



The unbundling of international roaming

There have been times that automatic international roaming did not exist. Already in the 1980's some early type of a roaming service was available. The caller needed to dial different telephone numbers to reach the roaming subscriber, one for each roaming country that the roaming party was in. Roaming was limited between just a few countries that were sharing the same network technology. In Europe but even more in the USA, mobile communication was based on a patchwork of various technologies that were not compatible. In the Netherlands for a mobile service in the late eighties even for national roaming there were three telephone numbers to reach a subscriber: one number for the north, one for the middle and one for when the subscription was located in the south of the country. In the US up until 1999 there were several networks which had no or limited roaming possibilities, not even between the various states. This started to improve when AT&T introduced a 'one rate' model for the whole of the US, and roaming became a commodity.

Everything changed when GSM was introduced in the early 1990's, and international roaming started to emerge first in Europe, between the early members of the European Union and later on worldwide. Seamless and automatic international roaming as a result of the standardized roll out of GSM has since then become a global commodity that any network operator can offer to their customers.

On the other hand the monopoly that each of the network operator had on its mobile subscribers roaming service had resulted in very high costs for making and receiving phone calls while roaming, as also the high rates for wholesale roaming charging between network operators for the roaming service caused that international roaming became a 'cash-cow', as the cost for implementing international roaming was moderate and at a low risk compared to the revenues generated.

In Europe the lack of competition in roaming and high costs for consumers were the main reasons that the European Commission did introduce price regulation. At first prices were regulated in 2007 and focussing at Voice retail services and to SMS. Later on Data Roaming price regulation was added to the regulation package although this seemed of lower priority than voice at that time. In addition to retail, also wholesale rates for the inter-operator charging were brought under the roaming regulation, and also resellers and MVNO providers

are in the scope of the price regulation system and have the right to request a roaming service for the resale to an end-user.

Since the emergence of smartphones and the phenomenal growth of social media, and applications such as for YouTube and Skype, data service usage has exploded. In parallel there is a tremendous growth and development in Wi-Fi roll out that takes the larger part of the data explosion.

The usage per subscriber has obviously multiplied between 2007 after the introduction of smartphones and 2013. At least in Europe, but underway in other parts of the world, measures have been taken against 'bill shocks' to protect customers against excessive phone bills. Mobile Data international roaming however has not lost the image of being extremely costly. The effect is that many mobile subscribers switch of data roaming once they travel aboard, and very likely search for the nearest Wi-Fi network. According a MACH survey only 10-40% of the EMEA customers use data roaming when travelling, where over 60% uses voice. This suggests there is a great potential for growth in roaming traffic.

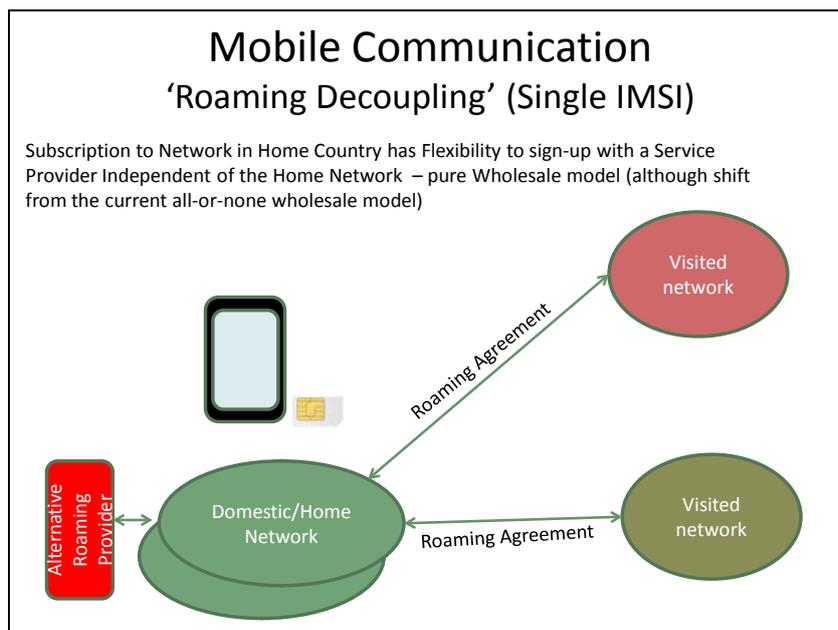
Mobile network operators presently find themselves in the position that the traditional international roaming services are under threat, the comfortable circumstances of the roaming market as in the past have long gone, and the roaming landscape is drastically changing:

- Further price regulation for roaming traffic in Europe both in 2013 and 2014 for Voice, SMS, and Data, for retail and wholesale
- Roaming regulation in other parts of world
- Development in Europe towards a 'roaming-free' single European market
- Development of Next generation Wi-Fi offering a 'GSM-like' experience in terms of seamless access, handover, and security
- Development of Wi-Fi Global Roaming
- Data offloading to Wi-Fi networks for effective capacity management
- Growth of LTE networks coverage and roll out
- Emergence of LTE international roaming
- Ongoing IP convergence : VoIP/VoLTE roll out

- Continued growth in data applications for social media, navigation, messaging, streaming etc.
- 'Structural' regulatory measure for separate sale of regulatory roaming services in European Community

There is considerable attention to the 'structural' regulatory measures that have been adopted in the European Union's regulation for roaming in the European Union and that will become effective in July 2014. The separate sale of regulated roaming services by any alternative roaming provider (ARP) shall enable customers to access regulated voice, SMS and data roaming services independent from their Domestic Provider. Two methods are proposed and will be implemented.

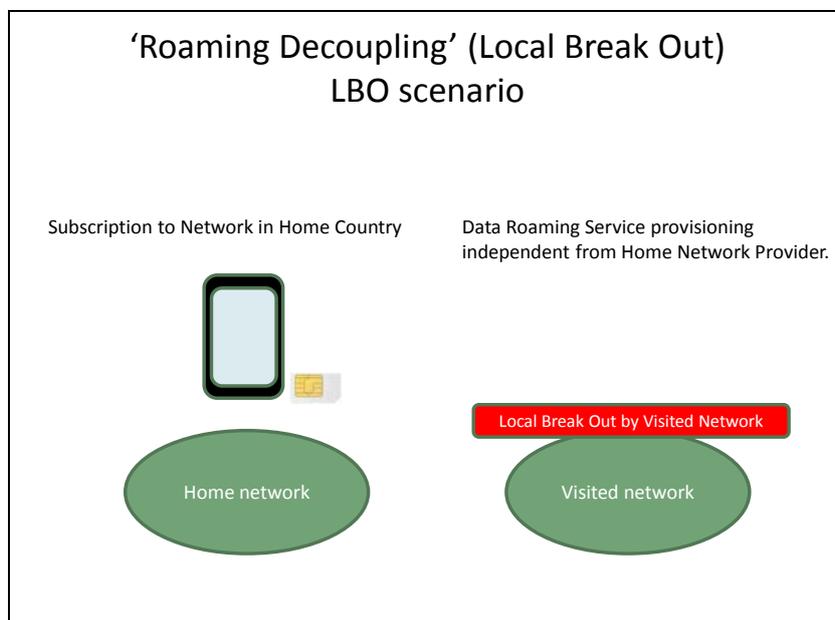
The first method is 'Single IMSI', which is a pure wholesale method that allows alternative roaming providers to offer the EU roaming service to end-users that are internationally roaming. The Home network provider needs to provide access to the ARP.



The method allows for an international roaming service without the need to change device or SIM, at no additional costs and without service degradation. The Single IMSI method

applies for Voice, SMS and Data. International retail roaming rates for this service should be 'wholesale-plus' and will need to benefit from the regulated roaming rates.

Local Break Out (LBO) is the second method and refers to the local provision of data service by a visited network operator, without involvement of the Home network. The end-user takes a subscription with the visited network independently from the Home network. The basis for this 'local Roaming' implementation is a harmonized APN 'EUinternet' that is provisioned to all LBO subscriptions that needs to be attached to using a manual selection of the network. International roaming rates are 'bypassed' in this way, and the service could be offered potentially at the price level for a national data subscription.



The expectations of the effect of the two roaming unbundling methods are diverse, and not.

The incumbent providers in the telecom industry are concerned about the cost of implementation (at the risk of losing some of their roaming business).

Visited networks may decide to offer LBO service to inbound roamers on their networks. In this way they can offer to these customers directly the retail roaming service, but they lose the direct access wholesale roaming income.

For providers such as MVNOs and resellers that are considering to offer a separate roaming services (single IMSI) may have to face the difficulty that the wholesale cost for purchasing the service from a Network Operator is higher than retail proposition than the network operators is offering for its own customer. Therefore for an alternative provider it will be difficult to make competitive propositions. Additional complication is that ARPs that deliver single IMSI have no strong negotiation power and have basically have no return traffic to offer

The two methods however are opportunities to try and win some of the untapped roaming potential customers in particular for Data. And nobody switches off the Wi-Fi , being afraid of costs. Many people do still for Mobile Data communication. Furthermore (according a Juniper investigation) 9 out 10 tablets currently only have Wi-Fi, thus are no market for Network Operators.

Currently the number of roaming agreement for LTE/4G is minimal. Most of LTE operators do offer data-only service and no VoLTE. The roaming implementation for LTE is not much different from earlier Packet Switched Data services in UMTS and GPRS, and technical barriers do not exit. The lack of international roaming for LTE is caused by the incumbent behavior of the network operators that do not want to jeopardize the legacy roaming services they currently have. If the significantly higher volumes that LTE will generate are to be charged at today's' international roaming rates, then the next level of 'Bill Shock' will occur. To maintain their current business model the incumbent operators would rather steer the customer and downgrade a roamer to a 2G/3G network then allow 4G/LTE roaming.

The savvy customer today is already used to making decisions when and how to see access to Wi-Fi networks, and occasionally mobile data communication networks. If such customers make use of Whatsapp, Skype and other Over-The-Top (OTT) services, then why would they need traditional roaming service any longer (other than for receiving calls on their home network mobile phone number)? This is where the opportunity for LBO may be: provisioning of a data service, based on just the visited network, in particular for LTE networks. The data hungry customer that has invested in LTE equipment and has become used to LTE speed and quality in the home country may want to sign up for a Local Break Out LTE offer by the visited network. As LTE is mainly data focussed, by using the LBO the customer while



roaming can continue to use voice, voicemail and SMS services in the traditional roaming was.

This effect will be encouraged by abolishing the roaming rates between EU countries, so that visited networks can no longer charge home networks a premium cost. Instead they will charge a rate more or less equal to a national mobile data session. For the visited network, in such circumstances there is no financial loss apparent in encouraging the roaming subscribers to use LBO as a separate roaming service. Roaming Decoupling will have a future as a feasible service. Other parties than the visited network cannot benefit from LBO, as there is no obligation to provide LBO as a wholesale service. When roaming rates are abolished the Single IMSI service implementation will become even more difficult than already the case currently.

The incumbent operators have a business model (small patches of data at an affordable price, like a 20 MB day pass at a price of a few Euros) that makes it not attractive to actively work on LTE roaming, at least not for their outbound roaming for their own customers. Traditional data roaming in this way is not relevant anymore, as long as LTE coverage is available to the roamer. So we may see LBO emerge particularly in LTE markets. As LBO is requested for July 2014, and LTE roaming is still far from ready and the timing is right for this development.

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