



Why VoIP for the PSAP?

**Strategic opportunity using
history's roadmap**

This document provides a high-level overview of VoIP technologies and issues . For complete product details, please refer to the release documentation; contact CML by e-mail, insidesales@cmls.com; or phone 1-877-CML-2911.

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Strategic opportunity using history's roadmap

The public safety industry is confronted with technology from all angles – every step of the process from the reporting of, responding to and resolving emergency incidents to planning new communications infrastructures. Technology and emergency services are interlinked today as never before.

This paper examines:

1. the general adoption rates of VoIP across a number of market segments,
2. why it makes sense for PSAPs and emergency services organizations to embrace this technology and
3. provides a proven roadmap for VoIP implementation.

A key driver of VoIP technology – the delivery of voice, data and video – is that it leverages and optimizes a single converged network, based on well-established infrastructure subsystems. Subsequently, cost savings in implementation, productivity and future enhancements are compelling for organizations across a number of vertical industries and levels of government organizations; ranging from local, state, regional and federal. The technical and productivity drivers of VoIP are numerous, such as the ability to provide more accurate incident information, and IT personnel being able to implement maintenance and support from remote locations.

There is a significant amount of hyperbole and hype around the rate at which VoIP is being adopted in the consumer and commercial markets. However, when looking at revenues of IP telephony equipment, the numbers are persuasive and point to rapid adoption levels. According to a 2003 study by International Data Corporation (IDC), this year's equipment revenue is expected to be \$4.7 Billion or a 48% increase over last year, and by 2007 is expected to be \$15.1 Billion, approximately a 308% growth in three years.

Nevertheless many people become confused when the topic is IP-based networks. Often when IP-based networks are discussed and described, immediately it is assumed to mean the public Internet. This is not so in building out Public Safety Networks. IP-based networks can and do interconnect with the Internet, but in most cases Public Safety Networks will use private managed IP networks. The Public Safety Networks discussed and described herein are built with redundancy, reliability and fail-over as primary design goals.

From the perspective of the PSAP, common barriers to adoption of VoIP technology concern the reliability and robustness of IP-based networks. The most common frame of reference for VoIP conversations, metaphors and analogies is the day-to-day office experience with a desktop PC/Macintosh – i.e. "the e-mail server will be offline while we perform an upgrade." Such environmental downtime and the need for regularly scheduled maintenance is not dictated by the technology but rather by business decisions involving cost and availability trade offs made when designing networks for non-mission-critical applications. VoIP networks and IP technologies used

for mission-critical applications are designed with different criteria and trade offs such as redundant servers, diverse routing, and Managed Private Networks.

When building a Public Safety Network using IP technology, the PSAP should consider a number of issues: Any complexity must be managed by the technology not the public safety personnel;

- networks must be engineered to support configurations in a multi-vendor, multi-protocol environment;
- products must be reliable and networks must be survivable;
- and solutions should increase capabilities while maintaining or lowering costs.

With these criteria addressed, IP-based technology will allow PSAPs to address key concerns:

- Response time;
- Accuracy of response;
- Reliability and survivability of infrastructure;
- Cost effectiveness.

Focus on the caller, not the technology. Public Safety personnel want information that is accurate and reliable and they want to be able to act on it – immediately. Effectively answering emergency calls is their top priority. Old and new technology must always support and advance this mandate, never hinder it.

You cannot send a response team if you cannot locate the caller. From identifying an emergency call and determining accurate location information to identifying the right PSAP to process the call – accurate location information is key. Many PSAPs are now beginning to receive emergency calls from softphones, IP enabled handsets and other IP connected devices. First, is it important to train your personnel on how to identify these calls and to help them to understand how to ascertain accurate location information. Until the IP infrastructure is standardized and location determination technology and functionality is built and rolled out, call-takers need to understand how to process and respond to VoIP calls effectively and efficiently.

Strategic Opportunity. Knowing that VoIP, IP-based networks and networking is not an “if” but a “when” reality, PSAPs have a real opportunity to use a well-traveled roadmap, the traditional telephone network, to accelerate the implementation of IP enabled networks and avoid hurdles of past implementations. When the traditional telephone network expanded to accommodate wireless telephony, the transition presented inherent challenges; challenges associated with location, capacity, response times, network engineering, call taker training and PSAP operations and operational procedures. The move to implement IP-based networks and to process VoIP based calls does not have to present the same challenges to the PSAP because the lessons from wireless are learned. VoIP is a destination. PSAPs can follow a roadmap to it.

ROADMAP

Location X,Y

Location plays an integral role, but the responsibility lies with the network to deliver that information. The PSAP requirement is to request and receive location information that can save lives. VoIP location accuracy will likely improve over time similarly to the developments for wireless. PSAP concern has to focus on putting the available location information into action.

Wireless

- Phase 0 – voice, no location
- Phase I – voice, identify tower
- Phase II – voice, X,Y and movement

VoIP

- Phase 0 – voice, no location
- Phase I – voice, physical location in the network (PBX, router)
- Phase II – voice X,Y and movement (GPS, WiFi triangulation)

Architecture

The VoIP architecture has the potential to evolve and be fundamentally the same as the proven wireless model, only labels have changed. The wireless model has been successfully implemented, therefore the time to market for VoIP can move considerably faster if the model is followed.

Wireless	=	VoIP
• MSC (Mobile Switching Center)	=	Trunking Gateway
• MPC (Mobile Positioning Center)	=	Location Server
• PDE (Position Determining Entity)	=	Location Generator

Mandatory Change

As with any technology cycle, success is predicated by some level of movement or growth. Current VoIP trends indicate that wireless history is likely to repeat itself.

Wireless	=	VoIP
• Network changes (tower location)	=	Network changes (DHCP Based)
• Subscriber growth	=	Subscriber growth
• Hardware changes (handset)	=	Hardware changes (GPS, WiFi)

Since the design plan and roadmap to VoIP readiness is clear, and proof of reliability and survivability exists, then can a PSAP really afford not to address that part of the audience that will surely adopt this technology?

Recent history has presented significant advantages for PSAPs as VoIP comes into view. The telephony and wireless lessons of the past provide the working model and will subsequently fast track the future of VoIP in PSAPs. Furthermore, this model will also help avoid some of the adversity and challenges of the past. If well designed, managed and maintained, VoIP is a technology that provides an opportunity to not only enhance the inner workings of the PSAP, but also to augment what all PSAPs do – reliably and accurately provide the best public safety services to all.

For more information about VoIP, contact:

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