Voice over LTE via Generic Access (VoLGA) as a possible solution of mobile networks transformation

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Abstract - this paper is focused on Voice over LTE via Generic Access Network, which concept is to connect the already existing Mobile Switching Centers to the LTE network via a gateway supporting 2G or 3G voice environment.

Keywords - Voice over LTE via GAN (VoLGA), Generic Access Network (GAN), Long Term Evolution (LTE)

I. INTRODUCTION

Nowadays the developing of wireless mobile broadband technologies is focused on one solution – LTE networks. It’s no doubt that LTE will become in future a main point for mobile operators in the whole world. But there is one problem for its integration in every country – it is unreal technically to build national LTE network for the short time. VoLGA is the solving of this problem. Due to VoLGA operators can integrate LTE stepwise, using 2G or 3G infrastructure.

II. VOLGA FROM LTE NETWORK POINT OF VIEW

VoLGA is based on the existing 3GPP Generic Access Network (GAN) standard. The purpose of GAN is to extend mobile services over a generic IP access network. One of the popular applications of GAN is with Wi-Fi-enabled phones. With GAN-based dual-mode mobile phones, all services are either available over their GSM networks as usual, or over Wi-Fi at home or in public places. Moving between the two network technologies is fully transparent to the user.

On the network side, VoLGA only requires software enhancements to the circuit to packet gateways which already exist for GAN. No modifications are required on the Mobile Switching Centers or the LTE core and access network nodes. This enables a rapid development and market introduction, especially in multi-vendor MSC network environments. Furthermore, VoLGA enables the use of all other circuit switched services over LTE without any modifications in the network.

On the mobile device side, the protocol stack initially developed for GAN can also be re-used in large parts. The two main software additions required are to include the LTE access technology as a radio bearer together with a modified handover procedure, as the VoLGA approach allows for a smooth handover of ongoing voice calls to GSM or UMTS when the subscriber leaves the LTE coverage area.

On the LTE side, the VANC connects to the Packet Data Network Gateway (P-GW) via the standard SGi interface. Both signaling and user data traffic (i.e. the voice packets) are transported over this interface.

From an LTE core network point of view the VANC (VoLGA Access Network Controller) looks like any other IP based external node and IP packets exchanged between a wireless device and the VANC are transparently forwarded through the Evolved Packet Core (EPC) network. VANC is he network element required by VoLGA which connects the circuit switched MSC to the packet switched LTE Network.

III. ADVANTAGES AND DISSADVANTAGES

The advantages of voLGA are: VoLGA enables other circuit switched services from day one without any additional development, VoLGA can be developed very quickly, as the already existing GAN protocol stack can be mostly re-used (the only major change in the software is handover handling), VoLGA can also ensure a smooth introduction of global roaming. The main disadvantage of voLGA is: not fully standardized yet.

IV. CONCLUSION

VoLGA makes it very simple to leverage existing 2G and 3G circuit switched equipment in live networks for LTE. This is especially because no software enhancements are required on existing network nodes. VoLGA could be the main bridge between 2G/3G and LTE among other voice over LTE solutions.

REFERENCES