Anatel´s Recommendation to EXECUTIVE TECHNICAL GROUP REGARDING PROJECT IIRSA "SOUTHAMERICAN ROAMING AGREEMENT"

Minutes for discussion - 2009 – May 4, 2009
Cusco - Peru

Action Plan Guidelines for Consensus Implementation Agenda (CIA)

Anatel recommendations for action plan guidelines

- Consensus from Bogotá meeting – November 7, 2008
  - Low use of due to elevated costs – Brazil
  - Concrete themes and coordinated action for exploitation of opportunities. Regulator should foster investment that produces quality and social and economic inclusion – Peru
  - There are roaming restrictions – GSM Association
  - In depth studies – Comcel and Tigo Colombia
  - Return of investment and new services – Telefónica
  - Improve services, life of population and foster integration – coordinating area
  - Frontier questions, fraud and reduction of taxes – all

Anatel´s recommendations for action plan guidelines

- Considerations from the study
  - Take advantage of low current traffic for the search for innovation without existence of legacy network
  - Optimize opportunities for income with roaming offer including new services and broadband applications where voice would be a basic VOIP technology commodity
  - Begin the construction of state-of-art UMA with little initial investment
  - Avoid interferences in the value of taxes in each country but create forms of collection management more adequate for the user
  - Cover questions regarding transparency, intra-regional long distance, border roaming and pre-paid roaming
  - The question has a component related to social and economic interest that goes beyond the interests of an entity rendering telecom services

Motivation and Concepts

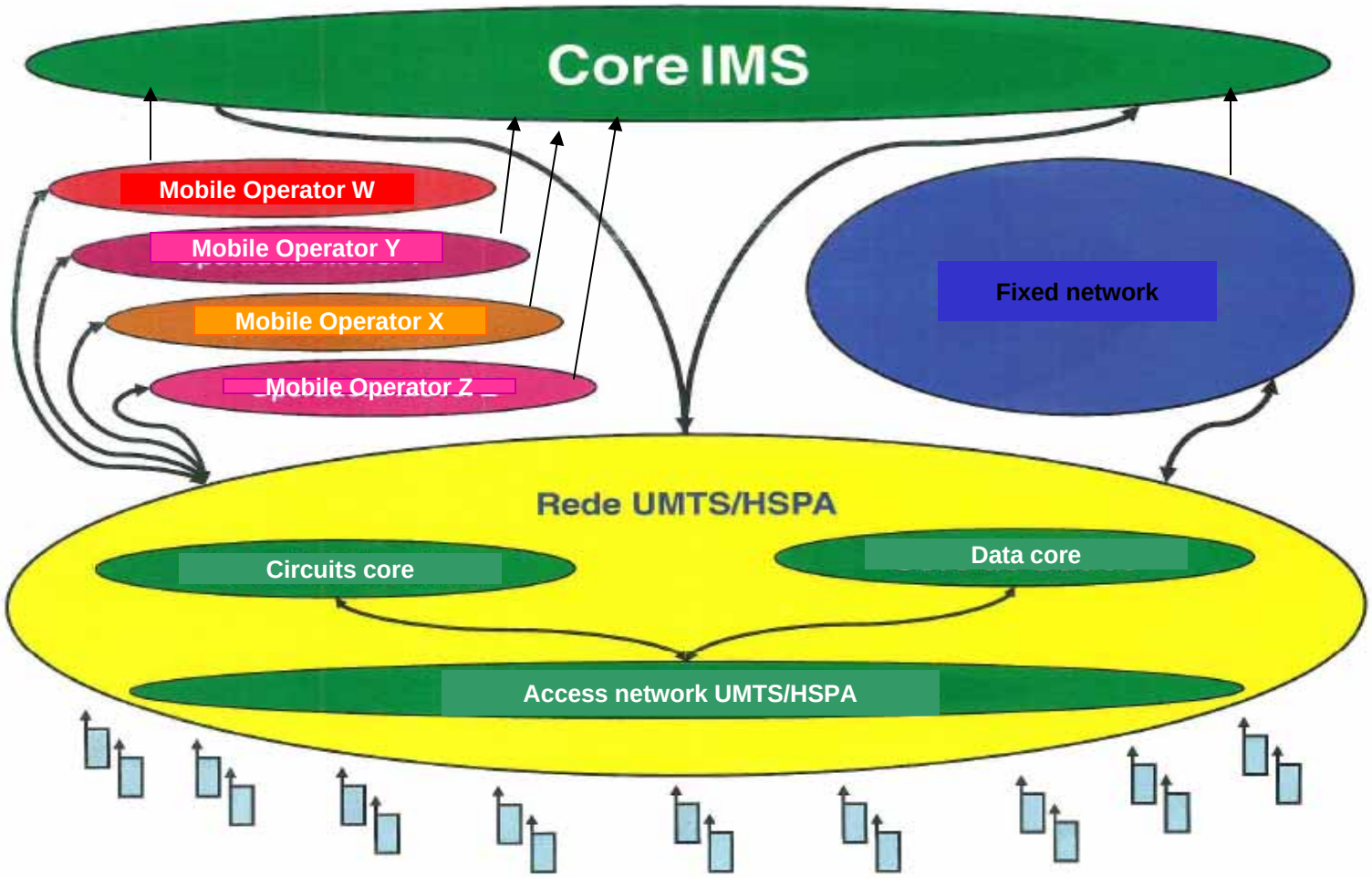
- **Considerations regarding the regulatory environment**
  - Fragmentation of productive processes
  - Transnational operators
  - Regulation of movements
- **Movement of movements** (Antonio Negri)
  - Dismissed capitalism
  - Exploitation based on cognitive elements
  - Migratory processes
  - Work as social relation
- **Common construction**
  - Community sense and freedom of each agent

IIRSA Meeting– Regulatel

Buenos Aires - March 31, 2009

- **Viability of a long term solution**
  - Study of a business plan
- **Implementation**
  - Short term for frontier questions and scientific experiments and experiences
  - Medium term for implementation in non-profitable branches
  - Long term for construction by stages
- **Forms of collection**
  - Bill & Keep Partial applied bilaterally or regionally as an intermediary solution until the implementation of a South American network for the legacy network
  - Bill & Keep purely with local call characteristics for all of South America in final situation

Example of platform with IMS



IMS Characteristics

- IMS – IP Multimedia Subsystem
- 3GPP, 3GPP2, TISPAN – supports GSM, GSM networks, Wireless LAN, CDMA200, fixed lines
- Uses IETF protocols (Internet) as SIP (Session Initiation Protocol)
- Not looking for adoption but it is projected for the support of multimedia and voice applications
- Requires more detail for specific applications
- "Plugfest 7 will further move the industry by including IMS, NGN, LTE and WiMAX interfaces for applications and services.“ June 2009 - NGN/IMS Forum
- “Plugfest 6 simulated two different IMS operator networks across 4 continents. A major achievement by the industry was shown in the short setup time of only a day and half that it took to bring into operations these complex networks supporting up to 250,000 user sessions. User equipment, application servers, service creation and robustness were tested.” January 2009 - NGN/IMS Forum

UNDERWATER BACKBONES

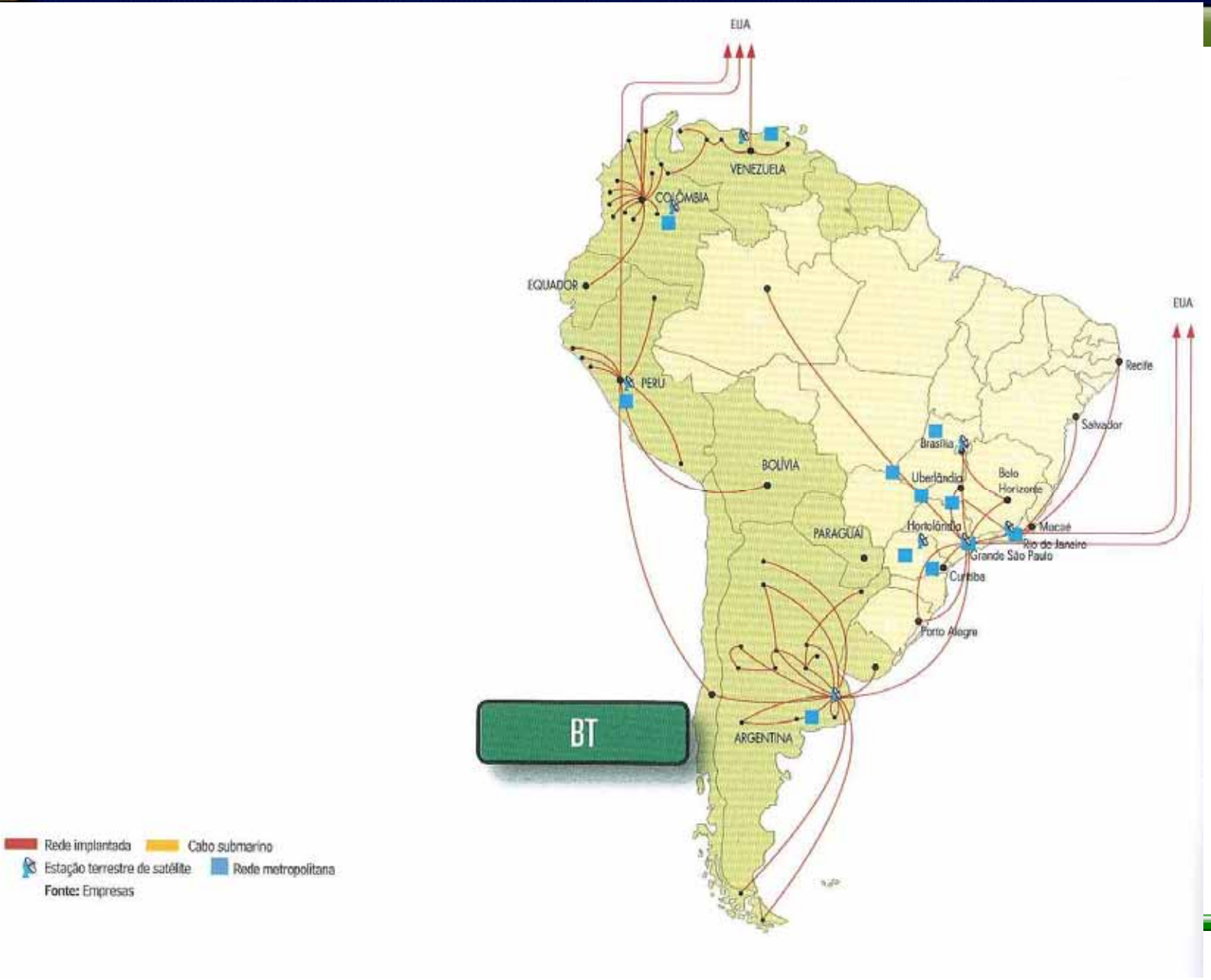
GLOBAL CROSSING

Rede Metropolitana

Rede Implantada

Estação Terrestre de Satélite

LONG DISTANCE BACKBONES



South American Roaming Project

1. Scope
2. Objective
3. Description of Service
4. Alternative technologies and development
5. WBS and Attribution
6. Implementation chronogram
7. Costs

South American Roaming Project

1- Scope

- The project originated from the work of the Technical Executive Group (TEG) regarding the "Implementation of a South American Roaming Agreement" project as part of a portfolio of 31 high-priority projects to be implemented before 2010.
- The IIRSA has the role of coordinating actions between all actors that allows the introduction of improvements, the fostering of regional integration through infrastructure through the search for regional consensus.
- With the discussions of November 7, 2008 in Bogotá, Colombia, each actor was invited to be creative, realize internal studies and bring concrete proposals to the second TEG of the project.

2- Objective

Implement the regional harmonization of mobile telecom roaming services through a South American Roaming Agreement based on a new generation network (NGN) with IMS (IP Multimedia System) at its core

3- Description of Service

3.1. General comments

a) The project allows any mobile terminal, or a terminal connected with a mobile system, to communicate freely using its own numeric country code with any other terminal in any area where it finds itself as a visitor (roaming)

b) This device or terminal, designated by station, can receive and originate voice, data, image, and video communications as well as diverse applications without any interconnection problems, with quality, security, at set prices and accepting diverse forms of payments, including pre-payment

3- Description of Service

3.2 Service characteristics

a) Transparency from the point of view of the user, that receives and pays accounts in the clearest manner possible;

b) Values paid are similar to those paid in the visited country, given that distances are not made relevant in order to foster the use of the device as if the user was in his country of origin using the IMS platform;

c) Voice communication in VoIP, the use of e-mail, files and tables, video calls and conferences are made in a standardized and friendly manner;

d) With the concept of zones, there is no additional difficulty for frontier calls that maintain local characteristics, only the caller who calls the operator who originates the call and the value paid is that of a a local call.

e) Different forms of access to communications can be used, such as IPv4 or 6, Internet, local and international numeration, etc.

3- Description of service

3.3 Prepaid terminals

a) upon arrival in a different country, a new authorization occurs and the terminal maintains its function as soon as it acquires credit in the local currency. Calls originate as if user was from the country being visited but also receives phone calls with the number from the country of origin

b) within the IMS network, the CPP system is used (caller pays) and the origin operator does not have to carry out payment to the destination (local or international) using databases to verify the access status (fraud, prepay, credit, etc.)

c) all calls, including frontier calls are treated as local calls with local payments. Questions of interference due to use of a fixed station pertaining to another country do not have repercussions for the value paid by the user. There are no additional displacement or charge for long distance within the zone

4- Alternative technologies and development

4.1. Network characteristics

Interlinks any visiting South American user, characterized as such by the network when a communication is originated or received, this occurs interlinked with IMS which has four parts::

a) IMT network with network access to mobile and fixed operators in each area or in interconnection points

b) IMT network with a core of packages

c) Core IMS

4- Alternative technologies and development

4.2. Development

a) It is an infrastructure that can be constructed in a modular form and adopted for any country

b) In each country, a single platform can be shared by all those who have a mobile service license

c) From the South American point of view, it can be perceived as an unique infrastructure with elevated capacity and flexibility, that needs to be tested in the future, but that can be constructed initially at low cost due to low traffic and few applications

d) The technological challenge is the interconnection with fixed and mobile telecommunication networks of each country to allow all kinds of communication

4- Alternative technologies and development

4.2. Development

e) The regulatory challenge is the development of a regulation that allows transparent and friendly communication, with minimal cost allowing for maximum return on investment

f) The challenge of operators is the physical, economic, operational and marketing structure for pre-paid and post-pay terminals

g) Maintains what remains of international roaming or roaming that may occur from the interconnection of the new network with other access networks that pertain to non- South American countries

h) Coordination of border frequencies can use numeration and specific routing based on recommendations

5- WBS and Attribution

5.1 WBS

a) Project from the new generation network with specific IMS for South American roaming

b) Creation of South American regulation for network support and support for implementation got licensed companies

c) Experiences or operational systems for implementation and use of the network for South American roaming

d) Products, systems and equipment necessary for implementation of South American roaming service in accordance with the requirements

5- WBS and Attribution

5.2 Attribution of agents

a) New generation network project with specific IMS for South American roaming – regulators, manufacturers, industries and operators

b) Creation of South American regulation to support the network and implementation for licensed operators – regulators

c) Experience or operational systems for implementation and use of network for South American roaming – service operators

d) Products, systems and equipment necessary for implementation of South American roaming service in accordance with requirements – Industries, laboratories, and manufacturers

e) General coordination – Technical Executive Group – financing of the project and adquisition of prototypes and pilot batches

6- Implementation chronogram

6.1 Planning

a) Approval of idea as an alternative – 3 months
b) Conceptual elaboration of project – 6 months
c) Elaboration of South American regulation for network support and implementation for licensed operators – 10 months
d) Elaboration of operation systems for implementation and use of network for South American roaming – 10 months
e) Development of products, systems and necessary equipment for implementation of South American roaming service in accordance with requirements – 18 months
f) Medium term pilot operation for small branches – 6 to 10 months
g) Initial Commercial Operation for long term implementation – 24 months

6- Implementation chronogram

6.2 Key points

a) Approval of the idea as an alternative. With the evolution of VoIP and voice as a commodity, this form of clusterization with local treatment is a global tendency that we can take advantage of in order to obtain, at lower costs, integration of South American broadband and a substantial reduction of prices for users through the simplification of processes

b) This is a process of improvement for all of Latin America in terms of sustainability and increased competitiveness for these countries

c) Due to a strong innovative component, particularly cultural, obstacles, especially for operators, must be overcome through government financing that guarantees approval and continuity of the project for the public interest and South American integration

7- Costs

Costs of South American system

a) A unique South American network is certainly more economical than multiple networks pertaining to each operator. One form of completing an estimation may be the cost per access that is occupied by roaming calls. The network has to have the capacity to transfer telecommunication signals in a transparent manner from one network to another. An initial cost no greater than 200,00 US$ per IMS access that equips the network.

b) The operation of a network is certainly more complex than a local operation. Initially the objective could be something like US$ 20,00 per month for the costs of operation, administration and access management.

c) Initial costs of gradual implementation of the solution can be calculated per country, consortium or economic group that has to construct a network that includes the transmission. An initial estimate may be US$10 million per country

d) Costs of coordination and management have to be estimated around US$ 1 million per year, for 5 years

Elaboration of regulation for network support and implementation by licensed providers

- Products essential for feasibility
  - Voice roaming, data, texts, video
  - Post-pay and pre-pay
  - Frontier calls
  - Security, anti-fraud systems, emergency (911, 128, 112,190, etc.) identity of calling number and follow-me
  - Creation of applications (South American users)
  - Robust and flexible low-cost platform to be tested in the future
- Regulatory activities
  - Approval of pilot unique infrastructure experience for South America
  - Share costs, compensation, interconnections, and investments (administrative entity or consortium of providers)
  - South American flat rate and initial frontier
  - Elaboration and presentation in CITEL, Mercosur forums
  - Project for financing of planning and acquisition of prototypes and a pilot operation with development of software, hardware, middleware, etc. (Funttel, Finep, BNDES, BID, etc.)
  - Interconnection obligations
  - Inclusion of compensation in RF licenses or service in regions of high return (metropolitan areas)

Elaboration of South American regulation for network support and implementation by licensed providers

- **Proposals of Regulatory Group**
  - **South American roaming networks need to organize themselves as integrates channels of free circulation:**
    - **The interconnection of licensed telecommunication networks with the South American roaming platforms that are technologically compatible (CDMA, GSM y W-CDMA);**
    - **As long as a South American user is roaming, uses the communication network, the call has to be taken to the roaming platform, which processes the communications of this visitor;**
    - **The platform has to consult the database of origin of the user to understand its service plan option, the diverse prices and applications;**
    - **Regulatory entities will look to harmonize the frequencies, numeration, routing, competitive stimulus and attention to international agreements;**
    - **Interconnections must obey by free negotiation and competition conditions, arbitrages, and technical standards**
    - **Connections will use equipment and systems certified by legal entities established for this purpose.**

Elaboration of South American regulation for support of network and implementation by licensed providers

- **Proposals of regulatory group**
  - **Networks of licensed providers of each service can:**
    - **Share radiofrequencies, given approval by a regulatory body in frontier regions or regions with less than 30.000 inhabitants;**
    - **In the frontier zone, up to 50km on each side of the border, users can rely on services from their licensed provider, communicate with providers of other countries and be treated locally with prices from their country of origin**
    - **Authorize formation of consortiums with the objective of loaning services to each licensed provider as if was their own network and radiofrequency**
    - **New services will be established based on agreements and according to the availability of technology**
    - **Security of the network in abnormal conditions, security against fraudulent use, protection against cyber attacks, etc. will be developed by an administrative entity selected by the licensed providers for the operation of the network**

Elaboration of South American regulation for netwwork support and implementation by licensed providers

- **Proposals of Regulatory Group**
  - **Regarding interconnection pricing and pricing for the public**
    - **Prices for the public for voice services have the same billing system in each country for local calls and the same distribution of taxes;**
    - **Data service for public is free or has the same treatment as similar regions;**
    - **Industrial exploitation lines for interconnection of licensed networks with the South American roaming platform abide by the same conditions whether they be local or long distance;**
    - **Discounts or price adjustments are the same, regulated by each country, adapted for local treatment**
    - **South American roaming platform is part of the licensed network for visiting users and its amortization is based on the costs of implementation of the platform;**
    - **Amortization of the platform is based on a shared system, based on proportions of occupation of each licensed provider;**
    - **Communication between the loaner that uses the South American roaming platform will initially be based on the Bill & Keep system, in other words, payment for the service will always pertain to the licensed originator of the call, that will eventually be in charge of the payment for the interconnection of its network with the platform unless the platform is part of its network.**

Elaboration of South American regulation for support of network and implementation by licensed operators

- **Proposals of Regulatory Group**
  - **Regarding function of South American roaming platform**
    - **Initially, due to reduced traffic, complexity of processing of prepaid access, data communication, security against fraud, etc. The platform can be made given an obligatory consortium between all licensed providers that interconnect to this platform;**
    - **This consortium will implement a platform in stages though an international auction or through consensus between regulators and licensed providers;**
    - **The operation and administration of the platform will be selected by a supranational administration entity;**
    - **Rights and obligations of this entity will be subject to agreement among parties involved;**
    - **Associates of the consortium have to create executive groups for processing and control of sensitive aspects, such as:**
      - **Anti-fraud systems, anti by pass, poaching and adulteration of cell phones, black lists and white lists, number control**
      - **Database of fixed and mobile accesses**
      - **Pricing and billing aspects, collect calling, including value added services**
      - **Network management to control infrastructure**
      - **Security systems from point of view of justice system**

Frontier connections

- Coordination of RF – Interferences (PCS/IMT-2000/CDMA/Wireless)
  - Multiple licenses for the same band in the same region

Alternatives for a short term solution beyond coordination of radiofrequencies

1. **Unique and shared infrastructure**
   - **Multiple licenses (more than 10) that compete using the same network in a system called Cobra and don't have to pay for interconnection**
2. **Network Sharing**
   - **Shared parts such as those of control**
3. **Specific doe (9 digits Ex: 9 or special category)**
   - **Differentiation by digit (quantity and type) and routing**
4. **Geographic localization for local and long distance pricing**
   - **Billing platform (IMS) receives A and B localization for pricing**
5. **Direct channeling between branches**
   - **Creation of mini-regions with independent infrastructure**
6. **Local billing (*Millenium Village or Village Phone*) "flat"**
   - **All frontier calls are part of a fixed monthly charge independent of volume of traffic per user**

Short term study of frontier connections

Example: Iguazu Falls

Diagnostic

- The region has multiple uses for the same band of radiofrequencies (PCS, IMT-2000, GSM, Internet, Wireless, etc.) that don't allow use even with attempts to coordinate the radiofrequencies
- The quantity of licenses makes the provision of service more difficult. In Brazil alone, there are 4 authorized providers of mobile serves, 2 or more of fixed services that have to survive amongst with others that have licenses in neighboring countries

Initial problems detected

- Licenses have different service authorizations
- Frontiers have traffic that requires different telecommunications applications
- Frequencies and networks interrelate in close and interfering manners
- Citizens have difficulty communicating even in their own territory

Short term study of frontier connections

Example: Iguazu Falls

Unique and shared infrastructure

- Multi licensed (more than 20) that compete using the same network with different radiofrequencies that don't pay for interconnection

Alternative 1

- Parts of shared control as a a common provider
- When local calls are made, they make their way to a center that can differentiate between digits (quantity and type) and route the call as long as it is a frontier call or
- Analyze the origin and destination for geographic localization for local or long distance pricing

Alternative 2

- Creation of a mini-region with independent infrastructure
- Licensed providers united by a legal entity or a third party is linked with them
- A system that can commute local calls without having to consult a control center can exist with a pricing system that can charge for local calls and only price long distance calls
- All frontier calls are part of a fixed monthly charge independent of traffic volume per user

Short term study of frontier connections

Example: Iguazu Falls

Recommendations for Regulatory Activities for studies

1. **Create a special frontier license exclusively for licensed mobile providers to participate in a consortium of licensed mobile service providers from neighboring countries in order to create an infrastructure that provides mobile services with radiofrequencies destined for services of licensed operators and permit activated terminals of each provider to make local calls in the event that they are located within the infrastructure. Calls outside of the zone would be treated based on existing policies of each provider**

Short term study of frontier connections

Example: Iguazu Falls

Recommendation of Regulatory Activities for Studies

3. Infrastructure will have direct interconnection with all licensed operators through a direct or indirect medium for direction of calls outside of frontier zone
4. Technological development should observe the radiofrequencies designated for each country, the licensed technology, available terminals, and applications and services authorized to each provider for the construction of infrastructure, with adherence to and relative transparency with regard to fraud control systems, portability, geographic localization, monitoring of phone calls according to judicial mandates and international anti-kidnapping control system agreements and traffic of products and valuables, among others

South American Roaming Business Plan

1. General characteristics
    1. GDP= US$ 3,9 trillion
    2. GDP/Capita = US$ 10.378,00
    3. Population = 382,4 million (2007)
    4. Area = 17,715 millions of km2
    5. 15 year business plan
2. Market segmentation
    1. Business
    2. Tourism
    3. Frontier

South American Roaming Business Plan

4. Initial data regarding traffic, income and rate of growth
    1. Business: 120 million of minutes/year; US$ 24 million, 6% per year
    2. Tourism: 160 million minutes /year; US$ 32 million, 10% per year
    3. Frontier: starting with the year 5, 8% for 36 million people at 50% density and 2% of 100 min/month of border traffic at US$ 0,20/min = US$ 48 million
5. Costs
    1. Starting with 80% of income up to 40% in year 15
6. Investments
    1. Initial: 10 countries with 1000 access points at US$ 200,00/access point
    2. Final: 10 countries with 10.000 access points at US$ 200,00/access point
    3. Amortization: every 5 years
7. Cost of capital
    1. WACC = 12%

South American Roaming Business Plan

8. Project Phase 1 (6 months)
    1. Survey of networks and platforms to be interconnected
    2. Establishment of platform and network architecture
    3. Development of applications to be supported
9. Project Phase 2 (10 months)
    1. Acquisition of prototypes and definition of testing methodology
    2. Implementation of platforms for testing
    3. Confirmation of sought after objectives
10. Project Phase 3 (total of 24 months)
    1. Implementation of pilot batches in selected countries and regions – medium term
    2. Execution of tests
    3. Evaluation of results
    4. Elaboration of resolutions, regulation, norms and start of long-term commercial implementation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