# Intrado's Viper and Power911 features

## Viper CPE System Fault Tolerance and Redundancy

The VIPER and Power 911 systems have been designed so that a failure of one component does not result in total system failure, in strict accordance with NENA's "no single point of failure" guidelines. The systems support the ability to deploy solutions in a highly fault tolerant configuration, to prevent any system downtime in the event of a critical component failure and ensure the survivability of at least 50% of all emergency lines. Fault tolerance is achieved via:

- Distributed 9-1-1 trunks across a minimum of two 911 Gateways
- Redundant Application Servers
- Redundant Soft Switch Servers
- Redundant Ethernet LANs across two switches
- Redundantly powered gateway shelves
- Dual workstation NIC cards configured in Teaming mode
- Redundant Virtual Object Server Software

System reliability is enhanced by the VIPER's distributed microprocessor architecture allowing each module to operate under its own control. This independent operation prevents any single point of failure. Built-in redundant hot stand-by modules and hot swappable modules make the solution ideally suited for critical 9-1-1 applications.

## Multi-Agency/Multi-Jurisdictional Support

The VIPER and Power 911 platform is designed to support Multi-Agency/Multi-Jurisdictional operations allowing for logically segregated databases and system resources, on a single physical database server, and call handling rules on a per agency basis. Lines and Trunks, within the VIPER Soft Switch can be segregated by agency/jurisdiction to define what lines each agency/jurisdiction has access to. Data can be segregated by agency/jurisdiction to restrict access to authorized personnel only.

## Legacy and Next Generation Gateway Support

The VIPER system's IP based architecture and modular design accommodates next generation capabilities while maintaining support for traditional 911 call delivery mechanisms. Various gateway modules provide the interfaces to decode ANI (or Caller ID) and convert the voice signal to SIP. As an IP platform VIPER inherently supports Voice over IP formats. Presently the system supports the following Gateway Interfaces:

- CAMA analog
- CAMA T1 / T1 CAS
- ISDN PRI
- FXO
- SIP (NENA i3, Cisco, third party PBX)
- Ringdown (activated by off hook signaling)

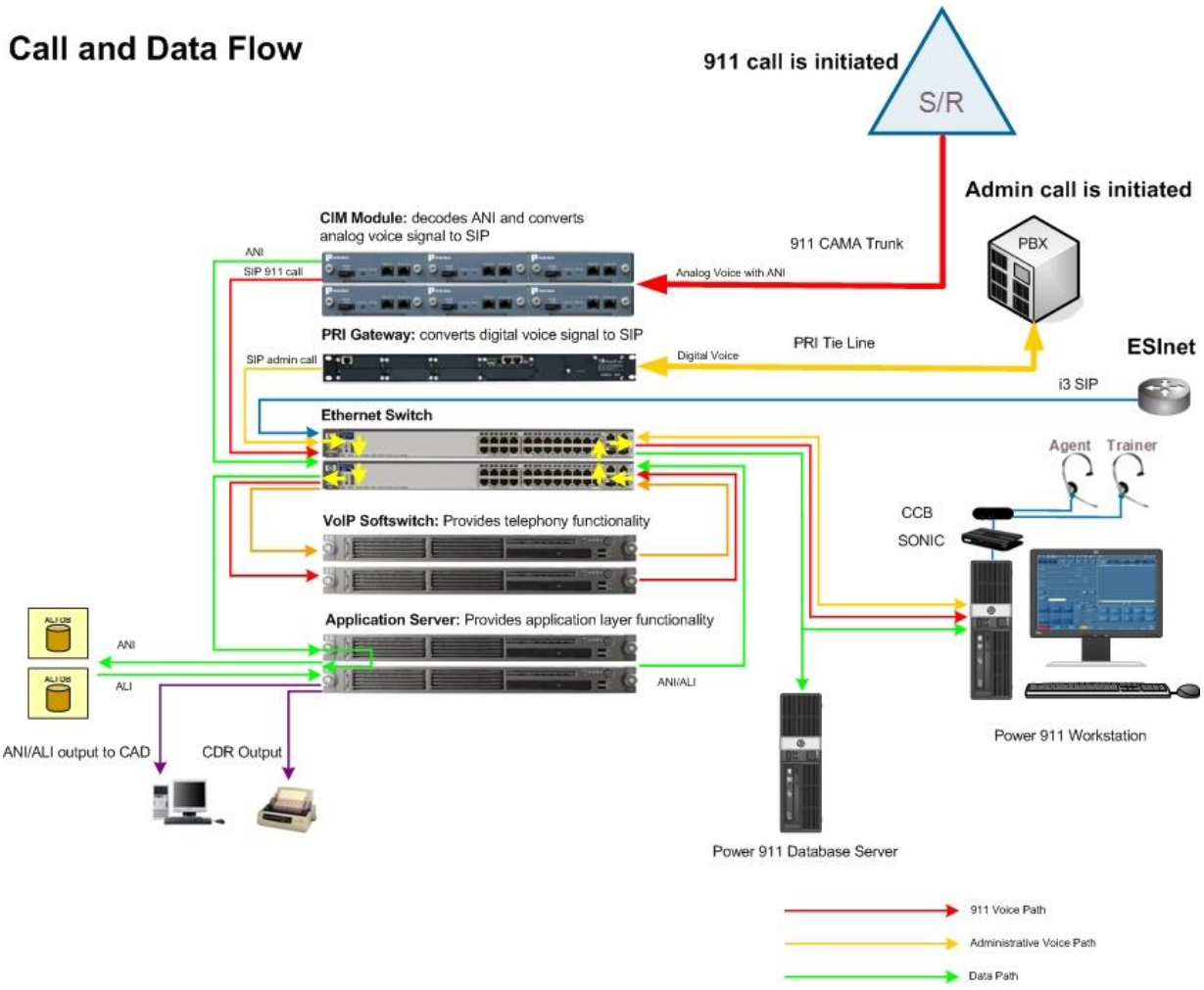


**Figure 1: Sample VIPER configuration**

As PSAP transition to Next Generation delivery mechanisms traditional gateway interfaces can be replaced or augmented to support Next Generation Gateways. As an end to end VoIP platform, VIPER is ideally suited to support the migration of PSAPs to these Next Generation systems.

## System Scalability

The VIPER system is highly scalable and can be expanded to support addition lines and positions by adding addition gateway interface modules, gateway shelves and Ethernet switches. The capacity of each component and the system expansion capabilities are described below:

- **CAMA Interface Module (CIM):** Each CIM card is capable of accepting up to four CAMA trunks.
- **Administration Interface Module (AIM):** Each AIM card is capable of accepting up to four analog administrative circuits.

- **Gateway Shelf**: Each gateway shelve can house up to three CAMA Interface Modules (CIMs) or up to three Admin Interface Modules (note CIM and AIM modules cannot be combined within the same shelf). Each CIM supports up to four CAMA trunks, for a per shelf capacity of up to 12 Trunks. Each AIM supports up to four FXO administrative lines for a per shelf capacity of up to 12 administrative circuits. The system can be expanded to support up to 16 CAMA Gateway Shelves and 16 analog administrative circuit Gateway shelves for a line capacity of 192 CAMA trunks and 192 analog administrative circuits. Additional analog capacity can be provided via alternate gateways if needed.
- **ISDN/PRI Gateway:** Each ISDN/PRI Gateway shelf can support up to 4 ISDN/PRI cards. ISDN/PRI cards are available in 1, 2 or 4 circuit capacities. The Positron VIPER can support up to 8 ISDN/PRI circuits. Intrado typically uses single circuit cards with no more than 2 cards per shelf to provide fault tolerance. Circuits cards can be individually distributed on multiple shelves (1 per shelf) to provide enhanced fault tolerance. Alternatively up to 8 circuits could be accommodated on a single shelf with the appropriate ISDN/PRI cards.
- **Ethernet Switch:** The Ethernet switch provides LAN connectivity to all components of the Positron VIPER and Power 911 systems. Typically the VIPER system is configured with redundant LAN switches, each serving one of the two parallel LANs (LAN 1 and LAN 2). Switches are available in 24 and 48 port configurations. Additional switches can be added as additional capacity is needed.

Remote and Geographical Diverse Architectures

Intrado's VIPER and Power 911 systems provide an end to end IP solution with no signal conversion between the controller and the local or remote call taker positions. Based on an architecture that relies solely on IP connectivity, the VIPER is ideally suited to support remote solutions and geographically-distributed architectures. Connectivity between sites is simplified and can be supported with a single data connection without any loss in functionality. The system's IP-based architecture and modular design support an array of design options that can accommodate:

- Standalone Solutions
- Host with Remote Solutions
- Remote Site Survivability (via locally deployed survivable gateways)
- Geographically Diverse Call Processing (via Satellite VIPER Nodes and locally deployed gateways) to minimized WAN bandwidth and provide enhanced remote functionality when a PSAP isolated from the host
- Fully Redundant Geographically Diverse Solutions (with VIPER Multi-Node solutions)

VIPER Multi-Node

Fully redundant geographically diverse solutions are supported via Intrado's VIPER Multi-Node solution. In a VIPER Multi-Node solution geographically distributed VIPER Servers (Nodes) operate simultaneously and independently. Each node consists of redundant VIPER Soft Switches and Applications Servers which provide telephony and application layer functionality, respectively. Incoming traffic is distributed across two separate instances of the traditional VIPER Soft Switch and Application Server pairs. In this design, four (4) VIPER Soft Switches and four (4) Application Servers are deployed (i.e. 2 groups/clusters of 2 Soft Switches and 2 Application Servers).

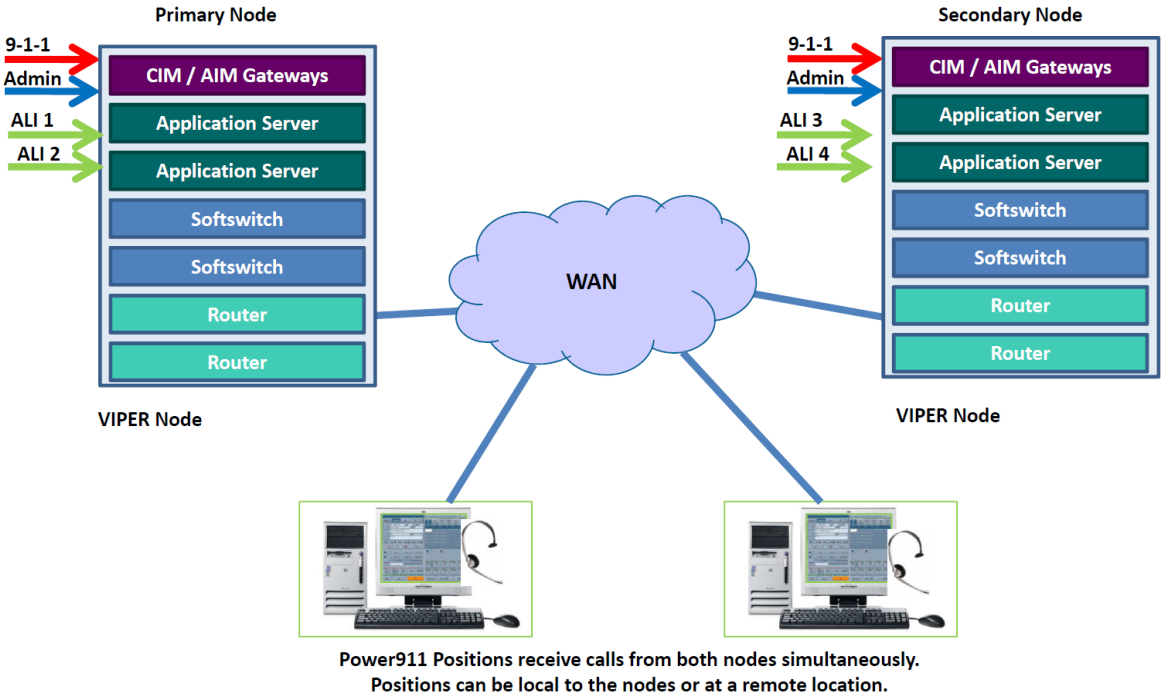


**Figure 2: Sample Multi-node Architecture**

As with the traditional design, within each group/cluster of VIPER Soft Switch pairs, one acts as an Active soft switch, and the other is in Standby state (in Standby, it is actually monitoring the Active soft switch and call states, and is prepared to take control automatically if required). Power 911 call handling positions receive calls from both VIPER Soft Switch groups ("clusters") simultaneously. The processing of calls from two separate nodes is transparent to the call taker.

VIPER Gateways managing incoming traffic (CIM, AIM and Mediant - T1/ISDN/PRI) support the ability to redirect their traffic to an alternative node should communication be lost with the primary node. In other words, the system automatically recovers to full 100% capacity without any user intervention. Consequently multi-node configurations provide host backup capabilities and enhanced fault tolerance (with two VIPER Soft Switch and Application Server pairs) in scenarios where system availability at one of the nodes is compromised.

# Power 911 Graphical User Interface

Call handling is performed through the Power 911 workstation's highly intuitive and customizable Graphical User Interface (GUI). The Power 911 GUI provides call takers with on-screen control of landlines, wireless calls and text messages. Through an intelligent approach to information display and management, Power 911 enhances emergency call handling efficiency and consistency.

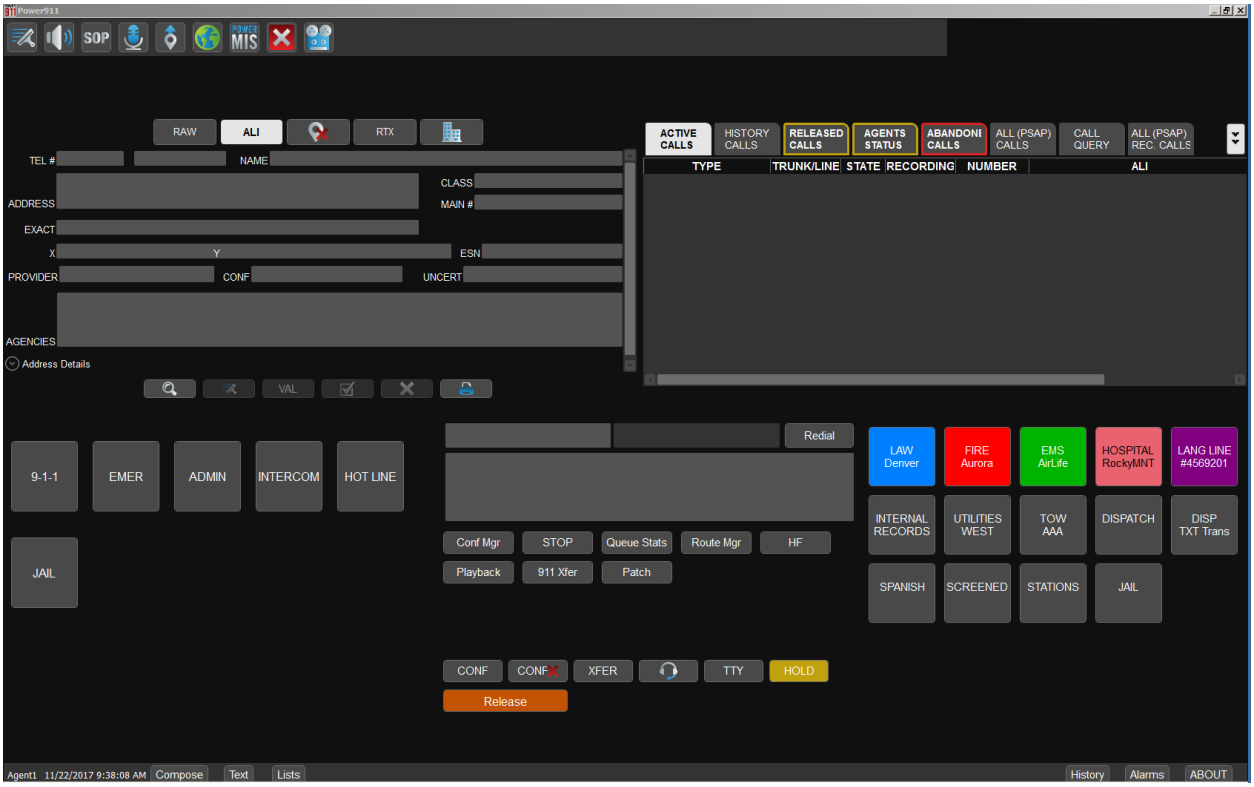


**Figure 3: Power 911 GUI**

Power 911's highly intuitive GUI enables rapid assimilation of the system features by new users, including those with limited (or no) previous PC experience. Most features are accessible through point and click operations. The features available through the GUI include:

- Automatic number identification (ANI)
- Automatic location identification (ALI)
- Incident creation: Used to enter and display incident information
- Standard telephone features, including call transfer, conferencing, accessing voice mail messages, and the ability to make outgoing calls
- Voice recording
- TTY capabilities (for communicating with hearing- or speech-impaired callers)
- Database queries (to retrieve historical information)
- Manual ALI searches

- A message board for sending and receiving internal text messages
- A panel used to respond to incoming 9-1-1 texts.
- A panel used to record custom greetings
- Volume control for audio devices
- Access to premises information and standard operating procedures (SOPs)
- Address validation using MOSAG or Intrado Location Manager (ILM)
- Display of system messages
- Pop-up hints that appear when the cursor is positioned over a button
- Multiple-language support for GUI text
- A panel used to monitor ACD queues (Route Manager Panel)
- Dynamic Agent ACD queue assignment (Route Manager Panel)

In addition, Power 911 also has a comprehensive list of keyboard shortcuts to perform virtually all functions via the keyboard. As call-takers become familiar with Power 911, they can take advantage of this convenience feature.

The various modules that make up the Power 911 GUI are moveable, resizable, and can be placed in any location on the screen, including multi-monitor setups. Modules can be enabled or disabled as required. Different layouts can be configured to accommodate each and every agent role and preference. The goal is to provide the most comfortable layout to the end-user while minimizing the number of screens required.

A layout editor tool is provided with Power 911 to create the new layouts. While in layout configuration mode, the system administrator can position and re-size primary and secondary panels through simple drag and drop operations. Display rules can be assigned to each panel like “Always visible” (set as primary panel) and “Always On Top” attributes to adapt to the Windows environment. When the GUI design is completed, the user simply locks all panels and save the resulting layout. Using Power 911 profiles, newly created layouts can be assigned to any workstation, agent and/or role, or be defined as the common layout for use by all (PSAP Profile). Pre-defined security provisions ensure that only authorized personnel can modify layouts.

## MapFlex 911

MapFlex 911® utilizes a server/client architecture and employs redundant (primary and backup) servers to forward incoming ALI information to call taker positions for optimal map rendering and 9-1-1 call plotting. Its use of locally sourced GIS data provides highly accurate information and enhanced situational awareness to PSAP personnel.

When a call or event is received at a workstation the map zooms to the caller location based on an administrator configured map scale, and the location is plotted on the main map display window.

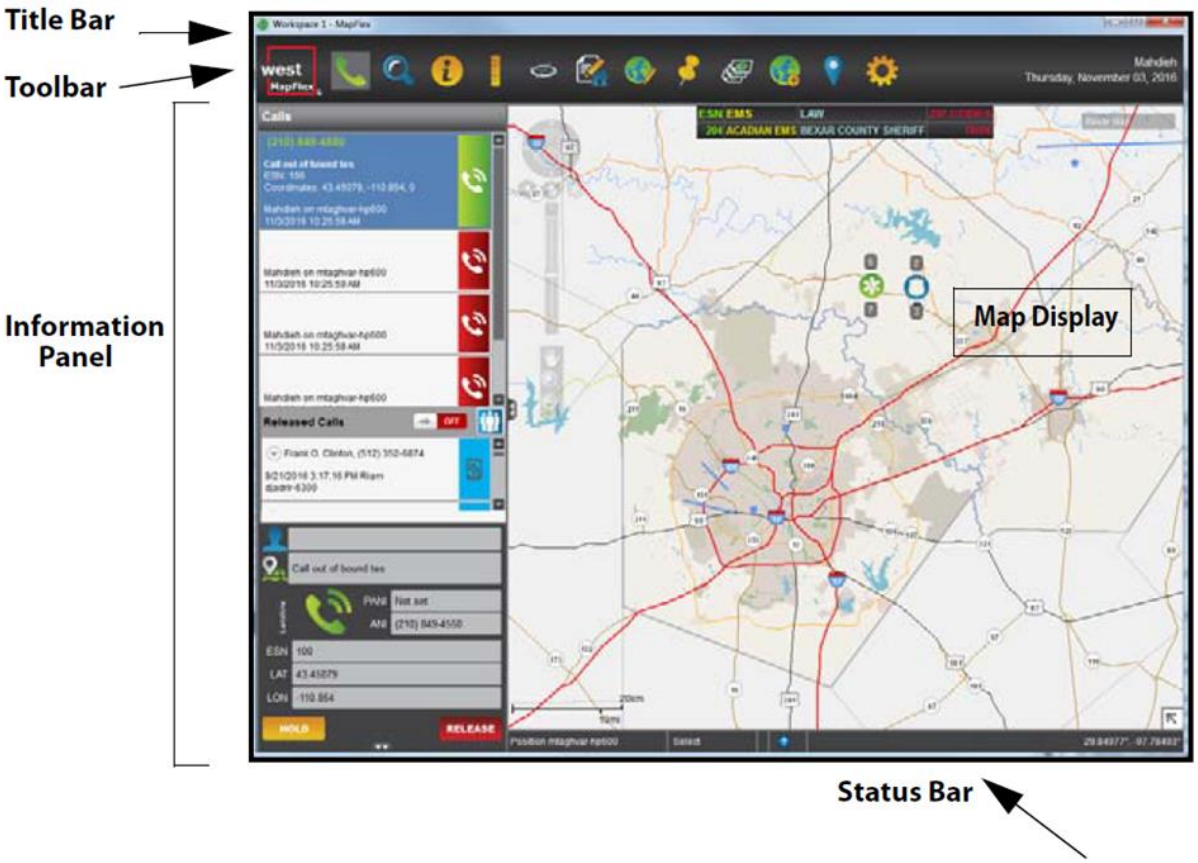


**Figure 4: MapFlex Graphical User Interface**

Events are displayed using color coded icons to represent Call Status and Class of Service.

- Landline calls
- Phase I wireless calls
- Phase II wireless calls
- Voice Over IP (VoIP) calls
- Text calls

MapFlex 911 uses information from the telephony system to display the locations of calls and incidents on the map. When utilized with Power 911, calls are presented on the map immediately after a valid ALI is received. This allows users to process calls directly from the map. Users can answer a call, put a call on hold, initiate a call to a responder agency, or release (disconnect) a call through the map.

When MapFlex is configured to show wireless call locations, it extracts information on the cell tower that carried the call from the ALI. An approximate location of the call, based on the GIS data provided (mapping coordinates, cell faces and broadcast range of that cell tower) is shown on the map.

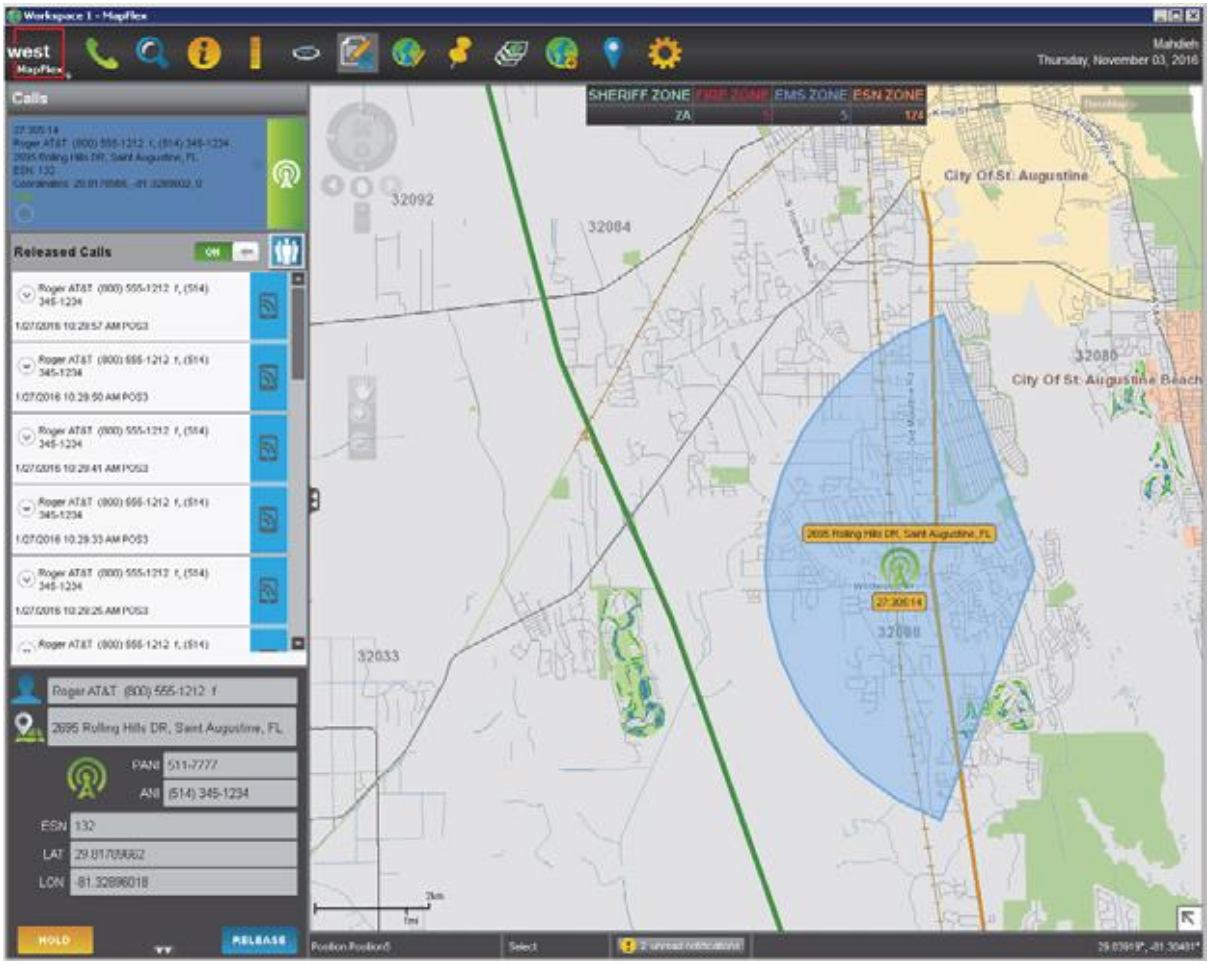


**Figure 5: Wireless Call Displayed with Sector ID**

With MapFlex 911 users can monitor all emergency activity within the PSAP's jurisdiction and create custom pins and annotations in the map to manage the incidents that they are handling. Users can also access detailed information about a call, incident, or other location (such as a school, hospital, or factory), search for locations, use tools to plan evacuations and measure distances. With its highly configurable and intuitive set of tools, MapFlex 911 provides call takers with vital information regarding emergency situations.

## TXT29-1-1 Text Messaging

Intrado's TXT29-1-1 solution is supported through Intrado's Power 911 system and is aligned with the NENA i3 Reference Architecture and ATIS/TIA Joint Standard (J-STD-110) that was developed to support text messaging to 9-1-1. The Standard defines the architecture, methods, and protocols for SMS messaging to PSAPs

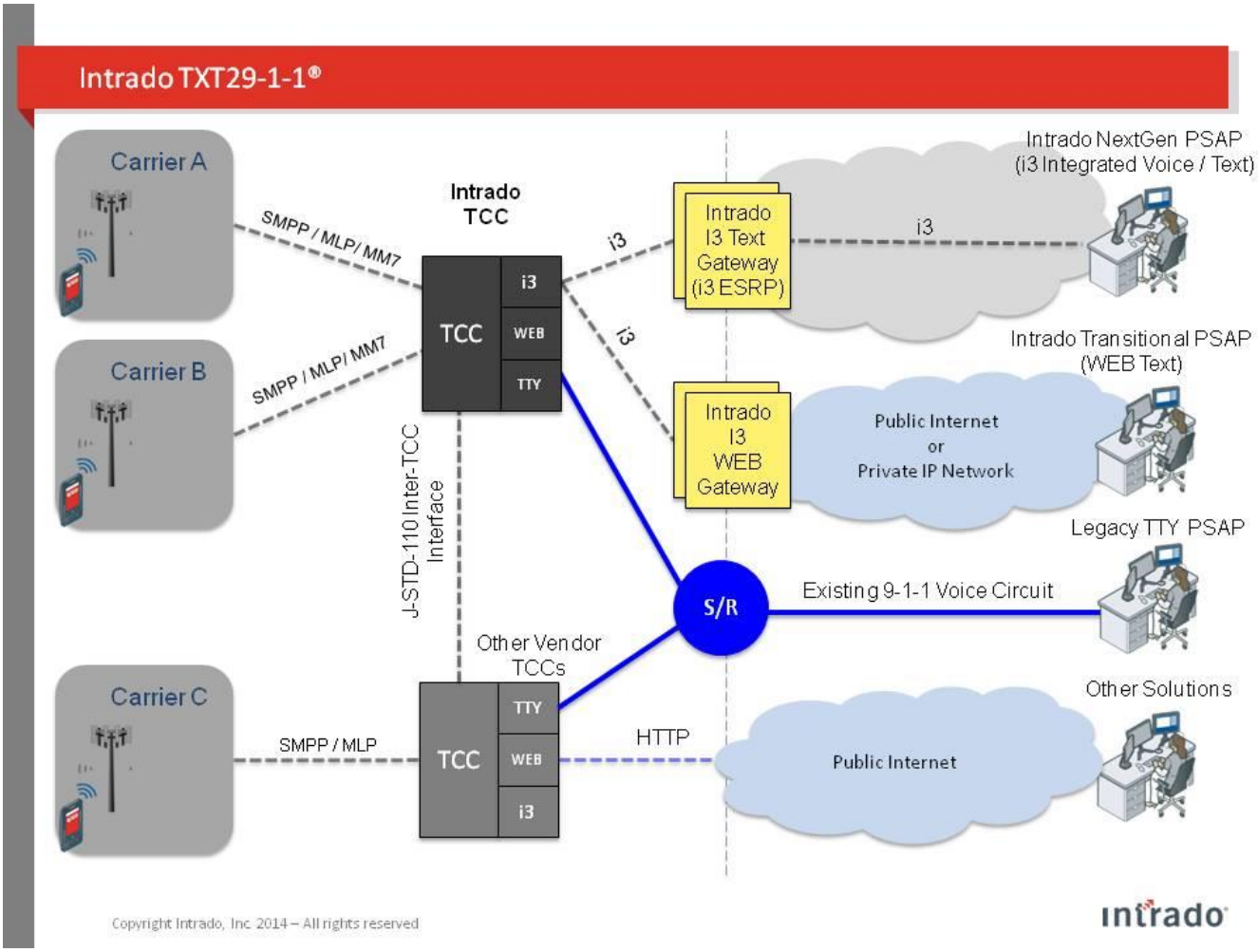


**Figure 6: TXT29-1-1 Architecture Overview**

Though PSAP's will need to request text messaging from each wireless carrier serving their jurisdiction, Intrado's TXT29-1-1 consolidates text messages from all carriers, streamlining the workflow. The use of a single display interface eliminates the need for carrier-specific user interfaces for each wireless carrier and provides a consistent means of communicating with each individual texter.