Customer Calling Party Number Standards

November 2022

Introduction

The purpose of this document is to convey to Lumen customers the standards for calling party number that needs to be delivered within the Lumen network. This is due to the introduction of the FCC's mandate regarding Robocall Mitigation methods, such as STIR and SHAKEN, to ensure the proper formatting of calling party number which is critical to the completion and delivery of customer traffic. Additional information on STIR and SHAKEN can be found on the Federal Communication Commission website www.fcc.gov/call-authentication.

The information described in this document will apply to both called and calling number information. Numbering information must be consistently passed within the Lumen network and to and from other carriers for STIR and SHAKEN to be effective. Carriers are moving to the use of E.164 format when exchanging VoIP traffic. E.164 is an international standard (ITU-T recommendation) that defines a numbering plan for the worldwide public switched telephone network (PSTN). The format and values of the calling and called information when traffic is exchanged between carriers must precisely match the format and values when traffic is signed.

Calling party numbers for North American customers must be delivered between carriers in a globalized E.164 format. Customer CPE must deliver calling party number to the LUMEN network in a consistent manner.

The following gives a quick overview of the formats to which the customer's traffic must adhere to insure reliable delivery to the terminating end:

- E.164 trunks: The FROM header must start with '+'
- Non-E.164 trunks: The FROM header must start with a number 2-9
- SIP interfaces using Globalized E.164 Format must be of the form
  - +1NPANXXXXXX where 1 represents the North American Country Code
    - E.g., +17208881000
- SIP interfaces not using Globalized E.164 Format must be of the form
  - NPANXXXXXX
    - E.g., 7208881000
- SIP interface EXCEPTIONS – certain 'key' words found in SIP RFCs and standards are allowed. These values are case sensitive:
  - ANONYMOUS Anonymous anonymous
  - RESTRICTED Restricted restricted
  - UNKNOWN Unknown unknown
  - UNAVAILABLE Unavailable unavailable
- PRI interfaces using 10 digit calling party numbers
  - NPANXXXXXX with Type of Number set to National
    - E.g., 7208881000

The calling party number on SIP interfaces may be provided in the Diversion, From, P-Asserted-Identity, P-Preferred-Identity or Remote-Party-ID headers.

Customers may **not** send alpha characters in the user portion of the SIP URI in the Diversion, From, P-Asserted-Identity, P- Preferred-Identity or Remote-Party-ID headers. If the originating customer seeks to restrict the calling party number from delivery to the terminating customer, the originating CPE must send a Privacy header with value 'id'.

Terminology

Type	Information
CC	Country Code
CDR	Call Detail Record
CNAM	Calling Name
DTMF	Dual Tone Multi Frequency
GSX	Sonus Media Gateway / Media Gateway Controller
IAM	Initial Address Message
IBTF	Inbound Toll Free
ISUP	Integrated Services Digital Network User Part
NDC	National Destination Code
NPA	Numbering Plan Area or Area Code
NXX	Number Exchange or Office Code
PAI	P-Asserted-Identity
PPI	P-Preferred-Identity
PRI	Primary Rate Interface
PSTN	Public Switched Telephone Network
RPID	Remote-Party-Identification
SIP	Session Initiation Protocol
SN	Subscriber Number
SS7	Signaling System 7
TN	Telephone Number

Standards

Number structures in SIP

This section describes the acceptable number structures for SIP interfaces. The described formats apply to the following SIP headers:

- IP URI
- FROM
- TO
- CONTACT
- Diversion Header
- P-Asserted-Identity
- Remote-Party-Identity
- P-Preferred-Identity

All headers in a SIP message must use the same format.

Lumen determines the calling party in a precedence order based on what SIP parameters are presented to the network. The precedence order for determining calling party numbers is as follows:

- Diversion Header
- P-Asserted-Identity
- P-Preferred-Identity
- Remote-Party-Identity
- From

RISK: Alpha characters must **not** be placed in the user portion of the SIP URI. Doing so may cause failure or blocking of a call.

E.164 and SIP

The preferred method of signaling in SIP utilizes a globalized E.164 format. E.164 is described as:

+CC NDC SN

+ is a leading indicator that the subsequent digits are in a globalized E.164 format

CC is 1 – 3 digits

NDC + SN is [15 – n] digits in length, where n is the length of the country code

CC NDC SN contains a maximum of 15 digits.

When using a North American dial plan the format is:

+CCNPANXXXXXX

Where CC is the country code value 1

NPANXXXXXX is the national number

- NPA = Area Code
- NXX = Exchange
- XXXX = Station ID

Non-E.164 format

The calling and called numbers may be expressed in non-E.164 format if those numbers are North American numbers. This may be applied to PRI or SIP based originations.

International called numbers must still follow the E.164 format. However, on SIP interfaces, international numbers must be presented without the leading '+' indicating the globalized format.

Note: The LUMEN network will globalize all values when received in non-E.164 format.

North American numbers will be presented without the lead 1.

North American number format:

NPANXXXXXX
Ex: 2144985984

When using non-globalized E.164 format and the called number is an international non-North American number it must be prefixed with 011.

Note: Because SIP does not support nature of address or type of number, any international number that is 10 digits in length may be misrouted as a North American call. This is why the preferred method of signaling with SIP is globalized E.164 that includes the leading '+'.

PRI interfaces

PRI must present North American calling party numbers in a 10-digit format. The type of number must be set to National Number. Calling numbers will be similar to the following examples:

- NPANXXXXXX example 2418810000

When placing outbound international calls on PRI, the called number must be sent as follows:

- CC NDC SN with ISDN called party type of number set to International
  - Ex. called number 442077919999
  - 011 may be prefixed on the international number when TON is set to International
- 011 CC NDC SN if the type of number is not specifically set
  - Ex. called number 01144207791999

Customers using ISDN PRI and wishing to restrict the presentation of their calling numbers must follow North American telephony standards and utilize Calling Party Information Element Presentation Indicator as described in ITU-T Q.931.

Calling line ID privacy

Customers wishing to restrict the presentation of their calling numbers must follow North American telephony standards and utilize the privacy header as described in RFC 3225. Customer must comply with all applicable local laws as they determine privacy indicator settings. Lumen will be passing what we receive as we may not know the customer's authorization to set the indicator.

933 emergency testing service

Included with select business products such as Voice Complete, Hosted VoIP, and SIP Trunking, the 933 service allows you to dial 933 to confirm your information is accurate with emergency services without ever dialing 911. Before this service is available, installation must be completed and the corresponding order must be closed.

If your calling party number fails the compliance standards outlined in this document, it will also fail to route properly for 911 calls. As such, once your order closes, this service can also be used to provide real-time feedback on CPN data format.

For more details including a list of qualifying products, and how and when to use this service, refer to 933 Emergency Testing Service: Frequently Asked Questions.

Appendix

An example where the called and calling information are all North American numbers:

INVITE sip:+12488845678@192.168.53.33:5060;dtg=SIPP_1.20.39.41 SIP/2.0
From: <sip:+12032015000;verstat=TN-Validation
Passed@192.168.122.33:5060;otg=BRMNEUAS03>;tag=gK020010a2
To: <sip:+12488845678@192.168.53.33:5060>
Contact: <sip:+12032015000@192.168.122.33:5060>
P-Asserted-Identity: <sip:+12032015000@192.168.122.33:5060>

An example where the called number is non-North American international number and the calling number is a North American national number:

INVITE sip:+442077919999@192.168.53.33:5060;dtg=SIPP_1.20.39.41 SIP/2.0
From: <sip:+12032015000;verstat=TN-Validation
Passed@192.168.122.33:5060;otg=BRMNEUAS03>;tag=gK020010a2
To: <sip:+442077919999@192.168.53.33:5060>
Contact: <sip:+12032015000@192.168.122.33:5060>
P-Asserted-Identity: <sip:+12032015000@192.168.122.33:5060>

An example where the called and calling information is all North American numbers and the signaling format is NOT globalized E.164 format:

INVITE sip:2488845678@192.168.53.33:5060;dtg=SIPP_1.20.39.41 SIP/2.0
From: <sip:2032015000;verstat=TN-Validation
Passed@192.168.122.33:5060;otg=BRMNEUAS03>;tag=gK020010a2
To: <sip:2488845678@192.168.53.33:5060>
Contact: <sip:2032015000@192.168.122.33:5060>
P-Asserted-Identity: <sip:2032015000@192.168.122.33:5060>

An example where the called number is non-North American international number and the calling number is a North American national number, and the format is NOT globalized E.164 format:

INVITE sip:011442077919999@192.168.53.33:5060;dtg=SIPP_1.20.39.41 SIP/2.0
From: <sip:2032015000;verstat=TN-Validation
Passed@192.168.122.33:5060;otg=BRMNEUAS03>;tag=gK020010a2
To: <sip:442077919999@192.168.53.33:5060>
Contact: <sip:2032015000@192.168.122.33:5060>

Example INVITE with a privacy header

INVITE sip:+12488845678@192.168.53.33:5060;dtg=SIPP_1.20.39.41 SIP/2.0
From: <sip:+12032015000;verstat=TN-Validation
Passed@192.168.122.33:5060;otg=BRMNEUAS03>;tag=gK020010a2
To: <sip:+12488845678@192.168.53.33:5060>
Contact: <sip:+12032015000@192.168.122.33:5060>
P-Asserted-Identity: <sip:+12032015000@192.168.122.33:5060>
Privacy: id