



International roaming explained



Latin America

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1. Mobile roaming explained

International mobile roaming is a service that allows mobile users to continue to use their mobile phone or other mobile device to make and receive voice calls and text messages, browse the internet, and send and receive emails, while visiting another country.

Roaming extends the coverage of the home operator's retail voice and SMS services, allowing the mobile user to continue using their home operator phone number and data services within another country. The seamless extension of coverage is enabled by a wholesale roaming agreement between a mobile user's home operator and the visited mobile operator network. The roaming agreement addresses the technical and commercial components required to enable the service.

The most common international roaming services are:

- **Voice:** Making and receiving calls to or from home country, visited country or a third country, while abroad
- **SMS:** Sending and receiving text messages to or from home country, visited country or a third country, while abroad
- **Email:** Reading and replying to emails while abroad
- **Mobile broadband:** Using mobile devices or dongles to access the internet, including downloading images, MP3s, films and software, while abroad
- **Applications:** Using mobile applications while abroad that require mobile data, such as location-based services and language translators.

International mobile roaming is one of a wider range of communications services offered to mobile users while travelling abroad, which also include hotel services, Wi-Fi, national "travel" SIMs, and visited operator SIMs.

How mobile roaming works

When a mobile user is abroad and turns their mobile device on, the mobile device attempts to communicate with

a visited mobile network. The visited network picks up the connection from the user's mobile, recognises whether



Figure 1.1 Overview of international roaming technology and operations

To explain roaming in more detail, Figure 1.2 shows commercial and technical details for international mobile roaming. The diagram focuses on the international roaming wholesale and retail arrangements, for simplicity.

The mobile user (Mobile User A) has an international roaming service with their home operator (Home Operator) and is automatically connected to a visited network (Visited Operator A) while roaming. Mobile User A is automatically granted access to Visited Operator A's network when arriving in the visited country by an exchange of a data between Home Operator and Visited Operator A, where Visited Operator A confirms Mobile User A is a roaming customer with Home Operator. As such, the wholesale roaming agreement between Visited Operator A and Home Operator specifies how this data is to be provided to the visited operator. Home Operator usually has wholesale roaming agreements with

more than one operator in the same visited country, which in this case is Visited Operator A and a second network, Visited Operator B. As a result, Mobile User A can call home using either visited operator networks, both of which use international transit services to carry the call back to Mobile User A's home country.

Mobile User A pays a retail price to Home Operator for the roaming service and does not pay Visited Operator A. Provided Mobile User B is not also roaming, they will not incur any extra charges to receive a call from, or to make calls to Mobile User A.

Visited Operator A sends transferred account procedure (TAP) files to a clearing house which forwards them to the Home Operator. TAP files are used for billing of calls while roaming.

Home Operator can then pay Visited Operator A the wholesale charges as per call volumes in the TAP file and rates in the wholesale roaming agreement.

it is registered with its system, and attempts to identify the user's home network. If there is a roaming agreement between the home network and one of the mobile networks in the visited country, the call is routed by the visited network towards an international transit network (Figure 1.1). The international transit network carrier is responsible for the call delivery to the destination network. Once this is done, the destination network will connect the call.

The visited network also requests service information from the home network about the user, such as whether the phone being used is lost or stolen, and whether the mobile device is authorised for international use. If the phone is authorised for use, the visited network creates a temporary subscriber record for the device and the home network updates its subscriber record on where the device is located so if a call is made to the phone it can be appropriately routed.

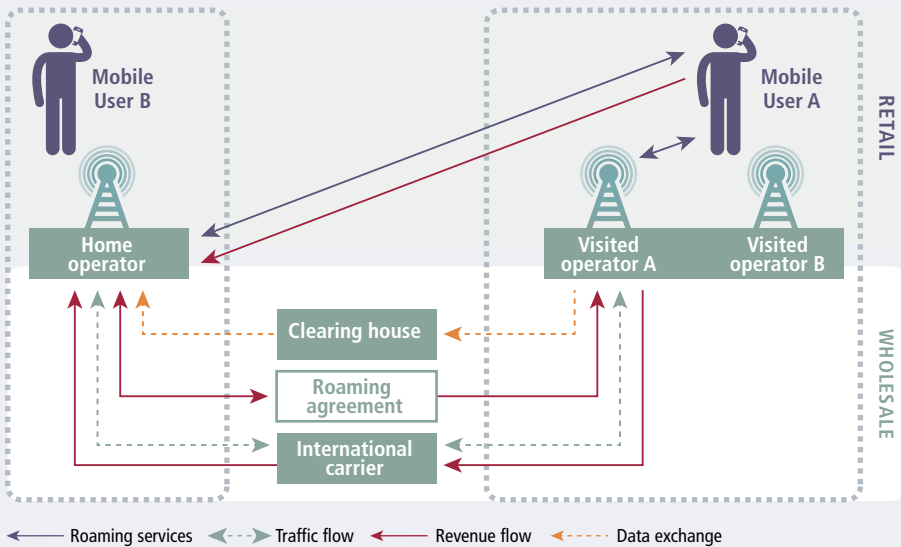


Figure 1.2 Commercial links required for international mobile roaming

Visited Operator A pays an international carrier (International Carrier) for carrying the call and handing over the call to Home Operator. International Carrier

pays Home Operator a termination rate for terminating the call in the home country.

Data roaming

With the increasing popularity of feature phones and smartphones, the use of mobile data services while roaming is set to continue to grow exponentially. Mobile data services are typically measured in kilobytes (KB) or megabytes

(MB), which refers to the volume of data transmitted for the service used. Data traffic volumes can vary significantly depending on the type and use of different data services.

Activity	Data traffic use
One hour of instant messaging	0.25 – 1 MB
One hour of web browsing	1.5 – 25 MB
Download 100 emails	1 – 10 MB
100 minutes talk on VoIP video calling	Around 50 MB
Download one photo	0.05 – 2 MB
Download one MP3	3 – 8 MB
One software download	70 – 800 MB
Download one film	700 – 1500 MB
Streaming one hour of video	250 – 500 MB
Streaming one hour of audio	50 – 150 MB

Figure 1.3: Mobile data traffic volumes¹

There are significant differences in the size estimates, as file size depends on the type of data, quality, and file length. For example, high definition and DVD quality streaming consumes greater amounts of mobile data than standard video or audio streaming.

2. Mobile roaming in Latin America

Regionally, the mobile environment is growing, both in subscribers and data traffic; however, roaming services are still emerging. Latin American countries are in different stages of economic development, with significant differences in inflation rates, currency exchanges, labor costs and GDP per capita. GDP per capita in some countries is up to 12 times higher than in others.² Additionally, compared with regions such as Europe, roaming penetration in Latin America is small. Just seven per cent of the region's population travelled abroad in 2011 (Figure 2.1), with factors such as greater distances between countries and less affordable travel in the region contributing to this lower rate of travel. Roaming use and its relevance as a service for mobile users varies

significantly across the region. As a result, up to 90 per cent of roaming traffic from the region is business-related.⁴

Within Latin America, there are around 500 operator roaming agreements and this number is growing. As commerce and tourism develop, more roaming routes are becoming economically viable. Roaming traffic flows are mainly across a number of key routes, although exact traffic patterns vary from operator to operator (Figure 2.2).

Both inter-regional and intra-regional roaming are major contributors to the Latin American roaming market. The exact traffic pattern can vary significantly from operator to operator, depending on factors such as the country, consumer base and market position.

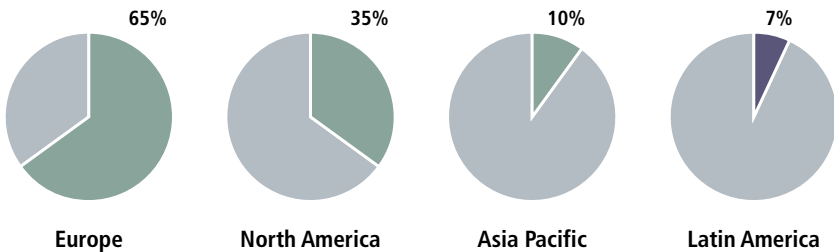


Figure 2.1 Ratio of international trips to population %, 2011³

- ← Main inter-regional roaming routes
- ← Main intra-regional roaming routes: tourism
- ← Main intra-regional roaming routes: business

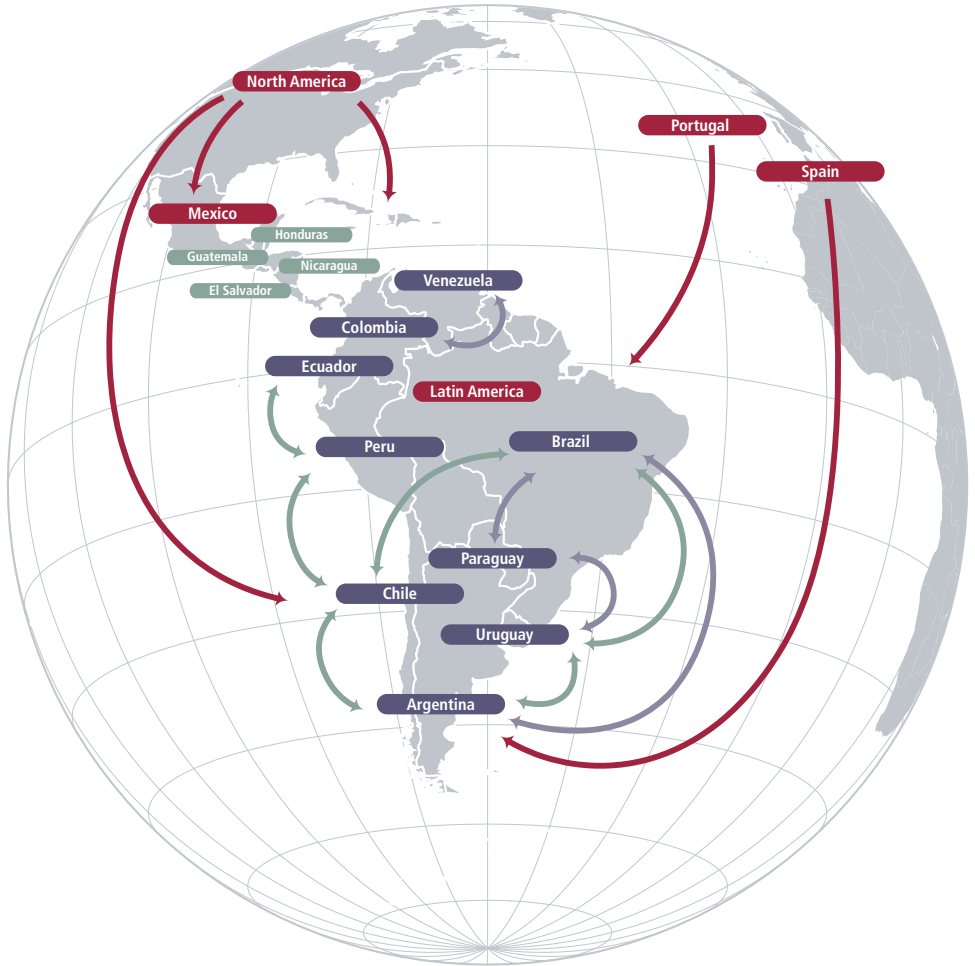


Figure 2.2 Main inter-regional and major intra-regional roaming routes for Latin America⁵

Regional challenges

As the Latin American market develops, structural and technical barriers must be addressed. Introducing roaming regulation while these obstacles remain could result in unintended consequences that harm the industry, mobile users and government revenue.

Structural barriers

Legal and technical developments are required to remove double taxation, combat fraud and liberalize international gateways. Combating these barriers is vital prior to any implementation of roaming regulation, as they artificially inflate roaming charges in individual countries.

- **Double taxation** inflates retail prices. This means retail prices can be inefficiently high, which affects the industry and mobile users, as well as government revenue. While initiatives by regulatory bodies such as the IIRSA (Initiative for the Integration of Regional Infrastructure in South America) exist to help remove double taxation, the problem continues and substantially increases roaming tariffs. In Latin America VAT rates range from seven to 27 per cent, complicating the task of roaming pricing for operators.

Few agreements have been reached to prevent double taxation in Latin America and some operators report that tax treaties in existence are operationally difficult to implement. In addition, many countries levy other local taxes, such as withholding taxes and local and state taxes, which further inflate prices. Double taxation remains on 72 per cent of roaming routes in South America.⁶

- **Fraud** remains a major financial concern for operators despite increased eradication efforts, causing losses of up to five per cent of total mobile revenues in Latin America – and up to 25 per cent can occur while users are roaming.⁷ The GSMA and regional bodies are leading initiatives to reduce fraud, and more than 80 per cent of Latin American operators have implemented Near Real Time Data Roaming Exchange (NRTDRE). For fraud to be significantly reduced, NRTDRE must be enforced through roaming agreements, which requires further investment in technology and negotiation of roaming agreements.⁸

- **International gateways** are the facilities through which international calls are sent and received. Where international gateways are not liberalized, their costs make up a significant proportion of the total roaming costs. Even with volume growth, there is no bargaining power for operators working across

monopolized gateways. This means inter-operator tariffs are likely to continue to be high. International long distance termination charges are another cost that inflates end-user prices. Although there has been much improvement in the level of competition, international gateway monopolies remain in at least 29 per cent of Latin American countries.⁹ In Arab countries, for example, international roaming call prices between liberalized gateways are typically 25 per cent lower than between those with gateway monopolies.¹⁰

GSMA recommends governments focus on removing and reducing these structural barriers to help to reduce roaming costs for mobile users.

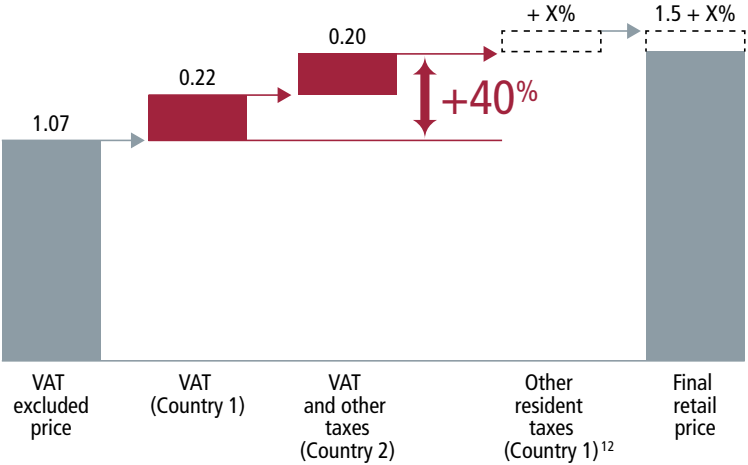


Figure 2.3 Impact of double taxation on end-user roaming prices¹¹

Technical barriers

In addition to structural burdens, the industry continues to heavily invest in meeting the technical challenges of international roaming. This level of investment is in addition to the mobile broadband roll outs across the region. Regulatory intervention will diminish the ability of operators to invest in meeting the challenges of mobile broadband roll out.



Technology challenges	Required investment
<p>Prepaid roaming: Operators have invested heavily to enable prepaid roaming, there are still many more post-paid routes available, with prepaid platforms such as CAMEL¹³ expensive to implement.</p>	<p>Technical implementation costs, including system upgrades and expansion of prepaid roaming, which burden smaller operators. Operators have increased the number of prepaid routes three fold over four years (Figure 2.4) and continue to invest.</p>
<p>Interoperability: CDMA technology is in use in some parts of the region which prevents seamless roaming. Additionally, use of different GSM/3G spectrum can prevent many low-cost handsets from roaming.</p>	<p>Enforcement and monitoring costs, which will disproportionately burden least developed countries. Additional investment is required by operators to provide consistent quality of service across roaming networks.</p>
<p>Coverage: Network coverage, particularly 3G, remains patchy as operators continue to roll out and upgrade their networks.</p>	<p>Consumer communication and marketing costs will need to increase to promote roaming and ensure transparency.</p>

Origin	Route availability (for South America only)		Increase in routes available
	2007	2011	
Argentina	5	21	16 (320%)
Brazil	2	12	10 (500%)
Colombia	0	6	6 (N/A)
Chile	17	32	15 (88%)
Peru	0	4	4 (N/A)
Total	24	74	51 (213%)

Figure 2.4 Prepaid route availability for a sample of South American countries, 2007 vs. 2011¹⁴

Inadvertent and border roaming

In addition to structural and technical barriers, incidences of inadvertent and border roaming can also affect mobile users. As a region, Latin America has low travel traffic between borders in comparison to Europe or North America. Up to four per cent of the population, according to the IIRSA¹⁵, lives in zones within a few kilometers from an international border. In many cases, differences in frequencies used for mobile devices or existing geographical barriers eliminate the occurrence of accidental roaming. Where a border is divided by a street or river, for example, this is much harder.

Operators are continuing to invest in technical measures to eliminate inadvertent roaming in narrow border zones, and offer competitive roaming packages for mobile users in these zones. Many operators across Latin America have introduced roaming tariffs that offer special rates across borders to facilitate cross-border trade and travel. This is an ongoing trend as operators increasingly work towards serving the needs of roaming consumers, which can be particularly seen in specialized tariffs for heavy tourism routes. The structure of these roaming tariffs varies widely, from opt-in regional rates and monthly bundles for postpaid users, to prepaid roaming tariffs.

3. Price trends

Regionally, market trends are positive and the industry is committed to taking the lead. Roaming prices are declining and operators continue to develop innovative offers, with reductions of up to 79 per cent since 2007 (Figure 3.1). Operators across the region are taking steps to serve the needs of mobile users living on international borders and address inadvertent roaming, as described in Chapter 2, as well as cater for regional tourism. Additionally, operators are investing heavily to address the technical challenges such as prepaid route availability and interoperability.

Mobile operators offer their customers a menu of tariffs from which they can choose from depending on their own preferences. With different needs and uses, mobile users can choose the most appropriate tariff to suit them. If regulators chose one price over another, this would effectively favor one group of mobile users over another.

Tariffs options may generally include different call prices (pre-paid/postpaid), whether the mobile phone has been purchased as a part of the bundle, the size of the monthly access fee, among many other factors.



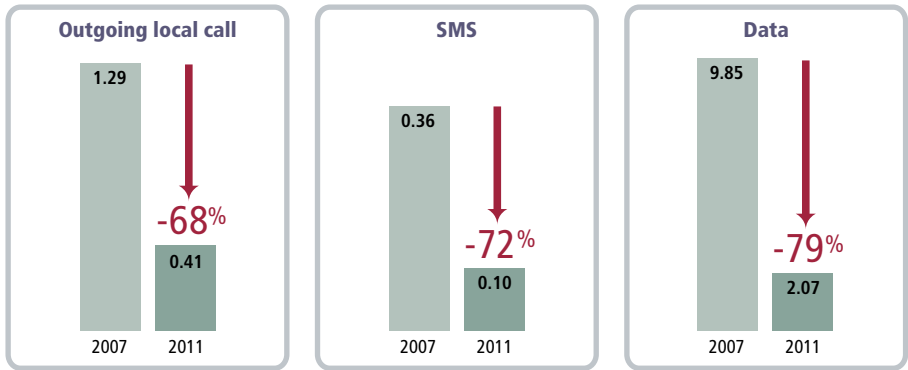


Figure 3.1 Selected examples of postpaid tariff comparison for Argentinian users roaming in Paraguay (USD), 2007 to 2012¹⁶

As a result of the trend towards higher volumes of data downloaded, operators have introduced innovative tariff packages, including flat rate daily bundles, which deliver much lower prices per megabyte than were previously available.

There is also a pre-paid roaming platform agreement between several Central American countries: Guatemala, El Salvador, Honduras and Nicaragua.

It should be noted that the structure of these roaming tariffs varies widely, from opt-in regional rates and monthly bundles for postpaid customers, to prepaid roaming tariffs and credits.

4. Impact of regulation

Regulators have expressed concerns about the level of roaming charges and consumer bill-shock. However, this concern does not translate to a single solution for the region. Differences in market conditions between countries may determine certain higher roaming charges in some countries and the reasons for higher charges. As such, regulators should first address concerns at the local level.

Uniform regulatory measures may fail to address the source of any problem, and are likely to be detrimental to market performance. Regional regulation cannot take into account all the different local market conditions and, as a consequence, may fail to address the actual cause of the problem. Additionally, the imposition of uniform regulatory measures may introduce new problems that harm mobile users and the industry.

■ Impact on developing countries

The burden of regulation can fall unequally and disproportionately impact less-developed countries. If regional roaming regulation was implemented, less-developed countries could be required to invest heavily to obtain interoperability and high quality services to align with the more

advanced, developed countries. This could place a greater financial burden on developing countries to meet regulatory requirements, impacting on funds available for other greater needs for the local population, such as subsidised handsets, or it may result in removing roaming services all together.

■ Impact on tourist destinations

Countries that rely heavily on tourism are more likely to have invested significantly in network capacity to support roaming. For example, some Latin American countries experience large numbers of in-bound tourists; while sometimes supporting a smaller domestic market of relatively lower revenue customers. In these instances, the economic cost of providing roaming might be significantly greater than the economic cost of providing mobile services to the local population. However, if regulation determines roaming charges to be the same as providing mobile services to the local population, then revenue earned from roaming may not meet its cost. Any shortfall might need to be met through increasing prices charged to the local population, which means they may end up subsidising the network capacity used by tourists.

■ Impact on universal broadband

Universal broadband access in Latin America depends on the ability of mobile operators to continue their high rates of investment. The mobile industry is capital intensive and the pace of asset replacement and investment in new technologies is rapid. Operators take considerable risks when they invest. The level of regulation is a strong influence on the investment decisions made by mobile operators and that, in turn, will impact on the services available to mobile users. By reducing the incentive for operators to invest in innovative services, it reduces the likelihood that mobile users will benefit from new services and extended broadband coverage in the future. As such, regional roaming regulation will ultimately negatively impact on the broadband services available for the unmet needs of consumers.

These impacts suggest large businesses and affluent leisure customers would benefit most from lower prices, rather than the mass market of mobile users who is most often incorrectly cited as suffering from high roaming charges. Competitive market dynamics are the best frameworks from which to determine the price for international mobile roaming services. Mobile users choose a mobile tariff based on the full value it provides across a number of services and operators optimise the pricing and value of the bundled tariff to address the needs of their local market. Regulating on the roaming elements of the tariffs reduces operators' flexibility to tailor its services for the mass market of end-users.

Regulating roaming is a move away from successful liberalisation of telecommunications markets which has promoted technological development and economic progress over the last two decades.

With mobile phone penetration in some Latin American countries at just 13 percent¹⁷, regulation of roaming could be detrimental to connecting the region and providing access to universal broadband.

5. Best practice

The industry recognises regulators' concern regarding international mobile roaming prices. However, regulators need to also recognise that international mobile roaming is a complex service, involving many different factors that can influence price, as described in this brochure. This complexity creates a significant risk that regulatory measures will result in unintended, detrimental consequences for mobile users, governments and the industry, particularly in the long term. Regulating price may result in short-term benefits for consumers; however, these are more than likely to be offset in the long-term by a reduction in the level of competition and innovation, as evidenced by the EU experience.

It is for this reason that the industry supports a measured approach to regulation, where regulators:

- Encourage operators to take measures that enhance mobile user awareness (transparency and bill shock) of tariffs when they travel
- Address structural barriers that increase costs for service providers and mobile users, such as double taxation and international gateway monopolies, as well as those barriers that hold back the development of market based substitutes

- Only consider price regulation after:
 - Other measures have been given sufficient time to conclude there is a persistent problem
 - Clear evidence shows that operators offering roaming services have market power — that is, competition in the market for roaming services is limited
 - Clear evidence shows that the operator company derives its market power from owning a natural monopoly
 - Clear evidence shows the benefit exceeds the cost of regulation.

Industry self-regulation

In June 2012, the GSMA announced an initiative that will provide mobile users with greater visibility of their roaming charges and usage of mobile data services when travelling abroad. At a meeting held in July, 24 operator groups agreed to undertake a number of measures which will help mobile subscribers better understand their data roaming charges and more effectively manage their use of data services.

The measures include:

- Sending text messages to remind mobile users of their data roaming tariffs when they arrive in another country and turn on their mobile device

- Implementing a monthly data roaming spending limit to help consumers manage their roaming bill and sending alerts when their data usage approaches the limit
- Temporarily suspending data service when use exceeds the spending limit.

These measures, which already cover more than a billion mobile users, will offer a more transparent and uniform experience for all travellers. These operators groups agreed to implement these data roaming transparency measures by the end of 2012, extending the coverage to more than four billion connections across 120 countries.



Endnotes

- 1 <http://www.broadbandgenie.co.uk/mobilebroadband/help/mobilebroadbandusage-guide-what-can-you-get-foryourgigabyte>, accessed 25 June 2012
- 2 AT Kearney, 2012. Note: Barbados and Aruba have very high GDP per capita on PPP basis (up to 86 times the lowest GDP country) but they have been excluded from this analysis because of their small size
- 3 A T Kearney based on information from UNWTO and EIU
- 4 Regional Study of the South American Roaming Services Market – Stage I, IIRSA, April 2009
- 5 Source: SICA - Central American Integration System, WTO Factbook, BlueNote MC
- 6 Percentage on all roaming routes provided by A T Kearney, based on a sample of 10 South American countries and sourced through IIRSA Regional Study of South American Roaming Services Market, April 2009; EIU; Operator websites
- 7 Source: IIRSA: Initiatives for the improvement of the South American market of roaming services, Analysis and Recommendations, February 2010
- 8 Ibid
- 9 AT Kearney, 2012. Note: Sample for Latin America is based on 24 countries as data unavailable for 14 countries
- 10 Source: *Gateway Liberalization – Stimulating Economic Growth*, GSMA, February 2007
- 11 A T Kearney 2012, Outgoing voice call price is given for a hypothetical example of a Claro Argentina subscriber travelling to Chile in USD
- 12 Other resident taxes may be indirect or regulatory fees applied to IOTs and retail prices
- 13 CAMEL is Customized Applications for Mobile networks Enhanced Logic, which is an intelligent network designed to work on either GSM or 3G core networks. CAMEL features include no-prefix dialling, real-time billing and being able to receive voice calls, MSM and use data services while abroad for pre-paid users
- 14 A T Kearney 2012. Sample is of the five largest Latin American countries by mobile subscribers numbers, October 2011
- 15 Source: IIRSA: Initiatives for the improvement of the South American market of roaming services, Analysis and Recommendations, February 2010
- 16 Selected examples of operators decreasing prices, using medium data from Argentina Telecom Personal, Argentina Claro and Argentina CT Movil sourced from operator websites
- 17 Wireless Intelligence, Q1 2012





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