

# 8x8 Nomadic 911

## Planning Guide



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# Introduction

Nomadic 911 is a feature that enables the Emergency Response Location (ERL) associated with a device or endpoint used with 8x8 Work to be automatically updated as the device moves around. It is available in the USA and Canada only.

An ERL is the location to which a first responder is dispatched should an emergency call be made where the caller is unable to verify their location verbally. It is also used to determine which local Public Service Answering Point an emergency call should be handled by.

Nomadic 911 can be used with certain deskphone models (see [supported list](#)); and with Work Desktop via a companion application called Location Manager which must be installed separately alongside Work Desktop.

This document explains how Nomadic 911 works and suggests approaches for deploying it into your organization. Each corporate network environment is unique however and you must decide which approach or combination of approaches is appropriate for your organization.



**Caution:** Use of Nomadic 911 may not be appropriate for every situation due to practical limitations in the underlying technologies used for identifying location. It is crucial that you read through this guide carefully so that you can make an informed decision about whether and how to make use of Nomadic 911 for your environment.

For in-depth documentation on setting up Nomadic 911 refer to the [Nomadic 911 Administration Guide](#)

## Nomadic 911 Operation

In order to determine their current location, desk phones and the Location Manager application both use their local network information to look up against a preconfigured mapping of local network information to emergency response locations.

Local network information is a combination of:

- IP Subnet
- Managed LAN switch chassis ID and optionally port ID
- Wifi Access Point BSSID

Note - a managed LAN switch is one that can provide chassis and port ID information to connected devices via Link Layer Discovery Protocol (LLDP).

The operation of Nomadic 911 can be considered in three stages:

- Provisioning
- Dynamic location updates

- Emergency calling

## Administration

Your local network information must be added and maintained in the 8x8 Emergency Routing Service portal along with the Emergency Response Locations that those network elements relate to. This must be set up in advance and continuously updated as you make changes to your local network infrastructure.

Once the locations and network infrastructure are in place in the ERS portal, users can then be enabled for ERS in Admin Console. This will create a corresponding subscriber entry in the ERS portal for the user's phone number.

## Voice For MS Teams

If you are using 8x8 Voice for MS Teams then your corporate locations and network information must be added and maintained in the MS Teams Admin Portal. If you are using a combination of 8x8 services (desk phone and/or 8x8 Work Desktop) *and* Voice for MS Teams then the location and network configuration must be maintained in both the ERS portal *and* in the MS Teams Admin Portal

## Dynamic Location Updates

### Desk Phone

When an 8x8 Work user has Nomadic 911 enabled and they have a supported desk phone activated, the desk phone is automatically configured to retrieve its ERL from the Emergency Routing Service. No additional configuration is needed on the desk phones themselves, however they must be able to access the URL of the Emergency Routing Service (see [technical requirements](#) for details)

### 8x8 Work Desktop

When an 8x8 Work user has the Emergency Routing Service enabled and they have the Location Manager application installed, the app attempts to determine its own location based on its local network information similar to a desk phone. If it cannot determine its location this way it will prompt the user to supply location information.

### MS Teams

When a Teams user with Voice for MS Teams is configured for Nomadic 911, their location is dynamically updated by the MS Teams platform

## Testing Dynamic Location

To avoid the need to call 911 to verify address updates, the test number 933 should be called instead. Calls to 933 are free and will play back the location information as it would be sent to a Public Safety Answering Point.

<b>Note</b>	Testing of emergency configuration should always be performed by calling 933 and not 911.
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## Emergency Calling

### Desk Phone

When a 911 or 933 test call is placed, if the phone was able to determine its location from local network information then that location will be used in the emergency call. If the phone was not able to determine its location then the call will be sent to a national emergency call center where the caller's location can be verified verbally and then routed to the appropriate Public Safety Answering Point.

### Desktop Softphone

When a 911 or 933 test call is placed, if Location Manager has previously determined the user's location (either automatically from local network information or by prompting the user for their location), then that location will be used in the emergency call. If a location has not been set by Location Manager then the call will be sent to a national emergency call center where the caller's location can be verified verbally and then routed to the appropriate Public Safety Answering Point.

### MS Teams

When a 911 or 933 test call is placed, the location determined by the MS Teams platform is used in the emergency call. If location could not be determined, then the call will be sent to a national emergency call center where the caller's location can be verified verbally and then routed to the appropriate Public Service Answering Point

## Deployment Considerations

### General Considerations

For Nomadic 911 to work correctly, each emergency response location in your environment must be uniquely identifiable on the basis of local network connection information. Local network information can be a combination of:

- Wifi Access Point BSSID
- Switch chassis and port learned via LLDP
- IP Subnet and mask

All endpoints (physical desk phones and the Location Manager app) must be able to connect to the Emergency Routing Service. See entries for "Nomadic 911 Location Management" in the [X Series Technical Requirements](#) for details.

## Physical Desk Phone Considerations

### Supported Device Models

Not all device models supported by 8x8 currently support Nomadic 911. Please refer to [this list](#) for supported models.

### Local Network Uniqueness

To accurately determine its emergency response location a physical desk phone must have a local network environment that is unique to that location within your corporate environment.

There are two possible approaches and you will need to choose the most appropriate for your environment:

1. Use managed LAN switches with LLDP enabled such that the desk phone can use the unique chassis (and optionally port) ID to look up its location
2. Each dispatchable location has a unique IP subnet

Note that when identifying location, switch/port takes precedence over IP Subnet



**Alert:** With the common use of RFC1918 private IP space there is no guarantee that these IP subnets will be unique outside your controlled corporate network. If using IP subnet as the identifier for emergency response location it is important to ensure that physical phones are not moved away from the corporate network to one that could have a matching IP subnet and cause a non-corporate location to be identified as a corporate location.

### Wired LAN Discovery

Desk phones can learn the chassis ID and port ID to which they are physically connected and use this information to look up their location. This is supported via Link Layer Discovery Protocol. Note Cisco CDP is not supported for this purpose.

The switches must be configured to use either MAC address or Interface Name as the data types for the chassis & port ID

### Managed Switch Chassis vs Port ID

If all the ports on a network switch are in the same emergency response location then it is not necessary to configure individual ports in the Emergency Routing Service portal.

In the scenario where some of the ports are in one location and some are in a different location, then it will be necessary to configure individual ports in the Emergency Routing Service portal

## Desktop Softphone Considerations

### Location Manager Application

The Nomadic 911 solution for Work Desktop requires that a companion Location Manager app is installed alongside Work Desktop. Location Manager has been designed to be as unobtrusive as possible and can be packaged and deployed via your remote management solution (e.g. via Microsoft Group Policy).

Location Manager requires some configuration that is provided as an option to the installer and is common to all your users. This can be provided on the command line for silent remote installation:

- Account ID
- Account Token

Location Manager also requires some initial configuration that is entered via the UI on first use that is unique to each user:

- Subscriber DID

### Supported Operating Systems

The location manager app is supported for Windows 7 and above and MacOS 10.10 and above (64 bit systems only).

### On-Site vs Off-Site Behavior

Location Manager changes its behavior depending on whether it detects it is On-Site (i.e. in a corporate location) or Off-Site.

- When On-Site, Location Manager should always be able to resolve its location based on the network mapping previously set up by an Administrator. If location cannot be identified when the user is On-Site, Location Manager will NOT prompt the user to enter one and any 911 calls will be routed to a national emergency call center.
- When Off-Site, if Location Manager is not able to identify its location, it will prompt the user to provide their address.

### Identifying On-Site vs Off-Site via DNS Lookup and Subnets

Location Manager uses a combination of DNS and IP Subnet to determine whether it is On-Site or Off-Site.

#### DNS

You will need to configure a DNS A record into your internal DNS zone such that it can only be resolved within your corporate network and *not* externally. The DNS name is then configured into the Emergency Routing Service portal and is used by Location Manager to determine whether it is connected to the corporate network or not.



Note the resolved IP address is never called and does not need to be able to respond to any ping or request. Simply being able to resolve the name to an address is sufficient.

### VPN Subnets

It is expected that the DNS entry above will also resolve for users who are connected via a VPN. To compensate for this you may configure one or more subnets that are specifically allocated to those VPN connections. Location Manager uses this configuration to avoid incorrectly considering itself to be On-Site when a user is connected via VPN.

### Virtual Desktop Environments

Location Manager is not supported in Virtual Desktop environments.

## Planning Checklist

Each deployment of Nomadic 911 will be slightly different and must be tailored for your particular environment and circumstances.

The following checklist may be useful in planning your deployment:

- Gather a list of all Emergency Response Locations in your corporate environment
- Ensure that each location can be uniquely identified on the basis of network infrastructure
- List of managed network switches, their chassis IDs (and optionally their port IDs) and their locations
- Ensure managed network switches have LLDP enabled
- List of Wifi Access Points, their BSSIDs and their locations
- List of IP subnets and their locations
- Access to create a DNS record that can only be resolved internally to your corporate environment
- List of VPN IP subnets that should not be considered to be within your corporate environment
- Application deployment plan for Location Manager app
- Small-scale rollout plan for testing



**Alert:** Note that ERLs should provide a “dispatchable location” meaning one that a first responder can find and which has an appropriately small area for locating the caller. For smaller premises, the civic address alone may be sufficient, however for larger premises a secondary location such as floor, suite etc should be provided too. It is your responsibility to ensure that the locations that are configured into the Emergency Routing Service are dispatchable.

## Examples

The following examples give guidance around 3 sample organizations each with a single network layout/strategy. It is perfectly acceptable to mix these strategies and it is supported to mix these approaches across a corporate network and even at an individual location.

### Example 1

Nationwide Widgets is a business with many locations. Each location has managed switches with voice VLANs, each with a unique IP Subnet. Laptop users may move between offices and off-site remote locations and typically connect via WiFi.

Location Name	IP Subnet	WiFi BSSID
Main St, Springfield	10.27.8.0/24	aa-bb-cc-dd-ee-00
Broadway, Springfield	10.27.9.0/24	aa-bb-cc-dd-ee-11
Hill Ave, Enfield	10.27.11.0/24	aa-bb-cc-dd-ee-22
HQ Floor 1	10.22.1.0/24	aa-bb-cc-dd-ee-33
HQ Floor 2	10.22.1.0/24	aa-bb-cc-dd-ee-44 aa-bb-cc-dd-ee-55
HQ Floor 3	10.22.1.0/24	aa-bb-cc-dd-ee-66

### Recommendation

Physical Phones leverage subnet mapping to provide ERLs automatically. Ensure physical phones are not moved off the corporate network to unknown networks that could have similar characteristics to corporate networks.

For 8x8 Work Desktop leverage WiFi mapping and deploy Location Manager to all user devices so that their dispatchable location is automatically updated as they move around.

### Example 2

ACME Corp is a business with multiple large campus type locations. The IP Subnet does not uniquely identify a location however each location has managed switches with LLDP enabled.

Location Name	Switch	Port	Notes
East Side Building 1 Plant 3	aa-bb-cc-dd-ee-00		Port info not required whole switch mapped to this location
West Side	aa-bb-cc-dd-ee-11		Port info not required whole switch mapped

Building 1 Plant 3			to this location
Gate 1 Plant 3	aa-bb-cc-dd-ee-22	Fa0/7	Port level mapping.

**Recommendation**

Physical Phones switch and switch/port mapping provide ERLs automatically. Ensure physical phones are not moved off the corporate network to unknown networks that could have similar characteristics to corporate networks.

**Example 3**

Tools4U is a business that has multiple locations with non-managed network switches. Each location has a local network that is being served IP addresses that are unknown/unmanaged and may overlap at each location. Physical desk phones are used exclusively, 8x8 Work Desktop is not being used.

Location Name	IP Subnet
Main St, Springfield	192.168.0.0/24
Broadway, Springfield	192.168.0.0/24
Hill Ave, Enfield	192.168.0.0/24

In this scenario the subnets of the local network do not provide information that allows the locations to be uniquely identified.

**Recommendation**

ERS is not enabled for users and location is assigned in Admin Console. Take steps to ensure that phones are not relocated to another location.

## Configuring Nomadic 911

See [Nomadic 911 Admin Guide](#).