Overview

The excitement in our industry around Voice over LTE (VoLTE) is immense. When compared to legacy voice services, VoLTE is superior in all aspects, both from a technical and customer experience perspective.

With over 360 4G-LTE networks currently operating globally, there has been a significant advancement in data speeds and HD video availability, as well as usage for mobile shopping and gaming. This progress is laying the foundation for an exciting new era of mashed-up VoLTE offerings that include combinations of rich communication services (RCS) comprising voice, video, instant messaging (IM), location-based and other services.

But in contrast to the speed with which 4G-LTE networks are being rolled out globally, VoLTE proliferation is relatively slow. This is because the technology runs on the IP Multimedia Subsystem (IMS) Core, a foundation that is relatively costly and considered a highly strategic investment, even for large-scale operators.

Moreover, the wealth of advancements that VoLTE brings introduces a range of other challenges. These include shifting customer usage from over-the-top (OTT) applications to new services and shifting from circuit switching to packet switching.

The most pressing challenge however, relates to monetization, and charging in particular. To maintain competitiveness and achieve a return on investment, service providers require sustainable business models and creative, real-time charging solutions that can cope with the complexity of mashed up VoLTE services.
A new business enabler

VoLTE is not just about voice. It is about producing a sophisticated user experience by seamlessly combining other rich communication services that include video, voice and others, such as interactive maps, chat, file transfer, location-based services.

From a service provider perspective, VoLTE features many capabilities that are similar to OTT offerings but with some clear advantages:

- **Mashed-up services**
  VoLTE can mash up different services into a single service that runs as a smart phone application. This is possible by running on IMS infrastructure, which enables multimedia environments to be seamlessly combined. Compared to OTT applications, VoLTE is superior in the number of services it can combine. For example, the popular WhatsApp service enables chat, file sharing (images and videos) and voice recordings, but does not feature live video or combining third-party services via application interfaces.

- **Built-in high-definition (HD) quality voice**
  VoLTE features HD quality voice, which can be integrated directly into the voice service of the operator rather than a third-party application or service. This provides users with clear voice quality without the need to purchase the service separately.

- **Ultra-quick setup time**
  VoLTE runs as a data service, which enables it to be as fast as the network. In reality, call setup time between VoLTE-supported handsets can be as short as 0.25 seconds. OTTs have no response for this advantage, since their voice services are dependent on the end-to-end quality of the network.

- **Quality of service (QoS)**
  Because VoLTE services are operated within the service provider’s core network, QoS is assured, with far superior performance compared to OTT applications.

Targeting business and enterprise customers

In addition to the clear advantages VoLTE provides to consumers, the business sector also represents an important target for service providers. Traditional services, such as video conferencing, voice email and location services, can now be offered via VoLTE with significant improvements over legacy 2G/3G offerings. By consolidating existing services into a single application while retiring legacy systems, service providers can benefit from a lower total cost of ownership.

Inter and intra-corporate video services also present new growth engine opportunities for service providers. Such services provide guaranteed QoS to businesses and enterprises, with clear benefits to sales persons on the go, providers of mobile health services and others, through the ability to share high-quality video in real time and more. In addition, with multi-perso1ona offerings, a single handset can host multiple user identities, thereby enabling dual usage for both business and personal needs.
The challenges

VoLTE and Rich Communication Services (RCS)

As mentioned earlier, with the introduction of RCS we are witnessing an exciting new era of mashed-up services, including combinations of voice, video, instant messaging (IM), location-based services and more.

From a technical perspective one of the main challenges with VoLTE and RCS is the fact that though from a customer’s perspective the services are aligned and integrate within a finger swipe, but in the back-end, the different services are sourced at separate network paths and components which do not necessarily integrate one with the other, and when a service is built, this should be taken into account.

Inter-generation network handoffs

Our industry is currently in the midst of a generational change, with most 4G LTE service providers still operating legacy 2G/3G networks. With the exception of highly advanced networks such as SK Telecom in South Korea, which already provides 90% 4G LTE coverage in populated areas, this situation is likely to persist for the next several years until the transition to 4G LTE is complete. During this interim period, 4G-LTE subscribers will continue to be handed off between 4G LTE and 2G/3G networks in the midst of their mobile sessions. This is necessary, since without a proper solution to anchor a call within the 4G LTE network’s IMS core, calls would disconnect, resulting in poor customer experience.

Unplanned Signaling increase

The shift from circuit-switched networks to packet-switched ones causes a clear and notable decrease in legacy voice system (SS7-based) traffic, as well as a surge in the diameter signaling associated with services running “as data” (including RCS, video calls, and so on). This surge is largely associated with the re-creation of all legacy services over IP (mainly voice), and effects diameter signaling.

It is forecasted that diameter signaling will grow tenfold in the next few years, to reach 100 million messages per second by 2017.

Projected global diameter signaling

This challenge requires service providers to immediately find solutions to lower the overall amount of signaling, since the effect on the network is critical in terms of performance degradation.

VoLTE Interoperability

As a customer, the ability to benefit from VoLTE is dependent on both the calling and called party being on the same network. The reason for this is the lack of interoperability between 4G-LTE service providers, which results in calls being automatically downgraded when traversing different service providers’ networks. This occurs regardless of whether both parties are using LTE-enabled handsets.

As a result, service providers are starting to understand that the only way to provide a better user experience is by reaching agreements with competitors to establish VoLTE interoperability. Without such agreements, the quality of VoLTE service offerings would have no significant QoS advantages over free OTT applications such as FaceTime, Viber and WhatsApp.

A notable initiative in this area has been the announcement by AT&T and Verizon to enable VoLTE calls between their networks, thereby providing full benefits of the technology to all customers possessing compatible handsets.
Monetizing VoLTE

With the investment in VoLTE mainly reliant on the IMS core, a key challenge in achieving ROI on VoLTE investment is being able to sell it to the customer. Despite the excitement surrounding the quality of HD voice, legacy services provided in today’s unlimited price plans are comparatively cheap. As a result, the value to consumers of paying a premium for HD voice remains to be proven. To address this challenge, service providers must find new sustainable business models for VoLTE. While there is no clear and immediate answer, we are seeing the emergence of solutions with new service combinations, backed up by creative charging models. For example, an Amdocs customer that provides VoLTE services now offers a solution that combines call duration information and location services. As part of this plan, differential tariffs are applied to calls depending on the location from which they are made. Users are therefore rewarded for making calls from those places that are charged at lower rates.

Amdocs real-time charging VoLTE solutions

Some of the key challenges faced by service providers from the emergence of VoLTE services relate to charging, with an emphasis on applying it in real time. As a market leader in convergent charging solutions, Amdocs has the solutions and experience that have enabled it to assist service providers in establishing and monetizing their VoLTE offerings.

Inter-session correlation

With the introduction of mashed-up VoLTE services, the need to combine rich communication services that are sourced from different network components is extremely complex. The reason for this is that when the subscriber consumes a single service, charging must account for the multiple, separate network sessions that comprise that service.

The ability to correlate these sessions in real time is handled by an online charging system (OCS). For example, a VoLTE service that comprises a video call, location-based rate and dedicated QoS for video is sourced from three separate subsystems: MMTel for video (Diameter Ro), P-Gateway for location-based services (Diameter Gy, assuming no location server is involved) and PCRF for QoS (Diameter Sy/Rx).

Amdocs’ online charging solution correlates these network sessions to accurately charge the end customer. It also enables the service provider to differentiate the service, either for different customer segments or according to a specific diameter interface, such as duration.
Signaling reduction

To handle unplanned surges in signaling traffic caused by the move to all packet-switched networking, Amdocs’ online charging solution provides three ways to lower diameter signaling:

- Dynamic quota Allocation: The OCS increases the quota size as well as other parameters such as quota validity time, leading to significantly fewer transactions with the PG-W and MMTel. The quota size is determined based on multiple factors that are important to service providers, such as service in use, location and consumption rate.

- Smart charging control: The OCS rates multiple concurrent services in a single credit control charging session. This reduces redundant diameter sessions and requests for selective services.

- Efficient PCC architecture: Pre-integration with Amdocs Policy Control and Charging provides improved signaling between the OCS and PCRF (over Diameter Sy protocol). It also enables single registrations of multiple resources consuming from the same bucket. In addition, the counter expiration time mechanism eliminates the need for the OCS to send SNRs as part of the event or when the offer expires at the end of the billing cycle.

Conclusion

With 2014 widely referred to 'the year of VoLTE', the world has already reached a turning point at which the vast majority of Tier-1 operators have chosen to either go live with VoLTE services or invest in them. By 2016, it is estimated that over 80 service providers worldwide will have already deployed some VoLTE services.

Many challenges lie ahead for service providers to ensure that they can provide a quality of experience that consumers expect, as well as achieve a return on their investment that ensures profitability. A solid, and efficient real-time charging solution is a crucial foundation to achieving this end. With significant proliferation of VoLTE still to come, service providers need to act now, to ensure the right systems are in place for that growth.

About Amdocs

For 30 years, Amdocs has ensured service providers’ success and embraced their biggest challenges. To win in the connected world, service providers rely on Amdocs to simplify the customer experience, harness the data explosion, stay ahead with new services and improve operational efficiency. The global company uniquely combines a market-leading BSS, OSS and network control and optimization product portfolio with value-driven professional services and managed services operations. With revenue of $3.3 billion in fiscal 2013, Amdocs and its more than 20,000 employees serve customers in over 70 countries.

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