Oracle Communications Virtualized VoLTE Solution

In an increasingly competitive marketplace where customers are looking for personalized digital services tailored to their needs, Communications Service Providers (CSPs) are looking for solutions to differentiate themselves and become the focal point of the extended value chain. The Oracle Communications virtualized VoLTE solution empowers CSPs to deliver compelling services with reliability, scalability, security, interconnection, reach and overall superior user experience. The solution is built following the industry leading NFV architecture, enabling CSPs to achieve greater service agility and to further shift spend toward innovation in order to keep pace with business and technology disruptions.

KEY BUSINESS BENEFITS

- Fully virtualized and orchestrated VoLTE solution, available on commercial hypervisors
- Simple and more cost-effective to deploy, operate and maintain
- Out of the box and configurable options for VoLTE offerings without coding or vendor customization
- Rich set of interoperability and interworking functions
- Five 9s availability with high levels of redundancy, reliability, scalability, security and compliance with regulatory requirements

Voice over LTE and IP Multimedia Subsystem

With faster set-up time, improved voice quality and multimedia, it is becoming increasingly clear that voice over LTE (VoLTE) provides a differentiated modern mobile communications offering for CSPs to exceed users expectations and allows CSPs to effectively compete with non-traditional or over-the-top service providers. VoLTE enables 4G LTE network operators to deliver rich voice, video and messaging core services. VoLTE's improved spectrum utilization over traditional voice services provides CSPs with cost reductions and an opportunity to regain valuable spectrum for use in other services.

The IP Multimedia Subsystem (IMS) provides the technical means for operators to transfer core services (voice, video and messaging) to an all-IP LTE environment. The main capabilities of an IMS system (authentication, authorization, registration, charging and routing) can be re-used by additional services, making IMS a future-proof and complete solution in the context of a broader IP-Communications strategy. The "access-agnostic" nature of IMS and support for seamless handover makes it an even more attractive option for operators with an IP-Communications strategy that extends to Voice over WiFi (VoWiFi). However, a conventional IMS network is compromised of a large number of special-purpose functional elements that interact via discrete signaling interfaces. Implementing and managing a highly diverse and complex network, integrating distinct products, resolving interoperability issues, service provisioning and troubleshooting across disparate solutions are all resource intensive and time consuming propositions resulting in protracted service roll-out, low product margins and poor investment returns

ORACLE®

OC Core Session Manager

• I/S CSCF, BGCF: Provides session routing functions and service invocation logic

OC Session Border Controller

• Provides network edge security, interoperability enablement, regulatory compliance and media anchoring

OC Evolved Communications Application Server

• TAS & SCC-AS: Provides IR.92/IR.94 supplementary services (e.g. call diversion, call barring, multi-party conferencing) and call continuity support

OC Policy Management

• PCRF: provides network resources mediation for the IMS Network and the and charging control rules

OC Diameter Signaling Router

• DRA/DEA: Provides centralized routing of Diameter based interfaces, and edge security for those interfaces which are exposed to external networks

Oracle Partner Ecosystem

• Dialogic MRF: Media resource function responsible for announcements playing (i.e. in call barring) and media mixing for conferencing (e.g. Multi-Party calls)

• NetNumber ENUM: IMS network call routing enabler and number manipulation

Oracle Communications Virtualized VoLTE Overview

The Oracle Communications Virtualized VoLTE solution is founded upon an agile virtualized IMS core with consolidated functional elements and interfaces. It is simpler and more cost-effective to deploy, operate and maintain as compared to traditional IMS core solutions. This end-to-end solution enables operators to overcome the common IMS deployment barriers and business challenges listed above. Based upon decades of market leading expertise in session border controllers, policy management systems, diameter signaling routers and IMS compliant application servers, the Oracle Communications Virtualized VoLTE solution provides CSPs with a rich set of security, regulatory compliance, interworking and interoperability features essential to VoLTE and VoWiFi deployments. With numerous out of the box applications provided by the solution, CSPs can jumpstart their VoLTE offerings without coding or vendor customization and offer a cohesive customer experience by delivering comprehensive, consistent and highly reliable IMS services across LTE, WiFi and legacy networks.
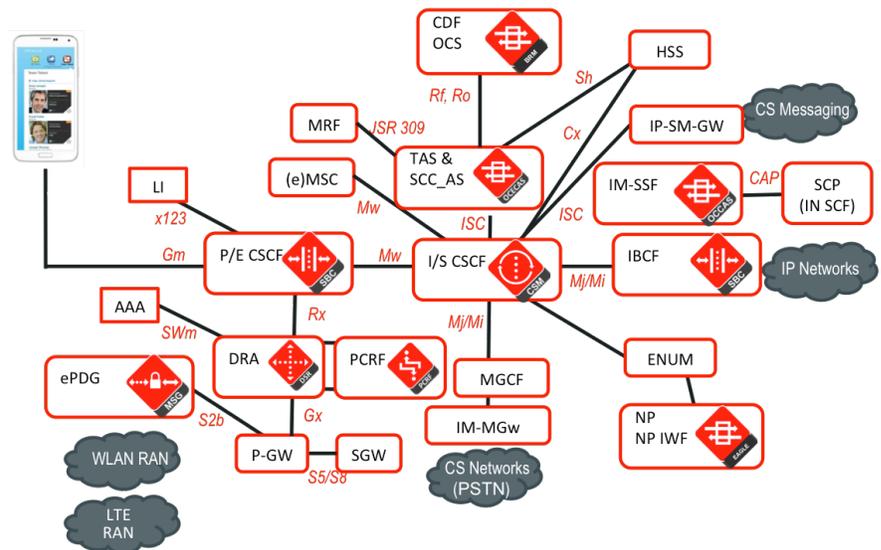

Figure 1. Oracle Communications Virtualized VoLTE Solution

An Agile and Virtualized IMS Core

By delivering core session control, session routing, and interconnect functions and industry-leading SBC functionalities in a single network function (virtual, physical or hybrid), the Oracle solution provides an integrated IMS core that is simpler and more cost-effective to deploy, operate and maintain compared to a traditional decomposed IMS core solution. The Oracle virtualized IMS solution is based upon 3GPP release 12 standards-based integrated network architecture. Built with a rich set of out of the box features and cost-effectively scaling from small initial service trials involving thousands of users to large-scale production deployments supporting millions of subscribers, the Oracle IMS Core solution reduces network deployment cost allowing CSPs to contain CapEx and OpEx.

KEY FEATURES

- Out of the box application designed for GSMA IR.92/64/94

- Maximum service reach enabled by interworking and normalization of signaling, media, transport, and security protocols and codec management

- Regulatory compliance supported by lawful intercept, prioritized routing of E911 calls, and session replication

- High QoS and quality of experience (QoE) ensured through high availability and session routing

- Revenue and cost optimization features, including accounting and protection against service theft/fraud

- Session design center providing code free extension of applications

- API exposure and security for 3rd party content partner management

- Robust proven traffic congestion management

- GUI driven mediation rules for interworking and functionality extension

- Flexible topology hiding configurations

IMS Core Services

The Oracle Virtualized VoLTE solution offers two main authentication methods, SIP Digest and IMS-AKA. In terms of IMS message and session routing, the capabilities include ENUM lookup queries, HSS location queries, initial Filter Criteria (iFC) based routing, PSI and wildcard PSI subdomain routing, local policies routing and routing based on subscriber's capabilities. The solution also supports subscription to Reg-event mechanism, third party registration and forking based on UA capability or preferential routing. The Oracle Communications IMS core solution is fully 3GPP release 12 compliant with all core session and breakout gateway functions and interfaces.

VoLTE Specific Services

Easy to Use Network Service Design

The Oracle Virtualized VoLTE solution empowers CSPs to enhance the customer experience with enriched multimedia services such as HD voice and video as well as complementary offerings such as VoWiFi. This solution comes with the Oracle Communications Evolved Application Server (OCECAS), an easy-to-use network service design and delivery products with many out of the box NFV-enabled and standards compliant features that provide for network-grade speed and reliability with the cost profile of an IT product. OCECAS transforms the service layer into an open, powerful and programmable architecture using the Session Design Center to provide a graphical, business view of all service logic which alleviates the need for coding or vendor customizations. This further empowers CSPs to go beyond vanilla offerings and effectively compete with alternative communications providers with innovative offerings and quick service rollouts. It delivers consistent, and comprehensive IMS applications across LTE, WiFi & legacy networks and aims to simplify, optimize and accelerate the entire service lifecycle in a virtualized environment. It includes a set of most valuable MMTEL supplementary services as dictated by GSMA IR.92.

Service Continuity

Single Radio Voice Call Continuity (SRVCC)

The central challenge during the transition from today's hybrid networks with gaps in LTE coverage to an all-VoLTE voice call environment, is transferring voice calls already in progress between LTE packet switched VOIP to legacy 2G/3G circuit switched voice, without compromising the established quality of service. Enhanced Single Radio Voice Call Continuity (eSRVCC) is a mechanism to move active voice sessions between LTE and 3G networks. The Oracle Communications Virtualized VoLTE solution enables eSRVCC by implementing both anchoring points, the Access Transfer Control Function (ATCF) and the Access Transfer Gateway (ATGW). The solution also includes the Application Server component known as a Service Centralization and Continuity Application Server (SCC-AS) for seamless call handover. The end-to-end eSRVCC flow assured by this solution enables operators to deploy services with more reliability and less complexity.

IMS Centralized Services

The Oracle Communications Virtualized VoLTE solution supports IMS centralized services as defined by 3GPP – enabling a VoLTE subscriber to receive services in a consistent manner regardless of the users access network (Circuit Switched CS or Packet Switch PS). In order to support this principle, originated and terminated sessions

via the CS or PS domains can be anchored in the Service Centralization and Continuity Application Server (SCC AS) in the IMS. The Oracle solution supports IMS anchoring for both enhanced and non-enhanced MSC (Mobile Switching Centre) for ICS. The 3GPP preferred approach for implementing ICS is with Mobile Switching Centers that have been enhanced for ICS (eMSC). However, most networks do not yet support eMSC. In this case the solution converts from CAMEL to SIP and generates an IMRN (IMS Routing Number) to anchor the call in IMS. This solution further synchronizes profile data updates between the HSS and HLR, addressing a gap in the 3GPP standards thereby solving a key challenge associated with supporting ICS using non-enhanced MSCs, this is done via the Oracle Communications Evolved Application Server (OCECAS) and the Oracle Communications Converged Application Server Service Controller (OCAS-SC).

Quality of Service

In an all-IP environment, providing the quality of experience required by subscribers for voice services results from the ability to establish and maintain reliable channels of bandwidth in real time, each dedicated to a specific subscriber's voice call. During call establishment, the Proxy Call Session Control Function (P-CSCF) communicates with the Policy Control and Rules Control Function (PCRF) to negotiate the specific capabilities and functions that will be allowed for the call. This negotiation is based on many variables, including the subscribers' entitlements and available quota, the technical capabilities of the subscribers' mobile devices, and the priority of the call relative to other voice and data bearers, among others. Establishment and reliable maintenance of these dedicated bearers for voice is critical, and places many complex requirements on the policy control infrastructure such as: programmability & flexibility, scalability & resiliency and of course network visibility & charging coordination. Oracle Communications Policy Management provides the flexible and resilient network policy system needed to meet the demanding requirements of VoLTE network. It is the market-leading independent policy management system, providing standards-based, yet customizable interfaces and multi-vendor interoperability with a wide range of third party network functions. Its GUI-driven, customizable natural language policy creation wizard provides an intuitive and flexible environment for easy and efficient creation of complex network policies. Its high scalability and resiliency provide a dependable backbone for the largest and most demanding 3G/LTE, VoLTE, VoIP, fixed, and cable networks.

The Oracle Communications Virtualized VoLTE solution also provides admission control, load balancing and comprehensive and mature QoS policy management and reporting features that deliver assured service quality and network availability during abnormal busy periods or networks events. CSPs can increase customer loyalty by ensuring high quality user experience. In order to ensure premium Service Level Agreements (SLAs) are met while preventing QoS theft by unapproved applications, the network must be able to distinguish and treat SLA backed sessions from all other types of sessions. This solution provides the needed L5 classification to address these use cases. The solution also provides per-session DiffServ or ToS marking as well as tools for measuring call and signaling quality metrics. It can be used to collect real-time QoS statistics for SLA customer reporting, fault isolation, SLA verification and traffic analysis.

Resiliency is an increasingly important concept in IMS networks, In order to guarantee network resiliency, the core IMS component of this solution in a P-CSCF role supports mechanisms to direct traffic to the appropriate CSCF based on distribution strategies

and by detecting and rerouting traffic away from failed CSCFs. The solution detects service failure on the fly and switches to standby node in real time without any service interruption. The Oracle Communications Diameter Signaling Router (OCDSR) prioritizes traffic to ensure end users the best quality of experience during network congestions. The OCDSR creates a centralized and secure signaling architecture that enables core networks to grow incrementally to support increasing service and traffic demands of VoLTE.

Security

In IP networks there are risks of denial of service (DoS), eavesdropping and other malicious attacks. To protect critical service elements such as CSCF servers and application servers in the network, the Oracle Communications Virtualized VoLTE solution unique security features helps CSPs build trusted and secure networks. Features such as topology hiding, dynamic rate liming and IMS Authentication and Key Agreement (IMS-AKA) encryption are especially important to secure network and service availability. Along with SIP digest authentication and open standard based authentication (OAuth), the Oracle VoLTE solution also features support for Internet Protocol Security (IPSec), Transport Layer Security (TLS), and Secure Real-Time Transport Protocol (SRTP) encryption for privacy and confidentiality. The Oracle Communications Virtualized VoLTE solution protects the network from signaling storms and preventing network degradation and outages with the Oracle Communications Diameter Signaling Router (OCDSR) flexible and robust congestion management engine.

Service Interoperability

Numerous characteristics of IP networks such as overlapping of different IP address spaces and difference in signaling protocols can disrupt the delivery of VoLTE services. The Oracle Communication Virtualized VoLTE solution provides IP address and protocol translation capabilities to maximize the types of clients, vendors and service infrastructure supported topologies. This allows CSPs to increase their addressable customer base and accelerate time to market. It supports IPv6-IPv4 interworking enabling CSPs to keep their core network as IPv4 while they start deploying IPv6 terminals. When it comes to peering, the solution allows interconnecting a service provider with IPv4 with a brand new operator that has started with IPv6 from scratch. The OCDSR GUI-driven mediation rule engine alleviates interworking and interoperability issues in a multivendor and multiprotocol environment. The SIP and DIAMETER header manipulation rules (HMR) feature allows for network operators to fix any interoperability issues within their VoLTE network. It also helps CSPs to create or modify services with existing features by simply changing the configuration on the network function without having to wait for a new release of software and the associated homologation process used to deploy a new release in the field. In essence, the usage of HMRs helps reduce the total cost of solutions and decreases the time-to-market for deploying new services and applications. A VoLTE-enabled network must be able to properly reserve and prioritize appropriate network resources.

Through our ecosystem partners such as Dialogic, the Oracle Virtualized VoLTE solution also provides multimedia service continuity across legacy, next-generation network (NGN) and IMS network elements through media and signaling interworking managed by the Media Gateway Control Function (MGCF), Media Gateways (MGWs), Media Resource Function (MRF) and Media Resource Broker (MRB).

Regulatory Requirements

Carrier grade VoLTE solutions need to fulfill strict government regulations such as emergency calling and law enforcement enablement. The Oracle Communications Virtualized VoLTE solution supports emergency call handling, lawful intercept and number portability. Depending on the regulation the handling of VoLTE emergency call can vary, the Oracle Communications Session Border Controller (OCSBC) provides CSPs various options in terms of IMS or CS fallback handling of VoLTE emergency call, emergency registration and call prioritization. For Lawful Intercept (LI) the OCSBC supports all the IMS interfaces to the LI servers, such as the X1 warrant provisioning, X2 signaling transport and X3 media transport. It also supports the various interception requirements such as mid-call interception. The Oracle solution provides CSPs with the added flexibility to choose the Number Portability strategy that is best suited for their needs by providing support for both the All Call Query (ACQ) and Onward Routing (OR) schemes.

NFV Ready

Built for Virtualization

Leveraging Oracle's many years of experience designing virtualized products, Oracle Communications IMS Core is designed from the start to run in a fully virtualized environment and is in full alignment with ETSI NFV's in-progress standards. With an underlying Acme Packet OS enhancement to symmetrical multi-processing environments (SMP), the Oracle Communications IMS Core can fully utilize multi-core platform design and architectures any underlying hardware platforms thereby delivering enhanced performance and capacity for IMS core virtualized node. The IMS Core architecture is designed to handle dynamic resource allocation (vCPU/vIO/vMem) in virtualized environments and it is designed to be hypervisor agnostic. It currently supports Oracle Virtual Machine (OVM) 3.2.1 and higher, as well as other popular hypervisors such as KVM and VMware. The Oracle IMS Core solution also runs on COTS hardware including the Sun Netra X3-2 and Netra X5-2. The remaining components of this solution are virtualized and orchestrated with multi-hypervisor and multi-platform support.

Virtualized VoLTE Orchestration Framework

The Oracle Communications Virtualized VoLTE combined with the Oracle Communications Application Orchestrator and Network Service Orchestration Solution allows CSPs full business transformation. This allows planning, engineering and operations teams in CSPs to rapidly deploy new network services and functions, which materially reduces operational effort and cost. The Oracle Communications Application Orchestrator provides a core management platform for CSPs, enabling them to further reduce the complexities associated to IMS deployment while leveraging the service agility and reduced OpEx that characterize NFV. This platform supports a composite network function (CNF) that can be any combination of a virtualized network function (VNF) and physical network function (PNF) to provide one or more public, private, or hybrid cloud computing solution. The Oracle Communications Network Orchestration Solution simplifies the deployment of virtualized IMS networks that cost-effectively support a new generation of services, such as VoLTE and VoWiFi.

VIRTUALIZED VOLTE ORCHESTRATION FRAMEWORK

Oracle Application Orchestrator

Manages the creation, integration, capacity and virtualization for PNFs, VNFs, or a Composite Network Function CNF) of both PNFs and CNFs

Oracle Communications Network Service Orchestration Solution

Orchestrates, automates and optimizes the lifecycle of any network services and VNFs along with their required virtual and infrastructure resources through real-time coordination with Virtual Network Function Managers (VNFM), Element Managers (EMS), Virtualization Infrastructure Managers (VIMs), and SDN controller

Professional Services

Oracle's integration service for Oracle Virtualized VoLTE solution has been pre-integrated and tested to reduce the complexities associated to interoperability issues in a multivendor CSP network. It is a robust deployment service that offers customers a thorough and streamlined design and implementation of Oracle's VoLTE and VoWiFi solutions. It combines an array of Oracle professional services offerings into a single service solution, including pre-installation planning, project management, solution architecture and design, solution testing and certification, onsite implementation, and post-implementation remote consulting.

CONTACT US

For more information about the Oracle Communications Virtualized VoLTE Solution, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.

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