

ITU-D Regional Development Forum for the Americas Region NGN and Broadband, Opportunities and Challenges

Convergence Opportunities and Technology Leapfrogging

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Agenda

- **Convergence**
 - Convergence related questions
 - Dimensions and profiles
 - Key factors: Economies of scale
- Market and Business trends per category
- Technology and Business Leapfrogging

Convergence related questions

- Does convergence refer only to Fixed and Mobile?
- Does convergence matter only to developed countries?
- Is convergence more expensive?
- What benefits may be addressed by convergence?
- How convergence may help developing countries?
- Others.....?

Convergence dimensions

Convergence is taking place at several domains

- ➔ **At Network domain**
 - One network for all service types: NGN, IMS
- ➔ **At Service domain**
 - Fixed, Nomadic, Mobile, Interactive and Broadcasting, Content, etc.
- ➔ **At radio Access domain**
 - DECT, WiMax, 3G, LTE, etc.
- ➔ **At Operational and Business domain**
 - OSS, Billing, etc, for all customer classes
- ➔ **At Terminal domain**
 - 2G, 3G, PDA, iPhone, etc.

Convergence profiles

Convergence Domain	Level of convergence			
	Separated Implementation	Low level convergence	Medium level convergence	Full convergence
Network	●			
Services	●			
Access	●			
Operations	●			
Terminals	●			

Present Mode of Operation

Initial status: Separated networks, services and operations

Convergence profiles

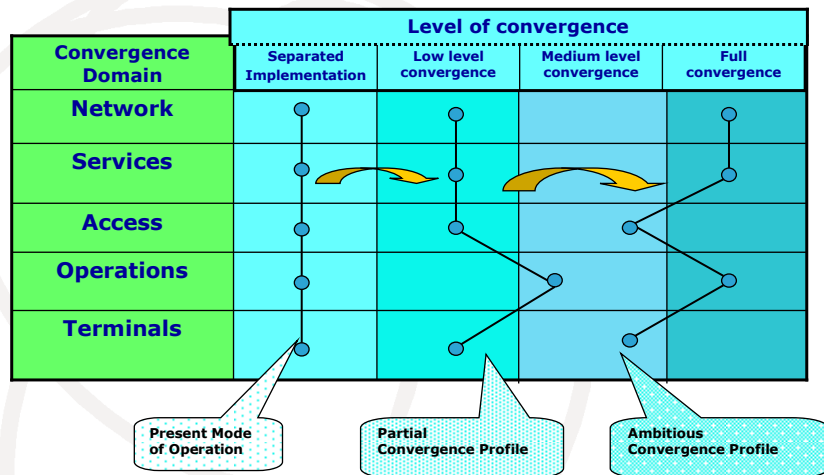
Convergence Domain	Level of convergence			
	Separated Implementation	Low level convergence	Medium level convergence	Full convergence
Network	●	●		
Services	●	●		
Access	●	●		
Operations	●		●	
Terminals	●	●		

Present Mode of Operation

Partial Convergence Profile

Example of convergence today by representative operators

Convergence profiles



Future profile driven by: Initial status, Market development, Economy of scale and Operator Strategy

Key Factors: Economies of scale

Economies of scale (EoS) are an inherent characteristic to the telecom technologies that impact on solutions, efficiency and cost reduction

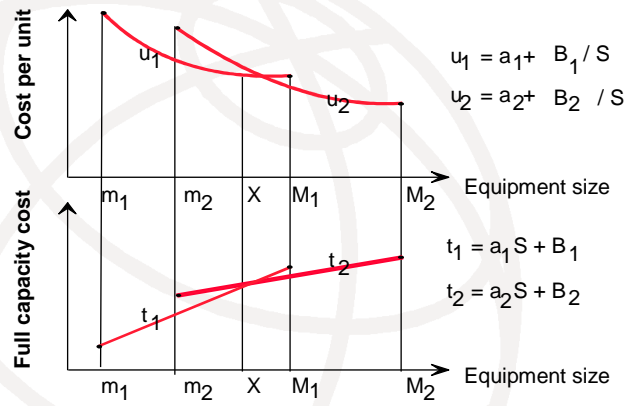
The five dimensions of the economy of scale:

- By **Size** of the systems
- By **Technology** capabilities
- By **Traffic efficiency** with the occupancy
- By customers **Density**
- By **Volume** of purchasing

Benefits per dimension

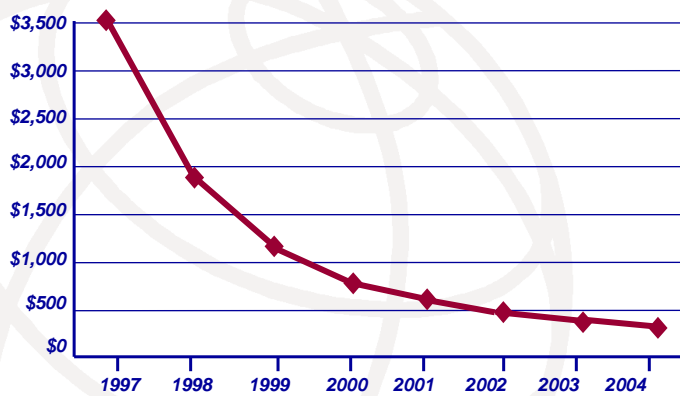
- Cost reduction per unit (i.e.: 10% to 30%)
- New technologies with higher productivity (i.e.: x10)
- Better utilization for a given GoS when larger systems (i.e.: +20%)
- Quadratic decrease with coverage radio increase
- Discount per volume in log scale (i.e.: up to 40%)

Economy of scale per system size



Cost reduction as function of size and occupancy

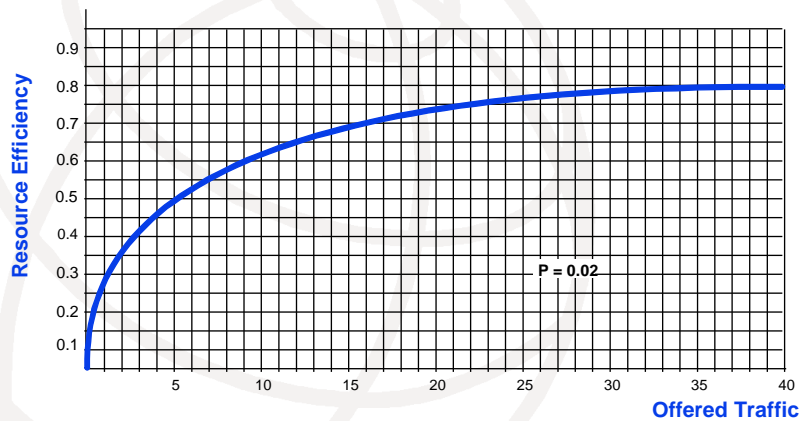
Cost reduction per technology evolution. Example for Ethernet ports



Source: Dell'Oro Group

Economy of scale per traffic efficiency

Impact on efficiency increase for a given quality with traffic and group size (non-linear effect)

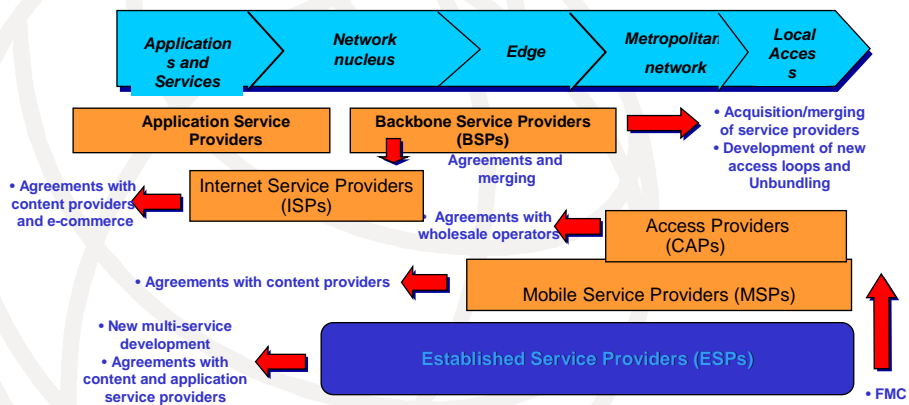


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Business domains and trends

Example of Value Added chain and operators movements to gain economy of scale and market



Business Planning case

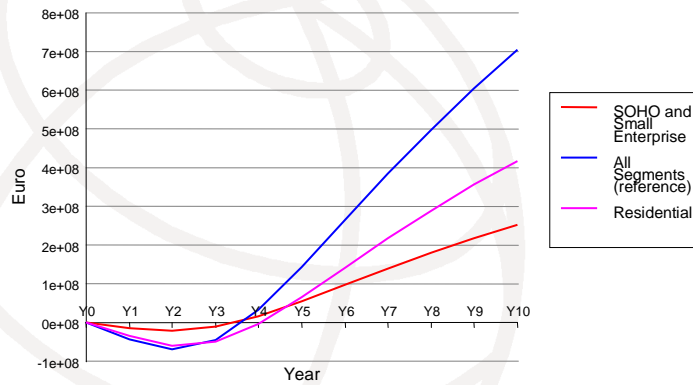
Evaluations to be based on robust techno-economical tools due to high number of alternatives and complexity

Case study performed for medium size country with mixes of customer classes and services domains:

- Multiservice IP Network with integrated operation available
- Three service categories: Voice, Data/Internet, Video distribution
- Modeling demands, multiservice traffic flows, dimensioning, network resources, CAPEX, OPEX and financial results for different levels of competition
- Evaluate differential future Cash-flows, NPV, IRR, etc. for a 10 years period

Business Planning case

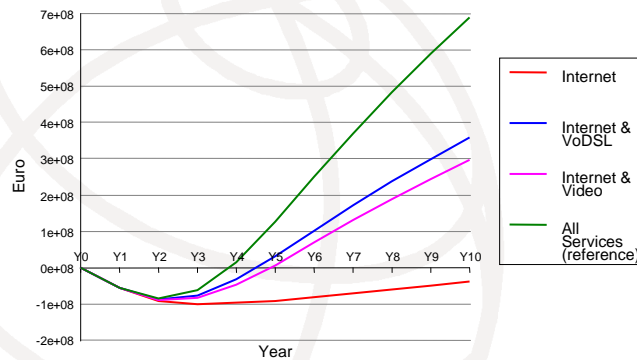
Effects of the mix of customers on Reference Scenario: Low competition level Network NPV



- SME and SOHO with quicker recovery but less NPV and company value at medium term
- "All customer segments" case with much better behavior

Business Planning case

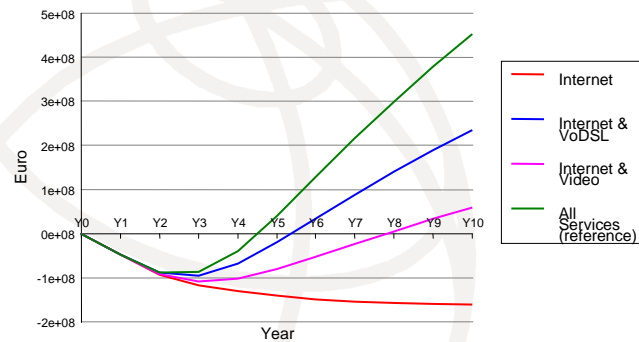
Effects of the mix of services on Reference Scenario: Low competition level Network NPV



- Major impact of service classes on NPV and company survivability
 - Single service classes without future
 - High benefit of "all services" case

Business Planning case

Effects of the mix of services on typical scenario: Medium competition level Network NPV

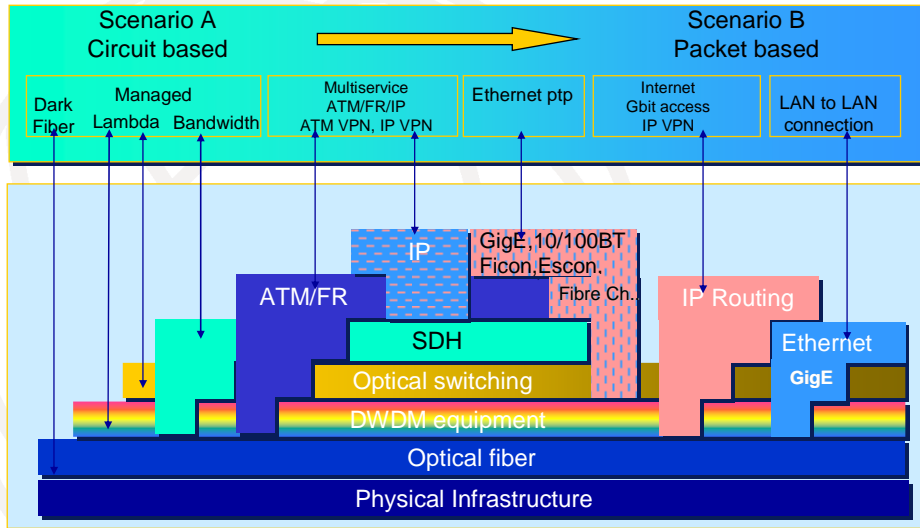


- Increase of competition level amplifies the previous effects on feasibility: big differences between service mixes
- Data only or single service classes without feasibility at medium term
 - Very robust behavior for the "all services" case

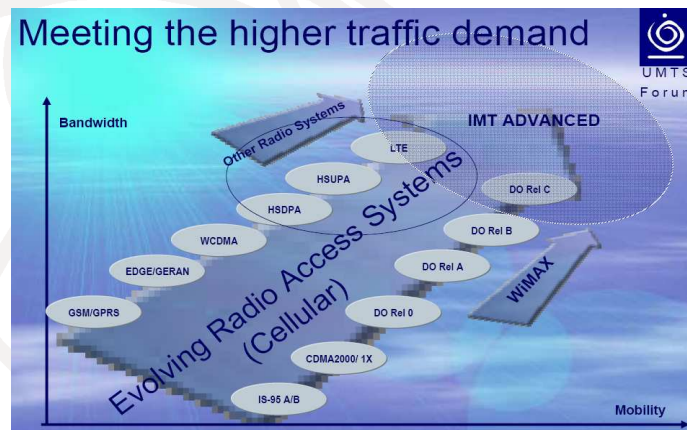
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Technological alternatives at core

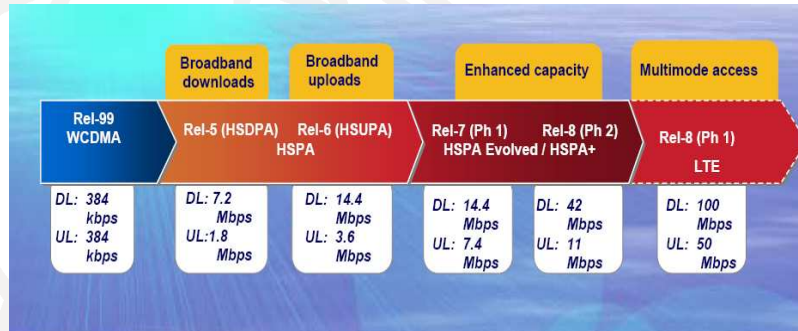


Network Architecture towards NGN Trends in WLL technologies for Bandwidth and Mobility



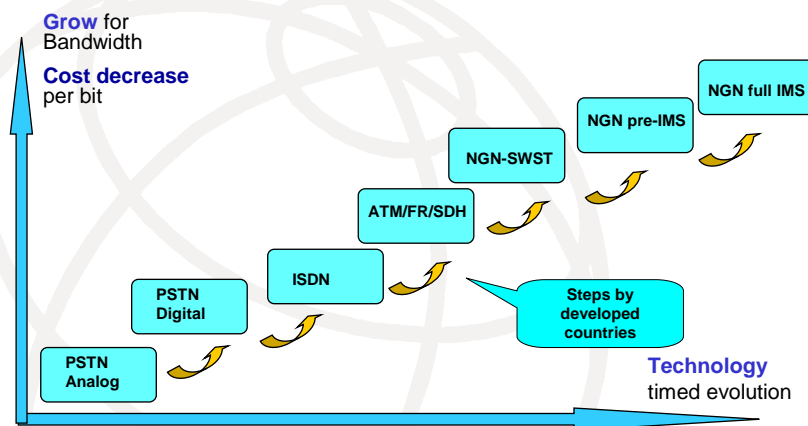
Convergence of different radio systems towards the integration of solutions and services at the IMT advanced

Network Architecture towards NGN Trends in UMTS solutions for higher capacity and performance



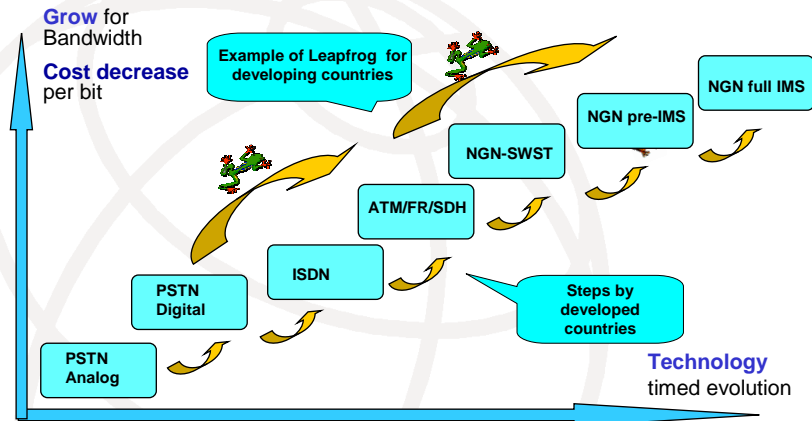
Evolution of the 3G and 3,5G versions towards 4G with increasing speeds and decreasing latency time

Network Architecture towards NGN Fixed network steps/leapfrogging



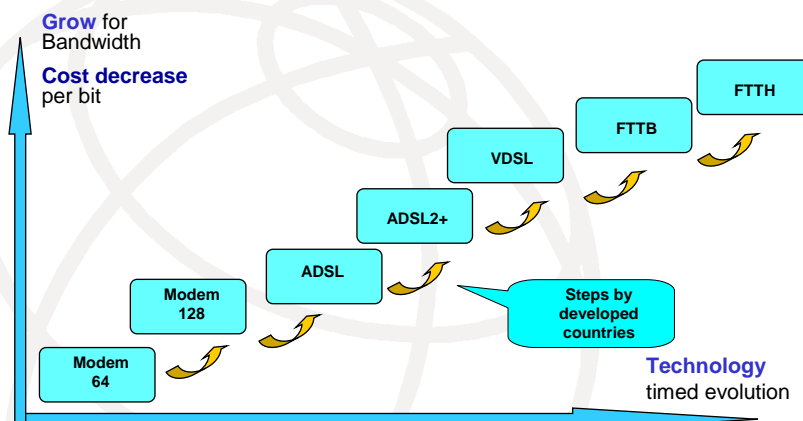
Historical migration steps for fixed network operators with early development and services deployment

Network Architecture towards NGN Fixed network steps/leapfrogging



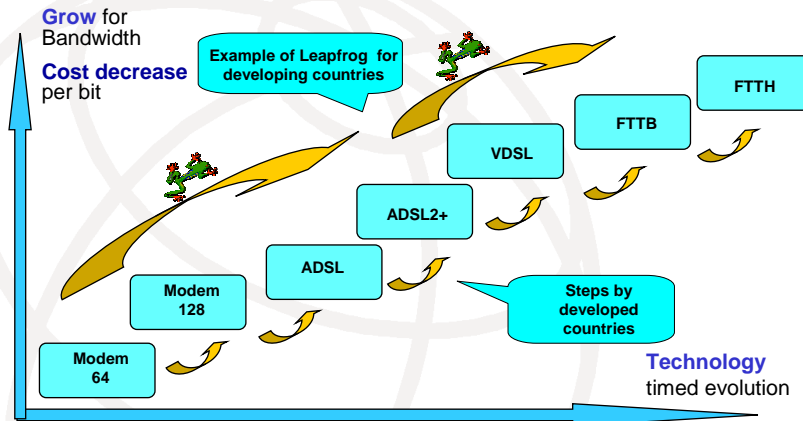
Migration strategy is strongly dependent on **country opportunity, infrastructure and service maturity**

Network Architecture towards NGN Fixed Access network steps/leapfrogging



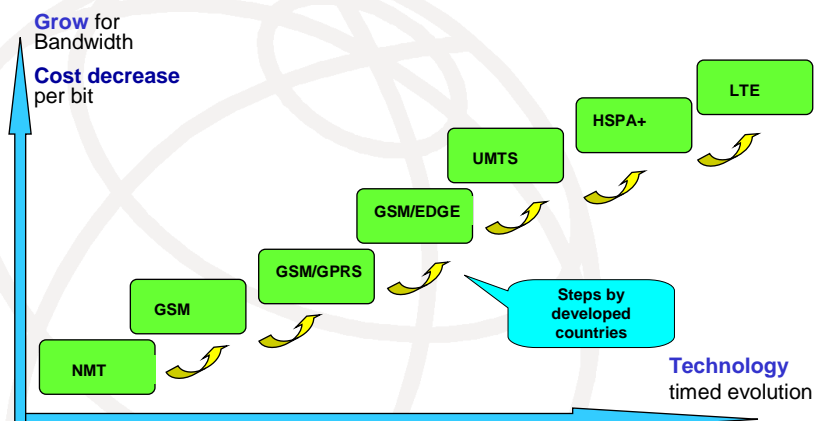
Historical migration steps for internet access operators with early development and services deployment

Network Architecture towards NGN Fixed Access network steps/leapfrogging



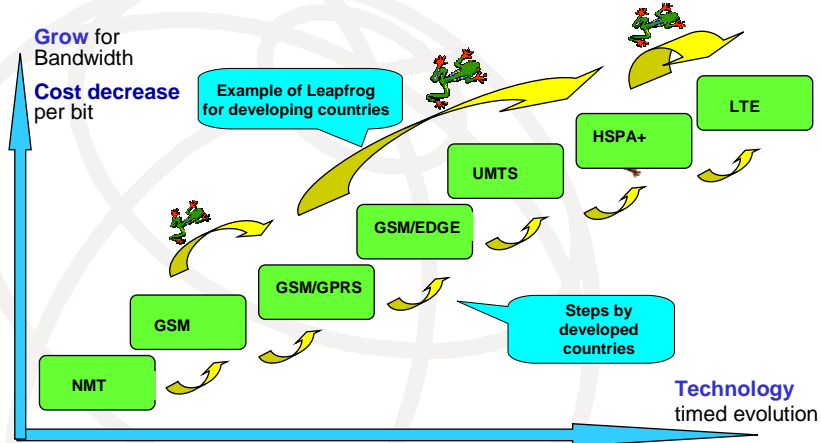
Migration strategy is strongly dependent on **country opportunity, infrastructure and service maturity**

Network Architecture towards NGN Mobile network steps/leapfrogging



Historical migration steps for mobile operators with early development and services deployment

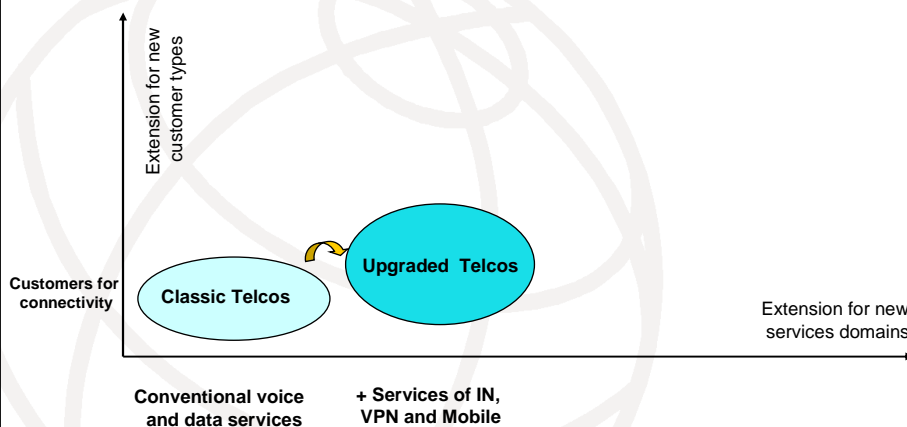
Network Architecture towards NGN Mobile network steps/leapfrogging



Migration strategy is strongly dependent on **country opportunity, infrastructure and service maturity**

Business Migration Leaps

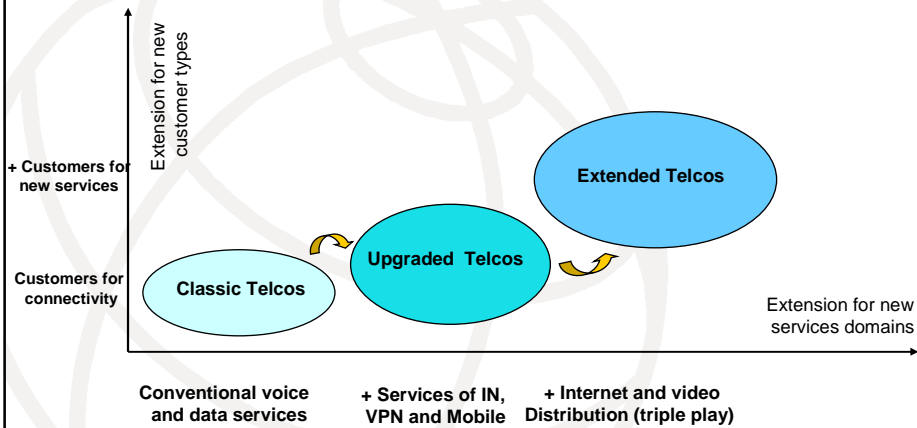
"staircase" for leading growing alternatives



Business Migration Leaps



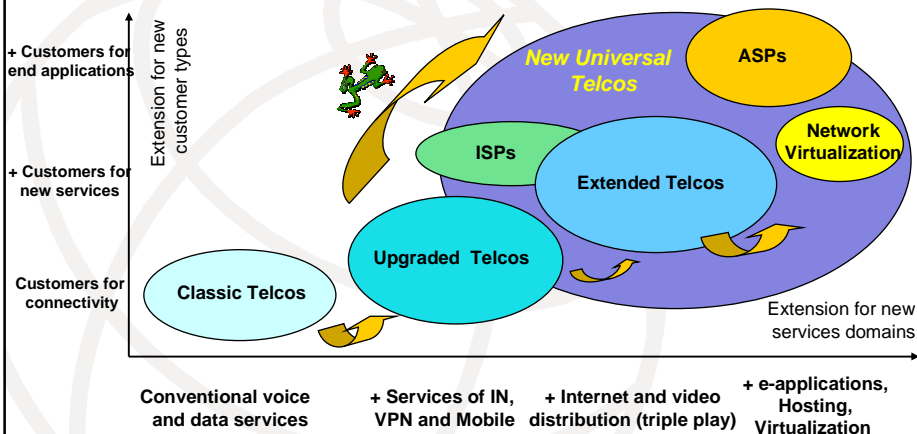
"staircase" for leading growing alternatives



Business Migration Leaps



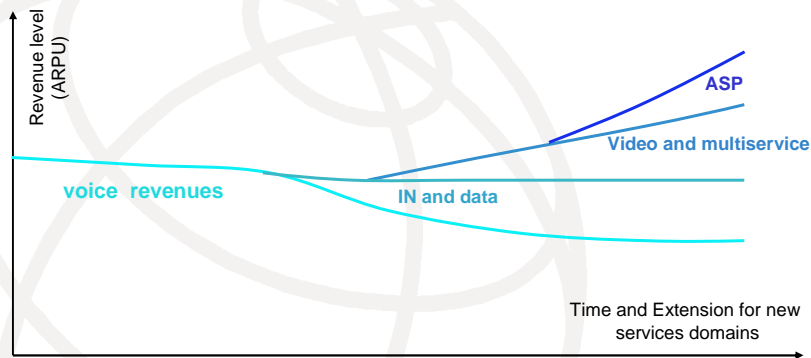
"staircase" for New Universal Telcos



Specific migration and timeframe to be optimized for the country context and regulatory conditions

Business Migration Leaps

Evolution of revenues with service domains



Conventional voice and data services + Services of IN, VPN and Mobile + Internet and video distribution (triple play) + e-applications and Hosting

Convergence strategy is fundamental to grow in a competitive environment

Conclusions

- Recent higher capacity technologies take benefit of economies of scale and **are cheaper per communication unit**
- Skipping intermediate development steps will **reduce transition and operational costs**
- Selection of Leaps per country is a function of **initial maturity stage, country size and demand growing rate**
- Developing countries may benefit from a **business staircase strategy** based on the experiences at developed ones

Recommendations

- Take benefit of experiences, benchmarking and proper **modeling of key techno-economical factors**
- Focus on **consolidated migration steps** and technologies with multiple services domains
- Take benefit of **all economies of scale**

**!! Which convergence will happen ?
Combination Driven by Market, Economy of scale
and Competition !!**