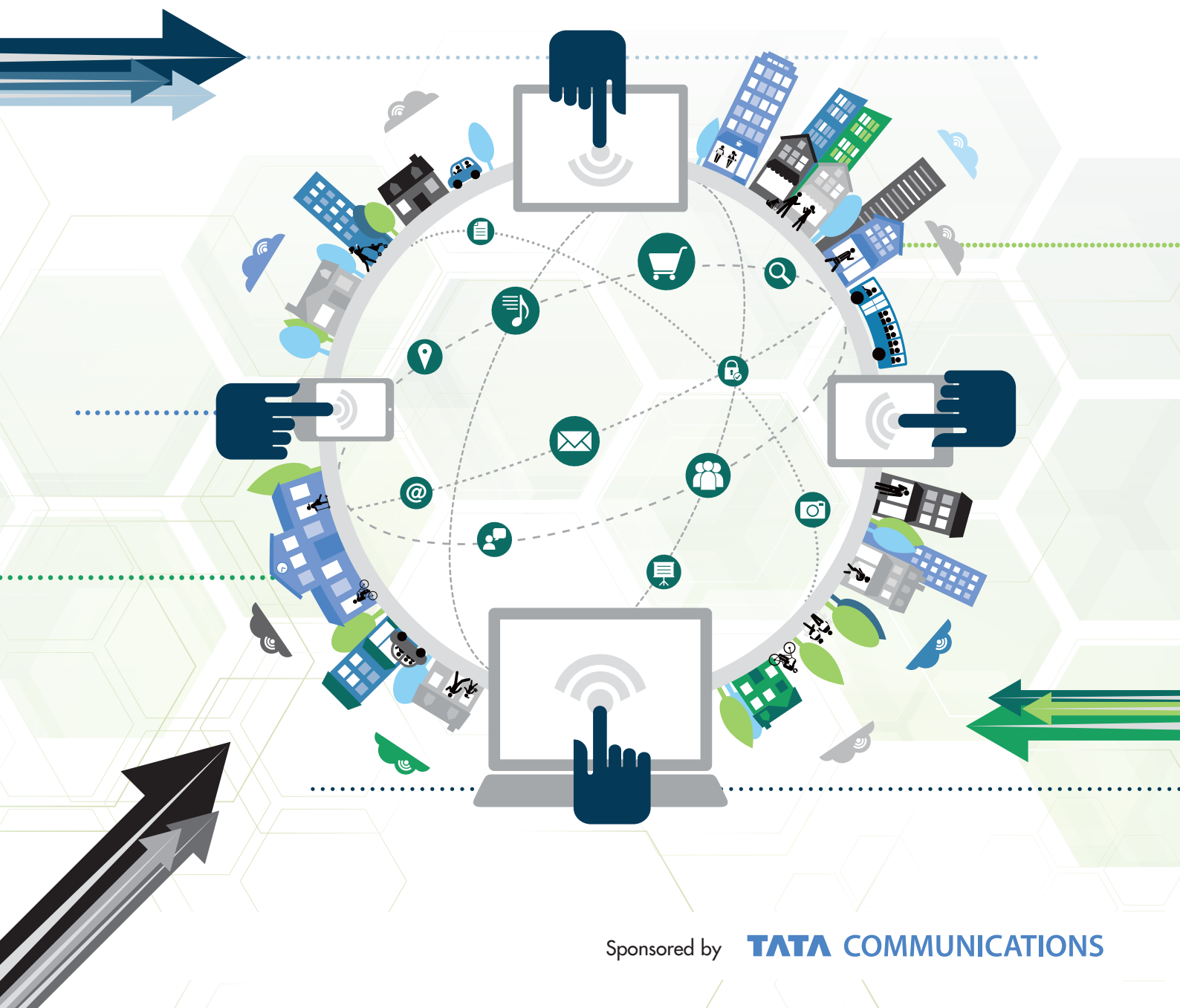


# Next Generation Roaming: Service Evolution and Innovation

Opportunities and challenges for operators amid technical and regulatory change



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The global mobile landscape is evolving faster than ever before, with new technologies, fast-changing regulation and consolidation re-drawing the terrain. These changing dynamics present both opportunities and challenges for operators. Informa Telecoms & Media has conducted extensive research, including a survey with mobile operators, MVNOs, wholesale carriers and telecoms equipment vendors, around LTE and next-generation roaming. The findings from this research are presented in a series of two white papers: The first whitepaper explores LTE roaming – market status and growth drivers, and is available to download here: [LTE roaming – Global Market Status and Drivers for Growth](#).

In this second whitepaper, Informa presents its conclusions on the growth of new data services and next-generation roaming.

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## Executive summary

- 1. As operators roll out and extend their LTE footprint, they are launching new services, including enhanced voice, video calling and enterprise telecoms services.** These new data services bring additional data revenue opportunities for mobile operators along with some key challenges in managing the quality of roaming services. Ensuring LTE data speeds and robustness of delivery will be essential for operators to position LTE roaming as a premium experience for both retail and enterprise segments.
- 2. Regulatory developments and local break-out (LBO) are expected to bring new competition, and thus change the dynamics of the roaming market over the next few years.** This paper finds that the loss of subscriber control to foreign networks is one of the biggest concerns for the home operators. However, the respondents feel that the home operators might still have an advantage over LBO providers due to the relationship they have with their customers and also because LBO models demand significant effort from the customers to choose and contract a different LBO provider every time they visit a foreign country.
- 3. This paper highlights that operators need to evolve their roaming propositions to suit the new competitive environment and to encourage customers to use data roaming.** According to the survey, 50% of the respondents think that operators first need to bring down the roaming prices to the level of home market. However, price is just one step and regulatory interventions are already pushing price caps to regulate the tariffs. Operators need to think beyond price and bring in service differentiation to remain competitive in both home and foreign markets.
- 4. The roaming departments within operator organizations are faced with a key challenge to prepare their networks to allow new data services to be made available to the roaming users.** With the increasing number of LTE networks and the proliferation of IP-based services, mobile operators will gradually recognize the importance of IPX as it provides better interconnection and transit, thus improving the data-roaming experience for users.

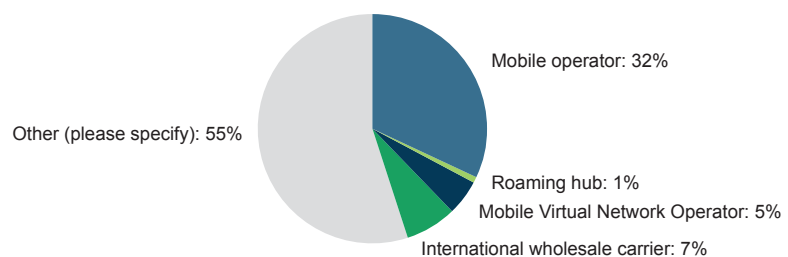
## Survey respondents

In May and June 2013, Informa Telecoms & Media conducted an online survey with mobile operators, MVNOs and international wholesale carriers about LTE and next-generation roaming. The survey received over 400 responses of which 188 were from mobile operators, MVNOs and wholesale carriers (see fig. 1).

The respondents were distributed around the world (see fig. 2). Asia Pacific and Europe were strong primarily because of the large intra- and inter-regional roaming within these regions. Also, as the roaming regulations in Europe are in the process of being amended, there was a high level of interest from the survey respondents in this region.

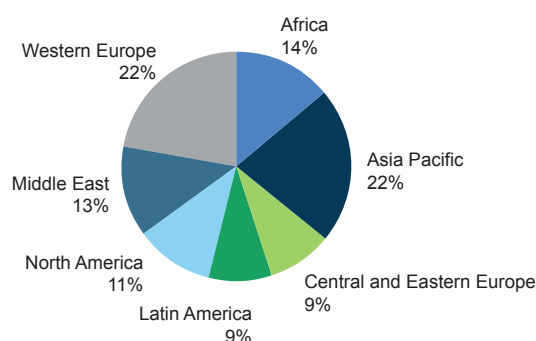
In this second white paper on next-generation roaming, our analysis is

**Fig 1: What is your company's primary area of business?**



*n*=423  
Source: Informa Telecoms & Media

**Fig. 2: In which region are you based?**



*n*=188  
Source: Informa Telecoms & Media

specifically focused on the operator respondents (91 responses were received from mobile operators and MVNOs) as they prepare themselves for the next-generation roaming market. In some of the questions, particularly around technology implementation, we have also included responses from wholesale carriers and roaming hubs.

## Mobile roaming market status

The growing proliferation of portable devices and popularity of media and social networking are driving the growth of mobile data. Informa's Data Monitor shows that non-SMS data revenues are accelerating with a steady year-on-year growth (see fig. 3).

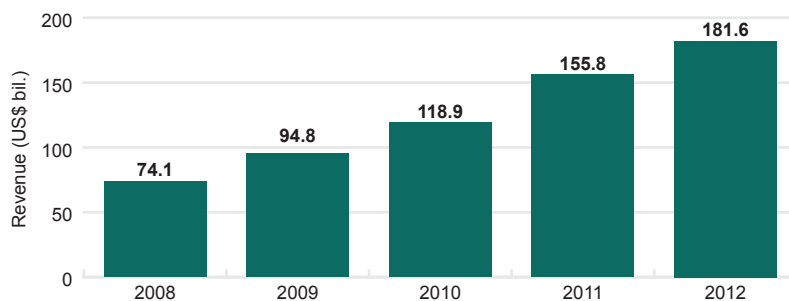
As the mobile data market continues to accelerate, it is influencing the roaming market with profound increase in roaming data usage. However, there still remains significant latent demand for using data services while roaming due to consumers' perceptions around roaming costs and fear of "bill shock". Consumers typically use much more data services, such as Facebook photo upload, music streaming and video downloads in their home market, than they use while travelling. This disparity in data usage behavior is primarily due to the uncertainties around roaming usage costs and associated bill shock.

The roaming regulations in the past have gone a long way to address end-user concerns around tariffs, and continue to be instrumental

in bringing down the cost of using mobile services while abroad. However, to encourage consumers to use data services while travelling abroad, the operators need to rethink their roaming strategies to include innovative digital services, a good quality of experience and attractive roaming tariff plans and data bundles. An increase in data roaming will be a significant opportunity for operators to tap new monetization opportunities if they can replicate successful in-market data strategies in the roaming context.

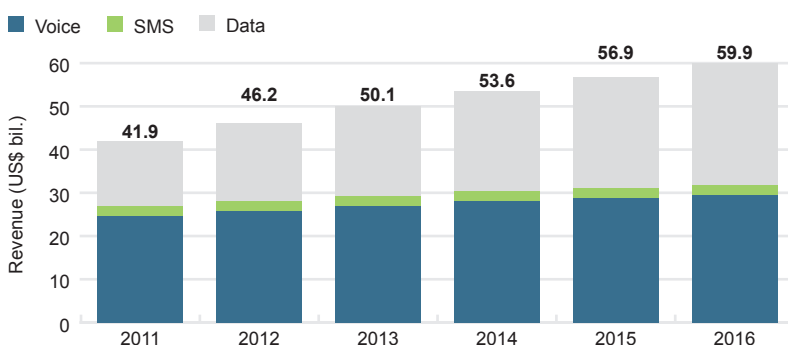
Informa forecasts the revenues from global mobile roaming to increase steadily between 2011 and 2016 at a CAGR of 7%. Much of this growth will be influenced by mobile data roaming, expected to grow at a CAGR of 13%, while voice will remain steady at a CAGR of 4% over the forecast period (see fig. 4).

**Fig. 3: Global data revenues (non-SMS), 2008-2012**



Source: Informa Telecoms & Media

**Fig. 4: Global roaming revenues, 2011-2016**



Source: Informa Telecoms & Media

## Key drivers shaping next-generation roaming

### Data services continue to grow

Over the years, operators have built a strong portfolio of mobile content across music, video and commerce services. Now, as operators roll out and extend their LTE footprint, they are offering new digital services, including enhanced voice, video calling and enterprise telecom services. LTE's enhanced speeds and capacity allows operators the opportunity to promote data-revenue growth.

Social networking and OTT messaging are growing phenomenally, diluting operators'

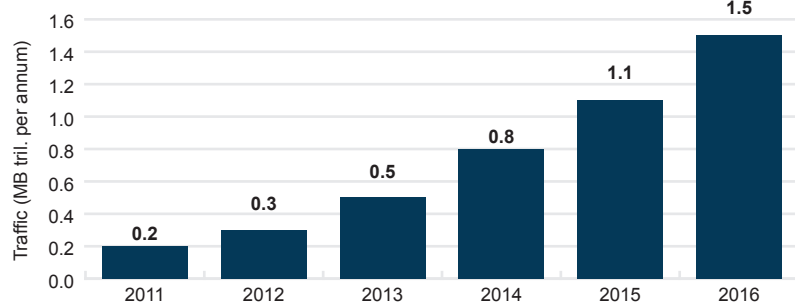
traditional voice and messaging revenues, while the accelerating use of video and other high-bandwidth data services is forcing operators to improve their network efficiency and bandwidth, to prepare for next-generation roaming.

To put this into perspective, Informa's Data Monitor shows that the global average daily volume of OTT messages has reached 19.1 billion, which is already higher than daily average of 17.6 billion for SMS messages, and is forecast to be double that of SMS by the end of this year. With regards to social networking, 498 billion MBs of mobile data are expected to be consumed worldwide in 2013, forecasted to increase to 1.5 trillion by 2016 (see fig. 5). Demand for these data services is not limited to home markets alone as consumers wish to consume these services even when traveling abroad, but are restricted by concerns around bill shock.

Voice is now migrating to IP (VoLTE) and, although this is still at quite an early stage, it will gradually evolve into a broader context to include enhanced data capabilities, such as in-call video, instant messaging, file sharing and presence. The simultaneous use of voice and data in a unified communications context will offer better voice quality and a richer user experience for customers in their home markets, and they will increasingly want to replicate this experience while roaming.

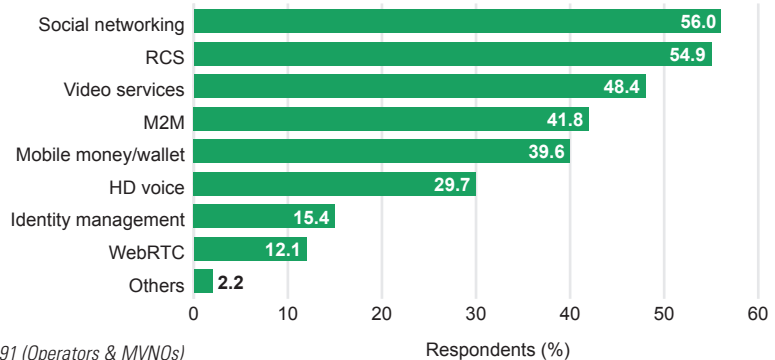
On the enterprise side, LTE, with its key advantages of spectral efficiency and low latency over the 3G networks, allows enterprises to mobilize an increasing number of business-critical services that require these characteristics. As a result, enterprises are rapidly

**Fig. 5: Global social networking traffic, 2011-2016**



Source: Informa Telecoms & Media

**Fig. 6: Which new disruptive services will generate more business opportunities in the roaming context?**



n=91 (Operators & MVNOs)  
Source: Informa Telecoms & Media

adopting new digital services including conferencing, enterprise cloud and M2M. And enterprise roaming customers will demand a high quality of service experience both in domestic and international markets as they access business-critical applications over LTE.

With that being said, LTE is driving the growth of next-generation mobile services. As businesses continue to go global, they have a pressing need to have these new services available while roaming. Informa's next-generation roaming survey shows that, in the roaming context, social-networking services will generate most of the business opportunities for operators with 56% of respondents voting for it, closely followed by RCS services (55%). Video services, M2M and

mobile payments will also be lucrative services for operators' roaming businesses (see fig. 6).

The key focus for operators now is to create new roaming service portfolios and business models to support international delivery of these new digital services. Ensuring LTE data speeds and robustness of delivery will be essential for operators to position LTE roaming as a premium experience for both retail and enterprise segments.

### Operators need to formulate a strategy to prepare for regulatory change

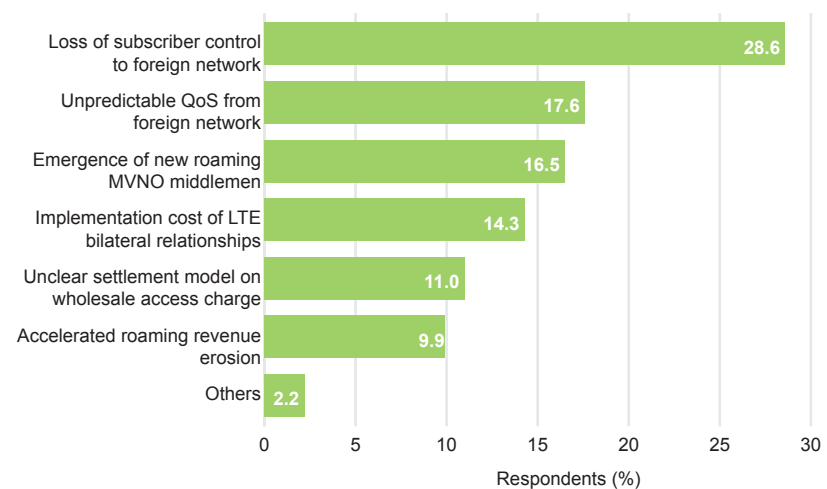
Mobile data roaming is still characterized by a legacy of "bill shock" which remains the biggest barrier to roaming usage. The roaming regulations in the past have

gone a long way to address these end-user concerns, and continue to be instrumental in bringing down the cost of using mobile services while abroad to the end user.

In the case of Europe, the European Commission (EC) envisions making the European Union (EU) one single telecoms market and, as part of its Connected Continent proposal, has announced its intention to eliminate roaming charges for European subscribers travelling within the EU. The commissioners across 27 EU states have already voted to fast-track the roaming proposal and, if approved by the Parliament, it will have a phased implementation with all roaming incoming call charges removed starting July 2014, moving to zero roaming premiums from July 2016 (the earlier July 2014 date for zero roaming is now pushed back to July 2016). These proposals come after the EC's Roaming III directive to reduce retail roaming prices, part of which came into effect in July 2013, and another round of price reductions is due next year.

Apart from the price caps, Roaming III regulation includes proposed structural changes to introduce more competition to the roaming market. Under these proposed changes, the European mobile network operators would be required to open their networks to alternative roaming providers and to data-only roaming MVNOs under the Local Break-Out (LBO) proposals. This "decoupling" of roaming services will allow consumers to buy voice and data roaming services from different or alternative roaming providers rather than their domestic mobile service providers. The consumers can also buy "data-only" roaming services from LBO providers in the visited country.

**Fig. 7: What areas will cause most financial impact on home operators' business under Local Break-Out?**



*n=91 (Operators & MVNOs)*  
Source: Informa Telecoms & Media

The European operators are wary of the new regulations as not only will they dramatically reduce their roaming revenues but also bring more competition into the market. In view of these new regulatory proposals, the European operators might actually increase roaming charges for regions outside the EU that are not covered by the regulation. This should, however, be only a short-term strategy for operators to recover their lost roaming revenues in Europe; they should evolve their roaming offers to sustain their roaming business in the long term.

Informa's next-generation roaming survey shows that, under LBO model, loss of subscriber control to foreign networks is one of the biggest concerns for the home operators as consumers will have an option to select data-roaming providers in the visited country. There are other parallel concerns, particularly around LTE roaming as LBO is still not fully defined (see fig. 7).

Amid these concerns, however, the survey respondents believe that

the home operators will still be better placed to control the roaming subscribers than the LBO providers (see fig. 8) as the LBO model will demand significant effort from the consumers to choose and contract a different LBO operator every time they visit a foreign country. Also, consumers will have to manually select and connect to the LBO network by overruling handset's automatic network selection, and the home operator might not be able to steer the consumers to any other network even in case of bad network reception in an area unless the automatic network selection is re-enabled by the consumer. This would be taxing for the consumers and is likely to lead to a deterioration in their roaming experience.

**Technology challenges need to be resolved so operators can tap latent demand for new services while roaming**

Next-generation data services bring a variety of challenges as service continuity and quality are paramount for these new digital services. With a variety of

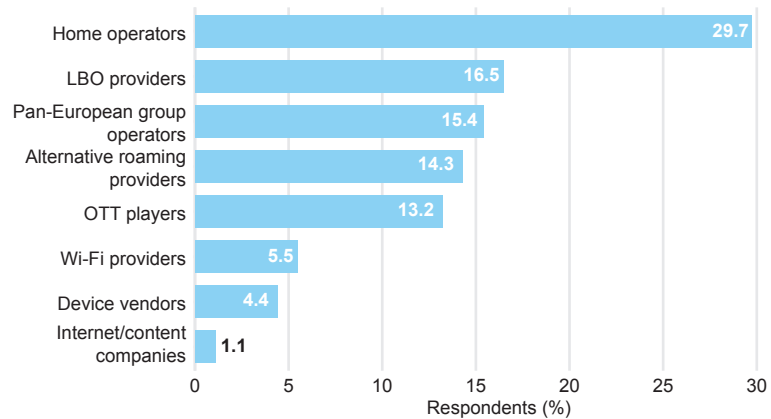
different networks (2G, 3G, LTE, Wi-Fi), users demand a seamless network experience and same level of service quality on the visited network as their home network. Thus, the roaming proposition needs to evolve as it should not be a “best effort” any more.

According to the Informa survey, “new-age” telecoms services will generate new opportunities for the operators. However, 57% of the respondents feel that M2M services will be challenging to implement in the roaming context (see fig. 9), followed by RCS (49%) and mobile money (46%).

Enterprise telecoms services are a key focus for mobile operators globally, pushing the need for a good quality of service and interoperability even more. In the case of M2M, despite being a strong business opportunity, the lack of industry standards and interoperability remain major barriers to mass deployment of M2M solutions. Besides, the lack of global roaming agreements makes international M2M delivery challenging as traditional SIM homing does not work for international M2M. Similarly, for other new services, interoperability is one of the major barriers to roaming adoption as devices, technologies and LTE spectrum frequencies remain fragmented (see fig. 10).

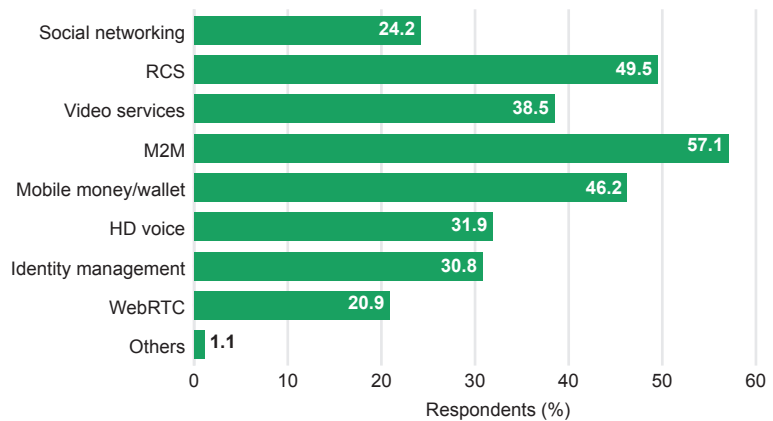
The industry has recognized that these challenges need to be resolved to make international service delivery possible. For M2M, for instance, device vendors and operators have rolled out their first initiatives around global SIMs to support global M2M capabilities. Vodafone and a few

**Fig. 8: Who is better placed to control inbound roamers under Local Break-out?**



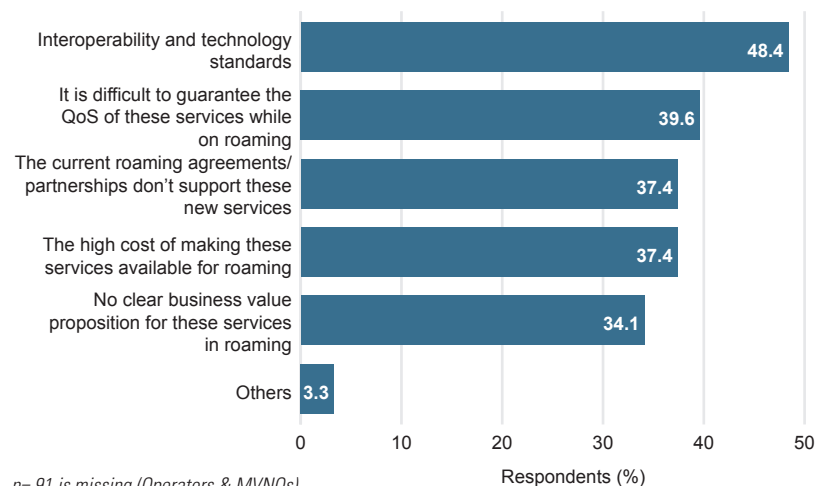
*n=91 (Operators & MVNOs)*  
Source: Informa Telecoms & Media

**Fig. 9: Which new disruptive services will generate challenges in the roaming context?**



*n=91 (Operators & MVNOs)*  
Source: Informa Telecoms & Media

**Fig. 10: What are the key challenges for operators wishing to support roaming for innovative services?**



*n= 91 is missing (Operators & MVNOs)*  
Source: Informa Telecoms & Media



other operators offer the Mobile Country Code (MCC) 901 SIM which are shared global SIMs for cross-border service delivery with a single international price for data connectivity. Using a global SIM in connected devices will make it easy for M2M customers to roam freely across the operator's footprint and its partners' networks without worrying about roaming handoffs or exorbitant roaming charges. In addition, the mobile operators are forming alliances to expand their global coverage to be able to offer seamless M2M roaming and interoperability across extended footprint. For example Jasper Wireless M2M Alliance, which is a federation of seven global mobile operators, and the Global M2M Association, which is an alliance of four European mobile operators aim to deliver seamless M2M services and global coverage to their enterprise customers.

The operators are also starting to make new roaming agreements to support these new services. In September 2013, SK Telecom, Swisscom and Rogers Communications partnered to facilitate world's first multi-continent LTE roaming service. The agreement will enable the LTE subscribers of the three operators to roam across South Korea, Switzerland and Canada and use LTE data services while roaming. This alliance was initiated by SK Telecom and is an extension of the regional LTE roaming partnerships it has already established with CSL in Hong Kong (June 2012), Singapore Telecom in Singapore (March 2013) and Globe Telecom in Philippines (April 2013). Meanwhile, in June 2013, Tata Communications and Telecom Italia Sparkle implemented

the first LTE roaming peering between two IPX providers, laying the foundation for growth in LTE roaming traffic.

These early alliances show that the operators are progressing towards LTE roaming implementation, to be able to monetize the next generation roaming opportunities.

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## Market development

### Data-roaming propositions need to evolve to stimulate and monetize demand

Retail-roaming offers need to evolve from conventional "per min"/ "per MB" charging to include innovative data-roaming bundles that will be easy to communicate to the consumers. These should help alleviate the fear of "bill shock" and encourage the wider use of data services while roaming. The real onus is on operators to design service bundles that are not only profitable but also appealing to the customers. For example, the popularity of social networking is encouraging mobile operators to experiment with application-specific plans, such as Facebook or WhatsApp roaming packs for "leisure travelers" who will be persuaded to buy these plans to stay connected with their friends and family while travelling: In September 2012, 3 Hong Kong launched "WhatsApp Roaming Pass" to allow its customers to use the WhatsApp service while roaming for HK\$48 (US\$6.20) per day with 5MB of inclusive data. Similar service bundles in other markets will prove rewarding for operators to target young vacation travelers.

In light of roaming tariff regulations, these data bundles or

service-based roaming offers may actually prove more lucrative for operators than the conventional "per MB" charging. In the bundled offer, the "per MB" data charge can be kept within the boundaries of regulated price caps while operators can still benefit from the bundle limits. While the larger the bundle offered, the lower the "per MB" charge will be, there is a higher probability that the roaming customer may not use the bundle fully. Thus, the onus lies with the operators to make compelling data-roaming packages for the users, while being mindful of the regulatory per-MB charging, to make potential profits. For example, Orange France is offering "Europe Internet Pass" for €20 (US\$26) with 400MB of inclusive data and seven days validity. The bundle satisfies the European roaming price cap regulation quite well, but, with a sufficiently large data allowance over the validity period, there is room left for potential profit through the customers not using all of the bundle allowance.

Business travelers will also appreciate application-specific plans, such as Salesforce.com roaming plan; however, the service continuity and quality will be more significant for them than the tariffs. Thus, operators will need to develop QoS-based roaming plans for business customers. According to Informa's survey results, 50% of the survey respondents believe that application-specific plans are useful and should be extended to roaming customers and close to 47% of the respondents believe QoS-based plans will boost the roaming experience (see fig. 11).

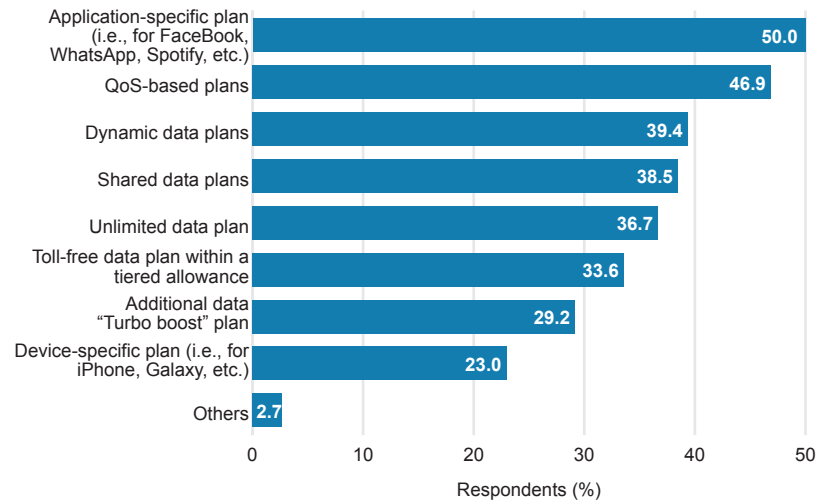


Although the operators have been experimenting with QoS-based offers for some time now, they have only received limited traction so far. For example, in 2012, Vodafone trialed a QoS-based traffic management service for enterprise customers in the Netherlands. As part of the service, customers on this plan received 20-30% more bandwidth at peak times than customers with a standard subscription. Market reaction to these QoS-based plans has not been strong enough to lead to mass-market rollout or meaningful marketing budget, and operators will need more evidence to make these QoS-based plans a mass-market phenomenon in the context of roaming.

Another key approach operators are experimenting with is to include roaming as part of the home allowance. For example, Vodafone in Europe allows its subscribers to use their home allowance within Europe for £3 (US\$4.70) per day and 3 UK has recently launched its "Feel at Home" plan for £5 per day to allow its subscribers to use their home allowance in the seven countries that have a 3 network. These plans are expected to offer transparency to the consumers and thus drive roaming usage.

Designing a range of innovative roaming tariff options to meet the demands of different customer segments is complex. However, it's not the only challenge. When launching any new/aggressive tariffs, the roaming departments within operator organizations are confronted with internal challenges, such as the costs of explaining the changes to sales and customer-care teams, advertising new tariffs offers, implementing changes in billing processes, etc. Another

**Fig. 11: What type of plans would be extended from home markets to roaming customers?**



*n=226 (all completed respondents)*  
Source: Informa Telecoms & Media

major issue is around wholesale roaming agreements that use a "per MB" model and are likely to continue to do so, at least in the near future, which may pose a potential challenge for retail tariff innovation.

### Operators need to do more to sustain their roaming business in the long term

Price remains a key consideration for roaming customers because "bill shock" is still one of the biggest barriers to roaming usage. Operators need to develop new approaches to offer more transparency to customers to encourage roaming usage. Some of the operators are already making initial efforts, for example, Telekom in Germany and Orange in France have introduced travel apps to help roaming customers stay aware of their data usage while travelling. This will help customers feel more secure about their roaming usage and spend, and is likely to alleviate "bill shock" associated with roaming.

As per the survey findings, roaming price and transparency are key considerations for operators, and

50% of the respondents think that operators first need to bring down roaming prices to the level of home market prices (see fig. 12). However, price is just one step and regulatory interventions are already pushing price caps to regulate the tariffs. Operators now need to think beyond price, and bring in service differentiation to remain competitive in both home and foreign markets. As enterprise users are likely to remain the largest roaming customer segment, quality of service differentiation will be imperative for them. On the other hand, new OTT service propositions, such as a Kindle 3G roaming download or Netflix access on roaming, will become essential to attract new roaming segments.

Another important consideration for operators is to include Wi-Fi in their roaming strategy. The majority of the travelers today do not use data roaming for fear of "bill shocks" instead relying on free/low-priced Wi-Fi hotspots at airports and hotels. The "free" Wi-Fi networks at airports and hotels are usually over-subscribed and offer a rather

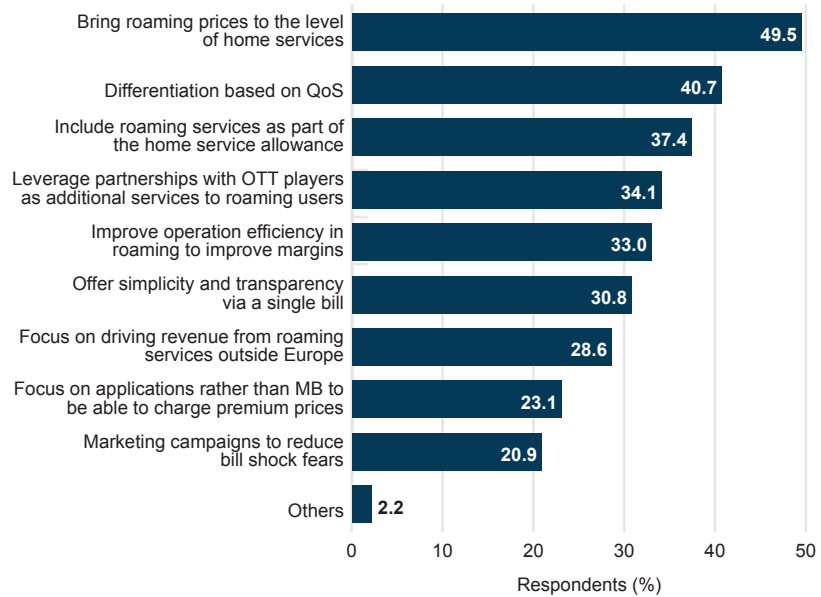
poor quality of experience to the users. Operator-branded Wi-Fi, if bundled into roaming packages, will allow subscribers to use operator-owned Wi-Fi hotspots that will provide a good quality of experience. However, to offer a good Wi-Fi proposition, operators need to build a strong Wi-Fi footprint across both their home and foreign markets and develop attractive Wi-Fi roaming bundles to induce consumers to adopt Wi-Fi roaming.

For example, for AT&T, Wi-Fi is central to their data strategy and the operator has recently partnered with Boingo Wireless for Wi-Fi roaming. This partnership will allow AT&T customers to access Boingo Wi-Fi access points when travelling abroad. This is an attractive deal, given Boingo's strong Wi-Fi footprint globally. One of the key requirements for customers is to purchase an AT&T data global roaming package and a 1GB global Wi-Fi allowance on Boingo hotspots will be included in the plan.

These bilateral Wi-Fi roaming agreements are a step towards enhancing roaming offers, as validated by the survey respondents' belief that Wi-Fi will complement data networks and improve customers' roaming experience (see fig. 13).

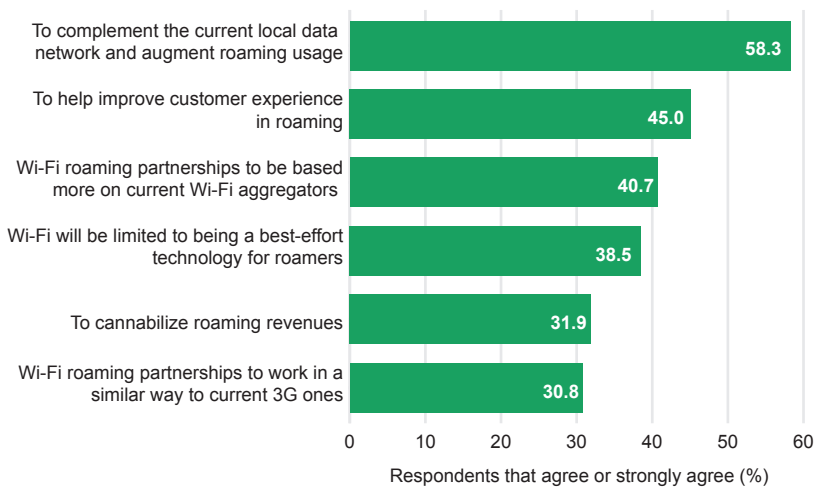
Around 30% of the respondents feel that Wi-Fi will cannibalize roaming revenues. However, if operators make right investments into Wi-Fi, including robust national Wi-Fi footprint and strategic international Wi-Fi partnerships, Wi-Fi will not cannibalize but rather complement cellular roaming. In fact, Wi-Fi will augment the roaming opportunity further by monetizing "Wi-Fi-only" media devices which are closed off in cellular roaming, thus increasing the operators' wallet share of roaming.

**Fig. 12: What key actions do operators need to take to sustain their roaming business in the long term?**



n=91 (Operators & MVNOs)  
Source: Informa Telecoms & Media

**Fig. 13: What is the level of agreement for Wi-Fi in the roaming context?**



n=91 (Operators & MVNOs)  
Source: Informa Telecoms & Media

There is currently a rapid growth in the number of Wi-Fi-only media devices, with Informa forecasting that more than three-quarters of tablet shipments in 2014 will be Wi-Fi-only tablets (i.e., of the total 260 million global tablet shipments in 2014, 199 million will be Wi-Fi-only tablets). The operators cannot rule out the underlying opportunity for roaming on these Wi-Fi-only devices.

Mobile operators around the world are expanding their Wi-Fi coverage to allow data offload and thus improve service quality for customers. A recent example is the Wireless Broadband Alliance's Wi-Fi roaming program where some of the largest global operators, including AT&T, China Mobile, KT, NTT DoCoMo and France Telecom Orange, have come together to allow their users

to access Wi-Fi hotspots on each others' networks across the world. These Wi-Fi roaming alliances will allow operators to offer a better quality of service to their "paid" roaming subscribers who buy data roaming Wi-Fi bundle offers (similar to the AT&T example above), thus not cannibalizing operators' revenues but complementing them.

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## Technical considerations for implementing next-generation roaming are key to lay the foundation for growth

The roaming departments within operator organizations are faced with a key challenge to prepare their networks to allow new data services to be made available to the roaming users. Operators need to consider both current and future market scenarios, including what new services will drive the growth of mobile data, how much data the travelers use currently compared with how much they are likely to use in the future, and what the impact of current and future roaming regulations will be.

There are numerous strategic and technical challenges to implementing LTE roaming, and operators need to carefully assess these challenges to select the right roaming partners for their business.

For LTE roaming, operators need to consider two key issues – telecommunications signaling and roaming interconnect.

Telecommunications signaling is the exchange of messages between

network components and/or handsets in order to set up a communication channel or service. GSM and 3G networks are primarily powered by Signaling System No. 7 (SS7) while LTE and subsequent technologies are powered by the Session Initiation Protocol (SIP) and Diameter.

Although Diameter is a continuation of SS7, it has significant differences compared with previous technologies which do not allow operators and vendors to use their expertise for the new LTE networks. Several operators have experienced outages in their new LTE networks attributed to unexpected spikes in data traffic (the signaling "storms") in the core networks as LTE creates new signaling challenges:

- LTE networks have 100% smartphone penetration (versus 3G networks) and the added weight of 4G tablets and dongles, which generate significantly more signaling messages on both the access and core networks, compared with feature phones or data cards.
- Mobile operators aim to monetize new networks more aggressively with new services, including VoLTE and RCS. These new services create an additional signaling burden on the core network compared with the current systems that are relatively simple (for example, signaling driven by voice or SMS).
- Real-time, online charging and advanced offers create new signaling traffic between operators' policy engines (PCRF) and various other parts (e.g., HSS, OCS), compared with current billing and charging systems.

With LTE deployments gaining pace globally, the Diameter and signaling markets are experiencing strong

growth. Diameter signaling is an important element for the operation of LTE networks and roaming as it interfaces between the policy engines (PCRF), the customer databases (HLR, HSS) mobility management (MME) for roaming subscriber-mobility management and QoS policy. SIP signaling is also expected to become important as operators start deploying VoLTE and RCS services. Session Border Controllers (SBCs) are considered to be pivotal components to manage the increase of SIP signaling.

For LTE roaming, operators need to either make new roaming agreements or expand their existing roaming agreements to include LTE. To assess new roaming partners for LTE, operators need to:

- Ensure that the scope of the vendor's roaming footprint meets their current and likely future requirements
- Assess the robustness of the signaling experience the vendor offers
- Assess the vendor's capability to offer carrier-grade Diameter signaling as well experience with managing mission critical services such as VoLTE
- Ensure that the vendor can offer seamless reporting, monitoring and trouble-shooting across 2G, 3G and 4G
- Ensure that the vendor can support CSFB signaling

These requirements are borne out by Informa's survey findings, which indicate that a vendor's LTE roaming footprint and expertise are the most important factors when selecting a roaming service provider (see fig. 14).

Roaming hubs simplify the creation of new roaming

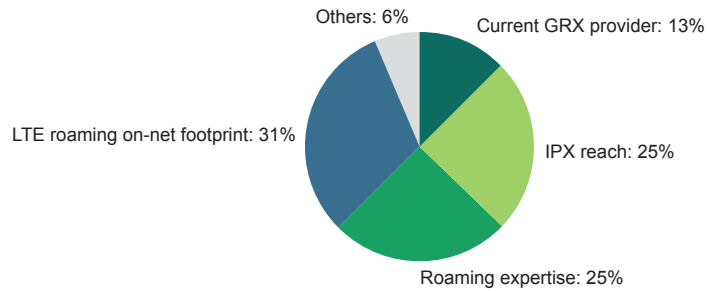
partnerships between operators, thus reducing the complexities of roaming ecosystem. The added challenges of LTE roaming will make hubbing more crucial. Although bilateral roaming interconnections will continue to remain relevant, there will be a gradual migration to hubs.

IP eXchange (IPX) is a GSMA-defined IP-based interconnection technology standard. It provides a number of advantages for roaming service providers based on improved interconnection and transit, thus improving the data roaming experience for users.

One of the key advantages of IPX is that it does not use the public Internet and so transit has fewer points for the data to travel through from the start to the endpoint (see fig. 15). This provides a better quality of service across both voice and data services while roaming and acts as one of the core business opportunities of IPX. As IPX allows operators to manage end-to-end data transit, it supports services that require particular attributes such as consistent connectivity, high bandwidth and low latency.

It will be crucial for IPX providers to provide a solid platform for operators to be able to monetize IPX-based data roaming. The survey respondents chose roaming data clearing, roaming financial settlement (data, VoLTE), LTE-hosted DRA/DEA and roaming hubs as the most important services an IPX provider needs to offer for LTE roaming (see fig. 16).

**Fig. 14: What would be the primary driver for you to select a LTE roaming service provider?**



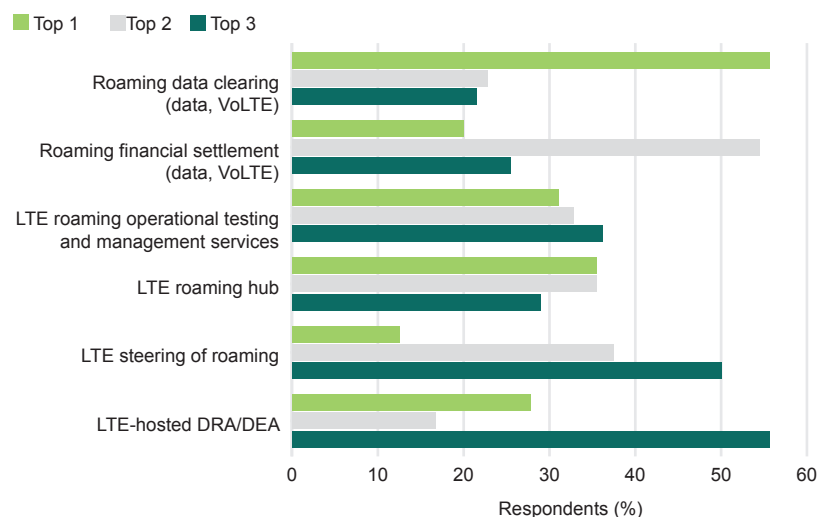
*n=110 (Operators, MVNOs and wholesale carriers)*  
Source: Informa Telecoms & Media

**Fig. 15: Advantages of IPX for an operator**

Advantage	Process	Differentiation
Cost reduction	Streamlining interconnect and voice transit	Streamlined partnering and revenue share
Better QoS for voice	Improved IP voice	Better customer experience than OTT VoIP so higher uptake of service
Better QoS for data	Data Class of Services (CoS) selection, which enables upgrading of data services in transit	Allows data to be marked to be expedited for forwarding ensuring that SLAs for latency can be guaranteed, depending on the type of data service used (useful for video streaming, HD voice, presence, etc.)
Partner management	Single connection to multipurpose platform	Simplifies service and partner management, supplementing multiple technology, device and connectivity choices to a single point connection

*Source: Informa Telecoms & Media*

**Fig. 16: Which of the following are the most important services that IPX provider needs to offer as part of the basic LTE roaming service?**



*n=110 (Operators, MVNOs and wholesale carriers)*  
Source: Informa Telecoms & Media

## Conclusions

### **1. QoS, interoperability and technology standards remain major barriers to the uptake of digital services while roaming**

Roaming cannot be “best effort” any more as users demand a good quality of service and look for guaranteed Service Level Agreements (SLAs). With a variety of different networks (2G, 3G, LTE, Wi-Fi), users demand a seamless network experience with guaranteed quality. The increasing use of enterprise applications will exert even more pressure on SLAs as business users represent the majority of roaming traffic and service reliability is critical for business applications.

### **2. New digital services are demanding that operators consider much more than price when establishing a partnership with a visited operator or an international carrier**

New digital services are bringing in extra complexities around service continuity, security, etc. and the operators need to manage these in order to provide a reliable service experience internationally. Diameter signaling capabilities, IPX reach, LTE footprint and roaming agreements are key factors when selecting the right roaming partner.

### **3. Operators should look to application-specific plans to evolve their approach to roaming tariffs**

Roaming tariffs need to evolve to include innovative service packages/bundles to encourage wider use of mobile services while roaming. For example, the popularity of social-networking applications is encouraging mobile operators to experiment with application-specific plans such as Facebook or WhatsApp plan for the “leisure travelers” who need to stay connected when roaming. However, these retail tariff propositions are largely dependent on the wholesale roaming agreements which still use the “per MB” model and are less likely to change in the near future.

Also, to launch any new/aggressive roaming tariffs, the roaming departments within operator organizations are confronted with internal challenges such as convincing senior management about the cost of explaining changes to sales/customer care teams, the changes in billing processes, etc.

### **4. Voice will continue to remain relevant in the future of roaming, representing more than 50% of roaming revenues by 2016. But voice in the future will be significantly different from the service we know today as it migrates to IP**

By migrating to IP (VoLTE), voice will help improve the end-user experience by offering HD voice and simultaneous use of voice and data services in a new unified communications context. Also, it will help operators reduce costs by using a single wireless network for both voice and data, and allow operators to re-farm their existing 2G frequencies to LTE. However, just migrating voice to IP is not sufficient; it needs to evolve into a broader context to include RCS voice, IM and social networking. Consequently, this is likely to have an impact on roaming policies as traditional per-minute charging for voice in roaming will need to change to a per-MB model as for data. But consumers typically do not understand the per-MB charging model and operators need to develop innovative pricing options to implement this change.

### **5. M2M offers a new opportunity for operators but roaming remains a key challenge for its adoption**

M2M is one of the major steps in the telcos’ digital strategy initiatives, and it offers them a strong opportunity. However, as global M2M models remain fragmented, operators need to collaborate and think more creatively to standardize M2M solutions, and subsequently other digital services. These new services will have wider deployments if the key barrier of global coverage for roaming is eliminated. Then the M2M customers will not require multiple relationships with different vendors in different countries, but just one global M2M agreement. Also, the industry needs to think about device and spectrum standardization, flat roaming tariffs and security. For example, the Global M2M Association (GMA) is a federation of four leading mobile operators in Europe to deliver seamless M2M services with roaming and global coverage. Also, the global M2M SIMs will help establish new roaming ecosystem for seamless M2M experience internationally.

### **6. Local Break-Out (LBO) is a hot topic right now and is attracting market attention. However, it is still not clear whether LBO is a threat or an opportunity, plus there are technical and business challenges to implementing it**

LBO is expected to change the dynamics of the roaming market and drive competition over the next few years. However, since the complexities in LBO implementation and the related costs are not fully defined as yet, it is uncertain if these new players will be successful. The “home operators” might have an advantage over the new LBO players due to the relationship they already have with their customers, but they need to evolve their roaming offers to suit the new competitive environment. A further advantage for the “home operator” is that the LBO model might demand significant effort from the customers to choose and contract a different LBO operator every time they visit a foreign country.

## Recommendations

As mobile operators deploy LTE networks and offer new digital services, they need to re-evaluate their strategies to prepare for next-generation roaming. Some of the key questions operators need to evaluate are: what new data services to launch to exploit LTE capabilities, how to reduce roaming-related costs and consolidate existing roaming agreements to include LTE, what types of new tariffs to launch and how to increase roaming usage on those tariffs.

### **1. Operators should develop a strategy for LTE roaming and explore strategic partnerships to be able to monetize next-generation roaming opportunities**

LTE deployments are accelerating, and operators now should focus on making LTE roaming agreements to leverage next generation roaming opportunities. They should explore strategic options for LTE roaming partnerships and peering agreements to allow their subscribers to roam on LTE networks when they travel.

When selecting the right roaming partners for its business, operators should carefully assess the LTE roaming roadmap and the scale of other operators.

### **2. Operators should partner with vendors that have robust IPX infrastructure, Diameter capabilities, as well as IP Voice network and experience**

LTE roaming is expected to generate significantly more data than at present, particularly in peak times, and this data will need to be transmitted across multiple roaming points across the world. Operators should make sure their IPX vendor has infrastructure robust enough to manage large amounts of data and handle unexpected spikes in data traffic. Also, they should ensure the vendor has significant IPX reach that matches operators' current and future roaming footprint. With the inevitable rollout of VoLTE, operators should partner with an IPX provider with IP voice experience and capabilities to facilitate and simplify the transition towards VoLTE in the next few years.

### **3. Operators should implement new service and tariff propositions to stimulate uptake of next-generation roaming services**

To try and offset declines in voice roaming revenues, operators must proactively start implementing new approaches to stimulate data roaming. Innovative data services should be made available for roaming on LTE networks and operators should evolve their tariff offers to include roaming within the data bundles which could be compelling for roaming users. For example, application-specific offers such as "WhatsApp Roaming Pass" or "Kindle 3G Roaming" to allow subscribers to use these services while roaming, with roaming agreement settled between content provider and operators in the background.

Operators should also assess how best they can launch innovative roaming offers to guarantee different Service Level Agreements (SLAs) and QoS standards. Different applications will have different needs for quality and reliability, which allow a series of opportunities to expand the roaming portfolio. For example, for some applications, access to LTE network will be essential and thus may include a premium tariff to guarantee network availability and service continuity. In addition, the tiered data plans, premium tariff for higher network speeds, can be useful to ensure QoS for services that require high-bandwidth, such as video streaming. Also, operators should explore the most effective way they can add Wi-Fi to these new roaming propositions to enhance the end-users' roaming experience.

### **4. Operators should develop new approaches to offer more transparency to customers to avoid "bill shock"**

Mobile data roaming is still characterized by legacy of "bill shock" which remains the biggest barrier to roaming usage. Operators should explore new approaches to offer more transparency to customers, in particular usage meters to track roaming usage in real time. This will help customers feel more secure about their usage and spend, and so is likely to encourage roaming usage. Operators can use roaming-specific applications as a platform to sell relevant travel-related applications and services, potentially with new partners.

### **5. Operators should assess how they can use the latest roaming regulations as an opportunity to generate new roaming revenues and remain essential players in the roaming value chain**

The proposed roaming regulations, if approved, are likely to change the state of roaming in Europe by eliminating roaming charges and forcing more competition in the market. Operators can view these roaming regulations as an opportunity to increase their roaming revenues if they are able to position themselves to take advantage of them.

Reduced roaming tariffs and a transparent pricing framework is likely to encourage the "non-roamers" to use data services while roaming. LBO will also enable the operators to generate revenue through inbound roamers if they can offer compelling roaming packages and a good quality of service experience to roaming users.



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## TATA COMMUNICATIONS

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