E911 Fundamentals with IQ SIP Trunk
&
Required Hardware Configurations for Customer Premise Equipment

UNDERSTANDING SITES/GROUPS AND PPU'S.

- Each Primary Place of Use (PPU), also known as a group or site has a group number identified as the phone number that will be utilized as the calling line ID for any 911 call from that PPU.
- If the phone number is ported to CenturyLink, the customer admin is required to do a follow up reconfiguration in the portal to swap out any temporary phone numbers configured by the system designer.
- Customer can have one phone number per location at no charge that can be identified as the 911 Group Calling line ID.
- Each telephone number associated with a particular location will use that same identified 911 Group Calling line ID number.
- Any additional numbers that you wish to have CenturyLink register for mobility or adding location level data (limit of 20 characters) with our 911 carrier from that site will have a nominal monthly fee per number.
- Out pulsing a toll-free number or a non CenturyLink number not inventoried in the same enterprise/tenant is considered an alien telephone number. When calling 911 from an alien number, the customer will be charged a minimum fee of $75 per call since these calls are sent to the National Call Center with no address information.
- **This is a contract violation and a public safety risk** since these alien telephone numbers route to a national 911 call center with no address identifier.

CRITICAL PUBLIC SAFETY BULLITEN:
Required 911 Settings for IQ SIP Trunk

Customer Premise Hardware Settings for 911

In order for 911 to work properly, there are several headers that must be formatted with the proper information in the customer premise hardware.

- Each ‘Group’ (Site/Place of Primary Use also known as a PPU) is configured with ONE phone number to be used for 911 services this is called the “Group Caller ID” number. All member telephone numbers share the 911 address assigned to that one phone number.

- If the Invite is not formatted properly, the Group Caller ID number will not be delivered to the 911 Operator and the address information is not automatically provided. **This creates a public safety concern as the caller will not get routed automatically to the correct end office and they cannot see the location of the caller. So that caller must be speaking to tell the operator where they are located and that call is then transferred causing response delays.**

- SIP traffic for each trunk (including 911) must use the Pilot Number TN as the PAI.

- The source IP + Port of the registration must be used as the source IP + Port of all subsequent SIP traffic for that trunk.

- The host portion of SIP URI for the From, To and PAI SIP Invite Headers must be the customer domain provisioned in the VoIP portal.

See the Chart on the next slide for specific detailed instructions.

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Customer Premise Hardware Settings for 911

SIP Header	Userinfo or Username	Host Portion of SIP URI or Realm
From	IQ SIP User TN	Customer Domain provisioned in CenturyLink
From Example	4782723710	voip.centurylink.com
From: <sip:4782723710@voip.centurylink.com>;tag=4247F498-864		
To	Dialed Number	Customer Domain provisioned in CenturyLink
To Example	911	voip.centurylink.com
To: <sip:911@voip.centurylink.com>		
P-Asserted-Identity	Pilot TN	Customer Domain provisioned in CenturyLink
PAI Example	9132756079	voip.centurylink.com
P-Asserted-Identity: <sip:9132756079@voip.centurylink.com>		
Authorization	Username is the Trunk Unique Username provisioned in Centurylink	Customer Domain provisioned in CenturyLink
Authorization Example	Digest username="257389-9132756079"	realm="voip.centurylink.com"
Authorization: Digest username="257389-9132756079",realm="voip.centurylink.com",uri="sip:911@voip.centurylink.com:5100",response="167fa3a0ab7669b23426620895a 6c2ae",nonce="BroadWorksXiok8lubtTf9vnl8BW",cnonce="6DA143DD",qop=auth,algorithm=MD5,nc=00000001		
Contact		Source IP & Port (Customer IP & Port)
Contact Example		63.157.48.130:5060
Contact: <sip:4782723710@63.157.48.130:5060>		

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SIP INVITE to CTL – 911 Example -> Correct Format

```
INVITE sip:911@voip.centurylink.com:5100 SIP/2.0
Via: SIP/2.0/UDP 63.157.48.130:5060;branch=z9hG4bK40368BD39C
From: <sip:4782723710@voip.centurylink.com>;tag=4247F498-864
To: <sip:911@voip.centurylink.com>
Date: Mon, 23 May 2016 16:38:29 GMT
Call-ID: 9D25A89A-203B11E6-B17ADA0D-8951F420@63.157.48.130
Supported: rel100,timer,resource-priority,replaces,histinfo,sdp-anat
Min-SE:  1800
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER
CSeq: 102 INVITE
Timestamp: 1464021509
Contact: <sip:4782723710@63.157.48.130:5060>
History-Info:  <sip:911@voip.centurylink.com:5100>;index=1,<sip:911@voip.centurylink.com:5100>;index=2
Expires: 180
Allow-Events:  telephone-event
Authorization:  Digest username="257389-
9132756079",realm="voip.centurylink.com",uri="sip:911@voip.centurylink.com:5100",response="167fa3a0ab7669b23426620895
a6c2ae",nonce="BroadWorksXiok8lubtTf9vnl8BW",cnonce="6DA143DD",qop=auth,algorithm=MD5,nc=00000001
Max-Forwards: 68
P-Asserted-Identity:  <sip:9132756079@voip.centurylink.com>
Session-Expires:  1800
Content-Type: application/sdp
Content-Disposition:  session;handling=required
Content-Length: 285

SDP was removed from this Invite
```

iQ SIP User TN

Source IP & Port

Customer Domain

Trunk Unique Username

Pilot TN

The **From Header** matches the User information in the Portal ---- >> TN@CustomerDomain
In this case, that is 4782723710@voip.centurylink.com

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SIP INVITE to CTL – 911 Example -> Incorrect Format

```
INVITE sip:911@voip.centurylink.com:5100 SIP/2.0
Via: SIP/2.0/UDP 63.157.48.130:5060;branch=z9hG4bK40368BD39C
From: <sip:4782723710@67.14.90.84>;tag=4247F498-864
To: <sip:911@voip.centurylink.com>
Date: Mon, 23 May 2016 16:38:29 GMT
Call-ID: 9D25A89A-203B11E6-B17ADA0D-8951F420@63.157.48.130
Supported: rel100,timer,resource-priority,replaces,histinfo,sdp-anat
Min-SE: 1800
Allow: INVITE, OPTIONS, BYE, CANCEL, ACK, PRACK, UPDATE, REFER, SUBSCRIBE, NOTIFY, INFO, REGISTER
CSeq: 102 INVITE
Timestamp: 1464021509
Contact: <sip:4782723710@63.157.48.130:5060>
History-Info: <sip:911@voip.centurylink.com:5100>;index=1,<sip:911@voip.centurylink.com:5100>;index=2
Expires: 180
Allow-Events: telephone-event
Authorization: Digest username="257389-
9132756079",realm="voip.centurylink.com",uri="sip:911@voip.centurylink.com:5100",response="167fa3a0ab7669b23426620895
a6c2ae",nonce="BroadWorksXiok8lubtTf9vnl8BW",cnonce="6DA143DB",qop=auth,algorithm=MD5,nc=00000001
Max-Forwards: 68
P-Asserted-Identity: <sip:9132756079@voip.centurylink.com>
Session-Expires: 1800
Content-Type: application/sdp
Content-Disposition: session;handling=required
Content-Length: 285

SDP was removed from this Invite
```

iQ SIP User TN

Source IP & Port

Customer Domain

Trunk Unique Username

Pilot TN

The From Header MUST match the User information in the Portal ---- >> TN@CustomerDomain

In this example, that would be
4782723710@voip.centurylink.com
It cannot be sent as 4782723710@67.14.90.84

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Example Group Caller ID

Here is the Group Name and the Group Caller ID for the example shown on the previous 2 slides

TN/Calling Party: 478-272-3710
Group Name: CUSTOMER EXAMPLE 0225 (a-18005)
Group Caller ID: 478-488-3751

Once the invite from SIP Header is corrected, the Group Caller ID for each Group will be sent to the 911 Operator upon receiving a call. This will allow the 911 Operator to receive the correct information and address.

Cisco CUBE Example – Voice Class SIP-Profile

Here is an example of a Voice Class SIP-Profile CUBE configuration for modifying the host portion of the SIP URI in the From Header to utilize the CenturyLink domain:

Voice class sip-profiles 100 request REGISTER sip-header from modify "198.36.149.80" "voip.centurylink.com”

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