Costing and pricing of interconnection services today and tomorrow: impact of migration to NGN and ITU/BDT activities

ITU Seminar on Tariff policies and interconnection
of telecom operators' networks
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Agenda

- Costing and pricing interconnection services:
  - Main principles of today's interconnection
  - Impact of migration to NGN
- Related ITU/BDT activities

Today's interconnection world

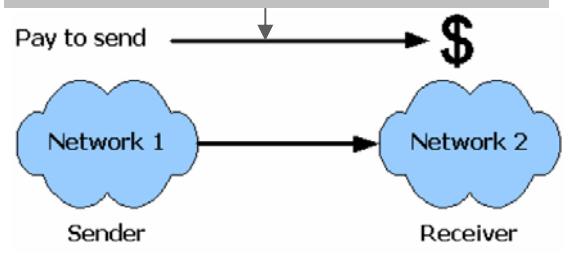
✓ Today two general interconnection regimes are established for voice and data related to their specific business models.

Voice	Data
Charging model: Calling Party's Network Pays (CPNP) as preferred interconnection regime In some cases Receiving Party Network Pays (RPNP) regime is used **Revenues:** mostly generated by subscribers, which initiate calls and pay all costs of a call.	**Charging model:** Bill and Keep (BAK) as the preferred interconnection regime for the Internet **Revenues:** mainly generated by subscribers often paying flat rates. As well as revenues from advertisements, exchange of traffic among peers.

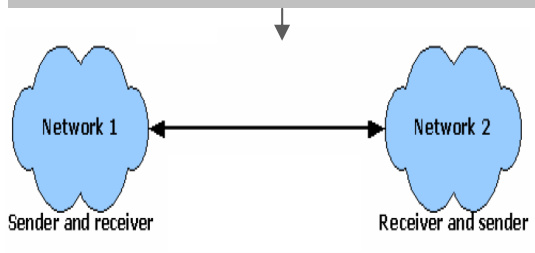
Today's interconnection world

Wholesale arrangements

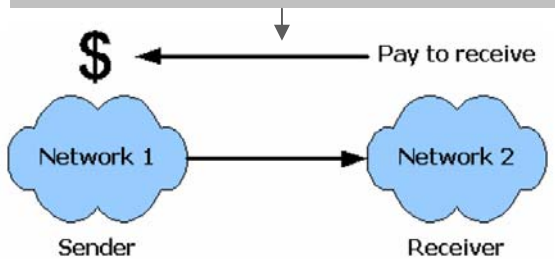
Calling Party's Network Pays (CPNP)



No interconnection charge (Bill and Keep, BAK)



Receiving Party's Network Pays (CPNP)



Retail arrangements

Calling Party Pays (CPP): the recipient pays nothing

Flat rate: prevalent in Internet

Receiving Party Pays (RPP): rarely used

Source: Gilbert, Tobin

Today's interconnection world

- Charges at the wholesale level impact retail pricing
  - Interconnection fee usually sets the floor for retail prices
  - High termination fees prevent flat rate plans from emerging

- CPNP (most common for voice telephony) with high terminations rates leads to :
  - Subsidies for handsets, rapid penetration (e.g. case of mobile markets)
  - Higher retail prices
  - Few flat rate plans for calls

- CPNP usually is considered as leading to higher penetration than other regimes (e.g. mobile case)

Regulation of interconnection

- **3 main reasons to regulate interconnection :**

  - Promote interconnectivity
    - Broader networks are more valuable, because of…
      - expanded connectivity - more options for calling (direct impact)
      - more complementary goods – more choice (indirect impact)
      - scale and scope economies - lower costs (indirect impact)

  - Control market power
    - Promote competition, facilitate entry
    - Protect consumers from market power abuse - price regulation

  - Coordinate interoperability

Regulation of interconnection

- Historical conditions have led to regulators mainly focusing on the control of market power:
  - Monopolies in fixed telephony;
  - Limited number of market players in mobile telephony

Modes of abuse

- Denial of access
- Discriminatory access: inferior access to 3rd parties
- Monopoly pricing: prices significantly higher than costs

Regulatory response

Common Principle - non-discriminatory access and interconnection obligation

- Mandatory unbundling and interconnection
- Obligations of non-discrimination and transparency
- Regulated prices and terms of interconnection

Approaches to price regulation

	RoR	Price-cap	Cost orientation
Prevent exercise of market power	**Yes.** The regulated firm can only earn a normal rate of return.	**Yes.** The CPI-X constraint prevents the firm from exercising market power (if chosen with care).	**Yes.** Cost + Reasonable rate of return only.
Productive efficiency	**No.** The firm will not reap the benefit from reducing costs and so has no incentive to do so.	**Yes.** Firms are automatically rewarded with higher earnings when they reduce costs (penalized when costs increase).	**No.** In the case of Historical Cost Accounting. **Yes.** In the case of Forward-looking Cost Accounting.
Allocative efficiency	**No.** Prices for individual services need not equal the costs of the service.	**Yes.** Firms have flexibility to set prices for individual services based on forward-looking costs. It is possible for individual prices to deviate from costs	**Yes.** Prices for individual services equal the costs of the service. No possibility to deviate from costs.
Dynamic efficiency	**No.** No incentive to invest and introduce new technology or services	**Yes.** The firm has incentives to invest efficiently.	**Yes.** The firm has incentives to invest efficiently.
Promote competition	**No.** Does not generally permit pricing flexibility for the firm to set prices to reflect forward-looking costs in response to competition.	**Yes.** Baskets prevents cross-subsidization. The firm has sufficient pricing flexibility to respond to competitive pressures by setting prices that reflect underlying costs and demand conditions	**Yes.** The firm has to set prices that reflect underlying costs. No cross-subsidization.
Minimize regulatory costs	**No.** Rate proceedings are often lengthy and resource intensive.	**Yes.** Price cap proceedings are are infrequent (once every 3 to 5 years).	**No.** Control proceedings are lengthy and resource intensive.

Approaches to price regulation

Regulators might use other approaches such as:

- **Benchmark –** the outcome of this regulation largely depends on adjustments made. Without appropriate adjustments, benchmarking can result in interconnection rates that make little sense. The goal of adjustments is basically to try to model interconnection costs and rates without having enough information on local cost inputs.

- **Retail minus -** the outcomes of this approach depends on the level of retail prices. This approach is usually used in the case of sufficient competition in downstream markets.

Approaches to price regulation

- From the whole range of possible approaches, the majority of EU states have chosen to adopt Cost orientation approach to regulate interconnection prices
- The EU countries have adopted quite different methods (combination of cost base and cost standard*) for their cost calculations;
- The majority of EU countries use FDC (Fully Distributed Costs) or LRAIC (Long Run Average Incremental Costs);
- Many countries worldwide are using Cost orientation as an approach to control interconnection prices.

Country	Cost base	Cost standard
Belgium	Historic/Current	FDC
Denmark	Forward-looking costs	LRAIC
Germany	Forward-looking costs	LRAIC
Greece	Current	LRAIC
Spain		Capacity-based model
France	Current	LRIC+mark-up for common costs+specific costs
Ireland	LRAIC	LRAIC
Luxembourg	Historic	FDC
Austria	Current	FDC
Portugal	Historic, forward-looking and current	FDC
Finland	Historic/Current	Company specifics
Italy	Forward-looking	LRAIC
Sweden		LRAIC hybrid model
Netherlands	Current	EDC – for originating access tariffs, BU-LRIC – for terminating access tariffs
Czech Republic	Forward-looking	LRAIC
Cyprus	Current, Forward-looking	FDC – for retail services, LRAIC – for wholesale services
Lithuania	Current	LRAIC

Sources : EC, Center for Tele-Information, CMT

* Cost base indicates which costs are allocated (historical, current); Cost standard indicates the way how costs are allocated.

Impact of migration to NGN

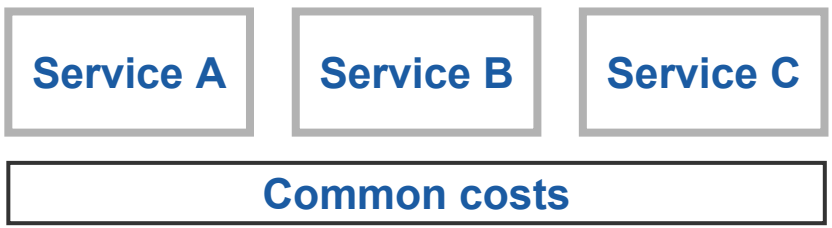
- Why NGN?
  - Cost savings;
  - Technology improvement;
  - One converged IP-based network;
  - More services

- Main principles of setting interconnection rates are likely to change when moving into an IP environment
  - Move away costs arising from dedicated use of one circuit per call to use of networks offering greater capacity and open at different layers
  - More fixed charges between operators based on capacity
  - Fewer variable charges based on the volume of traffic
  - Overall value of interconnection payments between operators may reduce

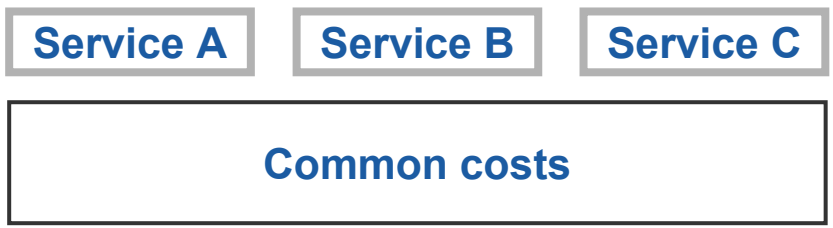
Impact of migration to NGN

- Furthermore, NGNs will significantly change cost structures of ICT services, including interconnection:
  - The proportion of Common costs is going to increase considerably
- Changing cost structures will have an impact on existing costing and pricing methods;
- NRA's will need to consider adapting current modeling and costing approaches to price regulation.

Traditional network



NGN



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Implications for future regulation

- Migration to NGN does not mean that SMP operators will immediately disappear, therefore efficient regulation will still be an issue.
- NGN will carry a wide range of services with diverse pricing models. Wholesale pricing models must support that diversity:
  - Trends toward bundling and flat-rate pricing in retail market could be mirrored by capacity-based pricing in wholesale market
  - Wholesale charges will need to take traffic and quality into account in order to provision efficient networks
  - Voice, which is likely to remain the main source of revenue and investments, has well-accepted retail charging model
  - No single IP interconnection model is superior in all circumstances

Implications for future regulation

- Due to the difference in nature of networks regulators are reviewing regulatory principles and evaluating how to migrate to the NGN environment with minimum distortions for the market, while at the same time preventing any disruptions to competition.

- NGN interconnection options:
  - Adaptation of current regulatory approaches;
  - Replication of new retail pricing methods at the wholesale level;
  - Flexible approach:
    - Because retail pricing models and cost conditions might vary across services, markets ant networks, there probably will be no single *"One size fits all"* interconnection model that maximizes efficiency in all situations.
  - Other alternatives - the question for future studies.

Agenda

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- Related ITU/BDT activities

NGN in ITU-D

- **Study Groups activities**

Study Group 1: Telecommunication development strategies and policies

Q 6-2/1 Regulatory impact of next generation networks on interconnection.
Q 12-2/1 Tariff policies, tariff models and methods of determining the costs of services on national telecommunication networks, including next-generation networks.

Study Group 2: Development and management of telecommunication services and networks and ICT applications

Q 19-1/2 Strategy for migration from existing networks to next-generation networks for developing countries

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SG 1. Q 6-2/1 Regulatory impact of next generation networks on interconnection

ISSUES FOR STUDY

- *Studies of various issues related to regulatory impact of next-generation networks on interconnection*

SG 1. Q 12-2/1: Tariff policies, tariff models and methods of determining the costs of services on national telecommunication networks, including next-generation networks

ISSUES FOR STUDY

- *Adapting business-plan models used in developed countries to conditions in developing countries;*
- *Financial and tariff implications of site sharing for terrestrial mobile services;*
- *Economics of NGN investment projects of telecommunication operators and cost models used in setting tariffs for new services offered on NGNs.*

SG 2. Q 19-1/2: Strategy for migration from existing networks to next-generation networks for developing countries

ISSUES FOR STUDY

- *Trends of telecommunication networks towards NGN.*
- *Examination of NGN technologies (network management, transport networks, access networks, interworking with existing networks, etc.).*
- *Methodologies for planning, with taking into account the behavior of different existing networks.*
- *Migration solutions to NGN (ITU-T SG13 works on NGN).*

Development Programmes

- Trends in Telecommunication Reform 2007 – The road to Next-Generation Networks (NGN)
- This publication covers:
  - The regulatory aspects of NGN
  - Next-Generation networking technology
  - Fixed-mobile convergence
  - Interconnection in an IP-based NGN environment
  - NGN-related technologies and universal access

The 2007 Global Symposium for Regulators

1. Best Practice Guidelines on Next Generation Networks migration, available at http://www.itu.int/ITU-D/treg/bestpractices.html

2. GSR Discussion Paper on NGN Interconnection and Access is available online at http://www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR07/discussion_papers/JScott_Marcus_Interconnection_IP-based.pdf

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Recent Direct assistance and capacity building

- Direct assistances in NGN development strategy (e.g. Cuba, Djibouti) 2008;
- Workshop on NGN Interconnection in the Arab Region, Manama, Bahrain, May 2007, all presentations available at http://www.itu.int/ITU-D/treg/Events/Seminars/2007/Bahrain/agenda.html
- TAF and TAL Seminars on Cost and Tariffs for 2006 http://web/ITU-D/finance/work-cost-tariffs/events/tariff-seminars/rio_de_janeiro-06/index-results.html
- Some activities planned for 2009:
  - Central American Workshop on NGN Regulation
  - Assistance to the Arab Region for the implementation of NGN

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Capacity Building

- Executive Training on Cost modeling and impact on ICT development: Strategic overview for Heads of Regulatory Authorities,
  Geneva, Switzerland, 10-11 November 2008
- Expert-Level Training for national regulatory authorities on cost model development, a step-by step approach
  Geneva, Switzerland, 10-21 November 2008
- COSITU Upgrading - ITU model for the calculation of costs and tariffs

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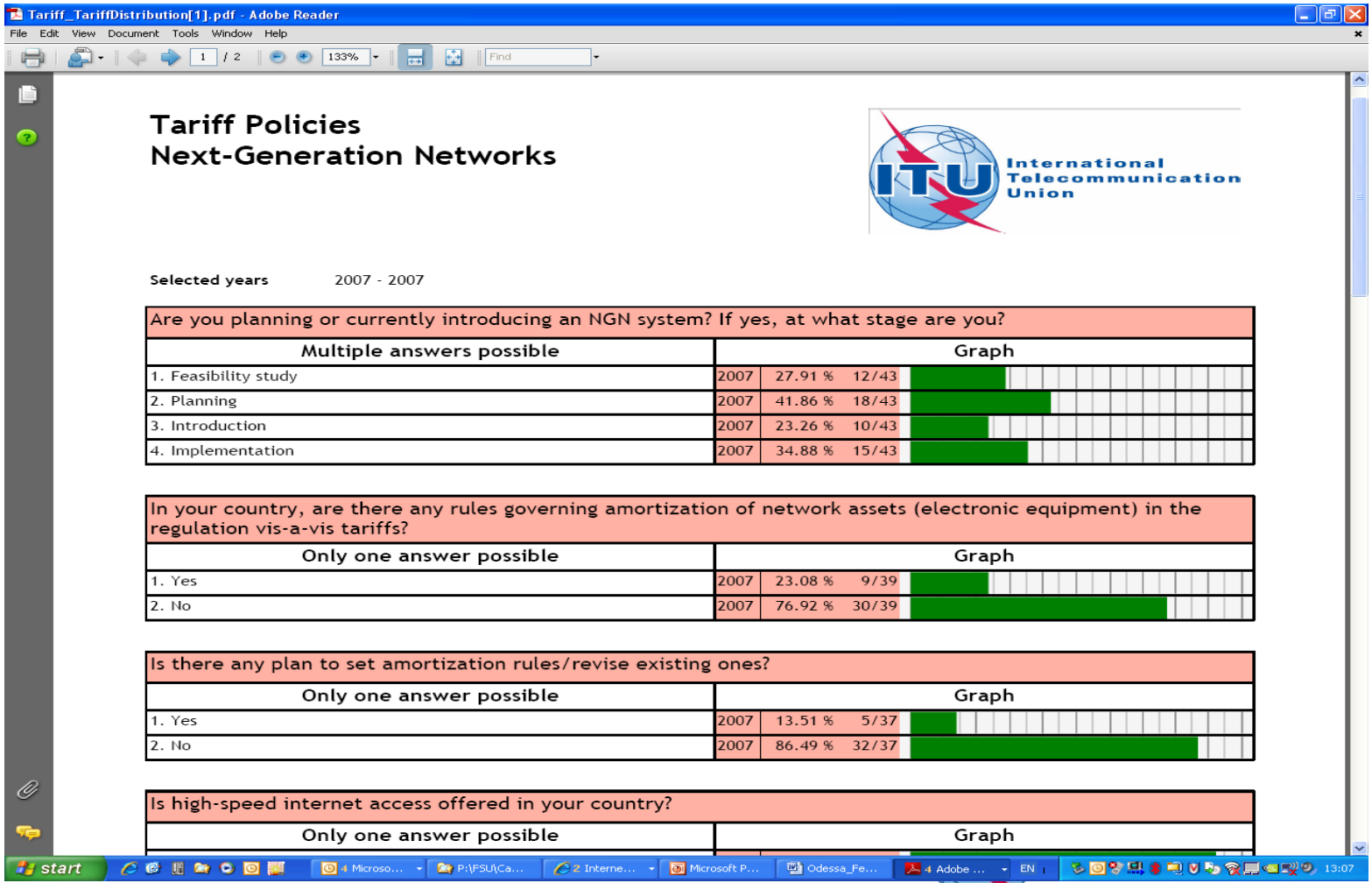
The ICT Eye

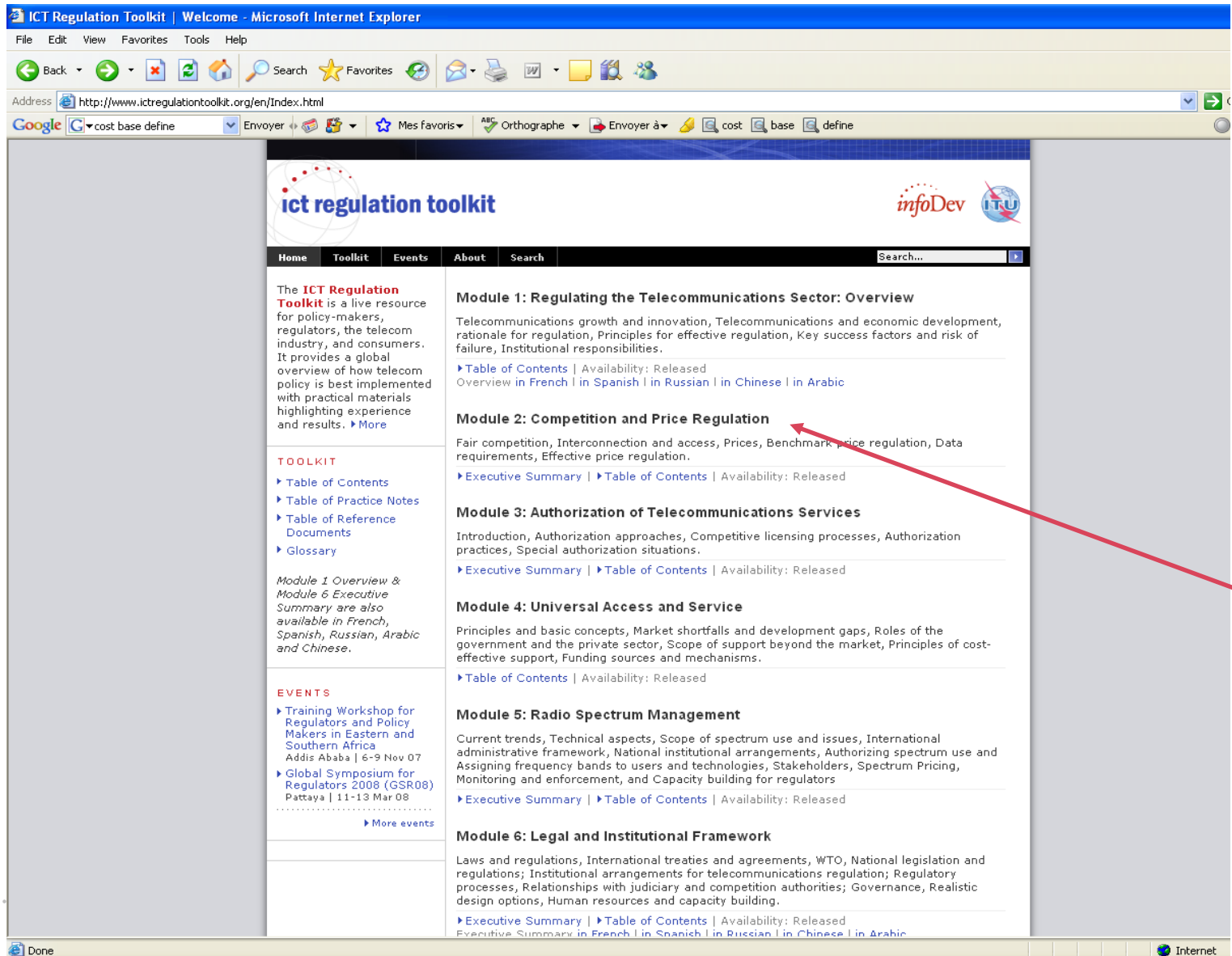
http://www.itu.int/ITU-D/icteye/Default.aspx

Tariff policies survey - NGN

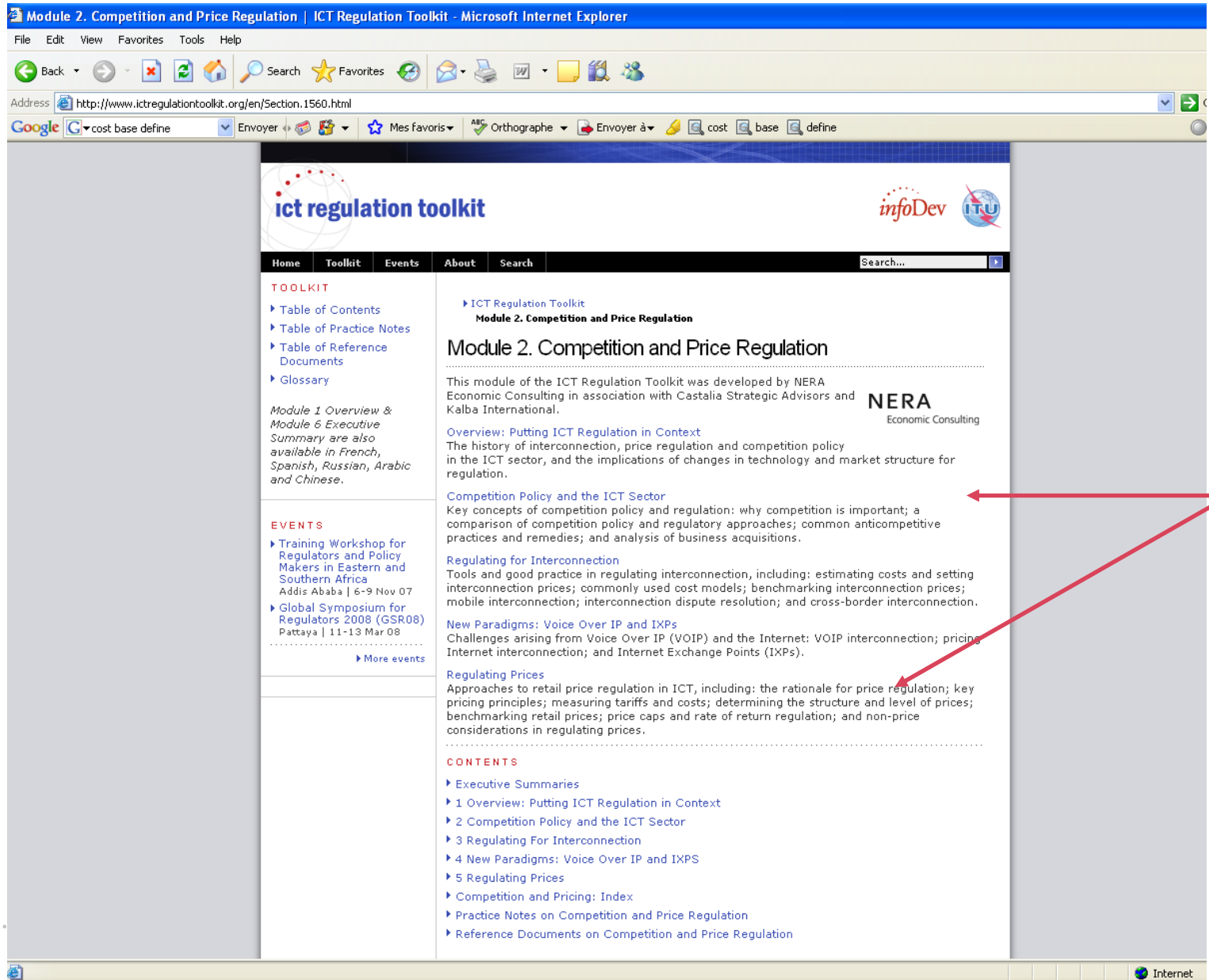


ICT regulation toolkit

http://www.ictregulationtoolkit.org/en/Index.html



ICT regulation toolkit



For more information on NGN in ITU-D

- Telecommunication Development Bureau
  - http://www.itu.int/net/ITU-D/index.aspx
- Regulatory and Market Environment Division
  - http://www.itu.int/ITU-D/treg/index.html
  - http://www.itu.int/ITU-D/finance/
- TReg
  - http://www.itu.int/ITU-D/treg/related-links/index.html
- ITU-D Study Groups web page
  - http://www/ITU-D/study_groups/index.html
  - Recent workshop “Tariff policies, tariff models and methodologies for the determination of costs of services on national telecommunication networks, including NGN” http://web/ITU-D/finance/work-cost-tariffs/events/tariff-seminars/Geneva-SG-08/agenda.html
- Study Groups Questionnaires
  - http://www/ITU-D/study_groups/SGP_2006-2010/questionnaires/index.html

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NGN in ITU-T

Main study groups addressing NGN:

- SG 11 - Signalling requirements and protocols
  - Network Signalling and Control functional
  - architectures in emerging NGN environments
  - Signalling and control requirements and protocols to support user attachment in NGN environments
- SG 13 - Next Generation Networks
  - Project coordination and release planning for NGN
  - Requirements and implementation scenarios for emerging services in NGN
  - Principles and functional architecture for NGN
  - Requirements and framework for QoS for NGN
  - OAM and network management for NGN
  - NGN mobility and fixed-mobile convergence
  - Network and service interworking in NGN environment
  - Service scenarios and deployment models of NGN
  - Impact of IPV6 to an NGN
  - Interoperability of satellite with terrestrial and Next Generation Networks (NGNs)
  - General network terminology
  - Public Data Networks
  - Protocols and service mechanisms for Multi-service Data Networks (MSDN)
  - NGN security
- **N.B: Most of the SGs questions have an "NGN" aspect in their work**.

ITU-T SG3

- **Tariff and accounting principles including related telecommunication economic and policy issues**
  - The Recommendation D-271 on “Charging and accounting principles for NGN” was approved in April 2008 during the SG3 annual meeting.

Other ITU-T Initiatives on NGN

- NGN Management Focus Group
  - The goal of the NGN Management Focus Group is to organize and undertake a centralized approach regarding specification of NGN related Fault, Configuration, Accounting, Performance, and Security Management interfaces.
- IPTV
  - IPTV Focus Group established in April 2006
  - IPTV GSI established in Dec 2007
- Network aspects of Identification Systems (NID)
  - Joint Coordination Activity (JCA NID) established in July 2006
  - Extended in 2007 to include sensor networking
- Identity Management (IdM)
  - IdM Focus Group established in Dec 2006
  - GSI on IdM established in Dec 2007
- Home Networking (HN)
  - Joint Coordination activity (JCA HN) established in March 2005

For more information on NGN in ITU-T

- SG 13 web page
  - http://www.itu.int/ITU-T/studygroups/com13/index.asp
- SG 11 Web page
  - http://www.itu.int/ITU-T/studygroups/com11/index.asp
- NGN GSI web page
  - http://www.itu.int/ITU-T/ngn/
- NGN Project management tool web page
  - http://www.itu.int/ngnproject/
- NGNMFG web page
  - http://www.itu.int/ITU-T/studygroups/com04/ngnmfg/index.html

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The World Telecommunication Policy Forum WTPF2009

Convergence, including Internet related public policy matters
Next-generation networks (NGN)
Emerging telecommunications policy and regulatory issues
International Telecommunications Regulations ITRs

- Selected online resources and policy papers are available on http://www.itu.int/osg/csd/wtpf/wtpf2009/about.html

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The NGN Policy and Regulatory Resources

http://www.itu.int/osg/csd/wtpf/wtpf2009/ngn.html

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Thank you!

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