MiVoice Connect

RAY BAUM'S General Overview and Solution Deployment Guide for Intrado

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Mitel®

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TRADEMARKS

Contents

Kari's Law and RAY BAUM'S Act

In August 2019, the United States Federal Communications Commission (FCC) adopted rules for implementing two federal laws that strengthen emergency calling; Kari's Law and Section 506 of RAY BAUM'S Act.

The Multi-line Telephone Systems – Kari's Law and RAY BAUM'S Act 911 Direct Dialing, Notification, and Dispatchable Location Requirements is described in the following link.

https://www.fcc.gov/mlts-911-requirements

FAQ about RAY BAUM can be found at the following link. https://www.fcc.gov/files/mltsfaqspdf.

Introduction of MIVC Support for Section 506 of RAY BAUM'S Act and Kari's Law

MiVoice Connect implements Section 506 of RAY BAUM'S Act and Kari´s law support in conjunction with third-party Next Generation of 911 (NG911) emergency service providers. In this document, Section 506 of RAY BAUM'S Act and Kari´s law is called RAY BAUM for simplification.

MiVoice Connect is integrated with two well-known Next Generation 911 (NG911) service providers in USA; RedSky and Intrado.

MiVoice Connect can be preconfigured for direct dialing of emergency 911 calls without having to dial any prefix or access code. The 911 calls are sent through SIP trunk to the NG911 service provider selected by the customer and then, after validating the civic address, the call is redirected to the public safety answering points (PSAPs).

The notification system is provided by the NG911 service provider and uses email or SMS notifications.

MiVoice Connect has an Emergency Notification application that provides notification in emergency scenario to dedicated users, and this can be used in conjunction with NG911 notification through email or SMS messaging which give more granular location information. Mitel Emergency application provides location information based on the Jack number configuration in Connect Director and the NG911 service provider notification will provide location information based on what is configured in the location information service (LIS) database and presented to PSAP. If the administrator can sync the dynamic location properly to the **Jack #** field in the **Users** page in Connect Director, then the existing emergency application can also satisfy Kari's law.

MIVC - RAY BAUM High Level Architecture with Intrado

There are a few options customers will have on how they implement their solution to meet the RAY BAUM'S Act. The option selected would be primarily tied to the type of deployment in place, such as:

- The size of the physical location site. If small enough, might only be one dispatchable location.
- Deployment is purely on-premises
- The deployment includes off-premises endpoints

Based on above requirements, the customer might:

- Need not upgrade, but rather use existing CESID mappings to allow for automatic move detection of IP phones.
- Need to upgrade to apply the new CESID mappings.
- Need to upgrade to apply the new CESID mappings. Also, must integrate with a third-party vendor.

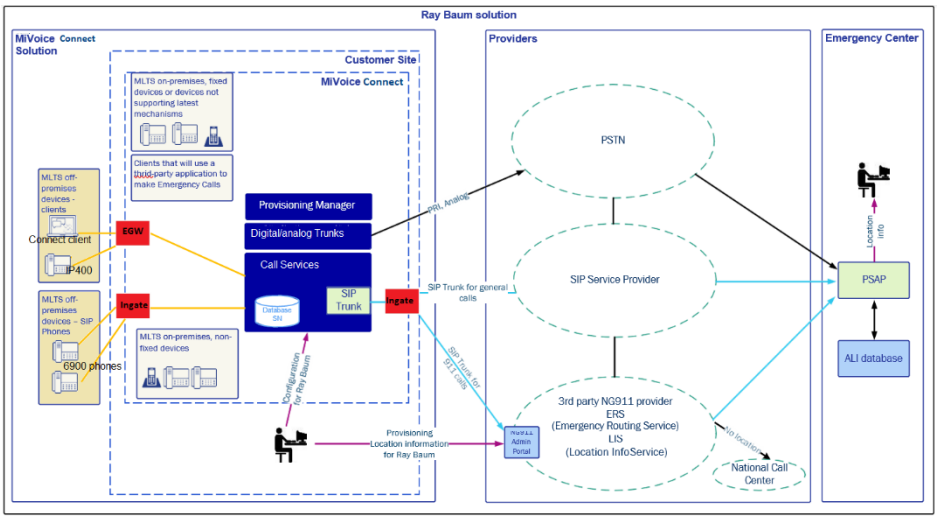
To help illustrate the options, consider a customer with a large physical deployment that will require more than one dispatchable location. For example, a single floor of a large building might require four dispatchable locations, one to cover each corner:

1. Customer has only on-premises IP4xx and/or 69xx and/or DECT devices. In this situation, the customer can order the required number of CESIDs (four in this example) from their service provider (provided the cost of CESID is less than the cost required to integrate with 3rd party NG911 vendor) and use the existing IP range and/or L2 CESID mapping features available on MiVoice Connect system without the need for any upgrade. Enabling these features provides a dynamic location update if the device is moved by the user within the premises.
2. If the customer adds Connect Client softphones on laptops or mobile phones or any kind of remote Teleworkers to their solution, the customer must upgrade and integrate with a Mitel-verified third-party vendor.

The solution required for third-party NG911 vendor integration will be discussed further in this document, while describing using the RAY BAUM feature without integrating NG911 vendors.

The following figure provides a high-level view of the MiVoice Connect RAY BAUM architecture.

Figure 1 : MiVC system onsite - RAY BAUM high-level architecture



The MiVoice Connect RAY BAUM solution is composed of the components that are described in the following sections.

- Intrado
- Edge Gateway

Intrado

A valid commercial agreement with Intrado is required. Part of setting up this agreement involves:

- Pre-authorization of the external internet address of Ingate(s) by Intrado.
- Identification of the following transport protocols to use with Intrado:
  - UDP on port 5060
  - TCP on port 5060

  Note: Currently, Intrado does not support TLS.

From this agreement, you must obtain the following information from Intrado:

- Pre-authorization of the external Internet address of the Ingate(s) used by Intrado.
- License to use the Extension Bind feature, if required.
- Intrado SIP Gateways - Primary and secondary SIP gateways using UDP (5060) that MiVoice Connect/Ingate will use for emergency calls. These gateways must be preconfigured and tested during the implementation and integration between MiVoice Connect and Intrado. The number 933 can be used as the test number.
- 911 Location Manager - Intrado-provided application that runs along-side select devices based on the requirement and device type.
- HELD URL - This is used by some devices to update their location directly on the Intrado location information service (LIS).
- Intrado Emergency Routing Service Portal - The main configuration portal for Intrado. You must use this portal to:
  - Define Locations
  - Define Subscribers (used to uniquely identify a caller and extension number)
  - Obtain account ID - This is used by Intrado to isolate one organization's locations from those of another. This is found in the **Administration** > **Authentication Token** page in the Intrado Portal. This must be configured as the organization ID in the MiVoice Connect **HELD Configuration** page and the SIP profile page in Connect Director.
  - Provide HELD+ Token - This is used by Intrado to authenticate client access to the Intrado LIS. This information is also available in the **Administration** > **Authentication Tokens** page in the Intrado portal. This must be configured as the parameter in the **Sites** > **HELD** parameter page in Connect Director. This token is used by Intrado to validate the HELD requests.

Edge Gateway

Edge Gateway is used for enabling Teleworker support for IP 400-Series phones and Connect Client.

Ingate SIParator

- Acts as Session Border Controller (SBC) and enables SIP trunking to and from the NG911 service provider.
- Enables Teleworker support for 6900-Series phones. (In pipeline for 2022 release).
- MiVoice Connect can be directly integrated, with or without using Ingate, to Intrado vendor using MIVC trunk switches. However, the deployment with Ingate is suggested for flexibility, security, and management.

MiVoice Connect

The following are the major network elements of MiVoice Connect:

- Provisioning interface
- Call servers
- SIP peer for Ingate

- Trunking nodes for PSTN or SIP trunks

MiVoice Connect enables the following features for RAY BAUM conformance:

- Location information by wire-map or by HTTP-enabled location discovery (HELD).
- DID and calling party number (CPN) substitution for each device (or location) that can be used to make 911 emergency calls.
- SIP peer profile dedicated to signaling with NG911 vendors, which helps in vendor integrations.
- SIP device capabilities for devices that provide location information.
- Emergency number dialing and routing calls based on trunks configured.

The Ingate SIParator is commonly used as the Session Border Controller (SBC) between MiVoice Connect and Intrado.

A SIP trunk is set up between MiVoice Connect and Ingate; and between Ingate and Intrado.

MiVoice Connect contains emergency location identification information for devices that are used with the RAY BAUM'S Act solution.

Establishing a Contract with Intrado

The channel partner/customer must have an agreement with Intrado. The agreement must be prepared with the information listed in the following table.

Table 1: Required information for the contract with Intrado

Requirement	Description
Locations	The number of locations required to satisfy RAY BAUM's law.
Subscribers	For the MiVoice Connect solution, this will include all users and devices assigned an extension to make emergency calls.
HELD Subscribers	These are the number of devices/subscribers that will provide Geolocation (currently, provided only by Connect Client).
911 Location Manager Clients	The number of users/devices that will require the NG911 application (for example, third-party softphones such as X-Lite and so on).
Notification Clients	The number of email address recipients for 911 Notifications to satisfy Kari's Law.
911 Location Manager	This optional feature allows access to Intrado's 911 Location Manager application that is to be used for some third-party softphones in the MiVoice Connect solution.

SIP message Syntax	Intrado obtains the location information from different SIP headers. MiVoice Connect requires the following header profile to be used by Intrado while integrating with Intrado. This information must be communicated to the Intrado team by the customer while setting up the account.
	`Profile Details:`
	`<FROM>=>location info(ERL),`
	`<PAI>=>Subscriber ID,`
	`<CONTACT>=Callback Number`

Requirement	Description
Extension Bind Feature	This optional feature binds an Intrado-owned DID to an emergency caller for use by a PSAP if an emergency call were to be dropped. The PSAP would call the Intrado DID, which Intrado will route back to MiVoice Connect. Due to this, the callback will reach the device that dialed 911 using MiVoice Connect routing. It is important for the customer to select the extension identification rules to be followed by Intrado that meet the requirements of the customer. This must be communicated to the Intrado team while setting up the account. For more information about the extension identification rules, along with the provisioning requirements to set up extension binding in MiVoice Connect, see Intrado Extension Binding on page 18. **Note**: Without the Extension Bind feature, Intrado will expect the CONTACT header (which identifies a user/callback destination) to be a 10-digit DID number (US), and an emergency callback will come back to MiVoice Connect through the public PSTN.

Access Control List of the Ingate Servers with Intrado

Intrado SIP gateways will accept calls only from pre-authorized customers. For the MiVoice Connect solution, Intrado must pre-authorize the public IP address or FQDN of the trunk switch/Ingate. If the Intrado SIP gateway receives a SIP invite from an unknown SIP client, then a 403, Forbidden error will be sent back.

Intrado Emergency Routing Service Setup - Intrado Portal

The Intrado Portal is available through the web. Intrado will provide this URL through a welcome email. For more detailed information about using this portal, see the *Emergency Routing Service User Guide* available from Intrado.

The following are some of the methods for setting up location information in Intrado:

- Location based on Static subscriber ID to ERL ID mapping.
- Location based on Dynamic subscriber ID to ERL ID mapping.
- Location based on HELD.
- Location based on network discovery.
- Location based on Private Subscriber ID using 911 Location Manager application.

MiVoice Connect, based on the deployment and devices, use subsets of the above methods for RAY BAUM conformance.

The following table lists the devices supported in MiVoice Connect and the respective methods used for location management with Intrado.

Table 2: List of devices supported in MiVoice Connect

Device Type	Location Management Method
69xx	Dynamic Subscriber ID to ERL ID mapping
IP4xx/MGCP	Dynamic Subscriber ID to ERL ID mapping
DECT handsets	Dynamic Subscriber ID to ERL ID mapping

Device Type	Location Management Method
MIVC Connect Client softphone	Location based on HELD
Analog phones	Dynamic Subscriber ID to ERL ID mapping
ATA	Dynamic Subscriber ID to ERL ID mapping
Any third-party softphones	Location based on Private Subscriber ID and using the 911 Location Manager application

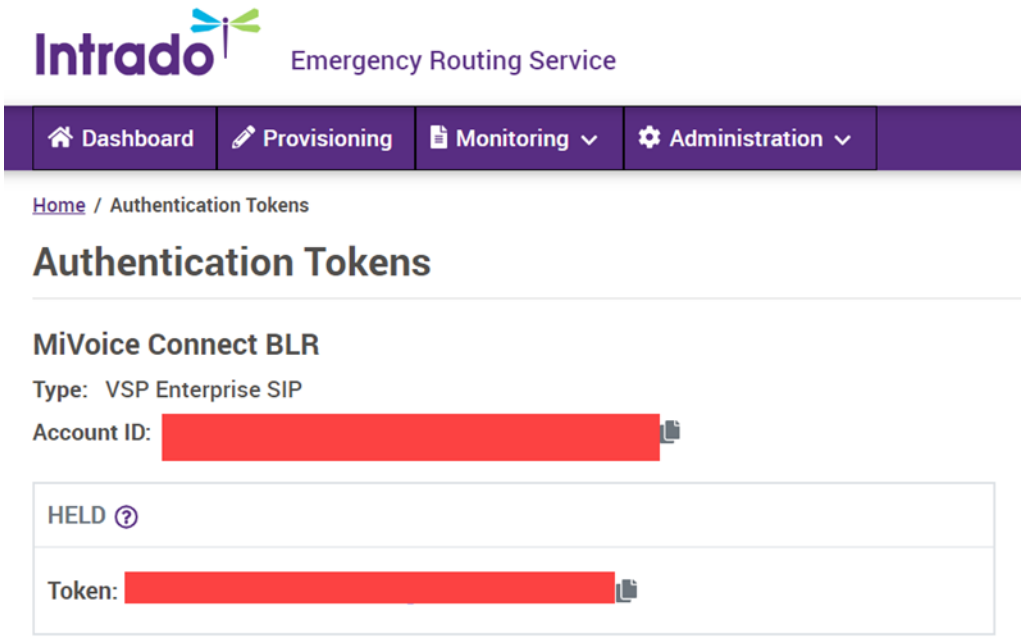
Intrado Portal - Emergency Routing Service

The Intrado Portal is available through the web. Intrado will provide this URL through a welcome email. For more detailed information about using this portal, see the *Emergency Routing Service User Guide* available from Intrado.

The Intrado Portal configuration for the above location management methods and other general steps to be followed for the MiVoice Connect solution to work with Intrado are as follows:

1. In the Intrado Portal, go to the **Administration** > **Authentication Tokens** page and identify the **Account ID** (organization ID) and HELD access Token information. This information will be required to set up the MiVoice Connect SIP Peer Profile and HELD parameters in Connect Director.

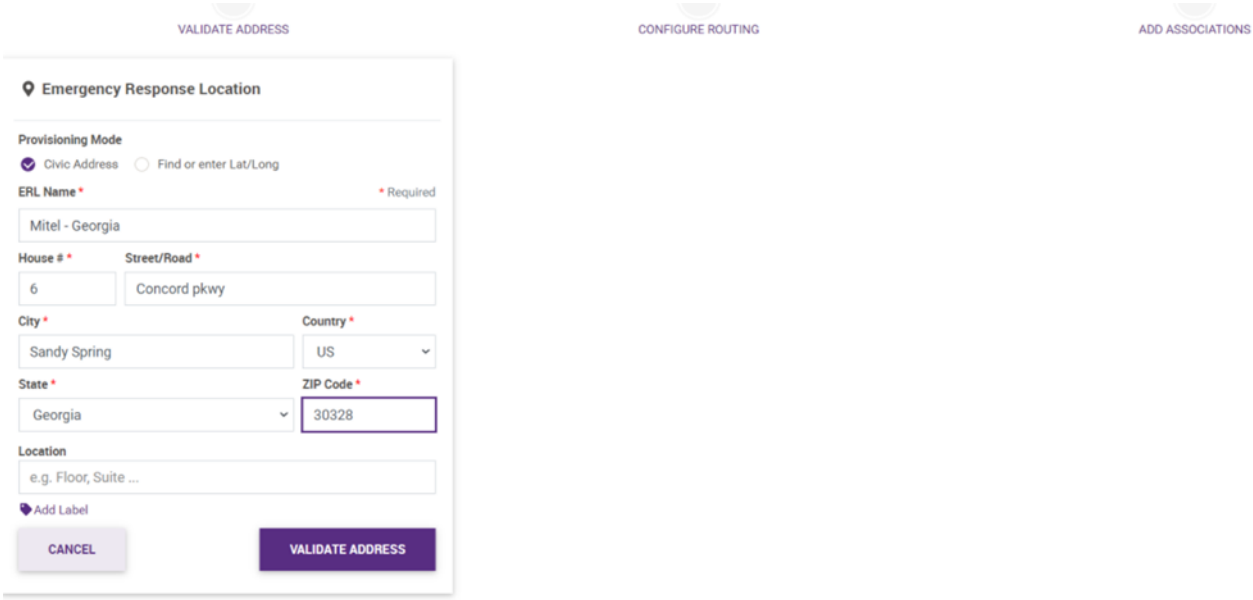
   Figure 2 : Authentication Tokens page



2. Identify the HELD URL and HELD credentials for your HELD-enabled clients.
   Note: Intrado will send the HELD URL through a welcome email.
3. Configure the Emergency Routing Locations (ERL):
   a. In the Intrado Portal, go to **Provisioning** and select **Add ERL**.
   b. In the page that opens, complete the following fields (see Validate Address):
      - **ERL Name** - Customer-defined label to identify the location
      - **House #** - Civic address provided to PSAP
      - **Street/Road** - Civic address provided to PSAP
      - **City** - Civic address provided to PSAP
      - **Country** - Civic address provided to PSAP
      - **State/Province** - Civic address provided to PSAP
      - **Postal Code** - Civic address provided to PSAP

- **Location** - The dispatchable location within the given civic address provided to PSAP

Figure 3 : Validate Address

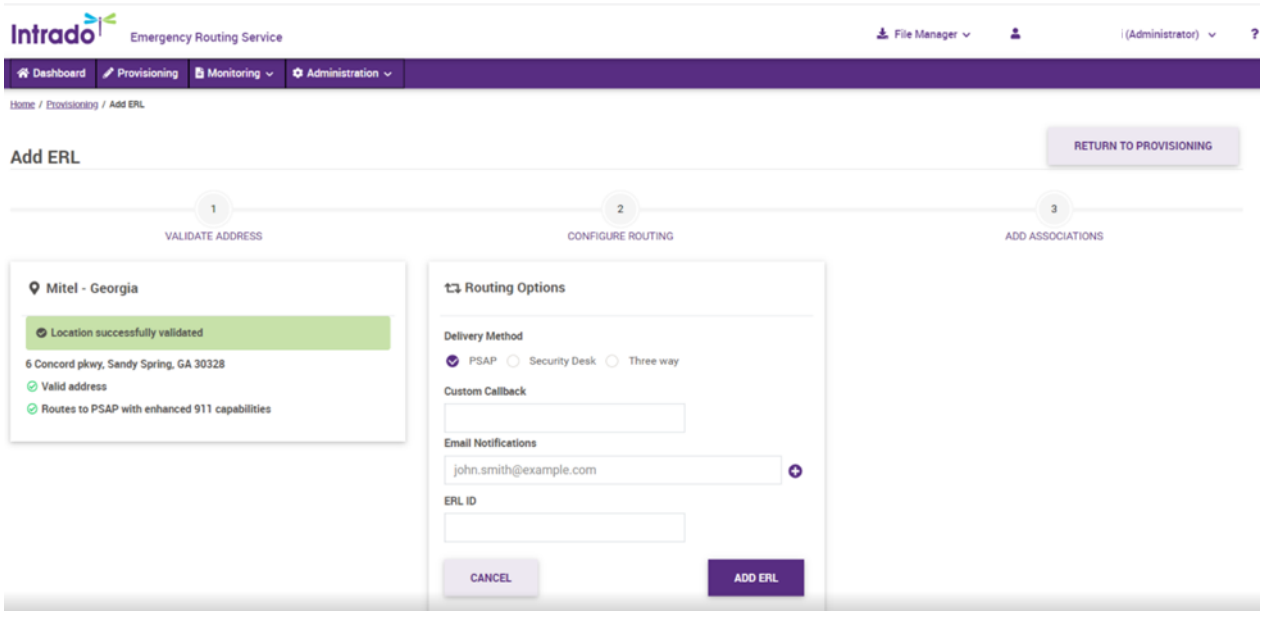


c. Click **Validate Address**.
d. In the page that opens, define the location's routing options by completing the following fields:

- **Delivery Method** - Select **PSAP** from the list of options.
  Note: MiVoice Connect supports only the PSAP delivery method.
- **Custom Callback** - Keep this field blank.
  Note: The custom callback is not used by MiVoice Connect. If this field is used, the callback number presented by MiVoice Connect in SIP Contact header messaging will not be used. Therefore, use this field only if required. It is recommended that you do not use this field.
- **Email Notifications** - Enter the email address for notifications.
  Note: It is recommend that you use the Intrado account-based email notifications instead of ERL specific email notifications (see below). Use this when you want the email notification to be sent to a different user based on location identified by ERL.
- **ERL ID** - Enter the CESID from the device or MiVoice Connect. This ID must match the FROM header in the SIP Invite and will be used as CESID in the MiVoice Connect configuration.

e. Click **Add ERL** to configure the ERL.

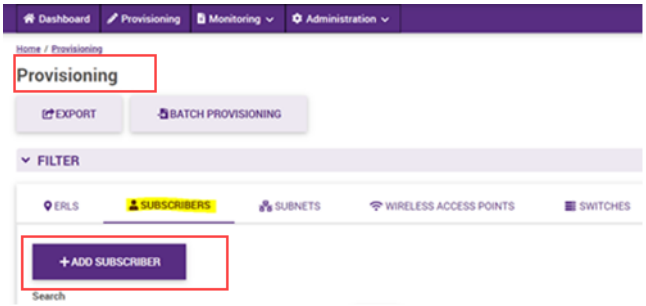
Figure 4 : Add ERL



4. Configure Subscribers:
   Note: For the MiVoice Connect solution, this will be all unique MiVoice Connect users that can make 911 emergency calls.

   a. In the Intrado Portal, go to **Provisioning** > **Subscribers**.
   b. Click **Add Subscriber**.

Figure 5 : Add Subscriber

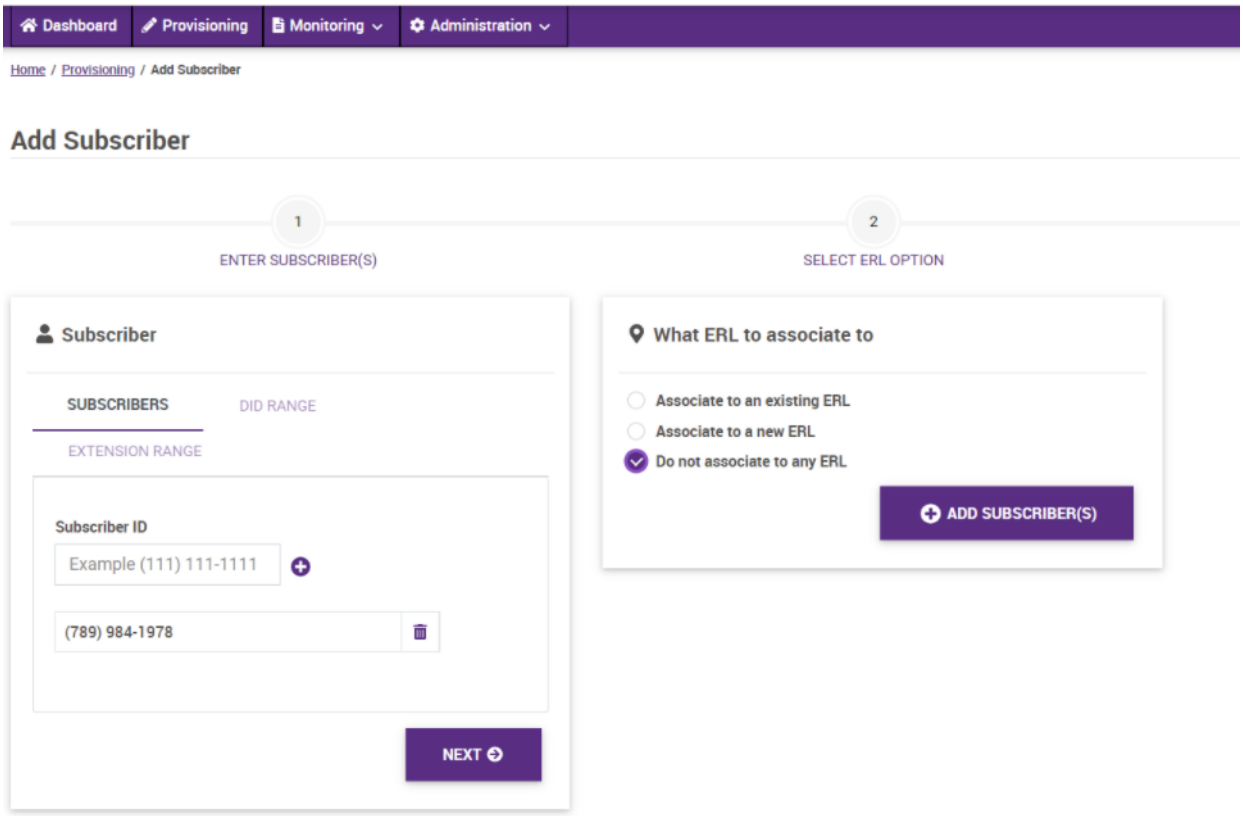


   c. In the page that opens, complete the following fields:

   - **Subscriber ID** - For MiVoice Connect this will be all extension numbers from which 911 emergency calls can be made.
     Note: If the Extension Prefix feature is used in MiVoice Connect, then the subscriber ID configured in Intrado must contain a prefix followed by the extension number without any character in between. For example, 1: Prefix - 111, Extension No - 1000 => Subscriber ID will be = 1111000 or Prefix - not used, Extension No - 1001 => Subscriber ID will be = 1001.

     For the MiVoice Connect solution, it is recommended that you use the Intrado's Extension BIND feature, which means the callback number will be the caller's extension number provided in the <CONTACT> SIP header. If the Extension BIND feature is not enabled, then the callback number will be any publicly reachable DID number and same will be sent in the CONTACT header. PSAP will use this number to reach the caller using any public trunks. For more details on extension binding, see Intrado Extension Binding on page 18. In MiVoice Connect, few users will have multiple phones assigned (teleworker mode/premise mode). At any point, only one of these devices will have an extension assigned. The phone with no extension assigned can still be used to make 911 emergency calls. However, for devices that do not have an extension, MiVoice Connect will not be able to derive the subscriber ID and callback number. Therefore, Intrado also fails to process the call and forwards the call to the National Call Center, which entails an additional charge. To overcome this, you must use the default extension, which will usually be a common service point such as a receptionist who has access to the office. For calls made using devices with no extension, the default extension will be used as the subscriber ID. If the Extension BIND feature is enabled, the default extension will also be used as the callback number. If the Extension BIND feature is not enabled, then the callback number will be derived from normal callback derivation method.
   - **DID Range**
     Note: This field is not applicable as the DID range is not used by MiVoice Connect.
   - **Extension Range**
     Note: This field is not applicable as the Extension Range is not used by MiVoice Connect. If you have all the extension numbers in series, then you can use this option (bulk configure).

Figure 6 : Adding subscribers



d. Click **Next**.
e. In the page that opens, in the **What ERL to associate to** field, select **Do not associate to any ERL** as MiVoice Connect uses the dynamic association method.

5. Obtain the client installer/guides for HELD devices and 911 Location Manager clients provided by Intrado.

SIP Message Headers Used by MIVC to Support Intrado

Following are the SIP message headers used by MiVoice Connect to convey information to Intrado. Intrado uses this information to facilitate 911 emergency calls and also to derive the location and callback number (See SIP message headers for more details).

Table 3: SIP message headers

SIP Header	Purpose
E911-Organization-ID	This will be same as the Account ID obtained from the Intrado website. This will be used by Intrado to identify the organization and specific rules for processing the emergency calls.
FROM	This header will contain the Location ID/ERL ID used for deriving the location of the caller.
<P-Asserted-Identity>	This header will be the Subscriber ID. The Subscriber ID will uniquely identify the 911 caller. If the provided Subscriber ID is not configured in Intrado, then it means that the caller has not subscribed to the emergency service of Intrado and the call will go to National Call Center, which entails an extra cost. Therefore, ensure that all the extensions that can dial 911 calls are configured as subscriber in Intrado.

SIP Header	Purpose
<CONTACT>	This header will contain the callback number to be used to reach the 911 caller in case of call discontinuation. This will be the extension number if the Extension Binding feature is enabled. Otherwise, this will be the DID number through which caller/closest user to caller can be reached.

Solution: How the Integration Works

Non-Fixed Devices

A non-fixed device is a device that the end-user can move from one location to another without assistance.

Collecting Data

For non-fixed devices, MiVoice Connect will check for the Geolocation, MAC address, and IP address.

Additional information can be added in the MiVoice Connect Director to complement the information received from the device. The additional information is added in the system by the system administrator.

MiVoice Connect uses the following priority order for deriving the location information during an emergency call:

- Geolocation – provided by HELD-enabled devices
- L3 (IP address) to CESID mapping
- L2 to CESID mapping
- Manual/Automatic CESID based on the switch type
- Site/Zone CESID

Sending Data to Intrado

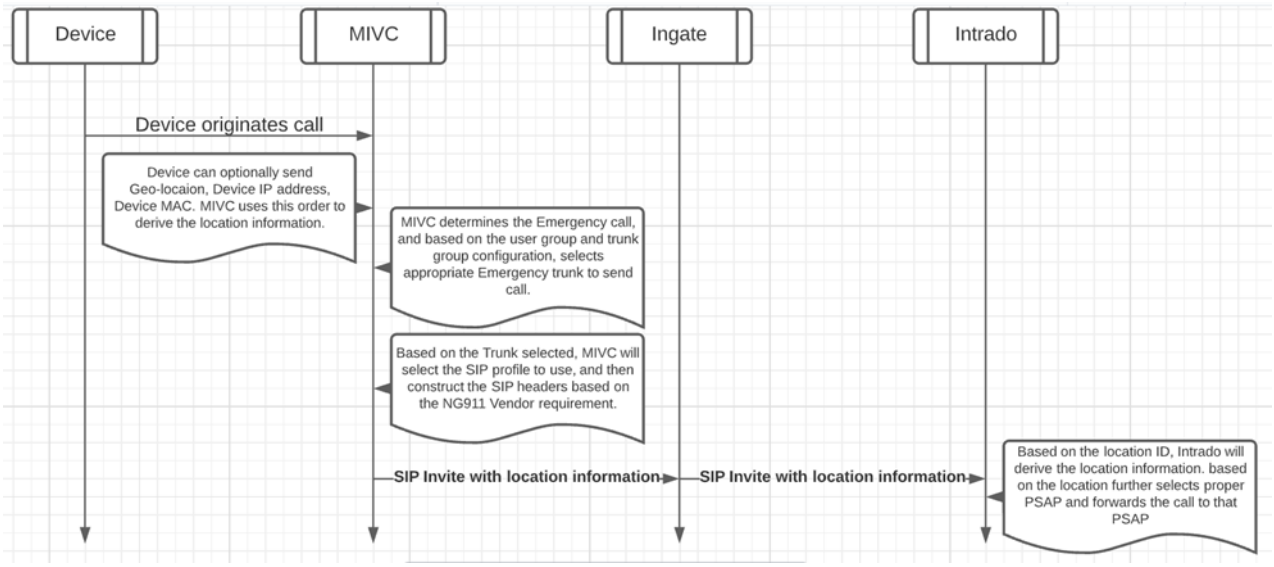
After MiVoice Connect has collected information from the device side, it builds the information to be sent in the SIP trunk, including the appropriate SIP headers required by Intrado (based on the SIP Peer configuration).

After that, the call is sent to the SIParator, which will transparently pass the call with the supported SIP headers to Intrado.

To conclude the process, Intrado will compare the information received to their database. If the data matches, the call is sent directly to the PSAP (emergency center). If the information is not found or invalid (for example, subscriber ID not configured, ERL ID not configured, invalid account ID, invalid SIP message format, and so on), then the call is redirected to the National Call Center for further triage.

Note: The call to the National Call Center entails an extra cost for the customer.

Figure 7 : Sending Data to Intrado



Fixed Devices

Fixed device is a device that cannot be moved to another place in the enterprise without assistance from a professional installer or network manager.

Collecting Data

For fixed devices, as no information is provided by the device, MiVoice Connect will use the programmed CESID (switch port CESID, switch, or Site CESID). This information must be added in the system by the system administrator.

Sending Data to Intrado

After MiVoice Connect has collected the information from the device side, it checks which provider is used and it builds the information to be sent in the SIP trunk, including the appropriate SIP headers as required by Intrado (the service provider).

After that, the call is sent to Ingate, which will transparently pass the call through the supported SIP headers to Intrado.

To conclude the process, Intrado will compare the information received to their database. If the data matches, the call is sent directly to the PSAP (emergency center). If the information is not found or invalid (for example, subscriber ID not configured, ERL ID not configured, invalid Account ID, invalid SIP message format, and so on), then the call is redirected to the National Call Center for further triage.

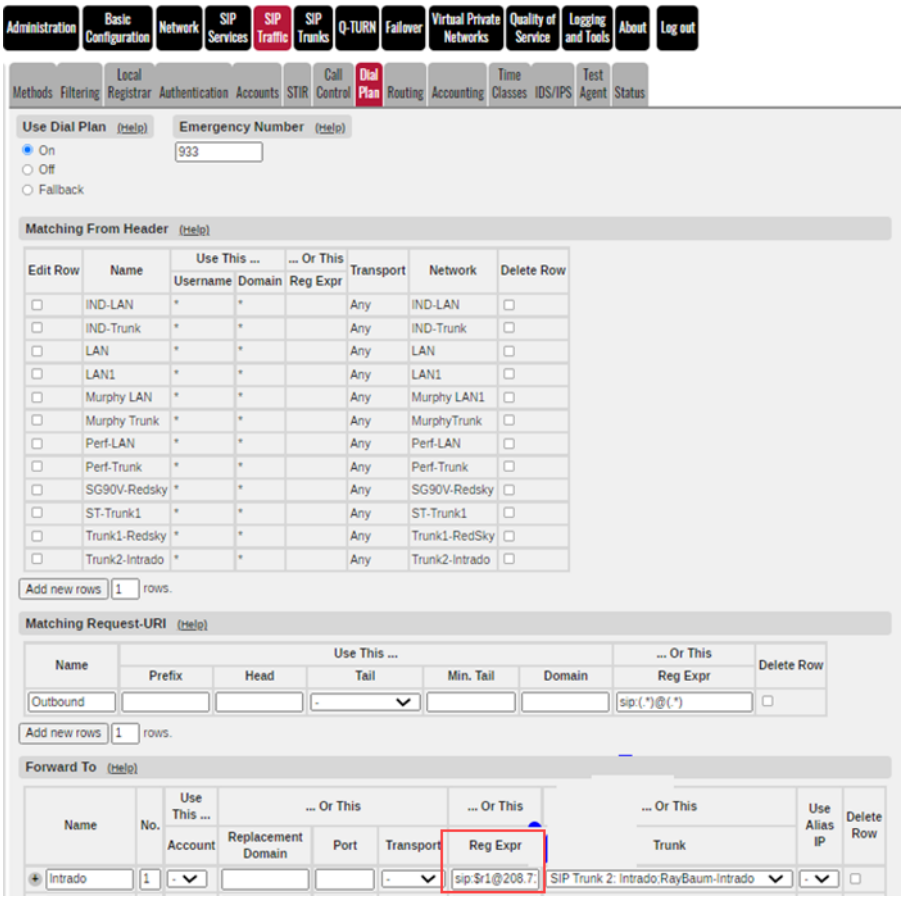
Note: The call to the National Call Center entails an extra cost for the customer.

Enabling the Ingate SIParator to Transparently Send Data to Intrado

When a 911 emergency call is placed, MiVoice Connect will send the location, subscriber, and callback information in different headers. These headers should be passed to Intrado by Ingate SBC as they are. Currently, Ingate always encrypts the <CONTACT> header. Normal service providers will be able to decrypt this; but Intrado will not decrypt. The <CONTACT> header in case of MiVoice Connect carries the callback number. Therefore, for the callback to work properly, you must configure Ingate to avoid encrypting the <CONTACT> header. This can be done by setting the regular expression in the **Reg Expr** field in the **SIP Traffic** > **Dial Plan** page in Ingate (see Dial Plan page).

Note: You must use Ingate 6.3.3 and later versions.

Figure 8 : Dial Plan page



Set the regular expression as follows:

sip:$r1@208.71.179.181?contact=%3csip%3a$(contact.user)%40182.75.150.31%3e

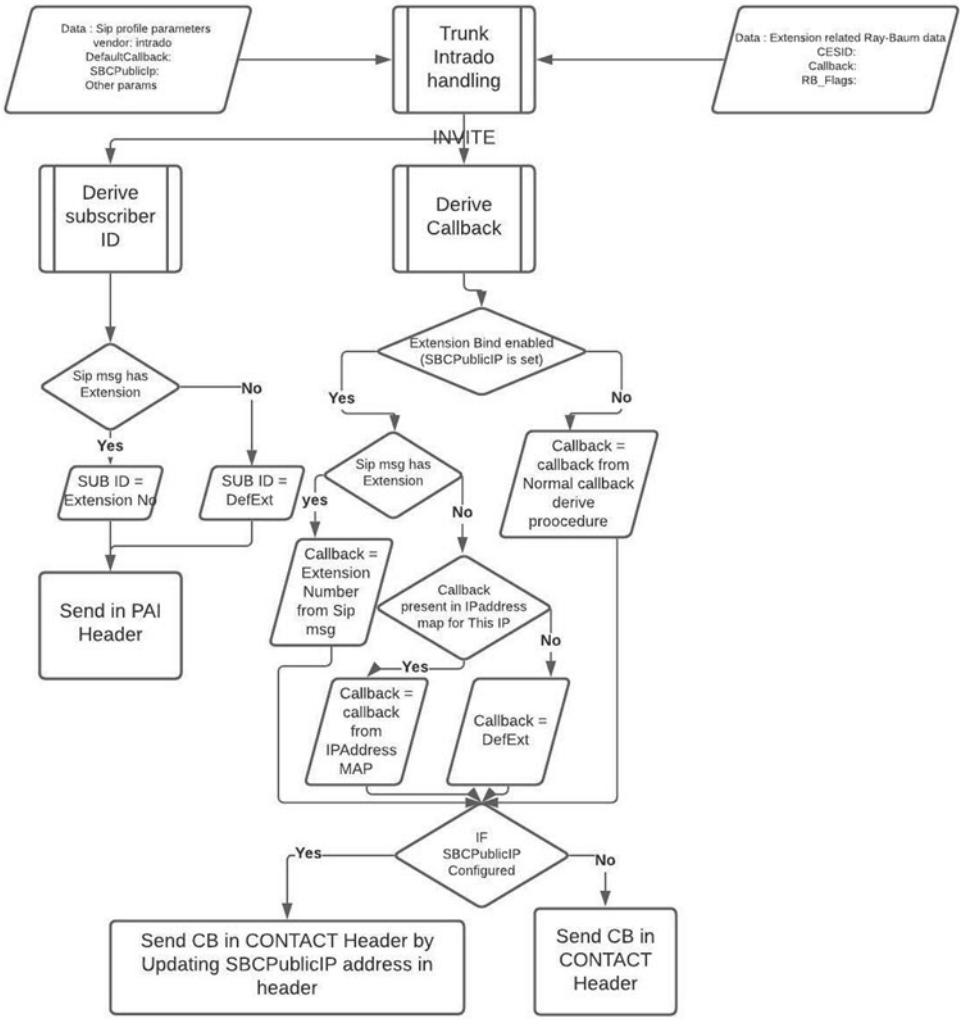
Note: You must replace 208.71.179.181 with the actual Intrado Public IP address obtained as part of the contract with Intrado. Also, you must replace 182.75.150.31 with the actual Ingate Public IP address.

Subscriber ID and Callback Derivation Using MiVoice Connect

There can be two types of active devices in MiVoice Connect:

- With a user assigned (that is, an extension number is assigned to the device)
- With a user not assigned (that is, no extension number is assigned to the device)
  Note: This situation occurs only if a user is logged in from a teleworker phone and nobody present in the office is logged in to the device using their own credentials.

Figure 9 : Flowchart for deriving subscriber ID and Callback Number



Note:

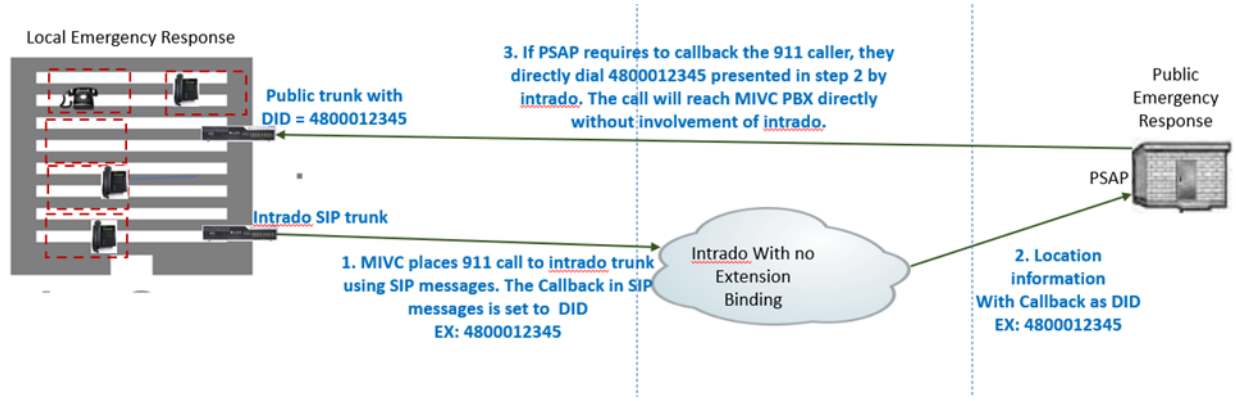
- If the SBCPublicIP parameter is set in the SIP profile, it means that Extension Bind feature is enabled in MiVoice Connect. The SIP profile name for SBCPublicIP is RBIntradoExtMapSBCPublicAddr.
- The DefExt parameter is the default extension that will be the extension number of the receptionist or a common service location through which all users of PBX can be accessed or assisted. The SIP profile name for DefExt is RayBaumDefaultCallback.
- Normal Callback derive procedure means following order. CID > DID > IP address map >Default Callback in SIP profile.

Emergency Callback

Previously, the CESID was considered as the location identifier and an emergency callback number. For RAY BAUM enabled SIP trunks, MiVoice Connect will separate the two concepts:

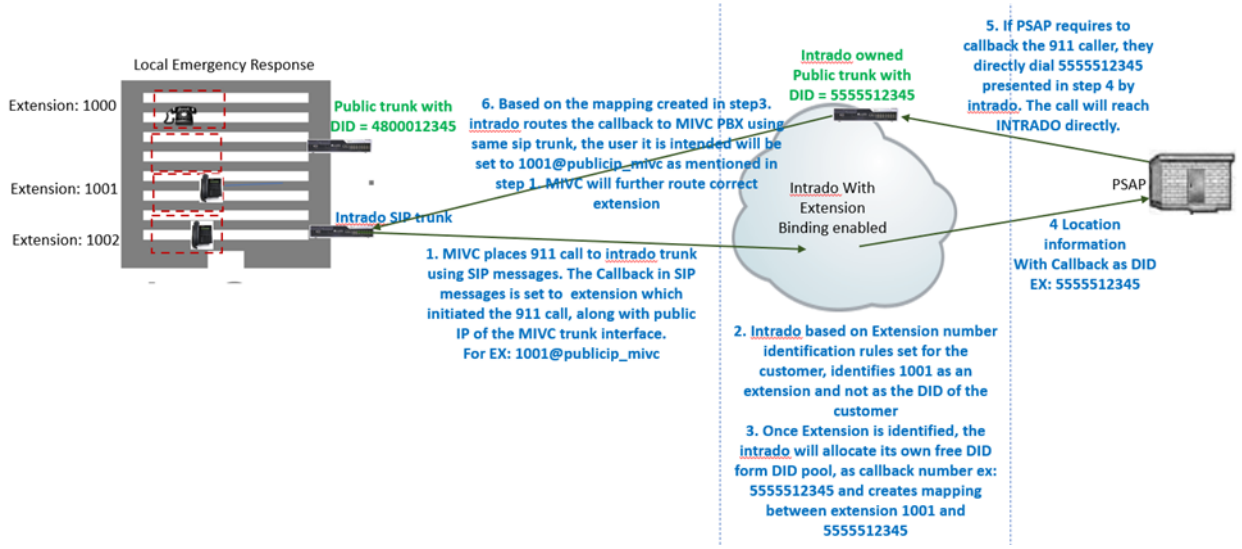
- CESID remains the location identifier for most devices, except for devices for which Geolocation is enabled and for softphones that will use an Intrado-provided application to identify the location.
- Without Intrado's Extension Bind feature, MiVoice Connect provides CPN/DID for all users/devices that can make 911 emergency calls and the PSAP will callback MiVoice Connect directly through the public PSTN.

Figure 10 : Callback without Extension Bind



- With Intrado's Extension Bind feature, MiVoice Connect provides the extension number as the callback number. After identifying this as the MiVoice Connect extension number and not a DID, Intrado provides an Intrado-owned DID to the PSAP. If an emergency callback is required, the PSAP will call Intrado's DID, which they would route back to the subscriber (extension) using the SIP trunk to Ingate. Ingate will forward it to the MiVoice Connect trunks and then on, to the actual extension.

Figure 11 : Intrado Extension Bind Flow



Intrado Extension Binding

With the Intrado Extension Binding feature, the callback number can be either of the following:

- MiVoice Connect extension number
- Publicly reachable MiVoice Connect DID number. The DID number in US will be a 10-digit number.

If the Extension Binding feature is enabled and the callback number sent by MiVoice Connect is the extension number, then Intrado will provide its own DID number as the callback number to PSAP. When PSAP uses the callback, it routes the call using Intrado SIP trunk (SIP messaging).

It is important to understand how Intrado identifies if the emergency incoming call's callback falls in to case one or two mentioned above. This is based on the rules configured at Intrado for the account in question.

Following are the few examples of the rules used for this purpose:

- Treat all numbers as the extension number (no chance for publicly reachable MiVoice Connect DID number).
- Treat all numbers other than 10-digit numbers as extension numbers.
- Treat all numbers up to X digits as extension numbers.

Note: Based on the existing extension number length, the customer can select one of the rules mentioned above.

For US customers, treating all numbers other than 10-digit numbers as extension numbers is more suitable. However, if a PBX has a 10-digit extension number plan, then it causes a conflict and the extension binding will not work. In this situation, the customers can either increase the extension plan in MiVoice Connect or opt to treat all numbers as extension numbers.

Note: The extension number in MiVoice Connect includes the extension prefix and the extension number.

Based on this rule selection, Intrado decides whether or not to apply extension binding for a call. If the callback number that Intrado derives is not the MiVoice Connect extension, it will not apply the extension bind mechanism to the call, and the number present in the MiVoice Connect header will be transparently sent to PSAP as callback.

Also, as mentioned earlier in the extension bind flow, when the SIP call with extension number in the <FROM> header reaches Ingate SBC, it requires to be routed to the MiVoice Connect trunk, to the proper MiVoice Connect phone switch, and to the correct MiVoice Connect extension. For this incoming call to be accepted and processed, there should be a specific configuration requirement on Ingate and trunk group.

Note: Only specific, critical part of configuration is captured here. The rest of the procedure to set up Ingate as SBC or as a trunk group is the same and is described in the respective administrator guides.
Note: When the Extension Bind feature is enabled, as explained, the actual extension number will be sent as callback. Therefore, you do not need to configure the **Callback Number** field in IP address map (strongly suggested). The only exception to this is for teleworker phones. For teleworker phones, the IP address map will have the MAC address-based entry. For MAC address-based entry, enter the externally reachable phone number which is located at actual teleworker location. The callback number entered in MAC address-based entry will be used only when a 911 emergency call is placed from the teleworker phone in **Available** state (no extension assigned and therefore calls cannot be routed). In all other cases, the actual extension number/default extension will be used as callback number. See the Flowchart for deriving subscriber ID and Callback Number for more details.

Ingate

To configure the Intrado trunk and corresponding Intrado public IP address, in the **Intrado** page (assuming that the **SIP Trunk 2: Intrado; RayBaum-Intrado** option is selected in the **View trunk** field in the **SIP Trunks** page), do the following:

1. In the **SIP Trunking Service** section, set the **Restrict to calls from** field to the interfaces of Intrado.

   In SIP Trunking Service, **Restrict to calls from** is set as Intrado because it is the name given to the Intrado IP address in the **Networks and Computers** page of Ingate.

   Figure 12 : SIP Trunking Service

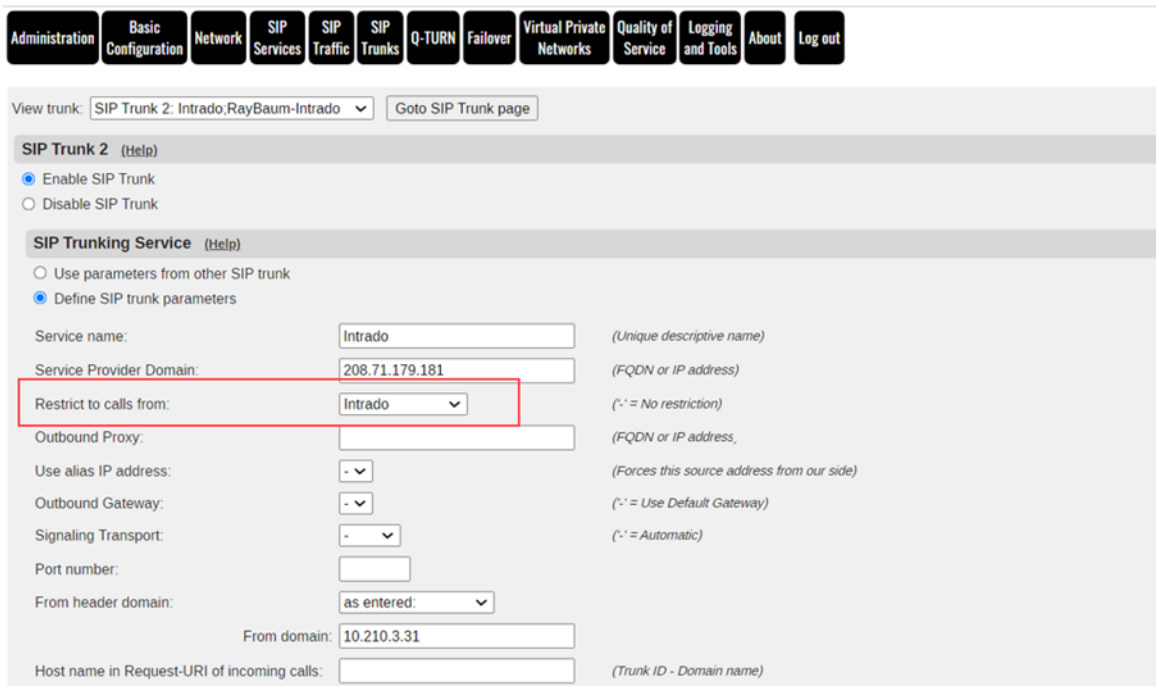
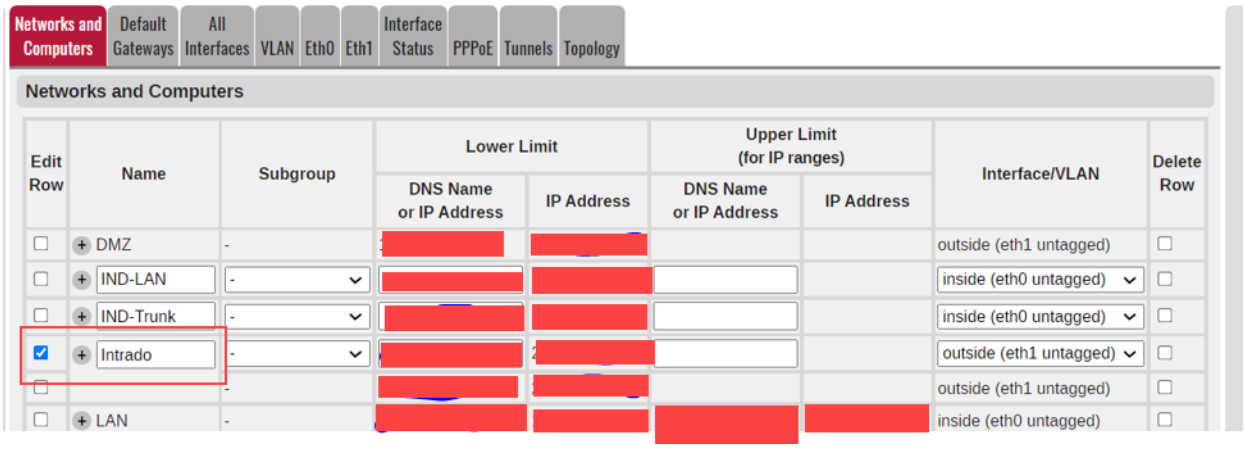


Figure 13 : Networks and Computers page



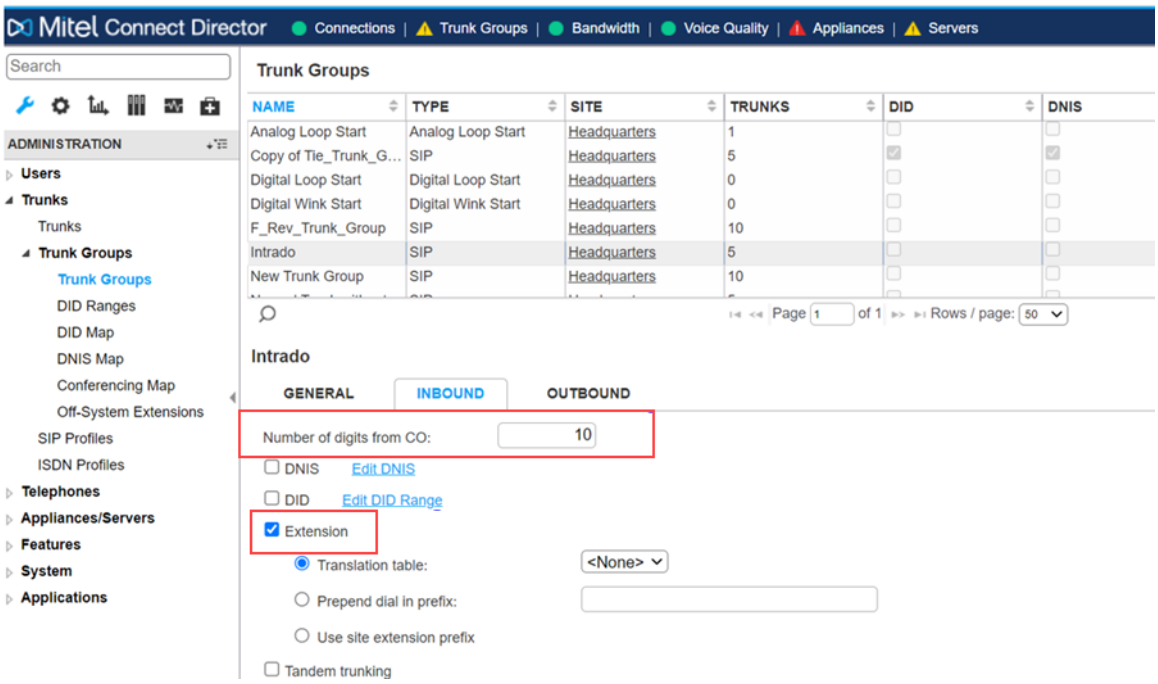
MiVoice Connect Trunk Group Configuration

With the above Ingate configuration, the SIP call will be forwarded to the MIVC SIP trunk. MiVoice Connect trunk will now process incoming calls based on the options set in the **Trunk Groups**> **Inbound** page in Connect Director.

Trunks must be configured to allow inbound calls. The number of digits required in the incoming message for a request to be processed must also be configured. To do so:

1. Launch Connect Director.
2. In the navigation pane, click **Administration** > **Trunks** > **Trunk Groups** > **Trunk Groups**. The **Trunk Groups** page opens.
3. Select the **Inbound** tab.
4. In the **Number of digits from CO** field, set the extension number length used in MiVoice Connect (including prefix).
5. Enable the **Extension** check box.
6. Click **Save**.

Figure 14 : Trunk Groups page



MiVoice Connect SIP Profile Configuration for Extension Binding

Intrado requires the MiVoice Connect Public IP address to be sent in the initial SIP message as part of the callback number. This is because, with internal private IP address, Intrado will not be able to route SIP INVITE message of the callback flow to MiVoice Connect SBC/Trunk.

Therefore, MiVoice Connect requires the customer to enable the Intrado Extension Bind feature explicitly and also configure the Public IP address that MiVoice Connect must set as part of the callback number header (CONTACT) for 911 emergency call SIP messages.

Enabling and Configuring Extension Bind and Public IP Address in MIVC

In the SIP Trunk profile configuration of Intrado, you must set the parameter RBIntradoExtMapSBCPublicAddr to the public IP address of MiVoice Connect as shown in SIP Trunk Profiles page. This parameter will enable and also set the public IP address in MiVoice Connect.

Along with the parameter RBIntradoExtMapSBCPublicAddr if set, you must set the parameter RaybaumDefaultCallback to a common extension number so that the devices with no extension can process the calls properly.

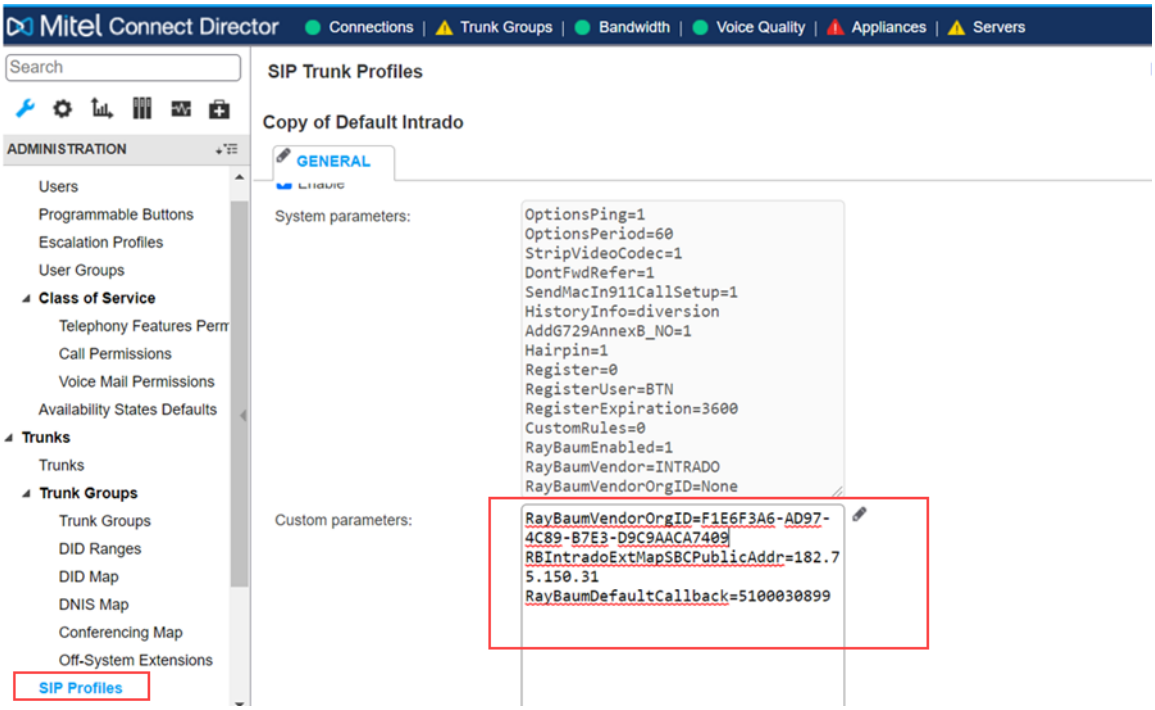
Note: With the above mandatory configuration, the Extension Bind will work as expected.

To enable and configure the Extension Bind feature and public IP address in MiVoice Connect:

1. Launch Connect Director.
2. In the navigation pane, click **Administration** > **Trunks** > **SIP Profiles**. The **SIP Trunk Profiles** page opens.
3. In the **SIP Trunk Profiles** page, select the vendor. For example, **Default Intrado**.
4. Using the **Copy** option to copy this profile.
5. In the **General Tab** > **Custom Parameters** field, add the following parameters:

   - Set RBIntradoExtMapSBCPublicAddr to the public IP address of MiVoice Connect to enable and set the public IP address in MIVC.
     Note: This parameter is required only if you are using the Intrado Extension Binding feature. Otherwise, do not configure this parameter.
   - Set RayBaumDefaultCallback to a common extension number so that for devices with no extension number, the calls can be processed properly.

   Figure 15 : SIP Trunk Profiles page

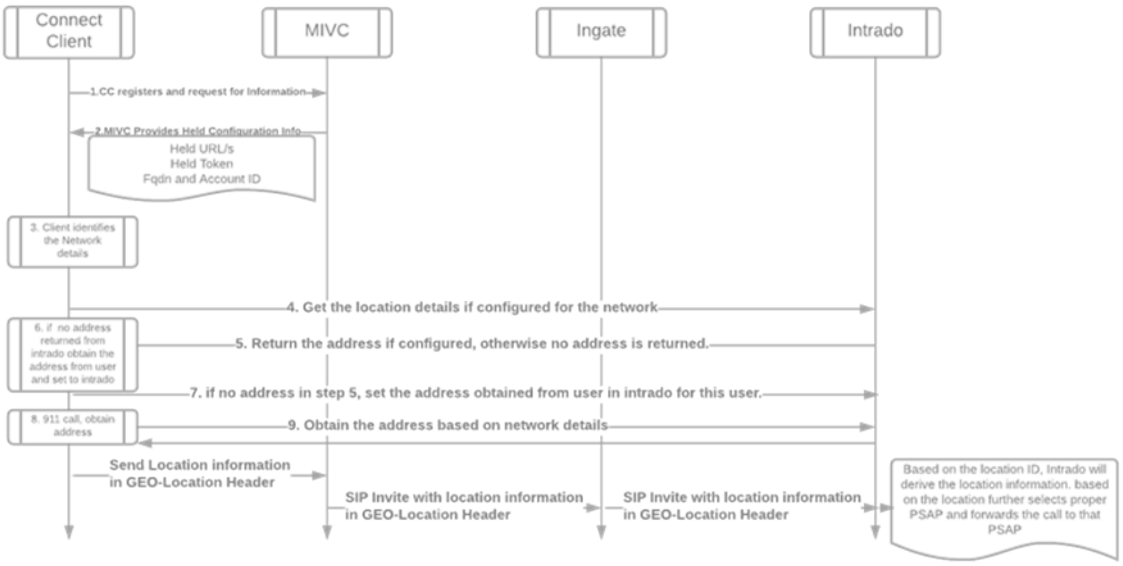


6. Click **Save**.

Connect Client Integration with Intrado

As mentioned earlier, Connect Client uses the HELD protocol to provide location information to Intrado. The location information when HELD is used, will be sent to Intrado using Geolocation SIP header rather than the FROM header. The following figure captures the connect client flow for location management.

Figure 16 : Connect Client integration with Intrado



As shown in the figure Connect Client integration with Intrado, for connect client to work with Intrado, MiVoice Connect must provision the following parameters in PBX, which will be shared with Connect client when it registers in softphone mode with MiVoice Connect. To provision the parameters:

1. Launch Connect Director.
2. In the navigation pane, click **Administration** > **System** > **Sites**. The **Sites** page opens.
3. Select the site where the **Enable RAY BAUM** option is enabled.

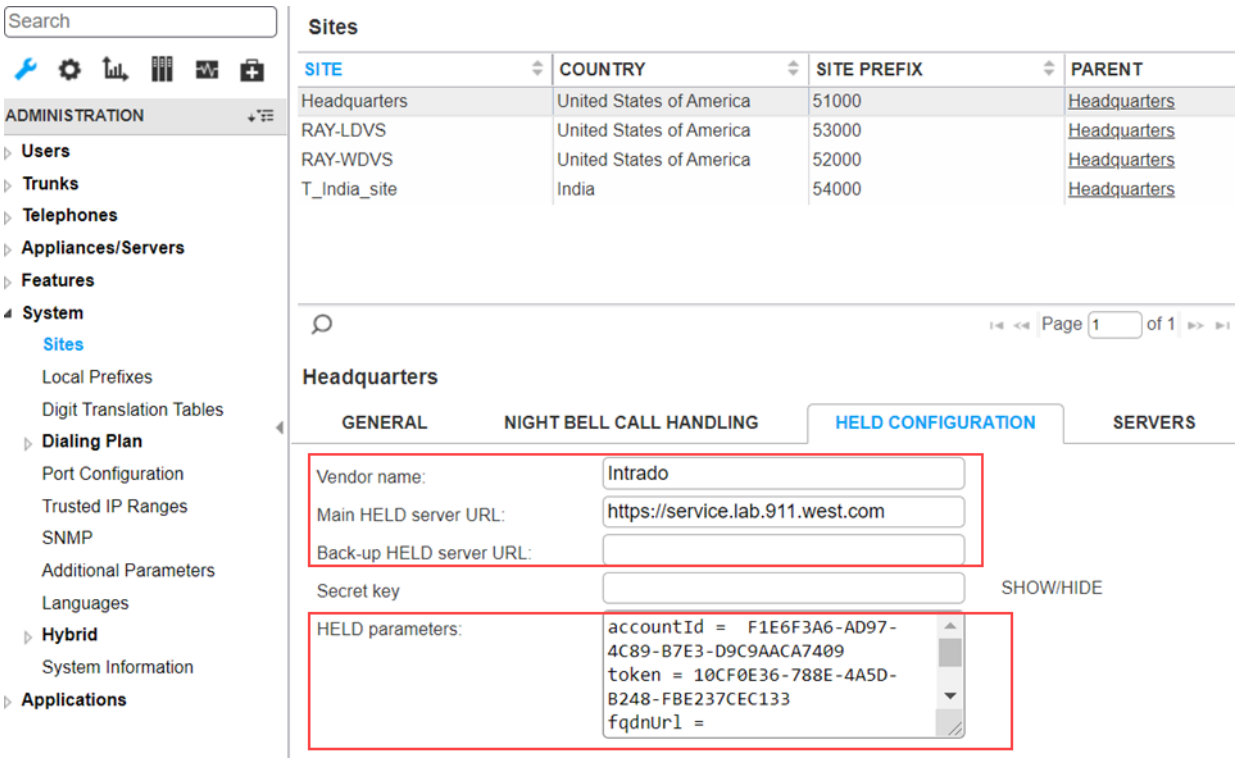
4. To configure the third-party vendor, in the **HELD Configuration** tab, complete the fields as described in the table Sites Page: Parameters on the HELD Configuration Tab. See the figure HELD Configuration tab for more details.
5. Click **Save**.

Table 4: Sites Page: Parameters on the HELD Configuration Tab

Parameter	Description
Vendor Name	Name of the third-party 911 vendor. You must enter **Intrado** here.
Main HELD Server URL	Intrado server URL obtained from Intrado.
Back-up HELD Server URL	Intrado server URL obtained from Intrado.
Secret Key	This field can be ignored because it is not applicable for Intrado.

HELD Parameters	The HTTP-enabled location discovery (HELD) parameters for a specific third-party vendor.
	Note: The administrator can specify any number of Intrado-specific parameters in this field in the following format:
	`key1=value1`
	`key1=value2`
	`...`
	`keyN=valueN`

Figure 17 : HELD Configuration tab



You must configure the parameters as described in the table HELD parameters for Intrado.

Table 5: HELD parameters for Intrado

Parameter	Description
accountId	This is the organization ID provided by Intrado based on the specific license agreement. After the Intrado account is set up, the account ID can be obtained by accessing the **Administration** > **Authentication Tokens** page in the Intrado portal. **Note**: This parameter is case sensitive and should match exactly as listed here in parameter column. For example, enter **accountId = <account ID>**
token	Token is used by Intrado to validate the location update/get/set request from any client. After the Intrado account is set up, the account ID can be obtained by accessing the **Administration** > **Authentication Tokens** page in the Intrado portal. **Note**: • If the token is not configured, the client will not be able to connect to Intrado or obtain any information from Intrado. • This parameter is case sensitive and should match exactly as listed here in parameter column. For example, enter **token = <token ID>**
fqdnUrl	The fqdnUrl must be set to a URL that can be resolved only in the office network and cannot be resolved from the Internet. For example, **www.test_fqdn.com** can be set up in the office DNS. If a user is connected to the office network directly or through VPN, then this URL can be resolved, but if they try to access this URL without connecting to the office network, then they will get page not found or related errors. **Note**: The URL entered here must not be one which can be resolvable in office and also in public internet network. The **fqdnUrl** field is used by the Connect Client to inform Intrado that the user is in office network or in public network. When the Connect Client obtains this url from MiVoice Connect, it will try to resolve it. If **fqdnUrl** can be resolved, it assumes that the user is in office network. Otherwise, it assumes that the user is in public network. This same information is communicated to Intrado. **Note**: This parameter is case sensitive and should match exactly as listed here in parameter column. For example, enter **fqdnUrl = <fqdnUrl>**

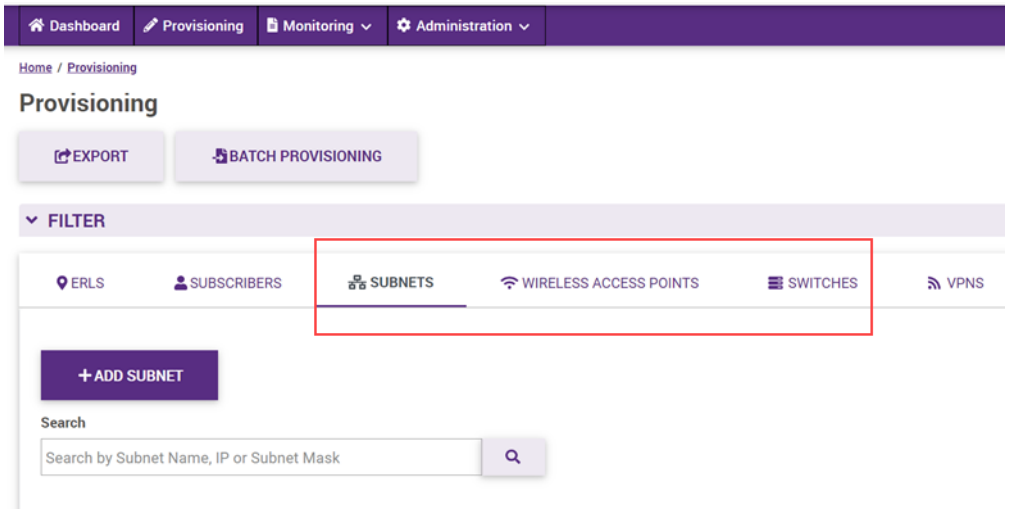
The purpose of communicating if the user is in office or not to Intrado is to use the Intrado Wiremap feature.

Intrado, like the MiVoice Connect IP address map, allows you to create a Wiremap based on subnets, wireless access points or switches. Therefore, the user can create a Wiremap and assign the Emergency Response Location (ERL) for each subnet or wireless access point. This avoids the Connect Client user to manually enter the address when they log in from the office network.

Note: User who log in from a remote location must manually configure the location.

The Wiremap is relevant only for private networks (office networks). In a public network, it is not feasible to maintain the correct Wiremap. The Wiremap is applicable and can be used only for HELD clients (Connect Client) in MiVoice Connect. To create a Wiremap, the MiVoice Connect administrator must first collect network information such as, IP subnets, the location in office, and wireless access point details, and configure this information in the **Provisioning** page of Intrado portal with proper location associated with each subnet/access points (which need not have the same Wiremap in MiVoice Connect).

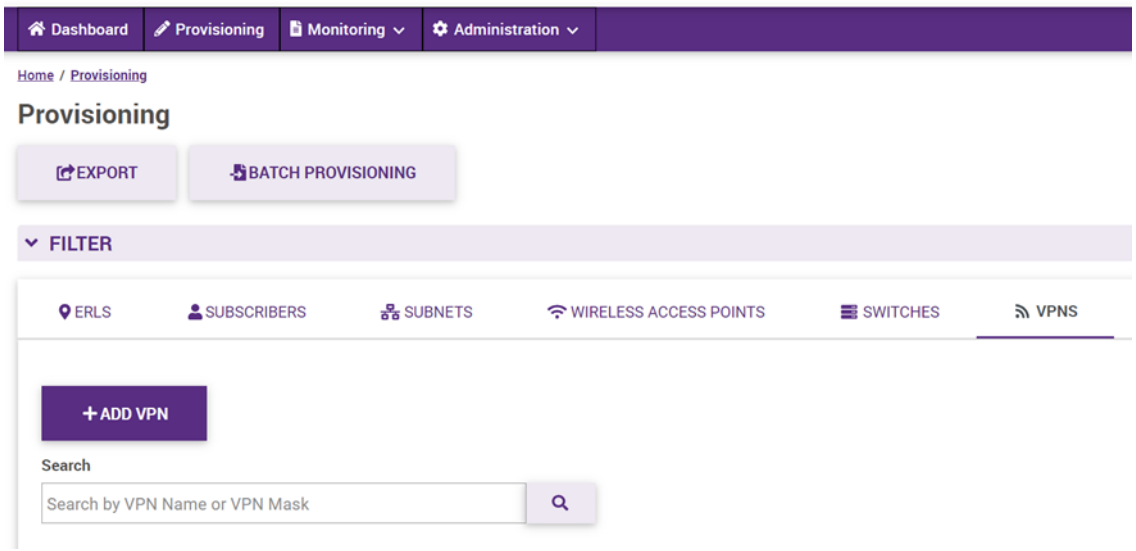
Figure 18 : Intrado Wiremap for HELD clients only



With the private network Wiremap created and associated with the locations at the Intrado site. The Connect Client, when logging in will obtain the location from Intrado based on the subnet/access point information and the same will be used as the users location. This allows the administrator to take responsibility for the location management for Connect Client when they are in private/office network, eliminating the need for the Connect Client user to enter the location. The Connect Client user can still update or use different locations by changing the location in Connect Client if they want to. If the Connect Client user updates/changes the location from Connect Client, it will impact that user until the user logs out. Subnet to location mapping will not get affected in the Wiremap. If the user logs in back from the office network, it will use the IP address based on the Wiremap if it is added in the Intrado portal.

If the user is at a remote location and connected to the office network through VPN, the FQDN can be resolved, but IP address-based mapping cannot be used. Therefore, in the Intrado portal you must add exception entries; that is, subnets allocated by VPN proxy must be configured in Intrado.

Figure 19 : VPN exceptions for Wiremap



Intrado creates location mapping based on:

- Subscriber location
- IP address location
- BSSID/GatewayMac location

If the client is on private/office network, the IP address to location mapping can be searched for. If the client is not on private/office network, this will be ignored. Therefore, the client must inform Intrado whether it is on private network or public network. The fqdnUrl resolution is used for this purpose.

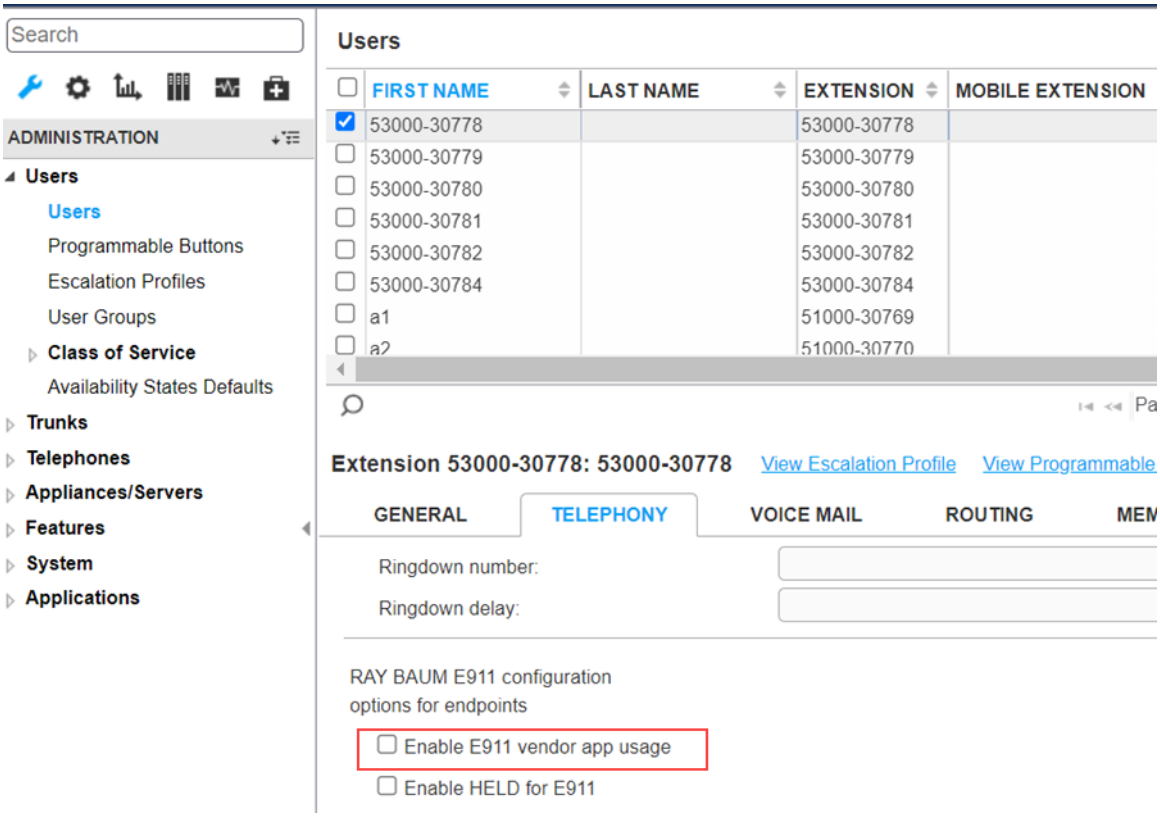
To summarize, if fqdnUrl can be resolved, and Connect Client is not logged in to the office network using the VPN, then Intrado will use the IP address of the client to search for possible locations as configured in Wiremap. Otherwise, it will use IP address mapping based on the BSSID/Gateway MAC address to derive the location.

Intrado Vendor Application Usage - 911 Location Manager

As mentioned in the preceding section, third-party clients with MiVoice Connect use the vendor application based method to manage the location information.

To use the vendor application method for a user/extension, the administrator must enable the **Enable E911 vendor app usage** option in the **Telephony** tab of the **Users** page in Connect Director.

Figure 20 : Enabling E911 vendor app usage



Intrado emergency routing service (ERS) provides enhanced 911 coverage for nomadic subscribers through an add-on application called the 911 Location Manager. This is a separate application that is installed on the subscriber's device and it tracks their location.

When the vendor application is used for the user, the **FROM** field will be private and the subscriber ID in the **PAI** field of SIP message will be used to derive the location. The user must update the location using the vendor application. The vendor application will update the Intrado location mapping for the subscriber.

The 911 Location Manager is designed to do the following:

- Determine whether the user is on-site or off-site and whether or not to prompt the user to automatically assign the enterprise's address for an on-site user.
- Automatically assign the enterprise's address for an on-site user.
- Prompt the off-site user at an unknown location.

- Remember familiar locations so that the users are not repeatedly asked to provide addresses when they re-visit the location as they move.

Configurations Required for Location Manager on ERS portal

The following are the configurations required for location manager on the ERS portal:

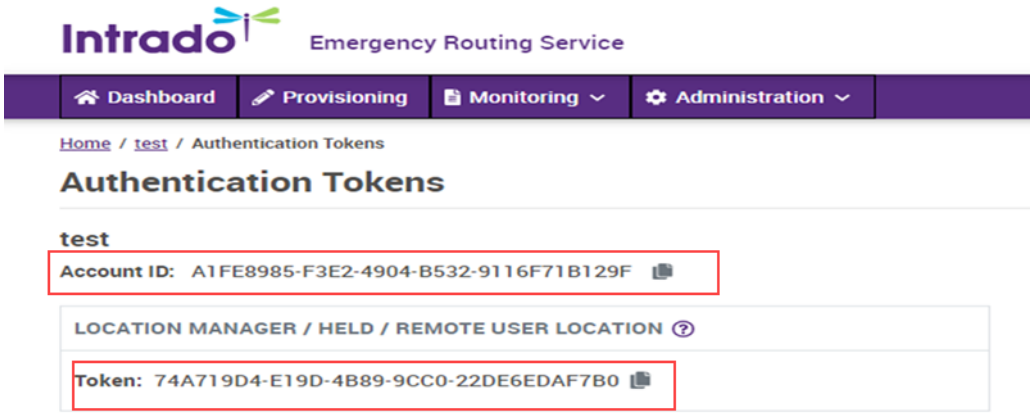
- Location Manager must be used with a proper account ID and token. The account can be the main or a sub-account.
- Configure the email address for this sub-account or main account for 911 notification.
- Add the subscriber ID using which the user will log in to location manager and the third-party softphone.

Account ID and Token ID from Account/Sub-Account

To get the account ID and token information for the account/sub-account:

1. In the Intrado portal, go to the account **Dashboard**.
2. Select **Administration** > **Authentication Tokens**. The page that opens displays the following information related to the selected account/sub-account based on the current account dashboard:
   - **Account ID**
   - **Token**

Figure 21 : Account ID and token ID for sub-account

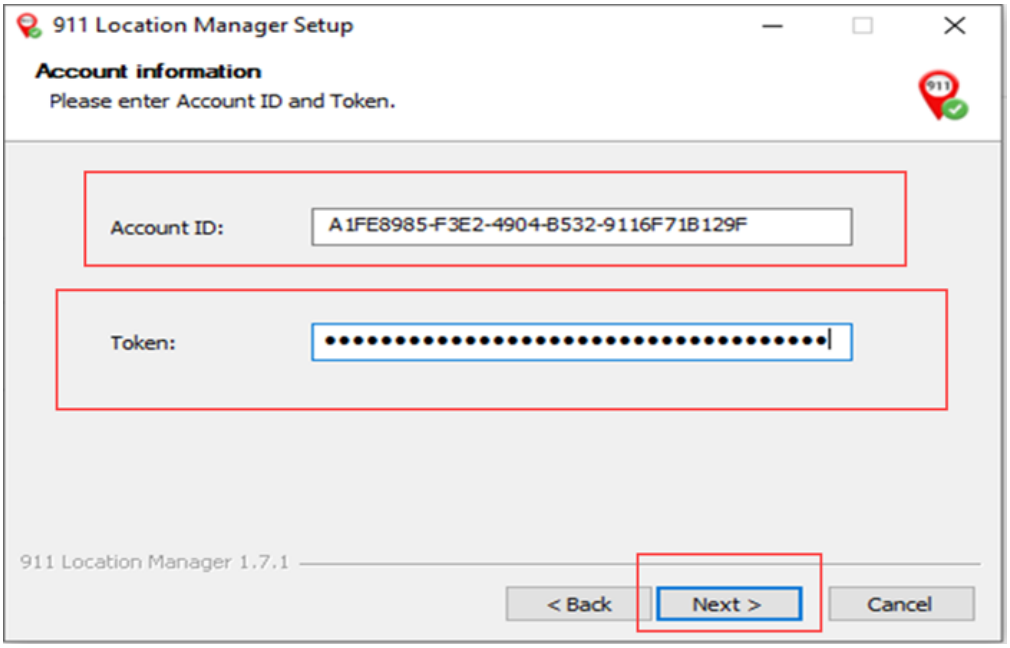


Installing the 911 Location Manager

To install the 911 Location Manager application:

1. Download the installation file that Intrado support team sent.
2. Double-click the file and accept the End User License agreement to proceed the installation.
3. Complete the following fields and click **Next** to install the 911 Location Manager application:
   - **Account ID**
   - **Token**

Figure 22 : 911 Location Manager Setup

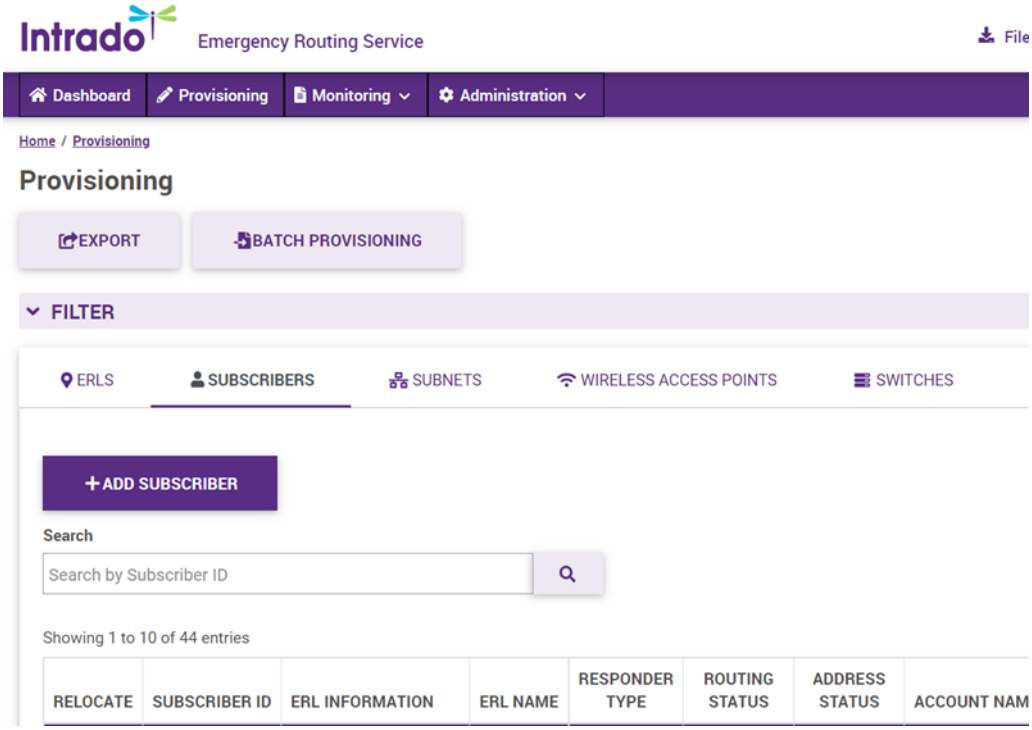


Creating a Subscriber in Intrado Portal Without Mapping Address

The subscriber ID must be created in the account while installing the Location Manager. The subscriber ID must be the extension number of the third-party softphone that uses the Intrado 911 Location Manager for location management.

Note: While creating the subscriber ID, you must not associate the subscriber ID with any already-configured Emergency Response Location (ERL).

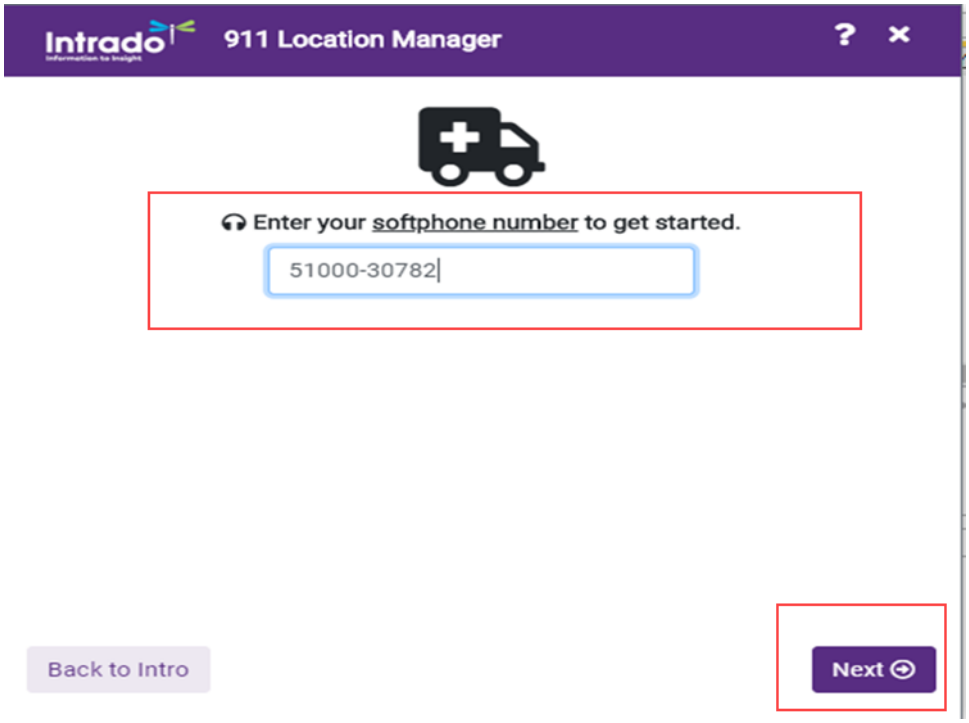
Figure 23 : Creating location manager subscriber ID



Registration of 911 location Manager

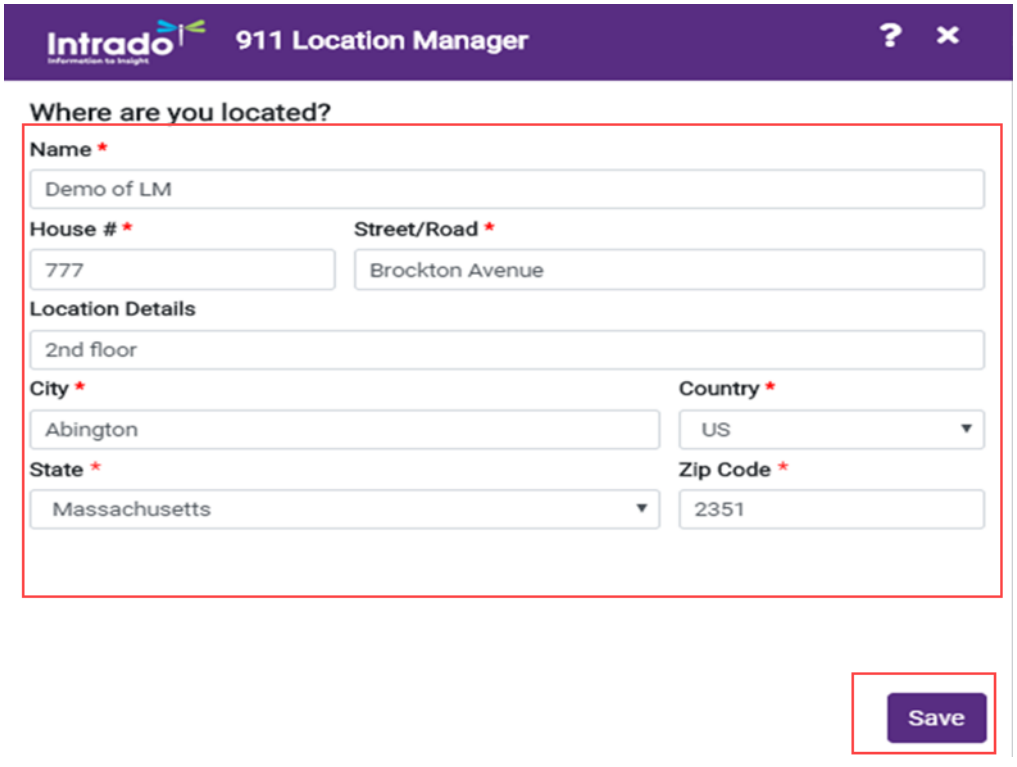
After the initial installation of 911 Location Manager, all users must provide their phone number in the **Enter your softphone number to get started** field and click **Next**. This links the user to the specific instance of the application called **Registration**.

Figure 24 : Registration



After the registration completes, the 911 Location Manager gets the location automatically if the Wiremap is created already for this subscriber. If not, the Location Manager prompts to enter the address. You must enter the address and save it. This address is mapped to the phone number/subscriber ID that you used to log in to the 911 Location Manager.

Figure 25 : Location update using location manager



Intrado 911 Location Manager is also the HELD-based client so that the location manager can get the location automatically from Intrado if the office/private network Wiremap is created by the administrator at Intrado.

As explained in Connect Client Integration with Intrado on page 22, the Wiremap is relevant only for private/office networks.

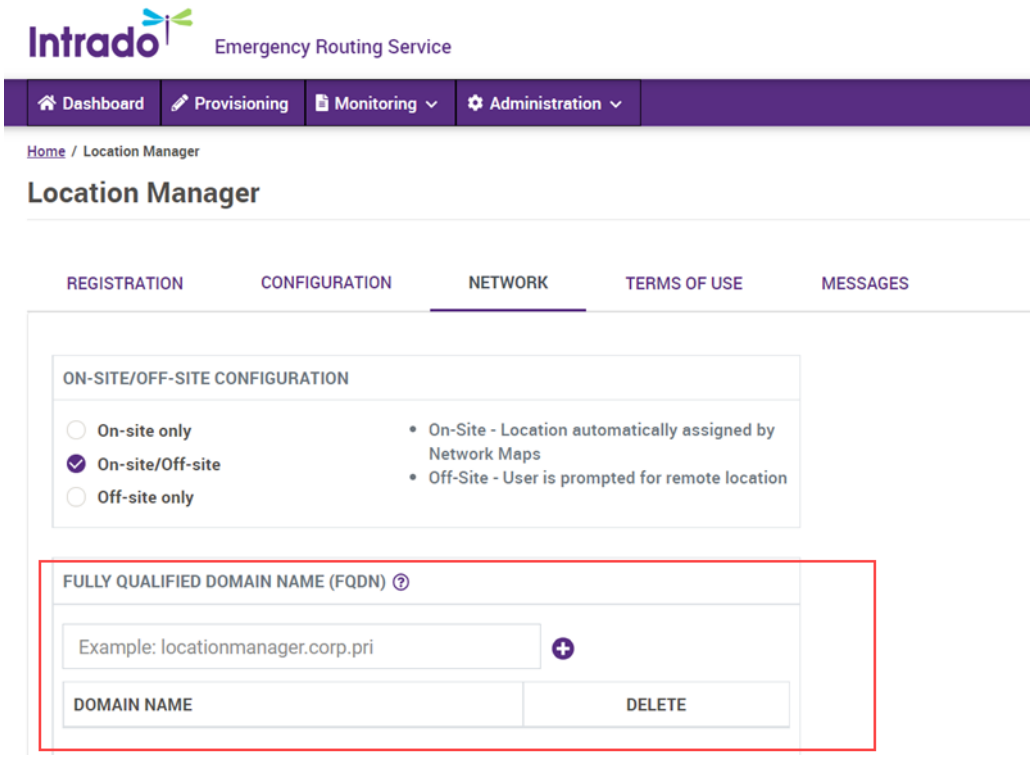
Therefore, Intrado returns the IP address to the 911 Location Manager using the Intrado Wiremap only if it identifies that the location manager is used in private/office network.

As explained earlier, how the location manager indicates to Intrado whether it is on office/private network is based on FQDN resolution by the 911 Location Manager. However, the 911 Location Manager cannot get the FQDN from MiVoice Connect. It gets the FQDN from Intrado. Therefore, the fqdnUrl configured as the HELD parameter (in the **Sites** page in Connect Director) in MiVoice Connect must also be configured in Intrado.

The fqdnUrl configured in Intrado must follow the same rule as that for configuring the HELD parameters in MiVoice Connect. That is, the fqdnUrl must be resolvable only in office/private networks, and from nowhere else.

The fqdnUrl configured in the **Sites** > **HELD Configuration** tab in Connect Director must be configured in the same way in the **Administration** > **Location Manager** page in the Intrado portal.

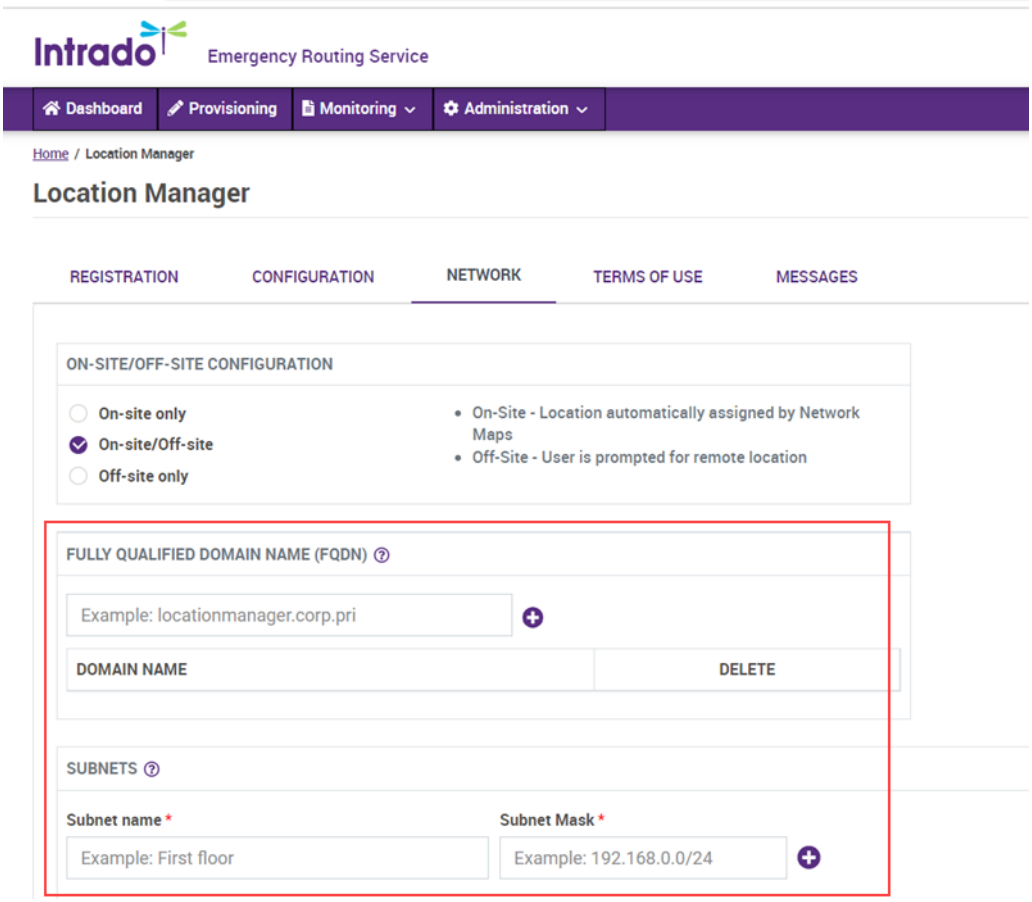
Figure 26 : FQDN URL configuration in Intrado for Location manager



Along with the FQDN URL, the administrator must add a VPN exception. This is to prevent the situation that if a third-party client user is connected to the office network using VPN, the location manager will be able to resolve the configured FQDN URL, while the user is actually in remote location. To prevent this, all the subnet addresses allocated by the VPN must be added as exceptions in the above-mentioned address resolution method. This is done by configuring VPN subnets along with FQDN URLs as in VPN Subnet exception for Location manager FQDN resolution.

Refer to the Intrado 911 Location Manager for more details on the other parameters and use cases.

Figure 27 : VPN Subnet exception for Location manager FQDN resolution

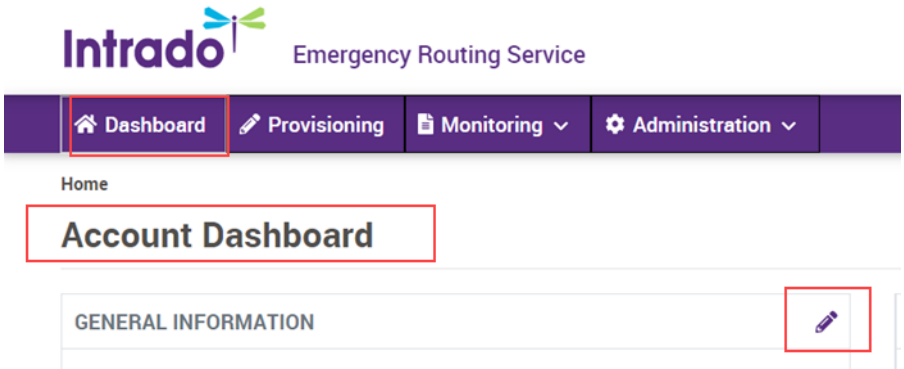


Emergency Notification Configuration

To fully conform to Kari's law, the Mitel Emergency Notification application can be used in conjunction with the Intrado Emergency Notification feature. To enable or configure the Intrado Notification feature, do the following:

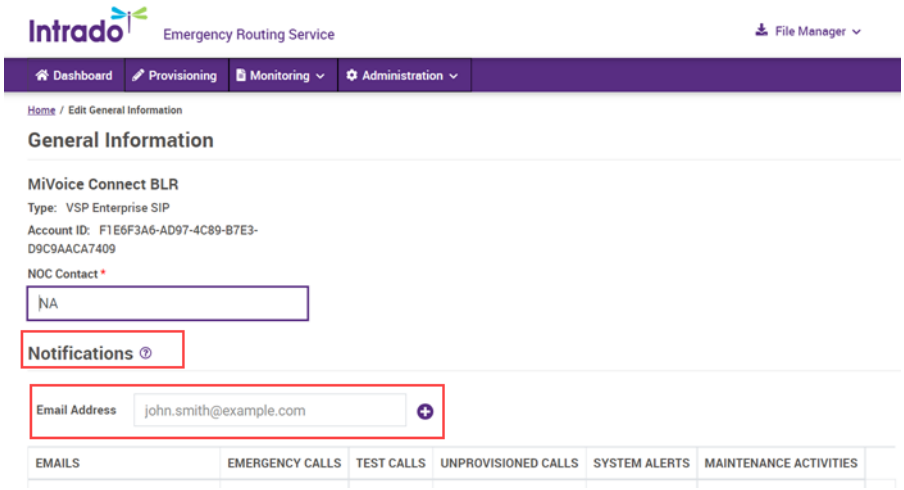
1. In the Intrado portal, go to **Account Dashboard** and click the **Edit** icon under **General Information**.

   Figure 28 : Account Dashboard page



2. In the page that opens, in the **Email Address** field, enter the email address and click **Notifications** to select the notification types required for the particular user.

   Figure 29 : Email Address field



3. The **NOC Contact** field can be used if required.

   The **NOC Contact** is the phone number of the person at the enterprise who the Intrado Emergency Call Relay Center (ECRC) would call in exigent circumstances to help resolve an emergency call issue. For example, if an emergency caller is unable to speak and cannot confirm the address or phone number, and this caller's emergency location is not yet provisioned in ERS, Intrado will call the NOC Contact number to try to determine the dispatchable location or emergency address of the caller.

Ports Used for Communicating with Intrado

The following ports will be used during communication with Intrado for 911 emergency calls:

- udp/tcp 5060
- rtp ports 10000-20000
- port - 443

Acronyms, Abbreviations, and Glossary

- **CESID** - Caller's Emergency Service Identification
- **CID** - Caller ID
- **ELIN** - Emergency Location Identification Number also known as CESID.
- **ERL** - Emergency Response Location.
- **ERS** - Emergency Routing Services.
- **Fixed devices** - Fixed device is a device that cannot be moved to another place in the enterprise without assistance from a professional installer or network manager.
- **HELD**– HTTP-enabled location discovery
- **L2** - Layer 2
- **L3** - Layer 3 of the Open OSI model
- **LIS** - Location Information Service
- **MLTS**- Multi Line Telephone System. Equivalent to a PBX, but is the nomenclature used in the RAY BAUM'S Act.
- **NG911** - Next Generation 911
- **Non-fixed devices** - A non-fixed device is a device that the end-user can move from one endpoint to another without assistance from a professional installer or network manager.
- **SBC** - Session Border Controller
- **SIP** - Session Initiation Protocol
- **TCP** - Transmission Control Protocol
- **UDP**– User Datagram Protocol