

# Telecom Software & Solution Services



## WHY TMA?

### TMA Competencies



23 Years of Experiences  
in Telecom Software &  
Solution Services



Trusted by World-Class  
Telecom Service Providers



End to End Services &  
Available Solutions  
for market readiness  
acceleration



Flexible business  
models - FTE,  
Project-based, TMO



Experienced Resource Pool,  
Easy to Scale –  
500+ Telecom Engineer



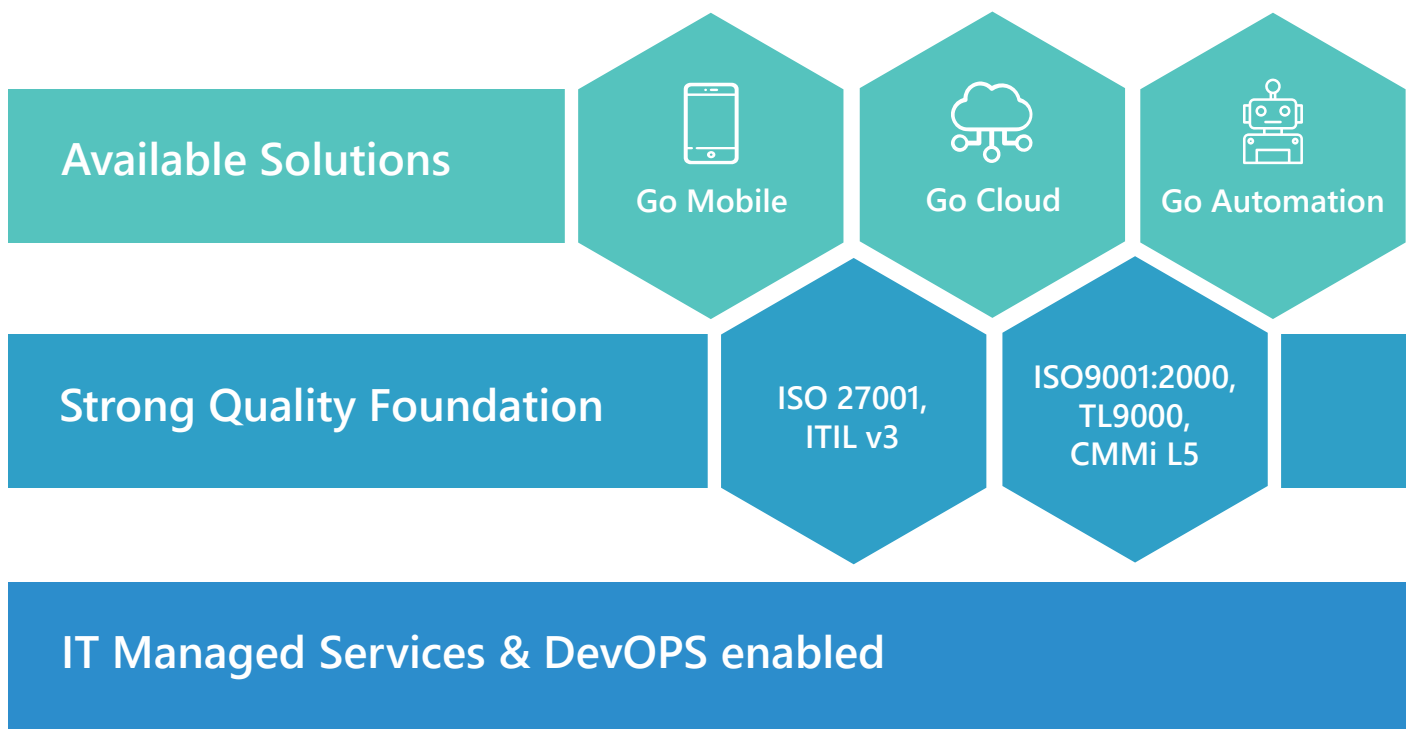
Best in Telecom Software  
Services in Vietnam with  
experiences in many  
large and complex projects

# WE ARE HERE TO SUPPORT YOUR SUCCESS

## End-To-End Services



## Solid Foundation



# WE ARE HERE TO SUPPORT YOUR SUCCESS

## Completeness in Telecom Domains

- ▶ From Networking to Telecom Applications and Products
- ▶ From Legacy Networks to NGN
- ▶ From Clients to Access Networks to Core Networks and Services
- ▶ From Enterprise to Carrier Grade solutions
- ▶ From On-Premise to Virtualization to Cloud-based Solutions
- ▶ From 2G, 3G to 4G/LTE to 5G

## Typical Solutions/Products

### Cloud/NFV

- VNFM, LTE MANO, 5G Core, VNFs, UCaaS, CPaaS

### NGN Network Transformation

- Media GW Controller, Call Agent, CRE
- Media Server, Access/Trunk/Voicemail GWs
- MGCF, AGCF, BGF, MFP/MRFP
- SBC, TAS

### Enterprise Solutions

- Unified Communication, Contact Center, IVR, IP PBX, Asterisk, WebRTC

### Signaling Controller

- SS7 GW, IWF, SIP Trunking, SIP Bridge
- Diameter Controller

### Clients

- Mobile VoIP, SIP Soft/Hard Clients, Smart Office Clients, S4B & Microsoft Teams integration

### Networking

- Network Performance & Management, Service Edge Router, GGSN, Broadband Remote Access, Access Management

# OUR TECH-STACK

## Technologies

### Network:

- SoftSwitch, IMS, 4G/LTE, 5G, 3GPP MC, PSTN, SS7, Enterprise Solutions

### New Technologies:

- Virtualization, Cloud, NFV, SDN, 5G

### Network Transformation:

- Class 4, Class 5, MGCF, AGCF, BGF, SBC, TAS, Transcoding, IMS, IPX Solutions, CRE, Billing Mediation, Signaling Solutions

### Protocols Stack:

- VoIP, Voice/Video Codec & HD Codec, SDP, MGCP, H.248, H323
- SIP, SIP-I/SIP-T, ISUP, SCCP, TUP, TCAP, Diameter, HTTP2
- SigTran, MTP2, MTP3, M3UA, M2UA, M2PA
- SCTP, TCP, UDP, TLS, IPv4, IPv6, IPSec

## Frameworks and Solutions

### Automation Framework:

- TMA Automation Framework, Robot Automation Framework, TMA Automation Analytic Tool

### Design Solution:

- Languages and Frameworks: C/C++, Python, Django/Tornado, Java, Spring MVC, Angular8, Scripting
- Databases: MySQL, Postgres, MongoDB, MariaDB
- High Availability Solutions: Pacemaker
- Cloud/NFV, SDN Enabled

### Standardized CI/CD model:

- Jenkins, Pipelines, Artifacts, IaC, Containers, Continuous Testing

## Tools

### Testing tools:

- HP QC, Atlassian Suite (JIRA, Confluence, Crucible, BitBucket)

### Development tools:

- SVN, Git, Bitbucket, Docker, GCC9, Googletest, ASAN, UBSAN, VARGRIND, Coverity, Whitesource

### Security tools:

- Nessus, OWASP, NMAP, BurpSuit, Accunetix, Kali Linux (Linux penetration testing tools)

### Other tools:

- Wireshark, TCPdump, Colasoft Packet Play, SmartBits, SIPP, LDAP Browser, MIB Browser, Tera Term, Mincom, Syslog viewer

## Platforms



### Linux

RHEL, Centos



### Virtualization

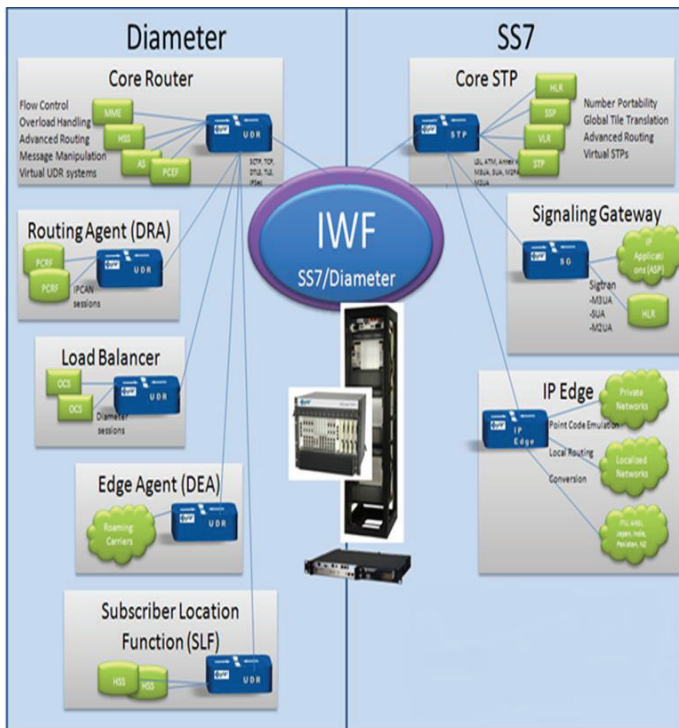
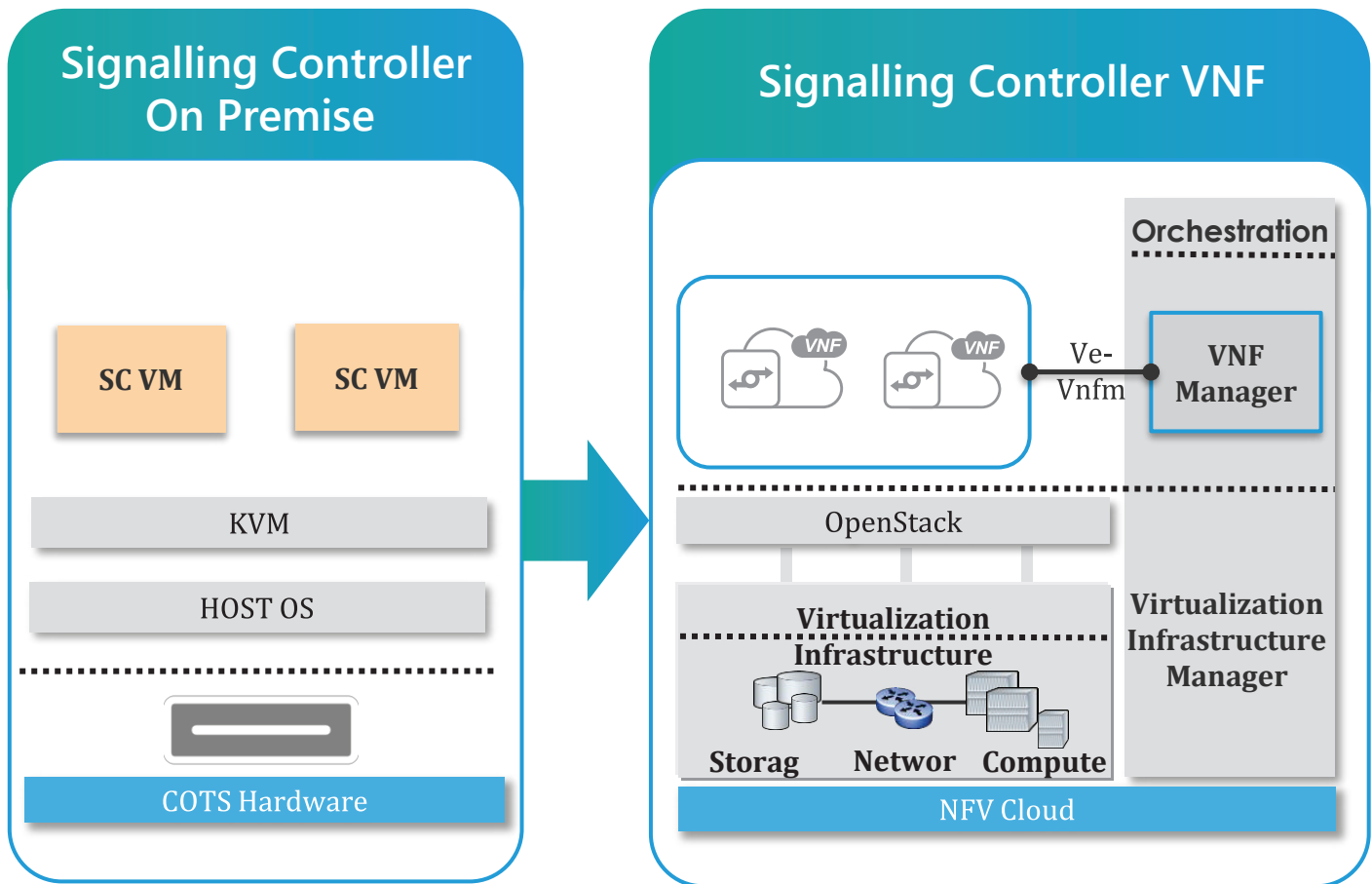
KVM, VMWare, OpenStack



### Cloud

OpenStack, OpenShift, K8s, AWS

# Case Study 1 - Signaling Controller VNF



**Description:** Design and migrate Signaling Controller Platform onto NFV architect

- Orchestration & Life Cycle Management
- CSAR package & VNF-D Development
- Ve-Vnfm Development – VNFM integration
- Disaster Recovery Mechanism

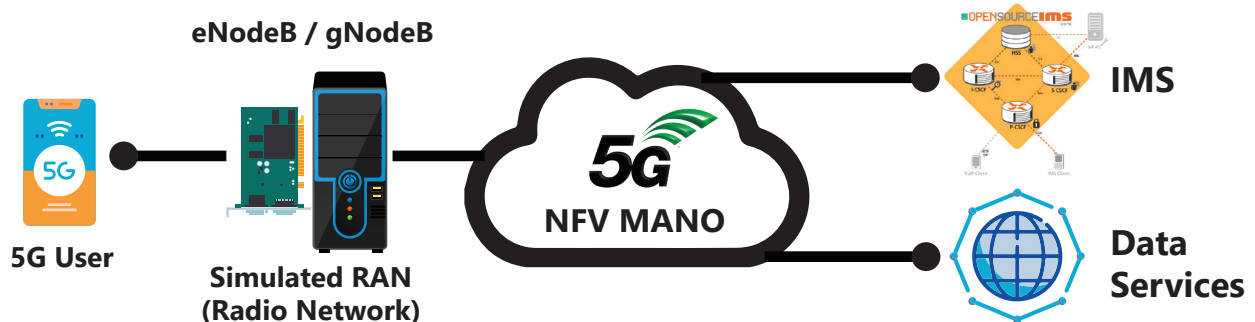
## Technologies:

- **Platform:** Centos, KVM, VMWare, NFV, OpenStack, VCP
- **Framework:** RESTful API, Django, High Availability – Pacemaker
- **Functions:** Diameter Router (4G, LTE), IWF, SS7, STP, SG, ...
- **Languages:** C/C++, Python, Django
- **CI/CD:** Jenkins, Docker

## Case Study 2 - 5G R&D Lab

### Support Functions

- Full operation of 5G core: AMF, SMF, UPF, AUSF, N3IWF, NSSF, NRF, UDM, PCF
- 5G Orchestration
- Operation, Administration and Management (OAM) of 5G Core
- gNodeB in NSA 5G System (with 4G EPC Core)
- gNodeB in Standalone 5G System (with 5G Core)



### 5G System Configuration

- Simulated RAN/gNodeB
- 5G Core
- IMS – IP Multimedia Subsystem

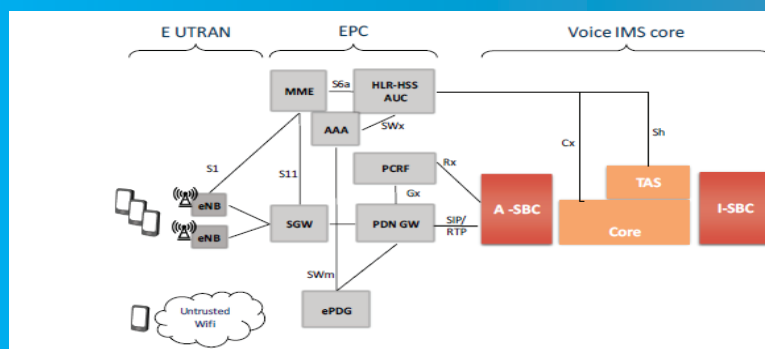
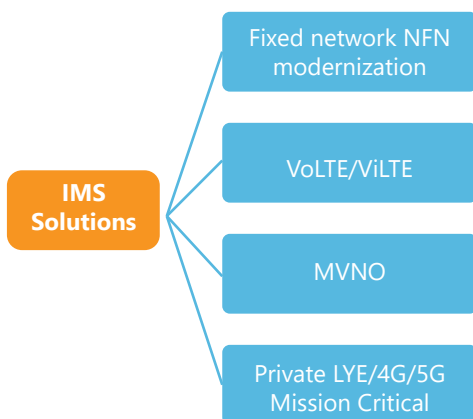
### Available Demo Package

- 5G Core Orchestration
- 5G NSA with VoLTE
- 5G SA with VoNR, VoWifi
- IPTV over 5G
- IMS Integration

### Technology

- 4G/5G
- VoIP, IMS
- NFV/Cloud

## Case Study 3 – IMS Solutions



VoLTE & VoWifi simplified architecture

### Technologies:

- 4G/5G, IMS, NGN, NFV/Cloud
- Languages: C/C++, Python, Flask
  - Platform: Linux, VMware,
  - Google Cloud
  - High Availability: Pacemaker
  - Test automation: Robot, Selenium and in-house Frameworks
  - CI/CD: Jenkins, Docker

### Feature Development

- ID Multimedia Subsystem
- Session Border Controller
- Next Generation Network
- Features developed based on 3GPP IMS and RFC standards

### Customer Engineering

- Tier-3 customer support
- Bug fixing & patching
- 24/7 emergency assistance

### Product validation

- V&V
- 95% Automation Coverage
- Functional & Non-functional
- System & Integration
- Performance
- Security & Vulnerability



# Case Study 4 - Network Transformation Solutions

## Description

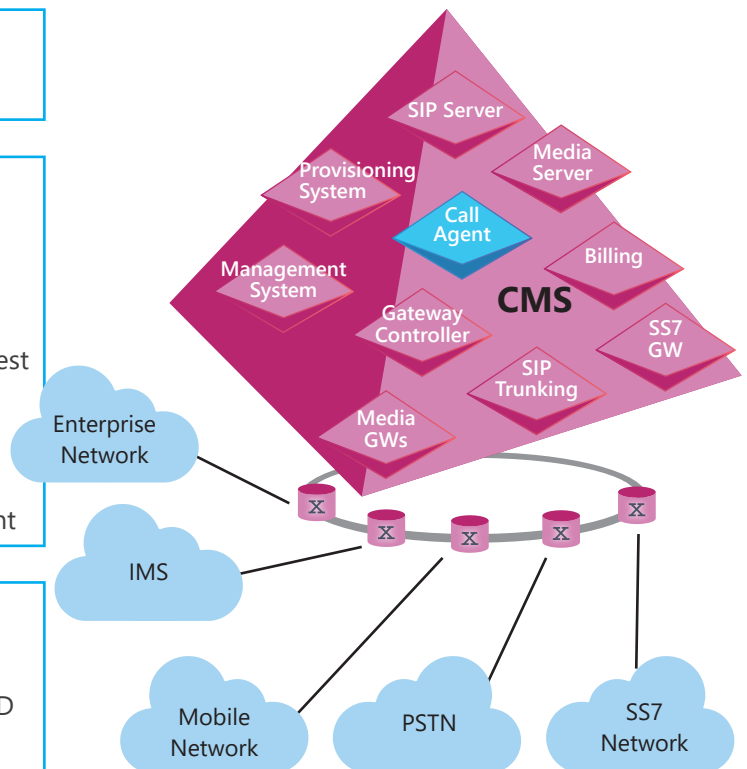
Enable solutions for Telco to migrate their legacy networks to NGN (SoftSwitch & IMS)

## Services

- **Development**
  - New Features & Tools
  - Product Sustaining
- **Product & Solution Integration Testing**
  - Full testing including Performance & Security test
  - Manual, Automation and Continuous Testing
- **Production Services**
  - Demo, deployment support
  - Migration and Upgrade procedure development

## Technologies

- **Platform:** RHEL, KVM, VMWare, NFV, OpenStack
- **Framework:** Ansible, Spring MVC, Pacemaker
- **Technologies:** SoftSwitch, IMS, VoIP, Voice/Video HD Codec, SDP, MGCP, H.248, Transcoding, SIP, SIP-I/-SIP-T, MGCF, AGCF, BGF, SG, Billing Mediation
- **Languages:** C/C++, Java, Spring, PHP, Protel
- **CI/CD:** Jenkins, Docker



# Enterprise Communication Solutions

