

# Premium Telecommunications Services through EPC Network Integration

## Customer Overview

The customer is a fast growing facilities based international carrier with presence in Europe, America, Asia, and CIS. They provide premium voice, SMS, and data services that are rigorously tested and meet exceptionally high communications standards.

## The Context

The customer wanted to integrate their EPC network with that of a Mobile Network Operator (MNO) and with a third-party billing application to enable provision of end-to-end voice, SMS, and data services. This required the integration of EPC elements such as UCN, HSS, and SMSC with the MME, SGSN, SGW of the MNO, and with the online billing system.

The need to integrate disparate network entities coupled with the lack of proper requirements specifications or documentation made this very challenging. The project timeline was also stringent since the original launch date had already been postponed due to lack of progress when first worked on internally.

## Type of Service Provided

Professional Services, Support Services

## Technologies Used

LTE, 4G, IMS, GTPv2, SIP, SDP, Diameter, RTP, SS7, MAP

## Solution Summary

GS Lab | GAVS successfully integrated the customer's EPC with the partner MNO and third-party online billing system. Various call scenarios like mobile origination, mobile termination, SMS, and data services (2G, 3G, 4G) with multiple SIM cards from different vendors were tested post integration. The team's expertise in EPC, 4G/LTE architecture, SIP, VoIP domain, IMS, core telecom soft switches, and next-gen networks helped execute this integration in record time.

## Challenges

- Complex task of integrating disparate network entities
- Required coordination with multiple vendors for their network elements
- Necessitated understanding of various nodes, topologies, interfaces, protocols
- Lack of proper requirements specifications
- Absence of documentation or knowledge transfer sessions
- Tight timelines due to already impacted launch schedule

## Solution Highlights

- Integration of customer's EPC with partner MNO and third-party billing system
- Integration and interoperability testing through the LTE network
- Insights on network behavioral troubleshooting
- Testing of various call scenarios like mobile origination/termination, SMS
- Testing of data services (2G, 3G, 4G) with multiple SIM cards from different vendors
- Discovery and fixing of major issues in MNO call flows during integration testing, interoperability testing, and roaming, while testing with the real SIMs

## Solution Impact

- Execution of integration in record time due to vast technical expertise
- Comprehensive integration, interoperability testing in LTE network - that was of critical importance to the customer
- Customer empowered to successfully launch themselves as an MVNO
- Enablement of voice, SMS, and data services across the globe
- Detection and remediation of major issues helped customer take informed decisions
- Helped decision-making on multiple elements through insights on behavioral troubleshooting

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## Solution Details

After several rounds of discussions with the customer and stakeholders, and understanding the current call flows, the GS Lab | GAVS team determined the scope of work and prepared a comprehensive project plan for the integration, after freezing the requirements. Since the network elements belonged to different vendors, the team had to coordinate with each of them separately to get a complete understanding of their topologies and interfaces. Based on this, precise requirements and design documents for end-to-end call flows were created. The team also supported the customer in getting approvals from partners.

Working on an MNO-MVNO integration architecture involves multiple nodes, interfaces, and protocols. The team had to gain in-depth understanding of each node - SIMs, UEs, EPC, OCS, and the different protocols involved in the end-to-end call flows. After this initial groundwork, the team successfully integrated the customer's EPC network with that of the partner MNO and third-party online billing system. Various call scenarios like mobile origination, mobile termination, SMS, and data services (2G, 3G, 4G) with multiple real SIM cards from different vendors were tested end-to-end post integration. The team uncovered major issues in MNO call flows during integration testing, interoperability testing, call flow analyses, and roaming, while testing with the real SIMs. The solution was validated from audio/video quality and billing perspectives.

The GS Lab | GAVS team's expertise in EPC, 4G/LTE architecture, SIP, VoIP domain, IMS, core telecom soft switches, and next-gen networks helped execute this integration in record time. The execution was divided across two phases. As this was first time launching themselves as an MVNO offering voice, SMS, and data services across the globe, integration and interoperability testing in an LTE network were of critical importance and insights on behavioral troubleshooting provided by the team helped the customer with decision making on multiple elements. This helped the customer take the new services to end customers with confidence.

## Network Diagram of MVNO-MNO Architecture

