



Next Generation Networks:

Challenges for Future Regulatory Policy and Performance of Telecommunication Sector



ICT Trends and Challenges in a Global Era

MSU/INT/BSL Programme

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Agenda

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



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 to make use of multiple broadband, QoS-enabled transport technologies 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**



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 are currently provided by different networks, e.g. data transmission networks, fixed and mobile telecommunication networks

● Integrity

- Network should integrate all existing communication networks

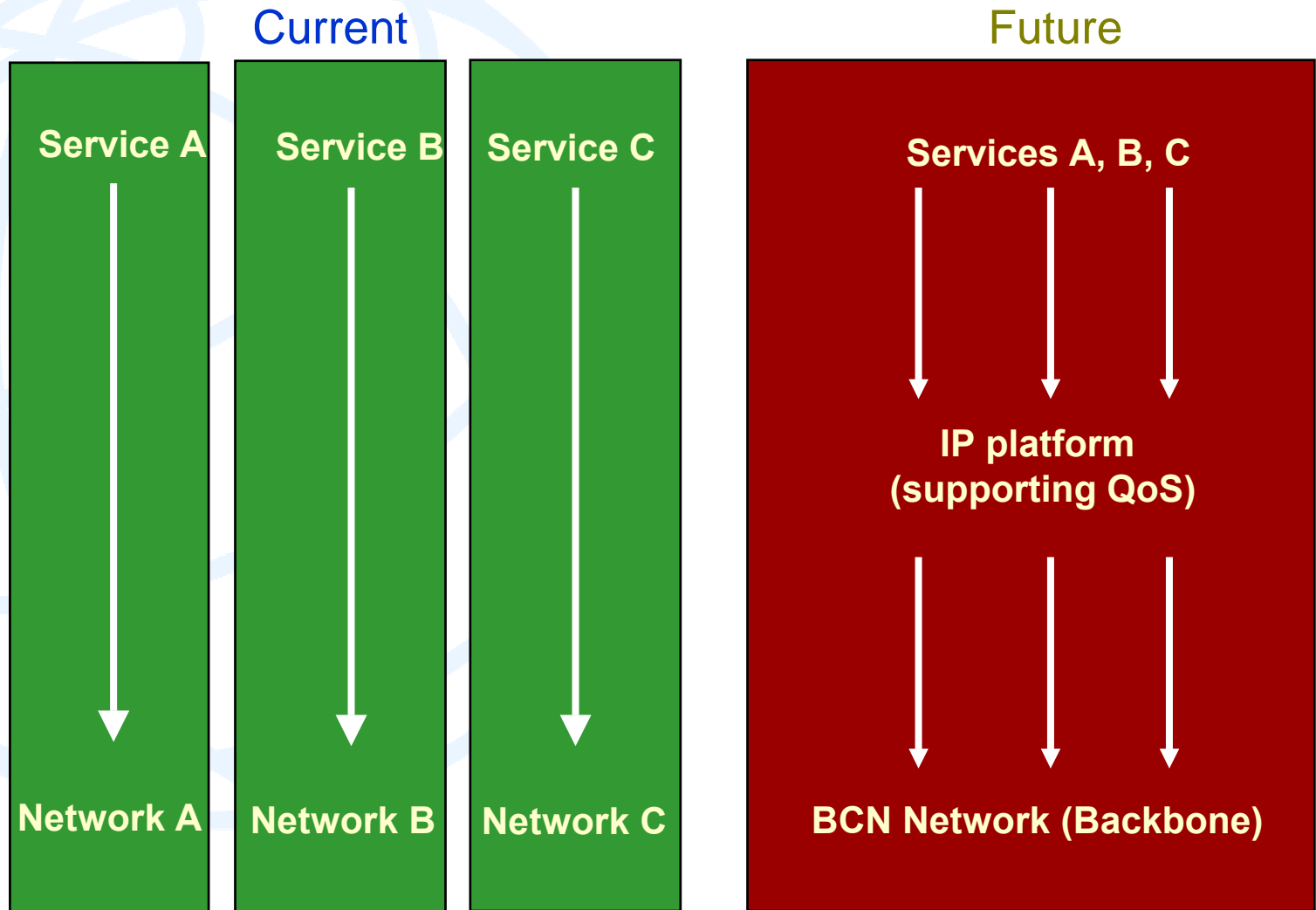
● Multi-layer orientation

- Networks should be multilayer, where steering, management and service provision functions are independent from transport and access

● Open character

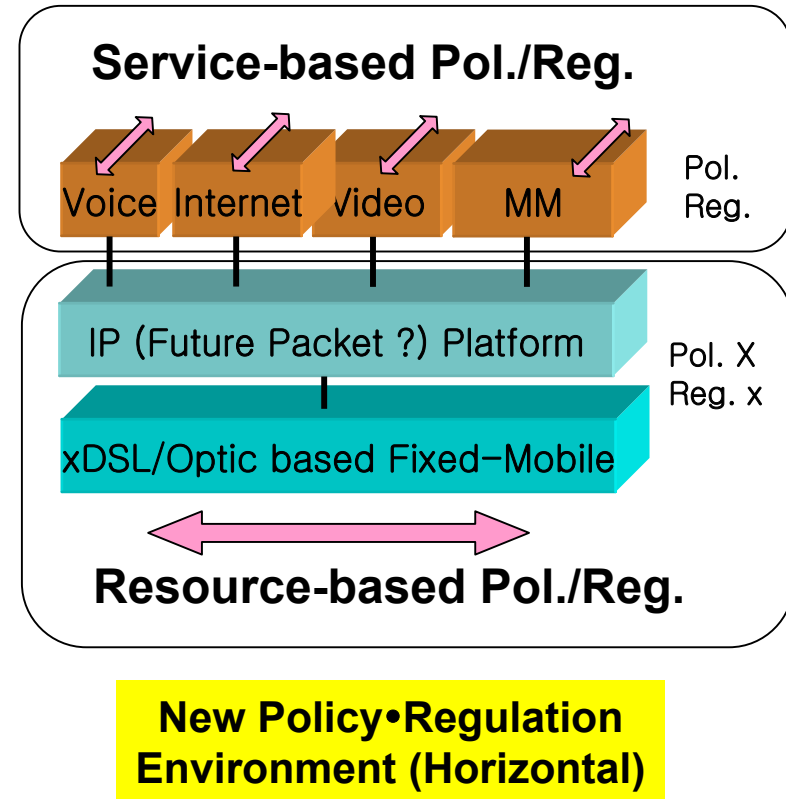
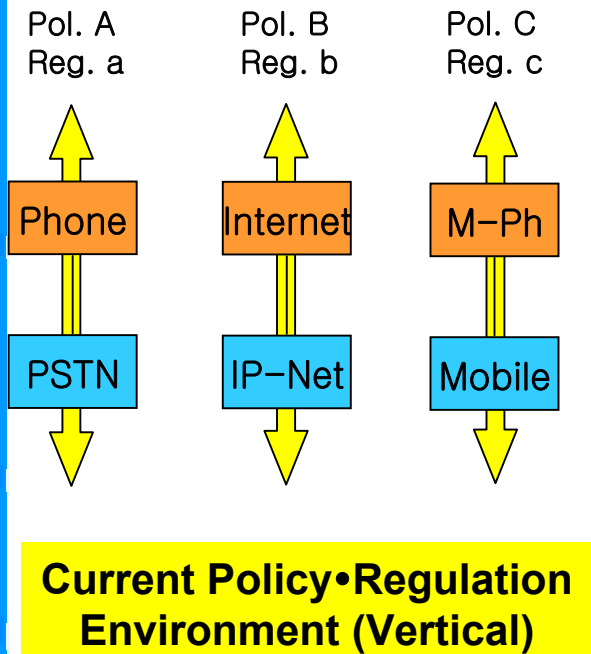
- Network layers should communicate through open interfaces enabling use of different equipment from diverse hardware manufacturers

What does NGN look like?



NGN: Regulatory Challenges

Migration from vertical to horizontal approach

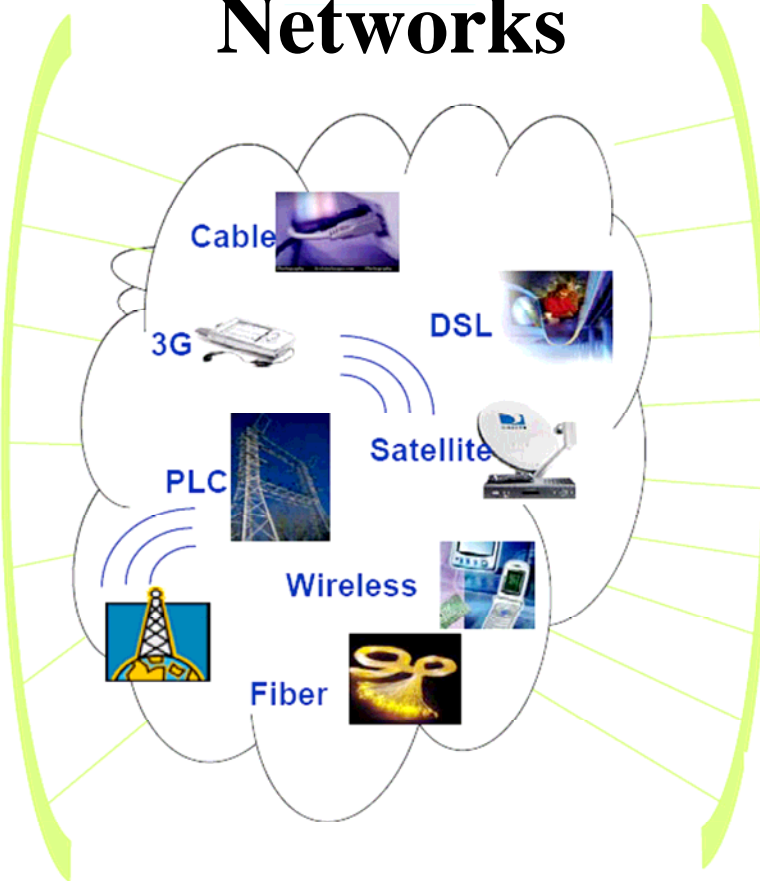


NGN: Business models

Access



IP-based Networks



Applications





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 around 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 slow 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**



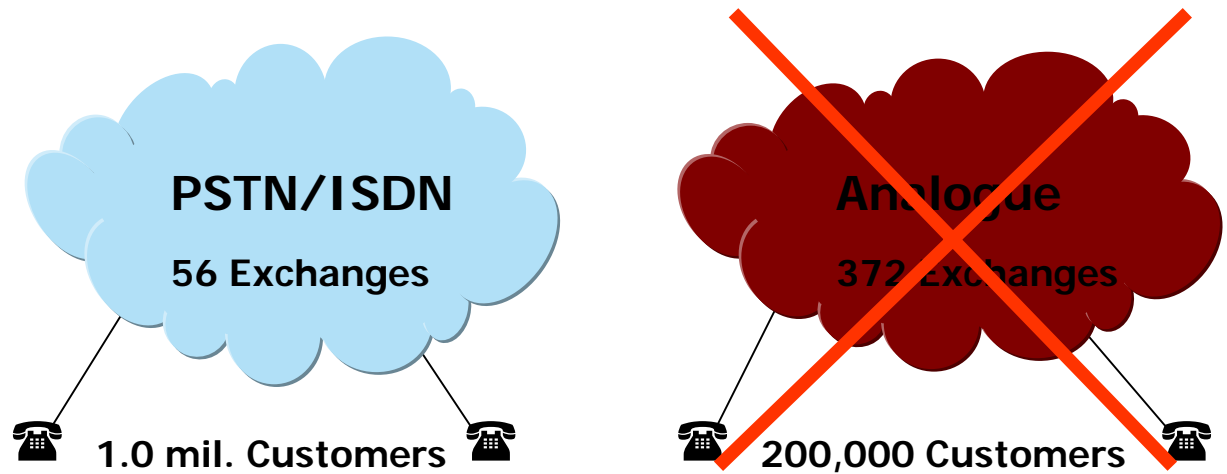
Migration to NGN

- **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.

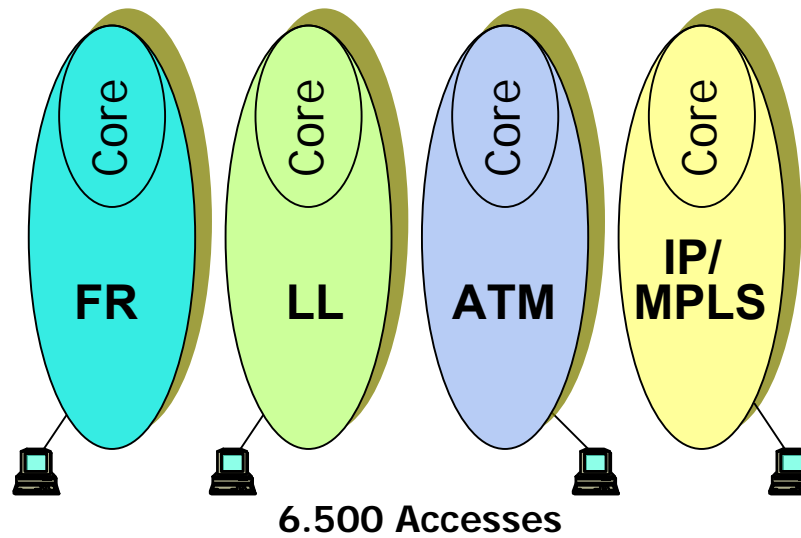
Case Study: Slovak Telecom

eNGine - Fully integrated IP Company by 2008

Voice



Data

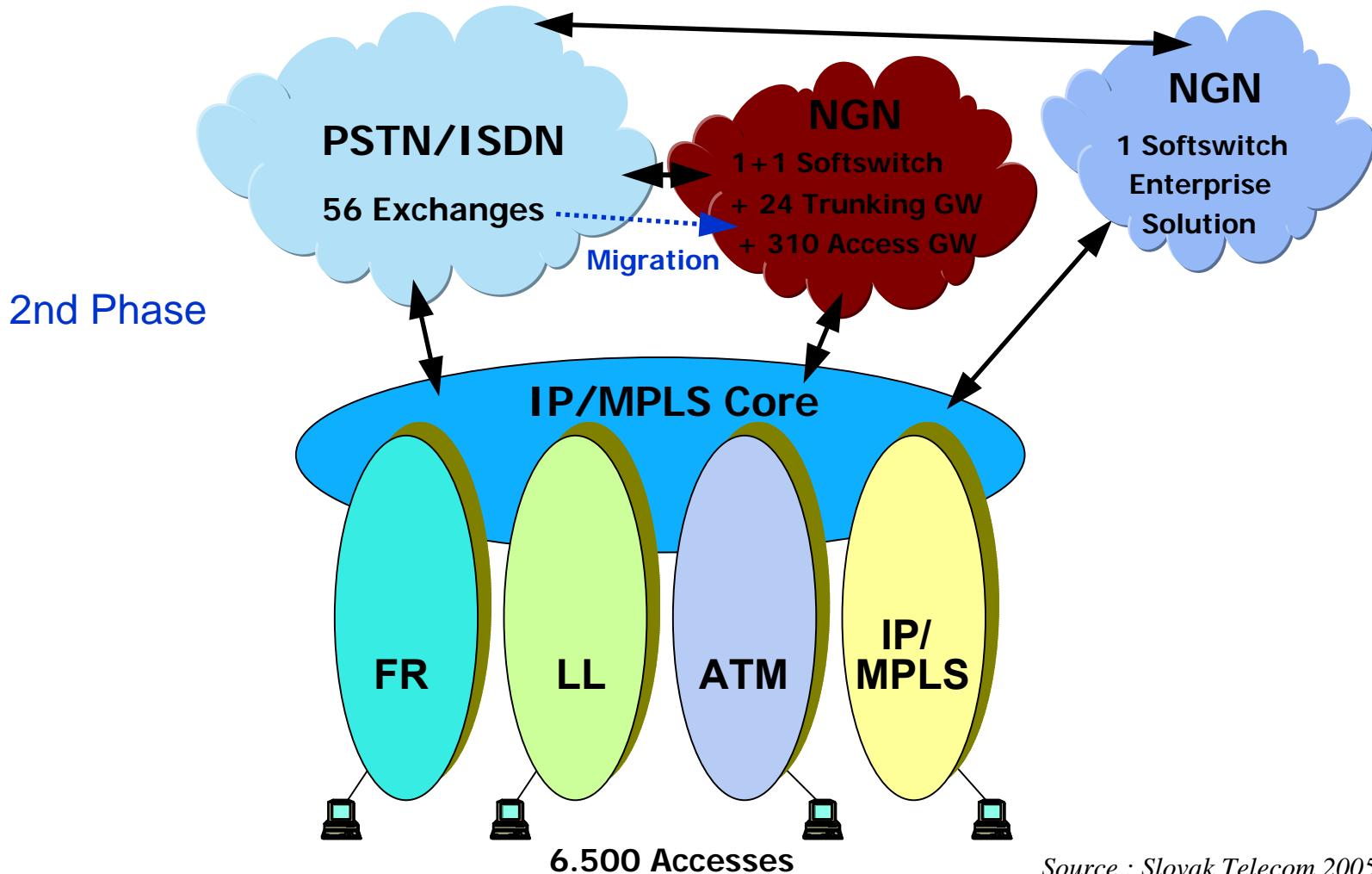


Source : Slovak Telecom 2005

Case Study: Slovak Telecom

eNGine - Fully integrated IP Company by 2008

1st Phase





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**

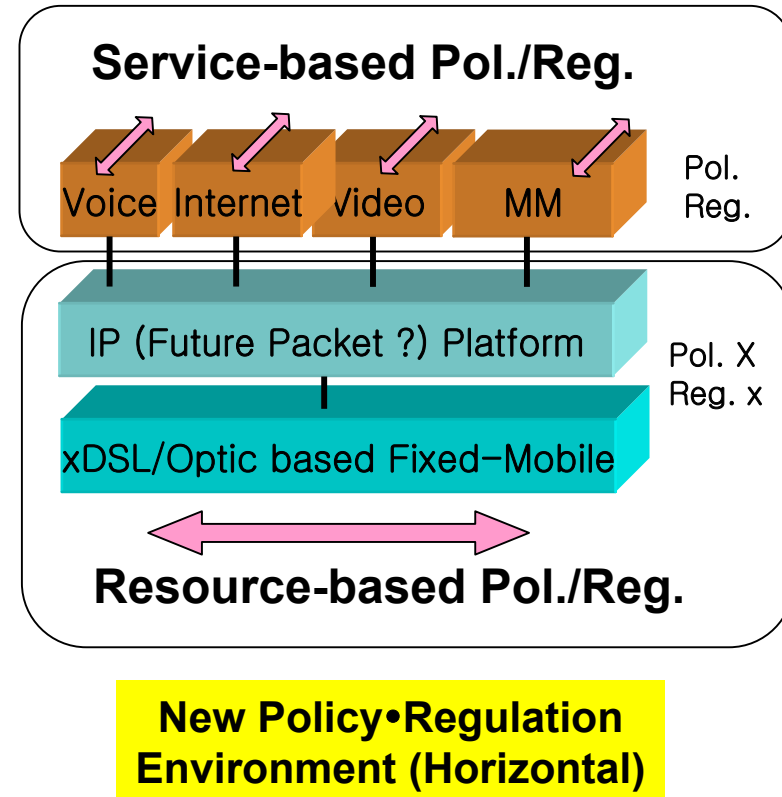
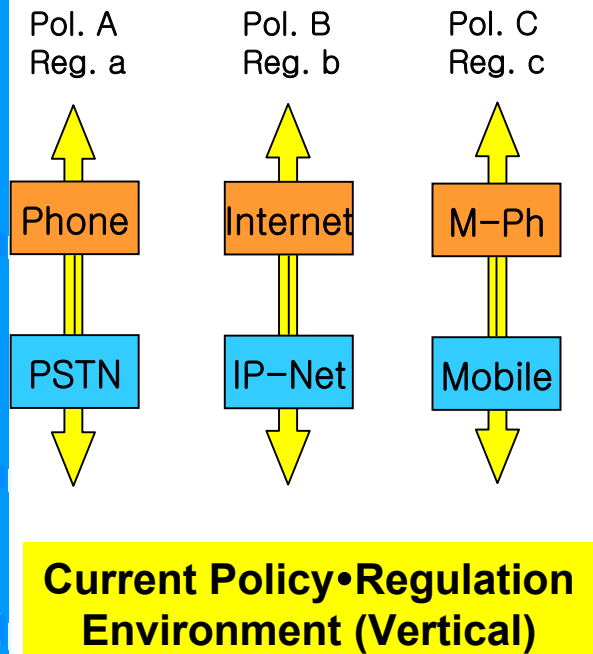


NGN Implications: Sector

- **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 required**
- **NGN should increase economic meaning of ICT sector**

NGN: Regulatory Challenges

Migration from vertical to horizontal approach





NGN: Regulatory Challenges

- **NGN strengthens competition**
 - **NGN creates new entrance opportunities for operating companies as well as newcomers**
 - **NGN creates new markets and reinforces position of some market players**
 - **Significant market power approach and promotion of fair competition; new definition of relevant markets**
 - **For NGN number portability will have crucial meaning**
- **NGN at this stage of development 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 incumbents**
- **NGN still requires high R&D expenditures that nowadays are mostly covered by hardware vendors**
 - **NGNs may be regarded as disruptive innovation**

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)**
 - **Authenticated caller or sender identification**
 - **Disability assistance**
 - **Data protection and privacy issues**
- **NGN requires debate on interconnection**
 - **IP peering agreements**



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**
 - **Should QoS remains unregulated it may become commodity**
- **NGN puts under consideration international settlement system**



NGN: Developing Countries

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



Conclusions

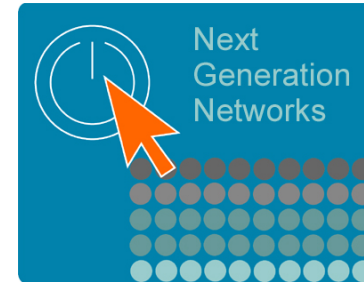
- **NGN still in seed stage**
- **NGN is an evolution and revolution in the same time**
- **NGN changes traditional paradigm of telecommunication sector**
- **Technological developments are important but are not enough to create new sustainable environment (Some regulation and policy oriented considerations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



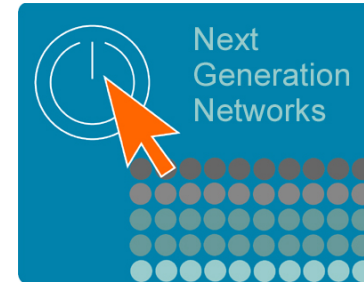
Conclusions

- **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**
- **NGN may contribute to diminished digital divide**

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, signaling 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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