

MTAS Dialed Number Mapping Management Guide

MTAS

USER GUIDE

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1 Introduction

This document describes how to configure the Dialed Number Mapping (DNM) service in the MTAS.

1.1 Prerequisites

It is assumed that the user of this document is familiar with the Operation and Maintenance (O&M) area, in general.

1.1.1 Licenses

To enable basic services in the MTAS, the Location Based Number Translation license must be installed.

For more information about the Location Based Number Translation 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 DNM service is an originating service, which is implemented as the extension of the Number Normalization service. The DNM function serves both fixed and mobile terminals.

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

An outgoing communication attempt generated by served user, as the calling party, starts the DNM service. The outgoing communication attempt generated by other supplementary services. For example: Communication Diversion (CDIV), Flexible Communication Distribution (FCD), or Session Transfer to Own Device (STOD), does not start the DNM service.

The DNM service is configured with group-centric data model. The group-centric model first organizes the mobile cells into bigger areas or groups and then stores the information needed to number translation on group level.

The DNM service utilizes location data configured in the *MtasCommonData* MO.

"The term "location" has different meaning for fixed and mobile terminals. For mobile terminals, the "location" represents the geographical location of the terminal at the time of placement of the call, derived from the P-Access Network Information SIP header. For fixed terminals, the "location" represents an area code, from the main identity set in Implicit Registration Set (IRS).

The DNM service includes the local format, short-code, national format, toll-free, and phone-context modification services. The local format dialing service enables a subscriber to call local number by dialing only the local format part, which is seven digits length in NANP. When a served user dials local format number, the DNM service checks whether the location from where the served user dials the number is within the home area. If the served user dials the local format number from the home area, the DNM service completes the dialed number by adding the Country Code for North America, followed by Numbering Plan Areas (NPA) prefix of subscriber for obtaining global e.164 number. However, if the served user dials the local format number from outside the home area, the DNM service rejects the call attempt by playing specific announcement.

The local format dialing service also allows for certain areas to be restricted from dialing local format calls. Seven-digit call attempt from a restricted area is rejected even if it is made within the home area. The local format dialing service also checks for transition areas, the areas which are in transition from local format to national format dialing. Local format call attempts from transition areas are allowed after playing an announcement.

The short-code dialing service enables a subscriber to call an assigned short number (short-code). When a served user dials a short-code number,



the DNM service checks the location from where the served user dials the number, followed by replacing the short-code number with the associated URI dependent on the position of the caller. If properly configured, dialing short-code from different location result in different actual URI to ensure that the caller is connected to the called party that serves the area. The short-code consists of less than local format length and it can start with any number including the “#” and “*” characters. The actual URI can be either tel URI, embedded tel URI, or SIP URI.

The mapping to the location-based short-code can take into account the calling of user language preference.

The national format dialing service enables a subscriber to call a national number by dialing the NPA and local number. The DNM service, when enabled will determine call type of the call for national format dialed number. Call type means what that call is classified as, for example: international, long-distance, local and so on. Based on the policy configuration, DNM service can allow or reject the call. In both cases, it is also possible to play an announcement for the calling user before the call is rejected or let to continue. The national format processing can be enabled or disabled for local format dialed calls. National format uses number analysis to determine the call type. For more details on Number analysis refer to *MTAS Location Based Number Analysis Management Guide*.

If the number is classified as exempted for localness checks, then the DNM does not determine the call type for the national format dialed calls. For more details on localness exemption, refer to *MTAS Number Normalization Management Guide*.

The toll-free service enables a subscriber to call a number (for example: 1-800-xxxxxxx or 310-xxxx) free of charge. The DNM service, when enabled, add a prefix in front of dialed number, which ensures further routing in the network. The added prefix depends on the location where the subscriber calls attempt.

The phone-context modification service enables a subscriber to call any format number. If the MTAS determines that the phone-context has to be modified, the DNM service checks the location from where the served user dials the number, followed by changing the phone-context of the called number using the modification rule dependent on the position of the caller. The new phone-context can be used later for Number Normalization. For more details on Number Normalization, refer to *MTAS Number Normalization Management Guide*.

2.1 Subfunctions

This section describes the following subfunctions:

- Evaluated dialed number
- Managing Dialed Number Mapping



- Playing generic announcement
- Processing local format number
- Processing short-code
- Processing national format number
- Processing toll-free number
- Processing phone-context modification
- Rejecting call attempt

2.1.1 Evaluated Dialed Number

The Evaluated dialed number subfunction evaluates the dialed number and determines whether the dialed number has local format format, short-code format, invalid format, or other-but-valid format. This subfunction also determines if the phone-modification is to be performed.

2.1.2 Managing Dialed Number Mapping

The Managing Dialed Number Mapping subfunction includes configuration management, performance management, and fault management needed for the DNM service.

2.1.3 Playing Generic Announcement

The Playing generic announcement subfunction plays DNM-specific announcements. The DNM-specific announcements are configured in CM parameters as generic announcement names. These names identify CM MO classes defined in the MTAS generic announcement function.

For more information about MTAS announcements, refer to *MTAS Generic Announcement Management Guide*.

2.1.4 Processing Local Format Number

The Processing local format number subfunction processes call attempt after the dialed number evaluation process determines that the dialed number has local format format. This subfunction performs data lookup and then inserts +1NPA prefix into the dialed number.

2.1.5 Processing Short-code

The Processing short-code subfunction processes call attempt after the dialed number evaluation process determines that the dialed number has short-code



format. This subfunction performs data lookup and then replaces the dialed number into an actual URI.

2.1.6 Processing National Format Number

This process is a subfunction of DNM function that processes call attempt after the dialed number evaluation process determines that the dialed number has national format. This subfunction performs data lookup and then inserts +1 prefix into the dialed number.

2.1.7 Processing Toll-Free Number

This process is a subfunction of DNM function that processes call attempt after the dialed number evaluation process determines that the dialed number has toll-free number format. This subfunction performs data lookup and then inserts location-dependent prefix into the dialed number.

2.1.8 Phone-Context Modification

The phone-context modification subfunction processes a call attempt after the dialed number evaluation process determines that the phone context of the dialed number has to be modified. This subfunction performs modification rule lookup and then modifies the Phone-Context of the dialed number.

The phone-context subfunction can be performed together with the one of local format, national format, short-code, or toll-free processing subfunctions.

2.1.9 Rejecting Call Attempt

The Rejecting call attempt subfunction handles a process for rejecting call attempt for the following reasons: invalid dialed number length, local format dial attempt from outside home area network, incorrect short-code provided, call to NPA configured in Invalid NPA List, and unsuccessful data lookup attempt or failure.

2.2 Interaction with Other Services

This section describes how the DNM interacts with other services.

2.2.1 Ad-hoc Conferencing

The DNM service is not started when a dial-out call is made from an Ad-hoc Conference service.



2.2.2 Carrier Pre-Select and Carrier Pre-Select Rn

The DNM service is started before Carrier Pre-Select (CPS) or Carrier Pre-Select Rn (CPSRn) service.

When processing the local format number the DNM service completes the number by adding +1NPA prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

When processing the short-code the DNM service replaces the number with the actual URI and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

When a mobile subscriber from home area network dials a national format number and provides CSC, the DNM service completes the number by adding +1 prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

When a mobile subscriber dials a toll-free number and provides CSC, the DNM service prefix the number with a location-specific prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

Since the CPS and CPSRn services only apply on tel URI or embedded tel URI, when the dialed short-code is replaced with the actual URI that is in SIP URI by the DNM service. The CPS and CPSRn services are not triggered.

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

2.2.3 Carrier Select and Carrier Select Rn

The DNM service is started before Carrier Select (CS) or Carrier Select Rn (CSRn) service. The Request-URI containing Carrier Select Code (CSC) in the SIP INVITE is processed by Dialed String Analysis (DSA) in the first invocation of Number Normalization service, see Section 2.2.6 Number Normalization on page 8. After the first Number Normalization service invocation, the Request-URI will contain `cic` parameter if the CS service is provisioned or `rn` parameter if the CSRn service is provisioned. The `dai="presub-unkwn-da"` parameter is also added into the Request-URI. Those parameters are kept by the DNM service.

When a mobile subscriber from home area network dials local format number and provides CSC, the DNM service completes the number by adding +1NPA prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

When a mobile subscriber dials a short-code and provides CSC, the DNM service replaces the number with the actual URI and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.



When a mobile subscriber from home area network dials a national format number and provides CSC, the DNM service completes the number by adding +1 prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

When a mobile subscriber dials a toll-free number and provides CSC, the DNM service prefix the number with a location-specific prefix and keep the `cic` or `rn`, and `dai="presub-unkwn-da"` parameters in the URI.

The CS and CSRn services are not triggered when the dialed short-code is replaced with the actual URI that is in SIP URI by the DNM service. The CS and CSRn services are only applicable on tel URI or embedded tel URI.

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

2.2.4 Communication Diversion

The DNM service will not be started after an incoming communication is diverted by the CDIV service. Therefore the local format and short-code number must not be used as diversion target for any of CDIV types as it not processed by the DNM service.

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

2.2.5 Flexible Communication Distributions

The DNM service will not be started after an incoming communication is distributed by the FCD service. Therefore the local format and short-code number must never be used as the target of FCD service or as the target of FCD Divert Primary (FCDDP).

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

2.2.6 Number Normalization

If the DNM service is unlocked and the Location Based Number Translation license is valid, the Number Normalization service is started twice, before and after the DNM service. The first invocation is to perform the “user equal to phone” error correction, to process the Carrier Select Code (CSC), and to determine whether the dialed number is Operator Service Number (OSN) or National Significant Number (NSN) number. If the result from Number Normalization first invocation is that the dialed number is OSN or NSN, the DNM service forwards the SIP INVITE as it is. However, if the dialed number is not OSN or NSN, the DNM service is triggered and the dialed number length evaluation process is performed. The DNM service can modify the phone-context parameter if presented in the Request-URI.



The Request-URI in the outgoing SIP INVITE following the DNM service process must again be normalized. Therefore, the Number Normalization service is started for the second time to normalize the URI.

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

2.2.7 Scheduled Conferencing

The DNM service is not started when a dial-out call is made from a Scheduled Conference service.

2.2.8 Session Transfer to Own Device

The DNM service will not be started after the STOD is started and distributes the call. Therefore the local format and short-code number must never be used as the target of STOD service.

For more information about FCD service, refer to *MTAS Session Transfer to Own Device Management Guide*.

2.2.9 Short Number Dialing

The DNM service must not be provisioned if the SND service is provisioned. The `mtasDnmAdministrativeState` and `mtasSndAdministrativeState` attributes must not be both unlocked at the same time.

For more information about the SND service, refer to *MTAS Short Number Dialing Management Guide*.

2.2.10 Outgoing Call Barring (OCB)

If DNM service determines the call type of the call, the OCB service uses the same call type value for category based barring. For more details on Call Barring refer to CB Management Guide.





3 DNM Configuration

The configuration of the DNM service can be broken down into the following steps:

1. Setting the MOs which control the DNM function.
2. Setting the MOs which define the DNM location data.
3. Setting the MOs which define the DNM-specific Number Translation data.

3.1 DNM Configuration Data

MOs that control the DNM service and the DNM MO structure is shown in Figure 1.

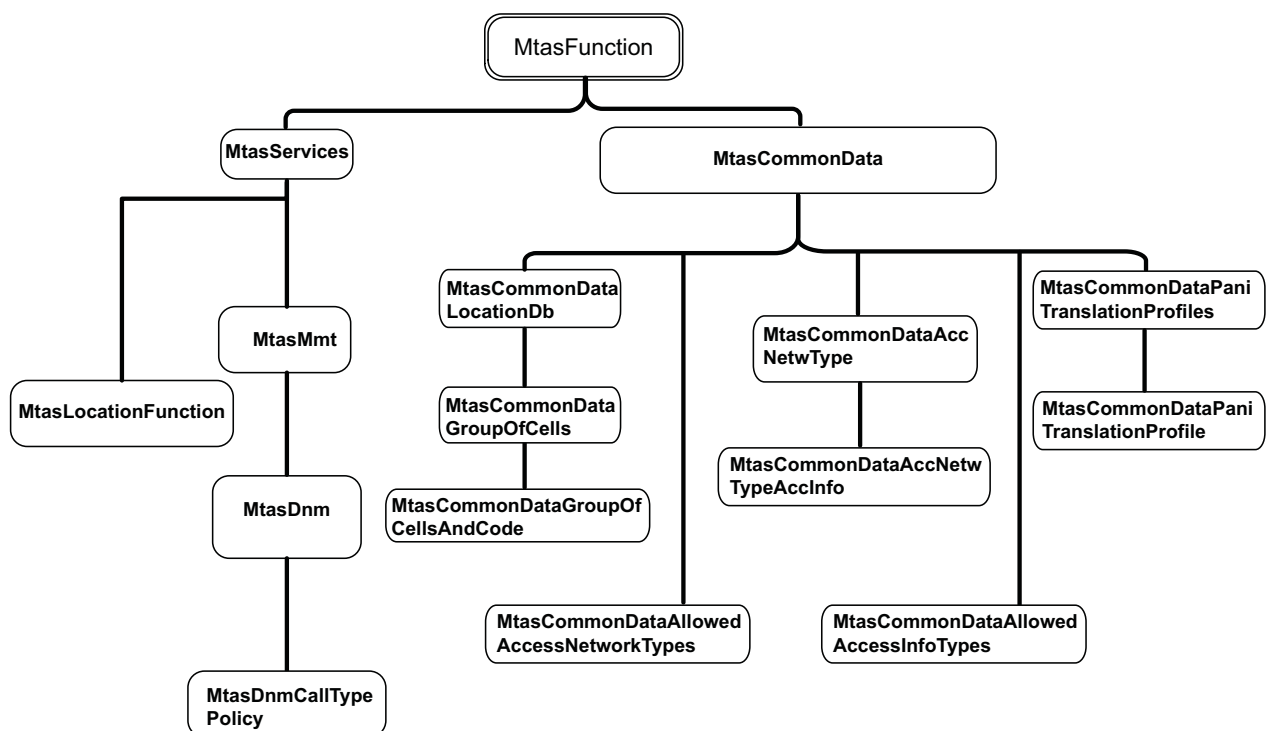


Figure 1 DNM MO Structure

For configurable MOs and attributes, related to the DNM services, refer to *Managed Object Model (MOM)*.



3.1.1 DNM Administrative State Configuration

The DNM service is enabled by setting the `mtasDnmAdministrativeState` attribute in the `MtasDnm` MO to 1 (Unlocked). If the `mtasDnmAdministrativeState` is set to 0 (Locked), no DNM service is provided by the MTAS.

3.1.2 Method to Access the Database Configuration

The function is only supported using a node internal database. The attribute `mtasLocationFunctionRsInterface` must have value 1.

3.1.3 Additional Configuration Activities

The rest of the configuration activities belonging to the configuration of the DNM function are listed in Table 1.

Table 1 Additional Configuration Activities

Activity	Attribute
Defines the generic announcement name to be played when the dialed number length is invalid	<code>mtasDnmAnnRejectInvalidDialedNumberLength</code>
Defines the generic announcement name to be played when the local call dialing attempt was made from outside the home area and therefore have been rejected.	<code>mtasDnmAnnRejectLocalFormatNbr</code>
Defines the generic announcement name to be played when the local call dialing attempt was made from a restricted area and therefore it was rejected.	<code>mtasDnmAnnRejectLocalFormatNbrRestriction</code>
Defines the generic announcement name to be played when a national (national format) number dialing attempt was determined to be a long-distance call.	<code>mtasDnmAnnWarningLongDistance</code>
Sets the attribute to 0 if there is no need to define areas where local (local format) dialing is forbidden. Set the attribute to 1 if a list of restricted areas needs to be defined from where local (local format) dialing is forbidden.	<code>mtasCommonDataNpaLocalFormatRestriction</code>



Activity	Attribute
Defines the list of NPA areas where local (local format) dialing is forbidden.	mtasCommonDataNpaAllowedLocalFormat
Defines if national level call processing is required to be followed by local level call processing in DNM service. National level call processing includes determining the call type and accepting/rejecting the call.	mtasDnmNationalAfterLocal
Defines the list of NPA-s which is in transition area from local format to national format dialing for making a new call	mtasCommonDataNpaTransitionList
Defines the name of the generic announcement, specified in an instance of <code>MtasGaAnn</code> , to be played when DNM service determines that the NPA is in transition area. The empty string would mean no announcement to be played.	mtasDnmAnnTransitionArea
Defines the name of the generic announcement, specified in an instance of <code>MtasGaAnn</code> , to be played when DNM service is unable to determine the R-URI corresponding to a short code. The empty string would mean no announcement to be played	mtasDnmAnnShortCodeFailure
Defines the name of the generic announcement, specified in an instance of <code>MtasGaAnn</code> , to be played when DNM service encounters a database error during local format dialing. The empty string would mean no announcement to be played.	mtasDnmAnnLocalFormatDialingFailure
Defines whether to accept or reject the call	mtasDnmCallTypePolicyCallControl
Defines the name of the generic announcement, specified in an instance of <code>MtasGaAnn</code> , to be played when DNM service decides that the call needs to be accepted or rejected. If this value is not specified, no announcement is played.	mtasDnmCallTypePolicyAnn



Activity	Attribute
This attribute defines if fixed device is supported in DNM. For fixed, the calling party number is used to determine the localness of call. For mobile, the location of the User Is used to determine the localness of the call	mtasDnmFixedDeviceSupport
This attribute defines the value of the operator named announcement to be played when the Dialed Number Mapping (DNM) service rejects an attempt for dialing NPA configured in Invalid NPA List.	mtasDnmAnnRejectInvalidNPA
This attribute defines the value of the operator named announcement, specified in an instance of <code>MtasGaAnn</code> , to be played when the DNM service rejects a call to location dependent number from WiFi access.	mtasDnmAnnPreventedAccessTypeWifi

3.2 DNM Location Data Configuration

The DNM location data is an MTAS representation of the location information (mobile cell based) and routing information which must be defined to enable the DNM function. The representation organizes data and groups mobile cells into bigger areas and stores the routing information per each area. This process is also called group-centric data model.

The DNM supports wildcarding cell configuration which provides:

- A configuration-based flexible PANI header selection.
- A regex rule based mobile cell search.

See Section 3.4 DNM Group-Centric Data Example on page 18 for examples of data model.

The DNM location data is configured in the `MtasCommonData` MO.

3.2.1 Group-Centric DNM Location Data Configuration

The Group-centric DNM configuration activities belonging to the DNM function are listed in Table 2.



Table 2 Group-Centric DNM Configuration

Activity	Attribute
Defines the name of the groups of cells (mobile cells identified by the <code>mtasCommonDataAccNetwTypeAccInfo</code> attribute).	<code>mtasCommonDataGroupOfCells</code>
Defines the sequence of digits which are inserted/appended into/to the dialed number in case the dialing attempt was determined to belong to this group and the call case is toll-free dialing.	<code>mtasCommonDataGroupOfCellsDigits</code>
Defines the list of Numbering Plan Areas (NPA) connected to this group.	<code>mtasCommonDataGroupOfCellsNpa</code>
Defines the connection between an existing group and a service code which needs to be mapped in this group.	<code>mtasCommonDataGroupOfCellsAndCode</code>
Defines the list of mappings between a Uniform Resource Identifiers and language preferences which are applicable for this group and this short code.	<code>mtasCommonDataGroupOfCellsAndCodeMap</code>
Defines the division layer and the group to which cells (identified by the <code>mtasCommonDataAccNetwTypeAccInfo</code>) belong to.	<code>mtasCommonDataAccNetwTypeAccInfoMap</code>
Defines the mobile cells present in the network.	<code>mtasCommonDataAccNetwTypeAccInfo</code>
Defines the access network types which exist in the network.	<code>mtasCommonDataAccNetwType</code>
Defines the location-based Rating Center that belongs to this particular cell	<code>mtasCommonDataAccNetwTypeAccInfoRC</code>
Defines the list of allowed Access Network Types. If the Access Network Type received in the <code>P-Access-Network-Info</code> header is not presented in this list, the call is handled as a fixed call.	<code>mtasCommonDataAllowedAccessNetworkTypes</code>



Activity	Attribute
Defines the ordered list of the allowed Access Info Types. If the Access Info Type received in the P-Access-Network-Info header is not presented in this list, the call is handled as a fixed call. MTAS supports more than 1 Access Info Type in 1 P-Access-Network-Info header.	mtasCommonDataAllowedAccessInfoTypes
Defines the wildcarding profiles. The wildcarding is used during the mobile cell lookup process.	mtasCommonDataPaniTranslationProfile

3.3 DNM Specific Number Translation Data

The DNM service starts the Number Translation function to analyze the dialed digits and make a preliminary substitution in the dialed number. The result from the Number Translation function also contains a string which represents an identifier of a division layer to which a group belongs to.

When defining the location independent and location specific data sets for the Number Translation function, it has to be considered that:

- Although the two data sets are defined in the same MOs (see Section 3.3.1 DNM Specific Number Translation Data Configuration on page 17), they must be designed as two separate data sets because the Number Translation service invocation (first invocation) ignores the location-specific rules and the Number Translation DNM invocation (second invocation) ignores the location independent rules.
- The Number Translation DNM invocation works on the dialed number which was the output from the Number Translation service invocation (first invocation).

Division layers allow that a larger geographical area (for example a country) to be divided into smaller areas in different ways. A division layer can cater for one type of location-dependent service (for example, service areas for *12xx short-codes can have a dedicated division layer). The smaller areas are modeled with the group of cells concept. It means that a mobile cell (represented by a string generated from the PANI header) can belong to a group of cells in a division layer and to a different group of cells in another division layer.

The DNM specific (or location-dependent) Number Translation data is stored in the same MTAS node where the DNM service is deployed, see Figure 2.

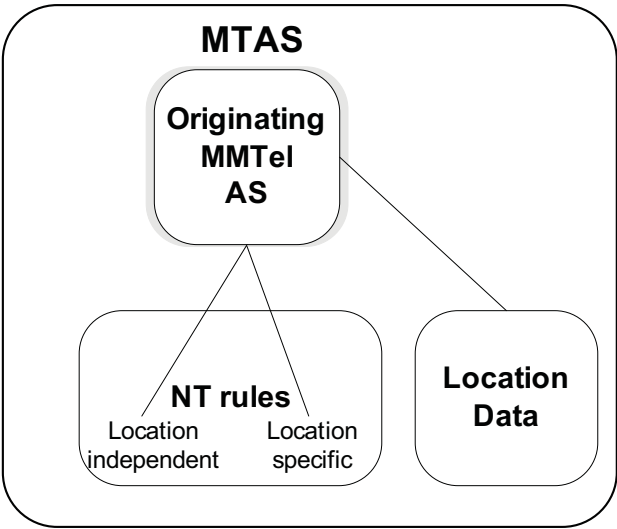


Figure 2 DNM Specific Number Translation Data Storage

3.3.1

DNM Specific Number Translation Data Configuration

The DNM Specific Number Translation configuration activities are listed in Table 3.

Table 3 DNM Specific Number Translation Configuration

Activity	Attribute
Define the location-dependent Number Translation profile. The profile matches part or the whole dialed number.	mtasNumberTranslationProfile
Define the location-dependent Number Translation rules. If location-specific digits needed to be inserted into the dialed number, then the "\$LOC" string must be inserted into the dialed number in the required position. If the whole number is replaced, then all digits are replaced by the "\$LOC" string. The identifier of the division layer to which this type of number belongs to is also added to the dialed number with "&" followed by the identifier. If the phone-context of the dialed number needs to be modified, then the "\$PCM" string must be added to the dialed number.	mtasNumberTranslationRule



For more information on how to configure the number translation function, refer to *MTAS Number Translation Management Guide*.

3.4 DNM Group-Centric Data Example

This subsection provides examples of data to support the data lookup for DNM service.

3.4.1 **MtasCommonDataAllowedAccessNetworkTypes**

This section describes `MtasCommonDataAllowedAccessNetworkTypes`.

3.4.1.1 **mtasCommonDataAllowedAccessNetworkTypesName Attribute**

This attribute defines the list of allowed Access Types.

The default values are:

- 3GPP-GERAN
- 3GPP-UTRAN-FDD
- 3GPP-UTRAN-TDD
- 3GPP-E-UTRAN-FDD
- 3GPP-E-UTRAN-TDD
- 3GPP2-1X
- 3GPP2-1X-Femto
- 3GPP2-1X-HRPD
- 3GPP-UTRAN
- 3GPP-E-UTRAN

3.4.2 **MtasCommonDataAllowedAccessInfoTypes**

This section describes `MtasCommonDataAllowedAccessInfoTypes`.

3.4.2.1 **mtasCommonDataAllowedAccessInfoTypesName Attribute**

This attribute defines the ordered list of the allowed Access Info Types.

The default values are:

- 10:cgi-3gpp



- 20:utran-cell-id-3gpp
- 30:ci-3gpp2
- 40:ci-3gpp2-femto

MTAS supports multiple access info types in one PANI header. The one with lowest priority is taken for cell lookup process.

3.4.3 **MtasCommonDataPaniTranslationProfile**

This section describes `MtasCommonDataPaniTranslationProfile`.

3.4.3.1 **MtasCommonDataPaniTranslationProfile Attribute (Primary Key)**

The value of this attribute is a concatenation of the access type name, character "&," and the access info type name. Examples are the following:

- Access network type: 3GPP-UTRAN-TDD
- Access info type: utran-cell-id-3gpp

The `MtasCommonDataPaniTranslationProfile` attribute value:

- 3GPP-UTRAN-TDD&utran-cell-id-3gpp

This represents a wildcarding profile for PANI header containing access network type (3GPP-UTRAN-TDD) and access info type (utran-cell-id-3gpp).

3.4.3.2 **mtasCommonDataPaniTranslationProfileRule Attribute**

The value of this attribute is a PANI translation rules list. Examples are the following:

- 10:/^234151D(.*)/3GPP-UTRAN-TDD&234151D/
- 20:/^([0-9]{6}[0-9A-F]{4})/TAC&\1/
- 30:/^([0-9]{6}[A-F]{1}[0-9]{3}[A-F]{1}[0-9]{2})/MNC&\1/
- 40:/^([0-9]{3})/MCC&\1/

3.4.4 **MtasCommonDataAccNetwType**

This section provides examples of data for the `MtasCommonDataAccNetwType` MO.



3.4.4.1 **mtasCommonDataAccNetwType Attribute (Primary Key)**

The attribute can contain any free token value (for example, “TacLte”).

3.4.5 **MtasCommonDataAccNetwTypeAccInfo**

This section provides examples of data for the `MtasCommonDataAccNetwTypeAccInfo` MO.

3.4.5.1 **mtasCommonDataAccNetwTypeAccInfo Attribute (Primary Key)**

The value of this attribute is a mobile cell identifier. In case of wildcarding, it can be any format value. If no wildcarding profiles (`MtasCommonDataPaniTranslationProfile`) configured, then it is a concatenation of the parent class primary key, which is the access type name, character &, and the access-info string (in hexadecimal).

Examples:

- Access type: 3GPP2-1X-Femto
Access-info string: 123456789A171A987654321
The `MtasCommonDataAccNetwTypeAccInfo` attribute value:
3GPP2-1X-Femto&123456789A171A987654321

This example represents a mobile cell which is part of the `scgrp1` group for short-code dialing, `WLCA3` group for national format dialing, `Toronto5` for local format dialing, and `tollfree4` group for toll-free dialing.

- Access type: 3GPP-UTRAN-TDD
Access-info string: any value starting with 234151D (wildcarding value)
The `MtasCommonDataAccNetwTypeAccInfo` attribute value:
3GPP-UTRAN-TDD&234151D

This example represents a virtual (wildcarding) mobile cell which is part of `scgrp1` group for short-code dialing, `WLCA3` and `lca5` groups for national format dialing, and `tollfree4` group for toll-free dialing.

- Access type: 3GPP-UTRAN-FDD
Access-info string: 234151D089E11 (wildcarding value)
The `MtasCommonDataAccNetwTypeAccInfo` attribute value:
MNC&234151D089E11

This example represents a mobile cell which is part of `8lca`, `WLCA3`, and `lca5` groups for national format dialing, and `Toronto5` and `grp10` groups for local format dialing.

3.4.5.2 **mtasCommonDataAccNetwTypeAccInfoMap Attribute**

The value of this attribute is a concatenation of the division type string, character &, and the group name string.



Examples:

- Division type: RO-SC (a number translation result)
Group name string: scgrp1
The `mtasCommonDataAccNetwTypeAccInfoMap` attribute value:
`RO-SC&scgrp1`
- Division type: RO-7 (a number translation result)
Group name string: Toronto5
The `mtasCommonDataAccNetwTypeAccInfoMap` attribute value:
`RO-7&Toronto5`
- Division type: PRE (a number translation result)
Group name string: tollfree4
The `mtasCommonDataAccNetwTypeAccInfoMap` attribute value:
`PRE&tollfree4`
- Division type: RO-7 (a number translation result)
Group name string: grp10
The `mtasCommonDataAccNetwTypeAccInfoMap` attribute value:
`RO-7&grp10`

3.4.5.3 **mtasCommonDataAccNetwTypeAccInfoRC Attribute**

The value of this attribute represents the rating center for the cell.

Examples:

- `MtasCommonDataAccNetwTypeAccInfoRC` attribute value: Bismarck
- `MtasCommonDataAccNetwTypeAccInfoRC` attribute value: Toronto
- `MtasCommonDataAccNetwTypeAccInfoRC` attribute value: Ottawa

3.4.5.4 **mtasCommonDataAccNetwTypeAccInfoAppISpecificData Attribute**

The value of this attribute represents the phone-context modification rule. The format is “PCM&Rule” where the “PCM” is a tag and the “Rule” is the Phone-Context modification rule.

Examples:

- `PCM&/^(.*)$/locationA.\1/`
- `PCM&/com/company.com/`

3.4.6 **MtasCommonDataGroupOfCells**

This section provides examples of data for the `MtasCommonDataGroupOfCells` MO.



3.4.6.1 **mtasCommonDataGroupOfCells Attribute (Primary Key)**

The value of this attribute is a string representing the name of the group of cells.

Examples:

- | | |
|------------------|---|
| grp10 | This group stores the NPA value for local format dialing. |
| Toronto5 | This group stores the NPA value for local format dialing. |
| tollfree4 | This group stores the prefix value for toll-free dialing. |

3.4.6.2 **mtasCommonDataGroupOfCellsNpa Attribute**

The value of this attribute represents the NPA used for local format dialing for the given group

Examples:

- 871
- 772
- 722
- 655

3.4.6.3 **mtasCommonDataGroupOfCellsDigits Attribute**

The value of this attribute represents the prefix used for toll-free dialing for the given group.

Example:

- AA321789

3.4.7 **MtasCommonDataGroupOfCellsAndCode**

This section provides examples of data for the `MtasCommonDataGroupOfCellsAndCode` MO.

3.4.7.1 **mtasCommonDataGroupOfCellsAndCode Attribute (Primary Key)**

The value of this attribute is a concatenation of group name, character &, and the dialed short-code.

Example:

- Group name: scgrp1
Access-info string: 123456789A171A987654321
(from `mtasCommonDataAccNetwTypeAccInfoMap` attribute)



Dialed short-code: #123
 The `MtasCommonDataGroupofCellsAndCode` attribute value:
`scgrp1{`

3.4.7.2 **mtasCommonDataGroupOfCellsAndCodeMap Attribute**

The value of this attribute is a concatenation of language tag, character &, and the actual URI.

Example:

- Language tag: en-CA
 Actual URI: tel:+17815623111
 The `mtasCommonDataGroupofCellsAndCodeMap` attribute value:
`en-CA&tel:+17815623111.`

3.4.8 **MtasNumberTranslationProfile**

This section provides examples of data for the `MtasNumberTranslationProfile` MO.

3.4.8.1 **mtasNumberTranslationProfile Attribute (Primary Key)**

The value of this attribute is the leading digits of the numbers. These digits are needed to be processed by the Number Translation function as part of the Dialed Number Mapping function.

Examples:

DEFAULT;	This attribute matches most service-codes, local format, and national format numbers.
310;	This attribute matches toll-free numbers starting with 310.
1800;	This attribute matches toll-free number starting with 1800.

3.4.8.2 **mtasNumberTranslationRule Attribute**

This attribute stores translation rules applicable within a profile. The translation rules have the following format: Order: Substitution-rule: Terminal-match where - Order is an unsigned integer and it defines which substitution rule is being matched first. The lowest number has the highest priority in matching. - Substitution-rule is a POSIX 1003.2 extended regular substitution of format `/regexp/replacement/`. - Terminal-match is TRUE or FALSE indicating if the expression is terminal or not. If terminal-match is true, the matching results are returned directly; otherwise, further matching is performed. See Figure 3.

Examples:

- 1 : / ^ [\ * #] [0 - 9] { 4 } / \$ LOC & RO - SC / TRUE ; belongs to the DEFAULT profile; matches a service code starting with “*” or “#” character followed by 4 digits; replaces the whole number with a location-specific URI and provides the division layer as RO-SC.
- 2 : / ([6 - 8] { 1 } [0 - 9] { 6 }) / \ 1 & RO - 7 | \$ PCM / TRUE ; belongs to the DEFAULT profile; matches a local format number starting with “6”, “7” or “8”; leaves the number unchanged and provides the division layer as RO-7; indicates that Phone-Context must be modified.
- 3 : / ([0 - 9] { 7 }) / \ 1 & RO - 7 / TRUE ; belongs to the DEFAULT profile; matches a local format number; leaves the number unchanged and provides the division layer as RO-7.
- 1 : / (^ 3 1 0 [0 - 9] { 4 }) / \$ LOC \ 1 & PRE / TRUE ; belong to the 310 profile; matches a toll-free number starting with 310 and followed by 4 digits; inserts a location-specific string before the original number and provides the division layer as PRE.
- 1 : / (^ 1 8 0 0 [0 - 9] { 7 }) / \$ LOC \ 1 & PRE / TRUE ; belong to the 1800 profile; matches a toll-free number starting with 1800 and followed by 7 digits; inserts a location-specific string before the original number and provides the division layer as PRE.

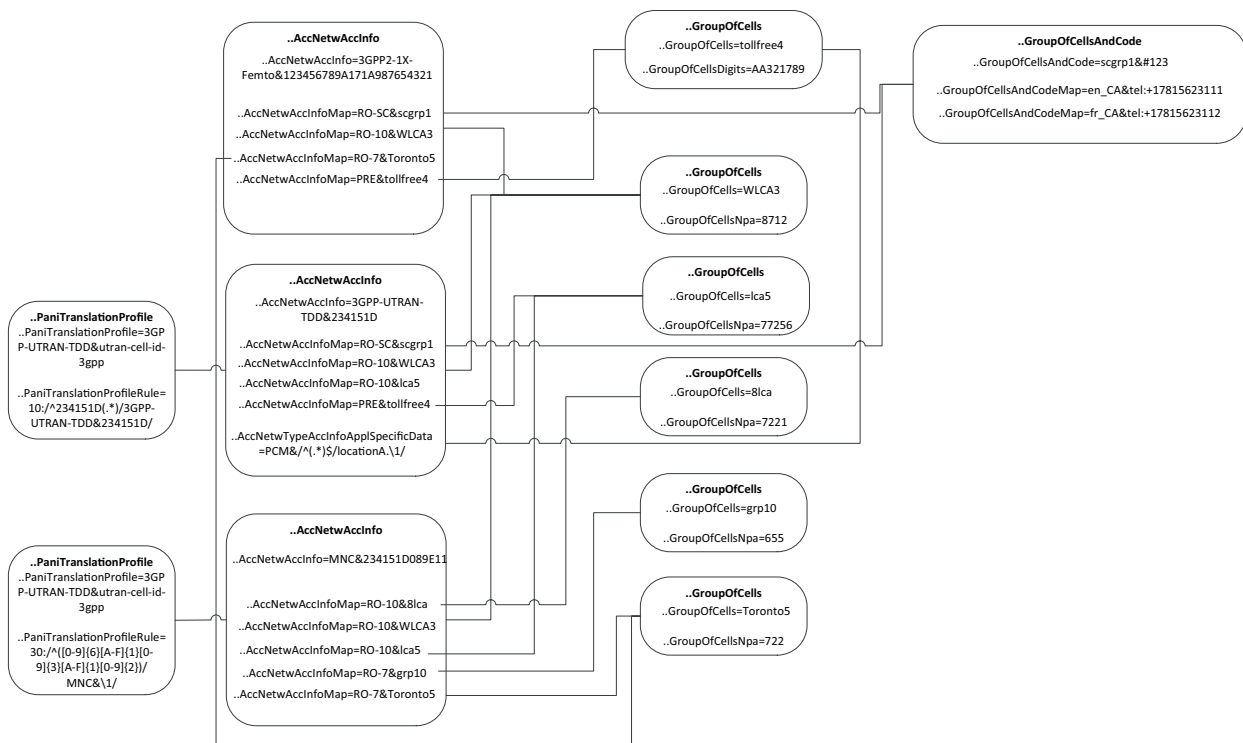


Figure 3 Data Example



3.4.9 **MtasDnmCallTypePolicy**

This section provides examples for `MtasDnmCallTypePolicy` Managed Object Class (MOC) allowance or rejection, or both, policy, based on dialed number length and call type determined by the Number Analysis.

3.4.9.1 **MtasDnmCallTypePolicy Attribute (Primary Key)**

This attribute defines the primary key for `MtasDnmCallTypePolicy`. The key is the combination of Call Type and dialed number Length. Possible values of call type are "Local", "Non Local", "L_National", "L_International", "L_IntraLata", "L_IntraLataToll", "L_InterLata", "L_NanpZone1", "L_Nanp", "L_Error". Dialed number length could be a range of Numbers from 7 to 10 and "greater10" for dialed number lengths greater than 10.

Example:

`L_IntraLataToll&10` : Represents the call policy for IntraLataToll calls when the dialed digit length is 10

3.4.9.2 **mtasDnmCallTypePolicyCallControl Attribute**

This attribute defines whether to Accept or Reject the call

Examples: Accept the IntraLataToll call when the dialed digit length is 10

`MtasDnmCallTypePolicy` : `L_IntraLataToll&10`

`mtasDnmCallTypePolicyCallControl`: true

3.4.9.3 **mtasDnmCallTypePolicyAnn Attribute**

This attribute defines the name of the generic announcement, specified in an instance of `MtasGaAnn`, to be played when DNM service decides that the call needs to be accepted or rejected. If this value is not specified, no announcement is played.

Examples: Accept the IntraLataToll call when the dialed digit length is 10 and play the "IntralataAnn" announcement

`MtasDnmCallTypePolicy` : `L_IntraLataToll&10`

`mtasDnmCallTypePolicyCallControl`: true

`mtasDnmCallTypePolicyAnn` : `IntralataAnn`



3.5 Memory Constraint

The suggested maximum instances for the memory constraint are listed in Table 4.

Table 4 Memory Constraint

MOC Name	Suggested Maximum Instances
MtasCommonDataAccNetwType	8
MtasCommonDataAccNetwTypeAccInfo	51114
MtasCommonDataGroupOfCells	10,000
MtasCommonDataGroupOfCellsAndCode	6,700,000



4 Number Analysis

Number Analysis is component that determines the call type for North American Numbering Plan (NANP). NANP is an integrated telephone numbering plan of 24 countries and territories: the United States and its territories, Canada, Bermuda, and 16 of the Caribbean countries. The numbering plan is as <CC><NPA>NXX><XXXX>.

- CC (Country Code - digits)
- Numbering Plan Areas (NPA -3 digits)
- End Office Code (3 digits)
- Subscriber/Station Number (4 digits)

NANP is for both mobile and fixed terminals.

Based on the NANP configuration, Number Analysis can return the following call types:

1. Local
2. Non Local
3. National
4. International
5. IntraLata
6. IntraLataToll
7. InterLata
8. NanpZone1
9. Nanp

For details on how to configure Number Analysis refer to *Managed Object Model (MOM)*.





5 Performance Management

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





6 Fault Management

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