# Next Generation Networks

## *Challenges for the Future Regulatory Policy*


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*Note: The views expressed in this presentation are those of the author and do not necessarily reflect the opinions of the ITU. Jaroslaw K. Ponder can be contacted at Jaroslaw.Ponder@itu.int*

# Agenda

- What is NGN?
- Who drives NGN?
- What drives NGN?
- Economic implications for telecommunication sector
- Regulatory challenges
- NGN versus developing countries
- Conclusions

# Where are we aiming to?

## OLD ECOSYSTEM

- **Competition**
  - Limited/govt. sanctioned Monopolies
- **Market Structures**
  - 2 Dimensional: one network/one service
- **Consumer**
  - Regulated prices, no/little product differentiation, Limited innovation
- **Innovation**
  - Significant but slow
- **Ubiquitous Networks**
  - Universal Service Subsidies
- **Regulation**
  - Heavily regulated with strong jurisdictional boundaries

## NEW ECOSYSTEM

- **Competition**
  - Multiple Facilities-Based
- **Market Structures**
  - Converged, 3 dimensional, one network, many services
- **Consumer**
  - Lower bundled prices, more innovation, product differentiation, personalization, customization
- **Innovation**
  - Dynamic at all levels (Network/Applications/CPE)
- **Ubiquitous Networks**
  - Technological advances
- **Regulation**
  - Less regulation, boundaries blurred

## Next ?

# Next Generation Networks?

- **A broad concept**
  - encompasses the whole development of new network technologies, new access infrastructures, new services…
- **Focused concept**
  - Specific network architecture and related equipments, with one common IP core network deployed for all the legacy, current and future access networks.

# Next Generation Networks?

- **ITU definition: ITU-T SG 13: Rec. Y.2001**
  - A NGN is a **packet-based network** able to provide telecommunication services and able to make use of **multiple broadband**, **QoS-enabled** transport technologies and in which **service-related functions** are **independent** from underlying **transport-related technologies**.
  - It enables **unfettered access** for users to networks and to competing service providers and/or services of their choice.
  - It supports **generalized mobility** which will allow consistent and ubiquitous provision of services to users.

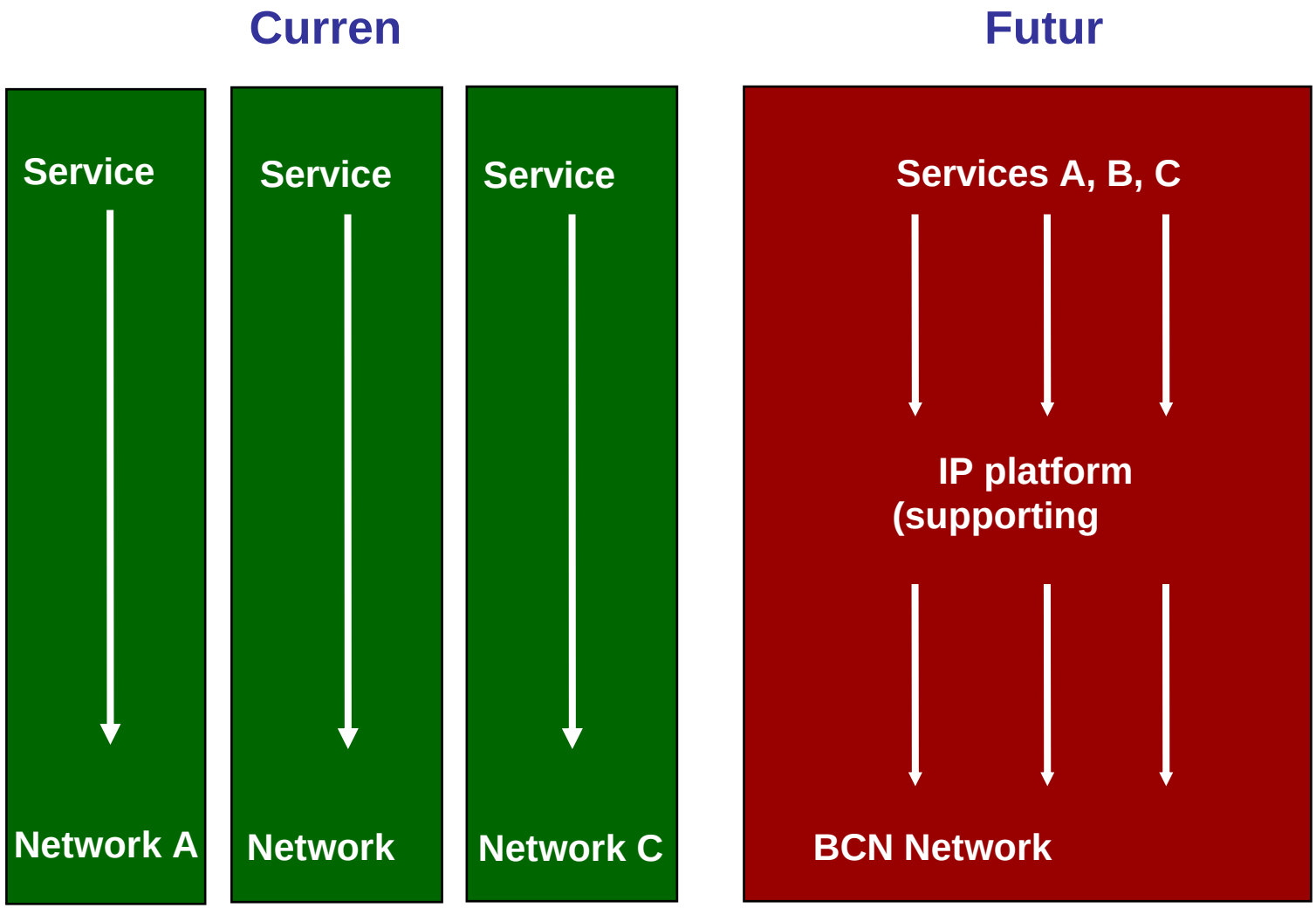
# Next Generation Networks?

- **NGN characteristics**
  - Packet-based transfer
  - Separation of control functions among bearer capabilities, call/session, and application/service
  - Decoupling of service provision from network, and provision of open interfaces
  - Support for a wide range of services, applications and mechanisms based on service building blocks (including real time/ streaming/ non-real time services and multi-media services)
  - Broadband capabilities with end-to-end QoS

# NGN: What is different?

- **Multimedia**
  - NGN should enable provision of wide range of services including: data transmission, voice services, video services
- **Generalized mobility**
  - NGN should enable provision of communication services regardless of place
- **Convergence**
  - Network should enable provision of diverse services that nowadays are provided thanks to different networks, e.g. data transmission networks, fixed and mobile telecommunication networks
- **Integrity**
  - Network should integrate all existing communication networks
- **Multi-layer orientation**
  - Networks should be multilayer, where steering, management and service provision functions are independent from transport and access
- **Open character**
  - Network layers should communicate through open interfaces enabling use of different equipment from diverse hardware producers

# How NGN looks like?

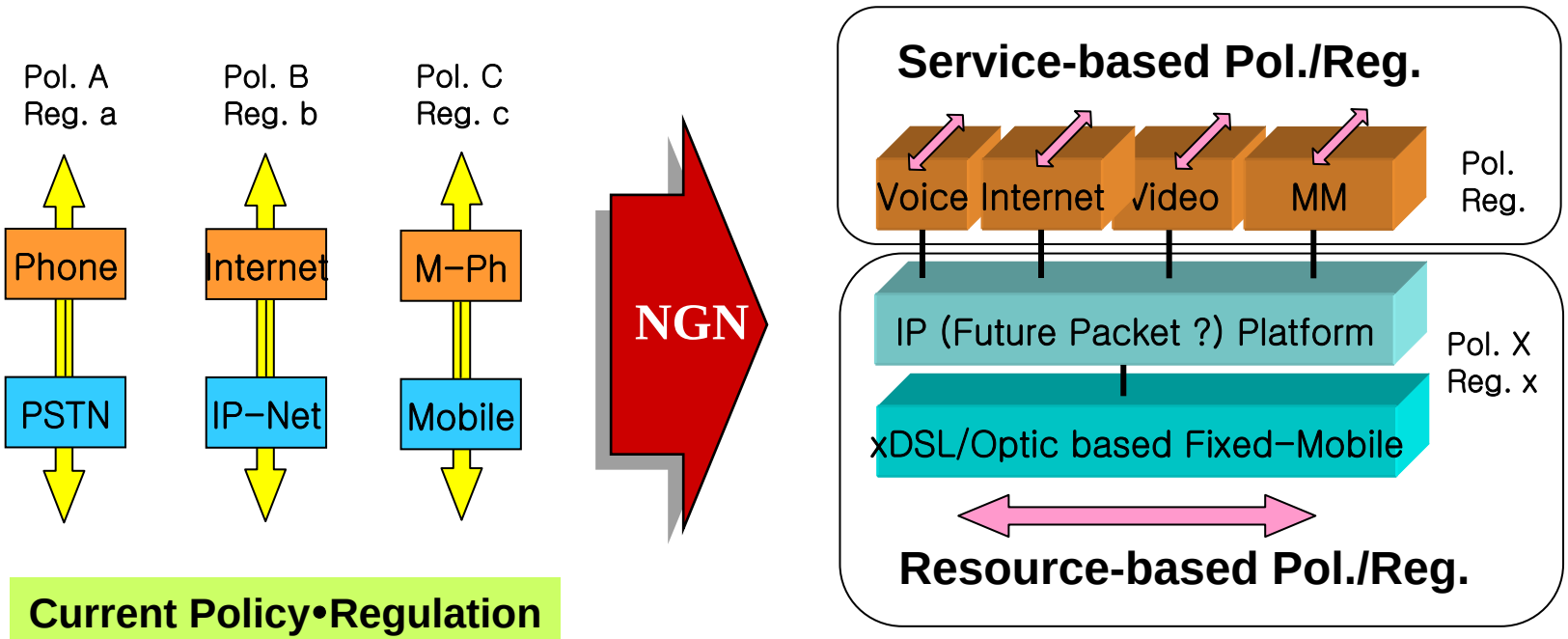





*Source: Shaw, R. (2005)*

# NGN: Regulatory challenges

## Migration from vertical to horizontal approach



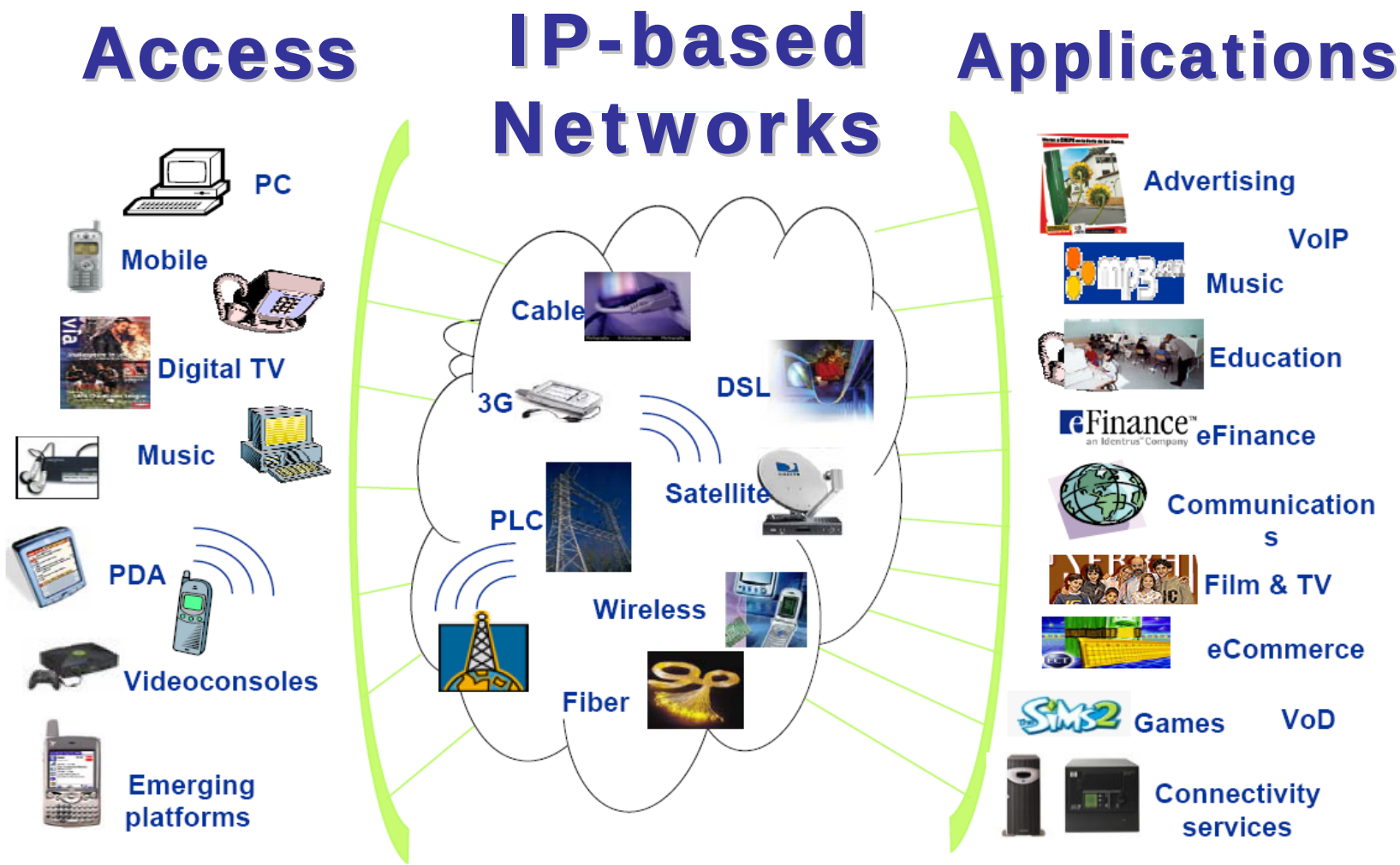

**Current Policy•Regulation Environment (Vertical)**

**New Policy•Regulation Environment (Horizontal)**



*Source: ITU*

# NGN: Business challenges / models



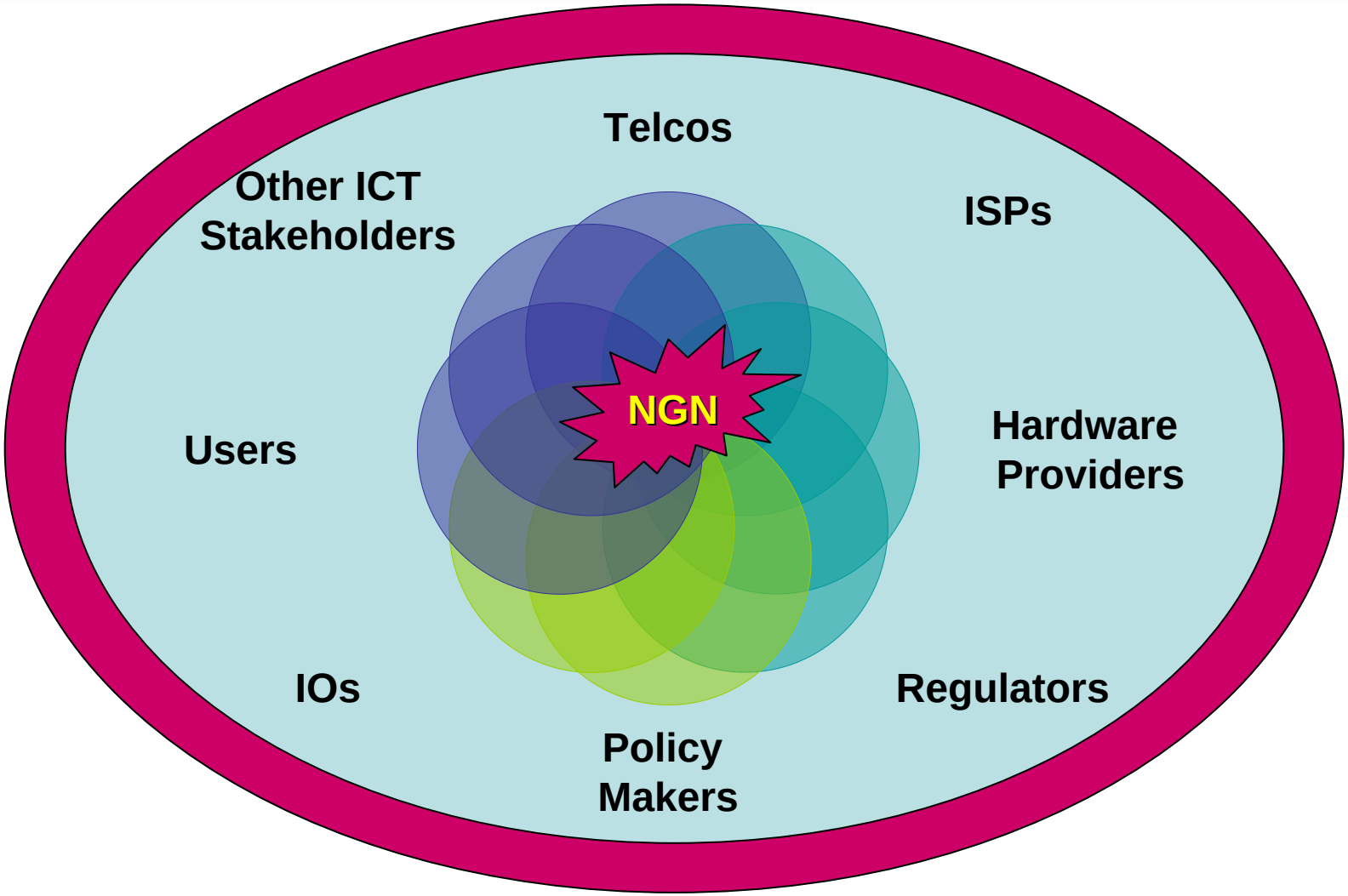



*Source : Telefonica 2005*

# Who drives NGN?

- Telecom operators ?
- Internet service providers ?
- Communication service providers ?
- Hardware providers ?
- Other ICT sector stakeholders ?
- Users?
- Policy makers ?
- Regulatory authorities ?
- Someone else?

# Who drives NGN?



# What drives NGN development?

- **Better financial performance**
  - Revenue growth
  - Margin protection
  - Reduced OPEX and CAPEX
- **Operational issues**
  - Obsolescence & modernization
  - Reliability, resilience & quality
  - Capacity & scalability
  - Simpler and faster provision of service
- **Competitive issues**
  - New service roll-out/substitution & service differentiation
  - Market share growth & protection
  - Convergence of voice, data and IT enables provision of new offerings in packages

# NGN Implications: Supply side

- **Savings in CAPEX and OPEX**
  - Network consolidation requires less physical assets (e.g. real estate, about 40% savings)
  - Fewer network elements and interfaces required
  - Standardization of NGN networking equipment triggers competition and consequently fall of prices
  - Economies coming from IP
  - Network maintenance (savings about 30%)
  - Personnel (savings around 30-40%)
  - IT costs (savings around 40%)
  - Power consumption (savings around 40%)

# Business opportunities and risks

- **Business Opportunities**
  - Service providers, network operators, content developers, manufacturers
  - High investment required
- **Existing Risks**
  - Financial difficulties of telecom operators may slaw down migration to NGN
  - Uncertainty about business model
  - Demand for new multi-media, value-added and content-based services still remains unknown
  - Openness of services to third party suppliers may diminish incumbents' revenues
  - Technical challenges
    - end-to-end Quality of Services, congestion management, network security, interoperability, network reliability and management, user mobility
  - Legal environment

# Business opportunities and risks

- **Possible strategies mitigating investment risk and fostering success of NGN**
  - Simultaneous investment in next generation networks in mobile and fixed
  - Investment in deployment of fixed broadband connectivity leading to provision of cheaper and richer service packages
  - Fostering content development
  - Acceleration of standardisation process
  - Work on regulatory environment that would give investment incentives
  - Return on investment has to be assured

# Migration to NGN

- **2009 / British Telecom:** BT aims to move majority of its subscriber base to "broadband dial tone" by 2009. Aims for annualized cost savings of **£1bn** pa from 21st century network Capex in medium term likely to be below current **£3bn** pa level once network migration completed.
- **2012 / Deutsche Telekom:** Company has completed an NGN overlay backbone network, voice/data integration to be driven by customer demand, company has suggested by 2012. Core network already IP-MPLS, carriers traffic for both fixed and mobile business.
- **2009 / KPN :** Company is in "first phase" of move to an IP everywhere environment for corporate customers. KPN aims to move to an all IP core backbone by 2007, with Ethernet in the access network by 2009. ATM and SDH to be phased out of network by 2010, completing move to IP. Cost savings targeted at **150 M Euro** pa from 2005, rising to **2000 m EURO pa** from 2008. Headcount to fall by equivalent of 8000 by 2009. Network transformation programme means capex at **1-2 bn** Euro pa from 2006 onwards.

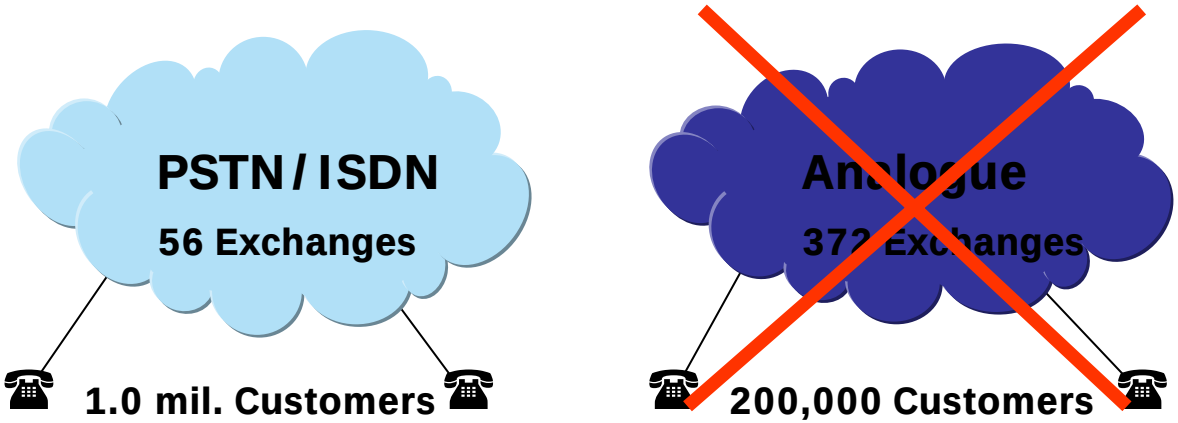


***Source: CSFB, 2005***

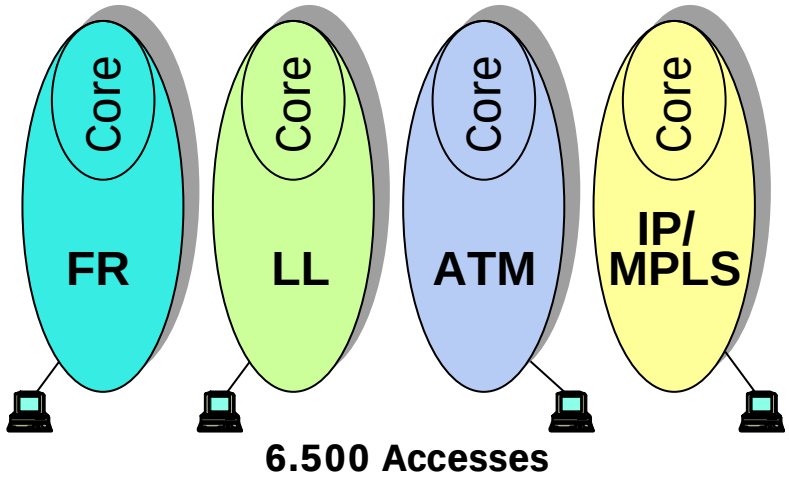
# Case Study: Slovak Telecom

## eNGine - Fully integrated IP Company by 2008

### Voice




### Data






*Source : Slovak Telecom 2005*

# Case Study: Slovak Telecom

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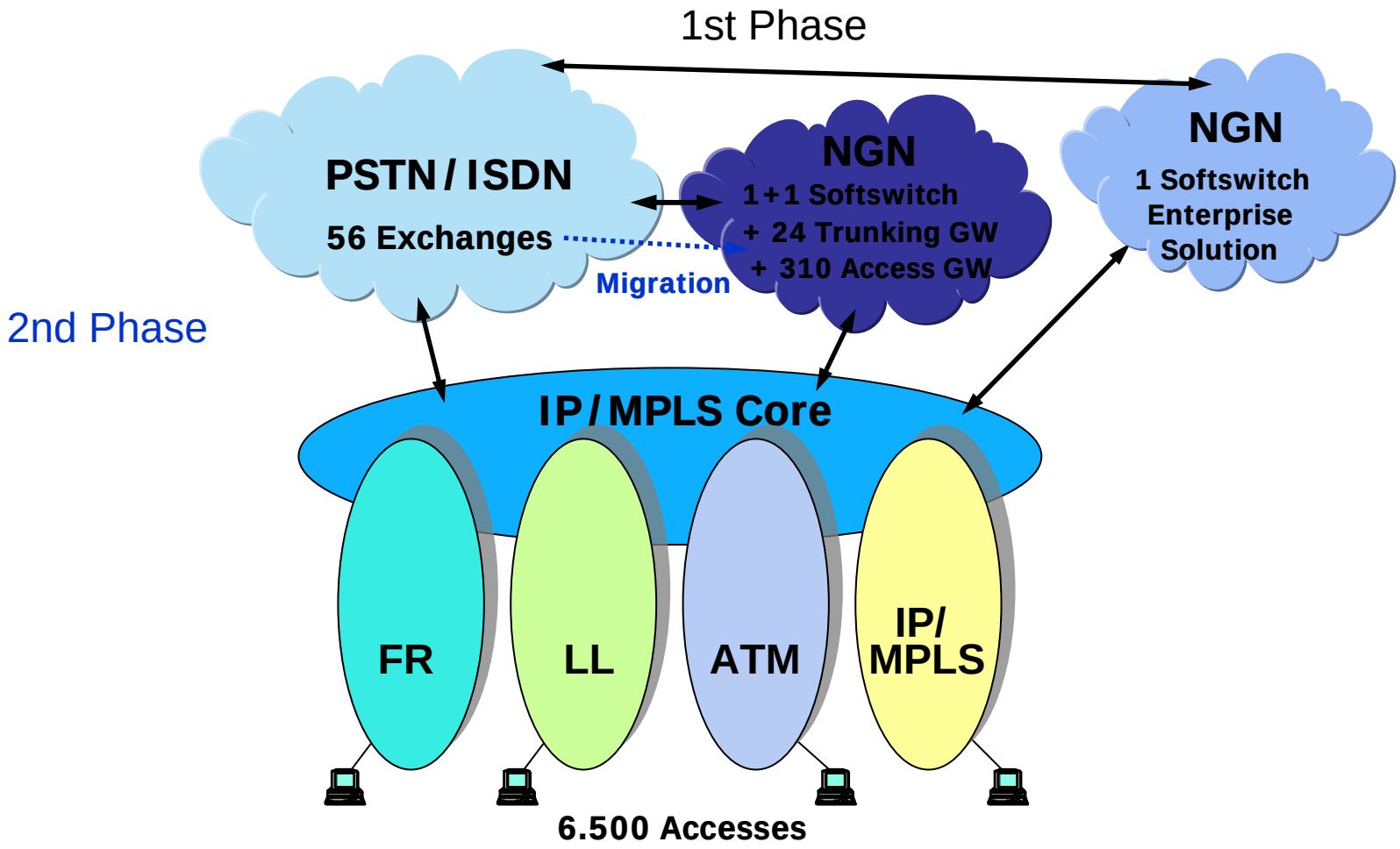





*Source : Slovak Telecom 2005*

# NGN Implications: Demand side

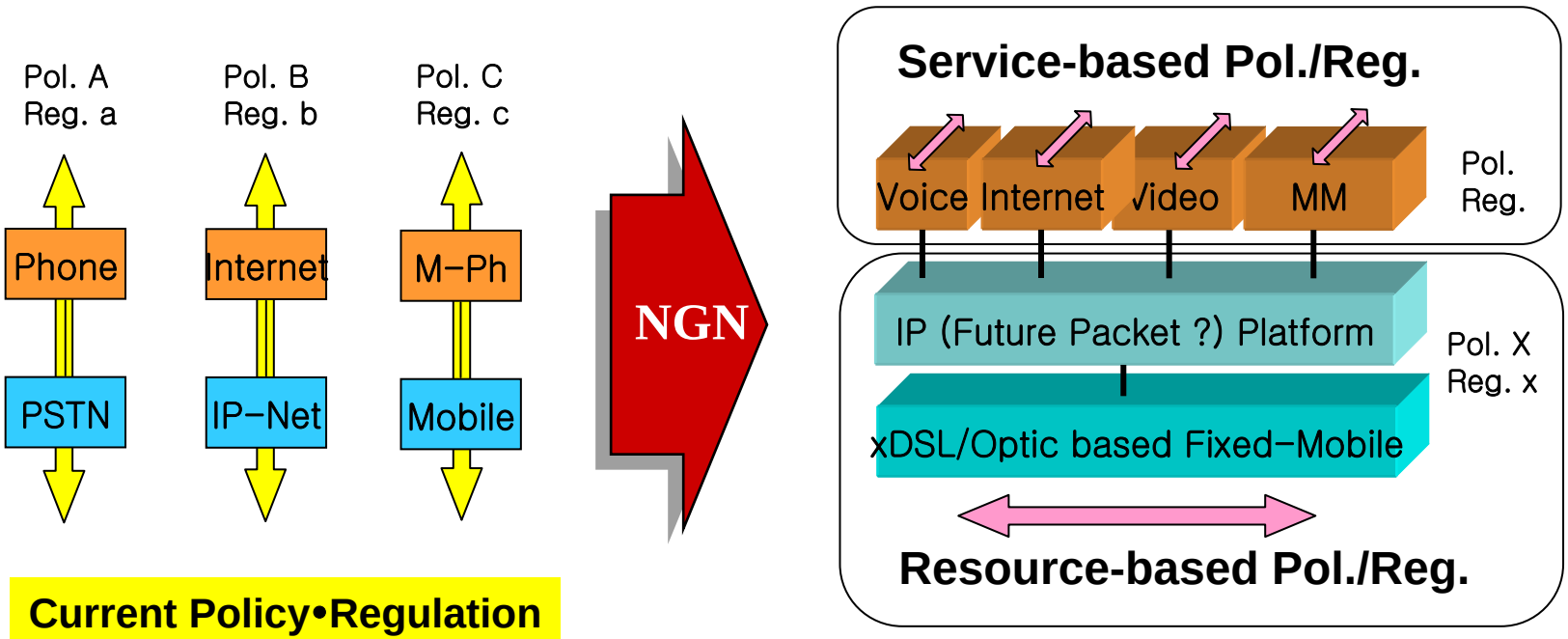
- **New quality of service**
  - Enhanced Efficiency → automatic network monitoring and fault management
  - Self configuration of voice applications via web interface → reduction of activation time
- **Flexible addition of new voice applications and customer locations via central network management**
- **No own investment in PBX necessary**
- **Full cost transparency through flexible and simple pricing**
- **New price strategies bundling offerings**

# NGN Implications: Sector

- **NGN accelerates process of convergence**
  - Market structure
  - Institutional changes
- **Changed role of network operators**
- **Newcomers: electricity companies, cable companies and mobile operators**
- **Changed business models**
  - New sources of revenue
  - Bundling offerings more popular
- **Revision of regulatory policy reqiured**
- **NGN should increase economic meaning of ICT sector**

# NGN: Regulatory Challenges

## Migration from vertical to horizontal approach




**Current Policy•Regulation Environment (Vertical)**

**New Policy•Regulation Environment (Horizontal)**



Source: ITU

# NGN: Some regulatory objectives

- **Competition**
- **Investment**
  - Modernization
  - Roll-out
- **Innovation**
  - Infrastructure
  - Services
- **Public needs**
  - Consumer protection
- **Socio-economic aspects**

# NGN: Regulatory Challenges

- **NGN requires creation of incentives to invest (for both new entrants and incumbents)**
  - NGN is still seen as risky investment
  - Nowadays most of investment will be done by incubents
  - Broadband policies facilitate migration to the Internet
  - NGN still requires high R&D expenditures that nowadays are mostly covered by hardware vendors
  - Regulatory uncertainty negativly impacts NGN expansion
- **NGN strengths competition, but….**
  - NGN creates new entrance opportunities for operating companies as well as newcomers
  - NGN creates new markets and reinforce position of some market players
  - Significant market power approach and promotion of fair competition; new definition of relevant markets
  - Balance between ex-ante regulations and ex post remedies
  - Effectiveness of self correcting forces in a competitive marketplace

# NGN: Regulatory Challenges

- **NGN requires broad debate on interconnection and pricing**
  - Confrontation of two existing models
    - Internet model versus circuit-switched one
  - Cost models: Will it be possible to separate connectivity and services?
    - Outcome of CEPT consultations give impression that nothing is going to change in the future
      - Operators are aiming for NGNs to be no more than a complete re-building of PSTN on top of a new IP sub-structure
      - Business models may not be changed
  - Will NGN be more then PSTN on IP?

# NGN: Regulatory Challenges

- **NGN character requires intensified efforts in field of consumer interests protection**
  - Universal Service
    - Access to the communications infrastructure or provision of telephone services (mobile telecommunications and broadband)
    - Any location including access while on the move or geographic restrictions
    - Funding
  - Consumer emergency calls (E112/E911)
  - Consumer protection and privacy (e.g. SPAM, SPIM)
  - Quality of services
  - Authenticated caller or sender identification
  - Disability assistance
  - Data protection and privacy issues

# NGN: Regulatory Challenges

- **National Security and Critical Infrastructure Protection**
  - Network attack mitigation
  - Public safety emergency and law enforcement assistance
  - Priority access during or after disasters
  - Service restoration
  - Analysis and reporting of network metrics and outages
- **NGN attaches great importance to wireless technologies.**
  - The optimal spectrum management should become objective of all regulators
- **NGN triggers discussion on Quality of Service**
- **NGN puts under consideration international settlement system**

# NGN: Developing Countries

- **NGN can become crucial in terms bridging of digital divide**
  - Smaller investment required (CAPEX)
  - Cheaper maintenance (OPEX)
  - Packet based technology
- **Services**
  - NGN give possibility of provision of divers services
  - Business model may be adjusted to the country profile
- **Financial sources for investment has to be found**
  - NGN requires revision of international settlement system
  - Public Private Partnerships has to be promoted
  - Sources of revenue have to be localized on the local markets

# Conclusions

- NGN still in seed stadium
- NGN is an evolution and revolution in the same time
- NGN changes traditional paradigm of telecommunication sector
- Technological developments are important but not enough to create new sustainable environment → Some regulation and policy oriented considerations have to be taken into account
- Competition is key to NGN; on the other hand NGN fosters competition

# Conclusions

- NGN creates incentives to invest for both new entrants and incumbents
- For incumbents NGN remains the only way to preserve gradually declining revenues (competition from mobile and VoIP)
- NGN protects consumer interests, but…
- NGN fosters innovation dynamics
- NGN may contribute to diminished digital divide

**What is the role of policy makers and regulators?**

# Useful ITU resources

- **Strategy and Policy Unit (SPU)**
  - http://www.itu.int/osg/spu/NGN/index.phtml
- **ITU-T Study Group 13 (Next Generation Networks)**
  - *Responsible for studies relating to the architecture, evolution and convergence of next generation networks including frameworks and functional architectures, signalling requirements for NGN, NGN project management coordination across study groups and release planning, implementation scenarios and deployment models, network and service capabilities, interoperability, impact of IPv6, NGN mobility and network convergence and public data network aspects.*
  - http://www.itu.int/ITU-T/studygroups/com13/index.asp
- **Focus Group on Next Generation Networks (FGNGN)**
  - *The Focus Group (FG) has been created to address the emerging needs for global standards for Next Generation Networks (NGN).*
  - http://www.itu.int/ITU-T/ngn/fgngn/

# Useful ITU resources

- **Open Communications Architecture Forum (OCAF) Focus Group**
  - *The objective of the OCAF Focus Group is to agree on specifications for a set of components for a new carrier grade open platforms that will accelerate deployment of NGN infrastructure and services.*
  - *http://www.itu.int/ITU-T/ocaf/index.html*
- **NGN Management Focus Group**
  - *The NGN Management Focus Group has been created to organize and undertake a centralized approach regarding NGN management specifications. It has been created in response to a request from the NGN Focus Group.*
  - *http://www.itu.int/ITU-T/studygroups/com04/ngn-mfg/index.html*

# Thank you very much for your attention!

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