



What is VoIP? – A Primer

Protecting the PSAP ecosystem

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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The volume and velocity of the discussions surrounding Voice over Internet Protocol (VoIP) have been building over the past year, raising numerous questions, concerns, opinions and providing a wide range of, in some cases conflicting, analyses. The purpose of this paper is to approach the topic of VoIP with the facts to demystify this technology and to explain; in easy to understand terms, how VoIP will impact emergency services professionals.

VoIP is increasing in its usage and is affecting global communications on all levels. Two leading telecom industry analyst groups, Infonetics and International Data Corporation (IDC), project the IP telephony equipment industry to grow approximately 308% by 2007. Change is inevitable and VoIP is bubbling under the surface. But just like all previous changes, VoIP is manageable and can be a painless, seamless change if you are prepared to tackle the issues head on with knowledge and determination.

The FCC defines VoIP as “Internet Voice, also known as Voice over Internet Protocol (VoIP), a technology that allows you to make telephone calls using a broadband Internet connection instead of a regular (or analog) phone line”. In other words, voice (also data and video) travels through data networks in the form of data packets. When the data packets leave a device or computer, they are “broken up” and reassembled as the original voice stream at the receiving point (a phone, a device or a computer).

Historically, the telephone number was king. In the wireline world, the telephone number carried a wealth of implicit data, including the physical location of the caller. Telephony architecture was based on a simple point-to-point model where numbers were routed and traced easily and accurately. When mobile phones came into widespread use, the traditional model of telephone numbers was considered appropriate, but the implicit data regarding location had begun to be eroded. The physical location of the caller was related to a proxy, the cell tower, not just a number. This use of a proxy introduced a new dimension and level of abstraction that injected a level of uncertainty in locating a caller, but it was assumed that this uncertainty and level of error could be mitigated and absorbed into normal emergency services operations. The traditional model continued to work well and provided a reliable workhorse for communication.

VoIP is simply a new dimension of communication. IP is the most widely used network protocol for data transmission around the world. In most applications, IP is the “invisible” technology that is broadly deployed and relied upon for personal, commercial, military and secure government communications. VoIP is a stable and proven communications platform

and protocol that enables faster transmissions, integrates more information and makes engineering more robust, redundant and reliable networks easier. For E9-1-1, this means the PSAP will have the ability to:

- integrate data, video, full voice recording, maps and other information with basic call information
- operate highly distributed PSAP environments across geographically separated sites to provide overflow call handling, coordinated responses, etc.
- share local, state, regional and federal resources including specialized knowledge workers, agencies, and so on
- reduce costs by paying less than traditional phone lines, maintaining ALI data bases, etc.
- integrate more local data and more robust data sources under local control
- improve collaboration with other PSAPs
- deploy one technology and skill set for networking to the PSAP and within the PSAP

PSAPs require a reliable and dependable network architecture that is easy to deploy, manage and extend. The network must provide the best, most accurate information to call takers. This architecture should provide the lowest cost infrastructure to operate while producing the largest impact and reap the greatest reward, regardless of any technology changes or upgrades. The system/network has to be able to locate callers irrespective of the technology used.

The bottom line is that you do not care about, and cannot control, the technology used to deliver a call to your center. To you, a call is a call and how it gets to your PSAP should not impact your operational ability to provide reliable services and responses to the citizens in your community that depend on your center and personnel. Whether it's new or old technology, the end goal and priority remains the same – assisting the citizens and visitors in your community who need emergency services.

VoIP technology is benefiting all industries around the globe, but more specifically, as the technology becomes widely used here is how it will help meet PSAP requirements:

- Provide improved networking flexibility and survivability; - *today*
- Fast response time; - *today*
- Allow an alternate PSAP to act as call screeners for overflow; - *today*
- Simplify capability expansion - through WAN connectivity and standards; - *today*
- Deliver a robust platform for evolving to greater data capabilities to address various emergency service requirements (connect to HAZMAT, Interpol, SPCA); - *today/tomorrow*

- More accurate response through interconnection to multiple data sources both local and regional; - *tomorrow*
- Transfer of associated data with the voice - ALL records, supplemental data, emergency type, and so on; - *tomorrow*
- Allow auto-discovery and auto-configuration of data sources; remote updating capabilities; and multi-vendor, multi-technology interworking; - *tomorrow*
- Address Federal mandates for regional coordination and Homeland Security initiatives. - *tomorrow*

The FCC and NENA recognize the future potential of VoIP and are working together to understand the intersection of 9-1-1 and VoIP. However, there is a definite divide of the minds. If you offer a phone service, you must offer 9-1-1. This is why the telecommunications industry is differentiating between a phone service and a communications service. NENA recommends that the government legislate how communications service companies deliver 9-1-1. The FCC wants to foster competition and encourage new technologies; in particular they want communications service companies to stay in North America. As a result, the FCC is currently weighing legislation vs. the encouragement of good corporate citizenship.

Either way, no specific decision has been made, but it is agreed that VoIP will play a significant role in the future of communications. What this means for the PSAP is whether VoIP is legislated or encouraged, readiness is key.

Be open. Change is coming, but VoIP is change for the better. Closely watch other enterprises and how they operate with Private Data Networks. The best model is a working model. For instance, financial institutions and airlines have operated mission critical data networks for years and are now moving to add VoIP capabilities. These industries started with similar challenges that are currently faced by PSAPs – architecture built on simple point-to-point communication, reliability and survivability are highest priority, redundant mission critical information over distributed environments, and a highly dependent client base.

Leverage the lessons. Major call centers have put VoIP into action and have demonstrated what works by experience. For instance, the PSAP can watch and learn that the infrastructure investment for VoIP is largely software upgrades, which means lower cost and less compromise than if it were to start from scratch.

One to 1000. One person in an emergency is a priority. Waiting until the PSAP receives a thousand calls before becoming VoIP-ready could be disastrous. Traditionally PSAPs have relied on government regulation. Again, there is no telling when VoIP will be government regulated.

The future design of PSAPs will not only implement government-mandated concepts, but will also have the opportunity to raise the bar for both reliability and survivability through the implementation of best practice network design concepts. VoIP presents a real and immediate opportunity to enhance and protect the integrity of your PSAP, which in turn impacts the ecosystem of PSAPs everywhere.

For more information about VoIP, contact:

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