



INTERNATIONAL TELECOMMUNICATION UNION

**ITU WORKSHOP ON
What rules for IP-enabled NGNs?**

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WHAT RULES FOR IP-ENABLED NGNs?

CHAIRMAN'S REPORT

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INTRODUCTION

1. At the invitation of [Mr. Yoshio Utsumi](#)¹, ITU Secretary-General, an [ITU Workshop, “What Rules for IP-enabled NGNs?”](#)² was held at ITU Headquarters in Geneva, Switzerland, from 23 March to 24 March 2006. The event was organized within the framework of the ITU’s wider [activities on NGNs](#)³, and the [Strategy and Policy Unit’s New Initiatives Programme](#)⁴ and chaired by [Professor Eli Noam](#)⁶, Director of the [Colombia Institute for Tele-Information](#)⁷.
2. The two-day meeting was structured to debate six broad themes in examining current market developments of IP-enabled NGNs and considering the future implications for policy and regulation, including: an introductory session on [framing the debate](#)⁸; [evolution of national, regional and international perspectives](#)⁹; [perspectives on pro-competitive regulatory approaches to NGNs](#)¹⁰; [what rules for interconnection and interoperability](#)¹¹; [ensuring an open NGN platform and promoting the expansion of service and content providers](#)¹²; and [new concepts of universal service, access and consumer protection: what way forward?](#)¹³. A [round table](#)¹⁴ presented some concluding views and contributions from participants invited to speak by the Chairman.
3. The event [website](#)¹⁵ provides links to the [final agenda](#)¹⁶, all [background papers](#)¹⁷, [presentations](#)¹⁸, a related [newslog](#)¹⁹, several [additional contributions](#)²⁰, the [Chairman’s Report](#)²¹, [webcast audio archives](#)²² and a website on [NGN policy and regulatory resources worldwide](#)²³.
4. Approximately 100 participants took part in the meeting, representing a range of government policy-makers and regulators, international and intergovernmental organizations, communication service providers, ICT companies, academics, consultants and other stakeholders.

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5. The first day of the meeting focused on framing the current policy and regulatory debates surrounding the roll-out of IP-enabled [NGNs](#)²⁴. This offered an opportunity to consider some of the key issues and regulatory challenges, outline the evolution of different perspectives and regulatory approaches toward NGNs, and offer some detailed discussion on interconnection and interoperability issues.

Opening Ceremony

6. [Mr. Roberto Blois](#)²⁵ opened the meeting and welcomed participants. In his [speech](#)²⁶, he noted the public interest in a converged Internet Protocol (IP)-enabled communications environment and emphasized the importance of NGNs to the ITU’s work in both technical and policy domains.
7. Mr. Blois started by noting that the reason to be debating this topic now is that policy makers and communications regulators around the globe are beginning to seriously tackle how to best promote the broader public interest in a converged Internet protocol-enabled communications environment. These debates have recently intensified as a number of traditional telecommunication providers have begun investments and deployments of IP-enabled NGNs. These NGNs can be seen as a logical progression from separate PSTN- and IP-network infrastructures to a unified platform for future electronic communications based on IP.
8. He said that faced with rapid convergence between telecommunications, broadcasting, and computer technologies, the days when legislation and regulatory foundations could be based on assumptions of separate services running over separate networks was no longer valid (Figure 1). But if regulatory asymmetry is no longer tenable, he asked what is the path forward? He argued that in many ways, it seems we are back today to a fundamental debate on the overall objectives of communications policy. What exactly is our role in promoting the public interest here? He noted the rules of the game are rapidly changing and how we react as policy makers and regulators to the new technical and economic realities may create the foundations for this sector for decades to come.

9. Mr. Blois said that first indications are that this will be a fractious debate as is typically the case when platforms are deployed. On the one hand, many argue that the IP communications environment has thrived in an unregulated environment that has produced competition at the edges of the network—resulting in many new and innovative applications. Some are even arguing that concepts of "network neutrality" should be codified across technical, legislative and regulatory regimes. Others argue deployment of IP-enabled NGNs requires significant investments and suggest regulatory moratoria so the sufficient returns on investment can be secured.

10. However, Mr. Blois also noted that a number of competitive providers argue just the opposite: they say that there are questions as to whether, in the absence of wholesale economic regulation, will market dynamics be sufficient to ensure a competitive NGN environment? As investors fundamentally dislike policy upheavals that distract them from focusing on market fundamentals—they want to see regulatory stability and certainty. He noted that sensitive to the complexity of the issues and polarization of viewpoints, policy makers and communication regulators have to date generally taken a cautious approach.

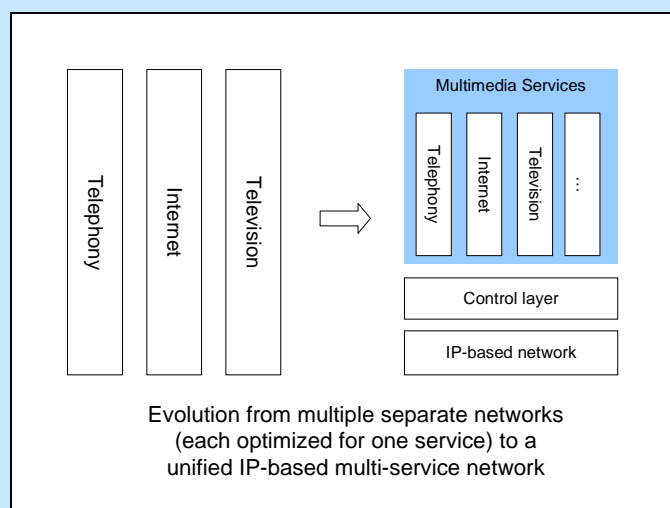
11. Mr. Blois emphasized the interest of the ITU in providing a forum for dialogue to exchange views and experiences and frame current thinking on regulatory approaches to NGNs. He introduced [Professor Eli Noam](#)²⁷ as the Chair of the meeting and expressed his hope for an open debate and a successful workshop.

Session 1: Framing the Debate

12. This session sought to outline the background to the workshop and frame the debate from different perspectives.

13. At the invitation of the Chair, [Mr. Robert Shaw](#)²⁸ presented [What Rules for IP-Enabled NGNs?](#)²⁹ He emphasized that ITU wished to assist its Member States to prepare for the deployment of NGNs, many of which are developing countries. He reviewed trends in communication technologies (including broadband, growth of wireless and convergence) and outlined key challenges facing the Internet, such as security, spam, authentication, governance and IPRs. He introduced the [ITU definition of NGNs](#)³⁰, with NGN core and access networks supplemented with a “business layer” for IP networks providing QoS, reliability and security assurance for services across carriers. Mr. Shaw summarized some of the likely security, operational, competition and consumer requirements and emphasized that NGNs are likely to be considered as global public infrastructure. He suggested that the requirements for globally interconnected NGNs may lead to new service-based interconnection arrangements (rather than capacity-based, especially for latency-sensitive isochronous traffic) and asked whether, in a multi-service environment, should voice continue to be distinguished as a service requiring a distinct set of regulatory requirements?

Figure 1: Convergence in NGNs



Source: [Ruling the New and Emerging Markets in the Telecommunication Sector](#)³¹, Christian Wey, Geneva, 23 March 2006.

14. [Mr. Davide Gallino](#)³² of the [European Regulators' Group \(ERG\)](#)³³ outlined Europe's and ERG's approach to NGNs in his presentation, [Regulation between Evolution and Revolution: Approaching NGNs](#)³⁴. He described the role of the ERG as an interface between national regulatory authorities and the European Commission (EC), as well as its work advising the EC on developments in electronic communications. Under their [Work Programme 2006](#)³⁵, ERG will deliver its Common Positions on principles for IP interconnection and regulatory principles for NGNs by the end of 2006. He noted the market and policy developments underway in several countries and identified **three main regulatory challenges**:

- how the Commission Recommendation on Relevant Markets susceptible to ex ante regulation is adapted for network/service convergence;
- access as the key element in competition; and
- interoperability and internal market issues.

These regulatory challenges are complicated by different telecoms and Internet regulatory models (Table 1), lack of content regulation in some countries and technical complexity.

Table 1: Old World versus New World	
'Old World'	'New World'
<ul style="list-style-type: none"> • Interconnection (transit/termination); • Cost orientation; • Price caps; • National Regulatory Authority discretion on numbers, frequency use; • Emergency services. 	<ul style="list-style-type: none"> • Peer-to-Peer (centralized/distributed) and transit; • Bundled offers (services + bandwidth + content + mobility); • Price squeezes; • Nomadicity, unlicensed bands, spectrum trading.

Source: [Regulation between Evolution and Revolution: Approaching NGNs](#)³⁶, presentation to the [ITU Workshop, "What Rules for IP-enabled NGNs?"](#)³⁷ by Mr. Davide Gallino, Geneva, 23 March 2006.

15. Mr. Gallino stated that the EC markets list is being reviewed for consistent definitions (by end 2006). Retail markets 1-6 are based on PSTN, so all these markets are subject to change. Mr. Gallino believes the wholesale markets list for PSTN needs to be updated for developments in broadband and the emerging markets concept probably needs reworking. ERG wants to understand how technological change affects CAPEX and OPEX and whether SMP operators' cost reductions can be passed onto altnets and end-users. Mr. Gallino equated network neutrality with technology neutrality, and noted the risk of walled gardens at the IP Multimedia Subsystem (IMS) level and suggested that the [Universal Service Directive](#)³⁸ needs updating for 'fixed location'. He said that given convergence and bundled services, the [Recommendation on Relevant Markets](#)³⁹ and [New Regulatory Framework](#)⁴⁰ should guarantee flexibility and be technology-neutral.

16. During this Session, it was noted that comparisons of the PSTN and broadcasting regulatory systems led to assumptions that 'either or both' had to be imposed. One participant said that the Internet is intrinsically different so a zero-based regulatory approach and minimum regulation is more appropriate. The participant said that intelligent design of standards for open access and better interconnection may leave industry better-placed than trying to design the ultimate regulatory system.

Session 2: Evolution of National, Regional and International Proceedings

17. Sensitive to the complexity of the issues and polarization of viewpoints, national policy-makers, communication regulators and related institutions have to date taken a cautious approach. This session sought to discuss how national, regional and international institutional approaches are framing the debate and how they saw the next steps forward.

18. [Mr. Jaroslaw Ponder](#)⁴¹ of the [Strategy and Policy Unit](#)⁴² observed that there are proceedings to deal with NGNs at the national level in many countries, as documented on the SPU's [NGN resource website](#)⁴³, but little has been done at the regional and international levels. In the near future, ITU will distribute a survey on proceedings at the national and regional levels, and he invited participants to contribute. ITU would warmly appreciate participants' responses and input to this survey.

19. [Ms. Salma Jalife Villalón](#)⁴⁴ from [Cofetel](#)⁴⁵ presented [Regulatory Framework under Discussion: CITEL and APEC Experiences](#)⁴⁶, outlining the approaches of the [CITEL](#)⁴⁷ regulatory advisory group for the Americas and [APEC](#)⁴⁸ towards NGNs. CITEL advises Member States on advanced networks through its [PCC.I Telecommunications Standardization Group](#)⁴⁹. Its [Working Group on Advanced Network Technologies and Services](#)⁵⁰ works on Internet domain name issues, cybersecurity, broadband and advanced networks, while another Working Group is addressing [Standards Coordination](#)⁵¹. PCC.1's [Workshop on NGNs](#)⁵² concluded that migration to NGNs must take operators' priorities into account, NGN expansion will be user-driven and regulation should allow competition, regulating services and not technologies. The PCC.1 Workshop on VoIP noted that VoIP offered flexibility and lower costs, but introduced security issues.

20. [APEC's](#)⁵³ [Telecommunication and Information Working Group \(APEC TEL\)](#)⁵⁴ promotes the development of the Asia Pacific Information Society. TEL's work on NGNs began at [TELMIN 5](#)⁵⁵ with the Shanghai Program of Action. The [TEL 30](#)⁵⁶ Brainstorming Session on NGNs concluded that a light regulatory touch is needed, in response to calls for certainty in the regulatory treatment of NGNs. Given APEC's mandate for trade facilitation, APEC needs to ensure standards are not a barrier, but rather a facilitating factor for trade. [TEL 31](#)⁵⁷ identified topic areas for future work (e.g., interconnection/interoperability; trade facilitation; NGN security, reliability and confidence and capacity-building in NGNs for underdeveloped areas) which were later endorsed at [TELMIN 6](#)⁵⁸ and are due to be discussed at a Regulatory Roundtable at [TEL 33](#)⁵⁹ in April 2006.

21. In her presentation, [NGNs: Can the GATS adapt?](#)⁶⁰, [Ms. Lee Tuthill](#)⁶¹ of the [World Trade Organization](#)⁶² asked whether NGNs would lead to a competitive landscape, how this would change regulation (more, less or different) and whether WTO provisions would apply? Ms. Tuthill said that [GATS obligations](#)⁶³ are designed as over-arching and adaptable principles. They are encouraged to be 'neutral' vis-à-vis technology as well as 'neutral' with regard to measures: they do not specify which law or agency must implement them, or whether measures should be ex ante or ex post. The [Annex on Telecommunications](#)⁶⁴ guarantees 'reasonable and non-discriminatory' access to and use of leased circuits (paragraph 5), and may be adaptable to NGNs. The [Reference Paper](#)⁶⁵'s definition of interconnection as 'linking' was ruled a 'broad concept' by a Panel. However, these apply only to "public" and basic "transport" services that are less significant in an IP-based environment, while the classification schemes used ([GATS W/120](#)⁶⁶ and [UN Central Product](#)⁶⁷) are at risk of becoming outdated (e.g., voice versus data; public versus business, telecom versus computer services). The Telecom Scheduling [Chairman's Note](#)⁶⁸ asked whether existing commitments on voice and/or data continue to apply, and sought to adapt classifications for changes in technology and regulation. Ms. Tuthill concluded that if NGNs lead to more competition, general competition and ex-ante principles could be used, and WTO rules may become a "fall-back".

22. [Mr. Atsushi Hiramatsu](#)⁶⁹ of [Nippon Telegraph and Telephone \(NTT\)](#)⁷⁰ described the work of Japan's [Next Generation IP Network Promotion Forum](#)⁷¹ established in December 2005 to promote the transition to an IP-based network in Japan. Japan wants to maintain security, reliability and interoperability in the move to all IP networks. [The Forum](#)⁷² was established after a [MIC study](#)⁷³ to clarify the steps to an all-IP network and to agree how to achieve a smooth transition among all parties. It brings together 211 operators, vendors, government and academics to investigate NGN technical standards, verify interconnection through interoperability tests and promote R&D and standardization. It aims to realize a range of IP network services, establish technical conditions for carrier facilities (in a Telecommunications Council intended to be released by October 2006) and review technical rules for transition (in the 2007 timeframe). The Forum consists of three Groups: the Technology Group, Standardization Group and Planning & Promotion Group (for research strategy). In the Technology Group, two Working Groups are working on interconnection tests and technical research. In addition, four sub-Working Groups are reviewing key areas of:

- 1) quality and functionality;
- 2) safety and reliability;
- 3) interconnectivity and interoperability (including C-plane & U-plane interfaces, transport functionality, service & billing and telephone service requirements); and,
- 4) IP network platform functionality and fixed/mobile seamless use.

Session 3: Perspectives on Pro-Competitive Regulatory Approaches to NGNs

23. Some have argued that the IP communications environment has thrived in an unregulated environment that has produced Darwinian competition, resulting in new and innovative applications. Some also argue that “network neutrality” should be codified in technical, legislative and regulatory regimes. Others argue that deployment of IP-enabled NGNs requires significant investments and suggest regulatory moratoria for infrastructure providers. However, current competitive telecom providers often argue the opposite, saying there are questions as to whether, in the absence of wholesale economic regulation, market dynamics will be sufficient to ensure a competitive NGN environment? This session sought to explore these different perspectives.

24. [Professor Christian Wey](#)⁷⁴ presented⁷⁵ his background paper commissioned by ITU, entitled [Ruling the New and Emerging Markets in the Telecommunication Sector](#)⁷⁶, co-authored by [Dr. Pio Baake](#)⁷⁷ and [Sven Heitzler](#)⁷⁸ at [DIW Berlin, the German Institute for Economic Research](#)⁷⁹. This [paper](#)⁸⁰ characterizes a regulatory procedure for new and emerging telecommunication markets with insights using dynamic competition theory. Prof. Wey reviewed recent technological developments and NGNs (Figure 1), presented relevant insights from Schumpeter’s theory of creative destruction, and outlined possible regulatory options for new and emerging markets. He identified different scenarios for competition: in access (where services are identified with dependencies on access technologies and access operators) or in platforms (where services and service providers are independent of platform/access infrastructure). He noted that it can be argued that mandated net neutrality possibly neglects synergies that may result from vertical integration and also does not address the infrastructure investment problem. Current investments in NGNs are mainly in:

- Transmission networks e.g. passing fibre;
- Network equipment e.g. softswitches;
- Migration of legacy Operating Support Systems;
- Premises (e.g., British Telecom’s geographical restructuring of network nodes).

25. Ex ante regulation aims to foster competition through asymmetric regulation of access, focusing mainly on former monopolists, termination and interconnection, unbundling and resale regulation tariffs (typically cost-based or price caps). To date, regulation has sought to ensure efficient use of existing networks, ensure an investment-friendly environment and counter (re)monopolization of markets. The main regulatory challenges in the future will be to:

- Facilitate alternative access networks;
- Adapt market power tests for new markets, bundled and complementary products; and
- Consider whether/how to implement structural openness through separation.

He argued that regulation must depend on longer-run tendencies towards competitive structures. On the one hand, *Ex ante access regulation* reduces firms’ incentives to invest in NGNs. However, on the other hand, given strong network effects, incumbents often obstruct interconnection and *ex post regulation* has often proved difficult. If there are non-replicable assets (which can be difficult to identify), then access should be regulated. Where new markets are created (which is also difficult to identify), regulatory holidays can protect investment incentives, but have to be evaluated over time. For example, how long should they last? If competition emerges over time, access regulation would not be needed. In this regard, Professor Wey proposed a scheme for conditional regulation of new markets.

26. [Mr. Wolfgang Reichl](#)⁸¹ of [Telekom Austria](#)⁸² spoke on the [Industry Requirements for a regulatory environment for NGNs](#)⁸³ from [European Telecommunications Platform \(ETP\)](#)⁸⁴’s view, as an industry body advising the European Commission on telecom issues. The ETP promotes industry self-regulation and competition, and clarifies business issues for its members, comprising mainly fixed incumbents and major telecom firms. Its [2006 Report on the technology, business models and regulatory aspects of NGN](#)⁸⁵ reviews their implementation, regulatory implications and the need for a positive environment. Policy-makers need to evaluate if existing policy and regulatory frameworks are suitable for NGNs. Technological developments have raised concerns over privacy, but it should be left to industry to provide consumer choice and opt-out privacy protection. Mr. Reichl suggested that while NGN technologies are maturing, current business models are mostly based on existing infrastructures. He also said that it is not evident how NGNs fit into existing

markets, but ETP believes that NGNs are not *in themselves* a new market and over the long-term, general competition law may be sufficient.

27. Mr. Reichl said the new regulatory environment should rely on market forces and competition, for innovation and investment. Mr. Reichl argued that the regulatory environment should be provider-neutral and technology-neutral, leaving technology decisions to the market, and focusing on services, if needed. In the short-term, economic regulation may have to address enduring bottlenecks in the access network, but over the long-term, it should be based on competition law, allow for interoperability and avoid market fragmentation. Non-economic regulatory goals should be ‘hands-off’, with a light regulatory touch. He also argued that the EU should consider agreements with other regions for cross-border services, as NGNs have a global focus, necessitating global standards.

28. Because of the absence of [Professor Robert Frieden](#)⁸⁶ of [Pennsylvania State University](#)⁸⁷, the Chairman summarized his presentation [Net Neutrality or Net Bias? Finding the Proper Balance in Network Governance](#)⁸⁸ for the benefit of participants. Professor Frieden summarized arguments of net neutrality and network flexibility. He suggested that advocates for network flexibility see net neutrality as thwarting competition and diminishing incentives to invest in NGNs as well as also rejecting constraints on their ability to price discriminate and recoup their investments. Prof. Frieden highlighted differences between the open “best effort” basis of Internet peering and the telecom model’s route-specific focus, with route tracking, usage metering and cost accounting. He concluded that network flexibility (in pricing, service provisioning and QoS) can make economic sense, but deliberate blocking and/or degradation of traffic do not. ISPs should be allowed to partition bandwidth and offer downstream end-users and upstream ISPs different bandwidth levels and QoS.

29. [Melinda Tan](#)⁸⁹ of Singapore’s regulator, the [Infocomm Development Authority \(IDA\)](#)⁹⁰, presented Singapore’s approach to NGNs and VoIP in [Ensuring Competition and Growth in NGN](#)⁹¹. Since full liberalization in 2000, Singapore has relied on proportionate regulation, market forces and promoting competition. IDA seeks to regulate in a transparent, non-discriminatory and technologically neutral manner and does not specify which technologies should be used, leaving these decisions to industry. Singapore finalized its framework for VoIP in June 2005 with a policy of regulatory forbearance where appropriate. VoIP operators are not required to meet number portability, directory or emergency services or IDA’s QoS levels, but must inform users of service limitations. In March 2006, IDA announced its NGN National Infocom Infrastructure plan, which will enable facilities-based competition and allow players from the whole telecom value chain to participate in the market.

30. During this session, the point was made by some that undertakings given by incumbents on prevention of foreclosure are not necessarily a substitute for ex ante regulation. It was suggested that convergence and multiple different access technologies will shake up the competitive environment, so monopoly power may have only a limited lifetime left.

Session 4: Perspectives on Pro-Competitive Regulatory Approaches to NGNs (continued)

31. [Mr. Hasan Alkas](#)⁹², Senior Economist of [Deutsche Telekom AG](#)⁹³, presented [The Technology Neutrality Concept used to Perpetuate Regulation into NGN](#)⁹⁴. He briefly described Deutsche Telekom’s structure and the main dynamics shaping the industry. He noted that network overlay or replacement for the migration to NGNs depend on operators’ starting points and described different approaches for NGN interconnection. He suggested that services will be highly competitive, putting pressure on infrastructure providers to interconnect voluntarily, so NGN interconnection will be based on voluntary standards. He argued that the main incentive fostering NGN investments is the avoidance of regulation, as NGN is still a nascent market. He suggested that the growing range of access technologies increased competition and reduced entry barriers, and asked whether the local loop is still a fixed access bottleneck? Given convergence, technology neutrality is appropriate in general, but Mr. Alkas believes that the concept has been used mainly to leverage regulation from traditional markets into newly emerging markets, such as mobile and VDSL.

32. He observed that it is a common misconception that service functions will become fully independent from the transport layer in NGNs, as NGNs could require special treatment of specific services (e.g. Voice, TV) and many services will be complementary in character. He suggested that differentiation on the basis of

service classes could be appropriate, with QoS as the key parameter. He also argued that the decision whether network operators choose transit, peering, or a form of Requesting Network Pays should be the outcome of the market, and not of regulation. In Germany, IP-Interconnection is currently not regulated, but is likely to be soon.

33. [Mr. S.N. Gupta](#)⁹⁵, Principal Advisor at the [Telecom Regulatory Authority of India \(TRAI\)](#)⁹⁶, presented [Ensuring Competition and Growth in NGN](#)⁹⁷. He gave an overview of ICTs and the licensing regime in India. India's ICT market is growing fast, but with a growing urban-rural divide. India has liberalized licensing and regulation for broadband in its broadband policy, but has a policy against Local Loop Unbundling (LLU) and has not yet introduced resale by non-facility based operators. Mr. Gupta outlined the regulatory challenges of NGNs, TRAI's public consultation process and its findings. In his view, NGN licensing requires a single, converged regulator for telecom, IT and broadcasting; a unified technology-neutral, service-agnostic license ("one license – one network – all services"); and a capacity-based, open-access interconnection regime. India is seeking to establish a nationwide, fibre-based IP-MPLS backbone with Metro Area Networks using DSL, Ethernet and wireless technologies for triple play products and VoIP over a three-year horizon. A consultative group including TRAI, service providers, technical institutions, academics and vendors will be set up to analyze NGN standards and how they can be adapted to India's needs.

34. [Mr. Robert Stil](#)⁹⁸, Chief Economist of the Dutch regulator, [Onafhankelijke Post en Telecommunicatie Autoriteit](#)⁹⁹, gave a presentation on [New Regulatory Approaches Fostering Innovation Dynamics in the Telecommunication Sector](#)¹⁰⁰. He summarized the EU [New Regulatory Framework \(NRF\)](#)¹⁰¹. NRF stipulates that emerging markets (where first-movers may have substantial market share) should not in principle be regulated ex ante, but ex ante regulation is permitted where necessary, based on market analysis (Cell 1 in Table 2). The NRF is technologically neutral and focuses on services. Mr. Stil suggested that a service-based approach would not suit NGNs, as it may over-regulate and hamper investment incentives. He also stated that asymmetric regulation (with light-touch or forbearance) goes against NRF and carries the risk of re-monopolization. Mr. Stil said that for NGNs, regulation should focus on bottlenecks and only regulate non-replicable assets. He noted questions of how to determine replicability, over what time horizon (longer than 2-3 years due to large investments) and the problem of technical versus functional replicability. He concluded that to preserve incentives but prevent re-monopolization, ex ante regulation should be limited to non-replicable assets within a general competition law framework to ensure optimal investment incentives.

Table 2: Categories of Regulatory Attention

	<i>Established services</i>	<i>Emerging services</i>
<i>Legacy infrastructure</i>	<i>Cell 1</i> Use NRF	<i>Cell 2</i> No ex ante regulation
<i>New infrastructure</i>	<i>Cell 4</i> Current debate	<i>Cell 3</i> No ex ante regulation

Cell 1 - Market analysis to decide whether to use ex ante remedies
Cell 2 - Subject to competition law, but not ex ante regulation.
 Note: prevent leverage of existing market power from old services => regulate established services.
Cell 3 - Emerging services on new infrastructure: no ex ante regulation in principle
Cell 4 - Current debate - use NRF for technology-neutrality

Source: [New Regulatory Approaches Fostering Innovation Dynamics in the Telecom Sector](#)¹⁰², Robert Stil, Geneva, 23 March 2006.

Discussions at the end of this session focused on definitions of replicability of assets, and how to get non-replicable assets in line with regulatory frameworks. It was proposed that replicable assets are those that can

be used to bring pressure to bear on the market. It was suggested that, for example, if coordination capability were to become externally replicable within a call server (depending on the interface and exchanges), certain regulators would be content to stop regulating coordination capability. There are thus possibilities for deregulation, but the issues are complex. It was suggested that discussion of the risk of re-monopolization was less relevant to some markets, but it was pointed out that old monopolization common carrier arguments are still relevant to some developing country markets.

Session 5: What Rules for Interconnection and Interoperability?

35. The technologies and architecture of IP-enabled NGNs are fundamentally different from the PSTN and result in new network topologies, associated costs and interconnection models. This fundamentally disrupts current interconnection regimes, which is forcing a reopening of long-standing debates on the premises of interconnection as a structural remedy for promoting competition. In a multi-service NGN environment, does it continue to make sense to distinguish voice (including VoIP) as needing a distinctive interconnection regime? If so, why not for other services? Are there applicable lessons to be learned from Internet interconnection arrangements?

36. [Scott Marcus](#)¹⁰³ of the [Wissenschaftliches Institut für Kommunikationsforschung](#)¹⁰⁴ [presented](#)¹⁰⁵ his background paper commissioned by ITU, entitled [Interconnection in an IP-enabled NGN environment](#)¹⁰⁶. His paper reviews the economics of interconnection for PSTN and the Internet and considers the likely evolution of interconnection arrangements in IP-based NGNs. Its analysis suggests that most current observed behaviour can be explained by existing economic theory, including arguments of market power, termination monopoly, demand elasticities, network externalities, price discrimination and the Coase Theorem (which states that private parties can often negotiate arrangements more efficiently than regulators, provided certain preconditions are met). His paper finishes with a hypothetical projection of interconnection for a European incumbent and concludes that a “Coasian” interconnection regime is likely to be more efficient and more consistent with consumer welfare than a regulated regime. However, where markets are not effectively competitive, mandates for interconnection may prove unavoidable, especially once PSTN interconnection regulatory regimes are withdrawn. Mr. Marcus said that policy-makers and regulators may be well-advised to focus first and foremost on ensuring competitive markets in broadband access, and only secondarily on interconnection.

37. [John Horrocks](#)¹⁰⁷, a consultant and specialist from the [European Conference of Postal and Telecommunications Administration \(CEPT\)](#)¹⁰⁸, reviewed market developments and spoke on [New Models for Interconnection](#)¹⁰⁹. He noted that users now provide their own services and peer their own traffic. Telcos are trying to introduce NGNs, whilst trying to preserve service control. Costs are technology-dependent, so cost-based termination conflicts with technological independence. Significant Market Power (SMP) will be increasingly difficult to apply in many more markets and micro-markets than regulators can deal with.

38. Mr. Horrocks proposed that telcos should respond by moving to zero or low termination rates. In his view, this would maximise competition (with operators’ revenues deriving solely from their own subscribers) and remove regulation on interconnection. However, caller origination charges would need to be adjusted (may need to double). He noted various options for the IP interconnection platform, with service platform running on top of it:

- Walled gardens (copying PSTN), as being developed in UK.
- GSMA – IPX (private IP) following on from GPRS, with a separate backbone.
- GSMA + IPX + Public DNS/ENUM
- GSMA + IPX + Hubs (favoured among mobile operators)

39. [Mr. Souheil Marine](#)¹¹⁰, Manager of [Alcatel](#)¹¹¹’s [Digital Bridge Programme](#)¹¹² spoke on [Fixed Mobile Convergence \(FMC\): Standards, Market Status and Regulatory Issues](#)¹¹³. He noted that IP Multimedia Subsystem (IMS) is now offering voice services at reduced cost and making convergence possible. The next big step is for ITU to define global standards. Unlicensed mobile access leverages existing networks and fixed-mobile convergence will allow the use of a single device to access both networks. This is especially important for developing countries, where mobile telephony is dominant (e.g., twenty times’ more mobile

than fixed telephones in Ghana). In developed economies, regulation distinguishes between different markets and FMC has to be addressed by regulators (in replicability, etc.). Mr. Marine noted growing interest in converged licenses. He suggested that Broadband Wireless Access (BWA) is making fixed/mobile access irrelevant, and that IMS architecture combined with BWA could allow mobile and fixed operators in developing countries to improve universal access.

40. Discussions at the end of this session focused on interconnection. Telcos now have services interconnection, as well as network interconnection. The impact of a two-side access approach to interconnection (where companies are dependent on each other, with fixed, wireless and mobile access) and interactions from multiple networks on interconnection was discussed. A gradual glide path towards zero-based termination (Bill and Keep) was discussed. However, it was pointed out that application of the Coase Theorem did not necessarily result in Bill and Keep – interconnection arrangements may still include exchange, but they are negotiated, rather than imposed.

41. The Chair highlighted the importance of interconnection in the NGN debate and summarized the main outcomes of the day's sessions. He thanked participants for their contributions in a full day, and looked forward to tomorrow's discussions.

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Session 6: What Rules for Interconnection and Interoperability? (continued)

42. The Chairman, Professor Noam, welcomed participants for the second day of the event and introduced the speakers for the first session.

43. [Keiichiro Seki](#)¹¹⁴, Director of the International Economic Affairs Division at the Japanese [Ministry of Internal Affairs and Communications](#)¹¹⁵ spoke on [Towards NGN: From PSTN to new IP-based networks](#)¹¹⁶. He reviewed recent technological developments and the growth of broadband and VoIP in Japan. He said that in core networks, there is a risk of unilateral technological arrangement of interfaces by incumbents. New nodes with 'soft switches' allow incumbents to offer new services without further construction. The installation of these new nodes may result in changes to the locations where competitors interconnect. In access networks, replacement of copper local loops can foreclose competitors relying on existing copper loops to provide DSL. He noted growing competition at deeper levels of infrastructure that has eroded Japan's incumbent [NTT](#)¹¹⁷'s market share in broadband, so incumbents are keen to move into FTTH to regain market share. Competitors also want equal treatment in deploying FTTH to remove the advantages of the incumbent in rights of way. There is concern that incumbents' existing market power may be replicated in NGNs. [MIC](#)¹¹⁸ has regulated the prices of line-sharing, introduced co-location rules and line of business restrictions for the incumbent and unbundled dark fibre.

44. Mr. Seki noted that replication (as well as maintenance) of local loops constitutes an economic bottleneck and suggested that unbundling, combined with pricing for incentives and equal treatment on construction could facilitate competition in fibre loops. In Japan, fixed IP migration started in 2005 and it is foreseen that complete substitution by soft-switches will take place by the end of 2007. It is estimated that in Japan 30 million customers (50% of the market) will shift to fibre access and NGNs in 2010. In response to the changing nature of competition, MIC is working to redefine bottlenecks, review its regulations and ensure interconnection, interoperability and consumer protection. MIC established a [Study Group](#)¹¹⁹ on competition rules in the move to IP, which will examine frameworks for ensuring "competitive neutrality" and "technological neutrality", future interconnection and tariff policy.

45. [Cara Schwarz-Schilling](#)¹²⁰, Head of International Economics Section at the German regulatory Federal Network Agency ([Bundesnetzagentur \(BNetzA\)](#))¹²¹, gave a presentation on [Interconnection Arrangements for IP-enabled NGNs – Discussion in Germany](#)¹²². She distinguished between telcos' centralized approach (& control by network design) and ISPs' decentralized approach (open access allowing more service providers to offer services). Migration by network substitution or overlay depends on network interconnection arrangements. She suggested that the migration to NGNs would result in rearrangement of core network nodes, with a leaner structure with fewer interconnection points at the lowest network level. She noted the different billing systems for voice services at the wholesale level (CPNP for PSTN and Bill & Keep for VoIP, including RPP for termination through the Internet access charge).

46. Ms. Schwarz-Schilling said Bill & Keep is not ‘interconnection at zero price’ but has these advantages:
- no transactions costs for wholesale pricing and billing;
 - no need for price regulation;
 - no termination monopoly inevitable;
 - no tariff arbitration;
 - it internalizes positive network externalities;
 - flexible end-user pricing without price squeezes.

However, the disadvantages are:

- topology of the point of interconnection (PoI) and the necessary network depth could increase market concentration;
- it may result in inefficient investments in parallel networks; and
- there is a trade-off between the hot potato problem and too many PoI.

Bill & Keep may lead to RPP at the retail level, depending on whether incoming and outgoing traffic levels are balanced. [BNetza](#)¹²³ has set up an [Advisory Group on Framework Conditions for IP-Based Network Interconnection](#)¹²⁴.

47. [Steve Unger](#)¹²⁵, Director of Telecoms Technology at the UK regulator [OFCOM](#)¹²⁶, presented [OFCOM’s approach to NGN interconnection and interoperability](#)¹²⁷. OFCOM had a consultation (in June 2005) and an industry consortium ‘NGN UK’ has been set up to work on IP interconnect architecture, the IP commercial model and interoperability (OFCOM has observer status). OFCOM wants a clear regulatory framework (not forbearance) with regulation following the market, rather than leading. In September 2005, BT undertook to: protect against foreclosure with unbundled network access in SMP markets; ensure equivalence of inputs (for SMP markets); and to give access to the network before launching new downstream services, with lead times sufficient for simultaneous launch of services. OFCOM is seeking to apply an *ex ante* competition framework to NGNs and has initiated studies of: converged backhaul; IP-based voice; converged copper-based access; and charging structures. OFCOM wishes to minimize regulatory risk for incumbents and altnets but not through regulatory holidays. Dr. Unger considers that the NGN business case is based on efficiency savings, so any obstruction of this (e.g. a regulatory requirement to maintain legacy services) puts the overall business case at risk. Conversely, competing altnets investing in NGNs depend on access to bottlenecks controlled by incumbents and need to be sure of access and interconnection so they can compete.

48. [Mr. Francois Varloot](#)¹²⁸, Deputy-Director of the Economic Division at the French telecoms regulator, [ARCEP](#)¹²⁹, spoke on [Regulatory Issues in an IP-Open Convergent Market, interconnecting NGN-core and non NGN-core carriers](#)¹³⁰. Mr. Varloot gave an overview of NGN architecture and the broadband market in France. He identified the main drivers for NGN deployments as:

- Incumbents’ loss of revenues from traditional services (e.g., voice services in France - *compared to incumbents’ loss of market share in ADSL services in Japan - Seki*).
- New services: bundles, convergent & nomadic services, profile, presence management;
- Potential cost reductions: efficiency savings, partly driven by obsolescence and increase of maintenance costs of the actual networks.
- flexibility: multiple points of access, independent layers (core independent of access).

Operators’ decisions as to when to migrate to NGNs depend on their domestic market, competition, involvement in mobile and obsolescence factors.

49. Mr. Varloot described symmetrical regulation issues of end-user requirements, operators’ issues and self-regulation. He said the main NGN issues for operators are: costs, migration issues, security, resource issues (e.g., number portability), interoperability and dependency on others’ migration (including interconnection points, technical standards and routing issues). He suggested that market players are working on IP/PSTN and IP/IP interoperability, but proactive regulation could: identify markets where interoperability is needed; speed it up; allocate resources; and ensure that third party service providers and virtual networks benefit fully. Mr. Varloot concluded by citing the example of the impact of NGNs on regulation for the case of fixed-mobile convergence.

Session 7: Ensuring an Open NGN Platform and Promoting the Expansion of Service and Content Providers

50. Traditional carriers are looking to move “up the value chain” into data and audio-visual content at the same time that mega-Internet application service providers (with strong brands and deep pockets) such as Google, MSN, eBay and Yahoo are entering voice markets and making forays into competitive infrastructure provisioning. Will market dynamics be sufficient to ensure a competitive environment? Some argue that without attention by regulators, providers may construct “N-play walled gardens” vertically integrating networks and services, potentially creating bottlenecks for the delivery of audiovisual content.

51. [Mr. Ernst Langmantel](#)¹³¹, Director of Technical Division at the Austrian regulator, [Rundfunk und Telekom Regulierungs](#)¹³², spoke on [NGN: Multimedia Implementation of the Legacy Telco Model?](#)¹³³. Mr. Langmantel contrasted the vertically integrated telco model with the Internet model. He pointed out that in the Internet, services are separated from the transport layer technically and commercially. The Internet is a ‘dumb’ transport layer (connectivity) overlaid with services in the intelligent nodes at network edges (the ‘edge centric’ approach). For interoperability between Internet ‘service islands’, typically service providers only need to agree (transport networks not involved).

52. NGNs are envisioned to be horizontally layered with the service layer separate from the transport layer, but NGN services and transport will still be *commercially* vertically integrated, so customers may be ‘locked in’ and can only access another IP providers if their NGN access provider agrees. This will depend on interconnection agreements between the customer’s (access) NGN provider and third party service providers. In contrast to the Internet’s handling of services at network edges, service provision in NGNs will have a more ‘network centric’ approach. When moving across service providers, for interoperability, all intermediate NGNs will have to implement interoperable versions of the same service.

53. Security (resource admission and control) and QoS (selection and control) are the key differentiators of NGNs. Mr. Langmantel identified the main drivers for NGNs as:

- End of life of legacy networks;
- Cost reductions (in CAPEX and OPEX);
- Coping with Internet on multimedia;
- Improved time to market; and
- Escape from regulation.

He considered that digital home infrastructure and services will decide the “battle between the Internet and NGNs”.

54. [Mr. Michael Nelson](#)¹³⁴, Director of Internet Technology and Strategy at [IBM Corporation](#)¹³⁵ spoke on [New Medium versus Old Models](#)¹³⁶. He noted that a profound shift is underway – one that necessitates an entirely new approach to policy, rather than just trying to impose old standards (for telephony and broadcasting) on the new Internet. He noted the public policy goals of the Internet in the abilities to connect, speak, share, choose, innovate and trust. He reviewed developments towards the “Next Generation Internet” in new technologies and standards (Table 3). He contrasted different views of who controls the Internet, and compared the top-down development of telephony standards with the user-driven Internet. Measures to foster competition and innovation include:

- Supporting open global standards openly developed;
- Supporting open source;
- Supporting open markets;
- Supporting R&D, education, & e-government applications;
- Enforcing competition laws; and
- Opening up more spectrum.

Table 3: Next Generation Internet – Web 2.0

	Web 1.0	Web 2.0
Tools	Browser, Wired	Blogs, Wikis, AJAX, Grid, Computing, Wireless
Standards	TCP/IP, HTML	SOAP, XML, XHTML Web Services
Focus	Enable data access, transactions Dialogue	Enable collaborative work Immersive environments
Media	Text, Image, PDF, MP3	Video, Conferencing, Skype
New Concept	Hyperlinks	Application mashup
Business Positioning	e-Commerce, e-Business	e-Business 2.0?

Source: [New Medium versus Old Models](#)¹³⁷, Michael Nelson, Geneva, 24 March 2006.

55. [Mr. Tomas Lamanuskas](#)¹³⁸, Deputy Director of Lithuania's [Communications Regulatory Authority](#)¹³⁹, spoke on [Regulation of N-Play Bundling of Services: Proposing a concept of regulation](#)¹⁴⁰. Mr. Lamanuskas reviewed historically different and distinct technologies that provided discrete and separate services. He identified drivers of growing computing power, innovation, miniaturization, digitization, decreasing costs and increasing speeds. He introduced the concept of convergence in technologies, networks, devices and services, as well as markets (where boundaries are becoming increasingly blurred). He sees the implications of network convergence as: use of a single network; additional services; competition between services; and competition between networks with different access technologies. Mr. Lamanuskas described three possible business models:

- device integration: access to services over different devices, putting users in control;
- telco network-centric model: leaving operators in control of access;
- 'application centric' model of the Internet: this does not leave anyone in control, offering more choice, control and confusion for customers.

He considers it likely that these business models will cohabit, while innovation will bring new IP services and opportunities for service providers such as Skype, Google and Yahoo.

56. Mr. Lamanuskas said that convergence will bring 'inter-modal' competition, where different networks (and devices) can compete to provide a whole variety of services vertically, as well as horizontally. He said that end-user ("last mile") control over access services could be leveraged to provide new services, but the last mile will be less relevant, as new technologies develop and competition among content providers grows. He argued that the regulator's role should encompass extension of core networks. He noted regulatory regimes should be reviewed to remove provisions hindering convergence (e.g., network-specific broadcasting licenses) and streamline other provisions to reflect convergence. He described standards review at: the global level (ITU radio rights and user rights); [European level](#)¹⁴¹ ([review of New Regulatory Framework and harmonization of spectrum rights](#)¹⁴²; market definitions and the inclusion of service markets in regulated markets need to be reviewed) and national level (radio spectrum, licensing system and technologically neutral, transparent, flexible regulatory frameworks for a converged environment).

Session 8: New Concepts of Universal Service, Access and Consumer Protection: What Way Forward?

57. Government and user expectations are changing as to what constitutes basic and universal service to ICTs. What does universal service imply in a broadband-based IP-enabled NGN environment? How can access for all be ensured? Are there new NGN consumer protection issues to be considered?

58. [Patrick Xavier](#)¹⁴³, of [Swinburne University of Technology](#)¹⁴⁴ in Australia [presented](#)¹⁴⁵ his background paper commissioned by ITU, entitled [Universal Service in an IP-enabled NGN environment](#)¹⁴⁶. This paper reviewed concepts of universal service (US) and how it is achieved and regulated under current licensing regimes, before considering the implications of an IP-enabled environment on universal service – whether USOs should be maintained for NGNs, whether they would apply to network infrastructure and/or services separately; whether broadband should be included within USOs; and what policies might be necessary. He proposed three good practice guidelines for Universal Service Obligations (USOs) in an NGN environment:

- recognize that USOs can cause inefficiencies;
- keep subsidies to the minimum necessary; and
- place primary reliance on market-based approaches.

The paper concludes that there is no firm view on whether universal service should be applied to network infrastructure or services and that there is no persuasive case for including broadband in universal service at the present time although some countries have decided to take that step.

59. [Sergio Antocicco](#)¹⁴⁷, Chairman of [INTUG](#)¹⁴⁸, spoke on the subject of [Consumer Protection in IP-Enabled NGNs](#)¹⁴⁹. Mr. Antocicco presented INTUG as a consumers' interest group, its aims and work with ITU, WTO and OECD, among others. He contrasted [ITU's definition of NGNs](#)¹⁵⁰ with INTUG's definition of NGNs as a multi-service, multi-protocol, multi-access, IP-based network. He suggested NGNs should enable Service Providers to offer:

- real-time communication services;
- peer-to-peer and client-server;
- nomadicity and mobility of both users and devices;
- interoperability (of legacy and NGNs).

Mr. Antocicco noted that restrictions in IPv4 address space is driving growth in Network Address Translation (NAT) technologies. He identified consumer interests as lower prices and lifestyle choice and said that convergence in services should introduce seamless service access where users can access “tailored” services from any access network. Services must be available on the networks to which users have access. He noted that end-to-end QoS will be one of the most important user requirements.

60. Mr. Antocicco noted problems of latency and jitter and suggested that if an operator tuned them for QoS for their specific customers, they could reduce overall network performance and QoS through interconnection with other networks. He noted the complex work on standardization underway in ITU Study Group 13, ETSI (TISPAN) and 3GPP. Mr. Antocicco noted that for interconnection, price, QoS and interworking must be ensured. For interoperability, issues arise in network capabilities, services, content and user information. Currently, he said there is little clarity in consumer and enterprise protection in NGNs. For users, costs, choice and transparency in QoS and tariffs are important, with opt-in essential. Users expect a demand-driven mechanism but this is currently little in evidence.

61. [Professor Knud Erik Skouby](#)¹⁵¹, Director of the [Center for Information and Communication Technologies](#)¹⁵², Denmark, presented [IP Migration's Implications for Concepts of Universal Service and Consumer Protection](#)¹⁵³. He introduced the EU position on [Universal Service](#)¹⁵⁴ as a minimum set of services of certain quality to which all end-users have access at affordable prices without distorting competition, including telephony and TV/radio in the public interest (access and content). There are no universal service access obligations in the EU for the Internet. He described trends in triple play and the use of broadband as a platform for convergence. He noted consumer benefits included potentially enhanced competition, with many new players and a broader choice of new services which may address bottlenecks. Functionally, he noted that users cannot distinguish between non-circuit-switched-based voice services and PSTN/POTS. However, he noted that VoIP and VoB can help reach more remote areas and IP networks are increasingly used to redistribute TV and radio services.

62. Professor Skouby said that consumer protection issues from the new structures/services include: anonymity; security; privacy; interoperability; wide applicability; and trans-border reach. Social inclusion is increasingly important, as the world becomes more connected to ICTs. Therefore, universal service must be technologically neutral and should include Internet access. Universal service relating to voice only becomes less relevant as voice is delivered in combination with other services. Universal service must be adapted to reflect a broadband- IP-converged-world, where consumer protection is more complex.

63. [Mr. William Drake](#)¹⁵⁵, Director of the Project on the Information Revolution and Global Governance at the [Graduate Institute for International Studies](#)¹⁵⁶, Geneva, and President of the Computer Professionals for Social Responsibility Group, gave his presentation on [Public Interest Considerations in NGNs](#)¹⁵⁷. He noted different definitions of “public interest”, but noted that such concerns will only increase with NGN roll-out and changes in policy. He said that technological developments have empowered users and raised their expectations (“digital rights”), resulting in increased concerns over regulatory and legislative capture, and industry concentration. He identified various hotspots and said that new international frameworks may be required. Some of the current issues include conflict, coexistence, or convergence, and whether the Internet is really “broken” as some claim.. He asked if NGNs are the answer? And referred to ISDN as a cautionary tale as how telcos can get it wrong.. Mr. Drake concluded by calling for transparency and inclusive dialogue.

64. [Ms. Alison Gillwald](#)¹⁵⁸, Director of the [Research ICT Africa! Link Center](#)¹⁵⁹ in South Africa, presented [the challenges of NGN regulation in developing countries: A South African Perspective?](#)¹⁶⁰ She outlined South Africa’s failure of privatization with an extended fixed line monopoly for universal service. The government’s commitments to [the incumbent](#)¹⁶¹ have led to regulatory risk for competitors and reduced investment. A Universal Service Fund was established. She related competition and universal service to questions of market inefficiency and market failure. In South Africa, infrastructure-based competition means PSTN/mobile/multimedia, and bottlenecks may arise in the submarine cable and local loop. The new South African Electronic Communications Bill includes:

- class licenses and exemptions;
- essential facilities (international) and obligation to regularly review;
- Carrier pre-selection;
- Forbearance on SMP to promote fibre investments in new residential loops and sub-loops
- Local Loop Unbundling (LLU).

However, she said that it reflects tensions between industrial policy, development, innovation and entrepreneurship.

65. Ms. Gillwald said there is talk of horizontal licensing to accommodate NGNs, with convergence under ‘managed liberalization’. She noted that for developing countries with limited networks, competition and LLU could increase quality/quantity of services at better prices, but might also increase the digital divide. She said that implementation of NGNs depended on vested interests and political constraints. She suggested also that NGNs might increase the digital divide, unless they were innovatively implemented. She suggested that competition with more effective use of the USF was necessary to promote universal service.

Session 9: Round Table: An Agenda for Action and Way Forward

66. At the Round Table, the Chairman, Professor Eli Noam, invited various participants to give their concluding opinions on the main outcomes of the workshop, the next steps, and the appropriate course of action for NGNs.

67. All participants expressed broad consensus that the process of transition to the IP environment is very challenging for all stakeholders and requires exceptional knowledge of technical, business and regulatory mechanisms that determine the telecommunication sector dynamics. Any initiatives facilitating capacity building and the exchange of experiences would be very valuable. There was a feeling that the role of the ITU in this area should be reinforced to share experiences. It was underlined that the ITU in particular has the capability of bringing specialists in technology, policy, and regulation throughout the world together. The participants found the meeting as comprehensive and for the time being do not see any need of organizing another event immediately like this. However, it was suggested that it would be useful to run a similar event in two years to review experiences. Generally, the regulatory debate on NGNs is still based on

many unknown assumptions and estimations and taking into consideration market dynamics, a similar discussion in the future might lead to more concrete results. It would also be an opportunity to share different country experiences, including those of developing countries.

68. It was generally felt that the transition to the NGNs will have significant macroeconomic impacts. Migration to NGNs represents a massive investment in infrastructure that has a lot of public good features. Many empirical investigations prove the positive relationship between the infrastructure creation and GDP. For this reason, many governments having particular interest in this may start proceeding proactively, fostering the development of the NGNs. In the view of some participants, the development of the new alternative access networks will significantly depend on the behaviour of the state and market mechanisms may not address these issues efficiently. If traditional regulatory mechanisms are followed, new technologies may not be implemented and new markets may not be achieved. Taking this into consideration, it was felt that regulation should focus more on dynamic efficiencies and that there is still place for a role on the part of governments in this field.

69. It was often discussed that the transition to the IP environment may create the possible re-emergence of a dominant – if not monopolistic position – of particular telecommunication network providers. A few presenters tried to dispel this fear during the workshop but nevertheless it remained as an open issue and there were discussions how to prevent re-monopolization and how market mechanisms are to deal with this tendency. It was stated that attempts to gain the monopolistic rent does not necessarily refer only to incumbents. Moreover, newcomers also set various barriers for competitors and prevent their entrance on the market. With regard to reasons for possible re-monopolization, it must still be clarified as to whether NGNs will represent the possibility for gaining unfair economies of scale..

70. A number of participants felt that market mechanisms alone will not be sufficient and regulatory intervention will be necessary and legitimate as is now the case. However, many felt that regulatory intervention should be seen as the last possible option. It was argued that all possible alternatives (e.g., different business models, different institutional constellations) should always be taken into account before intervention takes place.

71. During the discussions, three areas in which regulatory intervention were imaginable were pointed out: a) control of market power, b) deployment of technologies that would never be deployed without intervention, and c) management of scarce resources such as spectrum. Taking these areas into consideration, migration to the NGNs suggests that current regulatory concepts and mechanisms will remain in place in some form. However, regulatory instruments must nevertheless be adapted to the new environment over time. One example was the concept of universal service in an all IP environment.

72. There were several specific areas for which regulatory intervention was likely to be unavoidable. For example, many continue to experience difficulties when negotiating interconnection agreements. With NGNs, it will be necessary to pay attention to possible actions by service providers who refuse to transport particular applications over their networks in the future. Guaranteeing a certain quality of services is likely to be area of necessary regulatory intervention. In a similar manner, user protection is still likely to require significant involvement of the policy makers and regulators. This is not surprising as users do not have enough resources nor power to deal with companies as an equal partner.

73. It was emphasized by some that the debate should not focus on what market mechanisms cannot provide and therefore where regulators must intervene but rather should explore possible ways of further unleashing market forces. Depending on the starting conditions of each country, there are number of determinants that influence the shape of the each country's regulatory frameworks: some examples include politics, level of corruption, and the incumbent's position. Nevertheless, countries need to look for the most efficient regulatory approach that would match expectations in respect to long-term national social and economic policy. The situation is particularly difficult in developing countries where market mechanisms are not able to ensure perfect competition. In many cases, markets are so imperfect that regulatory intervention is unavoidable and in particular, the issue of significant market power plays a central consideration.

74. Regarding actions to be taken at the global level, it was stressed that international open standardization is a key factor to success for IP-enabled NGNs. As the broadest standards initiative, ITU's [NGN Global Standards Initiative \(NGN-GSI\)](#)¹⁶² is a significant facilitator. However, despite considerable work, there are many challenging issues that remain to be resolved. For example, specific definitions of open-access and cross-carrier interconnection regimes represent major and on-going challenges.

75. Another issue to be addressed on the global level is related to spectrum allocation. Particularly in the NGN world, determination of new ranges of unlicensed spectrum could influence levels of competition. Cybersecurity will also be a major consideration in NGNs which will require increased international cooperation as well as the involvement of governments working on harmonized legislation and mutual enforcement.

76. Many new NGN-based services will require new methods of international cooperation. It will be crucial to foster new methods for development of services. For example, changes are necessary to provide, for instance, audio-visual content across jurisdictions. Convergence is setting two very different regulatory cultures on a rapid collision course: the highly-interventionist regulatory culture of broadcasting and less interventionist (at least with regard to content) culture of telecommunications. This is a particularly sensitive topic as the regulation of audiovisual content industries is culturally embedded and tied to national regulatory regimes consistent with cultural and religious values

77. Concerning further investigations on policy and regulation, it was strongly recommended that a focus be placed more on investment. It was also suggested that a forum be created to foster on-going discussions. Some participants expressed the view that the NGN debate will still need more technical input in order to define critical control points. It was also suggested that further discussion be had at the Global Symposium for Regulators, and the outcome of the workshop should be submitted to the Global Standard Initiative.

Additional Contributions to the Event

78. [Tony Rutkowski](#)¹⁶³, Vice President of Regulatory Affairs at [VeriSign](#)¹⁶⁴, gave an [Update on NGN regulatory Affairs](#)¹⁶⁵. Mr. Rutkowski noted interest in [infrastructure protection](#)¹⁶⁶, fraud management, justice assistance, security and the competition framework. He summarized issues arising from the June 2005 EC Workshop. He noted that the Internet was never designed as a public infrastructure. He said that intelligent infrastructure will be the key enabler in near-term network convergence. He summarized the most common NGN infrastructure requirements and suggested that NGN will require more (and not less) regulatory activity. Worldwide, NGN statutory requirements are being set up by multiple instruments (ITU, Cybercrime Treaties, FCC rules, [EU Data Retention Directive](#)¹⁶⁷). He identified the most important NGN regulatory needs as: competitive requirements, public infrastructure protection requirements, and simple, numbers-based universal service mechanisms.

Session 10: Closing Ceremony

79. In his remarks summarizing the workshop, Professor Noam put forward several comments and reflections on the [ITU Workshop, "What Rules for IP-enabled NGNs?"](#)¹⁶⁸ This particular event was held in the context of ITU's work on [NGN](#)¹⁶⁹ and related follow-up mechanisms, so the results and outcomes of this meeting will strengthen ITU's work in this area.

80. In closing the meeting, the Chairman thanked the participants, the ITU Secretary-General and all ITU staff involved for their support for this event.

LIST OF ACRONYMS

APEC	Asia-Pacific Economic Cooperation
APEC TEL	APEC's Telecommunication and Information Working Group
API	Application Programming Interfaces
BWA	Broadband Wireless Access
CAPEX	Capital expenditure
CEPT	European Conference of Postal and Telecommunications Administrations
CITEL	Inter-American Telecommunication Commission
CPNP	Calling Party's Network Pays
DSL	Digital Subscriber Line
EC	European Commission
EoI	Equivalence of Inputs
ERG	European Regulators' Group
ETP	European Telecommunications Platform
ETSI	European Telecommunications Standards Institute
FTTH	Fibre-To-The-Home
FTTC	Fibre-To-The-Curb
FTTx	Fibre-To-The-XX
FMC	Fixed Mobile Convergence
GATS	General Agreement on Trade in Services
GSM	Global System for Mobile Communications
ICANN	Internet Corporation for Assigned Names and Numbers
ICT	Information and Communication Technology
IDA	Infocomm Development Authority of Singapore
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecommunication Union
LAN	Local Area Network
LLU	Local Loop Unbundling
MIC	Ministry of Internal Affairs and Communications of Japan
MSAN	Multi-Service Access Node (part of NGN access layer)
NAT	Network Address Translation
NGN	Next Generation Network
NRA	National Regulatory Authority
NRF	New Regulatory Framework (of the European Union)
OPEX	Operating Expenditure
OSA	Open Service Architecture
OSS	Operating Support Services
PAN	Personal Area Network
PATS	Pretty Advanced Telephone Service (referring to new, digital telephone system)
PoI	Point of Interconnection
POTS	Plain Old Telephone Service (referring to the analogue telephone service)
PC	Personal Computer
PSTN	Public Switched Telephone Network
QoS	Quality of Service
R&D	Research & Development
RPP	Receiving Party Pays
SMP	Significant Market Power
SNO	Second National Operator
SPU	Strategy and Policy Unit of the ITU
TDM	Time Division Multiplexing
TELMIN	Telecommunication Ministers Meeting (APEC)
TRAI	Telecom Regulatory Authority of India
UMTS	Universal Mobile Telecommunications System (3G)
USO	Universal Service Obligation
VoB	Voice over Broadband
VoIP	Voice over Internet Protocol
VDSL	Very High Bit Rate Digital Subscriber Line
VSAT	Very Small Aperture Terminal
WLL	Wireless Local Loop
WTO	World Trade Organization
WIPO	World Intellectual Property Organisation

GLOSSARY

Access NGNs – base network providing primary access to the NGN, developed on the basis of existing access or distribution network infrastructure (local loop) with the deployment of new high-speed technologies.

Asymmetric regulation – regulation that distinguishes in its treatment between operators, network and/or service providers (usually on the basis of market power and the historical dominance of an incumbent over competing entrants). For example, not all providers may be required to provide universal service or emergency calls to the same degree.

Bill and Keep – No payment of origination and termination fees are charged to other networks.

Bottlenecks/Control points – bottlenecks within the distributed infrastructure that offer the possibility to control traffic and network services, offering a source of market power. (According to [Mr. Wolfgang Reichl](#)¹⁷⁰, such network bottlenecks are likely to be found in the access network, but are not exclusive to the access network alone - [Industry Requirements for a regulatory environment for NGNs](#)¹⁷¹). (According to [Mr. Robert Stil](#)¹⁷², bottlenecks are likely to be non-replicable assets – [New Regulatory Approaches Fostering Innovation Dynamics in the Telecom Sector](#)¹⁷³).

Calling Party Pays – the arrangement in which the mobile subscriber does not pay for incoming calls. Instead, the calling party (party originating the call) pays the entire end-to-end cost of the communication.

Calling Party's Network Pays – Network operators compensate each other for the traffic they exchange through bilateral interconnection agreements, specifying settlement terms, as well as physical interconnections between the two networks (at the network level). The two interconnected carriers determine periodically how much traffic they have sent to and received from one another. The traffic exchanges between the two networks are netted to give the net traffic flow, which is multiplied by the interconnection fee. The result is a net settlement payment from the net originating network (the Calling Party's Network) to the net terminating network (the called party's network).

Coase Theorem – the economic theorem devised by Coase that states that private parties can often negotiate arrangements more efficiently than regulators, provided certain preconditions have been met [as set out in the background paper [Interconnection in an IP-enabled NGN environment](#)¹⁷⁴ by [Scott Marcus](#)¹⁷⁵].

Convergence – the merging of telecommunications, broadcasting and information technologies, e.g. the merger of fixed, mobile, terrestrial and satellite communications and including the merge of location systems and systems of establishment of places and liaisons [In [Regulation of N-Play Bundling of Services: Proposing a concept of regulation](#)¹⁷⁶, [Mr. Tomas Lamanuskas](#)¹⁷⁷ points out there is also convergence in services, networks, devices and markets, as well as in technologies].

Core NGNs – an integrated IP-based network with multi-service capabilities and differentiated quality of service, offering generalized mobility and unrestricted access by users to different service providers (as distinct from ordinary IP-based networks, e.g. the public Internet).

Control layer of NGN – the service creation, security and control layer, independent from the underlying access and transport technologies and infrastructure.

Ethernet – frame-based computer networks for Local Area Network (LAN).

Equivalence of Inputs (EoI) – operators (incumbents and competing altnets) have access to exactly the same inputs and products and use exactly the same systems and processes (subject only to agreed exemptions). This principle is most important and most widely applied in markets where dominant operators have Significant Market Power (SMP), to ensure a 'level playing field'.

Facilities-based competition – competition in services based on self-deployed local loops, where services are provided according to network deployment e.g. mobile and FTTH (in contrast to services-based competition). This often arises between firms with large initial investments, economies of scale and 'natural monopoly' characteristics.

Fibre-To-The-Curb – The deployment of optical fibre from a telephone switch to within 1,000 feet of a home or enterprise.

Fibre-To-The-Home – The deployment of optical fibre from a telephone switch directly into the subscriber's home or enterprise.

Fibre-To-The-XX – The deployment of optical fibre from a telephone switch to any location (Fibre-To-The-Premises, FTTP, and Fibre-To-The-Building, FTTB).

Forbearance – See “*Regulatory forbearance*”.

Foreclosure – prevention of access by other operators to the network (and thus competition with downstream end-to-end services) through e.g. network design decisions.

Fixed Mobile Convergence – the merging of fixed line telephony with mobile technologies, e.g. the “One Phone” service from Korea Telecom (KT) that functions using CDMA technology outside the home and Bluetooth inside the home to access the Internet or BT’s Fusion Phone.

Horizontal integration – refers to the structure of NGN whereby layers are separated into core, access, transport, control and service/application layers horizontally, with each layer dealing with a specific function of the integrated network. (This is in contrast to end-to-end, vertically integrated PSTN and mobile systems, where the system deals with all functions from start to finish, or user to user).

Hot potato problem – the forwarding and transit of packets, based on the best route available at that time. The optimal route becomes rapidly more complex to identify with the number of points of interconnection [the hot potato problem is mentioned in [Interconnection Arrangements for IP-enabled NGNs – Discussion in Germany](#)¹⁷⁸ by [Schwarz-Schilling](#)¹⁷⁹].

Industry concentration – the concentration of market power within an industry, typically measured by concentration ratios (the proportion or share of a total market owned by the number of firms e.g. largest three/five/ten firms) or by short-run SMP tests. Nb. This assumes that the size of a market can be defined and measured.

Interconnection – the physical connections between networks that are the basis for the exchange of traffic, under interconnection agreements.

Jitter – the weighted average of the latency difference between every pair of consecutive packets received, affecting the performance of real-time applications such as streaming video and audio.

Latency – the time it takes a bit of data to get through a network link.

Legacy networks – refers to existing networks (including PSTN and others) that may continue to run and be incorporated into NGN, where the ‘overlay’ approach is adopted in the migration to NGN, so the PSTN and IP network run in parallel.

Local Loop - The part of the network comprising the connection between the Public Telephone Operator’s exchange and the subscriber’s home [ITU’s Glossary of Technical Terms at <http://www.itu.int/newsarchive/press/WTPF98/Glossarytechnterms.html>].

Local Loop Unbundling – mostly within liberalisation, competitors are allowed to use the local loop twisted-pair telephone connections from the central exchange’s office to customer premises, so the incumbent’s local loop is opened to use by other operators.

Media gateway – formed by the split of the traditional switch into the media gateway (relating to the transport layer) and the soft switch (for call control). The media gateway ensures control of the physical layer of the network and converts incoming TDM signals into an outgoing IP signal. However, it is not an “intelligent” component as such.

Net bias - deliberate discrimination against specific bitstream traffic, or generators of a bitstream by ISPs without operational justification. It occurs when an ISP denies access despite ample capacity to switch and route traffic. It includes blocking ports and “sniffing” bits to identify and block certain types, e.g., a competitor’s VoIP traffic. It does not include dropping of bits and or denial of service based on congestion and the operational inability to route bits. It describes the deliberate degradation of service by an ISP through the partitioning and under-utilisation of bandwidth, so public transit routes become more congested and unreliable.

Net neutrality – Government should prescribe that now and forever the owner of the access network must not restrict the ability of its end-user customers to access specific content or to running specific applications. (Nb. Some argue that network neutrality is the equivalent of technology neutrality e.g. the presentation [Regulation between Evolution and Revolution: Approaching NGNs](#)¹⁸⁰ by [Mr. Davide Gallino](#)¹⁸¹). More

specifically for the Internet, this means that ISPs should not discriminate against, or in favour of, specific bitstreams for upstream ISPs or downstream ISPs or end-users, including blocking or deliberate degradation of traffic [[Net Neutrality or Net Bias? Finding the Proper Balance in Network Governance](#)¹⁸², by [Professor Robert Frieden](#)¹⁸³].

Network address translation (also “*network masquerading*” or “*IP-masquerading*”) - rewriting the source and/or destination addresses of IP packets as they pass through a router or firewall. Most systems using NAT do so in order to allow multiple hosts on a private network to access the Internet using a single public IP address.

NGN - A Next Generation Network (NGN) is a packet-based network able to provide services including 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 offers unrestricted access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users ([ITU Recommendation, 2001, Study Group 13](#)¹⁸⁴).

Non-replicable assets – assets requiring significant investment, time or effort to establish/recreate, so they are essentially non-replicable (often access bottlenecks). It does not make commercial sense for an entrant to replicate these assets. They often constitute barriers to market entry.

Peering – an agreement between ISPs to carry traffic for each other and for their respective customers. Peering does not include the obligation to carry traffic to third parties. Peering is usually a bilateral business and technical arrangement, where two providers agree to accept traffic from one another, and from one another's customers (and thus from their customers' customers).

Real options – the right, but not the obligation, to undertake some business decision, typically the option to make a capital investment. This right is not tradeable.

Receiving Party Pays – the party receiving a communication pays all or most of the end-to-end cost of the communication. For mobile telephony, this refers to the case where the receiving party pays the "airtime charge" for termination on the mobile handset (the originating or calling party may still pay for a local call).

Regulatory capture – referring to the lack of independence of a National Regulatory Agency that becomes, for various reasons (institutional, capacity-based, political, economic or commercial), dominated by the interests of the industry that it oversees.

Regulatory holidays – commitment of a regulatory authority not to intervene for a specified period in order to protect operators' investment incentives (generally most beneficial for established operators and monopolists).

Regulatory forbearance – regulatory restraint, where regulators refrain from action or intervention.

Replicable assets – assets that are easily recreated and duplicated. Replicability of infrastructure is already used to choose between infrastructure-based and service-based competition in determining proportionality - see ERG common position. There are different types of replicability – e.g. technical and functional replicability [[New Regulatory Approaches Fostering Innovation Dynamics in the Telecom Sector](#)¹⁸⁵, Robert Stil, Geneva, 23 March 2006].

Sender Keeps All – for telephony, the [party \(Public Telephone Operator\) originating the call/datastream keeps all of the revenues it collects](#)¹⁸⁶. For the Internet, Sender Keeps All (SKA) peering arrangements are those in which traffic is exchanged between two or more ISPs without mutual charge (an interconnection arrangement with no financial settlement).

Services-based competition – competition in services dependent on incumbents' local loops, e.g. Carrier pre-selection (resale, long distance) and ADSL (shared access). This is generally characterized by an open choice of service areas through existing line, relatively small initial investments, and greater flexibility regarding market entry, expansion and withdrawal.

Significant Market Power – definition of a significant (or critical) degree of market power by an operator (or consortium), as measured by a short-run market power test, the “joint dominance SMP test” that may, according to the legislation, act as the trigger point for action e.g. regulatory intervention, in some markets.

Soft switch – This is the part of the traditional switch that relates to the control layer and still carries out the switching function. However, contrary to TDM networks, it is not associated with any physical point in the network and no longer controls the physical links of the network.

Sunset clause (also “*sunset provision*”) – a provision or clause in the legislation, whereby all of it or parts of it cease to apply after a specific date, unless further legislative action is taken to extend it.

Symmetric regulation – regulation that applies equally to all network and/or service providers in the long-run, regardless of their market power i.e. all providers are required to provide emergency calls, universal service, intercept, data retention, consumer protection, etc. equally.

Technological neutrality – the argument that regulation should not ‘pick winners’ in terms of technology e.g. regulation should not favour cable over copper or fibre, or vice versa.

Transit – is an agreement where an ISP agrees to carry traffic on behalf of another ISP or end user. In most cases transit will include an obligation to carry traffic to third parties. Transit is usually a bilateral business and technical arrangement, where one provider (the transit provider) agrees to carry traffic to third parties on behalf of another provider or an end user (the customer). In most cases, the transit provider carries traffic to and from its other customers, and to and from every destination on the Internet, as part of the transit arrangement. In a transit agreement, the ISP often also provides ancillary services, such as Service Level Agreements, installation support, local telecom provisioning, and Network Operations Center (NOC) support.

Trusted Federations – the possibility of enhanced interfaces between specific groups of operators for collaborative interconnection and the joint delivery of services, resulting in collaborative partnerships for improved services [ITU background paper [Ruling the New and Emerging Markets in the Telecommunication Sector](#)¹⁸⁷ by Professor Christian Wey & associates from [DIW Berlin](#)¹⁸⁸].

Vertical Integration – refers to industry structure whereby service providers provide the full range of services along the length of the entire value chain from network infrastructure to end-user and/or consumer (existing market structure to date in Figure 1).

Walled gardens – the possibility of restricting access to certain addresses or services through service access control and restriction of interconnection e.g. through the use of proprietary standards or standards foreclosure through proprietary or legally protected Application Programming Interfaces (compared to end-to-end).

EVENT'S AGENDA

First day of the meeting - 23 March 2006
<p>Opening Ceremony</p> <ul style="list-style-type: none">• Welcome and Opening Addresses - <i>Roberto Blois</i> (Biography) - Deputy Secretary-General of the ITU, Geneva, Switzerland
<p>Session 1: Framing the Debate</p> <p><i>Session Description:</i> Policy makers and communications regulators around the globe are grappling with how to best promote the public interest in a competitive and innovative IP-enabled communications environment. These debates have intensified as traditional carriers have begun investments and deployments of IP-enabled NGNs—which can be seen as a logical progression from separate PSTN- and IP-network infrastructures to unified networks for future electronic communications based on IP. Technical convergence means regulatory asymmetry is no longer tenable but what path forward? Debates such as “network neutrality” are basic to communications policy and will reappear in many different forms in the coming years. This session outlines the background and frames the debate from different perspectives.</p> <ul style="list-style-type: none">• What Rules for IP-Enabled NGNs? – <i>Robert Shaw</i> (Biography)– Deputy Head, Strategy and Policy Unit, ITU Strategy and Policy Unit, Geneva, Switzerland (Presentation/Abstract)• Regulation between Evolution and Revolution: Approaching NGN - <i>Davide Gallino</i> (Biography) – Secretary, European Regulators Group, Brussels, Belgium (Presentation/Abstract)
<p>Session 2: Evolution of National, Regional and International Perspectives</p> <p><i>Session Description:</i> Sensitive to the complexity of the issues and polarization of viewpoints, national policy makers, communication regulators and related institutions are taking a cautious approach. This session discusses national, regional and international institutional approaches to framing the debate and how they see next steps forward.</p> <ul style="list-style-type: none">• National, Regional and International Proceedings on Rules for IP-enabled NGNs - <i>Jaroslav Ponder</i> (Biography) – ITU Strategy and Policy Unit, Geneva, Switzerland• Regulatory Framework under Discussion: CITEI and APEC Experiences - <i>Salma Jalife Villalón</i> (Biography) - Commissioner, Cofetel, Mexico (Presentation/Abstract)• Next Generation Networks: Can the GATS adapt? - <i>Lee Tuthill</i> (Biography) – Counsellor, World Trade Organization, Switzerland (Presentation/Abstract)• Next Generation IP Network Promotion Forum - <i>Atsushi Hiramatsu</i> (Biography) – Senior Manager, Network Technology Section, Next Generation Network Office, Nippon Telegraph and Telephone (NTT), Japan (Presentation/Abstract)
<p>Session 3: Perspectives on Pro-competitive Regulatory Approaches to NGN</p> <p><i>Session Description:</i> Some stakeholders argue that the IP communications environment has thrived in an unregulated environment that has produced Darwinian competition— resulting in new and innovative applications—some even arguing that “network neutrality” should be codified in technical, legislative and regulatory regimes. Others argue deployment of IP-enabled NGNs requires significant investments and suggest regulatory moratoria for infrastructure providers. Current competitive telecom providers argue the opposite, saying there are questions as to whether, in the absence of wholesale economic regulation, will market dynamics be sufficient to ensure a competitive NGN environment? This session explores these different perspectives.</p> <ul style="list-style-type: none">• Ruling the New and Emerging Markets in the Telecommunication Sector - <i>Christian Wey</i> (Biography) – Head, Information Society and Competition, Deutsches Institut für Wirtschaftsforschung, DIW Berlin, Germany (Presentation of Background Paper/Abstract)• Industry requirements for a regulatory environment for Next Generation Networks (ETP view) - <i>Wolfgang Reichl</i> (Biography) – Chair of WG on NGN at European Telecommunications Platform, Brussels, Belgium (Presentation/Abstract)• Net Neutrality or Net Bias? Finding the Proper Balance in Network Governance - <i>Robert Frieden</i>

([Biography](#)) - [Pennsylvania State University](#), USA ([Presentation/Abstract](#))

- **Ensuring Competition & Growth in Next Generation Network (NGN)** - *Melinda Tan* ([Biography](#)) - [Infocomm Development Authority](#), Singapore ([Presentation/Abstract](#))

Session 4: Perspectives on Pro-competitive Regulatory Approaches to NGN cont'd

Session Description: This session is a continuation of Session 3.

- **The Technology Neutrality Concept Used to Perpetuate Regulation into NGN** - *Hasan Alkas* ([Biography](#)) – Senior Economist, [Deutsche Telekom AG](#), Bonn, Germany ([Presentation/Abstract](#))
- **Developing New Regulatory Environment Enabling Expansion of the NGNs** - *SN Gupta* ([Biography](#)) – Advisor, [Telecommunication Regulatory Agency of India](#) (TRAI), India ([Presentation/Abstract](#))
- **New Regulatory Approaches Fostering Innovation Dynamics in the Telecommunication Sector** - *Robert Stil* ([Biography](#)) - Chief Economist, [Onafhankelijke Post en Telecommunicatie Autoriteit](#), (OPTA), The Netherlands ([Presentation/Abstract/Article](#))

Session 5: What Rules for Interconnection and Interoperability?

Session Description: The technologies and architecture of IP-enabled NGNs are fundamentally different from the PSTN and results in new network topologies, associated costs and interconnection models. This fundamentally disrupts current interconnection regimes which is forcing a reopening of long-standing debates on the premises of interconnection as a structural remedy for promoting competition. In a multi-service NGN environment, does it continue to make sense to distinguish voice (including VoIP) as needing a distinctive interconnection regime? If so, why not for other services? Are there applicable lessons to be learned from Internet interconnection arrangements?

- **Interconnection in an IP-enabled NGN Environment** - *Scott Marcus* ([Biography](#)) – Senior Consultant, [Wissenschaftliches Institut für Kommunikationsforschung](#), Germany ([Background Paper / Presentation of Background Paper/Abstract](#))
- **New Models for the Interconnection** - *John Horrocks* ([Biography](#)) – CEPT's Specialist, ECC TRIS Chairman and consultant to DTI, UK ([Presentation/Abstract](#))
- **Fixed Mobile Convergence (FMC): Standards, Market Status and Regulatory Issues** - *Souheil Marine* ([Biography](#)) - Digital Bridge Manager, France, Africa, Middle East, South Asia, [Alcatel CIT](#) ([Presentation/Abstract](#))

Second Day of the Meeting - 24 March 2006

Session 6: What Rules for Interconnection and Interoperability cont'd?

Session Description: This session is a continuation of Session 5.

- **Toward Next Generation Network - From PSTN to new IP-based network** – *Keiichiro Seki* ([Biography](#)) - Director of International Economic Affairs Division, [Ministry of Internal Affairs and Communications](#) (MIC), Japan ([Presentation/Abstract](#))
- **Interconnection arrangements for IP-enabled NGNs - Discussion in Germany** - *Dr. Cara Schwarz-Schilling* ([Biography](#)) - Head, Internet Economics Section, [Bundesnetzagentur](#), Germany ([Presentation/Abstract](#))
- **Ofcom's regulatory approach to NGN interconnection and interoperability** - *Steve Unger* ([Biography](#)) – Director of Telecoms Technology, Competition Group, [OFCOM](#), UK ([Presentation/Abstract](#))
- **Regulatory Issues in an IP-Open Convergent Market, Interconnecting NGN-core and non NGN-core carriers** - *François Varloot* ([Biography](#)) – Deputy-Director, Economic and Forecasting Division, [ARCEP](#), France ([Presentation/Abstract](#))

Session 7: Ensuring an Open NGN Platform and Promoting the Expansion of Service and Content Providers

Session Description: Traditional carriers are looking to move “up the value chain” into data and audio-visual content at the same time that mega-Internet application service providers (with strong brands and deep pockets) like Google, MSN, eBay and Yahoo are entering voice markets and making forays into competitive infrastructure provisioning. Will market dynamics be sufficient to ensure a competitive environment? Some argue that without attention by regulators, will providers construct “N-play walled gardens” that vertically integrated networks with services—potentially creating

bottlenecks for delivery of audiovisual content?

- **NGN as Multimedia Implementation of the Legacy Telco Model?** - *Ernst Langmantel* ([Biography](#)) – Director of Technical Division, [Rundfunk und Telekom Regulierungs](#), Austria ([Presentation/Abstract](#))
- **New Medium versus Old Models** - *Michael Nelson* ([Biography](#)) – Director, Internet Technology and Strategy, [IBM Corporation](#), USA ([Presentation/Abstract](#))
- **Regulation of N-Play Bundling of Services: Proposing a concept of regulation** - *Tomas Lamanauskas* ([Biography](#)) – Deputy Director, [Communications Regulatory Authority](#), Republic of Lithuania ([Presentation/Abstract](#))

Session 8: New Concepts of Universal Service, Access and Consumer Protection: What Way Forward?

Session Description: Government and user expectations are changing as to what constitutes basic and universal service to ICTs. What does universal service imply in a broadband-based IP-enabled NGN environment? How is access for all ensured? Are there new NGN consumer protection issues to be considered?

- **Universal Service in an IP-enabled NGN Environment** - *Patrick Xavier* ([Biography](#)) – Director, Info-Comm Analysis, Australia ([Presentation of Background Paper/Abstract](#))
- **Consumer Protection in the IP-enabled NGNs** - *Sergio Antocicco* ([Biography](#)) – Chairman, [INTUG](#) ([Presentation/Abstract](#))
- **IP Migration's Implications for the Concept of the Universal Service and Consumer Protection** - *Dr. Knud Erik Skouby* ([Biography](#)) – Director, [Center for Information and Communication Technologies](#), Denmark ([Presentation/Abstract](#))
- **Public Interest Considerations on Next Generation Networks** – *William Drake* ([Biography](#)) – Director, Project on the Information Revolution and Global Governance, [Graduate Institute for International Studies](#), Geneva; and President, [Computer Professionals for Social Responsibility](#) ([Drake](#)) ([Presentation/Abstract](#))
- **The challenges of NGN regulation in developing countries: A South African Perspective ?** - *Alison Gillwald* ([Biography](#)) - Director, Research ICT Africa!, Link Center, Graduate School of Public and Development Management, University of the Witwatersrand, South Africa ([Presentation/Abstract](#))

Session 9: Round Table: An Agenda for Action and Way Forward

Session Description: The Chairman will invite selected participants to participate in a round table to provide their “takeaways” from the workshops discussions and suggest pragmatic next steps. In particular:

- what are the issues that market forces may not fully address?
- what are the issues that need to be addressed at a national level?
- what are the issues that need to be addressed at the international level?
- how does this interrelate with ITU's NGN Global Standards Initiative?
- what next initiatives should be undertaken by ITU to promote an enabling environment on the global level?

Closing ceremony

ENDNOTE

¹ <http://www.itu.int/officials/Utsumi.html>

² <http://www.itu.int/osg/spu/ngn/event-march-2006.phtml>

³ <http://www.itu.int/osg/spu/ngn/index.phtml>

⁴ <http://www.itu.int/osg/spu/>

⁵ <http://www.itu.int/osg/spu/ni/index.html>

⁶ <http://www.citi.columbia.edu/elinoam/>

⁷ <http://www.citi.columbia.edu/home/>

⁸ **Theme One:** Policy-makers and communication regulators around the globe are grappling with how to best promote the public interest in a competitive and innovative IP-enabled communication environment. These debates have intensified as traditional carriers have begun investments in and deployments of IP-enabled NGNs—which can be seen as a logical progression from separate PSTN- and IP-network infrastructures to unified networks for future electronic communications based on IP. Technical convergence means regulatory asymmetry is no longer tenable, but what path forward? Debates such as “network neutrality” are basic to communications policy and will reappear in many different forms over the coming years. This session outlines the background and frames the debate from different perspectives.

⁹ **Theme Two:** Sensitive to the complexity of the issues and polarization of viewpoints, national policy-makers, communication regulators and related institutions are taking a cautious approach. This session discusses national, regional and international institutional approaches to framing the debate and how they see next steps forward.

¹⁰ **Theme Three:** Some stakeholders argue that the IP communications environment has thrived in an unregulated environment that has produced Darwinian competition resulting in new and innovative applications—some even argue that “network neutrality” should be codified in technical, legislative and regulatory regimes. Others argue that deployment of IP-enabled NGNs requires significant investments and suggest regulatory moratoria for infrastructure providers. Current competitive telecom providers argue the opposite, saying there are questions as to whether, in the absence of wholesale economic regulation, market dynamics will be sufficient to ensure a competitive NGN environment? This session explores these different perspectives.

¹¹ **Theme Four:** The technologies and architecture of IP-enabled NGNs are fundamentally different from the PSTN and result in new network topologies, associated costs and interconnection models. This fundamentally disrupts current interconnection regimes, which is forcing a reopening of long-standing debates on the premises of interconnection as a structural remedy for promoting competition. In a multi-service NGN environment, does it continue to make sense to distinguish voice (including VoIP) as needing a distinctive interconnection regime? If so, why not for other services? Are there applicable lessons to be learned from Internet interconnection arrangements?

¹² **Theme Five:** Traditional carriers are looking to move “up the value chain” into data and audio-visual content at the same time that mega-Internet application service providers (with strong brands and deep pockets) such as Google, MSN, eBay and Yahoo are entering voice markets and making forays into competitive infrastructure provisioning. Will market dynamics be sufficient to ensure a competitive environment? Some argue that without attention by regulators, providers may construct “N-play walled gardens” that vertically integrate networks with services—potentially creating bottlenecks for the delivery of audiovisual content.

¹³ **Theme Six:** Government and user expectations are changing as to what constitutes basic and universal service to ICTs. What does universal service imply in a broadband-based IP-enabled NGN environment? How can access for all be ensured? Are there new NGN consumer protection issues to be considered?

¹⁴ **Round Table:** The Chairman will invite selected participants to participate in a round table to provide their “takeaways” from the workshops discussions and suggest pragmatic next steps. In particular: what are the issues that market forces may not fully address? What are the issues that need to be addressed at the national and international levels? How do these issues interrelate with ITU’s NGN Global Standards Initiative, and what are the next initiatives that should be undertaken by ITU to promote an enabling environment on the global level?

¹⁵ <http://www.itu.int/osg/spu/ngn/event-march-2006.phtml>

¹⁶ <http://www.itu.int/osg/spu/ngn/agenda.html>

¹⁷ <http://www.itu.int/osg/spu/ngn/event-march-2006.phtml>

¹⁸ <http://www.itu.int/osg/spu/ngn/presentations.html>

¹⁹ http://www.itu.int/osg/spu/newslog/CategoryView.category_NGN.aspx

²⁰ <http://www.itu.int/osg/spu/ngn/presentations.html>

²¹ http://www.itu.int/osg/spu/ngn/documents/papers/chairmans_report.pdf

²² <http://www.itu.int/ibs/sg/spu/2006ngn/index.html>

²³ <http://www.itu.int/osg/spu/ngn/ngn-policy-regulatory-resources.html>

²⁴ <http://www.itu.int/osg/spu/ngn/index.phtml>

²⁵ <http://www.itu.int/officials/Blois.html>

²⁶ <http://www.itu.int/osg/dsg/speeches/2006/ngn.html>

²⁷ <http://www.citi.columbia.edu/elinoam/>

²⁸ http://www.itu.int/osg/spu/ngn/speaker_bios.html#Shaw

²⁹ <http://www.itu.int/osg/spu/ngn/documents/presentations/shaw-23-march-2006.ppt>

³⁰ ITU’s working definition of a Next Generation Network (NGN) is as a packet-based network able to provide services including 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 offers unrestricted access by users to

different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users, at http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html.

31 <http://www.itu.int/osg/spu/ngn/documents/presentations/vey-23-march-2006.ppt>
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76 See <http://www.itu.int/osg/spu/ngn/documents/Papers/Wey-060323-Prem-v1.1.pdf>. The authors of this paper are Professor Christian Wey, Dr. Pio Baake and Sven Heitzler of the [Deutsches Institut für Wirtschaftsforschung](http://www.diw.de), the German Institute for Economic Research, at www.diw.de.
77 Email address: pbaake@diw.de
78 Email address: sheitzler@diw.de
79 <http://www.diw.de>
80 See <http://www.itu.int/osg/spu/ngn/documents/Papers/Wey-060323-Prem-v1.1.pdf>. The authors of this paper are Professor Christian Wey, Dr. Pio Baake and Sven Heitzler of the [Deutsches Institut für Wirtschaftsforschung](http://www.diw.de), the German Institute for Economic Research, at www.diw.de.
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136 <http://www.itu.int/osg/spu/ngn/documents/presentations/nelson-23-march-2006.ppt>

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145 <http://www.itu.int/osg/spu/ngn/documents/presentations/marcus-23-march-2006.ppt>

146 See <http://www.itu.int/osg/spu/ngn/documents/Papers/Xavier-060323-Fin-v1.pdf>. The author of this paper is Patrick Xavier.

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148 <http://www.intug.net/>

149 http://www.itu.int/osg/spu/ngn/speaker_bios.html#antocicco

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152 <http://www.cti.dtu.dk/>

153 <http://www.itu.int/osg/spu/ngn/documents/presentations/skouby-23-march-2006.ppt>

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174 See <http://www.itu.int/osg/spu/ngn/documents/Papers/Marcus-060323-Fin-v2.1.pdf>. The author of this paper is Scott Marcus of the Wissenschaftliches Institut für Kommunikationsforschung, the German Institute for Communications Research, at http://www.wik.org/index_e.htm.

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180 <http://www.itu.int/osg/spu/ngn/documents/presentations/gallino-23-march-2006.ppt>

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- ¹⁸³ http://www.itu.int/osg/spu/ngn/speaker_bios.html#Frieden . See also <http://www.personal.psu.edu/faculty/r/m/rmf5/>
- ¹⁸⁴ ITU's working definition of a Next Generation Network (NGN) is as a packet-based network able to provide services including 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 offers unrestricted access by users to different service providers. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users, at http://www.itu.int/ITU-T/studygroups/com13/ngn2004/working_definition.html.
- ¹⁸⁵ <http://www.itu.int/osg/spu/ngn/documents/presentations/stil-23-march-2006.ppt>
- ¹⁸⁶ <http://www.itu.int/osg/spu/intset/whatare/wtdr/wtdr.html>
- ¹⁸⁷ See <http://www.itu.int/osg/spu/ngn/documents/Papers/Wey-060323-Prem-v1.1.pdf> . The authors of this paper are Professor Christian Wey, Dr. Pio Baake and Sven Heitzler of the [Deutsches Institut für Wirtschaftsforschung](http://www.diw.de), the German Institute for Economic Research, at www.diw.de.
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