

MTAS Number Normalization Management Guide

MTAS

USER GUIDE

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1 Introduction

This document describes the MTAS Number Normalization function and how it uses the Number Normalization Common Component to provide Number Normalization.

1.1 Prerequisites

This section describes the prerequisites that must be fulfilled. It is assumed that the user of this document is familiar with the O&M area, in general.

1.1.1 Documents

Before any of the procedures in this document are carried out, the following documents must be read and understood:

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

1.1.2 Conditions

The following condition must apply:

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





2 Overview

The MTAS Number Normalization function uses the Number Normalization Common Component to provide normalization (conversion to E.164) of a Session Initiation Protocol (SIP) or tel URI as received in the SIP message, for service logic procedures, and routing.

The Dialed Number Mapping (DNM) and the Outgoing Call Barring (OCB) services are performing call type determination. Refer to *MTAS Dialed Number Mapping Management Guide* and *MTAS Barring and Dial Plan Services Management Guide* for details. Localness exemption means that the call type determination is omitted for certain numbers. After normalization of the called party number, the service will check whether the normalized called number is present in the localness exempted list. If it is present, then the call type determination is omitted.

The MTAS Number Normalization MO is defined by the *MtasNumNorm* MO, and its attributes, *mtasNumNormPcContent*, and *mtasNumNormPcRemoval*. These attributes control what information is passed to the Number Normalization Common Component for normalizing the URI. The parameters passed to the Number Normalization Common Component are a URI and a context.

The following sections describe URIs, the different context types, normalization data, and how terminals address sent numbers.





3 URIs

This section details tel and SIP URIs.

3.1 Tel URI

A tel URI is either in a global number format or a local number format.

3.1.1 Global Tel URI

The tel URI for global numbers takes the following form:

`tel:<global-number-digits>;Parameters, where
<global-number-digits> is the telephone subscriber.`

In a global tel URI, globally unique numbers are identified by the leading “+” character.

Example:

`tel:+12015550123`

3.1.2 Local Tel URI

The format of the local tel URI takes the following form:

`tel:<local-number-digits>;<phone-context>;parameters, where
the <local-number-digits>;<phone-context> part is the telephone
subscriber.`

Other attributes not used are left out for clarity.

Local numbers always have a <phone-context>, referred to in this document also as global number context, and parameters that identifies the scope of their validity.

A context consisting of the initial digits of a global number does not imply that adding these to the local number generates a valid normalized E.164 number.

Local numbers are unique only within a certain geographical area or a certain part of the telephone network.

Example:

`tel:3568046;phone-context=+44121`

This URI points to a phone number in Birmingham in the UK.



3.2 SIP URIs

The general form of a SIP URI is as follows:

`sip:user:password@host:port;Uri-parameters?headers`, where `user:password` is referred to as `user-info`.

The following is a description of a SIP URI:

- `user`: The identifier of a particular resource at the host being addressed.
- `password`: A password associated with the user. While the SIP and the SIP URI syntax allow this field to be present, it is rarely used because of security issues.
- `host`: The host part contains either a fully qualified domain name or a numeric IPv4 or IPv6 address.
- `port`: The port number where the request is to be sent.
- `Uri-parameters`: Parameters affecting a request constructed from the URI. `Uri-parameters` are added after the `port` component and are separated by semicolons. The URI parameter of particular interest to the Number Normalization is the URI parameter `user=phone`.
- `headers`: Not used.

3.2.1 Dialed Digits and User-info

A User Agent (UA) programmed with a dialing plan and an appropriate digit map can produce the following SIP URI when 5551234 is dialed:

```
sip:5551234@example.net; user=phone
```

It is not certain that the `user=phone` parameter is present, in this case, if `user` part is a number, and the context is displayed in the list of domain names defined by the `numNormProfileDomNameEr` parameter and the `numNormProfileUserEqPhoneEr` parameter is set, the parameter `user=phone` is added.

3.2.2 Embedded Tel URI

A UA can produce a SIP URI with the `<global-number-digits>` or `<local-number-digits>;<phone-context>` parts of a tel URI being embedded into the `user-info` part of the SIP URI, between the “sip:” and the “@”.

When a UA produces such a SIP URI, the entire telephone subscriber of the tel URI, including any parameters, is placed into the `user-info` part of the SIP URI, and a parameter `user=phone` or `user=dialstring` is added. Absence of



the `user=phone` parameter is handled as described in the following section, see Section 5.4 Context based User=phone Error Correction on page 16.

Examples of embedded tel URIs:

Example 1:

`tel:+12125551234` can be embedded into the following SIP URI, with the `12125551234` part being embedded in the user-info part of the SIP URI:

```
sip:+12125551234@example.net;user=phone
```

Example 2:

`tel:5551234;phone-context=nyc1.example.net` can be embedded into the following SIP URI, with the `5551234;phone-context=nyc1.example.net` part being embedded in the user-info part of the SIP URI:

```
sip:5551234;phone-context=nyc1.example.net@example.net;user=phone
```

Example 3:

`tel:5551234;phone-context=+1212` can be embedded into the following SIP URI, with the `5551234;phone-context=+1212` part being embedded in the user-info part of the SIP URI:

```
sip:5551234;phone-context=+1212@example.net;user=phone
```





4 UA and Produced URIs

The SIP and tel URIs generated by the UA depend on if the UA has digit map capabilities and if a local dial plan has been configured.

4.1 Local, National, and International SIP and Tel URIs

In the following sections, local, national, and international SIP and tel URIs are detailed.

4.1.1 Local Number

A local number is a number belonging to the same local area.

The following shows an example of basic data for a local dial plan:

Data	Dial plan (context)
International Country Code (CC)	+44 (UK)
Area Code (AC)	121 (Birmingham)
UA with Address Of Record (AOR)	+441215551235 resides in the operator.co.uk domain (or service provider). The UA has a context of Birmingham, defined by the birmingham.operator.co.uk URL.
AOR	+441215551235

When a local number and a Subscriber Number (SN) 5551234 is dialed, any of the following URIs could be produced:

```
tel:+441215551234
sip:+441215551234@operator.co.uk;user=phone
sip:5551234@operator.co.uk;user=phone
tel:5551234;phone-context=birmingham.operator.co.uk
sip:5551234;phone-context=birmingham.operator.co.uk@operator.co.uk;user=phone
tel:5551234;phone-context=+44121
sip:5551234;phone-context=+44121@operator.co.uk;user=phone
```



All these tel URIs are normalized to the following:

```
tel:+441215551234
```

All these SIP URIs are normalized to the following:

```
sip:+441215551234@operator.co.uk;user=phone
```

4.1.2 National Number

A national number is a number within the same country.

The following shows an example of basic data for a national dial plan:

Data	Dial plan (context)
International CC	+44 (UK)
AC	121 (Birmingham)
UA with AOR	+441215551235 resides in the operator.co.uk domain (or service provider). The UA has a context of Birmingham, defined by the birmingham.opeco.uk URL.
AOR	+441215551235

Any of the following URIs could be produced when the national number 02412340461 is dialed:

```
tel:+442412340461
sip:+442412340461@ope.co.uk;user=phone
sip:02412340461@operator.co.uk;user=phone
tel:02412340461;phone-context=birmingham.operator.co.uk
sip:02412340461;phone-context=
birmingham.operator.co.uk@operator.co.uk;user=phone
tel:02412340461;phone-context=+44121
sip:02412340461;phone-
context=+44121@operator.co.uk;user=phone
```

All these tel URIs are normalized by the Number Normalization function to the following:

```
tel:+442412340461
```

All these SIP URIs are normalized by the Number Normalization function to the following:

```
sip:+442412340461@operator.co.uk;user=phone
```



4.1.3 International Number

An international number is a number that resides outside the current country.

The following shows an example of basic data for an international dial plan:

Data	Dial plan (context)
International CC	+44 (UK)
AC	121 (Birmingham)
UA with AOR	+441215551235 resides in the operator.co.uk domain (or service provider). The UA has a context of Birmingham, defined by the birmingham.operator.co.uk URL.

The user
dials an AOR
+46812345678
of a user in
Stockholm,
with AC=8,
Sweden CC=46
by dialing 0046
812345678.

AOR	+441215551235
-----	---------------

Any of the following URIs could be produced when the international number +46812345678 is dialed:

```
tel:+46812345678
sip:+46812345678@operator.co.uk;user=phone
sip:0046812345678@operator.co.uk;user=phone
tel:0046812345678;phone-context=birmingham.operator.co.uk
sip:0046812345678;phone-context= birmingham.operator.co.uk
@operator.co.uk;user=phone
tel:0046812345678;phone-context=+44121
sip:0046812345678;phone-context=+44121@operator.co.uk;user=phone
```

All these tel URIs are normalized by the Number Normalization function to the following:

```
tel:+46812345678
```

All these SIP URIs are normalized by the Number Normalization function to the following:

```
sip:+46812345678@operator.co.uk;user=phone
```



4.1.4 NSN

The National Significant Number (NSN) is a number that is only significant within a country.

The Number Normalization function returns the URI with a `phone-context` equal to a CC.

The following shows an example of basic data for an NSN dial plan:

Data	Dial plan (context)
International CC	+44 (UK)
AC	121 (Birmingham)
UA with AOR	+441215551235 resides in the operator.co.uk domain (or service provider). The UA has a context of Birmingham, defined by the birmingham.operator.co.uk URL.
AOR	+441215551235

Any of the following URIs could be produced when the NSN number 100 is dialed:

```
tel:+44100 sip:+44100@operator.co.uk;user=phone
sip:0044100@operator.co.uk;user=phone
tel:0044100;phone-context=birmingham.operator.co.uk
tel:100
sip:100@operator.co.uk
tel:100;phone-context=birmingham.operator.co.uk
sip:100; phone-context=birmingham.operator.co.uk@operator.
co.uk;user=phone
tel:100;phone-context=+44121
sip:100;phone-context=+44121@operator.co.uk;user=phone
tel:100; phone-context=+44
sip:100; phone-context=+44@operator.co.uk;user=phone
tel:100; phone-context=co.uk
sip:100; phone-context=co.uk@operator.co.uk;user=phone
```

All these tel URIs are normalized by the Number Normalization function to the following:

```
tel:+44100 or
```

```
tel:100; phone-context=+CC or NSN domain, for example:
tel:100; phone-context=+44
```

All these SIP URIs are normalized by the Number Normalization function to the following:

```
sip:+44100@operator.co.uk;user=phone or
```




```
sip:100;phone-context=+CC or NSN
domain@operator.co.uk;user=phone, for example:
sip:100; phone-context=+44@operator.co.uk;user=phone
```

4.1.5

OSN

The Operator Service Number (OSN) is a number with significance within an operator network. The Number Normalization function returns the URI with a `phone-context` equal to the OSN context. The OSN context can be set to an OSN domain name or a CC. If a digit map and a local dial plan are supported, the UA is configurable to generate any of the following URIs when the OSN number 133 is dialed:

The following shows an example of basic data for an OSN dial plan:

Data	Dial plan (context)
International CC	+44 (UK)
AC	121 (Birmingham)
UA with AOR	+441215551235 resides in the operator.co.uk domain (or service provider). The UA has a context of Birmingham, defined by the birmingham.operator.co.uk URL.
AOR	+441215551235

Any of the following URIs could be produced when the OSN number 133 is dialed:

```
tel:+44133 sip:+44133@operator.co.uk;user=phone
sip:0044133@operator.co.uk;user=phone
tel:0044133;phone-context=birmingham.operator.co.uk
tel:133
sip:133@operator.co.uk;user=phone
tel:133;phone-context=birmingham.operator.co.uk
sip:133;phone-
context=birmingham.operator.co.uk@operator.co.uk;user=ph
one
tel:133;phone-context=+44121
sip:133;phone-context=+44121@operator.co.uk;user=phone
tel:133; phone-context=+44
sip:133; phone-context=+44@operator.co.uk;user=phone
tel:133; phone-context=co.uk
sip:133; phone-context=co.uk@operator.co.uk;user=phone
```

All these tel URIs are normalized by the Number Normalization function to the following:

```
tel:+44133 or
```



```
tel:133;phone-context= OSN domain name, for example,  
tel:133;phone-context=operator.co.uk
```

All these SIP URIs are normalized by the Number Normalization function to the following:

```
sip:+44133@operator.co.uk;user=phone or sip:133;phone-context=OSN domain name@operator.co.uk;user=phone, for example, sip:133;phone-context=operator.co.uk@operator.co.uk;user=phone
```

4.1.6 Seven-Digit

The seven-digit number is a specific number within the North American Numbering Plan (NANP) that can be used for dialing local phone calls, sometimes known as local format or network format. If the Dialed Number Mapping (DNM) service is activated and the valid license is provided, a mobile subscriber is able to call local number by dialing seven digits number part only. The seven-digit dialing is allowed only if the mobile subscriber calls from the home network area. The dialed number is completed by the DNM service by inserting the USA or Canada Country Code (+1), followed by the three digits local area code, which is known as Numbering Plan Area (NPA), before the dialed number. The resulted number is then being normalized by the Number Normalization service.

For more information about the seven-digit dialing, refer to *MTAS Dialed Number Mapping Management Guide*.

4.1.7 Short-Code

The short-code is a special telephone number that is shorter than a full telephone number, even shorter than the seven-digit number, see Section 4.1.6 Seven-Digit on page 14. The short-code is easier to read and to remember. It can start with any number, including * and # characters. If the DNM service is activated and the valid license is provided, a mobile subscriber is able to dial short-code where the dialed number is replaced with the actual URI (tel URI or SIP URI) dependent on the location from where the mobile subscriber dials the number.

For more information about the short-code dialing, refer to *MTAS Dialed Number Mapping Management Guide*.



5 Contexts

When a non-international number is dialed, there is always some context in which that number is to be interpreted. The following three types of contexts are supported:

- Domain name contexts
- Global number context
- Asserted-identity context

5.1 Domain Name Context

A domain name context can provide a hierarchical structure of contexts. The domain name does not necessarily resolve to a host address.

Geographical domain name context examples are as follows:

- stockholm.se
- dallas.tx.us

Other domain name context examples are as follows:

- ericsson.com
- mainoffice.company.com

5.2 Global Number Phone Context

A global number context can be the leading part of a full international number.

Global phone number context examples are as follows:

- +468 (partial number = Stockholm)
- +1 (partial number = USA)

The “+” is mandatory for a global phone context. If the “+” is not present, then the context is treated as a domain name context.

5.3 Asserted-Identity Context

User phone context can be derived from the following Asserted-Identities:

- Asserted-Identity = P-Asserted-Identity: The SIP Asserted Identity P-Asserted-Identity header field. The Number Normalization function uses

the P-Asserted-Identity context if input URI context is not present in the input URI passed to the Number Normalization.

- Asserted-Identity = `<userIdentity>`: The CAI3G input arrives at XDMS CAI3G Agent with a `<userIdentity>` element on CAI3G.
- Asserted-Identity = X-3GPP-Asserted-Identity: The Ut input arrives at the XDMS XCAP Servlet running directly in an XCAP Web Application with an X-3GPP-Asserted-Identity.

5.4 Context based User=phone Error Correction

During the input validation, the host part of the SIP URI is checked against a list of domain names configured by the `numNormProfileDomNameEr` parameter. User equals phone error correction is done against these domain names, that is, the Number Normalization function inserts a missing `user=phone` parameter in the Input-URI, when the following conditions are met:

- The user part of the Input-URI contains a number.
- The error correction feature is enabled in the `numNormProfileUserEqPhoneEr` parameter.
- The host part of the Input-URI matches an entry in the `numNormProfileDomNameEr` parameter.

With this correction applied, the determination of the URI changes from name to number.

5.5 Context and Context Resolution

The context is used for the following purposes in the Number Normalization:

- Profile resolution: Finding context entry to decide which profile to use.
- `user=phone` error correction: Finding the context entry to apply `user=phone` error correction.
- Normalize context: Finding a context entry to normalize the URI. When a phone context is found, a corresponding configured context must be found to determine how the number is normalized. Because each type of context has a different hierarchical structure, the context resolution procedure is different for each type of context.

5.5.1 Profile Resolution

The Top-Level Domain Country Code (TLDcc) or the CC of the context is used to check the contexts configured against a profile, as shown in Table 1 and Table 2. This is done to select the correct profile.



Table 1 Profile 1 Context Configuration

Configured Profile 1 Context
se
+46
com

Table 2 Profile 2 Context Configuration

Configured Profile 2 Context
uk
+44

Example 1:

Received URI context birmingham.co.uk
Profile selected: 2

Example 2:

Received URI context +448
Profile selected: 2

Example 3:

Received URI context users.operatorX.com
Profile selected: 1

Example 4:

Received URI context +42
Profile selected: none

5.5.2

User=phone Error Correction Context

The context is used to check the contexts configured for known originating sources that have `user=phone` missing in the SIP URI. This is done to correct the `user=phone` missing parameter, see Table 3.

Table 3 User=phone Error Correction Context Configuration

Configured user=phone Error Contexts
operator.stockholm.se
+468
someplace.somewhere.com

Example 1:



URI sip:02412340461;phone-context=+468@operator.stockholm.se

When the `user=phone` parameter is missing, the received URI context `operator.stockholm.se` is checked against the preconfigured contexts shown in Table 3. For the URI “operator.stockholm.se” context, the output SIP URI has the missing `user=phone` parameter added to it.

5.5.3 Normalize Context Resolution

To execute the domain name context resolution:

1. If the domain is present in a list of configured contexts, that context is used and the resolution stops.
2. If there is a subdomain present, it is removed, and step 1 is repeated.
3. If there is no subdomain present, the resolution stops.

In the following examples, the contexts shown in Table 4 are configured.

Table 4 Domain Name Context

Configured Domain Name Context
se
stockholm.se
operatorX.com

Example 1:

```
'Domain Name Context = proxy.stockholm.se';  
'Context selected = stockholm.se'
```

Example 2:

```
'Domain Name Context = operatorY.com';  
'Context selected = none'
```

Example 3:

```
'Domain Name Context = users.operatorX.com';  
'Context selected = operatorX.com'
```

5.5.4 Context Resolution Reduction

To execute the context resolution reduction:

1. Remove all visual separators.



2. If the context is in the list of configured contexts, use that context and resolution stops.
3. Remove the most significant left part of the domain name context.
4. If the resulting context is in the list of configured contexts use that context and resolution stops.
5. Repeat step 4, removing the most significant left part of the domain name context until either a context is found, or there are no digits left in the context.

In the following example, the context shown in Table 5 is configured.

Table 5 Global Phone Context

Configured Phone Context
operator.stockholm.se

Example:

```
'Global Phone Context = host1.operator.stockholm.se' ;
'Context selected = operator.stockholm.se'
```

5.6 Initial URI Error Correction

This correction is performed at the very beginning of URI processing and may be enabled independently of Context based User=phone Error Correction (see Section 5.4 Context based User=phone Error Correction on page 16 and Section 5.5.2 User=phone Error Correction Context on page 17) and Context based Number Normalization. If URI error correction is enabled by the `mtasNumNormApplyUriCorrection` attribute set to 1, the following corrections are applied:

- “user=phone” parameter is added if it is missing in the SIP embedded Tel URI and the user part of the Input-URI contains a number.
- “phone-context” parameter is added if it is missing in the SIP embedded Tel URI or Tel URI that contains a local number. Value of inserted “phone-context” parameter is controlled by `mtasNumNormPcContent` attribute. If set to 0, the domain name associated with the default IMPU of the served user is used. If set to 1, the user provisioned country code and area code is used.
- superfluous “phone-context” parameter is removed if URI contains a global number.

Initial URI error correction is executed before Context based user=phone Error Correction and thus it renders the latter ineffective or unnecessary if executed.





6 Normalization Data

When all the Number Normalization data is set, the table sync parameter must be set to `TRUE`. The cached data is then updated and the table sync set to `FALSE`.

It is not allowed to set the table sync parameter to `TRUE` more frequently than every 15 seconds.

6.1 Configured Profile

The data that is configured for profile “sweden” is shown in Table 6.

Table 6 Configured Profile Data for Profile = Sweden

Profile Name: numNormProfileName	Profile Context: numNormProfileContext
sweden	se
	+46

The data that is configured for profile “United Kingdom” is shown in Table 7.

Table 7 Configured Profile Data for Profile = United Kingdom

Profile Name: numNormProfileName	Profile Context: numNormProfileContext
United Kingdom	uk
	+44

6.1.1 Profile user=phone Configured Data

The data that is configured for profile “sweden” is shown in Table 8.

Table 8 User=phone Contexts for Profile = Sweden

user=phone Error: numNormProfileUserEqPhoneEr	Configured user=phone Error Contexts: numNormProfileDomNameEr	numNormProfileWarningText
1 (TRUE)	0:operator.stockholm.se	Number input not valid.
	1:+468	
	2:someplace.somewhere.se	



The data that is configured for profile “United Kingdom” is shown in Table 9.

Table 9 User=phone Contexts for Profile = United Kingdom

user=phone Error: numNormProfileUse rEqPhoneEr	Configured user=phone Error Contexts: numNorm ProfileDomNameEr	numNormProfileWa rningText
1 (TRUE)	0:redding.operator.co.uk	Number input not valid.
	1:+44141	
	2:somelace.somewhere.co .uk	

6.2 Algorithm Data

Each configured context used for normalizing the URI has the following data associated with it:

- Set of substitution regular expressions
- Set of OSN numbers
- Set of NSN numbers

The substitution regular expressions, set of OSN numbers, and set of NSN numbers are associated with the context through indexing. The data associated with the contexts used for normalizing a URI is detailed in Table 10 and Table 11. The Substitution data is detailed in Table 12 and Table 13. The OSN and NSN data is detailed in Table 14 and Table 15.

Table 10 Contexts and Algorithm Data for Profile = Sweden

Configured Context: numNormCo ntextRule	OSN Data Inde x: numNormCo ntextOsnIndex	NSN Data Index: numNo rmContextNsn Index	Area Code (AC): numNormConte xtSubAreaCode	Substitution Expr ession Index: numNormConte xtSubRulesIndex
+46	osn_operator	nsn_Sweden	8	Sub_Index2
+468	osn_operator	nsn_Sweden	8	Sub_Index2
stockholm.se	osn_operator	nsn_Sweden	8	Sub_Index2
operator.stockh olm.se	osn_operator	nsn_Sweden	8	Sub_Index2
gothenburg.se	osn_operator	nsn_Sweden	3	Sub_Index2
se	osn_operator	nsn_Sweden	8	Sub_Index2



Table 11 Contexts and Algorithm Data for Profile = United Kingdom

Configured Context: numNormContextRule	OSN Data Index: numNormContextOsnIndex	NSN Data Index: numNormContextNsnIndex	Area Code (AC): numNormContextSubAreaCode	Substitution Expression Index: numNormContextSubRulesIndex
+44	osn__UK_operator	nsn_UK		Sub_Index1
+44121	osn__UK_operator	nsn_UK	121	Sub_Index1
co.uk	osn__UK_operator	nsn_UK		Sub_Index1
birmingham.operator.co.uk	osn__UK_operator	nsn_UK	121	Sub_Index1
coventry.operator.co.uk	osn__UK_operator	nsn_UK	24	Sub_Index1

Table 12 Substitution Data Sub_Index1

Index: numNormSubstitutionRuleIndex	Order	Substitution Expression
Sub_Index1	0	0:/^00(.*)\$/+1/:TRUE
	1	1:/^0(.*)\$/+44\1/:TRUE
	2	2:/^(.*)\$/+44\$AC\1/:TRUE

Table 13 Substitution Data Sub_Index2

Index: numNormSubstitutionRuleIndex	Order	Substitution Expression
Sub_Index2	0	0:/^00(.*)\$/+1/:TRUE
	1	1:/^0(.*)\$/+46\1/:TRUE
	2	2:/^(.*)\$/+46\$AC\1/:TRUE

Table 14 OSN Data

OSN Index: numNormOsnDataIndex	OSN Context 0: numNormOsnDataContextAndNumbers	OSN Number 1: numNormOsnDataContextAndNumbers	OSN Number 2: numNormOsnDataContextAndNumbers	OSN Number 3: numNormOsnDataContextAndNumbers	OSN Number 4: numNormOsnDataContextAndNumbers
osn_operator	0:operator.se	1:124	2:125	3:\+46124	4:/^0046124\$/+46124/
osn_operator	0:operator.co.uk	1:152	2:153	-	-



Table 15 NSN Data

NSN Index: numNormNsnDataIndex	NSN Context 0: numNormNsnDataNumbers	NSN Number 1: numNormNsnDataNumbers	NSN Number 2: numNormNsnDataNumbers
nsn_Sweden	0:+46	1:192	2:133
nsn_UK	0:+44	1:156	2:157

6.3 Localness Exemption Configuration

This section describes how to configure the numbers that must be skipped from localness check.

The Managed Object Class `MtasNumNormLocalnessExemptNumber` is present in the MO `NumNormList`.

```
dn:MtasNumNormLocalnessExemptNumber=UserAssignedString
NumNormList=0
MtasMmt=0
MtasServices=0
applicationName=MtasFunction
nodeName=jambala
```

6.3.1 MtasNumNormLocalnessExemptNumber

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

The value of the `mtasNumNormLocalnessExemptNumber` Attribute (Primary Key) is the normalized number that must be skipped from localness check.

Examples:

`MtasNumNormLocalnessExemptNumber` attribute value: 1234567001

`MtasNumNormLocalnessExemptNumber` attribute value: 1234567100

6.4 Configuration Examples

The following sections show examples on how to configure local, national, and international SIP and tel URIs.

6.4.1 Tel URI Local Number

This section shows an example on configuration using a local number, for more information see Table 16.



Table 16 *Local Stockholm Number*

Incoming Request URI:
<code>tel:7195523;phone-context=stockholm.se</code>
After Normalization:
<code>tel:+4687195523</code>

Profile selected = sweden
 Configured context = stockholm.se
 Substitution expression = Sub_Index2
 OSN data index = osn_operator
 NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits do not match 00.
- Leading digits do not match 0.
- Match found. +46\$AC is prepended to the local number.

6.4.2

Tel URI National Number

This section shows an example on a configuration using a national number, for more information see Table 17.

Table 17 *User in Stockholm Dials a Gothenburg Number*

Incoming Request URI:
<code>tel:0317195523;phone-context=stockholm.se</code>
After Normalization:
<code>tel:+46317195523</code>

Profile selected = sweden



Configured context = stockholm.se
Substitution expression = Sub_Index2
OSN data index = osn_operator
NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits do not match 00.
- Leading digits match 0, replace 0 with +46.

6.4.3 Tel URI International Number

This section shows an example on a configuration using an international number, for more information see Table 18.

Table 18 User in Stockholm Dials a UK Number

Incoming Request URI: <code>tel:0044121123456878;phone-context=stockholm.se</code>
After Normalization: <code>tel:+4412112345678</code>

Profile selected = sweden
Configured context = stockholm.se
Substitution expression = Sub_Index2
OSN data index = osn_operator
NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.



- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits match 00, replace 00 with “+”.

6.4.4 SIP URI Embedded tel, Local Number

This section shows an example on a configuration using a local number, for more information see Table 19.

Table 19 SIP URI Embedded tel, Local Number

Incoming Request URI:
<code>sip:7195523;phone-context=stockholm.se@stockholm.se</code>
After Normalization:
<code>tel:+4687195523@stockholm.se;user=phone</code>

Profile selected = sweden
 Configured context = stockholm.se
 Substitution expression = Sub_Index2
 OSN data index = osn_operator
 NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits do not match 00, go to next rule.
- Leading digits do not match 0, go to next rule.
- Match found. +46\$AC is prepended to the local number.



6.4.5 SIP URI Embedded tel, National Number

This section shows an example on a configuration using a national number, for more information see Table 20.

Table 20 SIP URI Embedded tel, National Number

Incoming Request URI: <code>sip:087195523;phone-context=gothenburg.se@gothenburg.se</code>
After Normalization: <code>sip:+4687195523@stockholm.se;user=phone</code>

Profile selected = sweden
Configured context = gothenburg.se
Substitution expression = Sub_Index2
OSN data index = osn_operator
NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “gothenburg.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits do not match 00, go to next rule.
- Match found, replace 0 with “+46”.

6.4.6 SIP URI Embedded tel, International Number

This section shows an example on a configuration using an international number, for more information see Table 21.



Table 21 *User in Stockholm Dials a UK Number*

<p>Incoming Request URI:</p> <pre>sip:004412112345678;phone-context=stockholm.se@stockholm.se</pre>
<p>After Normalization:</p> <pre>sip:+4412112345678@stockholm.se;user=phone</pre>

Profile selected = sweden
 Configured context = stockholm.se
 Substitution expression = Sub_Index2
 OSN data index = osn_operator
 NSN data index = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- Substitution rules “Sub_Index2” used to normalize, see Table 13.
- Leading digits match 00, replace 00 with “+”.

6.4.7 OSN Number tel, Local Number

This section shows an example on a configuration using an operator OSN number 124, for more information see Table 22.

Table 22 *User Dials an Operator OSN Number 124*

<p>Incoming Request URI:</p> <pre>tel:124;phone-context=stockholm.se tel:124;phone-context=operator.stockholm.se tel:124;phone-context=.se tel:124;phone-context=gothenburg.se tel:124;phone-context=+46 tel:124;phone-context=+468</pre>
<p>After Normalization:</p> <pre>tel:124;phone-context=operator.se</pre>



Profile selected = sweden
Configured context = stockholm.se
Substitution expression = Sub_Index2
OSN data index = numNormOsnDataIndex = osn_operator
NSN data index = numNormNsnDataIndex = nsn_Sweden
Context OSN data index = numNormContextOsnIndex = osn_operator
Context NSN data index = numNormContextNsnIndex = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request digits match the OSN number 124.
- Context “operator.se” applied to output normalized URI.

6.4.8

OSN Number tel, International Number

This section shows an example on a configuration using an operator OSN number 124, for more information see Table 23.

Table 23 User Dials an Operator OSN Number 124

Incoming Request URI: tel:+46124;phone-context=stockholm.se tel:0046124;phone-context=operator.stockholm.se
After Normalization: tel:+46124;phone-context=operator.se

Profile selected = sweden
Configured context = stockholm.se
Substitution expression = Sub_Index2
OSN data index = numNormOsnDataIndex = osn_operator
NSN data index = numNormNsnDataIndex = nsn_Sweden
Context OSN data index = numNormContextOsnIndex = osn_operator
Context NSN data index = numNormContextNsnIndex = nsn_Sweden

The following events occur:

- The incoming request context matches profile “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request digits match the OSN number rules +46124 or 0046124, see Table 14.



- Context “operator.se” applied to output normalized URI.

6.4.9 NSN Number tel, Local URI

This section shows an example on a configuration using an operator NSN number 133, for more information see Table 24.

Table 24 User Dials an Operator NSN Number 133

<p>Incoming Request URI:</p> <pre>tel:133;phone-context=+46 tel:133;phone-context=+468 tel:133;phone-context=operator.stockholm.se</pre>
<p>After Normalization:</p> <pre>tel:133;phone-context=+46</pre>

Profile selected = sweden
 Configured context = stockholm.se
 Substitution expression = Sub_Index2
 OSN data index = numNormOsnDataIndex = osn_operator
 NSN data index = numNormNsnDataIndex = nsn_Sweden
 Context OSN data index = numNormContextOsnIndex = osn_operator
 Context NSN data index = numNormContextNsnIndex = nsn_Sweden

The following events occur:

- The incoming request context matches profile context “sweden”, see Table 6.
- The incoming request context matches context “stockholm.se”, see Table 10.
- The incoming request leading digits do not match any OSN numbers configured, see Table 14.
- The incoming request digits match the NSN number 133.
- Context “+46” is applied to output normalized URI.

6.4.10 NSN Number SIP URI

This section shows an example on a configuration using an operator NSN number 133, for more information see Table 25.

*Table 25 User Dials an Operator NSN Number 133*

Incoming Request URI: tel:133;phone-context=stockholm.se tel:133;phone-context=operator.stockholm.se tel:133;phone-context=.se tel:133;phone-context=gothenburg.se tel:133;phone-context=+46 tel:133;phone-context=+468
After Normalization: tel:133;phone-context=operator.se

Profile selected = sweden

Configured context = stockholm.se

Substitution expression = Sub_Index2

OSN data index = numNormOsnDataIndex = osn_operator

NSN data index = numNormNsnDataIndex = nsn_Sweden

Context OSN data index = numNormContextOsnIndex = osn_operator

Context NSN data index = numNormContextNsnIndex = nsn_Sweden

The following events occur:

- The incoming request context matches profile context “sweden”, see Table 6.
- The incoming request context matches context “+46”, see Table 10.
- The incoming request leading digits do not match any NSN numbers configured, see Table 15.
- The incoming request digits match the NSN number 133.
- Context “+46” is applied to output normalized URI.



7 Example Logic for Parameters Passed to Number Normalization Common Component from MTAS

The following sections detail the behavior of the Number Normalization Common Component based on what the MTAS passes to it. The following attributes are described:

- `mtasNumNormPcRemoval`
- `mtasNumNormPcContent`

The `mtasNumNormPcRemoval` attribute controls if the Phone-Context present in the URI is to be removed or not. If it is removed, the subscriber context (CC and AC) associated with the subscriber is considered as a higher priority context for normalization of the URI. If it is not removed, the URI context is considered as a higher priority for normalization of the URI.

The `mtasNumNormPcContent` attribute controls which context that is to be used to normalize the URI if set to 0, the context associated with the default IP Multimedia Public Identity (IMPU) is used. If set to 1, the subscriber's provisioned +CC-AC context is used to normalize the URI.

The following examples are described:

- Using Phone-context in URI to Behavior
- Using Context of P-Asserted-Identity to Normalize
- Using Phone-context in Request URI, context = CC-AC also Provided
- Using CC-AC Provided to Normalize

When the MTAS is unable to normalize the number because the `numNormProfileContext` does not exist, it does not reject the call with 400 bad request. Other nodes in the network are able to normalize the number even if MTAS has failed.

The Number Normalization Common Component must be appropriately configured for the various examples, see Section 7.1 Phone-context in URI to Behavior Use on page 34 to Section 7.4 CC-AC provided to Normalize Use on page 35.

For more information about the Number Normalization Common Component parameters, refer to *Managed Object Model (MOM)*.



7.1 Phone-context in URI to Behavior Use

The Number Normalization Common Component normalizes the URI using the phone-context present in the URI. The Number Normalization Common Component must have the context configured.

If the `mtasNumNormPcRemoval` attribute is set to 0, the context present in the URI is not removed. The R-URI is passed to the Number Normalization Common Component, the context is used by the Number Normalization to normalize the URI.

If the `mtasNumNormPcContent` attribute is set to 0, the P-Asserted-Identity is passed to the Number Normalization Common Component. If no context is available in the Request URI, then the domain name in the P-Asserted-Identity is used by Number Normalization to normalize the Request.

7.2 Context of P-Asserted-Identity to Normalize Use

The Number Normalization Common Component normalizes the URI using the context of the P-Asserted-Identity passed to it. The Number Normalization Common Component must have the context configured in the P-Asserted-Identity.

If the `mtasNumNormPcRemoval` attribute is set to 1, the context present in the Request URI is removed. The Request URI without the context is passed to Number Normalization Common Component.

If the `mtasNumNormPcContent` attribute is set to 0, the P-Asserted-Identity is passed to Number Normalization. If no context is available in the Request URI, then the domain name in the P-Asserted-Identity is used by Number Normalization Common Component to normalize the Request.

7.3 Phone-context in Request URI, context = CC-AC Also provided Use

The Number Normalization Common Component normalizes the URI using the phone-context present in the URI. The Number Normalization Common Component must have the context configured.

If the `mtasNumNormPcRemoval` attribute is set to 0, the context present in the Request URI is not removed in the Request URI. The context is used by Number Normalization to normalize the request URI.

If the `mtasNumNormPcContent` attribute is set to 1, the Country Code and Area Code (CC-AC) that was retrieved from the HSS is passed to Number Normalization. If no context is available in Request URI, then the CC-AC is used to normalize the Request URI.



7.4 CC-AC provided to Normalize Use

The Number Normalization Common Component normalizes the URI using the Country Code and Area Code (CC-AC). The Number Normalization Common Component must have the CC-AC context configured.

If the `mtasNumNormPcRemoval` attribute is set to 1, the context present in the Request URI is removed in the Request URI. The Request URI without the context is passed to the Number Normalization to be normalized.

If the `mtasNumNormPcContent` attribute is set to 1, the CC-AC that was retrieved from the HSS (Get Data) is passed to the Number Normalization. The CC-AC is used to normalize the Request URI.