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# 9-1-1 Location Data and Multi-line Telephone systems

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TeleCommunication Systems (TCS)  
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# TCS and Public Safety

Public Safety Solutions - leader in Public Safety solutions for Wireless E9-1-1, NG9-1-1 and E1-1-2

- Deployed the first U.S. wireless E9-1-1 solution in 1996
- Wireless and VoIP E9-1-1, together with our Wireline E9-1-1 solutions, serve over 140 million Wireless and IP-enabled devices and process half of all U.S. wireless E9-1-1 and VoIP 9-1-1 calls or over 150,000 calls per day from serving over 140M Wireless and IP-enabled devices
- The nation's only TL 9000-certified wireless and VoIP E9-1-1 Network Operations Center (NOC) outside those run by Carriers
- Pioneering work done in improving the methods by which U.S. public safety answering points (PSAPs) can receive a wireless and VoIP subscriber's location during calls for emergency assistance.
- Meets Wireless E9-1-1 Phase I and Phase II FCC requirements
- Provide NENA VoIP i2 E9-1-1 service
- Provide Geo-Spatial routing based on X/Y, MSAG , or USPS based addresses
- The only TL9000 certified NOC outside of a carrier environment provides 24x7x365 monitoring and support
- Operate 2 data centers that have provided 6+ years with 99.999% uptime
- Active in wireless E9-1-1 legislation and standards, we continue to be a leading innovator in wireless public safety solutions.



## TCS Strategic Offers include

- Location & Messaging Infrastructure
- Location-enabled Applications
- End-to-End Satellite Solutions
- Wireless & VoIP E9-1-1
- Cyber-Security





# Some of TCS' customers

## Commercial Customers



## Government Customers





# Agenda

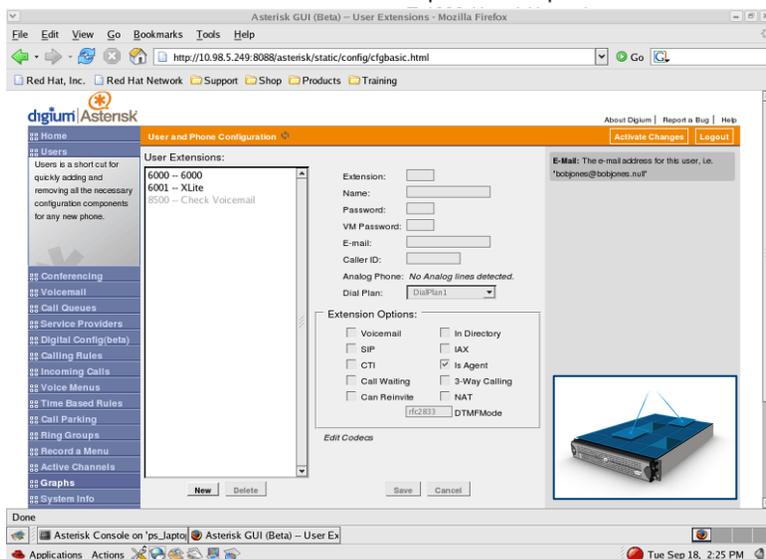
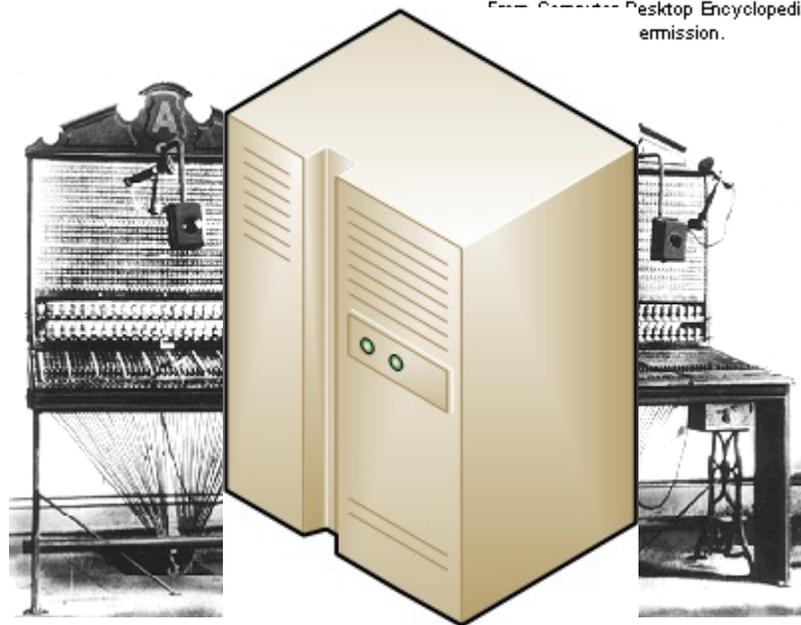
- TeleCommunication Systems (TCS) - An Introduction
- Multi-Line Telephone Systems-MLTS/PBX - A Short Overview
- E9-1-1 issues faced in dispersed PBX environments
- Common scenarios where getting accurate “Location Information” still remains elusive
- How can this Location Gap be bridged
  - Best practices on tracking and updating
  - Validating and matching caller location data
  - Solutions available today
- Questions



# MLTS/PBXs - A short Overview

Private Branch Exchanges are in essence an in-house telephone switching system that interconnects telephone extensions to each other as well as to the outside telephone network...

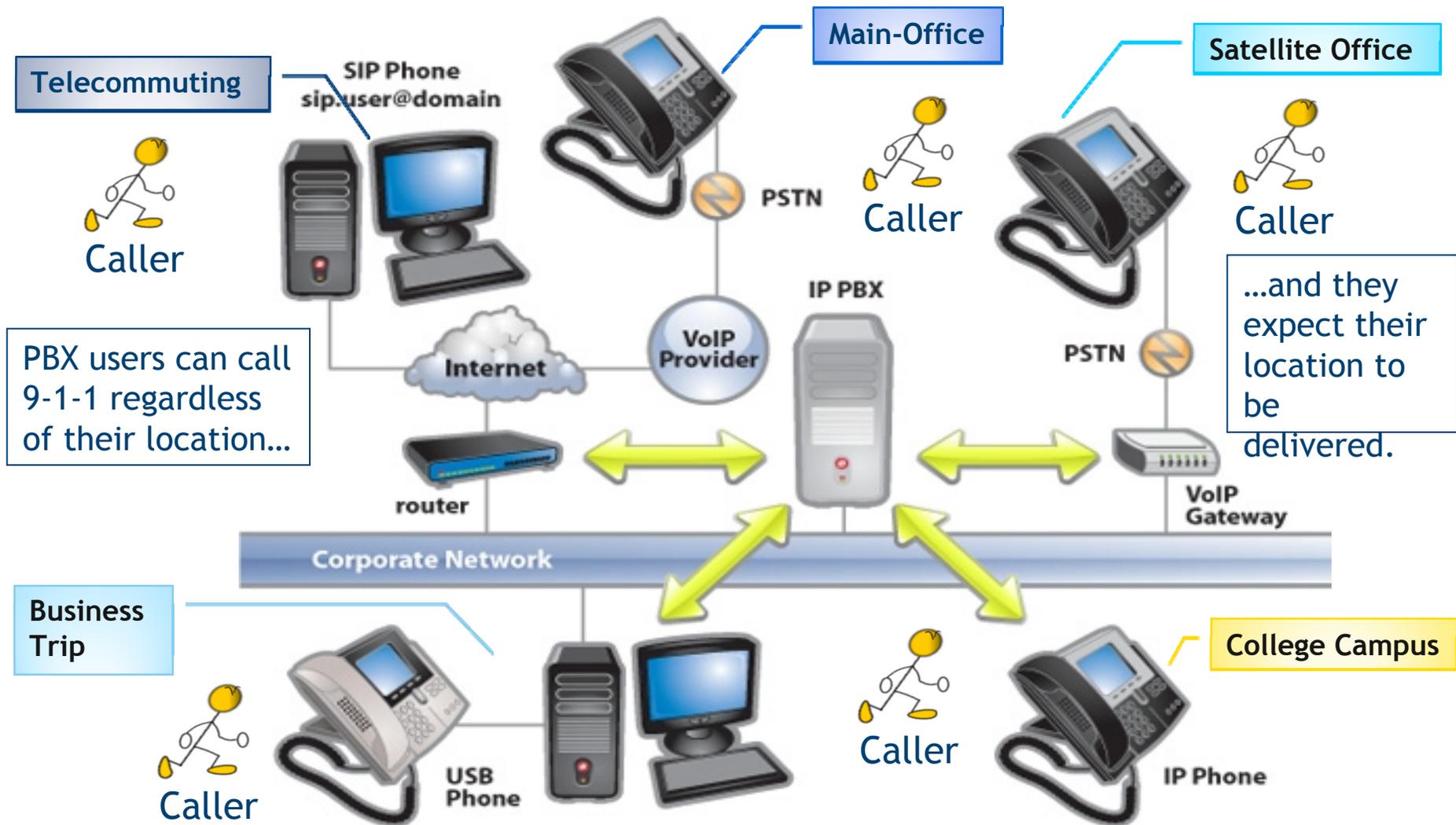
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...they have evolved from Switch-Board hardware to Key based Systems, to very complex digital electronic switches (E-PBXs), and finally to software-based IP enabled switches...



## So why does using a PBX seem to exacerbate the “Location Determination” issue





## PBX's can be location-ally challenged...

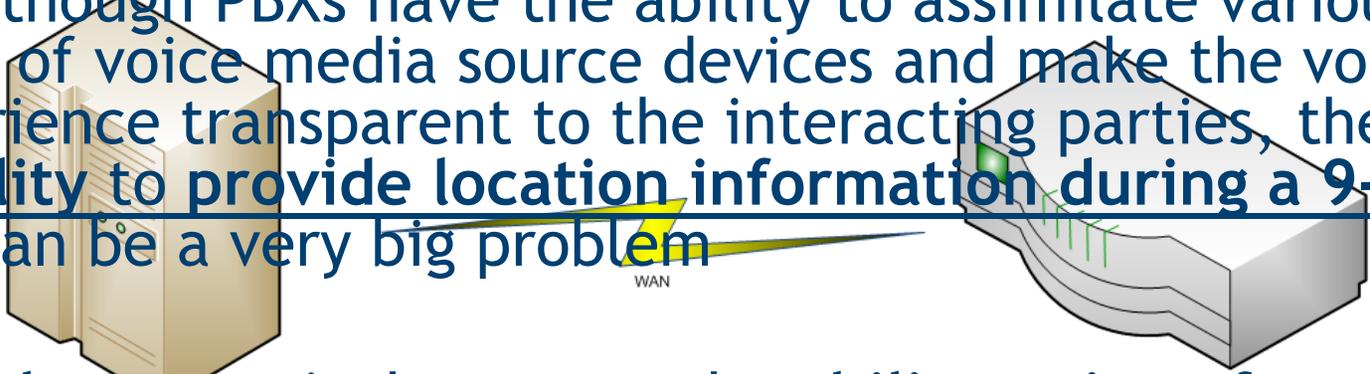
- A PBX's sole existence is to make sure that **multiple inbound calls** all get **routed** to the intended individuals', and outbound calls complete successfully all while using voice trunks in the most optimal manner possible while being "**Location Agnostic**"
- Key drivers behind the evolution of PBX's has been **simplifying configuration/management, scalability,** and above all **efficient** use of voice resources
- 9-1-1 is generally an after thought, and in most cases viewed as just another number that a caller connected to the PBX should be able to dial since that is mandated by law



# PBX driven phones are known to get lost...



- Even though PBXs have the ability to assimilate various types of voice media source devices and make the voice experience transparent to the interacting parties, their inability to provide location information during a 9-1-1 call can be a very big problem



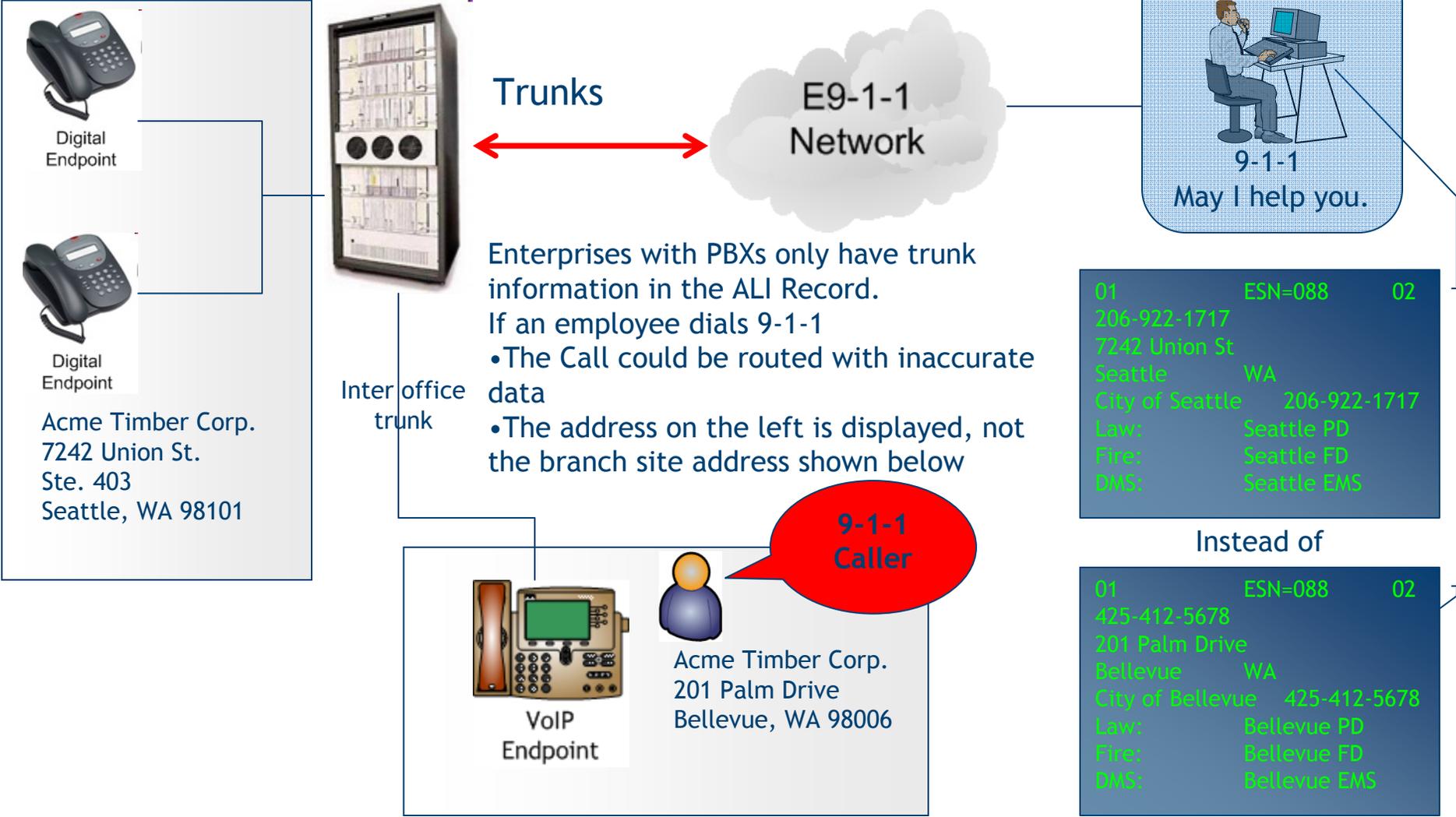
- PBXs do not natively possess the ability to interface with 9-1-1 infrastructure and provide location information during a 9-1-1 call to the Public-Safety entities serving residents



- To further aggravate this situation many owners that use PBXs are unaware of this issue, and if they are, have little incentive to correct the predicament this puts them in



# Why the location impairment





## How is this Location Gap bridged

- Use of a database that gives the Enterprise the ability to store a 9-1-1 caller's location with the ability to update the data in real-time
- Use of a service or system that:
  - updates the caller location in (near) real-time
  - delivers enhanced data on behalf of the Enterprise when a 9-1-1 call is dialed

Lets look at the best practices...



## Best Practices - Some solution options

- One approach incorporates the use of:
  - “Location Information Server” (LIS)
    - Gives the Enterprise the ability to:
      - automate the collection, validation (MSAG), storage, and management of employee/telephone location information
      - empower employees to manage their own “location profiles”
      - store enhanced location information that could significantly save “location determination” time during a 9-1-1 call
      - provide the caller’s latest validated location information to the requesting service during a 9-1-1 call
  - Another approach makes use of:
    - **Wire-Map Database System:** gives the Enterprise (Admin) the ability to keep a record of the employee/phone location on file and the required interfaces to ensure that data can be updated easily (adds, moves & changes)
    - **ALI-DB Update System:** enables the Wire-Map Database System (via a physical link) to update the ALI-DB records with accurate caller location information as “location change events” occur



## But what is a Location Information Server...?

- A Location Information Server (LIS) serves as a **container/repository** for subscriber location information.
- Location information can be in the form of a **civic address** and/or **geo-spatial location** attributes (lat/long) associated with a particular physical location.
- The LIS is configured with mappings between individual location elements and a logical representation of the physical locations with which they are associated. This set of associations is referred to as a **“Wire-Map”**
- Has the ability to request address validation against MSAG data to ensure that the information delivered to the PSAP is acceptable and in the correct format



## Address matching and Location Validation

Accurate and unambiguous civic addresses or locations for any subscriber—whether VoIP, wireless, or landline—are essential to E9-1-1 systems. Currently, PSAPs (public safety answering points) validate caller location with a locally managed dataset known as an MSAG (master street address guide).

- TCS' RAVE911™ (Real-time Address Validation Engine), a scalable address validation service that provides accurate real-time responses and meets the 9-1-1 requirements for VSP's, Cable MSO's, ILEC's, CLEC's, and any other provider offering nomadic or fixed-line voice service.
- RAVE911's revolutionary process of matching the subscriber's location (service address) to the MSAG data assures the provider has validated location data for that subscriber that can be used at the time of a 9-1-1 call.
- RAVE911 employs an innovative method that adopts a patented three-tiered approach to searching, matching, and validating subscriber location data:
  - Automatic validation: Upon receiving a call for emergency assistance, RAVE911 automatically validates a civic address and associates MSAG data contained in the TCS validation database.
  - Semi-automatic validation: Should a record fail to match, RAVE911 returns MSAG-compliant alternatives which are then analyzed and compared to ensure validation.
  - Assisted validation: If a record still can't be processed, a 9-1-1 analyst can use Live911™ - TCS' state-of-the-art web-based tool to match the subscriber's location (service address) to the corresponding MSAG in an efficient and managed environment.



# MSAG Validation

