From a classic telephone network towards a full voice&video over IP network. Defense at the state of the art

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Abstract— **Voice Design provides the seamless and gradually migration of the existing fully separated TDM-based Voice network infrastructure to a centralized fully data-integrated VoIP application. This migration will reduce overall costs and simplify HR and MR management, but introduces some great technical challenges. However, this evolution is mainly industry and technology driven and would not improve end-user experience without the implementation of Unified Communications.**

I. INTRODUCTION

The existing Voice Network infrastructure "BeMilCom" is fully TDM-based and has a three-layered topology: a meshed backbone, an access layer (barracks' PBX) and end-user equipment. The project Voice Design will fulfill the industry and technology requirements and is characterized by three pillars: Conversion, Centralization and Security. Nevertheless, these pillars will introduce some risks that will have to be technically overcome.

II. CONVERSION, CENTRALIZATION AND SECURITY

A. Conversion

Firstly, the separated TDM-infrastructure will be abandoned and both voice and video will be treated as data applications, sharing as such the data infrastructure with all other business applications. Hence, conversion will also affect end-user Eqt because TDM voice and video Eqt (PBX, phones and VTC Eqt) will be replaced by IP-terminals

Because voice and video are very sensitive to latency and jitter, decent QoS will have to be implemented on LAN as well as WAN equipment to make sure they will always be prioritarized over all business applications and other network traffic.

B. Centralization

Secondly, the existing three layered topology will be replaced by a two layered approach: a centralized Call server platform and end-user Eqt, eliminating as such the access layer (decentralized PBX). Conversion and centralization will also affect the existing decentralized public interface in each military barrack as they will be replaced by a single (redundant) centralized public IP-interface (using SIP signaling).

As a result, there will be no longer a local intelligence nor local public interfaces, so WAN link failure measures and a decent risk assessment are become crucial to assure service availability. Fortunately, the Upgrade WAN project made these WAN connections very stable and reliable. Moreover, the installation of passive communication servers end the use of a mobile backup solution (FXO) in case of WAN link failure will transparently guarantee continuity (Minimize procedure).

Centralization (one single Call server) requires also a new numbering scheme, because there can no longer be overlapping suffixes and 4 digits are not sufficient to cover all military personnel.

C. Security

Finally, as voice and video become IP-applications, security should not be neglected. Especially external customers and interfaces with external voice networks need our attention.

Like the new Multi-Tier Data infrastructure (DMZ) will secure Extranet talk between different customer networks, a centralized Session Border Controller platform (i.e. Multi-tier Voice & Video) will cover voice and video interfacing. All external customers and interfaces with external PBX will have to pass through this highly secured voice and video Firewall.

III. UNIFIED COMMUNICATIONS

The project Voice Design will also involve a new Service Catalogue, which will contain a well-defined list of services. A new and innovative service is Unified Communications (UC), which realizes the integration of real-time communication services (such as chat, video and voice conferencing, whiteboarding, …) with the existing non-real-time communication services (voicemail, e-mail, …). It optimizes business processes and enhances human communications by reducing latency, managing flows, and eliminating device and media dependencies.

IV. CONCLUSION

The project Voice Design not only assures that Belgian Defense catches up with technology and industry standards, but it offers also innovative services like Unified Communications. The UC service will optimize business processes and will reduce overall costs by replacing expensive VTC solutions and by organizing remote multipoint meetings using its video & audio conferencing facilities.