

5G Core Development for OMEC Project

Customer Overview

The Open Networking Foundation (ONF) is an operator-driven, community-led non-profit consortium fostering and democratizing innovation in software-defined programmable networks. Through ecosystem building, advocacy, research, and education, ONF is accelerating the state-of-the-art in open networking and catalyzing creation and adoption of open disaggregated solutions leveraging open source software.

The Context

GS Lab | GAVS is a member of ONF, actively participating in various projects hosted under the ONF umbrella. Proprietary solutions of prominent vendors have controlled the telecom industry and slowed down private LTE adoption. ONF wanted to develop a 3GPP specification compliant EPC and open source the code to promote private LTE and edge services deployments.

Type of Service Provided

End-to-end participation in 5G core development, open sourced under OMEC (Open Mobile Evolved Core) project - starting from early stage discussion, implementation, to testing of various modules

Technologies Used

Telecom core architecture, 3GPP specifications, EPC protocols
C, C++, Go, Python, Terraform, Ansible, Intel SGX

Solution Summary

GS Lab | GAVS leveraged this opportunity to contribute to an upcoming technology in an open source forum to the fullest. With expertise in a wide range of telecom technologies and protocols, GS Lab | GAVS actively contributed to all the components of OMEC and was involved in all stages – from early discussions, implementation, to testing of the modules. The availability of OMEC created new opportunities for telecom operators, MVNOs, and small vendors in the private LTE and edge services space.

Challenges

- Absence of open source EPC implementation
- Telecom industry controlled by proprietary solutions from large vendors
- Lack of opportunities for smaller players to deploy private LTE or edge services

Solution Highlights

- Leveraged SDN and NFV to develop 3GPP specification compliant EPC
- Contributed to development of:
 - NGIC-RTC
 - C3PO (all components)
 - Intel SGX based SGX-DLR-IN, SGX Router, SGX-DLR-OUT, SGX-KMS (design and development)
 - OpenMME (single handed contribution)
 - Nucleus (various features)
 - IL_Trafficgen
 - Deployment Framework

Solution Impact

- Availability of open sourced EPC implementation
- Enablement of many players to deploy reliable, scalable, private 5G platforms and edge services over public and private cloud

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Solution Details

The GS Lab | GAVS team contributed to all the components of OMEC by leveraging Software Defined Networking (SDN) and Network Function Virtualization (NFV) technologies to develop 3GPP specification compliant EPC.

- NGIC-RTC**

Control User Plane Separated (CUPS) architecture 3GPP TS 23.401, TS 29.244, TS 29.212, TS 29.303 based implementations of SGW, PGW, and SAEGW.

- C3PO**

Contributed to all components of C3PO repository packages the HSS, Database, CDF, CTF, PCRF, and Secure CDR system. Also designed and developed Intel SGX based SGX-DLR-IN, SGX Router, SGX-DLR-OUT, SGX-KMS - a set of VNFs/processes that enable protection of sensitive CDR.

- OpenMME**

The team single handedly contributed to this - a grounds up implementation of the Mobility Management Entity (MME).

- Nucleus**

Also an implementation of MME, the GS Lab | GAVS team contributed to various features of Nucleus including new flows, DNS based discovery of SGW-C, performance, and scalability.

- IL_Trafficgen**

A DPDK Packet Gen based traffic generator which together with the built-in test features in the NGIC-RTC provides a simple means of testing the performance envelope and operation of NGIC-RTC.

- Deployment Framework**

A set of terraform based tools for efficient and automated building of OMEC based VNF infrastructure. It packages a set of scripts to build, configure, and deploy the KVM based Virtual Machines (VMs) over which each of the constituent OMEC network functions can be installed, configured, and operated.

Solution Architecture

