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Communications

5G and Cloud: Bringing Today's Voice Network and Services into the Future

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INTRODUCTION

With 5G on the horizon, and Cloud and Artificial Intelligence (AI) technologies going mainstream, voice is experiencing a resurgence as people increasingly ditch their keyboards and touch pads in favor of simpler and more natural voice interactions. This can offer a significant market opportunity for Communications Service Provider (CSP) voice services as part of both a larger unified Cloud communications and customer experience strategy for enterprises, and an immersive audio and virtual reality services for person-to-person and person-to-machine applications.

This paper provides guidance to CSPs on how they can evolve to support and generate revenue streams from these new, disruptive 5G and Cloud voice services. It will discuss several possible 5G voice migration paths based on the latest 3GPP standards as well as Oracle Communications voice solutions that are part of the company's broader 5G, Cloud, and unified communications services.

THE FUTURE OF VOICE SERVICES

The future of voice services is based on a combination of 5G, Cloud and AI technologies. The adoption of 5G will provide massive Quality of Service (QoS) upgrades including lower latencies, higher speeds, superior network availability, improved reliability and reduced jitter. This will eliminate voice problems such as stuttering, skipping, and dropped calls that enterprises and consumers have endured for years with 3G and 4G network congestion. Furthermore, the ability to provide an Ultra-Reliable, Low Latency Communication (uRLLC) 5G network slice for voice communications will solve common voice quality and latency issues.

New 3GPP standards for 5G are including codec technology that supports multiple audio channels, immersive audio, and virtual reality communications use cases. This will enable a range of exciting new 5G voice services whereby people communicating with each other can be immersed in each other's' environment, and can chat while watching videos together.

5G will also accelerate the evolution from 3G circuit-switched voice to IP Multimedia Subsystem (IMS)-based Voice over LTE (VoLTE) which is a necessary step in migrating to full 5G Voice over New Radio (VoNR) capabilities.

At the same time, Cloud-based communications are growing rapidly. Forbes predicts that by 2020, 83 percent of all business processes will be managed using Cloud technology and voice is no exception. In the enterprise, Cloud communications is being driven by three trends: operations are becoming more distributed and decentralized in branches and home offices, making on-premise telephony systems cumbersome, inefficient and costly; the proliferation of devices that are accessing the network is increasing complexity and security concerns; and data centers housing IT assets and applications are

being consolidated and located and managed remotely. These trends are driving enterprises to engage CSPs to provide Cloud-based Unified Communications-as-a-Service (UCaaS) and Communications Platform-as-a-Service (CPaaS) that will benefit from 5G's improved QoS. These services can include voice, video, and Rich Communications Services (RCS) that provide enterprise customers with significant cost savings, improved employee productivity and collaboration, and the ability to deliver personalized customer experiences to their users.

Consumer communications preferences are also shifting as they look for natural, faster, and more personalized voice engagements via talk, live chat, social media, and other channels. This provides an opportunity for CSPs to provide rich and interactive voice services as part of integrated communications offers.

While voice has been a primary means of person-to-person communications, it is now taking over person-to-machine communications. It will transform customer digital experiences as AI-infused personal voice assistants, chatbots, and voice-controlled interfaces are used to search the Internet, buy services, support real-time translations, and interact with any device. CSPs can infuse their digital customer experience platforms with these capabilities as well as offer AI-based voice services as part of an Internet of Things strategy.

VOICE OVER 5G MIGRATION PATHS

The journey to 5G has several possible mobile network migration paths and voice services must be supported in all evolution phases. To ensure seamless voice service continuity and interworking across 4G and 5G networks, 5G VoNR will use the IP Multimedia Subsystem architecture and associated IMS services which are already implemented today to deliver VoLTE services. There are currently about 1.4 billion VoLTE subscriptions globally in more than 155 networks in over 75 countries. The number of VoLTE subscriptions is expected to grow to 5.9 billion by 2024, representing 85% of combined LTE and 5G subscriptions. For this reason, some of the 5G deployment options described below will continue to use IMS and VoLTE, enhanced by additional 5G services as they become deployed over the next several years.

A new 3GPP voice codec called Evolved Voice Service (EVS), which is starting to be used on 4G networks today, is expected to be the default codec for 5G. This new codec, trademarked as "HD voice+" by the GSMA, will enable superior voice quality and a range of exciting new voice services such as sharing high quality music over a voice call.

The industry is coalescing around three evolutionary phases for voice services as CSPs role out their 5G networks. These phases include adopting non-standalone (NSA) options consisting of 4G LTE and 5G radio access technologies and a 4G Evolved Packet Core (EPC) as well as a standalone (SA) option which consists of only 5G New Radios (NR) and a 5G Next Generation Core (NGC) as shown in Table 1:

Table 1: Three Evolutionary Phases for 5G Voice Services

	PHASE 1: 5G NSA (3GPP OPTION 3)	PHASE 2: 5G SA INITIAL PHASE	PHASE 3: 5G SA MATURE PHASE (3GPP SA OPTION 2)
Description	CSPs launching 5G services in NSA mode by offering 5G data boosts while maintaining VoLTE services	5G data where coverage is available, Evolved Packet System (EPS) technology for voice fallback to the LTE network, completing the connection through VoLTE	5G New Radio coverage for voice (VoNR) and data with seamless mobility between 4G and 5G with voice handover
Devices	VoLTE-enabled 4G/5G dual connectivity devices	5G devices that support VoLTE and are EPS-enabled	5G devices that support VoNR and core network protocols, backwards compatible with previous generation 5G devices
Benefits	Rapid launch of devices and initial 5G data services	Launch of 5G devices, improved voice up-link coverage, new data services, reduced operating costs	Ultra-low latency and ultra-reliable connections for users, 5G high data speeds while making voice calls, high quality HD Voice+ experience, new immersive voice/video/virtual reality services
Considerations	Minor software upgrades to the 4G EPC and 4G RAN Deployment of 5G NRs	Call set-up times are longer due to fallback from 5G to 4G Requires software upgrade of IMS, upgrade to a Cloud-based 5G NGC, upgrades to the 4G and 5G RAN	In areas without 5G NR coverage, Packet Switched Handover (PSHO) can be used to switch sessions from 5G NR to LTE radio so that VoLTE can take over voice services 4G and 5G session control is integrated into the IMS for processing, avoiding complex cross-system handover Cloud-based 5G NGC supports new use cases including network slicing and edge computing using cloud native, service based architecture Requires upgrade of IMS, software upgrades of the 5G NGC and RAN, and extensive interworking between 4G and 5G networks.

ORACLE COMMUNICATIONS 5G AND CLOUD COMMUNICATIONS SOLUTIONS

Oracle is making significant investments in 5G and Cloud solutions that will enable CSPs to deliver innovative communications services to both enterprise and consumer customers as shown in Figure 1. Oracle Communications 5G NGC cloud solutions deliver cloud native applications that support 4G and 5G architectures and enable VoLTE and future VoNR services. They are designed to support multiple migration paths from 4G to 5G for NSA and SA deployments. They also assist CSPs in the migration from networks that use the 5GNR alongside a 4G radio with both radios supported by an existing Evolved Packet Core, to full integration with the 5G NGC. CSPs can also utilize Oracle's signaling solutions to take advantage of 5GNR and deploy 5G-like network slices.

In addition, the company's market leading Session Border Controller (SBC) has long supported session delivery needs for service providers and is continuously evolving to deliver innovative cutting-edge services in cloud native environments. The Oracle Communications SBC secures real-time communications across IMS, 4G and future 5G network borders such as Voice and Video over LTE, Voice over IP, planned Voice over NR, video conferencing and calling, presence, and RCS. It ensures that critical CSP requirements for security, interoperability, reliability and quality, regulatory compliance, and revenue/cost optimization are met.

Oracle Communications Unified Communications Suite is a cloud-based voice, messaging and collaboration solution that is a market leader in the communications industry. It is a standards-based, scalable, secure and reliable platform that provides access to real-time and near real-time capabilities including voice, video, screen sharing, messaging, calendaring, and presence on desktop, web, and mobile devices.

Oracle Communications is collaborating with Microsoft Teams to provide secure, integrated, and easily-managed voice services across the Office 365 and Microsoft Teams collaboration environment. Teams provides a 4-in-1 experience across chat, meetings, and voice calling with the Office 365 platform. Together, Oracle Communications and Microsoft are delivering a secure, fully integrated, real-time voice experience for the many Office 365 customers who use Teams to foster collaboration. CSPs can take advantage of this by offering integrated Oracle and Microsoft solutions to their customers that provide a seamless and faster migration from legacy applications to the Cloud.

CSPs can also take advantage of Oracle's AI-based voice solutions which can be integrated into their own customer experience solutions as well as Cloud-based services for their enterprise customers. AI-trained voice with Oracle Digital Assistant allows enterprises to use voice commands to communicate with their applications to drive desired actions and outcomes, enriching the user experience with conversational AI, simplifying interactions and improving productivity.

Figure 1: Oracle Communications Vision for Voice Services.

CONCLUSION

In the new 5G and Cloud world, voice will be as important as ever. As Cloud-based communications continue to drive as-a-service business models, CSPs have the opportunity to grow communications service revenues by becoming managed Cloud service providers and brokers. This will enable CSPs to meet the needs of their enterprise customers who are increasingly drawn to the agility and flexibility of communications-as-a-service solutions because they provide access to a host of innovative capabilities without the large upfront capital expenditures required of traditional on-premise options. CSPs can sell communications in combination with other as-as-service offerings, such as customer experience management services. Likewise, they will be able to offer enterprises and consumers more natural, immersive and engaging person-to-person communications and person-to-machine communications enabled by personal voice assistants, chatbots, and voice-controlled IoT devices.

By partnering with Oracle Communications for Cloud and 5G, CSPs can lead the digital disruption that new voice applications and as-a-service models are delivering. They can pursue several different evolutionary paths for voice services, and accelerate the growth of innovative voice based digital services for their customers.

WHY ORACLE COMMUNICATIONS?

Oracle is accelerating digital innovation and migration of communications services to the Cloud and 5G:

- Robust, secure and integrated Cloud and communications network infrastructure
- Cloud and communications expertise across service providers and enterprises
- Secure, automated Cloud Native environment delivers scalability, agility, flexibility, and cost efficiency
- Future-proof signaling and policy platform evolution across 3G, 4G and 5G networks
- 5G Core Network-as-a-Service and Unified Communications-as-a-Service for digital businesses
- Flexible deployment – on-premise, hybrid and cloud
- World-class customer success organization

For further information, visit www.oracle.com/communications.

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Integrated Cloud Applications & Platform Services

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