

# MTAS Number Portability Management Guide

## MTAS

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### USER GUIDE

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# 1 Introduction

This document describes how to configure the Number Portability (NP) service in the MTAS.

## 1.1 Prerequisites

It is assumed that the user of this document is familiar with the O&M area, in general.

### 1.1.1 Licenses

To enable basic services in the MTAS, the NP license must be installed.

For more information about the NP license, refer to *MTAS Licenses*.

### 1.1.2 Documents

Before starting any procedure in this document, ensure that the following documents are available:

- *Ericsson Command-Line Interface User Guide*
- *Managed Object Model (MOM)*

### 1.1.3 Conditions

The following condition must apply:

An Ericsson Command-Line Interface (ECLI) session in Exec mode is in progress.





## 2 Overview

The NP service allows telephony subscribers to keep their telephone number when changing service provider (service provider portability), moving to a new location (location portability), or changing the subscribed services (service portability).

In MTAS, the main function of the NP service is to identify whether the other party URI (only if it is in either tel URI or embedded tel URI format) is within the original or donor network or has been ported to other network. If there is outgoing communication, the other party is the called party. If there is incoming communication, the other party is either the calling party or the party that diverted or distributed the communication before reaching the served user. If the other party URI has been ported to other network, the NP service conveys this NP-related information to the charging system.

MTAS plays an announcement to notify the caller that the called party is ported. The reason behind the NP announcement is that the caller may expect different charges than are applied. The NP announcement is played in basic MMTel calls and in Ad-hoc conference scenarios.

The NP service performs the NP lookup of the other party URI by sending a request to DNS/E.164 Number Mapping (ENUM). In outgoing communication, the other party is the called party, while in incoming communication, the other party is either the calling party or the party that diverted or distributed the communication before reaching the served user.

The NP function is triggered by `SIP INVITE` request and the two following types exist:

- NP service for outgoing communication
- NP service for incoming communication

The NP service for the outgoing communication is started by initial outgoing `SIP INVITE`. The received `SIP INVITE` is generated either by another node before MTAS or by another service started before the NP service inside the MTAS. In the typical use case for regular MMTel communication, the `SIP INVITE` that starts the NP service is generated by the caller. There are also some cases, typically in the transit case, where the `SIP INVITE` that starts the NP service is generated by another service inside the MTAS. This service is started before the NP service.

The following are examples of services that can generate the `SIP INVITE` to start the NP service:

- `SIP INVITE` starts the NP service following the Communication Diversion by Communication Diversion (CDIV) service



- `SIP INVITE` starts the NP service following the communication distribution by Flexible Communication Distribution (FCD) service
- `SIP INVITE` starts the NP service following the conference invitation by the conference focus

For more information about the CDIV service, refer to *MTAS Communication Diversion Management Guide*.

For more information about the FCD service, refer to *MTAS Flexible Communication Distribution Management Guide*.

For more information about the Ad-hoc conference service, refer to *MTAS Ad-hoc Conference Management Guide*.

The NP service for the outgoing communication implemented in the Originating MTAS looks up the NP-related information of the called party indicated in the Request-URI header of the `SIP INVITE`. If the called URI of the party is ported to other network, the NP service receives the NP lookup respond containing the `rn` parameter. Then, the NP service conveys this NP-related information to the charging system. The NP service following the successful NP-related information lookup inserts an indicator into the Request-URI header in the `SIP INVITE` to inform the next services or nodes that there is no need to perform the NP lookup again.

The NP service for the incoming communication is started by incoming `SIP INVITE` in the Terminating MTAS. Following the service invocation, the NP service for the incoming communication evaluates the History-Info header of the received `SIP INVITE` to determine whether the `SIP INVITE` is received directly from the caller or is received after the Communication Diversion or communication distribution by other party before reaching the served user.

The NP service for the incoming communication implemented in the Terminating MTAS looks up the NP-related information of the calling party indicated in the P-Asserted-Identity header of the `SIP INVITE` in the case where the NP service receives the `SIP INVITE` directly from the calling party (regular MMTel communication). If the calling party URI is ported to other network, the NP service receives the NP lookup respond containing `rn` parameter and then the NP service conveys this NP-related information to the charging system.

For more information about the MMTel service, refer to *MTAS MMTel Management Guide*.

The NP service for the incoming communication implemented in the Terminating MTAS looks up the NP-related information of the party that diverted or distributed the communication before reaching the served user in the case where the NP service receives the `SIP INVITE` indirectly from the calling party following the Communication Diversion or communication distribution. If the party that diverted or distributed the communication is ported to other network, the NP service receives the NP lookup respond containing `rn` parameter. Then, the NP service conveys this NP-related information to the charging system.



For more information about the NP service, refer to [IETF RFC 3482 Number Portability in the Global Switched Telephone Network \(GSTN\): An Overview](#).

For more information about the NP parameters, refer to the following documents:

- [IETF RFC 4694, Number Portability Parameters for the "tel" URI](#)
- *Managed Object Model (MOM)*

## 2.1 Subfunctions

This section describes the following subfunctions:

- Providing NP-related information for outgoing communication
- Providing NP-related information for incoming communication
- Performing NP lookup
- Managing NP

### 2.1.1 Providing NP-Related Information for Outgoing Communication

This is a subfunction of the NP function that is used to evaluate the received `SIP INVITE` in an outgoing communication. This subfunction also determines whether to perform an NP-related information lookup, followed by providing the obtained NP-related information to the Charging Server. The handled `SIP INVITE` of the outgoing communication can be generated by the served user as the caller, other node started before MTAS, or by another service within MTAS (for example, the CDIV service, FCD service, Ad-hoc conference service).

### 2.1.2 Providing NP-related Information for Incoming Communication

This is a subfunction of the NP function that is used to evaluate the received `SIP INVITE` in an incoming communication. This subfunction also determines whether to perform an NP-related information lookup, followed by providing the obtained NP-related information to the Charging Server. The handled `SIP INVITE` of the incoming communication can be received directly from the caller or received following the Communication Diversion or communication distribution executed in the preceding node.

### 2.1.3 Performing NP Lookup

This is a subfunction of the NP function that is used to send NP lookup request to the DNS/ENUM server, and then checks and processes the obtained result.



### 2.1.4 Manage NP

This subfunction makes it possible for O&M operator to configure the NP service to enable or disable the service when the license is present and valid.

## 2.2 Obtained rn Parameter Process

When the NP service performs an NP lookup to the DNS/ENUM server and the phone number of the other party is ported, the NP lookup response contains an `rn` parameter. The obtained `rn` parameter value from DNS/ENUM server can be in global format, local format, or invalid format.

The NP service conveys the NP-related information to the charging system by using the `rn` parameter value in global format. In the case of NP service for outgoing communication, the outgoing Request-URI contains `rn` parameter where the value is in global format.

If the obtained `rn` parameter value from DNS/ENUM server is in local format, the NP service normalizes the value before using it for charging information or for Request-URI modification.

If the obtained `rn` parameter value from DNS/ENUM server has an invalid format, the NP service does not prevent the call attempt. However, the NP service does not convey any information to the charging system. In NP service for outgoing communication, the NP service adds neither `rn` parameter or `npdi` parameter into the Request-URI.

The announcement is selected based on the Routing Number (RN) of the ported user with possibility that no announcement is played for some RN ranges. This is to avoid playing NP announcement to subscribers ported in to the network served by MTAS and to suppress NP announcement for virtual RN numbers used in some operator's network for subscribers ported within the network.

For more information about the NP parameters, refer to the following documents:

- [IETF RFC 4694, Number Portability Parameters for the "tel" URI](#)
- *Managed Object Model (MOM)*

## 2.3 Interaction with Other Services

This section describes how the NP service interacts with other services.

### 2.3.1 Communication Barring

In the originating MTAS, the NP service is triggered before Outgoing Communication Barring (OCB) service. Therefore, the NP service when



triggered by an outgoing communication can perform an NP lookup although the called-party is barred by OCB.

In the terminating MTAS, the NP service is triggered before the Incoming Communication Barring (ICB) service. Therefore, the NP service, when triggered by an incoming communication, can perform an NP lookup although the caller is barred by ICB.

For more information about the Communication Barring service, refer to *MTAS Barring and Dial Plan Services Management Guide*.

### 2.3.2 Communication Diversion

In the Transit MTAS, when an incoming communication is diverted by any type of CDIV service, the generated `SIP INVITE` to the new target starts the NP service if the `mtasNpControl` attribute is set to either 1 or 3. If started, the NP service performs an NP lookup by using as the input the new target URI if it is either in tel URI or in embedded tel URI format.

For more information about the CDIV service, refer to *MTAS Communication Diversion Management Guide*.

### 2.3.3 Flexible Communication Distribution

In the Transit MTAS, when an incoming communication is distributed by FCD service every generated `SIP INVITE` starts the NP service if the `mtasNpControl` attribute is set to either 1 or 3. If started, the NP service performs an NP lookup for every distributed target that has either tel URI or embedded tel URI format. Every successful NP lookup is followed by NP-related information conveyance to the charging system.

For more information about the FCD service, refer to *MTAS Flexible Communication Distribution Management Guide*.

### 2.3.4 Charging

When the NP service is triggered by an outgoing communication attempt and is followed by successful NP lookup resulting in receiving information that the called party is ported, it generates charging message for originating charging. The charging message includes a service-specific Attribute-Value Pair (AVP) that identifies the type of NP service (in this case, the NP service for outgoing communication), and a `Number-Portability-Routing-Information` AVP that contains the routing number information.

When the NP service is triggered by incoming communication attempt and followed by successful NP lookup resulting in receiving information that the caller is ported, or the party that diverts or distributes the communication is ported, it generates charging message for terminating charging. The



charging message includes a service-specific AVP that identifies the type of NP service (in this case the NP service for incoming communication), and Number-Portability-Routing-Information AVP that contains the routing number information.

For more information about Charging in MTAS, refer to *MTAS Charging Management Guide*.

### 2.3.5 Carrier Select and Carrier Select Rn

The NP service for outgoing communication is started before Carrier Select or Carrier Select Rn service. However, the Request-URI containing Carrier Select Code (CSC) in the SIP INVITE is processed by Dialed String Analysis (DSA) in the Number Normalization service, which is started before the NP service.

After the DSA process, the Request-URI header can contain `cic` parameter if the Carrier Select service is provisioned or `rn` parameter if the Carrier Select Rn service is provisioned.

When the Request-URI of an initial SIP INVITE contains an `rn` parameter inserted to be processed by Carrier Select Rn service and it does not contain an `npdi` parameter, the NP service checks the `mtasNpRnBeforeNpLookup` attribute value.

If the `mtasNpRnBeforeNpLookup` attribute is set to 1, the NP service suppresses the NP lookup and does not send any information to the charging system. The SIP INVITE is forwarded as it is without any modification.

However, if the `mtasNpRnBeforeNpLookup` attribute is set to 0, the NP service removes the `rn` parameter enclosed in the Request-URI of the initial SIP INVITE and then perform NP lookup. If the response of the NP lookup contains the `rn` parameter, the charging system is conveyed with the NP-related information. Also, the obtained `rn` parameter is added into the Request-URI before the SIP INVITE is forwarded to other node.

When the Request-URI of an initial SIP INVITE contains the `cic` parameter inserted to be processed by Carrier Select service and it does not contain `npdi` parameter, the NP service performs an NP lookup. If the response of the NP lookup contains `rn` parameter, the charging system is conveyed with the NP-related information and the obtained `rn` parameter is added into the Request-URI before the SIP INVITE is forwarded to other node. In this case, both `rn` and `cic` parameters appear in the outgoing SIP INVITE.

For more information about the CSRn service, refer to *MTAS Carrier Select and Carrier Pre-Select Management Guide*.

### 2.3.6 Carrier Pre-Select and Carrier Pre-Select Rn

The NP service for outgoing communication is started before Carrier Pre-Select or Carrier Pre-Select Rn service.



When the Request-URI of an initial `SIP INVITE` contains an `rn` parameter inserted to be processed by the Carrier Pre-Select Rn service and it does not contain `npdi` parameter, the NP service checks the `mtasNpRnBeforeNpLookup` attribute value.

If the `mtasNpRnBeforeNpLookup` attribute is set to 1, the NP service suppresses the NP lookup and does not send any information to charging system. The `SIP INVITE` is forwarded as it is without any modification.

However, if the `mtasNpRnBeforeNpLookup` attribute is set to 0, the NP service removes the `rn` parameter enclosed in the Request-URI of the initial `SIP INVITE` and then performs NP lookup. If the response of the NP lookup contains the `rn` parameter, the charging system is conveyed with the NP-related information and the obtained `rn` parameter is added into the Request-URI before the `SIP INVITE` is forwarded to the other node.

When the Request-URI of an initial `SIP INVITE` contains `cic` parameter inserted to be processed by Carrier Pre-Select service and it does not contain `npdi` parameter, the NP service performs an NP lookup. If the response of the NP lookup contains the `rn` parameter, the charging system is conveyed with the NP-related information and the obtained `rn` parameter is added into the Request-URI before the `SIP INVITE` is forwarded to other node. In this case, both the `rn` and `cic` parameters appear in the outgoing `SIP INVITE`.

For more information about the CPSRn service, refer to *MTAS Carrier Select and Carrier Pre-Select Management Guide*.

### 2.3.7 Ad-hoc Conference

In the conference focus, the NP service is started after the conference service. When the conference service receives an invitation attempt to the participants, after processing and validating the invitation, it generates new `SIP INVITES` addressed to invited participants. Thus, every generated `SIP INVITE` starts the NP service if the `mtasNpControl` attribute is set to either 1 or 3. If started, the NP service performs an NP lookup for every distributed `SIP INVITE` message to the participant that has either tel URI or embedded tel URI format. Every successful NP lookup is followed by NP-related information conveyance to the charging system.

For more information about the Ad-hoc conference service, refer to *MTAS Ad-hoc Conference Management Guide*.

### 2.3.8 Number Normalization

In the Originating MTAS, the NP service is started after the Number Normalization service. Therefore, the Request-URI header of the `SIP INVITE` that triggers the NP service has a normalized URI.

For more information about the Number Normalization service, refer to *MTAS Number Normalization Management Guide*.



### 3 NP Configuration

The NP service is controlled by the *MtasNp* MO. An overview of the NP MO structure is shown in Figure 1.

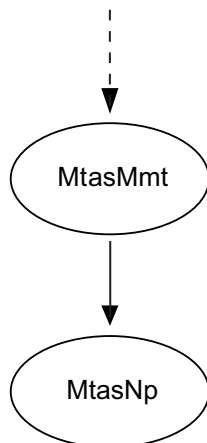


Figure 1 NP MO Structure

Configurable MOs and attributes related to the NP service are defined in the following documents:

- *Managed Object Model (MOM)*
- *MTAS Generic Announcement Management Guide*

#### 3.1 Configuration Activities

The configuration activities are listed in Table 1.

Table 1 Additional Configuration Activities

Activity	Attribute
Enables or disables the NP service. The NP service can be enabled for originating MTAS only, for terminating MTAS only, or for both Originating and Terminating MTAS.	mtasNpControl



Activity	Attribute
Configures the behavior of the NP service in originating MTAS following the receipt of SIP INVITE containing the <code>rn</code> parameter without the corresponding <code>npdi</code> parameter whether to perform NP lookup and to convey the NP-related information to the charging system or not.	<code>mtasNpRnBeforeNpLookup</code>
Configures the called number list in MTAS. If configured, MTAS performs additional check while playing announcement.	<code>mtasNpBNumberList</code>
Configures the list of the RN and announcement pair in MTAS. If configured, this list is used to fetch the announcement key.	<code>mtasNpRnAndAnn</code>

## 3.2 NP Administrative State Configuration

The NP service is enabled by setting the `mtasNpAdministrativeState` attribute in the *MtasNp* MO to 1 (Unlocked). If the `mtasNpAdministrativeState` is set to 0 (Locked), no NP service is provided by the MTAS.

## 3.3 Wholesale for NP Configuration

The NP service supports Wholesale. NP is configurable on Virtual Telephony Provider level.

Wholesale for NP is activated when the following attributes are set to 1 (Unlocked):

- The `vtasNpAdministrativeState` attribute in the *VtasNp* MO
- The `mtasNpAdministrativeState` attribute in the *MtasNp* MO

For more information about the Wholesale service, refer to *MTAS Wholesale Support Management Guide*.



## 4 Service Data Management

This section describes how to configure the service data.

### 4.1 Operator Subscription Level Service Configuration

The operator can activate or deactivate the Number Portability announcement service subscription for the subscriber by setting the user data using the CAI3G protocol. For more information about the CAI3G protocol, refer to *MTAS CAI3G Interface*.

The data in the operator part of the subscribers XML file must comply with the number-portability-announcement schema as defined in *MTAS Service Data Structure*. When the `activated` element is set to “true”, MTAS plays an announcement to notify the caller that the called party is ported.

If the operator subscription for NP announcement is missing, the default behavior is to play announcement based on node configuration.

The operator can change the default behavior of missing subscription for NP announcement by setting up the following CM parameters.

This attribute is used to determine the behavior of Number Portability Announcement Function when the served user is not subscribed to Number Portability Announcement.

`mtasNpSubscriptionDefaultBehavior 0` Number Portability Announcement is played for the served user.

`mtasNpSubscriptionDefaultBehavior 1` Number Portability Announcement is not played for the served user.





## 5 Performance Management

For measurements related to the NP service, refer to *Managed Object Model (MOM)*.





## 6 Fault Management

For alarms related to the NP service, refer to *MTAS Alarm List*.