value is 2.                                  |
| HLR/AUC/MNP/M2M,<br>HSS, DAE,<br>EIR, SAPC,<br>IPWorks/AAA | MAX_SEND_ATTEMPTS <sup>(4)</sup>         | Max number of send attempts.<br>Range: MAX_SEND_ATTEMPTS<br>>=1<br>Default value is 6. <sup>(5)</sup> |

(1) This parameter is used for all NEs that store data in CUDB.

(2) This parameter is only applicable for HLR.

(3) This parameter is only applicable for HSS.

(4) This parameter is used for all operations that interact with CUDB, HLR, and HSS.

(5) Setting MAX\_SEND\_ATTEMPTS to 1 means NE Group Retry is disabled.

To set the different bootloader configuration parameters, do the following:

1. On an SC node, log in as an administrator and execute the following command to set the parameters for a configuration:

```
$ bootloader.py config set --parameter @<parameter>@
--value <value>
```

For example:

```
$ bootloader.py config set --parameter @MassiveTelnetRetryFactor@
--value 9
```

2. Restart the dve-application module, on all affected PL nodes, one by one, for the changes to take effect.

---



---

## Warning!

Wait for each PL node to be activated before starting with the next one, otherwise traffic disturbances occur. Do not run `all`.

---



---

From an SC node:

```
$ bootloader.py node activate --host <hostname>
```

<hostname> is the hostname of the PL node to activate.



3. To list configured bootloader configuration parameters, execute the following command:

```
$ bootloader.py config list --show_all
```

## 24 Users

Create a user, set the correct authorities and add possible attribute rules. Update the policies to activate the changes.

This is performed in the **Access Control > Users** submenu in the **Dynamic Activation** GUI.

For more information see *User Guide for Resource Activation*, Reference [3].

## 25 CUDB Blocking for Backup

Dynamic Activation can receive a notification from CUDB so that certain provisioning towards CUDB is blocked during a CUDB backup. The purpose is to ensure consistency. The blocking and unblocking can either be triggered from the CUDB or manually. Manually by setting the `BlockForCudbBackup` attribute to `true` or `false` by use of a JMX client. When the backup is finished, the CUDB sets the `BlockForCudbBackup` attribute to `false`. This to allow all provisioning towards CUDB again.

It is necessary to create a default user with the purpose to communicate CUDB backup changes. Create a user with username `cudb` and select a password synchronized with CUDB.

This is performed in the **Access Control > Users** submenu in the GUI.

For more information see *User Guide for Resource Activation*, Reference [3].

There are template files located in `/opt/dve/tools/jmxbatchclient/templates/` for `get block`, `set block` and `set unblock`.

The following CAI3G and MML commands are blocked by the CUDB backup block:



*Table 12 Blocked HLR/AUC/MNP/M2M MML Commands*

| <b>MML Commands</b> |
|---------------------|
| HGSUI               |
| HGSUE               |
| HGAMI               |
| HGAME               |
| HGICI               |
| HGICI               |
| HGICE               |
| HGIRI               |
| AGSUI               |
| AGSUE               |
| HGMSI               |
| HGMSE               |
| HGS2I               |
| HGS2E               |

*Table 13 Blocked HLR/Components CAI3G and CAI Commands*

| <b>CAI3G Command</b>             | <b>CAI Command</b> |
|----------------------------------|--------------------|
| Create HLR Subscription          | Create HLRSUB      |
| Delete HLR Subscription          | Delete HLRSUB      |
| Create AUC Subscription          | Create AUCSUB      |
| Delete AUC Subscription          | Delete AUCSUB      |
| Create IMSI Changeover           | Create IMSICH      |
| Set IMSI Changeover              | Set IMSICH         |
| Delete IMSI Changeover           | Delete IMSICH      |
| Delete Mobile Number Portability | Delete NPSUB       |
| Create M2M Subscription          | Not Applicable     |
| Delete M2M Subscription          | Not Applicable     |

*Table 14 Blocked HSS CAI3G Commands*

| <b>CAI3G Commands</b> |
|-----------------------|
| Create EPSMultisc     |
| Delete EPSMultisc     |



| CAI3G Commands        |
|-----------------------|
| Set EPSMultisc        |
| Create AVGMultiSC     |
| Delete AVGMultiSC     |
| Set AVGMultiSC        |
| Create IMSAssociation |
| Delete IMSAssociation |
| Set IMSAssociation    |

*Table 15 Blocked DAE CAI3G Commands*

| CAI3G Commands          |
|-------------------------|
| Create DAE Subscription |
| Delete DAE Subscription |

*Table 16 Blocked SAPC CAI3G Commands*

| CAI3G Commands           |
|--------------------------|
| Create SAPC Subscription |
| Set SAPC Subscription    |
| Delete SAPC Subscription |

*Table 17 Blocked IPWorks/AAA CAI3G Commands*

| CAI3G Commands   |
|------------------|
| Create AAA User  |
| Set AAA User     |
| Delete AAA User  |
| Create AAA Group |
| Set AAA Group    |
| Delete AAA Group |

**Note:** If a command is executing when BlockForCudbBackup receives the value `true`, the command is not stopped.

### JMX Client

Use the following command to get the status of BlockForCudbBackup:

```
$ sudo -u actadm /opt/dve/tools/jmxbatchclient/jbc-rmi.sh
-Aadmin:admin service:jmx:rmi://<PS_JMX_Server_IP>:8995/jndi
```



```
/rmi://<PS_JMX_Server_IP>:8100/connector /opt/dve/tools/jmxb
atchclient/templates/BlockForCudbBackup-get.xml
```

Use the following command to set the status for BlockForCudbBackup to true:

```
$ sudo -u actadm /opt/dve/tools/jmxbatchclient/jbc-rmi.sh
-Aadmin:admin service:jmx:rmi://<PS_JMX_Server_IP>:8995/jndi
/rmi://<PS_JMX_Server_IP>:8100/connector /opt/dve/tools/jmxb
atchclient/templates/BlockForCudbBackup-setBlock.xml
```

Use the following command to set the status for BlockForCudbBackup to false:

```
$ sudo -u actadm /opt/dve/tools/jmxbatchclient/jbc-rmi.sh
-Aadmin:admin service:jmx:rmi://<PS_JMX_Server_IP>:8995/jndi
/rmi://<PS_JMX_Server_IP>:8100/connector /opt/dve/tools/jmxb
atchclient/templates/BlockForCudbBackup-setUnblock.xml
```





## Reference List

- [1] *Library Overview*, 18/1553-CSH 109 628 Uen
- [2] *Glossary of Terms and Acronyms*, 0033-CSH 109 628 Uen
- [3] *User Guide for Resource Activation*, 1/1553-CSH 109 628 Uen
- [4] *System Administrators Guide for Native Deployment*, 1/1543-CSH 109 628Uen
- [5] *Function Specification Layered Machine to Machine*, 15/155 17-CSH 109 628 Uen
- [6] *Function Specification Layered HLR*, 4/155 17-CSH 109 628 Uen
- [7] *Function Specification Administration of Multi Regions and BSS Capacity*, 10/155 17-CSH 109 628 Uen
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- [16] *Security Management Guide*, 29/1553-CSH 109 215/6 Uen