



Application Note

VoIP in Military Applications

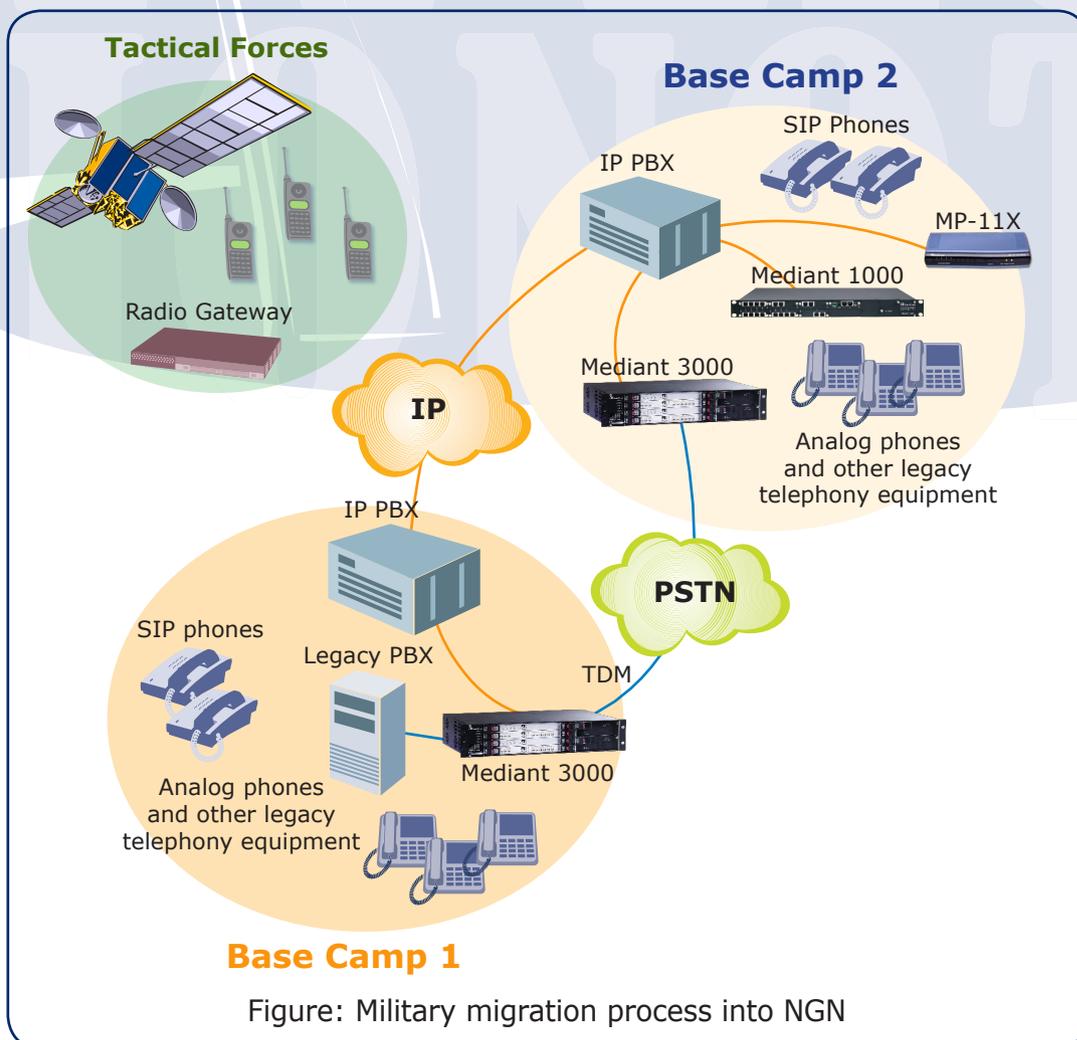
Powered by AudioCodes VoIP Mediant Gateway Family

Military Transition to Next Generation Networks

Military organizations located worldwide are currently transitioning their telephony infrastructure from legacy TDM to Next Generation Networks (NGN) based on VoIP technology.

The reasons for the migration taking place within the military have many similarities to those of the migration in the commercial telephony space. Some of these similarities include lower OPEX resulting from having a single consolidated network for data and telephony, and the ability to deliver new services quickly. However, deployments within the military can have additional specific benefits when moving to VoIP. Voice over IP, as its name implies, traverses over IP networks which, when designed correctly, can be more resilient than TDM networks. IP networks are easier to deploy and manage compared to their older TDM counterparts.

In the past, significant investments were made in legacy telephony equipment by military organizations. In most cases, this investment included military purpose built TDM equipment. As a result, the process of migration to NGN will be gradual. It may take many years before full end-to-end VoIP communication can be realized - where all handsets are SIP based and TDM trunks are eliminated.



Demonstrated in the figure above, is a typical military migration to VoIP. In base Camp 1, the legacy PBX, which serves a number of analog phones, is maintained, while the IP-PBX provides service to new SIP phones. The media gateway is used for interconnecting between the IP-PBX and the legacy PBX, as well as hosting external TDM trunks which provide connection to other bases. Base Camp 2 is retaining some of its analog phones by utilizing analog media gateways. Within the next few years, various legacy and NGN mixes will become more common place and inter-base connectivity will utilize both TDM and VoIP trunks.

Military Specific Needs

The technical needs of the military differ from those of commercial VoIP networks. Security and survivability are obvious military requirements which can also be found on commercial applications but not to the same extent as in the military sector. Other aspects such as voice quality under extreme network conditions and advanced call control capabilities, such as MLPP (Multi-level Precedence and Pre-emption), are also unique to the military.

Key Military VoIP Requirements

Military Specific Call Control Capabilities – the MLPP standard

Military VoIP networks are based on standard call signaling technologies such as SIP or H.248. However, some extensions are required to accommodate military specific needs. One example is MLPP, which is used by the US DoD (Department of Defense).

MLPP is an ITU defined standard which provides a prioritized call handling service. The MLPP service is critical in military applications, such as in times of emergencies when the importance of various types of communication is strictly defined, allowing higher precedence communication at the expense of lower precedence communication.

This architecture validates that in cases of network congestion, the military communication network can still function according to the chain of command, and provide the required grade of service according to the predefined precedence. It is essential for media gateways targeting military networks to support MLPP services.

Security

Information security is one of the major concerns when it comes to military communication. When deploying a media gateway all interfaces need to be secured, preventing unauthorized access to the gateway's resources and data. Control and Signaling channels are secured by employing encryption techniques such as IPSEC or TLS, creating a secured tunnel for exchanging signaling information. Management interfaces must also be encrypted and password protected using a privileged access system which provides access to authorized personnel only. In addition military applications typically require management to be carried over separate physical interface or VLAN.

The last novel aspect about security is securing Voice traffic by deploying an industry standard SRTP algorithm for delivering encrypted VoIP traffic. Utilizing this RTP profile and its counterpart algorithm, SRTCP - the bearer path between endpoints can be secured via encryption, message authentication and replay protection, thereby ensuring that voice traffic is only accessible by the intended participants.

Data Relay

In many cases legacy data equipment exists in the network transporting data communication, such as encrypted analog phones. This equipment uses Modems to traverse digital data over legacy analog and TDM networks. In such cases, the media gateway is required to support protocols such as V.150 Modem Relay, so that legacy data equipment calls can still be relayed reliably over VoIP channels.

Survivability

Military telecommunication equipment must be designed to maintain service even in extreme network conditions, such as high rate packet loss, long delays, and radical jitter conditions. The use of specifically designed voice coders, while maintaining uncompromised voice quality is essential to these mission critical voice communications.

As with any network deployed equipment, the media gateway could be subject to attacks over the network. In traditional network deployments, a firewall installed at the network boundary provides the required level of security by blocking unauthorized external access to the network.

In military applications, a higher level of protection can be achieved by employing a built-in Firewall and/or SBC within the gateway itself. This internal security entity protects against various DoS (Denial of Service) attacks and enforces VoIP traffic rules.

IPv6

IPv6 resolves one of the main issues with the current IPv4 standard which is a small IP addressing space that creates a shortage of IP addresses. The lack of IP addresses on IPv4 leads to workarounds, such as NAT, which produce negative interoperability effects on VoIP traffic.

Military organizations which are engaging in replacing and upgrading their legacy telephony networks, require assurances that their new networks will be future proof and demand that all equipment will be IPv6 capable. In addition to solving the address space problem, IPv6 improves handling of security, mobility and ad-hoc networking (dynamic addressing) issues which are important for military applications.

High Definition VoIP

In traditional PSTN Telephony applications, all telephony communications are based on the traditional PSTN limited bandwidth (200-3400 Hz and a sample rate of 8 kHz). Pairs of letters such as "P" and "T", "F" and "S" and "M" and "N" sound very similar as acoustically their critical energy is carried predominantly in the higher frequencies beyond the PSTN bandwidth. Words like Goal, Bold, and Gold have the same sound but contain a very different meaning. In addition, during conference calls it is often hard to identify the speaker. By using High Definition VoIP these limitations no longer interfere with the clear comprehension of voice communications. Voice over Packet networks will solve this problem allowing the use of wider speech bandwidth coders offering a higher voice quality than PSTN. Current Wideband coders can deliver almost twice the PSTN bandwidth.

In military communications where the difference between close phonemes can be the difference between life and death, the value of High Definition VoIP is immense.

Land Mobile Radio

Military organizations are realizing the importance of VoIP by interconnecting their currently disconnected "islands" of Land Mobile Radio (LMR) networks. LMR networks are used to reach

armed forces in the field, using radio communications equipment. Today's LMR equipment is based on proprietary TDM technology and its control is limited to the geographical locations of the equipment itself. This results in a large investment in LMR equipment located everywhere the military might need to access the LMR networks, or in worse scenarios, situations where military commanders cannot access multiple LMR systems at the same time.

Using Voice over IP "Mobile Gateways", the military organization can interconnect its LMR equipment using its IP network, allowing anybody who is connected to the ubiquitous IP network to access any LMR network anywhere, anytime, without investing in multiple LMR transceivers. In order to support such applications, Mobile VoIP Gateways need to support enhanced features such as Multicasting, proprietary encryption, flexible management and more.

AudioCodes Media Gateways for the Military

AudioCodes is a one-stop-shop for any media gateway type, starting from a basic two analog port media gateway, up to a 16,000 port, high availability digital media gateway. Since military VoIP networks require the use of both analog gateways and high availability media gateways, AudioCodes' rich portfolio provides an advantage for NEPs and SIs, allowing them to work with a single partner, significantly cutting on design and integration efforts.

Military projects usually contain a large number of requirements. Furthermore, lab testing may be extensive and time consuming. AudioCodes' vast experience in handling such projects becomes a true advantage for the Network Equipment Providers and System Integrators.

The Mediant family of media gateways matches the specific needs of the military organization as described in previous paragraphs. The Mediant 3000 digital media gateway is suitable for trunking applications (both SS7 and PRI) with capacities reaching up to 2016 channels along with high availability. The Mediant 1000 is a hybrid gateway that supports both analog and digital interfaces using a modular approach. This gateway can be used as an analog media gateway as well as for low scale trunking purposes. Lastly, the MediaPack 1xx gateways, are small analog gateways, supporting up to 24 analog ports.

Unparalleled security and survivability support is offered by these gateways. This includes IPSec, SRTP, TLS, physical interface separation and more. Some of the Mediant family members have passed, or are going through, the US Department of Defense (DoD) JITC and FIPS certifications. Successful completion of these rigorous tests is mandatory for inclusion on the Approved Product List and deployment into the DoD.

AudioCodes is a leader in the High Definition voice arena, and many of the wideband vocoders, such as G.722, G.729.1 and Wideband AMR, are currently implemented on AudioCodes' gateways.

A vast experience in SIP and H.248, makes AudioCodes' offering one of the most feature-rich in the gateway market. The extensive functionality provided through AudioCodes in-house SIP and H.248 stacks includes, among many other things, support for MLPP.

AudioCodes advanced models of the Mediant family of media gateways support IPv6 and are one of the first in the market to offer this functionality.

About AudioCodes Products



Mediant™ 3000

Digital media gateway offering E1, T1, T3, STM-1 and OC3 PSTN interfaces, for capacities which span from 240 ports (8E1/T1) to 2,016 ports. The Mediant 3000 is a high availability gateway with a compact footprint of 2 rack units.



Mediant™ 1000

Modular media gateway providing mixed Digital (PRI & BRI) and Analog (FXS & FXO) configurations. Available with up to 4 E1/T1, 24 FXS/FXO and 20 BRI ports.



Mediant™ 1000 MSBG

The Mediant 1000 MSBG is based on the Mediant 1000 gateway technology, combined with Session Border Controller, Data & Voice security elements, Data Routing, LAN Switching and WAN Access.



MediaPack™ 124

Analog media gateways with mixed FXO and FXS ports for IP to PBX Connectivity, supporting 4, 8 and 24 analog ports.



310HD



320HD



350HD

The AudioCodes 300HD Series of High Definition IP Phones meet a growing demand for High Definition VoIP solutions in end-user phones and terminals.

About AudioCodes

AudioCodes Ltd. (NasdaqGS: AUDC) provides innovative, reliable and cost-effective Voice over IP (VoIP) technology, Voice Network Products, and Value Added Applications to Service Providers, Enterprises, OEMs, Network Equipment Providers and System Integrators worldwide. AudioCodes provides a diverse range of flexible, comprehensive media gateway, and media processing enabling technologies based on VoIPerfect™ -- AudioCodes' underlying, best-of-breed, core media architecture. The company is a market leader in VoIP equipment, focused on VoIP Media Gateway, Media Server, Session Border Controllers (SBC), Security Gateways and Value Added Application network products. AudioCodes has deployed tens of millions of media gateway and media server channels globally over the past ten years and is a key player in the emerging best-of-breed, IMS based, VoIP market. The Company is a VoIP technology leader focused on quality and interoperability, with a proven track record in product and network interoperability with industry leaders in the Service Provider and Enterprise space. AudioCodes Voice Network Products feature media gateway and media server platforms for packet-based applications in the converged, wireline, wireless, broadband access, cable, enhanced voice services, video, and Enterprise IP Telephony markets. AudioCodes' headquarters and R&D are located in Israel with an additional R&D facility in the U.S. Other AudioCodes' offices are located in Europe, India, the Far East, and Latin America.

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