



MOBILE : LTE ROAMING

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# REVENUE GROWTH IN A NEW ERA OF ROAMING

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LAUNCHING AND MONETISING  
GLOBAL LTE ROAMING SERVICES

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The mass global deployment of Long-Term Evolution (LTE) networks is driving the evolution of international roaming. And it's creating new opportunities to deploy and monetise 4G services while extending high-performance bandwidth-intensive applications and communications services around the globe.

By the end of 2015, there will be more than 450 LTE networks deployed globally – according to the Global mobile Suppliers Association (GSA). Mobile network operators (MNOs) in 181 countries are launching LTE services and exploring how they can be used to drive revenue and differentiate their offerings. 4G isn't just a shift in technology, it's the realisation of new potential in wireless networking.

With so much of the hype around delivering faster and more demanding services domestically, MNOs should not overlook the impact of global roaming. Global roaming on LTE is critical for offering a complete 4G service and ensuring that high-value subscribers access the services they want that deliver reliable quality of service (QoS) and quality of experience (QoE).

Subscribers are more demanding than ever and have growing expectations of their communications service. The development of LTE in domestic markets has only added to these expectations and made roaming an instant differentiator for an MNO.

In an always-on, always-connected world, communications services cannot fail or show diminished performance when the subscriber leaves their home market. This leads to the perception of a sub-standard service and tells the subscriber that there are limits to their 4G services. This hurts potential roaming revenue opportunities for the MNO, while increasing instances of subscriber churn.

LTE roaming is therefore very important. MNOs that are able to seamlessly deliver 4G services globally are positioning themselves to monetise their domestic LTE networks for the long term and create a subscriber base that's eager to use roaming services. MNOs gain an advantage over competitors – and subscribers experience 4G services without limits.

## CONNECTING THE ECOSYSTEM

The challenge is to manage the complexity of roaming on LTE and deliver consistent and reliable QoS and QoE globally. However, it can be difficult to efficiently develop roaming services while dealing with new technologies and relationships.

Although LTE is maturing, the overall ecosystem is still fragmented with MNOs managing a blend of 2.5G, 3G and 4G technologies. This complexity in domestic operations is a big challenge when operating networks in parallel and transitioning to an all-IP LTE environment. It can mean roaming services are not prioritised or are difficult to roll out and manage on a global scale.

So what happens if 3G subscribers roam onto 4G networks? And what about the reverse when 4G subscribers roam onto 3G-only networks – with all the billing and customer management implications? MNOs need to be able to support voice, SMS and data services in 4G with the possibility for voice and SMS circuit-switched fall-back. And they need to manage dynamic steering to resolve the sort of issues associated with mixed 3G and 4G roaming customers.

When developing LTE roaming services, these issues need to be examined while also creating a strategy for interconnecting with operators around the world. MNOs must note that if there are 450 MNOs operating or launching LTE networks by the end of 2015, then there are 450 potential partner relationships to develop and maintain.

New agreements will need to be signed and resources dedicated to ensuring these are maintained in the long term. Added to this is the possibility that these partners could be using different standards – TD-LTE or LTE-FDD. Creating global relationships can be costly and resource intensive, making it difficult to monetise roaming services quickly.

Nevertheless, these challenges can be overcome. Operators just need to look at their options in terms of partnering and developing their LTE roaming services, and also for solutions to simplify the ecosystem and deliver for their subscribers.

## SIX PRIORITIES TO THINK ABOUT

At its core, launching a global LTE service is about solving challenges around quality, connectivity and efficiency. It highlights some of the most pressing challenges facing MNOs, as well as some of the innovations that are shaping the market. So here are six priorities an MNO should think about when starting to develop a global LTE roaming service:

- 1. Routing:** LTE takes a more dynamic approach to traffic routing than has been the case in traditional circuit-switched TDM networks. Traffic can automatically be re-routed in case of a network failure or other changes. This approach ensures a more efficient, but also less predictable network topology. And it can make network management more difficult and create operational challenges.
- 2. Transport:** As LTE traffic is usually transported across a connected IPX network, it's important to understand requirements for comprehensive IPX coverage and IP network reach, as well as flexible IP transport configuration.
- 3. Inter-working:** There is a need to normalise any Diameter variants to support seamless interoperability between different vendor Diameter agent end-points. Another inter-working requirement can be the need for SCTP to TCP protocol inter-working, to enable inter-working between TCP and SCTP-based network elements.
- 4. Network and roaming intelligence:** With so much data being generated through network usage, it's important to be able to understand traffic flows, congestion issues, utilisation and availability data. In addition to network performance information, it's also necessary to be able to get insights into subscriber QoE and QoS issues, as well as apply decision support to help resolve network issues.
- 5. Security:** A fully meshed network with no demarcation point puts your network at risk from DoS attacks, through exposure of the network topology. Network cloaking techniques can be used to hide network node IDs, thus securing your network against security breaches.
- 6. Network roaming assurance:** Network resilience means there are requirements for comprehensive SLAs, 'five nines' availability and fast re-routing in the network core, to assure service continuity.

These are some of the fundamental requirements and considerations that should form part of an LTE roaming launch strategy. However, LTE roaming presents opportunities for innovative thinking and new approaches to providing roaming services.

## NEW MODELS FOR BORDERLESS MOBILITY

As more subscribers rely on data roaming, MNOs need a more efficient and effective roaming service model. They need to overcome the latency issues associated with routing roaming traffic via home markets, which usually involves multiple transit parties. There's also a need to overcome capacity constraints at GRX peering points.

'Local Breakout' (LBO) is one new model. The data roaming service is de-coupled from the home network operator, and is managed instead by the visited network. This approach has the advantage of reduced latency, due to local routing, but also has disadvantages such as high integration costs and new operational costs on visited network operators. It can also significantly reduce home operator visibility and roaming policy control.

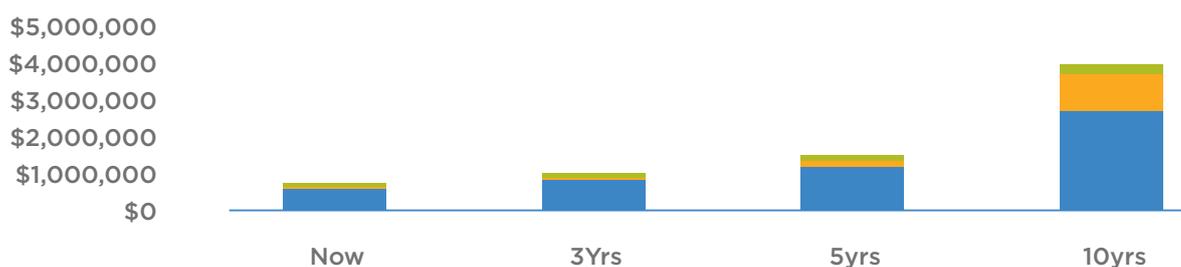
An alternative to LBO for inter-regional roaming is 'Regional Breakout' (RBO). Like LBO, RBO provides for mobile internet access closer to the roamer's current location, rather than using home routing. However, with RBO, the home operator maintains full visibility and control of roaming policy. The operator also benefits from a direct relationship with the roamer with reduced home routing costs, while the user experience is enhanced.

Tata Communications recently completed testing its Data Roaming Boost service demonstrating the benefits of a Regional Breakout approach to data roaming. The tests were conducted for European outbound roaming to Singapore. Data Roaming Boost delivered a more than 2x improvement in mean data rates (HTTP MDR – Kb/s), accompanied by a 50% reduction in packet round trip delay (RTD ms).

The company also analysed a variety of base data and found that MNOs can see measurable cost and revenue benefits possibly exceeding \$1 million over a three-year period. These projected cost/revenue benefits are based on a combination of:

- More predictable pricing and cost savings from the elimination of GRX/IPX for outbound traffic
- Additional savings based on a combination of more subscribers and higher usage per subscriber
- Enhanced customer satisfaction, equating to fewer customer complaints to the contact centre, as well as lower churn rates
- Improved QoE, increasing service quality and leading to higher service uptake

### Data Roaming Boost – US\$ benefit projections



Time	Now	3 yrs	5 yrs	10 yrs
■ Incremental revenue from QoE improvement	\$671,344	\$930,164	\$1,294,946	\$3,042,254
■ Roaming operations cost savings	\$34,523	\$59,569	\$149,029	\$956,994
■ Business operations cost savings	\$109,350	\$136,360	\$170,913	\$307,810
<b>Total</b>	<b>\$815,217</b>	<b>\$1,126,093</b>	<b>\$1,614,888</b>	<b>\$4,307,058</b>

## THE ADVANTAGE OF MULTI-SERVICE IPX

IPX delivers superior class of service to support services such as global MPLS-based VPN access and IP transit, as well as voice/video over IPX, international signalling and LTE roaming. Its combination of quality and connectivity creates new value for IP-based services.

There's also the opportunity to use the IPX and its underlying network and expose access to the network via APIs, to enable 3rd party application integration. Using this approach, the network can be used to enable new services to increase network traffic, as well as wholesale revenue.

While this idea is already accepted in domestic network environments, by extending API access to the IPX networks, new services can be developed to enhance international and roaming services and increase associated revenue accordingly. By recognising and harnessing the competitive dynamic from existing next generation service providers, network operators can exploit the advantage of enhanced quality associated with IPX connectivity, to help deliver a range of new services to end customers.

## VOICE - THE KILLER APP?

Despite being seen as a service in decline, voice is driving growth in IPX-connected LTE traffic. IP-based services like VoIP, HD Voice and VoLTE need the quality and reliability of IPX to be widely adopted and grow. However, voice is often overlooked, with more attention paid to video, messaging, presence services, games and other digital media. And it is voice that will be a driver for the development of the LTE-IPX ecosystem.

When you prove that you can deliver high-quality voice services on LTE, other services will fall into line. MNOs should consider integrating VoLTE and launching VoLTE roaming early, as part of an LTE strategy. Building VoLTE volume quickly helps to take advantage of aggregated QoS based inter-connect agreements and offers MNOs the opportunity to blend IP Voice with a range of other LTE services. This creates a compelling, blended service proposition that can exceed customer expectations and create new revenue opportunities.

With growing support for the S8HR approach for VoLTE roaming, including endorsement from GSMA, the path to VoLTE roaming deployment should become easier. This will create a further compelling reason to launch VoLTE roaming as soon as possible.

## LONG-TERM GAINS

This paper presents a combination of base requirements for LTE roaming connectivity, together with a tantalising glimpse at some new roaming services and models, as well as the commercial opportunities that these models present for MNOs.

There are already over 500 million LTE subscribers around the world and that number is set to grow to 2.3 billion by 2019, according to Tele-Geography. As subscriber numbers grow, MNOs need to take action and be ready with robust, reliable and profitable LTE roaming services. Above all, continuing technical and commercial innovation defines ways to generate new revenue and profit from roaming. At a time when roaming revenue might seem to be confounded by regulatory challenges in particular, LTE roaming can enable new revenue and a foundation for profitable, sustainable growth.

## TATA COMMUNICATIONS – SUPPORTING LTE ROAMING

Tata Communications LTE roaming service provides a unified LTE roaming solution for subscriber mobility management, authentication (S6), policy control (S9), and payload transport (S8) between your network and your roaming partners' network.

Together with our established 2G/3G roaming services, Tata Communications provides a complete solution for LTE roaming migration and management, supporting 2G, 3G and 4G roaming within a single solution framework. This addresses signalling, routing, inter-working, transport, business intelligence, security, regional breakout, clearing and service assurance for successful LTE roaming launch and ongoing management. We provide a comprehensive LTE and VoLTE test capability, to ensure the success of your LTE and VoLTE roaming launch.

Tata Communications provides enhanced IPX connectivity and IP transport, to support a wide variety of LTE traffic types, including voice and video. We combine SCCP and Diameter signalling, as well as legacy mobile roaming services such as GRX. This delivers a scalable upgrade path to 4G along with the ability to support multiple roaming services across a single managed carrier grade IPX connection.

The service is hosted across Tata Communications' global MPLS and IP network offering market-leading reliability, service availability and reach. It provides hundreds of IP access points, 74 globally located on-net PoPs and connectivity to more than 190 countries and territories.

Tata Communications' LTE Roaming Service is backed by our experience of operating the world's largest mobile signalling network for critical applications for MNOs worldwide, supporting the largest on-net signalling community. We're connecting roaming partners to the platform on a continuing basis, expanding global reach for your LTE roaming business.

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