



# Improving 988 Routing

*Presentation for the Rural Wireless Association*  
January 25, 2024

# Agenda

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**01** Introduction

**02** Some History

**03** 988 Routing Proof of Concept

**04** Regulatory/Legislative Update

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# 01 Introduction to Intrado

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- Intrado's **origins** date to the 1970s, when two former Boulder, CO sheriffs, who knew that 911 location could be improved, started the company. **Now**, we touch 90% of the 911 calls made in the U.S. and are the largest provider of 911 call-routing solutions to carriers and PSAPs.
- **Carrier Services**
  - Provide 911 location data management and call routing solutions for 100+ carriers, including 50 wireless carriers.
- **“Command Center” Services for State and Local Governments**
  - 2500 PSAPs use Intrado's call handling equipment and integrated data services.
  - Maintain an Emergency Call Relay Center to route directly to PSAPs calls that cannot otherwise be routed.
  - Provide a nationwide “text control center” to support text-2-911. Delivered the first text-2-911 call!
- **Enterprise Services**
  - Developed solutions to allow carriers, corporate and educational campuses to comply with Kari's Law and RAY BAUM'S Act dispatchable location requirements.
- **We're a leader in the transition to NG911**
  - Developed and deployed the largest ESInet, which we provide in partnership with a major carrier.
  - Direct provider of NG911 systems in 7 states.
- **Terrestrial/satellite convergence**
  - Provide the 911 component for supplemental coverage from space in 22 countries, including the U.S., Europe, Australia, New Zealand, and Japan. Expanding to additional countries/regions.

## 01 Introduction to the Team

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### **Brian Davenport**

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## 02 Some History: How did we get here?

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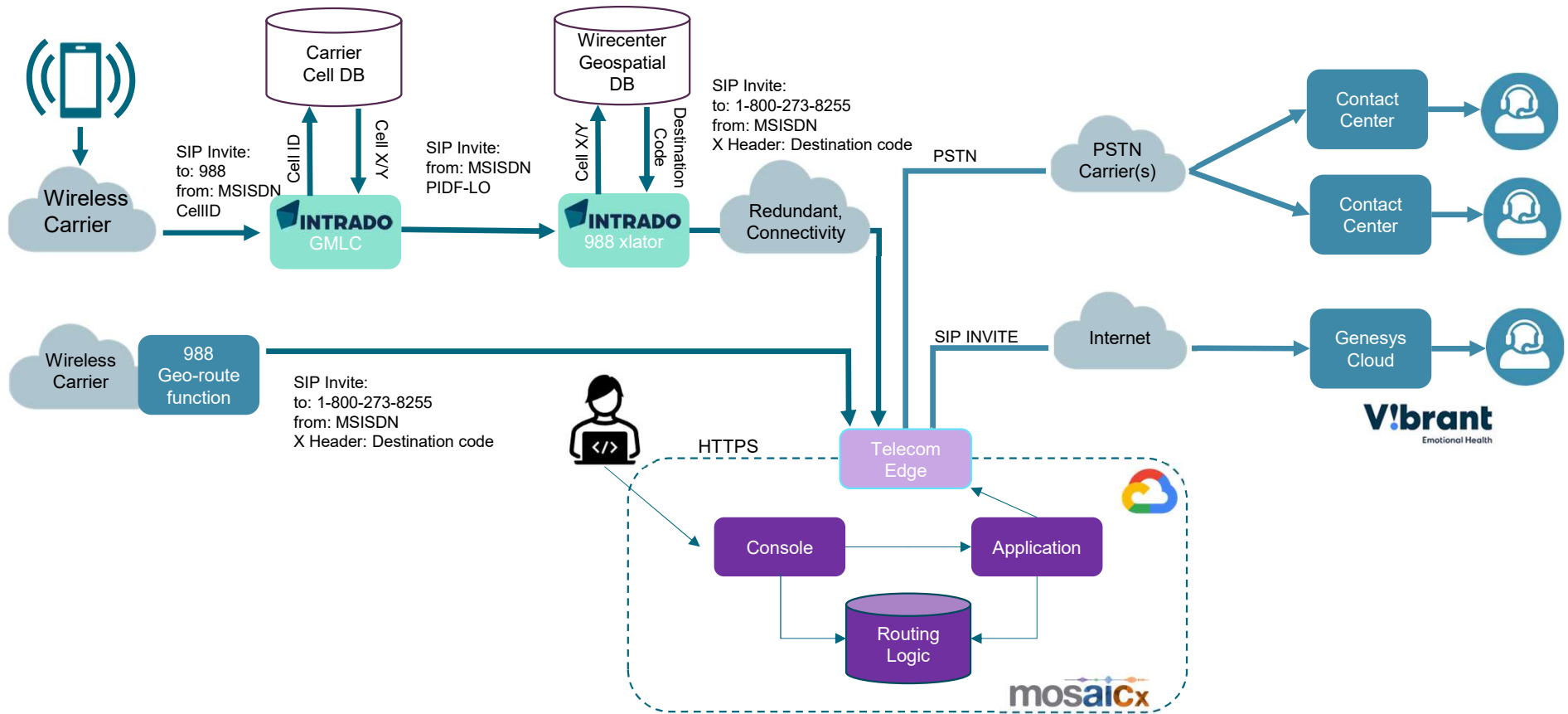
- In 2020, **Congress designated 988** as the universal three-digit telephone number within the United States for the purpose of the national suicide prevention and mental health crisis hotline system.
- **Substance Abuse and Mental Health Services Administration (SAMHSA)**, part of the Department of Health and Human Services, **is the primary owner of the 988 program**. The **FCC** is responsible for administering the **short code and overseeing reliability of 988**.
- SAMHSA chose **V!brant Emotional Health as the overall 988 administrator**, and V!brant chose Mosaicx as the subcontractor responsible for the 988 network.
- The Mosaicx network, however, is **capable of routing based only on NPA/NXX**, which has resulted in about half of 988 calls routing to a distant call center.
- The FCC held a **“988 geolocation forum” in May 2022** to discuss this problem and encouraged industry to develop a solution so that 988 calls route to the closest crisis call center.
- After the forum, **WCB reached out to Intrado** and asked us to look for a solution that would leverage existing 911 routing technology and infrastructure to improve 988 routing. We engaged in a yearlong Proof of Concept with V!brant, a major wireless carrier, FCC and SAMHSA to arrive at a solution.

## 03 988 Routing Proof of Concept

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- **POC showed how to leverage existing 911 infrastructure** for wireless calls to improve routing.
- Allows Vibrant/Mosaicx to use their existing methodology to route 988 calls.
- To achieve this result, Intrado **created a new database** that provided a “destination code” in the header by overlaying wire center boundaries on top of cell site location.
  - Example - for a call placed from Darrington, WA, by someone with a 303 (Denver) number:  
SIP TO: 1-800-273-8255  
SIP From: 1-303-810-0600  
SIP X-988: 999 360 436 0000
- **The solution is future proof** –
  - Allows for carrier networks to evolve.
  - Allows direct routing to ESInets and/or crisis call centers
  - Increases reliability by allowing diverse routes.
- **POC foundational for other use cases:** Text-to-911, VoIP, VoWiFi, roaming.
- Protects caller **privacy**.

# 03 Routing 988 Calls from Any Wireless Carrier will be Similar



## 04 Regulatory/Legislative Update

### FCC

- Chairwoman Rosenworcel has put the wireless industry on notice that 988 routing needs to be improved.
- If the FCC proposes rules, highly likely the Commission would require improved routing (X% of calls go to the closest crisis call center Y% of the time) but not rely on any particular solution.
- 988 outage reporting for providers adopted but not in effect, yet. Anticipating August 2024 implementation date.

### Federal

- Two legislative options proposed.
- One would require FCC to adopt rules on 988 georouting within about 12-18 months from enactment.
- Second would instruct FCC to create an advisory committee to make recommendations on 988 issues, including routing.

### State

- Eight states have implemented 988 fees: CA, CO, CT, DE, MN, NV, OR, VA, WA
- Several others considering a fee.
- Many states appropriating state funds to support 988.
- Cost recovery path not clear at this point.



## 05 Looking Forward: Immediate Next Steps

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### ➤ **Each carrier must decide whether it will develop a solution themselves or work with a vendor.**

- Whether or not working with a vendor, five things need to happen, and some of the work can be done in parallel.

- (1) **Carrier configures switch routing translation.** *Only* the carrier can do this because it's internal to the core network. All other activities below can be done by a vendor.
- (2) **Create a function to take the cell ID and convert to XY.**
- (3) **Create a function to take the XY and convert to destination code.**
- (4) **Build a physical route into the 988 network for 988 calls using NNI specification.**
- (5) **Deploy and test.**

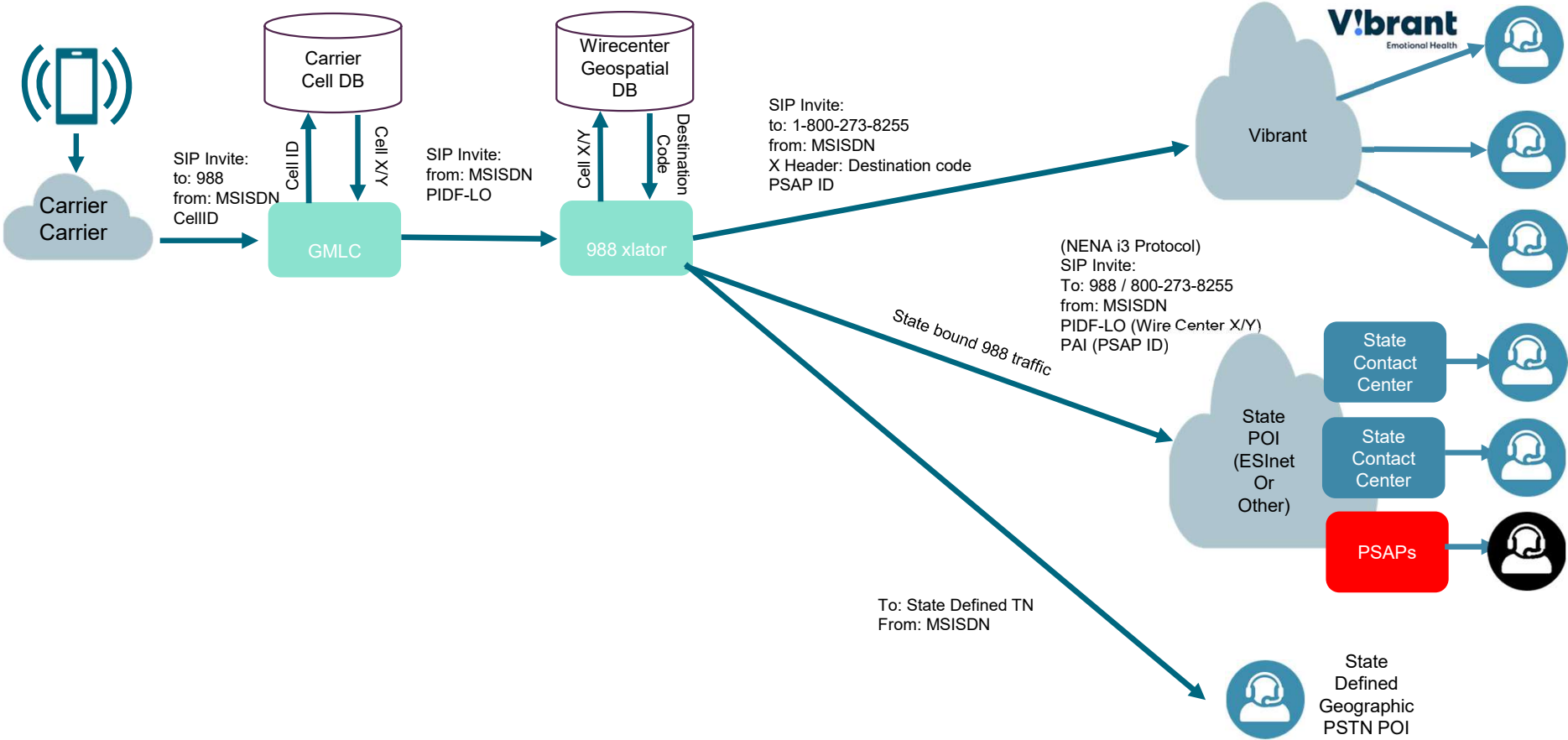
### ➤ **Serving PSAP ID Needed at Crisis Center**

- Need to address “exigent circumstances” transfer to PSAPs.

### ➤ **Routing to State ESInets**

- Near term, several States are opting out of V!brant's network.
- Long term, ESInet routing will follow NG911 deployment. Could depend on future FCC action.

# 05 Looking Forward: Direct routing of 988 calls to State POIs



## 05 Looking Forward: What Does the Future Look Like?

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- **Intrado is heavily invested in what the future looks like for 988 routing.**
  - We've published an end-to-end, non-proprietary spec. Addresses how to connect to an ESInet, [
  - Based on existing SIP technical standards = no need for additional technical standards development.
- **Launched “988 geo-routing service”**
  - Cost to carriers is an increment on top of 911 service, leveraging the existing core 911 architecture and infrastructure.
- **Exploring incremental use cases to expand 988 geo-routing to other platforms**
  - Text-2-988, VoIP, VoWiFi, Roaming
  - Working on “exigent circumstances” issue
- **Routing through ESInets is coming in some States.**
- **Regulation and/or legislation is possible by the end of this year.**

What are your  
questions?



[intrado.com](https://www.intrado.com)



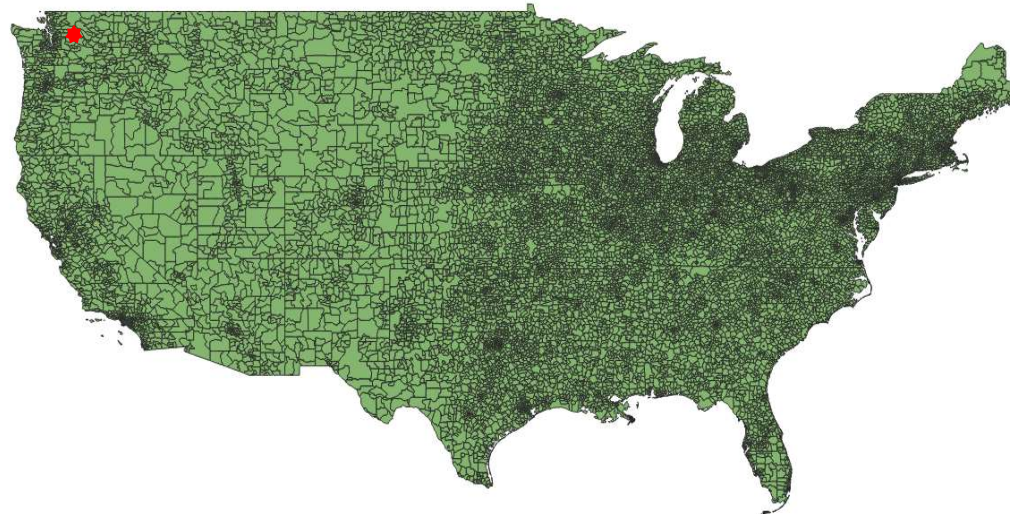
## POC Phase 2: Final Design Uses Wire Center Routing Boundary Layer

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**A wire center boundary** is a fixed geographic area that serves the telephone exchange system. Each of the 20,000 wire centers across the country has a unique phone number range (NPA-NXX-XXXX). This structure is universal across the US and maintained in perpetuity as a result of the Telecommunications Act of 1996.

**For the POC**, Intrado built a geospatial database that contains all wire centers within the US and a corresponding number range within that wire center. The corresponding number range is utilized to create a “**destination code**” that corresponds to a crisis center and is sent with the call to Mosaicx.

This new wire center-based destination code **allows Mosaicx to utilize existing geographic NPA/NXX routing schemes** to route these destination codes rather than build new translations as FIPS/county-based destination codes would have required.



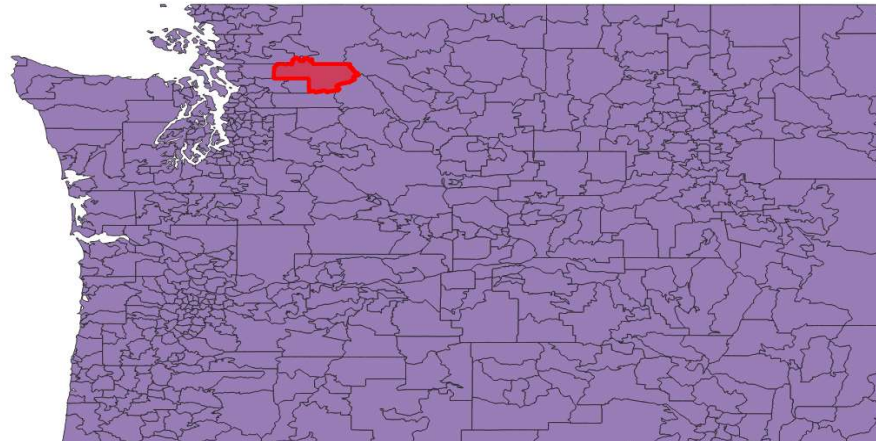
# POC Phase 2: Final Design Utilizing Wire Center Routing Boundary Layer (detail)

For production/implementation, the destination code will use wire center encoding to provide enhanced granularity:

- The destination code uses a wire center coding where the code is 999NPANXX0000:
  - 999 – Identifies x header as being wire center format
  - NPA – 3-digit identifier of NPA within wire center
  - NXX – 3-digit identifier of NXX within wire center
  - 0000 – last 4 digits (usually 0000) of the line number within the NXX

For a call placed from Darrington, WA:

SIP TO: 1-800-273-8255  
SIP From: 1-303-810-0600  
SIP X-988: **999 360 436 0000**



Feature	Value
Rate_Center_2013.shp	
WC_CODE	DRTNWAXX
(Denied)	
(Actions)	
WC_CODE	DRTNWAXX
NPA	360
NXX	436
STARTR...	0000
ENDRAN...	3999
STATE	WA
SWITCH	RSO
SERVICE...	EOC
LATA	674
OCN	4324
COMPAN...	FRONTIER COMMUNICATIONS NORTHWEST INC. - WA
OCNCAT...	ILEC
LOCALITY	DARRINGTON
EXCHAN...	DARRINGTON
RATECE...	MARYSVILLE
RC_STAT...	MARYSVILLE_WA

## 03 Learnings from Proof of Concept

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- **Serving PSAP ID Needed at Crisis Center**
  - 3% of calls need PSAP involvement
  - Wire center is not same as PSAP boundary
  - PSAP ID allows Crisis Center to contact correct PSAP quickly
  - PSAP ID passed with 988 call
  
- **Routing to State Emergency Services IP Networks (ESInets)**
  - States such as CA are/plan to routing 988 over ESInets
  - Direct routing by carriers will add redundancy to 988 routing network
  - ESInets have geo-routing built in through NENA i3 protocol
  - X/Y of wire center and serving PSAP ID can be passed to ESInet as routing key

[make sure this content goes into slides 11 and 12]



## 05 Looking Forward: Network-to-Network Interface Specification [collapse with 12]

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- Intrado has defined and published an open, non-proprietary joint network-to-network interface specification based on POC and subsequent development. Based on existing SIP technical standards = no need for additional technical standards development. POC interface is not a proprietary solution. Any wireless carrier may deploy it either working with their 911 service provider or by developing their own interface.
- There are other use cases.