



# Monetizing next-generation roaming opportunities

Driving profits with differentiated quality and greater efficiency



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## Executive summary

Amid regulatory and market pressure, 2014 promises to be a pivotal year for the global roaming market. LTE is driving the growth of mobile data and operators are introducing innovative new services and business models to enable LTE for customers across borders. For operators to monetize next-generation roaming opportunities, they will need to devise carefully planned strategies to include service and marketing innovation, the right commercial models and charging mechanisms, and new billing tools, along with vendor partners that can help with complexities of implementation and operations. Operators need to be flexible in their approach, to be able to employ multiple policy strategies for different types of roamers. The traditional one-size-fits-all approach will not work anymore and they need to be able to micro-target.

1. LTE can allow operators to differentiate the roaming experience for their customers over 3G networks. In order to drive roaming growth, operators need to focus on improving the quality of experience (QoE) for their roaming customers. Break out of roaming subscribers' data traffic locally can help operators improve the quality of experience. But, operators will need to find an optimal balance between their need for subscriber control (via home routing) and improved quality of service (via the 3GPP's local breakout [LBO] approach).
2. As LTE drives data roaming traffic and the regulatory pressures squeeze roaming margins for operators, they need to focus on improving roaming service operational efficiency. In order to optimize roaming costs and drive incremental roaming usage, operators should look to develop new commercial models and renegotiate IOTs with their roaming partners. However, this may not be enough to sustain the roaming business in the long term.
3. Negotiating bilateral LTE roaming agreements and commercial IOT models can be an expensive and complex process. Operators should look to an interconnectivity roaming hub approach as a hubbing solution can help them streamline their roaming relationship management and also improve cost efficiency. There are additional benefits of connecting with hubs, including accelerated rollout of new services and a wider roaming footprint to meet the global roaming needs of travelers.
4. A dual/multiple IPX/GRX strategy can prove to be advantageous to ensure service redundancy. Having two or even multiple IPX/GRX vendors can help operators buffer against any network outages which is crucial for the new digital services that demand service continuity and reliability. Also, multiple IPX vendors can help operators save costs through optimized interconnections along with the additional benefit of a wider roaming footprint across geographies.

## Survey respondents

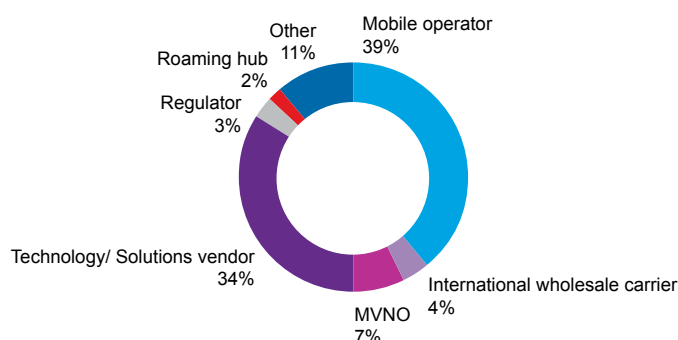
Ovum has conducted extensive research, including a survey with mobile operators, MVNOs, international wholesale carriers, and telecoms equipment vendors, around next-generation roaming

opportunities. The survey received over 330 responses, of which 169 were from mobile operators, MVNOs, and wholesale carriers (see Figure 1).

The respondents were distributed around the world (see Figure 2). Asia Pacific and Europe were well

represented, primarily because of the large amount of 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 in roaming from respondents in this region.

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



n=334

Source: Ovum

## Market status

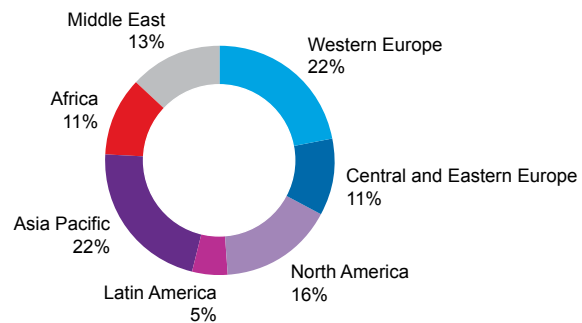
Today, the traffic carried on mobile networks is increasingly data-centric as data services, such as streaming audio and video are quickly replacing voice. Video applications now account for the majority of the total traffic, contributing as much as 60-70% for some operators. Added to that,

social media and communication services such as Facebook, WhatsApp, and Viber are generating vast amounts of user-generated content. This increased data traffic is an opportunity for operators as it drives mobile revenue for them while voice traffic tapers off. Ovum's mobile revenue forecasts (see Figure 3) show that data revenue is accelerating, driving overall mobile revenue worldwide.

This enormous growth in data traffic is also a challenge for operators as existing 2G and 3G mobile networks are less able to manage this traffic growth. Operators are increasingly looking to all-IP networks such as LTE to provide the required bandwidth for these data-hungry devices and applications. The number of LTE network launches continues to grow worldwide as operators need increased network capacity to meet the high bandwidth demands of their customers. According to Ovum estimates, there were 228 live LTE networks worldwide at the end of 2013. Ovum's database indicates additional 148 LTE networks in planned, deployment, or in pre-commercial phase, which means that a global total of 376 LTE networks will be active within the next few years. With these LTE deployments, LTE subscription growth is also accelerating. Ovum forecasts LTE connections to grow at a compound annual growth rate (CAGR) of 55% between 2013 and 2018 (see Figure 4).

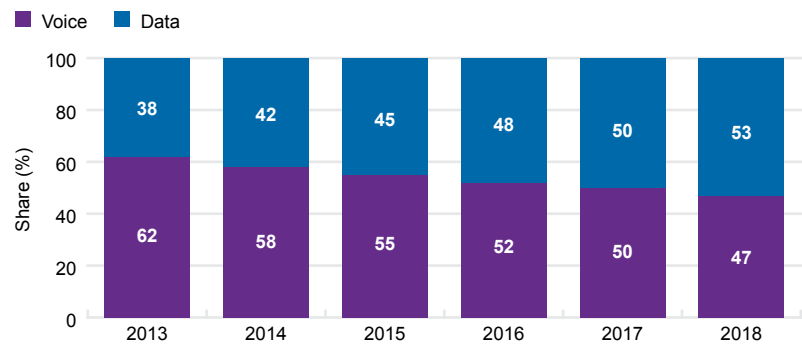
The growth in mobile data will have a ripple effect on the roaming business growth as well. Although voice services currently account for the majority of roaming revenue, data services are fast catching up, offering a significant opportunity

**Figure 2: In which region are you based?**



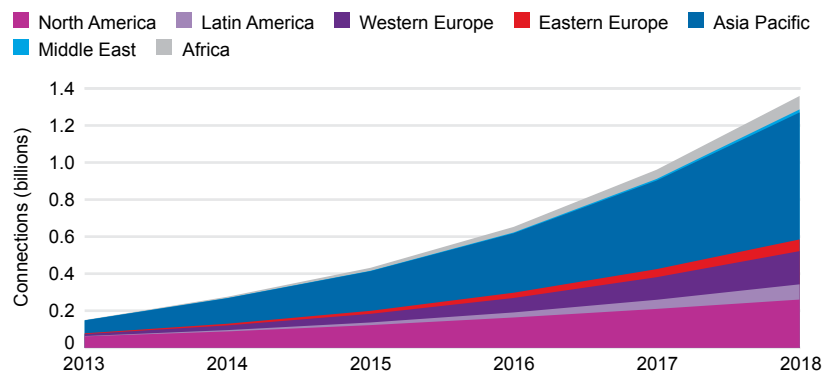
n=334  
Source: Ovum

**Figure 3: Global mobile revenue, voice and data market shares, 2013–18**



Source: Ovum

**Figure 4: LTE connections by region, 2013–18**



Source: Ovum

for operators. Consumers today want to use the same high-speed data services, such as streaming video and social media, when they are travelling as well. And when they travel, they expect a seamless network with the same quality of experience as they get from their

home network. Thus, LTE roaming is now becoming a priority for operators wishing to differentiate their services from the competition, based on data speed performance. According to Ovum analysis, 2014 will witness a strong trajectory for global LTE roaming agreements.

The majority of operators are now turning their attention towards making LTE roaming work efficiently and profitably. However, there are inherent complexities, with LTE spectrum fragmentation and device limitations posing a challenge for operators wishing to connect with one another. In addition, there are other technical and operational hurdles, such as enabling and monetizing new digital services (e.g. VoLTE and enterprise services) for roaming on LTE networks.

## Drivers and challenges shaping the next-generation roaming market

### Regulatory changes stimulate roaming usage

Time and again the industry has talked about roaming “bill shock” and the customers’ perception of high roaming costs and how it inhibits usage. Roaming has always been expensive, with operators charging a high premium from customers when they use voice, messaging or internet services outside the home network. Additionally, mobile data plans and pricing can be confusing as it is difficult for customers to quantify their data usage to control their spending.

Roaming policy regulations have been helpful in bringing down the costs of using mobile services while abroad for the consumers. The roaming regulations in Europe are noteworthy and there has already been a considerable decrease in roaming prices in European Union (EU) since the European Commission (EC) started its policy regulations back in 2007. The EC

is now pushing toward eliminating roaming charges altogether resulting in a single EU market, which, if approved by the European Council, will be effective from December 2014.

Understandably, the European operators are wary of “zero roaming” regulation as it will dramatically affect their once high-margin roaming business. On the other hand, the roaming alternatives, such as local SIM cards and Wi-Fi, cannibalize operators’ roaming revenue. Thus, operators are now taking a proactive approach and are adopting new initiatives, such as offering inclusive bundled roaming tariffs and “roam-like-home” plans to their customers. These new plans provide much more certainty to customers that they can use data services while roaming in the same way as they do at home. This is likely to stimulate roaming usage and result in a multifold increase in data roaming traffic.

Many operators are already witnessing an upsurge in the number of roaming customers and data roaming traffic on their networks. For example:

- Vodafone is witnessing good progress with its daily roaming plans that allow customers to use voice, text, and data while roaming for a daily charge (€3 or €4 per day, depending on home country and roaming location). The operator reported a high take-up of the offer; the number of customers registered increased from 8.2 million in August 2013 to 15 million by June 2014. In its 1Q14 results, Vodafone announced that 22% of its roamers are using the daily roaming plans, which is impressive as it is likely to also include the “silent roamers.”

- The “Feel at Home” roaming offer from 3 UK is another example. After the first four months of its launch, 3 UK reported an increase in the total amount of roaming data used monthly by its customers on the plan by a factor of 53. Also, the average roaming data usage per user increased massively, from 7MB per user in August 2013 to 264MB per user in February 2014.

The increase in data roaming traffic is an opportunity for operators as the growth in data roaming volume is expected to outweigh the decline in per-MB price, contributing positively to the roaming revenues for operators. However, operators will need to focus on the roaming quality of experience of their customers while managing their roaming operational efficiency.

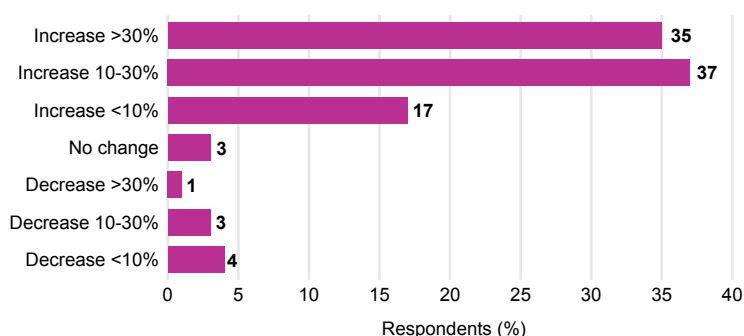
Roaming regulatory intervention has not been as pronounced in other regions as in Europe, primarily due to Europe’s close proximity of countries and massive intra-region travel for both trade and leisure. However, there have been some recent regulatory initiatives in other parts of the world, aimed at making roaming more affordable for consumers. Apart from the regulatory developments, there are some operator-led initiatives too as some of the operators have taken a proactive approach in launching new roaming propositions in order to stimulate roaming adoption among their customer base (see Figure 5).

Ovum’s next-generation roaming survey results show that 89% of the operator respondents expect roaming data traffic to increase over the next three years (see Figure 6). This significant increase in data roaming traffic is an opportunity

**Figure 5: Selected roaming initiatives, by region**

Europe	Regulatory	In 2007, the European Commission (EC) implemented wholesale and retail price caps on voice calls (and set a glide path) along with transparency measures. In 2009, the wholesale and retail price caps were extended to SMS and data, followed by further extension of price caps in 2012. The EC is now pushing to eliminate roaming charges altogether resulting in a single EU market, which if approved by the European Council, will be effective from December 2014.
	Commercial	<ul style="list-style-type: none"> <li>• 3 UK launched its 'Feel at Home' offer to allow customers to use their UK voice, SMS and data bundle when roaming in selected countries, for free</li> <li>• Vodafone launched its daily roaming offer that allows customers to use their domestic voice, text, and data while roaming for an affordable daily charge</li> <li>• French operators (Orange, Bouygues, Free) launched inclusive roaming bundles</li> <li>• Swisscom launched inclusive roaming bundles as part of its Natel Infinity plans</li> </ul>
Africa	Regulatory	The regulators in the Southern African Development Community are evaluating possible roaming regulations; West African Telecommunications Regulatory Assembly evaluating roaming regulations across the region
	Commercial	Market pressures have driven down roaming prices in some areas: <ul style="list-style-type: none"> <li>• Zain's One Network program in Africa to eliminate roaming charges for cross-border traffic</li> <li>• Bharti Airtel's African companies included in the 'Bridge Alliance' for simplified roaming across Africa and Asia</li> <li>• Recent partnership of nine operator groups to reduce roaming charges across Africa and Middle East</li> </ul>
Middle East	Regulatory	In 2012, regulators from across the Gulf Cooperation Council (GCC) implemented wholesale prices caps to regulate roaming voice across GCC countries; second phase of regulations evaluating retail price decline across SMS and data
	Commercial	<ul style="list-style-type: none"> <li>• Recent partnership of nine operator groups to reduce roaming charges across Africa and Middle East</li> <li>• Mobily Saudi Arabia launched WhatsApp and Facebook roaming plans, for fixed daily or monthly charge</li> </ul>
Asia Pacific	Regulatory	Disparate countries with no region-wide regulation; voluntary adoption of guidelines suggested by International Mobile Roaming Working Group in 2012 <ul style="list-style-type: none"> <li>• In September 2013, Australian Communications and Media Authority implemented International Mobile Roaming Standard that mandates operators to alert subscribers on roaming</li> <li>• Bilateral roaming agreements between Australia and New Zealand, Singapore and Malaysia</li> </ul>
	Commercial	3 Hong Kong launched WhatsApp roaming bundle for a fixed daily charge
Latin America	Regulatory	Regulatel is working with regulators and operators across Latin America to implement roaming regulations. There is increasing trend towards bilateral roaming regulations primarily to resolve cross-border roaming issues. <ul style="list-style-type: none"> <li>• In 2012 Argentina, Brazil, Uruguay and Venezuela together have proposed lower tariffs at borders</li> <li>• The Central American Regulators' Group proposed no roaming fees within 5 kilometers of Central American borders</li> </ul>
	Commercial	GSMA launched data roaming transparency scheme in 2012
North America	Commercial	In October 2013, T-Mobile US launched its roaming initiative to offer free international 2G data roaming and texting across 100 countries worldwide

Sources: Ovum, Companies

**Figure 6: How do you expect your data roaming traffic to change over the next three years?**

n=147 (mobile operators, MVNOs and wholesale carriers)  
Source: Ovum

for operators, but it is equally a challenge, particularly for European operators as they will no longer be able to charge a premium to their roaming customers. The European operators' intra-EU roaming

revenues are likely to erode while their roaming wholesale costs will be acutely high (roaming wholesale costs are proportional to roaming usage). This could be a slippery slope for European operators

leaving them with three possible options (or a combination of the three) to deal with the increased data roaming traffic:

- Finding and evaluating new business models to stimulate more usage at a value to the consumers but avoiding revenue erosion. For example, bundling roaming services as part of domestic package will help encourage roaming adoption. However, operators may choose to increase the overall price of domestic bundles so as to cushion the roaming revenue decline. Also, introducing new plans based on customers' data usage patterns; for example, offering application-specific plans – WhatsApp roaming plans,



say, or Netflix roaming plans – at attractive yet profitable prices.

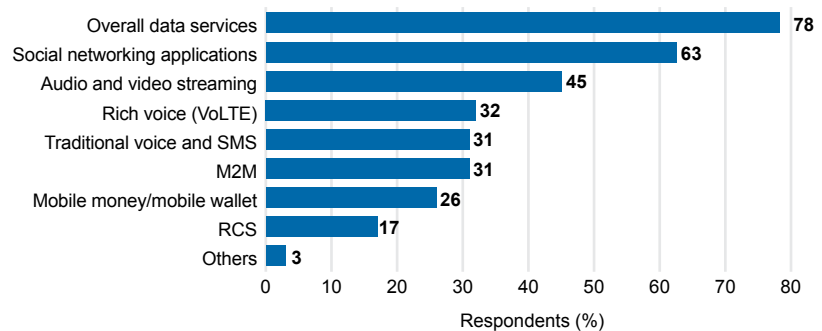
- Accepting the regulatory mandate to allow customers to use roaming services without paying any additional fees, but limiting their usage according to the regulator’s “fair use clause” in order to optimize internal wholesale costs. However, operators are still seeking more clarity from the EC on “fair use” policy.
- Focusing on improving roaming cost efficiency by using local breakout (LBO), by partnering with roaming hubs, or by renegotiating inter-operator tariff (IOT) with roaming partners.

### LTE drives new digital services on roaming

As mobile operators embrace LTE, they are introducing new services, such as video streaming, HD voice, and VoLTE applications, to their customers. Customers today want to use the same services everywhere and expect the same quality of experience whether they are at home or are travelling abroad. For business consumers of roaming services, it becomes even more important to offer reliable access to business-critical services, such as videoconferencing and business cloud, both for domestic and roaming use. This makes LTE roaming a priority for operators, to enable new digital services on roaming and offer an optimal quality of experience.

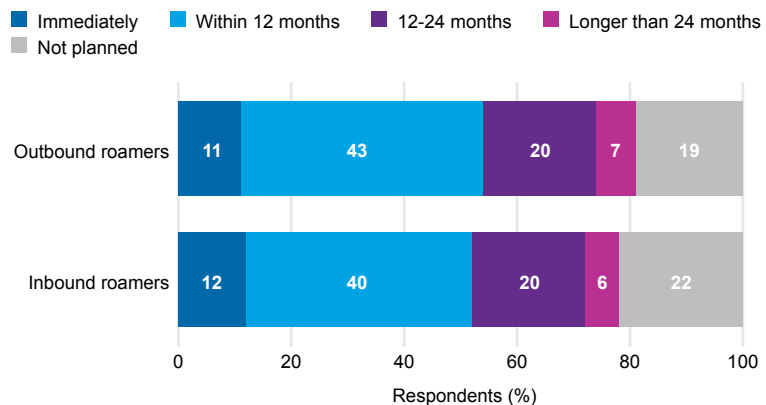
Ovum’s survey results show that 78% of the respondents believe that overall data services will continue to drive roaming traffic growth over the next five years (see Figure 7). Social networking and streaming services are also expected to stimulate roaming traffic

**Figure 7: Which services are expected to drive roaming traffic growth over the next five years? (select the top three)**



n=147 (mobile operators, MVNOs and wholesale carriers)  
Source: Ovum

**Figure 8: How soon after you have deployed VoLTE in your domestic market will you support it for roamers?**



n=112 (mobile operators, MVNOs and wholesale carriers)  
Source: Ovum

growth, voted by 63% and 45% of respondents, respectively. Other digital services, such as VoLTE and M2M are rated slightly lower by the survey respondents, perhaps due to complexities in technology and service interoperability.

### Rich voice (VoLTE)

VoLTE will pave the way for richer multimedia voice services to include simultaneous use of voice and video while improving service quality through high-definition (HD) voice. Most importantly, it will help operators lower their costs through network efficiencies. There is a strong operator momentum towards VoLTE with many operators

busy deploying their first VoLTE services. However, while VoLTE may not bring any incremental revenue for operators, it will provide them with the opportunity to differentiate their services to compete against OTT providers and other network operators. For example, SK Telecom in South Korea is not charging a premium for its VoLTE service; instead it is using it to improve the customer experience as a way to boost customer loyalty. Customer loyalty is important and it helps to improve overall KPIs. But, because of the expensive and complex IMS deployments and with no immediate revenue growth, many operators regard VoLTE as a long-term

migration rather than an urgent requirement. This is even more the case for emerging market operators since they first need to expand their LTE coverage to be able to offer richer services on LTE.

That being said, roaming VoLTE is also a lower priority for operators due to its additional complexities around interoperability and signaling. According to Ovum's survey results, roaming VoLTE might have to wait as many operators do not have specific plans for it as yet (see Figure 8). The majority of survey respondents do expect to support VoLTE for roamers within one year of deploying it in the domestic market (but domestic VoLTE deployments will be gradual anyway, as we discussed above). For other respondents, roaming VoLTE may take longer while a significant number of them have no plans for it as yet.

It is only recently – in June 2014 – that the first roaming VoLTE was demonstrated by China Mobile and KT Corp in South Korea. This paves the way for commercial VoLTE roaming deployments. However, enabling VoLTE for roaming customers presents significant implementation challenges. Operators will first need to establish LTE roaming agreements with one another to support new services on roaming. This might mean commercial agreements and technical interconnections with hundreds of other operators, which could be a long and complex process. But, more importantly, operators will need to evaluate their roaming partners' capabilities and readiness to offer VoLTE (or other new services) to roaming customers. Currently, the number

of VoLTE destinations is quite limited, which is slowing operators' roaming VoLTE ambitions. However, instead of bilateral interconnections, managed service for VoLTE through a hub (i.e. connecting to an IPX provider), may help operators accelerate their VoLTE roaming targets. IPX interconnection allows faster rollout of new services along with the necessary scale and geographic reach and quality of service (QoS) guarantees.

### M2M services

M2M promises to bring many new opportunities for operators with a range of vertical and horizontal M2M use cases. However, M2M adoption has been slower than expected, primarily due to the lack of industry standards and service interoperability. M2M applications do not necessarily require the high bandwidth offered by LTE networks but these "always on" devices demand service continuity and quality. Thus, traditional voice/data roaming agreements will need to evolve to include M2M roaming with new charging models.

Enterprise M2M customers demand a global M2M roaming solution to ensure multinational service delivery. To match enterprise customers' geographic needs, operators will need to develop a global M2M footprint by way of extending their commercial roaming agreements to include M2M roaming and charging. This again will depend on their roaming partners' capabilities and readiness to offer M2M services to roaming customers. Operators are actively entering into M2M alliances in order to expand their M2M roaming coverage and enable SIM provisioning for global connectivity of M2M devices.

## Market development

### Operators need innovative data roaming offers to stimulate roaming usage

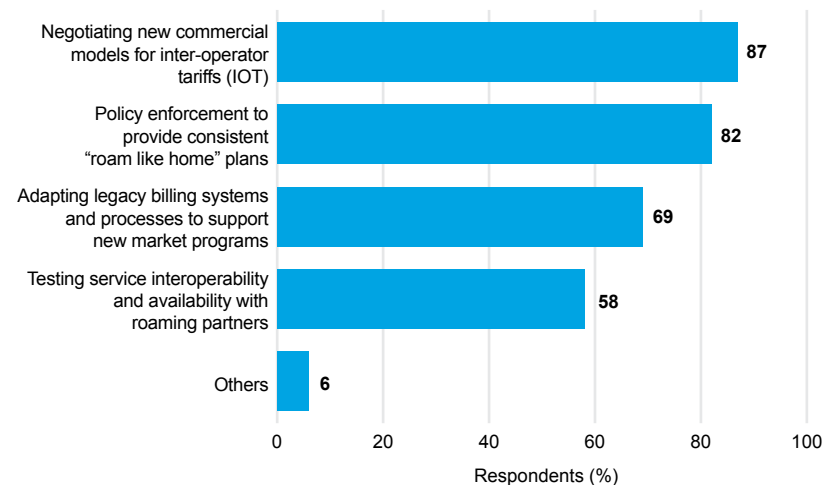
One of the key priorities for home network operators is to encourage customers to start using data services while travelling. Operators need to offer attractive roaming bundles and data packs to convert the "silent roamers" into active roaming customers. Retail-roaming offers need to evolve from the conventional per-min/per-MB charging to include innovative data bundles that offer a "worry-free" roaming experience to customers. Regulatory and market pressures are already forcing European operators to offer roaming-inclusive domestic data plans that allow customers to use data roaming services in much the same way as they do at home; even outside Europe, operators have taken cues from the European experience and launched "roam-like-home" plans to monetize roaming opportunities.

However, launching innovative roaming tariffs involves a range of complexities for operators. As per the survey findings, service monetization and commercial models are key considerations for operators: 87% of the respondents think that negotiating new commercial models for IoTs is the biggest challenge to support new roaming offers (see Figure 9).

New digital services demand innovative charging models; for example, VoLTE, which is an enhanced voice service, will need to be charged as data, while M2M services, which require low bandwidth but consistent wireless connectivity, will need innovative charging models to avoid exorbitant roaming bills for customers. Operators may need to renegotiate



**Figure 9: As a home network operator, what specific challenges do you face, or anticipate facing in the future, while launching new roaming offers? (select the top three)**

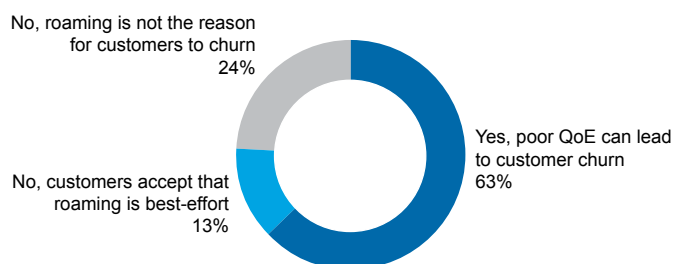


their commercial IOT models to be able to provision and monetize these services across borders. Other than commercial IOTs, operators may need to manage policy and control functions and look to adopt new billing systems in order to support new retail roaming propositions, such as real-time charging, daily passes, etc. And for new application-specific roaming offers, such as a WhatsApp or a Netflix roaming bundle, QoE guarantees will be crucial. Operators may need to evaluate LBO solutions to be able to offer a good-quality roaming experience to customers.

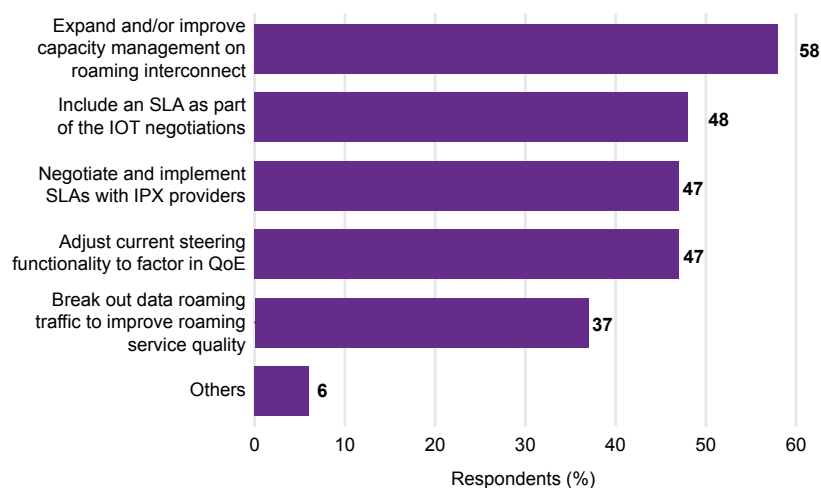
### Quality of experience will be paramount to retain roamers and improve loyalty

New digital services, such as VoLTE and video, require high bandwidth and consistent connectivity. LTE, with its key advantages of spectral efficiency and low latency, can enable these services, allowing operators to offer a richer quality of experience to their customers. Customers increasingly want to replicate this experience while roaming; they demand a seamless network experience and same quality of service on the visited network as their home network.

**Figure 10: As a home network operator, do you think poor roaming quality of experience (QoE) can impact domestic churn?**



**Figure 11: As a home network operator, what do you plan to do to improve QoE for your roaming customers?**



Roaming cannot be on a best-effort basis any more as service continuity and quality are paramount for new digital services. Roaming may not be the top priority for customers when choosing their domestic service provider, but it may well be the reason for leaving them: From a home network operator perspective, 63% of our survey respondents agree that poor quality of experience (QoE) can lead to domestic churn (see Figure 10).

In order to drive roaming growth, operators really need to focus on improving QoE for their roaming

customers: 58% of our survey respondents say that they plan to expand capacity management on roaming interconnect to improve QoE for their roaming customers (see Figure 11), in addition to including service level agreements (SLAs) and adjusting steering functionalities. However, this may not be enough for next-generation LTE roaming, and operators will need to do much more.

For new digital services, QoE is affected by how “far away” the roaming customer is from the home network. The effect becomes even more apparent for bandwidth-hungry delay-sensitive applications, such as videos and VoLTE, making it even more difficult for operators to guarantee the QoE to their far away roaming customers. Using a local breakout solution can help operators improve QoE for roaming customers; however, operators do not yet see the importance of breaking out data traffic locally, voted by a moderate 37% of respondents as important. Local breakout (LBO) is the mechanism where roaming data traffic does not

travel back to the home network but is handled by the local/visited operator and it can be a powerful technique for operators to improve roaming service quality for their outbound roamers. Apart from better service quality, LBO may also allow for cheaper roaming tariffs while bringing additional roaming revenue to the visited operator.

Despite these advantages, loss of subscriber control to foreign networks under the LBO model is one of the biggest concerns for home operators. Home operators might want to preserve their retail relationship with outbound roamers and also control their service experience. In order to enable new services in roaming that demand high QoE, operators need to find an optimal balance between their need for subscriber control (via home routing) and improved quality of service for their customers (via the LBO approach). And it is not only the service quality, but also service profitability which is important as home routing can prove to be

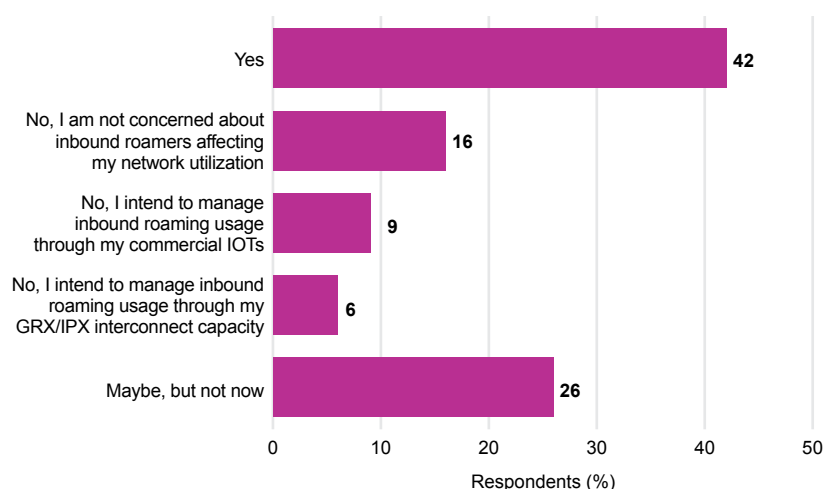
difficult and expensive to provision ‘roam-like-home’ plans. The local breakout model can help operators save data transport costs, thus improve overall service profitability. However, operators will have to overcome the operational complexities associated with LBO, such as policy and charging rules integration with roaming partners.

On the other hand, it is equally important for visited operators to offer a good QoE to their inbound roaming customers; however, this should not be at the expense of their domestic customers. From a visited operator perspective, domestic customers contribute the majority of their service revenue and so are a higher priority for them. Thus, it is imperative for operators to manage inbound roaming usage in a way that does not have an impact on the domestic customers’ network usage. Operators need to ensure fair usage between domestic and inbound roaming customers to offer the appropriate QoE to all of them. Roaming policy enforcement therefore becomes critical: 42% of our survey respondents are planning to implement it while another 26% may do so at a later date (see Figure 12). However, 15% of the respondents still feel that they can manage inbound roaming usage through commercial IOTs and GRX/IPX interconnections while a meager 16% say they are not concerned about it as yet.

**Cost efficiency will be critical for operators to sustain roaming business in the long term**

Increasing demand for video, social networking, and other high-bandwidth digital services is driving mobile data traffic growth

**Figure 12: As a visited network operator, do you plan to implement roaming policy enforcement to ensure fair usage between domestic and inbound roaming customers?**



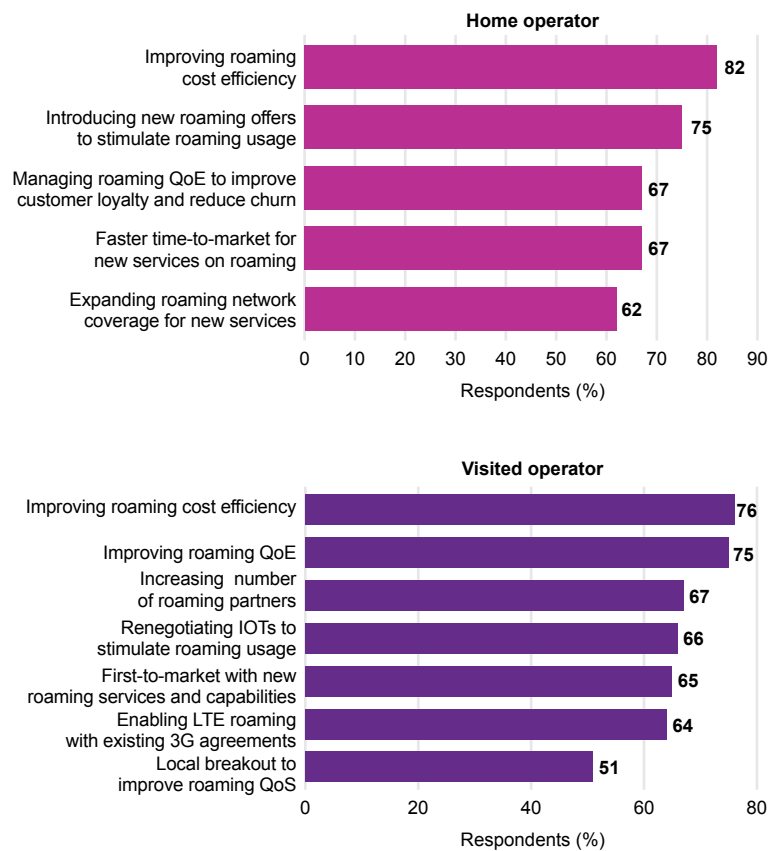
n=117 (mobile operators & MVNOs)  
Source: Ovum

for operators both in domestic and roaming markets. As LTE drives data roaming traffic and the regulatory pressures squeeze their roaming margins, the operators are being forced to focus more on their roaming network efficiency. This is true for both home and visited operators, as validated in our recent survey: 82% of our survey respondents agree that improving roaming cost efficiency is the top priority for a home network operators, while a close 76% of the respondents agree that it is the top priority for a visited network operators (see Figure 13).

Roaming cost efficiency is paramount for operators. In order to optimize roaming costs, operators are striving to renegotiate IOTs with their roaming partners (see Figure 14). But, with the expected sharp rise in data usage volumes, renegotiating IOTs may not be enough to sustain the roaming business in the long term. Negotiating bilateral LTE roaming agreements and commercial IOT models with hundreds of operators can be an expensive and a complex process. Operators should look to a roaming hub approach as a hubbing solution can help them streamline their roaming relationship management and improve cost efficiency.

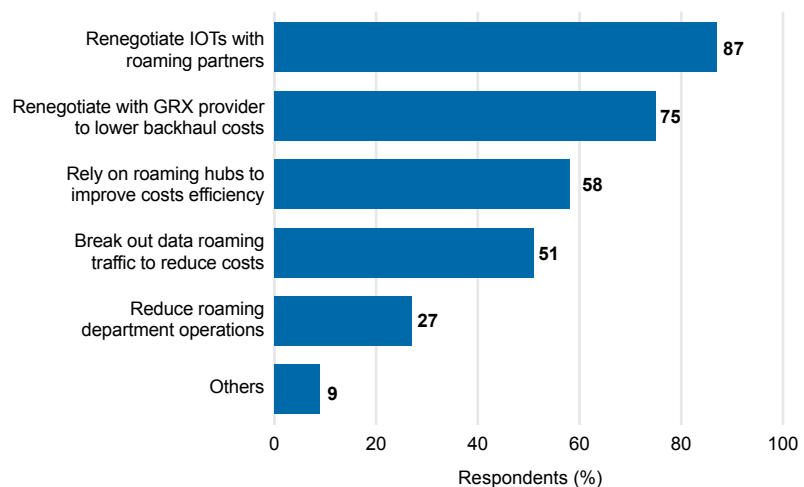
Another approach for operators could be to adopt the LBO model and break out data roaming traffic locally in order to improve roaming efficiency. As the roaming data will not need to travel back to the home network, there will be lower data transport costs, saving on the overall costs for home operators. For the visited operators, LBO could bring additional roaming revenue.

**Figure 13: As a home or a visited network operator, what are your priorities for next-generation roaming business?**



*n=126 (mobile operators & MVNOs)*  
Source: Ovum

**Figure 14: With the expected sharp rise in data usage volumes, what methods do you intend to use to control roaming costs? (select the top three)**



*n=124 (mobile operators, MVNOs and wholesale carriers)*  
Source: Ovum

## Technical considerations to monetize next-generation roaming

Today we see a strong focus from operators on LTE roaming. Not only the large tier-1 or global operators, but also small national operators are actively pursuing their strategies to deploy regional and global LTE roaming agreements. However, 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. This is where the roaming hubs can help simplify the creation of new roaming partnerships, thus reducing the complexities of the evolving roaming ecosystem. Bilateral roaming interconnections will continue to remain relevant, but the added challenges of LTE roaming will make hubbing more crucial.

There are additional benefits of the connectivity hub approach: 50% of our survey respondents think that the connectivity hub approach will help them prepare for their next-generation roaming business by improving roaming efficiency (see Figure 15). Almost as many, 48%, of the respondents think it will help to improve the roaming quality of experience for customers, while 38% think that it will help expand roaming coverage.

The connectivity hub approach should:

- **Reduce roaming operational costs and improve efficiency.** Direct interconnection with each roaming partner is complex and expensive. Connecting to an IPX partner can help simplify roaming

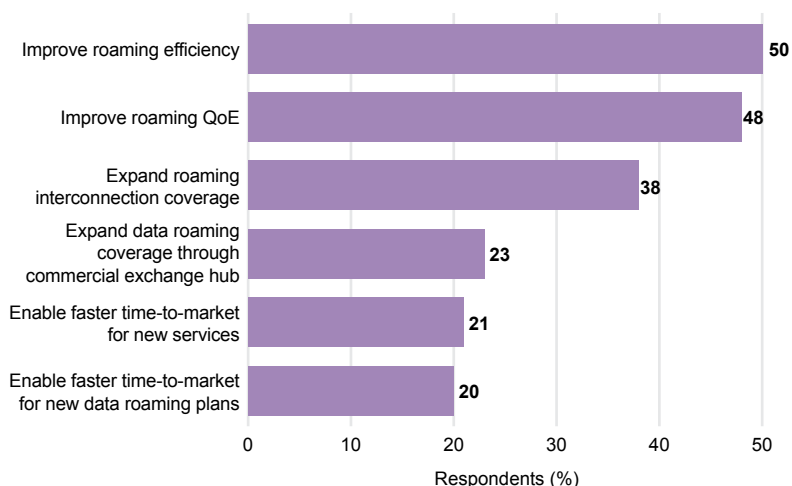
partnerships and streamline interconnect and voice transit, to save operational costs.

- **Improve roaming quality of experience.** Network continuity and quality are essential, particularly with different SLAs across different classes of services (CoS). LTE roaming via the hubbing approach can offer improved interconnection and transit, allowing operators to offer a better data roaming experience to customers.
- **Expand roaming coverage and footprint.** Operators can rely

on single interconnection with IPX provider to meet the global roaming needs of customers for wider footprint. IPX can offer sufficient reach for reaching a critical mass in coverage.

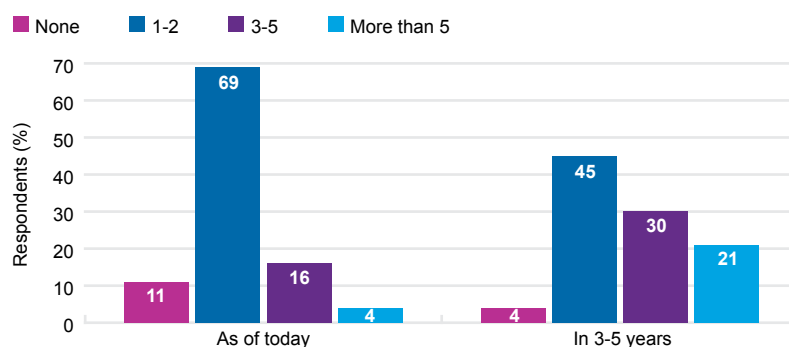
- **Enable faster services' rollout.** Connecting to a LTE roaming exchange can help fast-track LTE roaming service rollout and allow operators to scale their roaming operations quickly. Operators can rapidly launch innovative and differentiated LTE services, including IP-based voice, data, and rich multimedia

**Figure 15: How do you think a connectivity hub approach will help operators prepare for next-generation roaming business?**



*n=112 (mobile operators, MVNOs and wholesale carriers)*  
Source: Ovum

**Figure 16: How many IPX/GRX providers do you have (and/or plan to have)?**



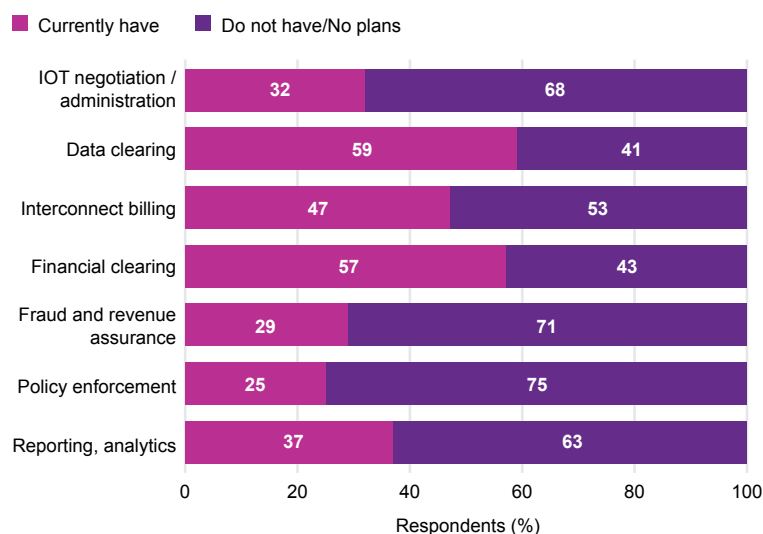
*n=112 (mobile operators, MVNOs and wholesale carriers)*  
Source: Ovum

communication services, across multiple devices.

Operators plan to have not just one but multiple IPX/GRX vendors, as validated in our recent survey: 69% of operators have one or two IPX/GRX vendors now while 51% of operators plan to have more than two vendors in 3-5 years' time (see Figure 16). One of the biggest reasons for operators to partner with multiple IPX/GRX vendors is to ensure service redundancy. A dual-IPX strategy helps operators create redundancy to buffer against any network downtimes or outages on any one IPX vendor. This is important, particularly with new digital services that demand service continuity and reliability. Also, multiple IPX vendors can actually help operators save costs through optimized interconnections while giving them higher negotiating power to keep prices in check. There are additional benefits too, such as a wider roaming footprint across geographies and the flexibility to add new services through multiple vendors.

To prepare for next-generation roaming opportunities, operators require much more support from their managed services providers. The traditional IOT administration, data/financial clearing services, and fraud assurance services are still imperative. However, the new digital services demand stronger support around policy and control, and

**Figure 17: Do you currently have (or plan to have) a managed services provider for the following roaming operation functions?**



*n=112 (mobile operators, MVNOs and wholesale carriers)*  
Source: Ovum

reporting and analytics, to enable a better quality of experience for roaming customers.

Policy and control is becoming more and more critical, particularly with European regulation mandating "roam-like-home" plans with an implied "fair use clause" that will be important to optimize wholesale costs. Policy enforcement is becoming crucial for visited network operators to protect the QoE of domestic customers while offering data services to inbound roamers and maintaining roaming SLAs at the same time. However, as per our survey findings, only 25% of the operator respondents have a managed services provider for policy

enforcement (see Figure 17) while a vast 75% of the respondents do not – or have no plans – for it as yet.

Similarly, 63% of the operator respondents have no current plans for a managed services provider for reporting and analytics services. This is a bit disappointing as reporting and analytics are gaining traction fast as they enable operators to understand their customers' roaming data usage behavior in real time. This is important as it will allow operators to launch the new services that customers demand and launch them at the prices customers would be ready to pay, to stimulate roaming usage growth.

## Conclusions

- **Increasing data roaming traffic is an opportunity, but also a challenge for operators.** New digital services drive mobile data traffic growth for operators in both their domestic and roaming business. This brings new opportunities for operators to monetize their roaming portfolios. However, it also brings new challenges as increased data traffic adds to higher wholesale costs that increase the pressure on margins, following the shake-up of roaming regulation.
- **As increasing data roaming traffic adds to the pressure on margins, roaming operational efficiency is paramount for operators.** In order to optimize their roaming costs, operators will need to renegotiate IOTs with their roaming partners. But renegotiating IOTs may not be enough to sustain the roaming business in the long term. Operators should evaluate partnering with connectivity hubs if that fits with their overall roaming business strategy.
- **QoE is crucial as well, particularly for new digital services on roaming.** As operators provision new digital services and introduce innovative tariff plans, they really need to focus on improving QoE for their roaming customers. For new digital services, QoE is affected by how “far away” the roaming customer is from the home network, and is even more crucial for delay-sensitive applications, such as videos and VoLTE. A local breakout solution can help operators improve the roaming quality of experience.
- **New service and tariff propositions are likely to stimulate uptake of next-generation roaming services, but there remain commercial challenges.** A faster time to market and expanded geographic coverage are crucial to support these new services globally. But operators also need to negotiate commercial IOTs and introduce new charging models in order to support the new roaming offers. They also need to manage policy and control functions in order to support new retail roaming propositions, such as real-time charging, daily passes, etc.
- **Despite outbound roamers contributing significantly to roaming business, operators cannot ignore their inbound roaming segment.** Outbound roamers drive the majority of the roaming traffic and revenue for mobile operators. However, inbound roaming can also prove lucrative and bring significant revenue for operators, particularly in high inbound traffic countries. Operators wishing to grow their roaming business should tap into the inbound roamers. First and foremost, they should ensure a good quality of experience (QoE) for inbound roamers which will become more important once operators start implementing data breakout. In addition, they should focus on increasing the number of roaming partners, with the “first-mover advantage” in support of new roaming services (e.g. roaming VoLTE).
- **Roaming VoLTE offers a new opportunity for operators but will have to wait longer.** VoLTE, which will include HD voice and simultaneous use of voice and data services, will help operators offer good quality of experience to their customers. Since last year, a handful of operators have started to take their first steps towards the commercial rollout of VoLTE in their domestic markets. But, roaming VoLTE does not seem to be a priority for most of the operators at the moment as there are interoperability and commercial issues that remain to be resolved. However, managed service for VoLTE through a hub (i.e. connecting to an IPX provider), may help operators accelerate their VoLTE roaming plans.



## Recommendations

- **Operators should evaluate new business models to stimulate roaming usage at a value to customers, but without eroding their revenue.** Operators should explore new commercial models to offer a “worry-free” roaming experience to customers, but they should also be mindful not to impact their margins. For example, bundling roaming services as part of domestic packages is likely to encourage roaming adoption. However, operators should carefully assess the price of these domestic bundles: They may well choose to increase the price if possible, or implement policy controls, to cushion the roaming revenue decline. They should also launch value-based application-specific plans, such as WhatsApp or Netflix roaming plans.
- **Operators should prepare their networks for a “first-mover” advantage in support of new roaming services and expand their roaming partnerships.** As operators launch rich-data services, such as VoLTE, in their domestic markets, they should prepare their networks to offer those services to inbound roamers as well. A faster rollout of new services for inbound roaming customers will provide a strong service differentiation and help operators steer more roaming traffic on their networks. This will be crucial to expand the roaming revenue generated by the inbound segment.
- **Operators should evaluate a data breakout solution to improve the roaming quality of service and efficiency while still preserving their relationship with outbound roaming customers.** Operators should adopt the LBO model to improve the roaming quality of service, particularly for delay- and error-sensitive services, such as VoLTE and M2M. In addition, the LBO model can help improve roaming efficiency by reducing the overall roaming costs for the operators. However, operators should find an optimal balance between their need for subscriber control (via home routing) and improved quality of service for their customers (via the LBO approach).
- **Operators should implement roaming policy management to ensure a good quality of experience for both domestic and inbound roaming customers.** An expected sharp increase in data roaming traffic may have an adverse impact on the quality of the domestic service. Visited network operators should adopt policy tools to ensure fair usage among inbound roamers so as not to affect the QoE for domestic subscribers. Also, for home network operators, policy enforcement is becoming increasingly important to implement “fair use” for outbound roamers in a way that will optimize wholesale costs and protect roaming revenue.
- **Operators should partner with connectivity hubs to streamline and improve their roaming business.** As LTE drives data roaming traffic and the regulatory pressures squeeze their roaming margins, the operators need to improve their roaming operational efficiency. Connectivity hubs can help operators streamline their roaming relationship management and extend home network capabilities to their roaming customers wherever they are roaming. There are additional benefits of connecting with hubs, including a faster rollout of new services and a wider roaming footprint to meet the global roaming needs of customers.



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## TATA COMMUNICATIONS

### About Tata Communications

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