



GSMA Intelligence

ANALYSIS

Building the case for an IP-communications future

February 2015

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Executive summary

Mobile communication has evolved dramatically over the past twenty years, from the advent of SMS and mobile messaging, to the emergence of smartphones and the mobile application ecosystem. Innovative third-party service providers have pushed the boundaries of digital communications and shown us what users now expect from modern mobile communications services. Following the growth of LTE and the development of new mainstream IP-communications services (high quality voice and video combined with rich messaging functionality), mobile network operators (MNOs) are now in a position to respond.

The user value proposition for IP-communications lies in traditional MNO strengths. IP-communications is comprised of Voice over LTE (VoLTE), Video over LTE (ViLTE) and IP-messaging or Rich Communication Services (RCS). While each service offers some genuine advantages over alternatives, the real user value proposition of IP-communications lies not in innovative service enhancements, but in a superior user experience based on interconnection, reach, richness and reliability (including handset-integration).

The MNO value proposition for IP-communications is compelling and multifaceted. Although challenges exist, it is becoming increasingly viewed as a mandatory evolutionary shift. The incentives for MNOs to invest in IP-communications range from short and medium-term benefits such as brand positioning and legacy network switch-off, to the long-term payoff of greater primary demand for MNO core services, and the possibility of greater control over other access mediums (such as Wi-Fi). Growing pains around the business case, industry consensus and technical/implementation issues are inevitable, however IP-communications is becoming increasingly recognised as a natural evolution of core mobile services, and therefore a basic requirement of doing business in the future.

The industry is ready for IP-communications. The 'IP multimedia subsystem' (IMS) has emerged as the preferred technical means for transferring core MNO services to an all-IP LTE environment due to its flexibility, cost-effectiveness, and support for IP services over any access medium. With over 40% of the world's mobile network operators having now launched an LTE network, and LTE coverage now exceeding a quarter of the world population, the industry is now in a realistic position to make a global, interconnected IP-communications network a reality.

IP-communications is happening, but its success will hinge on interoperability and scale. If the trajectory of current and actual launches is maintained, we expect to see approximately 450 stand-alone VoLTE networks and 300 RCS networks by the end of 2020. Interoperability, however, currently lags stand-alone launches, which threatens to undermine the advantages of network effects and reach. The GSMA has been advised of significant planned interconnection activity during 2015/16, and the long-term ability of MNOs to realise the greatest rewards from IP-communications will depend on this eventuating and continuing further beyond.

Native integration of IP-communications in the vast majority of smartphones is now inevitable. The proportion of shipped smartphones that were VoLTE capable during December 2014 is estimated at 9%. This is expected to rise to between 65% and 85% by

2020, depending on the degree to which VoLTE chipset costs fall with scale. IP-messaging/RCS devices made up an estimated 6% of total smartphone shipments at the end of 2014, with a baseline forecast of almost 50% by 2020. An alternative scenario sees the inclusion of the RCS common-core in the Android 'M-Release' during H2 2015, and RCS-capable devices making up close to 90% of all smartphone shipments by 2020. However the specifics play out, it is now only a matter of time before almost all smartphones are natively IP-communications capable.

IP-communications over everything. Voice over WIFI may be the forerunner to an environment where MNOs are able to launch any IP-based service they control over any access network their users choose. The potential result is a level of operator control, influence and reach that goes far beyond mobile networks, surpassing anything the mobile industry has seen to date.

IP-communications: A natural evolution of core mobile services

On March 10 1876 Alexander Graham Bell made the world's first telephone call, a brief but groundbreaking conversation with his assistant in an adjoining room. Incredibly, despite the subsequent 140 years featuring a level of technological change unprecedented in our history, the basic telephone calling experience remains virtually the same now as it was then. Much has changed in the last few decades around that core calling experience, of course. Mobile technology has completely redefined our concept of remote communication. While we were once limited to fixed locations such as the home or office, the limitations of geography have been almost entirely removed. Short Message Service (SMS), and later Multimedia Messaging Service (MMS), opened up an entirely new parallel medium alongside voice by allowing us to use our handsets to conduct fluid conversations through text and simple media. Despite the many technical and functional limitations of these technologies, mobile messaging emerged as a popular medium for many users, and mobile network operators (MNOs) were quick to embrace it along with them.

More recently alternative forms of mobile communication have appeared in the periphery as parties both within and outside of the traditional mobile industry have expanded and improved upon existing network-integrated (and therefore operator-controlled) voice and messaging services. This is almost entirely a result of modern high performance mobile data networks (3G and onward) that have, along with application ecosystems such as the Apple App Store and Google Play, become arguably the biggest platform for innovation and disruption since the advent of the Internet itself. Intense competition has been a natural result of the sheer magnitude of the opportunity, the number of powerful players vying for control, and the low barriers to entry for newcomers and start-ups. The outcome of this has been numerous new, enhanced, and creative variations of traditional mobile voice and messaging services, such as *Skype* (voice and video), and *WhatsApp* (messaging).

Some of these services have seen widespread adoption and success, partly because most operate indirect revenue models and are provided to end users entirely free of charge. No single service, however, has emerged as a clear 'owner' of the next generation of mobile communications, and there is a strong argument that this is because none have managed to simultaneously meet the same basic standards of reliability and reach offered by Bell's original phone system in 1876. Long Term Evolution (LTE) or '4G' has grown rapidly in recent years (there were over 350 live LTE networks at the end of 2014), and new Internet Protocol (IP)-communications services have emerged along with it. As a result, mobile operators and handset manufactures are now in a realistic position to deliver the modern concept of mobile communications (high quality voice and video combined with rich messaging functionality) in a fully integrated and interconnected implementation based on those original telephone user-experience standards.

Voice over LTE (VoLTE), including Video over LTE (ViLTE), and Rich Communication Services (RCS) have been the subject of discussion for years now, and yet they remain a source of confusion for many in the industry. What exactly are they? What do they offer end users? And most importantly, how do they represent an opportunity for the mobile industry? Furthermore, recent high profile network and handset launches indicate that we may be witnessing the beginning of an industry-wide shift to IP-communications. As such, it is an appropriate time to take stock of the progress that has been made in the areas of

network launches and native device integration to date, and identify the major variables expected to influence their development between 2015 and 2020.

The IP-communications value proposition

Modern voice, video and messaging services

The full IP-communications calling experience consists of a voice component (VoLTE), a video component (ViLTE), and an IP-messaging/content component (Rich Communication Services, or 'RCS').

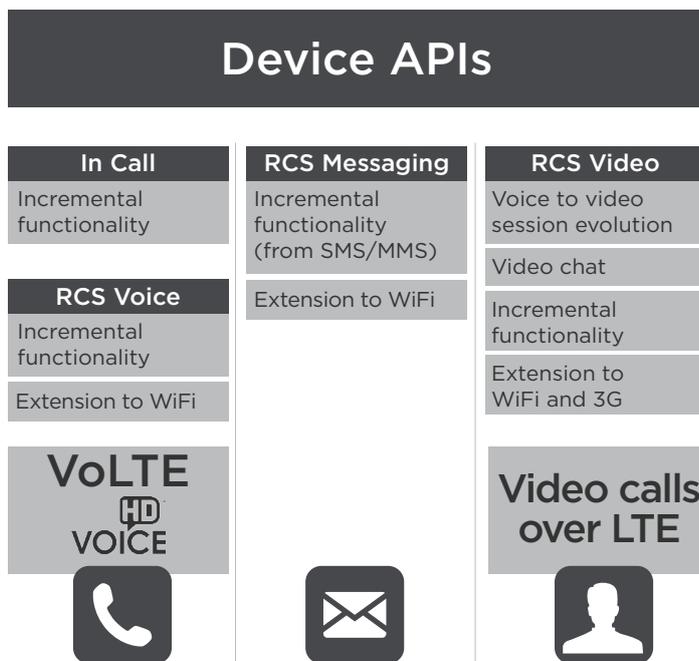


Figure 1: The different service components of IP-communications.

Voice over LTE (VoLTE) is a digital voice service that is delivered over an LTE network. The most notable feature of VoLTE is its ability to deliver 'High-Definition (HD) Voice', a substantially clearer and higher quality audio than 'normal' mobile voice services. At the time of writing, VoLTE is based on the GSMA IR.92 standards.

Video over LTE (ViLTE) is an extension of VoLTE, which augments the voice channel with a high quality video channel. At the time of writing, ViLTE is based on the GSMA IR.94 standards.

Rich Communication Services (RCS) or 'Enriched Calling' is a suite of modern IP messaging services including 1-to-1 messaging, group messaging and media sharing. This includes standard voice and video over IP (VoIP) functionality. While previously device manufacturers and network operators have been free to 'pick and choose' specific RCS features and functionality, to ensure consistency the GSMA has recently released a set of RCS 'common core' standards that define the basic set of functions to be included in any RCS implementation. At the time of writing, RCS is based on the GSMA RCS 5.2 standards, with version 5.3 expected in the very near future.

Though VoLTE does not address an acute user pain-point or glaring functional gap, its value proposition is real. VoLTE-based HD Voice has received positive reviews from a

wide range of commentators (e.g. TIME Magazine¹, CNET²), almost all of whom describe an unusually clear calling experience. Handset battery life when using VoLTE is around 40% greater than when using Voice over IP (VOIP), and call-establishment time is almost half that of a standard mobile voice call³. In terms of IP-messaging, the GSMA is working with a number of MNOs to further develop the concept of ‘Enriched Calling’ using RCS features. This takes advantage of the ability to deliver multiple communications services simultaneously in order to more closely link the voice call experience to pre-call, in-call, and post-call content sharing.

Leveraging traditional network operator strengths

More generally, however, IP-communications and the services that comprise it are not individually new or groundbreaking innovations. Smartphone users have been enjoying high-quality, free of charge IP-messaging services for years, courtesy of Internet giants such as Facebook (*Messenger*), mobile operating system developers such as Apple (*iMessage*), and previously unknown start-ups such as *WhatsApp*, *Viber* and *WeChat*. Likewise, video services such as *Skype* have made basic video and voice calling available for free to anyone with access to either a smartphone or a desktop computer. Other ‘non-mainstream’ mobile communications services, such as *Tinder*, *Instagram*, *Snapchat*, and *YikYak* either offer functionality that appeals to a niche market, or blur the line between communications services and social networks.

The rationale for MNO-provided IP-communications is that:

1. There is near-universal demand for modern mainstream voice, video and rich messaging services.
2. Existing non-MNO solutions all suffer, to some degree, from compromises on interoperability, richness, reliability (including handset-integration) or reach.

Non-MNO voice and video services, such as *Skype*, require a user to download a stand-alone application and then step through a registration process, while contacts must then be searched for and added individually. These VoIP services can achieve a similar call quality to VoLTE with little or no network loading, but it comes at a high price in terms of the impact on battery life and the amount of network resources required to support the call⁴. Further, such services perform extremely poorly or to the point of being inaudible when under heavy network loading. Non-MNO messaging services have slightly different limitations. Facebook *Messenger*, for example, is popular among Facebook users but is restricted to messaging functionality only, and communication with a user’s Facebook ‘friends’. Apple’s *iMessage* and *FaceTime* combination offers a voice, video and IP-messaging system that is polished, seamless and well-integrated with both the operating system and handset, but is unavailable to the 88% of smartphone users in the world who do not own an iOS device. Stand-alone messaging applications have a wide reach and some, such as *WhatsApp*, are even reportedly on the verge of adding voice and video functionality. However, while

¹ <http://time.com/110319/att-tmobile-volte/>

² www.cnet.com/news/6-reasons-why-youll-eventually-want-voice-over-lte/

³ Signals Research Group, Signals Ahead publication: Behind the VoLTE Curtain, Part One, August 2014

⁴ Signals Research Group, Signals Ahead publication: Behind the VoLTE Curtain, Part Two, January 2015

improvements have been made to the user experience (contact-list access functionality for example), quality of service inconsistency and handset integration compromises remain an issue, as does regional clustering of popularity and usage.

Rather than a competitive play based on individual services or 'killer features' (despite the fact that VoLTE and Enriched Calling may be considered just that by some), IP-communications leverages the traditional network operator strengths of reliability and reach into all three channels that comprise the modern set of mainstream mobile communication services. The GSMA's Network 2020 programme refers to 'the Green Button Promise', meaning that such services should command a level of user confidence comparable to the experience of pressing the green dial button on a traditional mobile device. That, essentially, is the end goal of operator-provided IP-communications.

The right network solution for IP-communications

The past two years have seen a wave of LTE network deployments around the world, and while LTE offers clear benefits over predecessor technologies in terms of data bandwidth and latency, the base network alone is not suitable for reliably carrying voice services. Most MNOs still use a circuit-switched (CS) system, which runs over older 2G (GSM) and 3G (CDMA/WCDMA) networks. Many are now planning for and investigating the best way to eventually bring their networks in line with the Internet world by moving all services to a full LTE IP packet-switched (PS) environment. Advantages include ceased reliance on legacy technology, ensured core service continuity, and the ability to take full advantage of the performance benefits offered by LTE. For a variety of reasons, a system standardised by the 3rd Generation Public Partnership (3GPP) and known as the Internet-Protocol Multimedia Subsystem (IMS) has emerged as the widely preferred solution.

The argument for IMS is that it is a cost-effective means of transitioning core communication services (voice, video and messaging) to an IP-platform, is more network-efficient than existing systems, and creates further opportunities for richness and innovation in the future. The basic capabilities of the 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. Finally, IMS is 'access-agnostic', supporting seamless handover and making no distinction between connection types, including Wi-Fi - the strategic implications of which will be discussed later in this report.

An opportunity for MNOs to reclaim relevance

In a short space of time the mobile industry has witnessed a shift in customer demand from high-margin services, such as voice and SMS, to an almost exclusive focus on mobile data offerings - both quantity and, to a lesser extent, speed. The net result for MNOs has been downward pressure on 'Average Revenue per User' (ARPU), and an inability to effectively differentiate and compete on any basis other than price and network performance. IP-communications represents arguably the first major opportunity for mobile operators to adapt and, by extension, to preserve the relationship with their users and support core

service revenues in the longer-term.

That is not to say that IP-communications does not offer shorter-term advantages. VoLTE, as a new service with a distinguishable unique selling proposition, presents a fast moving MNO with a genuine branding and market positioning opportunity relative to local market competitors. In the UK, for example, Everything Everywhere (EE) have positioned themselves as a mobile data performance leader by heavily investing in and embracing 4G LTE. In the US, AT&T and Verizon have begun to use this strategy with VoLTE. A more immediate benefit may be the ability to further tweak and optimise bundle-structuring, one of the few tactical differentiation levers available to an MNO. The addition of IP-communications services to the product mix expands the range of potential plan and bundle permutations meaning greater flexibility and more options, be it in pricing, zero-rating of related data traffic or something else entirely. Finally, VoLTE requires significantly fewer network resources than VoIP alternatives⁵ and traditional CS voice which, in addition to handset battery life advantages for users, reduces stress and demand on operator networks (particularly during peak usage periods). This has a flow on effect of making flat rate and all-inclusive voice and messaging plans more manageable and appealing to an MNO, further reinforcing the end user value proposition.

In the medium term, there is the question of preparing for the eventual switching-off and shutdown of 2G and 3G legacy networks. The financial and operational inefficiency of running, supporting and maintaining multiple networks in parallel is fairly self-evident. In many markets a secondary result of this will be the freeing up of the spectrum range previously occupied by legacy networks, which can then be reallocated to alternative uses. An obvious contender for this is LTE itself, which is significantly more spectrally-efficient than previous generation networks in terms of data bandwidth and throughput.

The greatest benefit of IP-communications, however, lies in the longer term potential to achieve scale and fully deliver on the promises of reach, reliability and richness. If this occurs, IP-communications will offer a genuinely superior user experience to alternative mainstream voice video and messaging options, with the result of greater primary demand for operator core services and, ultimately, stronger long-term revenues. In a more strategic sense, IP-communications enables MNO control of Voice-over-Wi-Fi (VoWiFi), another fast emerging and potentially disruptive technology. IP-based services are technically detached from the underlying access medium, and Voice over Wi-Fi is the first example of an MNO service being used over an access network that in many cases the MNO does not control. This may set something of a precedent. If scaled and interconnected successfully, an IP-communications network based on IMS then becomes a platform that may ultimately provide MNOs with a degree of control and impact that goes much further than simply restoring the relevance of core services.

⁵ Signals Research Group, Signals Ahead publication: Behind the VoLTE Curtain, Part One, August 2014

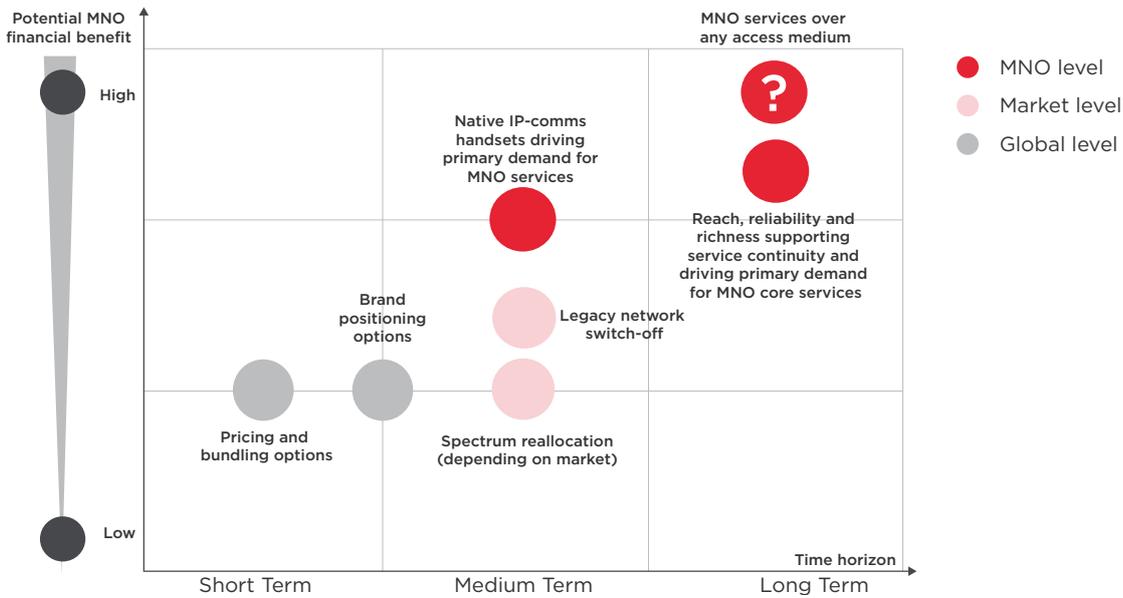


Figure 2: The different ways an MNO might expect to benefit from an IP-communications strategy.

Figure 2 provides a generalised perspective of the range of opportunities available to mobile network operators, as well as the timeframe involved and the level of financial impact. This will, of course, vary from market to market, and from operator to operator (spectrum reallocation, for example, will not be a factor in some markets). What is important, however, is that while short and medium term incentives exist, and should be considered where applicable, IP-communications can only be a long-term, global, industry-wide strategy.

Growing pains

The process of moving to an all-IP mobile world is not without complications. MNO feedback collected by the GSMA’s Network 2020 programme suggests that the business case is usually the first hurdle, and this was reiterated by the results of a recent LTE and VoLTE survey by Credit Suisse⁶. As with any major strategic investment, the long-term nature of IP-communications makes a direct return-on-investment calculation a difficult and imprecise exercise, even where the areas of potential benefit are well understood. Other questions may arise around the customer proposition and the wisdom of investing in something that, initially at least, is supported by little direct demand. Not all MNOs agree that IP-communications is a pressing priority, with technical efforts instead being directed toward expanding basic LTE coverage, or on exploring other network enhancements such as Network function Virtualisation (NFV) and Software Defined Networks (SDN). Constructing the extensive web of roaming agreements required to make a global network function smoothly will take time, and will be prolonged in many cases by the complex and unique commercial relationships between individual MNOs. Finally, there are various technical difficulties that are yet to be fully overcome, for example unique issues relating to the different video codecs in use on different networks, or billing and tracking while roaming. Further concerns exist over the ability to ensure a minimum quality of service while handling communication between networks, and compliance with legal obligations around emergency calling and lawful interception.

⁶ European Mobile Industry Survey, Credit Suisse, December 2014

Such growing pains are an inevitable part of any major evolutionary change. Business-case barriers will break down over time as momentum continues to build, and the value for both end-user and MNO becomes clearer and better understood. While it may seem counterintuitive in the context of a strategy that rests so heavily on interconnection and ubiquity, full industry consensus at this point is not only unrealistic, it is unnecessary. Rather than a radical set of new technologies and services, IP-communications is gradually becoming more widely acknowledged as a natural evolution of core mobile services. In other words, it is becoming less optional, and more a basic requirement of doing business in the future.

The industry is ready for IP-communications

Over 40% of the world’s mobile network operators have now launched an LTE network, and global LTE coverage now exceeds a quarter of the population. Although this may not seem significant initially, it is well beyond any theoretical threshold required for critical mass and network effects to take hold. It would be easy to suggest that MNOs are late to the IP party given that alternative IP-based services have been around for many years now (WhatsApp, for example, was launched in 2009), but that would be an oversimplification. IP-communications over IMS requires an LTE network, and as can be seen in Figure 3, the majority of LTE networks in operation have been less than two years in existence.

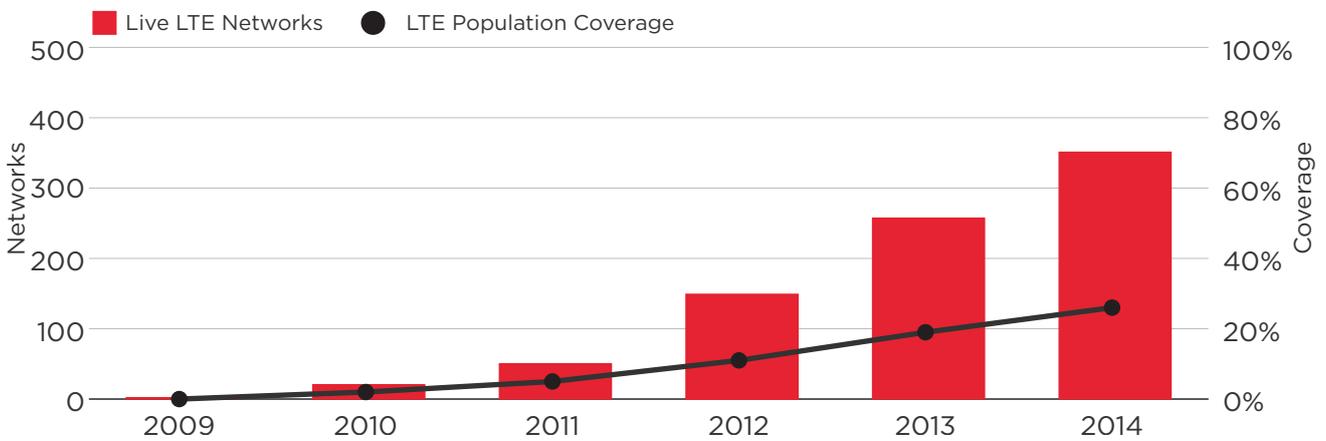


Figure 3: Deployed LTE Networks worldwide (cumulative) and LTE coverage at calendar year end.

Source: GSMA Intelligence

Individually some MNOs that have deployed an LTE network have been the only operator in their local market to do so, rendering nugatory any immediate suggestion of local interoperability. Given that the strategic basis of IP-communications is so closely linked to the concepts of interoperability and ubiquity, it is not difficult to understand why some MNOs have chosen not to rush into an IMS deployment to date. This situation is changing rapidly, however, and here are now more than 70 individual markets where MNOs with live LTE networks collectively exceed 80% market share, making widespread local interoperability an achievable initial goal. In short, the industry is now in a realistic position to take the first significant steps toward making a global interconnected IP-communications network a reality.

IP-communications is happening

Networks: The path to scale and interconnection

Unilateral network launches

Unilateral, or ‘stand-alone’ launches refers to the number of networks capable of supporting each of the two major components of IP-communications; VoLTE (including ViLTE), and RCS/IP-messaging. At the end of December 2014 there were 14 live VoLTE networks, predominantly in East Asia and North America, and 40 RCS networks spread throughout the world. These numbers reflect the fact that during most of the past two years RCS has been the IP-communications focus of both the GSMA and the majority of MNOs with an IP-communications strategy. This is expected to reverse over the next two years however, as mobile operators have been open in their intention to prioritise VoLTE as the ‘lead’ IP-communications service, due to greater customer awareness of VoLTE and an increase in the number of supported handsets on the market.

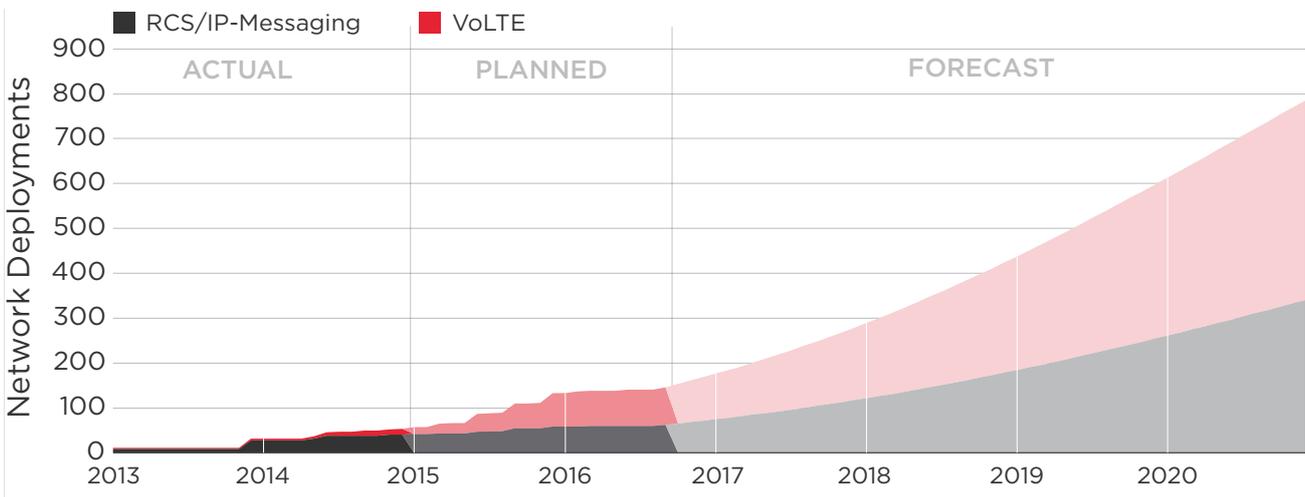


Figure 4: Total cumulative live IP-communications networks (globally).

Note: Includes VoLTE and RCS deployments on the same LTE networks. Planned launches are probability-weighted.

Source: GSMA Intelligence

Based on information provided directly by MNOs to the GSMA, we expect to see approximately 70 VoLTE launches and 20-25 RCS launches between now and the end of Q3 2016, across a relatively even geographic spread. Forecasting beyond 2016 is a challenge, but if the current trend of actual and planned launches is maintained, we would expect to see approximately 450 VoLTE networks and 300 RCS networks by the end of 2020. In other words well over half the world’s MNOs will have launched a VoLTE network (skewed of course toward developed markets which have greater numbers of LTE networks and coverage), and many will have also launched RCS. This is consistent with our view that as VoLTE launches accelerate, we expect that many of these MNOs will subsequently add RCS to their IMS stack in order to complete the full IP-Communications/Enriched Calling picture which requires little in the way of additional investment.

Interconnected markets

A more significant metric is the number of interconnected operators and markets, given the degree to which the IP-communications value proposition depends on it. There is no other single factor that is more critical to IP-communications achieving universal reach. A non-interconnected network can be compared to a set of 20th-century-style regional telephone exchanges with local calls available but no connection to a national network, i.e., useable, but fundamentally handicapped. Figure 5 shows that at the end of 2014 only three individual markets had met the ‘Interconnected’ criteria (Germany, Spain and South Korea), and when this is compared to Figure 4, a gap between interconnection efforts and unilateral launches to date is apparent. Feedback from those mobile operators who have launched early IP-communications networks suggests that they have initially focussed on configuring and trialling their networks with their own user base, and that interconnection is viewed as a secondary step.

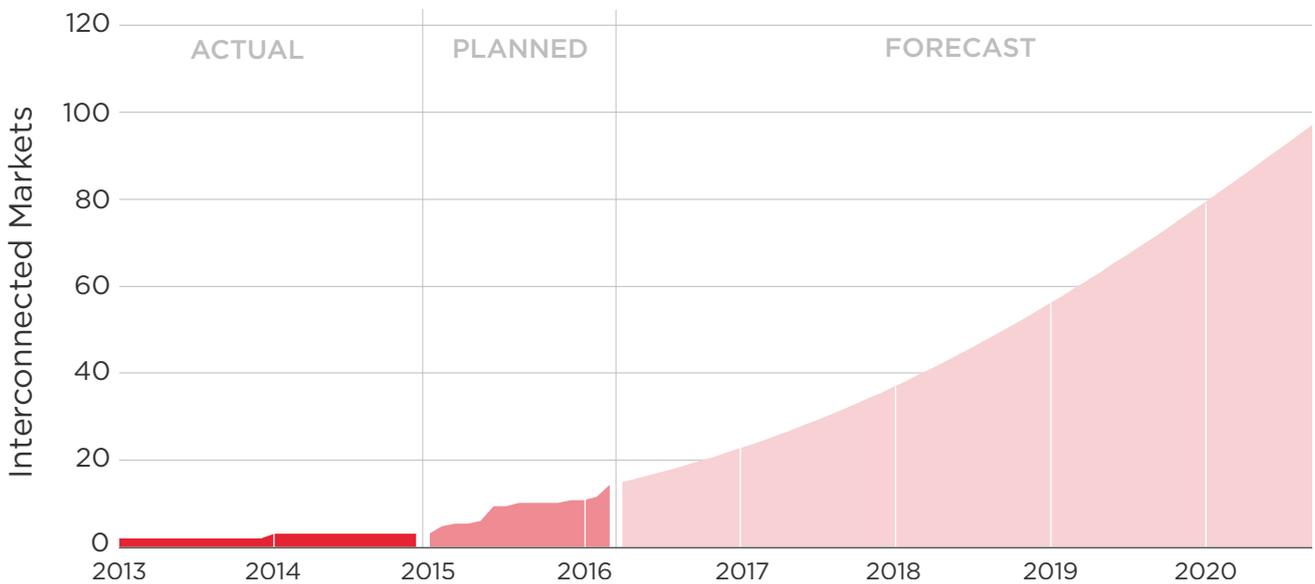


Figure 5: Total cumulative interconnected IP-communications markets (globally).
 Note: ‘Interconnected Markets’ refers to the number of countries where local operators collectively exceeding 60% market share have met the 3GPP standards for IP-communications interconnection AND where the local population exceeds four million.

Source: GSMA Intelligence

Again the GSMA has been informed by its operator members of a range of interconnection plans in different markets over the next 12 months, and as such we expect to see this figure rise to 15 by the end of Q1 2016. Some of these, such as the announcement by AT&T and Verizon to launch interoperable VoLTE networks in the US market during 2015, are particularly significant and high-profile, and can be expected to build traction and further awareness of IP-communications both within and outside of the industry. As with unilateral launches, forecasting beyond known planned activity is difficult as we can only speculate on the factors that will affect some of these decisions in 3-6 years time, however the trend – assuming planned activity eventuates and further momentum can be built off the back of it – suggests that we may see as many as 100 interconnected IP-communications markets by the end of 2020. The future of IP-communications, and the ability of MNOs to realise its greatest potential benefits, will depend on it.

Native devices: The great enabler

The level of support among mobile handset vendors and the proportion of devices available with native IP-communications capability is the second major variable in the IP-communications equation. A substantial and visibly growing range of handsets that support IP-communications services ‘out of the box’ not only enables more users to take advantage of the live networks and services already on offer, but also helps to give other MNOs the confidence to deploy them. To date the GSMA has identified over 40 VoLTE capable smartphone model types and over 40 natively enabled RCS/IP-messaging smartphone model types in the market.

Reliable data on the proportional market share of these devices is currently scarce, whether attempting to track shipments, sales, or installed base. GSMA Intelligence has used a unique estimation methodology which involves matching a list of known IP-communications devices against the GSMA’s IMEI database, a service which issues ‘Type Allocation Codes’ and IMEI number ranges (a unique handset identifier) to vendors prior to the shipment of new handsets. Following adjustments to account for known distortions (e.g. weighting by known market share, rolling average to account for manufacture-shipment lag time etc) we believe this to be a reasonable proxy for the percentage of all smartphones shipped in a given period that are IP-communications capable.

Voice over LTE/Video Over LTE

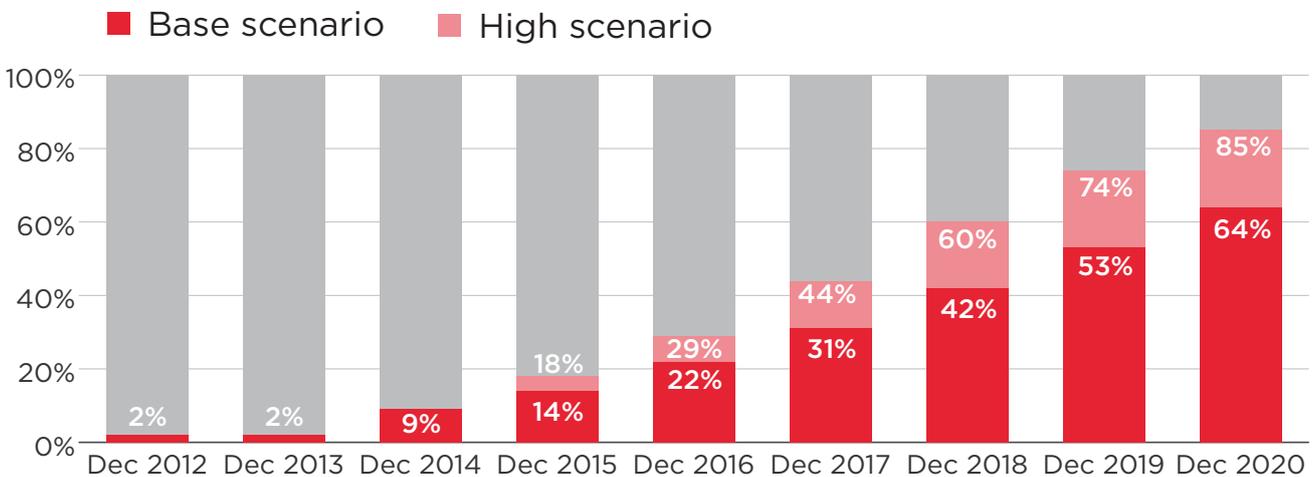


Figure 6: VoLTE-capable smartphones as a percentage of total smartphone shipments (estimated).

Source: GSMA Intelligence

Figure 6 shows that at the end of both 2012 and 2013 VoLTE-capable handsets were limited to around 2% of the smartphone market, mostly made up of a handful of select high end models from Samsung, Sony and LG. This increased substantially toward the end of 2014, driven by the Apple iPhone 6 and 6+ models, both of which are VoLTE-capable and have well exceeded sales expectations since their September 2014 launch.

The continued growth in VoLTE handset availability is expected to be a feature of the coming years, as a number of major OEMs have indicated their intention to increasingly build VoLTE

capability into their smartphone ranges, provided user demand continues to grow alongside device and network availability. Samsung, Sony and LG are likely to continue to expand their VoLTE ranges further along the price/feature continuum, while other manufacturers are expected to take their first major steps into the VoLTE world with the 2015 releases of their higher-end handsets in markets with existing or anticipated live VoLTE networks. The impact of the iPhone 6 should not be understated. Apple have a long track record of adopting fledgling technologies and bringing them into the mainstream (the mouse, the USB interface, and the capacitive touch-screen as just a few examples), and it would be surprising if VoLTE did not experience the ‘Apple effect’ to some degree.

The high case projection shows that by the end of 2020, 85% of all shipped smartphones will be VoLTE capable. It is important to note that this does not refer to the true installed base or ownership proportion, which lags shipments/sales and will be lower than the figures above for any given year. This is still a fairly optimistic forecast, however, as one of the underlying assumptions is that virtually all LTE chipsets will be VoLTE capable by that point. We concede that this is far from a certainty, given that intellectual property associated with the VoLTE chipset is protected by no less than 70 patents, and it therefore remains unknown whether the cost of VoLTE chipset integration will decrease with scale as would otherwise be expected. Reduction in smartphone build costs will be an increasing focus in future, as handset manufacturers increasingly look to target developing markets where evidence suggests price-points of US\$50 or even lower may be required to achieve material penetration. If this is the case, the true 2020 figure may in fact be closer to the 65% mark.

IP-messaging/RCS Enriched Calling

While theoretically all smartphones are capable of supporting RCS via a downloadable application, for these purposes we only track natively integrated RCS devices, or in other words those that are RCS messaging capable ‘out-of-the-box’.

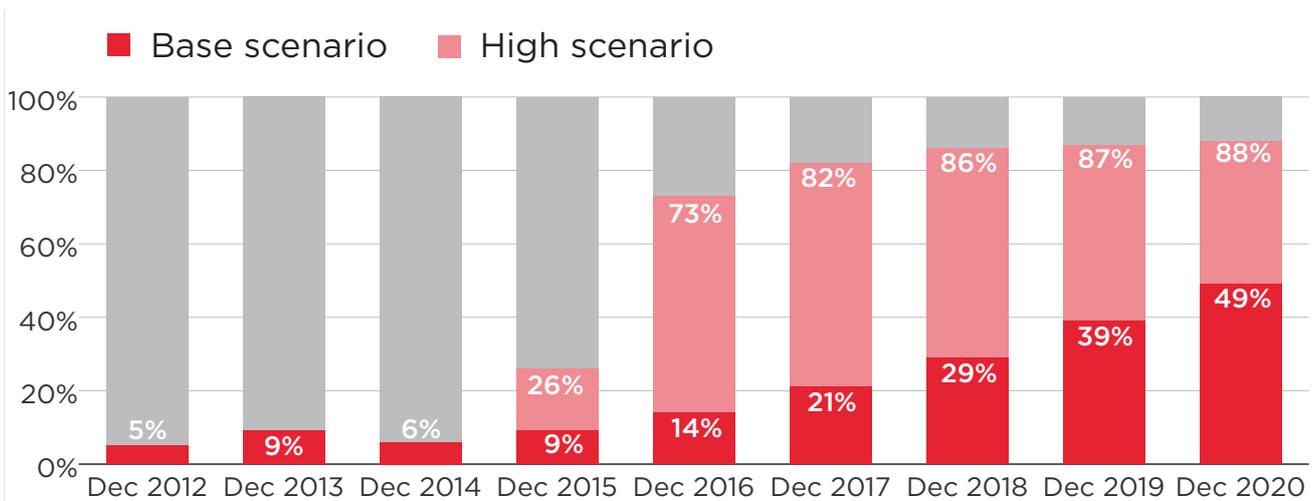


Figure 7: Native IP-Messaging/RCS-capable smartphones as a percentage of total smartphone shipments (estimated). Source: GSMA Intelligence

At first glance it appears that shipments (and therefore sales) of RCS-capable smartphones have been erratic between 2012 and 2014. In reality this is influenced by the dramatic growth

of smartphones as a product category over this time, with each passing year making up a greater proportion of all mobile handsets sold (just 49% in Q4 2012 vs 75% in Q4 2014). In addition to this, the tracking method used had not, at the time of writing, recorded some of the newer versions of RCS-capable models, which are still pending confirmation (RCS capability is not typically detailed in the official handset specifications of a new model). This means the 2014 figure is probably slightly understated. Nevertheless, it appears that handset manufacturers have been in something of a holding pattern on RCS, potentially waiting for evidence of more widespread network support before committing to the service beyond a few select test devices. We expect this to change in 2015, though the degree of that shift depends on one key variable in particular...

Figure 7 shows two forecasts, each representing two quite distinct scenarios. The base case forecast assumes that RCS-capable smartphone share will increase steadily and unremarkably over the next six years. This is based on the assumption that RCS will grow not as a standalone service, but rather off the back of VoLTE-led IMS deployments, and an IP-communications/Enriched Calling experience that is increasingly understood to be greater than the sum of its parts. If this occurs, device manufacturers will respond accordingly and gradually move toward producing converged full-IP-communications devices that include RCS common-core services, though a much slower rate than VoLTE itself, given the lag in network launches and a lower level of direct end-user demand. Unlike VoLTE, RCS/IP-messaging has no specific hardware requirements, and therefore cost concerns are less of an issue.

The high case forecast shown in Figure 8 presents a different scenario entirely. This takes into account the impact of the inclusion of the RCS common-core as a standard functionality of the next major version of Google's Android operating system – tentatively dubbed the 'M-release' – which is expected to be officially released around Q3 2015. The Android operating system currently enjoys a smartphone market share of more than 80%. This means that, depending on when each manufacturer decides to begin installing the new OS version in their new handsets, roughly four out of every five smartphones shipped would be natively RCS/IP-messaging capable within a relatively short space of time. In this scenario RCS/IP-messaging becomes a far more appealing proposition from the perspective of an MNO, much faster.

The future of IP-communications

At such an early stage of the technology lifecycle for IP-communications it is difficult to form a clear picture of the next six years. Early indicators are positive, however, and recent developments and high-profile handset and network launches suggest that this trend will continue. IP-communications suffers from a typical 'chicken and egg' paradox where support from multiple directions is required in order to experience widespread growth (in this case, both networks and handsets), with each 'side' tentatively watching for commitment from the other. Based on available data and recent events, we believe IP-communications (VoLTE in particular) may now have reached something of a tipping point. Interoperability, however, remains a threat to IP-communications realising its potential. The ability of IP-communications to deliver on its promises, and therefore for operators to reap its greatest benefits, will depend on the degree to which MNOs consider interconnection (and to a lesser extent, roaming) an integral part of the IP-communications process, and support it accordingly.

Despite some suggestions to the contrary, MNO-based messaging is far from dead. The impending success of VoLTE, and the fact that the incremental cost of RCS to a pre-existing IMS set up is relatively low means that we expect to see gradually increasing RCS network support. Likewise, native integration in Android smartphones would see a surge in device support. Enriched Calling features aside, IP-messaging/RCS is unlikely to ever be seen by users as a brand or a standalone service in its own right, nor will it in any way detract from the popularity of social networks or applications offering utility and niche functionality that goes beyond mainstream messaging. Rather, we expect it will gradually and quietly supplant SMS as the default rich messaging option that 'just works'.

In terms of native IP-communications handsets, we anticipate a shift from industry-driven to demand driven growth as a result of increasing user awareness of VoLTE and HD calling. VoLTE is becoming a brand, a perceived mark of a high-end handset and something users eventually expect to see on the box. Vendor feedback suggests that this is beginning to be reflected in customer demand, particularly within digital pioneer markets in East Asia and North America. The inclusion of the RCS common core in the Android 'M-release' would drive a rapid increase in the availability and sales of full-IP (both VoLTE and native IP-messaging capable) smartphones. It is no longer a question of whether all smartphones will eventually be IP-communications capable, but a matter of time.

Finally, IP-communications and Voice over WIFI may be the forerunner to an environment where MNOs are positioned at the heart of IP-based communications, and are able to launch any IP-based service they control over any access network their users choose. How exactly this this plays out remains to be seen, but if IP-communications can be scaled and interconnected successfully, mobile network operators may enjoy not just a resurgence in the relevance of their core service offering, but a level of control, influence and reach that goes far beyond mobile networks, surpassing anything the mobile industry has seen to date. Watch this space.

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