

Solution Description SIP Trunking

Ericsson Dynamic Activation 1

TECHNICAL SOLUTION DESCRIPTION

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1 Introduction

Session Initiation Protocol (SIP) Trunking service enables for the IMS network to provide multimedia telephony for IP Private Branch Exchange (IP-PBX) of enterprise using fixed network.

Ericsson Dynamic Activation (EDA) supports IMS Centralized Services (ICS) and provides an end-to-end SIP Trunking service provisioning solution.

1.1 Purpose and Scope

The purpose of this document is to describe SIP Trunking service provisioning, supported by Dynamic Activation, from a solution perspective.

1.2 Target Group

The target group for this document is as follows:

- System Administrator
- Network Administrator
- System Integrator

For information about the different 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, see *Glossary of Terms and Acronyms*, Reference [2].

2 SIP Trunking Solution Overview

Dynamic Activation offers off-the-shelf provisioning for standard applications and an Integrated Development Environment (IDE) for customer adaptations.



The customer can use IDE to develop SIP Trunking provisioning solution based on a Subscriber View, which orchestrates the following:

- IMS subscription in Home Subscriber Server (HSS)
- IMS-based SIP Trunking subscription in Multimedia Telephony Application Server (MTAS)
- ENUM subscription in IPWorks

If there is inconsistency within the SIP Trunking subscription data in the IMS network, the Subscriber View also supports rollback. For more information about the Subscriber View, refer to *Product Overview*, Reference [3].

3 SIP Trunking Provisioning Architecture

The following figure depicts the support for SIP Trunking provisioning in the Data Layered Architecture (DLA).

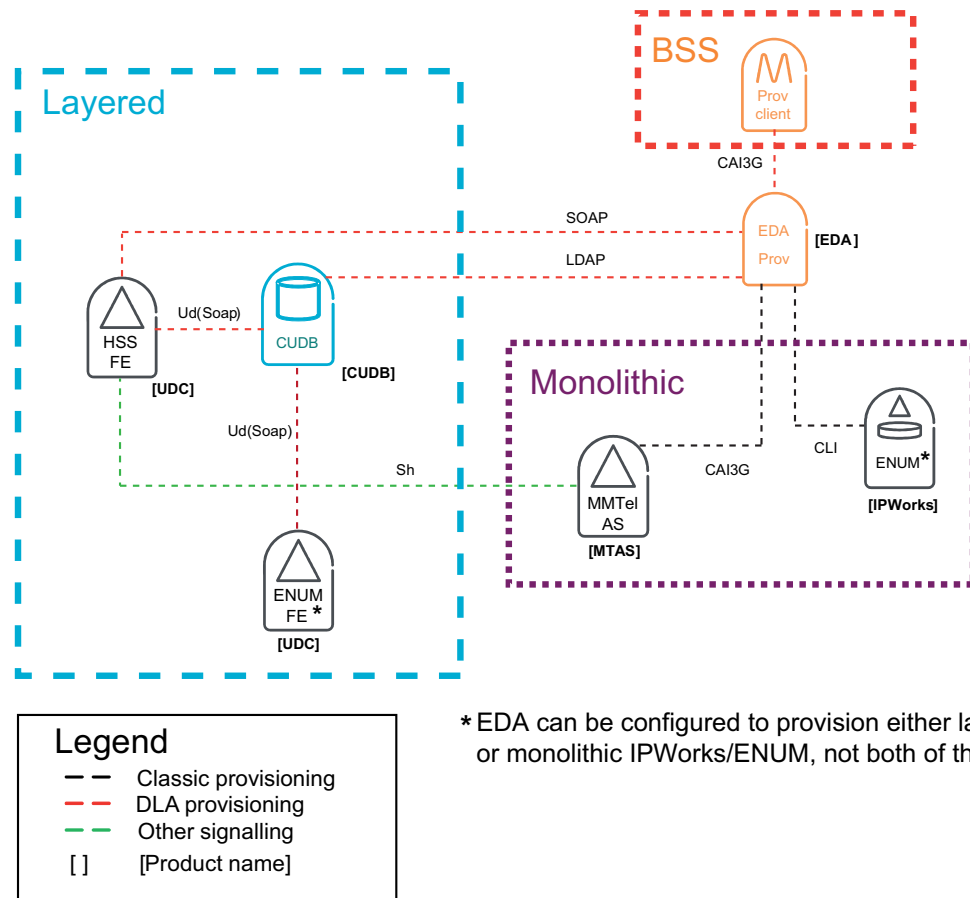


Figure 1 SIP Trunking Provisioning Architecture in DLA

- **BSS** - Business Support System (BSS) initiates the provisioning request towards Dynamic Activation.
- **Dynamic Activation** (15.0 or later) - A provisioning system that provides a single provisioning interface towards the BSS, by hiding the complexities of provisioning multiple underlying Network Elements.
- **Layered Network Elements**

The following Network Elements (NEs) are included:

- **CUDB** (15A or later) - The Back-End database offered by the Ericsson realization of DLA, which decouples the user data storage from the application logic in the front ends.
- **HSS-FE** (15A or later) - A real-time NE to support the network entities that are handling calls (sessions). It resides in the home domain of the operator. It provides support for user authentication, authorization, mobility management, roaming, charging, identification, and subscription management for IMS, EPC, and Wireless Local Area Network (WLAN) networks.



- **ENUM-FE** (16A or later) - A Telephone E.164 Number Mapping (ENUM) FE that has a central role for the DNS. It provides the resolution of the IMS-related domain names, the users private, and public addresses in the IMS network.

- **Monolithic Network Elements**

The following NEs are included:

- **ENUM** (14B or later) - A ENUM server that has a central role for the DNS. It provides the resolution of the IMS-related domain names, the users private, and public addresses in the IMS network.
- **MTAS** (15A or later) - An Application Server for the MMTel, which implements the standard multimedia telephony based on 3GPP IMS R6 with certain additions for 3GPP R7, Telecoms & Internet converged Services & Protocols for Advanced Networks (TISPAN).

4 SIP Trunking Provisioning Data Model

MTAS supports two types of SIP Trunking connectivity with IP-PBX; static and dynamic mode. Both variants exist in IMS, but with different data representation. These representations are based on Ericsson standard data model. For more information about static and dynamic connection mode in MTAS, refer to the MTAS document **MTAS Technical Product Description SIP Trunking AS**, Reference [8].

4.1 Static Mode Connection

In static mode the IP-PBX has the following data in HSS:

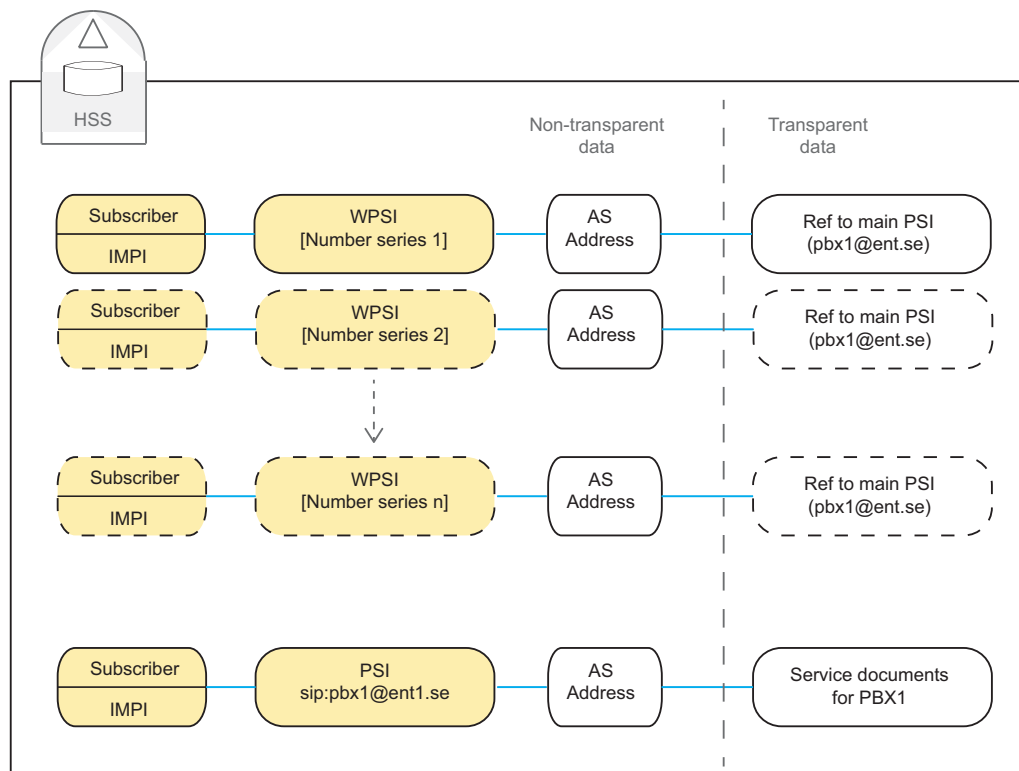


Figure 2 HSS Data Model for Static Mode

- One main IP-PBX identity. A Public Service Identity (PSI) that represents the IP-PBX. This identity is used to store a service document, in transparent data, the resource configuration of the IP-PBX.

The identity also contains the Application Server Hosting PSI address (AS address in Figure 2) which is a direct route to the MTAS (Ma routing). This relates to the standard “Server-Capabilities” Attribute Value Pair (AVP) returned in Location Information Answer (LIA) on Cx (TS 29.229).

- One or more wildcard PSI. Each wildcard PSI represents a number series of the IP-PBX. Each wildcard PSI contains a reference in transparent data to the main IP-PBX identity.

The wildcard PSIs also contain the Application Server Hosting PSI address (AS address in Figure 2) which is a direct route to the ST AS (Ma routing). This relates to the standard “Server-Name” AVP returned in LIA (Location Information Answer) on Cx (TS 29.229).

In static mode the following data is needed in DNS:

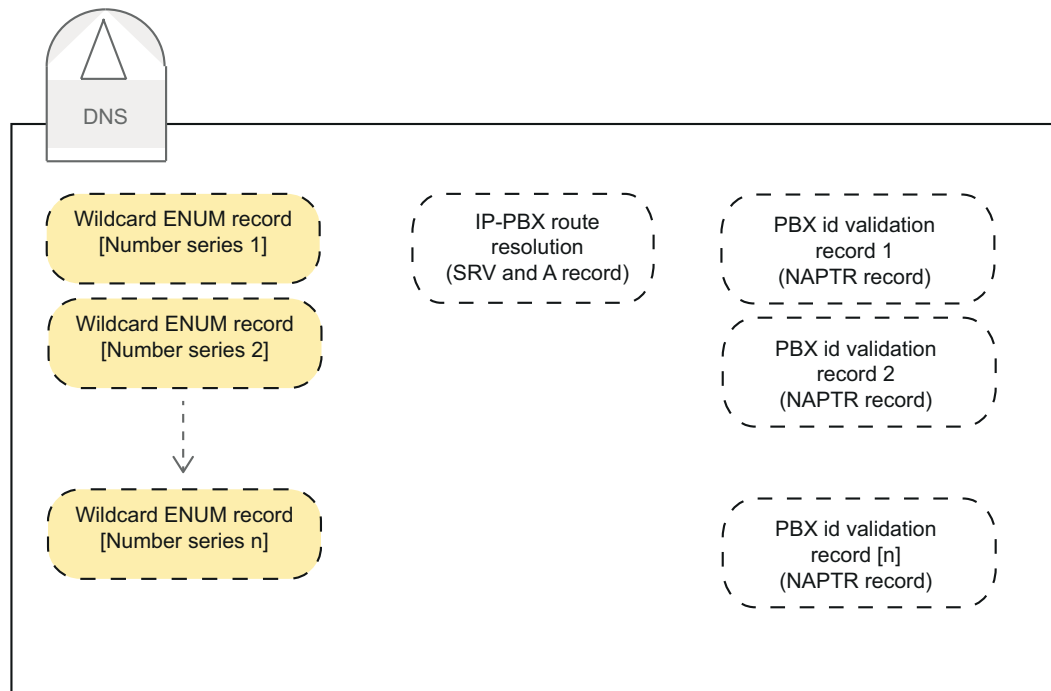


Figure 3 DNS Data Model for Static Mode

- One or more wildcard ENUM entries depending on the number of number series allocated to the IP-PBX.
- One Fully Qualified Domain Name (FQDN) resolution entry for resolving terminating routing. It is not required if IP-PBX route is defined with IP address in MTAS service data.
- One or more Name Authority Pointers (NAPTR) record for DNS-based IP-PBX main identity lookup (not required if TLS certificate based IP-PBX identity handling is used).

4.2 Dynamic Mode Connection

In dynamic mode the IP-PBX has the following data in HSS:

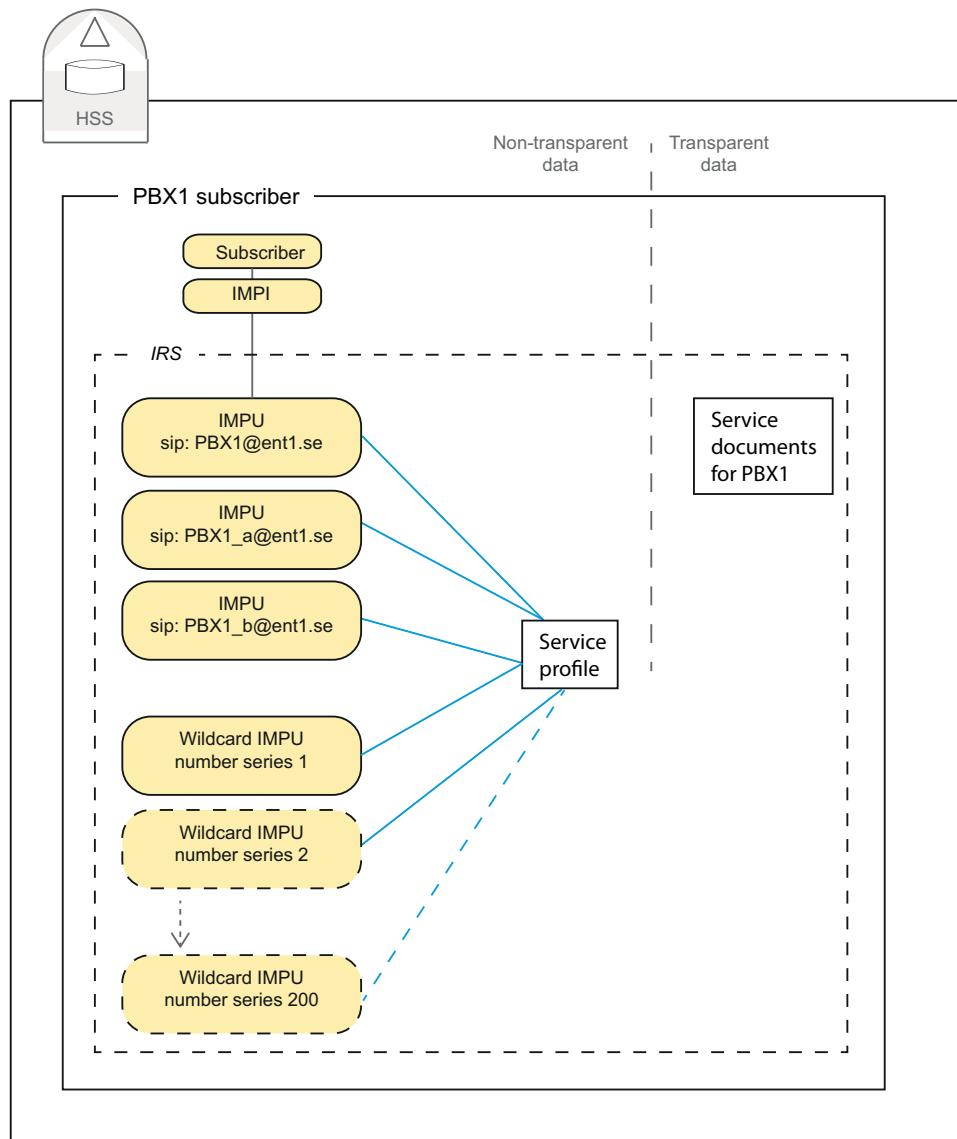


Figure 4 HSS Data Model for Dynamic Mode

- One Implicit Registration Set (IRS) containing the following identities.
 - One default SIP identity and one default TEL identity is needed. The SIP identity is referred to as main IP-PBX identity. A distinct IMPU used by the MTAS to store a service document, in transparent data, the resource configuration of the IP-PBX.

The Default TEL identity is required for PSTN interworking.

- One or more distinct IMPUs used for registration (representing the IP-PBX routes).

- One or more wildcard IMPUs. Each wildcard IMPU represents a number series of the IP-PBX. All wildcard IMPUs must reside in the same IRS as the main IP-PBX identity to get registered.
- All identities of the IRS use the same service profile. The service profile contains all Initial Filter Criteria (iFCs) required for origination and termination of requests.

In dynamic mode the following data is needed in DNS:

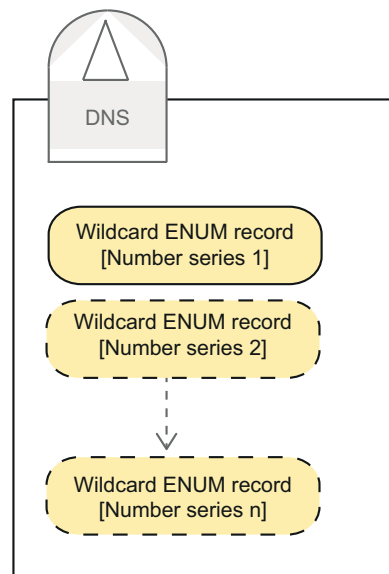


Figure 5 DNS Data Model for Dynamic Mode

- One or more wildcarded ENUM entries depending on the number of number series allocated to the IP-PBX.

In static and dynamic connection, a SIP Trunking subscription, XML user documents containing resource configuration, is provisioned through MTAS/XDMS, owner of the SIP Trunking subscription. It is stored in CUDB, through HSS-FE, as Sh transparent data.

5 SIP Trunking Provisioning Interface

This section includes information about the Northbound and Southbound provisioning interfaces used in the SIP Trunking provisioning solution.



5.1 Northbound Interface

The SIP Trunking provisioning Northbound Interface is a Subscriber View over CAI3G. Dynamic Activation IDE can be used for developing SIP Trunking Subscriber View interface according to specific deployment needs, in static, or dynamic connection mode, or both.

5.2 Southbound Interface

As shown in Figure 1, the SIP Trunking provisioning southbound interfaces are supported by the off-the-shelf applications. The SIP Trunking provisioning solution maps the Subscriber View request to the different underlying application commands, before the activation.

6 SIP Trunking Provisioning Use Cases

To set up a SIP Trunking service, the SIP Trunking Subscriber View needs to support the `Create/Set/Get/Delete` SIP Trunking subscription operations. It also needs to support rollback, see Section 6.1 on page 9.

The Subscriber View receives and validates the incoming CAI3G request. The Subscriber View is broken down into the standard sub-MO requests and starts the out-of-box applications in synchronous order of:

- 1 Centralized IMS/HSS
- 2 MMTel/MTAS
- 3 ENUM/IPWorks

Note: For the `Delete` operation the order is different compared to the other operations, IMS is last. This because the `associationId` must be deleted last, for loose-error-handling purposes.

The following section includes the concrete SIP Trunking provisioning use cases.

6.1 Rollback

For the `Create/Set/Delete` operations, if any provisioned applications fail, the failed applications and the previously successful ones are rolled back.

- For the `Create` operation, the `Delete` rollback applies.



- For the `Delete` operation, the `Create` rollback applies.
- For the `Set` operation, the following rollback scenario applies:
 - On `Set-Set` operation, the `Set-Set` rollback with old value applies.
 - On `Set-Delete` operation, the `Set-Add` rollback with old value applies.
 - On `Set-Add` operation, the `Set-Delete` rollback applies.

Note: If the affected NE does not support removal of attributes, such operation is not rolled back. Below repair action is expected.

Regardless if the rollback is successful or not, the standard error response with specific error message is returned to the BSS.

For standard error responses and messages, refer to:

- *Layered IMS Provisioning over CAI3G*, Reference [4].
- *MTAS Provisioning over CAI3G*, Reference [5].

For rollback failure cases, the repair action is expected as follows:

- For the `Create` operation - delete the SIP Trunking subscription and create it again.
- For the `Set` operation - set the SIP Trunking subscription again.
- For the `Delete` operation - delete the SIP Trunking subscription again.

If any of the above suggestions fail, manual repair is needed.

6.2 Create a SIP Trunking Subscription

This section contains the operations for `Create` SIP Trunking subscription in static and dynamic mode connection. If the SIP Trunking subscription does not exist, it is initiated. If the SIP Trunking subscription exists, it is upgraded.

Figure 6 shows the sequence of how a SIP Trunking subscription is initiated and upgraded in IMS/HSS, ST/MTAS, and ENUM/IPWorks.

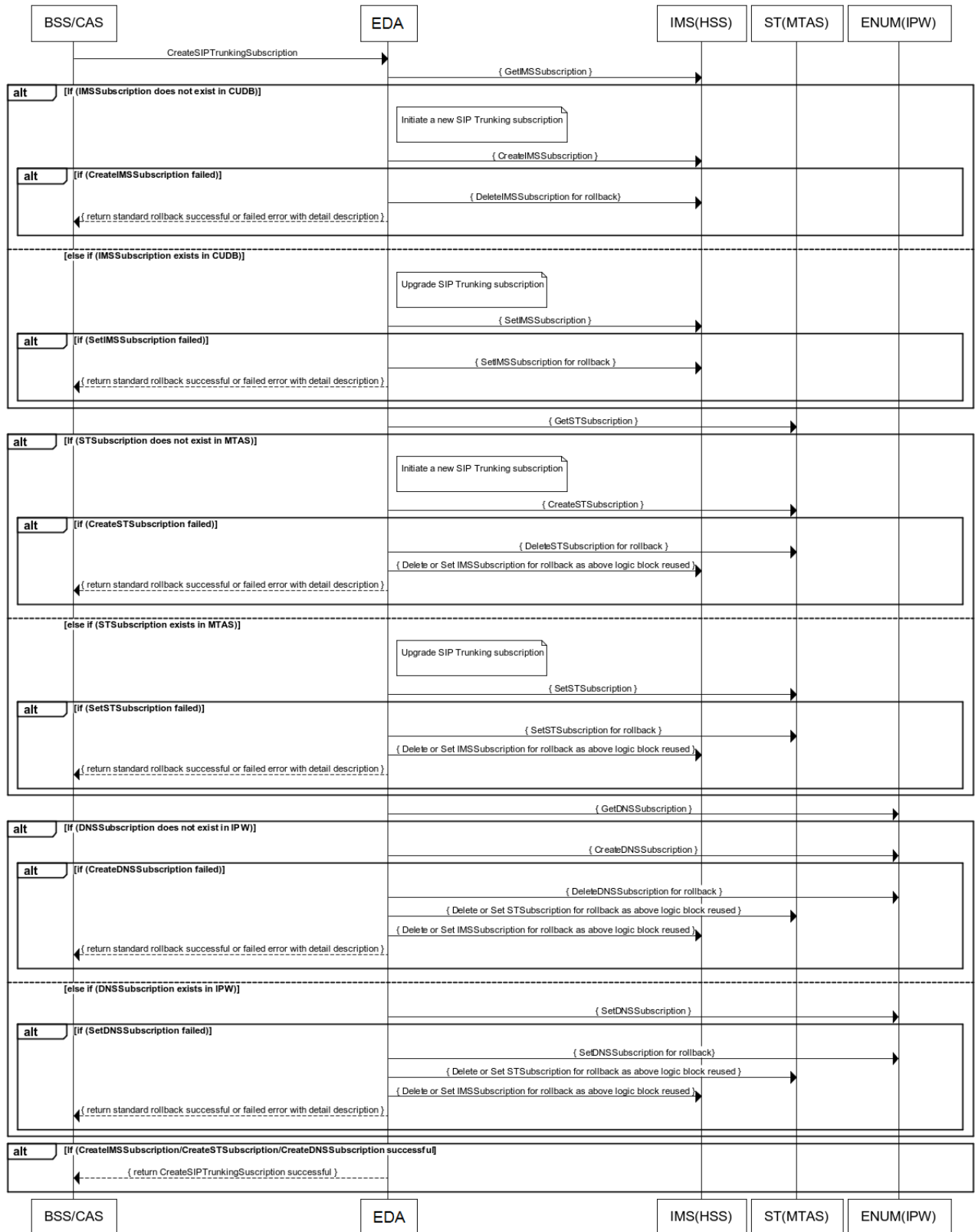


Figure 6 Initiate and upgrade SIP Trunking Subscription



6.3 Set a SIP Trunking Subscription

If a SIP Trunking subscription does not exist in any of the nodes IMS/HSS, ST/MTAS, or ENUM/IPWorks, the standard application errors are returned to the BSS. A Create of a new SIP Trunking subscription is needed.

Figure 7 shows the sequence of how a SIP Trunking subscription is Set to an existing subscription.

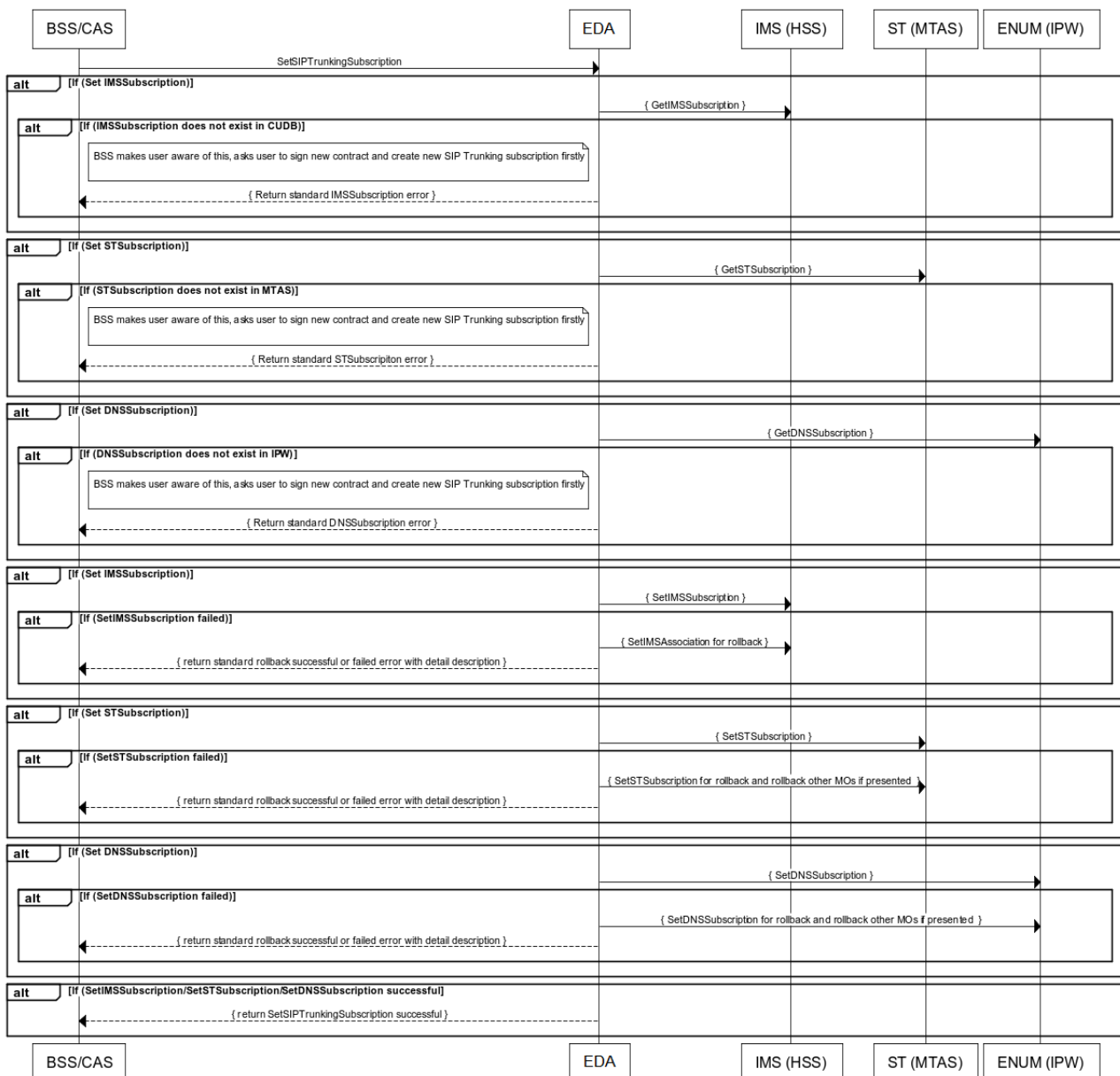


Figure 7 Set SIP Trunking Subscription



6.4 Get a SIP Trunking Subscription

If a SIP Trunking subscription does not exist in any of the nodes IMS/HSS, ST/MTAS, or ENUM/IPWorks, the standard application errors are returned to the BSS. Data inconsistency can occur, repair action is expected as mentioned in Section 6 on page 9.

Figure 8 shows the sequence of how the `Get` operation for an existing SIP Trunking subscription is processed.

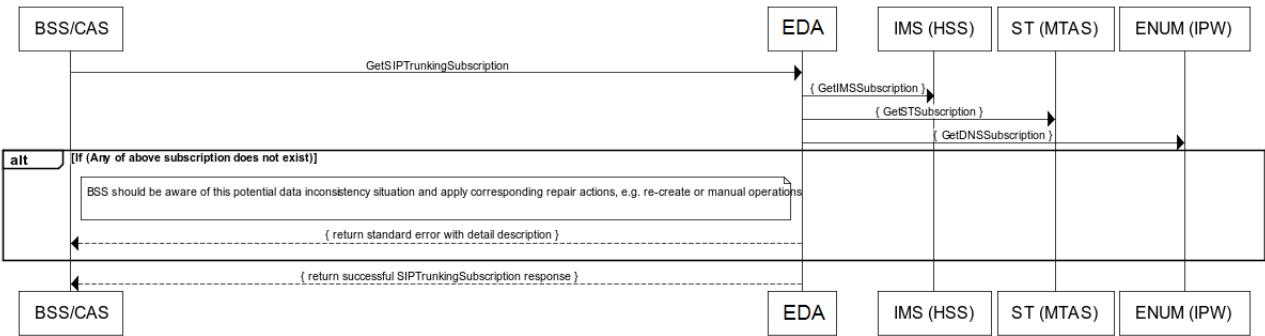


Figure 8 Get SIP Trunking Subscription

6.5 Delete a SIP Trunking Subscription

If a SIP Trunking subscription does not exist in any of the nodes IMS (HSS), ST/MTAS, or ENUM/IPWorks, the standard application errors are ignored and the operation is treated as a successful deletion.

Figure 9 shows the sequence of how an existing SIP Trunking subscription is deleted.

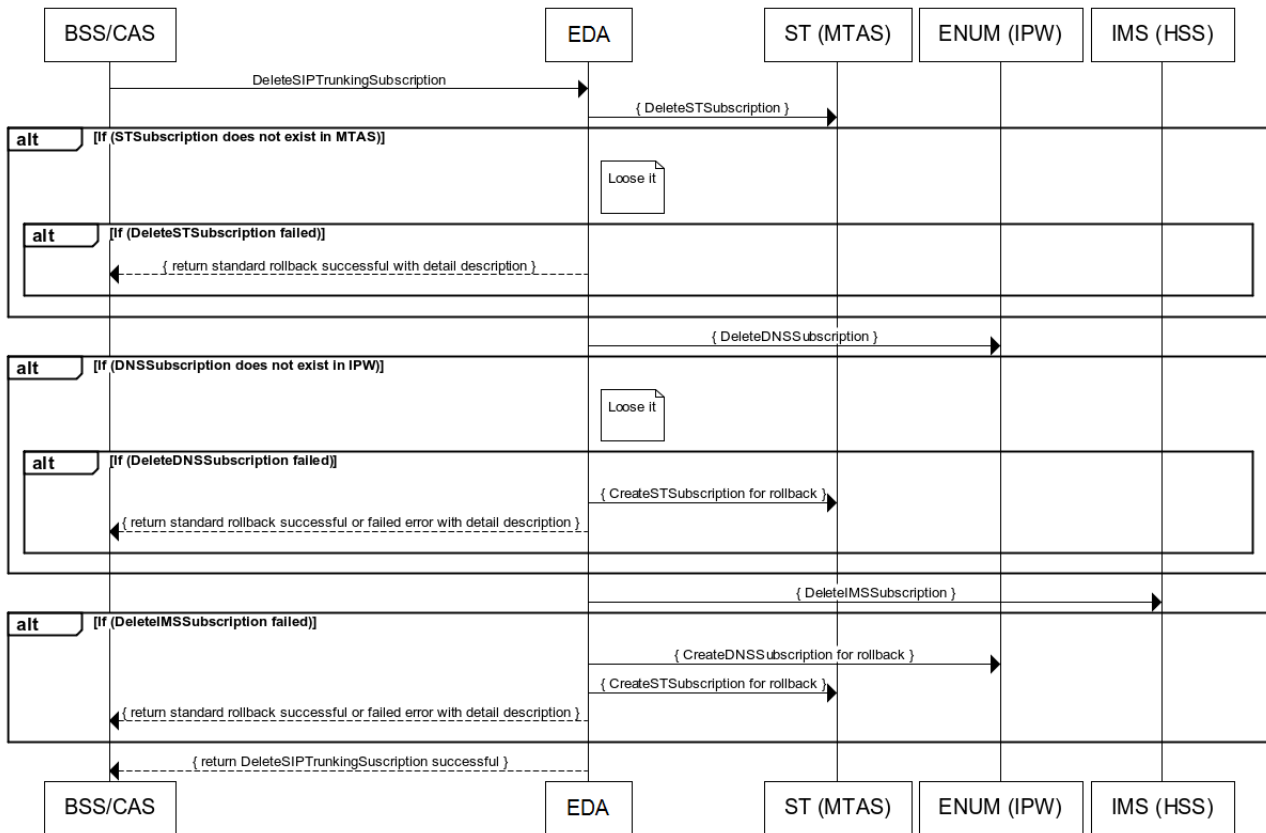


Figure 9 Delete SIP Trunking Subscription

7 IDE

The SIP Trunking provisioning solution is developed by Dynamic Activation IDE, which can implement the previously mentioned SIP Trunking Subscriber View. IDE, including SDK, is delivered in the Customer Adaptation Package. For more information about IDE, refer to *Customer Adaptation Development Guide for Resource Activation*, Reference [7].



8 License

SIP Trunking Subscriber View belongs to the EDA Basic Packages. For SIP Trunking relevant off-the-shelf applications, see information about Value Packages in *Function Specification Resource Activation*, Reference [6].





Reference List

Library References

- [1] *Library Overview*, 18/1553-CSH 109 628 Uen
- [2] *Glossary of Terms and Acronyms*, 0033-CSH 109 628 Uen
- [3] *Product Overview*, 1550-CSH 109 628 Uen
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- [8] *MTAS Technical Product Description SIP Trunking AS*, 5/221 02-FGC
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