



VoLTE: A circuit-breaker for mobile network operators

Enabling Unified Communications for consumers and the enterprise



White Paper

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Introduction

The inexorable rollout of LTE networks worldwide will provide more than just increased speed and throughput for bandwidth-hungry mobile consumers and data applications. LTE will also provide new and improved functionality across a range of communication scenarios for mobile network operators (MNOs) when targeting both consumers and enterprises.

The catalyst for this is the adoption of IMS within LTE, which enables MNOs to continue offering traditional voice and high-speed data services, while also integrating more advanced services involving presence, instant messaging, video and data sharing into a single access point – the mobile phone, with a single address – the mobile phone number.

The move towards Unified Communications (UC) across multiple devices and media types will become an inviting and natural step for MNOs when adopting IP network access technology, as it will facilitate the development of a more robust enterprise market offering, while also breathing life into the consumer end of the UC value chain – the Rich Communication Suite (RCS).

The momentum behind LTE is enormous. And it has to be. MNOs now have little option when it comes to evolving their networks to keep pace with the burgeoning demand for high-speed data applications, and the reality that data is increasingly becoming the single largest component of network traffic.

On May 11, the Global Mobile Suppliers Association announced that LTE is the fastest developing mobile system technology ever. The organisation confirmed that 154 firm LTE network deployments are planned or in progress in 60 countries, including 20 networks which have commercially launched.

A further 54 operators in 20 more countries are engaged in LTE technology pilot trials or tests, ahead of formal commitments to deploy networks for commercial service (these are referred to as pre-commitment trials). Taken together, it means that 208 operators in 80 countries are now investing in LTE.

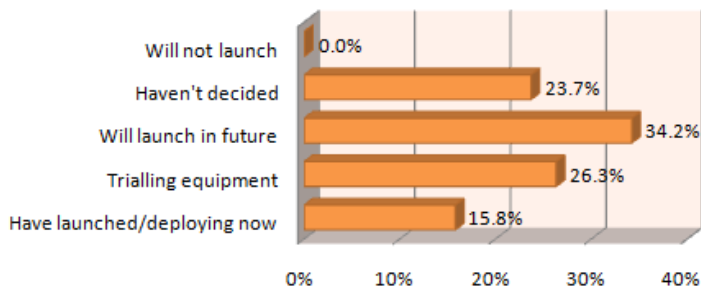
During April and May this year, mobileSQUARED surveyed almost 40 leading operators worldwide for BroadSoft with a series of questions regarding their approach to Voice over IP (VoIP), UC, RCS and LTE to better understand business plans for both the consumer and enterprise markets in an all IP environment.

Individual survey results are anonymous, but the participating operators represent the majority of major operating groups – including 3 Group, AT&T, Etisalat, Maxis Communications, MTS, NTT DoCoMo, Orange/France Telecom, Orascom, QTel, Reliance Communications, Singapore Telecom, T-Mobile/Deutsche Telekom, Telefónica O2, Telenor, TeliaSonera, Telstra, Tigo, Turkcell, Vodafone, Wataniya Telecom and Zain.

Approximately three-quarters of all operators surveyed said they have either already launched LTE or are deploying a network now, that they are currently trialling equipment, or that they plan to launch LTE in the future.

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What are your technology plans around LTE?



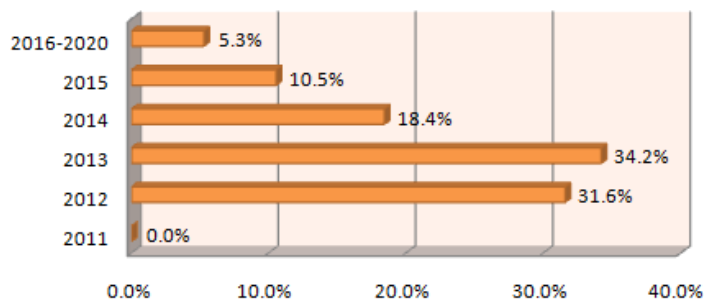
Source: BroadSoft

One-third of operators – the single largest group – said that they will launch LTE in the future, but have no trials or network deployments in process at the moment. A further 26 percent said that they are currently trialling vendor equipment, while 16 percent said that they have either already launched LTE, or are deploying networks at the moment. The remainder – almost a quarter of all operators – have not yet decided what to do because of spectrum or cost issues.

With 20 operators already having launched their LTE networks, and the likes of Verizon Wireless and Metro PCS due to switch on by mid-year, the rollout of LTE for consumers is steadily gaining momentum. Initial deployments of LTE have targeted heavy data users with dongles. However, the single biggest issue around LTE has been the future of voice and SMS.

None of the operators surveyed here thought LTE handsets would be widely available this year. A total of 34 percent thought LTE would not become a viable consumer offering until 2013, with 32 percent saying 2012. A further 18 percent said it would be 2014, 10.5 percent said 2015, and five percent thought it would be 2016-2020 until there was sufficient availability of devices.

When do you think LTE handsets will be widely available?



Source: BroadSoft

The 2012/13 timeframe ties in with a number of operator announcements. AT&T plans to introduce VoLTE technology by 2013 after an initial roll-out of circuit-switched fall back (CSFB). The operator has already begun integrating the IMS architecture, but VoLTE will not be rolled out to the market until 2013 when there is more ubiquitous coverage on the LTE radio access network.

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Verizon Wireless plans to launch commercial VoLTE services in 2012 and will enhance the service with RCS. MetroPCS plans to begin trials of VoLTE this year, though a commercially available service wouldn't launch until late in the fourth quarter, or early 2012. MetroPCS has already partnered with HTC to roll out its own VoLTE-capable handset.

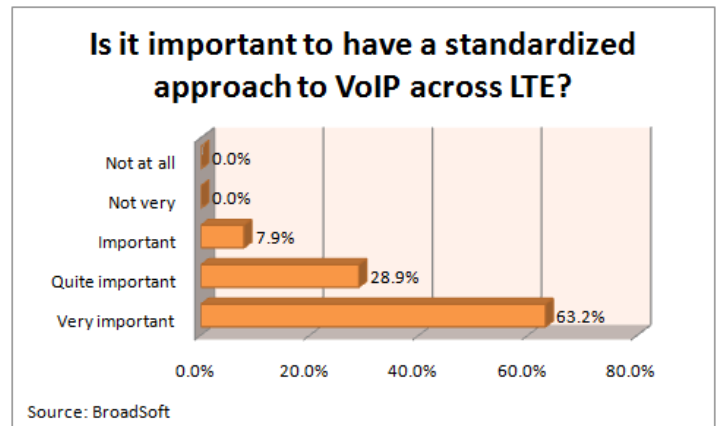
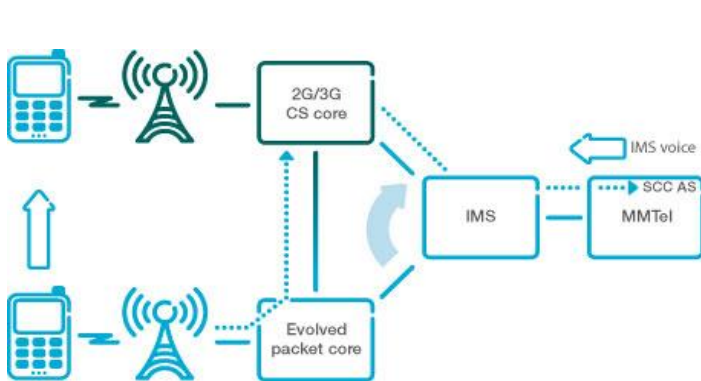
And staying in the US, Leap, the wireless communications provider behind the Cricket brand, says it will launch LTE this year to enhance its EV-DO data service on its CDMA network, although it doesn't expect to see widespread availability of consumer devices until the second half of 2012.

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VoLTE – A circuit-breaker

LTE is an all-IP technology, meaning that there is no support for the circuit-switched domain voice currently used by the majority of MNOs worldwide. This means that new voice and SMS solutions were required to interoperate between different LTE networks and, more importantly, continue to provide seamless voice connectivity when one or another network drops back to CS domain voice – be that on HSPA, WCDMA, GSM or CDMA.

The answer was provided by integrating IP Multimedia Subsystem (IMS) specifications developed by 3GPP as part of the core network architecture for LTE and adopting a standardized approach to VoIP across the mobile operator community. The standards work was driven by the GSM Association which formerly announced the VoLTE initiative on February 15, 2010, at the Mobile World congress in Barcelona. The GSMA adopted and expanded the original work of the One Voice Initiative* to address the entire end-to-end voice and SMS ecosystem by also focusing on roaming and interconnect, in addition to the interface between customer and network.



VoLTE was backed by more than 40 organizations at launch, including handset manufacturers, network vendors and operators including 3 Group, AT&T, Bell Canada, China Mobile, Deutsche Telekom/T-Mobile, KDDI, mobilkom austria, MTS, NTT DoCoMo, Orange, SKT, SoftBank, Telecom Italia, Telecom New Zealand, Telefónica, Telenor, TeliaSonera, Verizon Wireless and Vodafone.

Almost two-thirds of operators surveyed by mobileSQUARED said that it is 'very important' to have a standardized approach to VoIP across LTE networks and that the GSM Association's efforts with the VoLTE initiative will help develop a sustainable ecosystem and increase scalability for devices.

A further 29 percent of operators believed standardization was 'quite important', but that spectrum and roaming issues still need to be addressed, while eight percent said standardization was 'important' for operators, but not for mobile customers who will end up using the most attractive solution regardless.

*Page note: * The One Voice Initiative was a collaboration between AT&T, Orange, Telefónica, TeliaSonera, Verizon Wireless, Vodafone, Alcatel-Lucent, Ericsson, Nokia, Nokia Siemens Networks, Samsung and Sony Ericsson that used current open standards to define the minimum mandatory set of functionality for interoperable IMS-based voice and SMS over LTE.*

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The key underlying principles of VoLTE are:

Single implementation promotes scale – For a Voice over LTE implementation to continue, it must be applicable to the entire LTE industry, and not subject to fragmentation or undue diversity.

Single implementation reduces complexity – It is better to have a single implementation that is adhered to by all so that messages and media flow smoothly from one customer to another, wherever those customers are and whoever they happen to be a customer of.

Single implementation enables roaming – For roaming to work, every device must implement the interfaces between itself and the network it is trying to connect to in exactly the same way. Similarly, every network must accept devices that are attaching to it because of the common implementation of interfaces between the two entities.

By taking these principles as its bedrock, VoLTE defined three sets of interfaces for an end-to-end calling structure that take into account interconnect and roaming:

- The User Network Interface (UNI) between the customer's equipment and the operator's network.
- The Roaming Network Network Interface (R-NNI) between the home and visited network of a subscriber that is not attached to their normal home network.
- The Interconnect Network Network Interface (I-NNI) between the networks of the two parties making a call.

The adoption of VoLTE across the global MNO community is significant on a number of levels. Firstly, the price point of IP-based communications is such that MNOs will be forced to innovate in terms of how services are offered, packaged and priced. Consumers will not tolerate being charged over the odds for mobile VoIP, when compared with Over the Top (OTT) services that are nominally free outside of mobile internet data charges, unless operators can show the value within a variety of communications options.

Revenues for voice over the internet pricing models are close to zero, which will force operators to create a new value-added proposition if they are to continue charging for voice minutes within a traditional subscription model. The most obvious option is to bundle UC and RCS in a single address book, enabling users to track presence, IM, voice and video calls all with the same identifier – the mobile phone number.

Secondly, the Quality of Service (QoS) on connecting network-based mobile VoIP calls will be much better than OTT services, thereby creating a *de-facto* two-tier system. A VoLTE call would be explicitly identified in the operator domain as real time conversation and routed with low latency transit from network to network, whereas an OTT call would be treated as traditional data on the internet.

Although mobile internet data speeds will obviously continue to improve, internet traffic can still be overloaded and quality issues will be exacerbated when roaming as data always routes back to the home network. For instance a VoLTE call between a US customer roaming in the UK, and a French customer roaming in China would be connected directly between the UK and China networks on VoLTE, while an OTT call would route from the UK back to the US, to France and then to China.

Thirdly, it will create the world's single largest mobile VoIP community – far surpassing OTT services from the likes of Skype, Jajah, Vopium, Fring, Truphone and, now, Google Talk. It is therefore unlikely that VoLTE will merely replace CS-based voice in an operator offering, and it would be unsustainable given the cost for carrying voice over IP.

Mobile VoIP has been a very real competitive threat to MNOs and reactions to it have varied from operator to operator. Some, such as Verizon, embraced the threat by partnering with Skype and offering a mobile VoIP service for 3G smartphone customers. Telefónica even went as far as acquiring Jajah to integrate its VoIP service over its cellular networks.

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However, many operators have attempted to restrict the use of mobile VoIP on their networks by imposing surcharges – or using Deep Packet Inspection technologies to charge customers separate fees for using VoIP, streaming video, and sending instant messages. Others, in Egypt and Germany for example, have even tried to enforce a ban on international mobile VoIP calls to protect international call revenues.

The emergence of smartphones and apps though has opened the floodgates and the only way MNOs can truly compete is by introducing their own mobile VoIP services.

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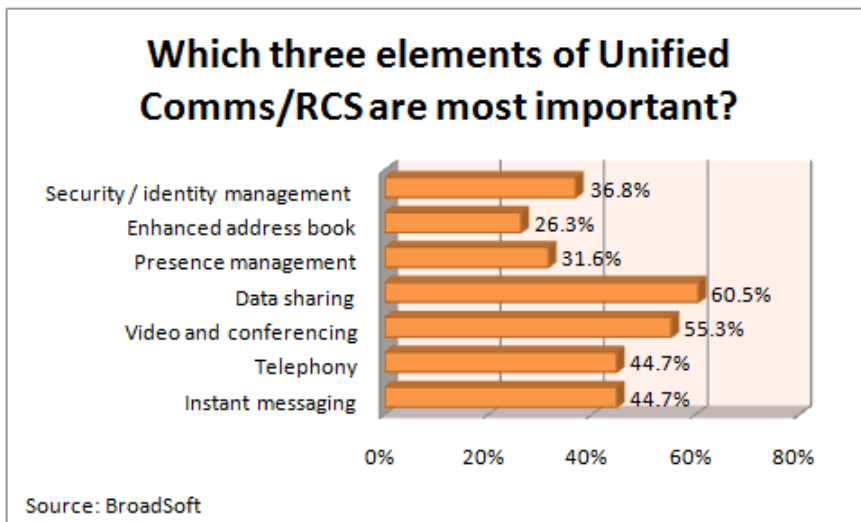
UC and RCS – targeting enterprise and consumer

Voice is only one element of an MNO offering, however. UC and RCS integrate a number of different tools so that businesses and individuals can manage all their communications in one entity instead of separately – thereby bridging the gap between VoIP and other internet-based communication technologies.

UC gives control over a number of features, including:

- Presence: the availability and willingness of a person to communicate
- Single Number Reach: enhanced address book functionality
- Data sharing: sending files and multimedia
- Video calls and conferencing
- Voice telephony
- Instant Messaging (IM)
- Security / identity management

When operators were asked to choose the three most important elements of UC and RCS, there was a spread of views, however ‘data sharing’ came top, chosen by 60.5 percent of respondents, followed by ‘Video and conferencing’ chosen by over 55 percent. This implies that there could be a strong enterprise message in terms of rolling out UC – a market where mobile operators have traditionally struggled to break out of their retail-centric sales environment.

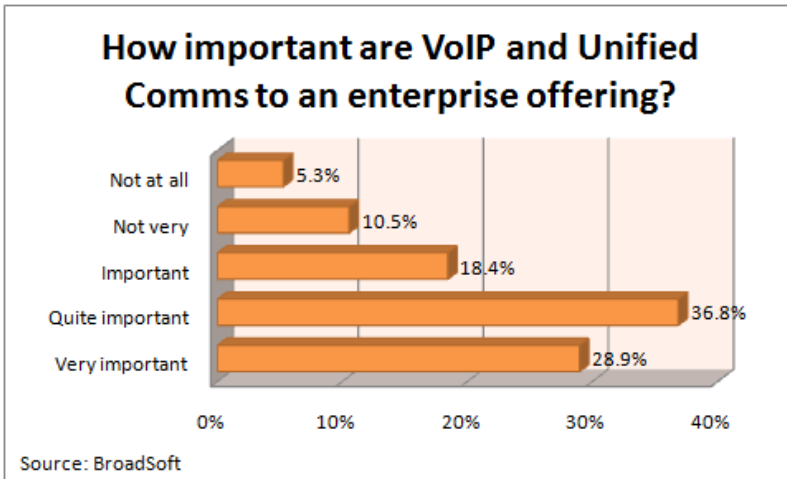


In joint third place, with 45 percent, were basic telephony and IM followed by security/identity management (37 percent), presence management (32 percent) and enhanced address book (26 percent).

Taken together, VoIP (or VoLTE) and UC would appear to offer a strong marketing message for MNOs targeting the enterprise market. Almost 84 percent of operators surveyed by mobileSQUARED believed that VoIP and UC were at least ‘important’ as part of an enterprise offering.

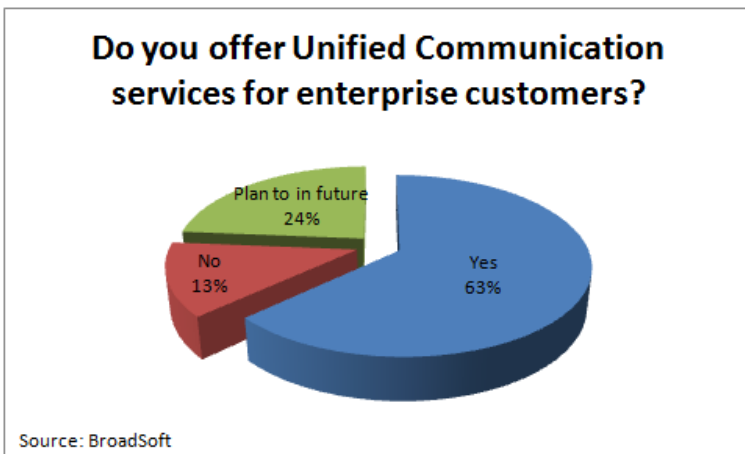
Approximately 30 percent of operators stated that VoIP and UC were ‘very important’ as they would help drive down operating expenditure and improve overall communications management, while 37 percent - the single largest group - said they were ‘quite important’ as VoIP and UC will help to drive new applications and services. A further 18 percent said they were ‘important’, and should be central to any enterprise solution.

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Only 10.5 percent of operators said that VoIP and UC were 'not very important' as there were still too many concerns around security and public access to enterprise data, while 5.3 percent said they were 'not important at all'.

The vast majority of operators (87 percent) surveyed by mobileSQUARED stated that they already either offer UC services for enterprise customers, or plan to in the future. A total of 63 percent already offer UC services, 24 percent planned to in the future, while just 13 percent said they do not offer such services.

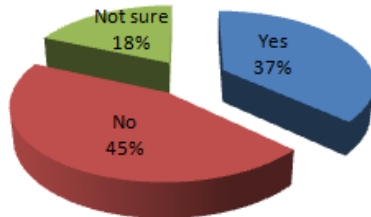


There is obviously momentum behind UC and a belief that it is central in putting together an attractive enterprise offering. However, MNOs have traditionally struggled when trying to cater for the UC requirements of large enterprises beyond simply offering BlackBerry for email on the go.

Despite the growing momentum behind LTE and UC, the vast majority of operators still do not believe they are well placed to sell the network technology as an enterprise solution with a related UC offering.

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Do you think mobile operators are generally well placed to sell LTE as an enterprise solution?

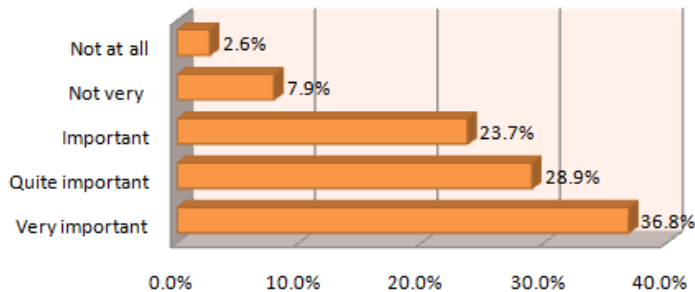


Source: BroadSoft

Around 45 percent of operators surveyed said they were not well placed to sell LTE as an enterprise solution as there is still too much emphasis placed on retail and mobility offerings with little investment or support for enterprise customers. Another 18 percent said they were 'not sure,' while 37 percent believed they have successfully established new sales models and departments to support enterprise customers.

On the consumer side, approximately 90 percent of operators also believe that UC and RCS are 'important', or better, to offer to the consumer. Almost 37 percent - the single largest group - said that UC and RCS are 'very important' as increasing use of voice, SMS, IM, video and social media applications mean that operators will have to integrate such services on the device, most likely under a single address book function.

How important are Unified Comms and RCS to the consumer?



Source: BroadSoft

A further 29 percent stated UC and RCS are 'quite important' and, although it would be nice to integrate within the device, such services will most likely remain in the network/cloud, while just 24 percent said they are 'important', but consumers are happy as long as they can access the individual elements (voice calls, SMS, IM, etc) on the handset.

Around eight percent said UC and RCS were 'not very important' as consumers are more concerned with network quality and tariffs, while three percent said they are 'not important at all' as consumers increasingly choose what they want to use from the mobile internet or by downloading apps.

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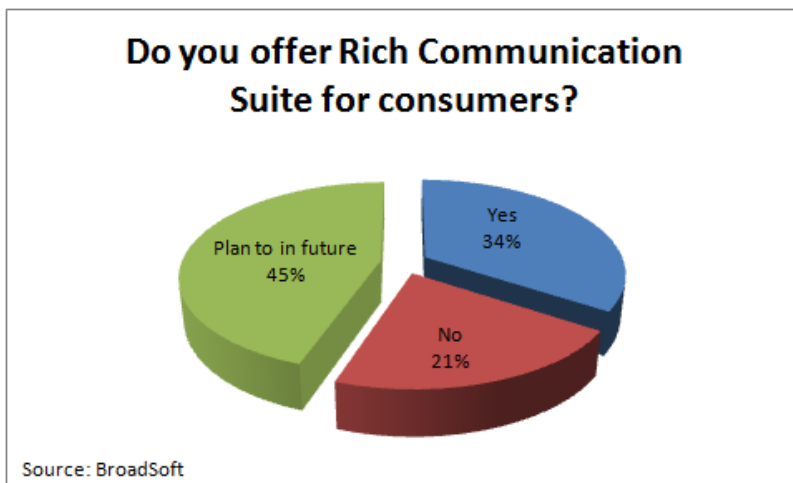
The jury has been out on RCS for some time, but the adoption of IMS within LTE means RCS becomes no more than an app server on the infrastructure sitting on top of VoLTE. In February this year, five operators announced plans to start offering a new version of RCS later this year.

Deutsche Telekom, Orange, Telecom Italia, Telefónica and Vodafone all said they intend to commercially launch RCS-evolved services across several European markets from late 2011, with additional operators expected to launch later in 2012. RCS-e is based on a specification put forward by Bharti, Deutsche Telekom, Orange, Orascom Telecom, SK Telecom, Telecom Italia, Telefónica, Telenor and Vodafone, which enables customers to use IM, share live video and share files such as photos simultaneously during calls, regardless of the network or device used.

As customers open their address book, they will be able to see which communication services are available to them. They can then choose their preferred communications option. For example, a customer would see if their contact is in an area with 3G coverage and is able to receive video.

Participating operators will work with handset suppliers to ensure the service is integrated into the address books of devices, so that customers will not have to download any additional software or technically configure their handsets in order to benefit from the enhanced experience.

The majority of operators surveyed by mobileSQUARED (81 percent) stated they either already offer RCS for consumers or plan to in the future. However, the amount already offering Rich Communications was almost half that already offering UC for the enterprise market (34 percent), while 45 percent said they intend to offer RCS in the future. A further 21 percent said they have no plans to offer RCS.



Of those that said 'no', there was almost unanimous agreement that RCS was not a viable option. One simply said there was no demand, another said that RCS was being investigated, but the value proposition is unclear, while another said RCS is not considered a high priority or seen to offer high enough potential.

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Conclusion

Mobile VoIP is here to stay and MNOs will now have a level playing field to compete with OTT providers, or possibly even a competitive advantage, with the introduction of VoLTE and associated Unified Communications (UC) offerings to specifically target the enterprise customer.

From the research conducted by mobileSQUARED for BroadSoft specifically, it is worth pointing out that 66 percent of MNOs believe VoIP and Unified Communications (UC) are 'very important' or 'quite important' to an enterprise offering, yet 45 percent of MNOs do not think they are well positioned to sell LTE as an enterprise solution because of their retail focus.

Small businesses are already buying services in retail stores, so MNOs are well positioned to expand their offering to include modern UC services such as video, web collaboration, instant messaging, and presence, etc. However, many MNOs (45 percent according to our survey) are also missing an opportunity by not adjusting their business model to include a direct sales force focused on selling more than just minutes of voice to enterprise customers.



With more than five billion mobile subscriptions worldwide, the entrenched retail environment will be working hard to ensure that MNO customers migrate up the value chain – much as we have seen with the adoption and use of smartphones. UC and RCS capabilities will be a natural step for smartphone users, offering more avenues of communications and a more intuitive means of communicating with friends and family.

Likewise, the emergence of a strong UC offering means the majority of MNOs - which thought they were not well positioned to sell LTE as an enterprise solution - will have the opportunity to duly target these services at a new business segment - driving revenue and innovation.

The integration and use of VoLTE means service providers can offer a higher grade of service and better QoS for voice and video calling than the 'best effort' courtesy of OTT providers. VoLTE specifications ensure the bare minimum voice quality and service requirements are as good as current CS-domain voice, or better.

In reality, however, many calls will be routed using Adaptive Multi-Rate (AMR) wideband, or High Definition (HD) voice, due to the low latency and high bandwidth of LTE. The AMR wideband speech codec is supported in 3G multimedia services and defined in 3GPP technical specifications for IMS, MMS and Transparent end-to-end Packet-switched Streaming Service.

HD voice will supply 150-millisecond (ms) roundtrip – more than enough for standard voice calls which is around 250ms. Furthermore, VoLTE calls can interface to carrier-certified SIP stacks and applications, just as SIP Trunk services do today. This will make it less cumbersome for both SIP-based mobile and fixed handsets to use the same application. MNOs can also control QoS and stuttering when falling from LTE to CS-domain as they need to manage the charging and billing mechanisms and only a service provider can manage the uplink and provide network-controlled variable rate transcoding to ensure that equal quality is delivered to all devices.

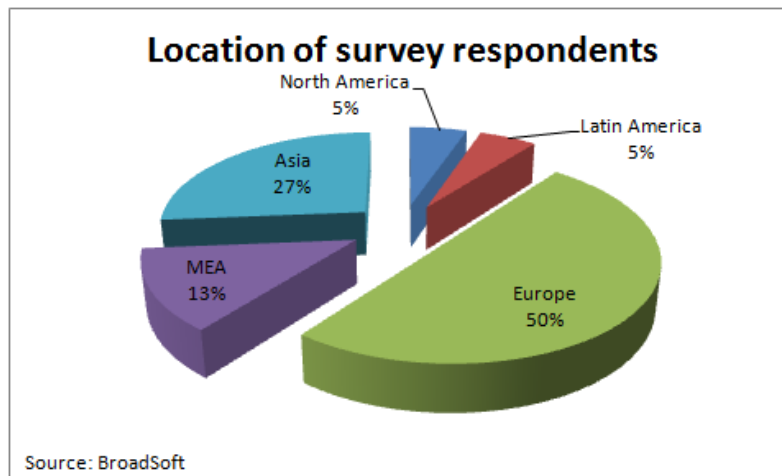
On the device side, VoLTE and UC innovation will force vendors, applications developers and MNOs to work together in creating better end-to-end security and Service Level Agreement – finally addressing previously ignored enterprise requirements.

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About mobileSQUARED

mobileSQUARED provides specialist research which enables brands, agencies and the mobile industry to increase engagement with the mobile consumer. We conduct primary research on the mobile industry and mobile consumers, with a focus on delivering exclusive forward-looking data on mobile device usage, mobile web, app and commerce trends and usage, and mobile advertising responsiveness to help clients identify and respond to fast-changing mobile trends. And for a wider view of the industry, we provide detailed mobile industry user and revenue forecasts. Our clients look to mobileSQUARED's expertise to provide candid insight into the mobile market. We do this using our extensive global network of senior contacts to research, collect and collate the latest data, developments, trends and insight on an ongoing basis.

For more information www.mobilesquared.co.uk



Note: mobileSQUARED surveyed 38 leading operators worldwide for BroadSoft. The majority (50 percent) of operator respondents were based in Europe, followed by Asia (27 percent), Middle East and Africa (13 percent), North America (five percent) and Latin America (five percent).