

Migration from TDM to IP in Public Safety Environments: The Challenge for Voice Recording

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VoIP communications are becoming commonplace, and the best IP recording solutions can migrate from TDM to IP to provide investment protection for public safety organizations in transition between the two technologies.

Introduction: Success Story for Voice over IP

Definition of Voice over IP

From the beginning, as the Internet and local area networks expanded to a broad range of users, Voice over Internet Protocol (Voice over IP / VoIP) generated a lot of buzz. Voice over IP refers to the delivery of voice information over Local Area Networks or Wide Area Networks. It involves sending audio in digital form through discrete packets rather than the traditional public-switched telephone network (PSTN).

Why Companies are Migrating to VoIP

At the onset, VoIP struggled with performance and QoS (Quality of Service) issues, but today, companies are switching to VoIP because it relies on only one network infrastructure for both data and voice, thus reducing investment and maintenance costs drastically. In addition, it is easier managing VoIP systems because they offer browser-based configuration tools for both IP phones and PBXs. Furthermore, telephone charges for long-distance calls between international subsidiaries are much lower when routing them over the company's own network instead of the PSTN. Increased operational flexibility for help desks, remote access, and reduced deployment costs from a combined, enterprise-wide infrastructure as well as increased productivity from converged applications are just some of the other advantages of VoIP over TDM-based telephony.

An Additional Advantage for Public Safety Organizations

In addition to reduced communication costs and an increased productivity, many public safety organizations find IP telephony especially useful for connecting mobile units.

Voice Recording

Key Markets

Voice recording may be used by many different types of companies for a variety of functions. The key markets include financial institutions, such as banks, brokerage firms and insurance companies; public safety organizations, including First Responders (police, fire and EMS departments); law enforcement; the Department of Defense; intelligence and internal security organizations; air-traffic control; correctional facilities; transportation; and border control. In fact, any company with a contact center or customer support by phone will benefit from voice recording. However, while many organizations focus on optimal customer support through inbound or outbound marketing, support hotlines and other logistical operations, the goals for public safety organizations are quite different.

Voice recording in Public Safety Organizations

Public Safety Answering Points (PSAPs) need a record of every emergency interaction. Therefore, emergency calls from the public, radio transmissions between public safety units, or any other interaction, must be reliably recorded and stored.

During an emergency, lives are at stake, and every second counts. Communication is a vital ingredient in transmitting accurate information to emergency personnel and ensures an appropriate, efficient and timely response.

To accomplish this, recording solutions must be reliable, redundant and provide fast and intuitive search-and-replay of all communications. If there are accusations of negligence, an inquiry may take

place in a court. The preservation of oral communications then becomes critical in determining what was said, by whom, to whom, and when.

Besides legal compliance, public safety organizations also use voice recording to improve operational efficiency. Trained operators and dispatchers work in time-critical environments. Voice recording helps to debrief and train them.

Voice over IP Recording

Overview

Today, three methods of VoIP recording predominate:

- Active VoIP recording
- Passive VoIP recording
- IP vendor-specific VoIP recording

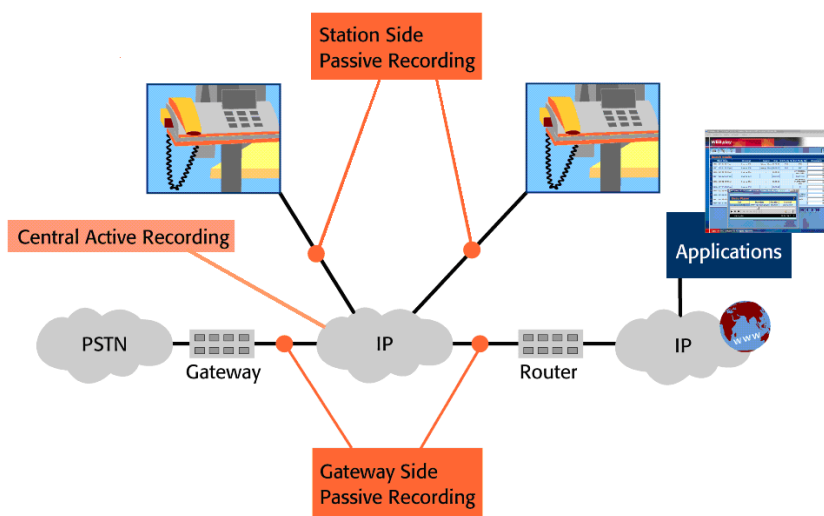


Figure 1: VoIP recording methods

Active VoIP Recording

In active VoIP recording, the recording software is an integral part of the call-flow. The telephone system interacts with the recorder either manually or automatically to let it join the conversation, similar to the third party in a conference call. Data-sensitive installations such as financial institutions or the government use this method when the alternative passive solution, “sniffing,” is prohibited.

Active VoIP recording works independent of the LAN infrastructure. The recording software may be set up as a central component anywhere in the network (see figure 1). This method is particularly useful in a distributed LAN infrastructure, often found in organizations with multiple branches. The active recording solution then may be placed in the central headquarters to monitor calls from other locations. The active system reduces administrative costs and may be updated at any time for new telephones or locations without changing the recorder configuration (see figure 2).

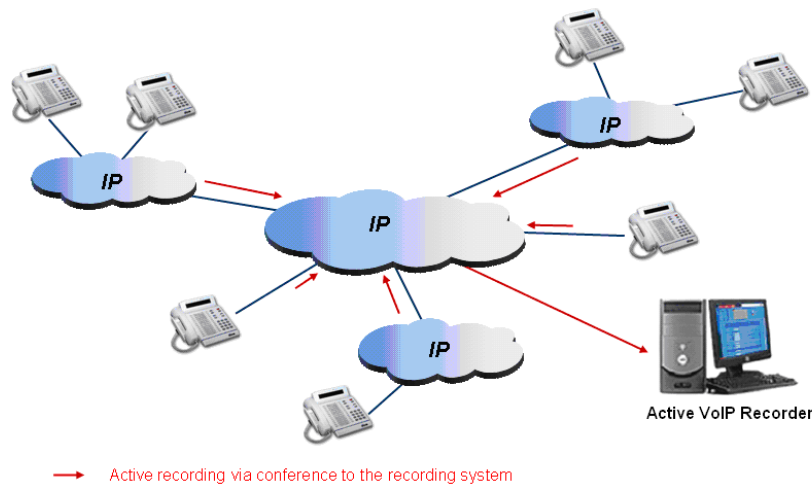


Figure 2: active VoIP recording on central location

Passive VoIP Recording

Passive recording solutions analyze RTP (Real-time Transfer Protocol) traffic to detect and record audio packets. They combine these audio packets to record calls to and from IP phones and preserve related call index data — such as IP address, incoming or outgoing phone number and call direction — to facilitate search and retrieval.

The software may be connected to either the LAN switch of an IP phone (Station Side Passive Recording) or to the gateway (Gateway Side Passive Recording) depending on customer requirements (see figure 1).

When both internal and external calls must be recorded, the data must be obtained at each switch. Financial institutions and public safety organizations may use this method for selective recording of main access lines. This setup, “Station Side Passive Recording,” only records the selected extension and may be compared to tapping the phone line of an analog or digital phone. However, when the LAN environment is changed, the recording environment must be changed as well.

For bulk recording of external calls from a large number of phones, “Gateway Side Passive Recording” is preferred. This solution works best for large-scale installations in call centers, financial institutions and public safety organizations because it is independent of the number of connected telephones. Just the channel limit of the gateway affects its performance. For example, if the customer uses a gateway with two T1 (PRI) interfaces of 46 channels, then a recorder for 46 VoIP channels can support several hundred phones installed behind the gateway.

Another benefit is that the network may consist of several LAN segments and may be changed at any time without modifying the recorder configuration.

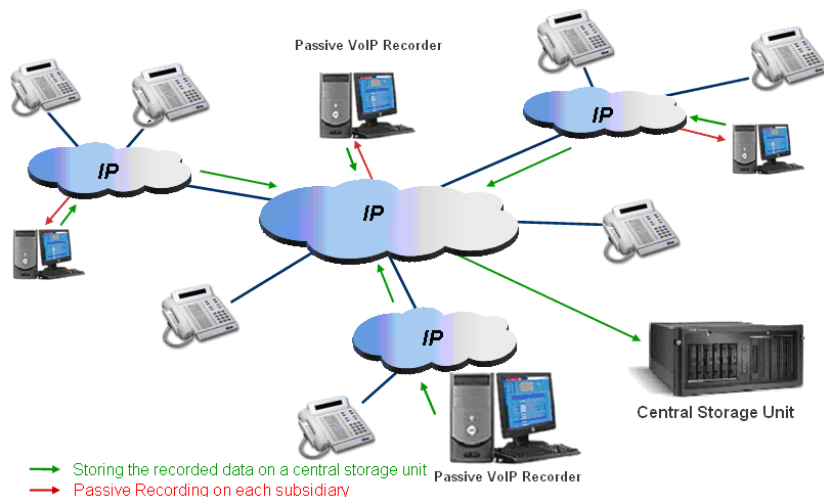


Figure 3: passive VoIP recording in a distributed LAN infrastructure (multiple IP networks and central storage unit)

IP Vendor-Specific VoIP Recording

In addition to the recording methods described above, some IP PBX vendors provide an interface for connection to VoIP recording solutions. These interfaces use a proprietary format unique for each vendor and support for example recording of encrypted calls as well as a higher number of calls per server.

Challenges of Voice over IP Recording in Public Safety Organizations

In public safety organizations, voice recording plays an integral role in the protection of people and property. A Voice over IP recording solution fulfils the needs of first responders, Command and Control Centers, and law-enforcement agencies (LEAs) and must meet many different challenges.

Bulk Recording in Hybrid Environments

In most cases, recording in public safety organizations involves hybrid environments. In addition to PSTN and Voice over IP calls, radio or trunked radio communications must be recorded as well.

Many organizations require voice recording but are still in the process of upgrading to a Voice over IP telephony system. For investment protection, the recorder must work for both traditional TDM-based communications and Voice over IP. The best recording solutions in the market offer this capability in one unit using the same server.

Usually, public safety organizations must record all communications, a set-up generally referred to as "bulk recording". To guarantee a 24/7 operation, the recording platform must be extremely reliable and stable. The hardware should provide redundant architecture, and the installation should employ hot and/or cold-standby concepts.

Time-critical Solutions

In situations where a few seconds can mean the difference between life and death, fast and intuitive interfaces and efficient search-and-replay for recorded calls is an absolute must. Very often, callers panic during emergencies and become incoherent. The immediate replay of such calls is crucial to a successful response. Therefore, voice recording solutions must seamlessly integrate with Command and Control Centers (C3). Such integrations could provide, for example, touch-screen support or simple search and replay of calls.

Tamper Proof

To use recorded calls as legal evidence, the data must be tamper proof. This can be achieved using encryption algorithms such as AES (Advanced Encryption Standard).

Traceability

Traceability is one of the most important features for recording in public safety environments. The recording system must provide tools to re-enact an entire scenario. To accomplish this, calls must be

tagged with details such as incoming or outgoing phone numbers, call direction, duration and time of call, etc. In addition, unanswered calls, with the time and number of rings, must be preserved as well.

Conclusion – Future Aspects

The convergence of communications, spurred by the transition to Voice over IP, will continue unabated. Other formats such as video will be leveraged to the IP-platform for maximum productivity and rapid response.

This in mind, before choosing a recording system, public safety organizations must determine their needs. Challenges for recording in public safety organizations are obviously reliability, traceability, as well as highly integrated and tamper proof solutions. In the case that the organization is still using a traditional PBX, then a recorder supporting hybrid environments will anticipate growth to Voice over IP and provide investment protection.

About the Author



Andreas Potyka, Product Manager at ASC telecom AG, is responsible for designing and managing VoIP recording products.

About ASC

ASC is a leading global provider of innovative solutions to record, analyze and evaluate communications. With ASC software, all multimedia interactions in contact centers, financial institutions and public safety organizations are documented and analyzed by intelligent speech and text evaluation methods.

“Leadership in technology through innovation” is a guiding principle that perfectly describes ASC’s current scope of activities. Today, the company generates more than 50 percent of its revenues with innovative software solutions. With subsidiaries in the United States, the United Kingdom, France, Switzerland and Singapore, and certified and powerful distribution partners, ASC’s ambitious projects span more than 60 countries. An export quota of almost 70 percent, together with its worldwide service network, makes ASC a powerful global player.