7th Global Symposium for Regulators

Report of the Chairperson

ITU Global Symposium for Regulators (GSR)

5-7 February 2007

Dubai, United Arab Emirates

THE ROAD TO NEXT-GENERATION NETWORKS (NGN): CAN REGULATORS PROMOTE INVESTMENT AND ACHIEVE OPEN ACCESS?

Regulatory Reform Unit
Telecommunication Development Bureau

International Telecommunication Union
www.itu.int/ITU-D/treg

EXECUTIVE SUMMARY

ITU's 7th annual Global Symposium for Regulators (GSR), held in Dubai, United Arab Emirates from 5-7 February 2007, attracted 471 participants, bringing together regulators, policy makers and service providers from 111 countries to identify best practice guidelines that promote regulatory frameworks that foster innovation, investment and affordable access to Next-Generation Networks (NGN) and that facilitate the migration to NGN. The GSR, organized by ITU in collaboration with the Telecommunication Regulatory Authority (TRA) of the United Arab Emirates, was chaired by Mr Al Ghanim, Director General of the TRA.

The focus of this year's meeting was the *road to next-generation networks: can regulators promote investment and achieve open access?* The meeting examined pressing regulatory issues such as NGN investment, competition, interconnection, consumer protection, universal access and international internet interconnection. The first day was open to regulators, policy makers, ITU-D Sector Members and other invited guests. The second and third day was reserved for regulators and policy makers.

The 2007 GSR also introduced a new feature, **Speed Exchanges**, to provide additional opportunities for participants to meet informally and exchange views. A series of nine informal, moderated roundtable discussions was offered, each on a different issue, and participants were invited to spend twenty minutes at the table of their choice before moving to another roundtable discussion.

As in the previous GSRs, consensus was reached on an output document, the *Best Practice Guidelines* **for Next-Generation Network (NGNs) Migration**. The document was widely consulted and expresses the view of the National Regulatory Authorities (NRA) participating in the GSR that an enabling regulatory regime can foster innovation, investment and affordable access to NGNs and facilitate migration to NGNs. This enabling regime includes, *inter alia*:

- the establishment of an effective regulator separated from the operator;
- the adoption of clear and transparent regulatory processes;
- regulatory flexibility and technology neutrality to permit technological innovation;
- the creation of regulatory certainty for both incumbent and competing/alternative providers in order not to stifle innovation; and
- regular reassessments of the framework in order to remove undue regulatory barriers to competition and innovation as well as to allow the framework to evolve with the objective of enabling users and providers to migrate to succeeding generations of networks when the market dictates.

Regulators are also urged to adopt investment friendly regulation considered of paramount importance for the success of NGN deployment, while maintaining a level playing field and protecting consumer interests.

Because the deployment of NGN will not happen overnight, the best practices encourage regulators to define policies that allow for the co-existence of legacy and IP networks, alternative voice services such as VoIP, and bundled services that provide voice together with TV and Internet access (also called triple play). In doing so, regulators are to consider applying the same rules to all operators and providers of telephony services irrespective of how they are delivered to consumers, under the symmetrical regulatory approach. The best practice guidelines cover all aspects of service provision including authorization, access, interconnection and interoperability, numbering and NGN identification systems, universal access, quality of service, consumer awareness, security and protection.

The final text of the document is attached to this report.

A series of GSR Discussion Papers on the Road to Next-Generation Networks (NGN) were issued for the global gathering of regulators to spark a common understanding of the key regulatory issues raised by the move to NGNs. These discussion papers are available on the TREG website (http://www.itu.int/ITU-D/treg/Events/Seminars/2007/GSR07/documents.html) and were open for comment until 1 March 2007.

This year's symposium consisted of six plenary sessions, focusing on multiple aspects of NGNs such as how close we are to an NGN world, the difference between the NGN and telecom world, pricing and interconnection, competition, consumer protection, and the way forward. The GSR also included four break-out sessions, enabling participants to benefit from more detailed discussions on investment, interconnection, universal access, and international internet interconnection. In addition, there were nine topics addressed during the Speed Exchange roundtable discussions.

Opening Ceremony

H.E. Mr Sultan Bin Saeed Al Mansoori, UAE Minister for the Development of Government Sector stated his belief in an open global economy and its role in elevating emerging economies by applying best practices and by making use of other countries' economic experiences throughout history. He underscored the importance of telecommunications and information technology and the strides taken by the United Arab Emirates (UAE) in these two sectors and the imperative role that they play in pushing the wheels of economic, social and intellectual development.

The UAE telecommunications strategy is designed to support and develop the non-oil economic sectors including trade and commerce, financial services, education, transportation and healthcare services to diversify the economic platform.

In 2006, mobile phone usage in the UAE had surpassed 125 percent and the government is currently studying new regulations to increase broadband services. Internet usage has exceeded 60%, and the government is planning shortly to utilize the best technology available on fixed land lines via Next-Generation Network (NGN).

The UAE is keen to enhance the role of the ITU and encourages implementing best practices to bridge the digital divide between countries. The government supports all plans and activities to drive technology forward in the UAE, especially those of the ITU. Although there have been six previous GSRs, this is the first time that it has been held as an official annual meeting organized by ITU. He concluded by expressing confidence that the GSR would yield fruitful results and contribute to developing the telecommunications and information technology sectors in the world.

Dr. Hamadoun I. Touré, ITU Secretary-General expressed his delight that the 2006 ITU Plenipotentiary had adopted Resolution 138 on the Global Symposium for Regulators (GSR). This Resolution crystallizes the will of ITU members to hold the GSR on an annual basis. This Resolution also recognizes the key role that regulators play within ITU and the importance of regulatory reform in the growth of the ICT sector. Regulatory reform is vital to ITU's mission.

Regulatory reform is at the very heart of the tremendous progress developing countries have already made to improve access to ICTs. During the time that Dr. Touré served as BDT Director, the number of mobile subscribers increased from a little over 500 million in 1999 to nearly 2.5 billion by the end of 2006. Sixty three percent of the total 2.5 billion mobile subscribers worldwide in 2006 were in developing and emerging countries like Brazil, China, India, Pakistan and Russia, and the numbers of subscribers continue to grow.

This tremendous growth in mobile services is the result of regulatory reform, innovative business practices and leveraging technological developments. The ITU Secretary-General encouraged participants to extend this success to broadband internet access and next-generation networks, services and applications. He noted the need for all to work together to leverage the promises of next-generation networks to ensure that the WSIS targets of connecting all the world's villages to ICT by 2015 are met.

Dr. Touré assured participants that the whole of ITU will play its part. TSB is developing the technical standards for NGN networks. BR will ensure that spectrum necessary for wireless services is allocated. BDT will ensure that the benefits of NGNs are realized by all of the world's people.

The road to NGN, he explained, may take many paths. Regulation will be vital to ensuring that the benefits of technological advances are realized by all of the world's people. As new networks are deployed, it will be necessary to ensure that competitive bottlenecks remain open. More immediately, many regulators will focus on issues like universal access, quality of

service, the enabling environment and international internet connectivity. It is also time to enhance cybersecurity and anti-spam laws and to ensure they are vigorously enforced. The model-anti-spam law presented at the last GSR is a good place at which to begin these discussions, he said.

The migration to NGNs represents a unique opportunity to analyze and evolve our regulatory frameworks. One guiding principle, he suggested, as we develop our regulatory frameworks is to ask how to craft the best regulatory framework to achieve the WSIS objective of ensuring that all of the world's people have access to ICTs.

Mr. Sami Al-Basheer Al Morshid, Director, ITU Telecommunication Development Bureau (BDT) expressed his delighted that the first major event for BDT under his leadership was the Global Symposium for Regulators. The world now has 145 regulatory bodies and the majority of them are here today, including some of the most recently established regulators from Lebanon and Samoa. He explained that the focus of the GSR is dialogue and for that reason there are very few formal presentations. He encouraged the active participation of all delegates.

Highlighting the consultation to identify best practices on NGN regulation that was launched by Dr. Touré, in his former role as BDT Director, he explained twenty-nine countries and organizations had actively contributed to this consultation. The GSR Chairperson, Mr. Al Ghanim, has consolidated these contributions into a draft set of best practice guidelines. He invited all regulators and policy makers to review the draft guidelines with the goal of reaching agreement on a final set of best practice guidelines by the close of the meeting.

He stressed the importance of regulatory reform to the growth of the ICT sector and his intention to ensure that BDT provides the kinds of regulatory products and services the membership demands.

NGNs are a very hot topic. Some predict they will change the ICT sector. Others believe that NGN deployment will be uneven, or may never be deployed in some countries. Certainly, to the extent that NGN deployment takes place, the migration to NGN will not occur overnight. And the paths to NGNs will be many. Some will use the migration to NGN for their own advantage. Others will use it to expand opportunities to bridge the digital divide. Now is the time for the global community of regulators and policy makers to discuss and develop an enabling regulatory framework to ensure that the best of NGNs are available to all of the world's people and that any challenges are fully understood and addressed. He emphasized that the global community must commit to develop a framework for the good of end users, while at the same time balancing the interests of all players.

Mr. Mohamed Al Ghanim, Director-General, Telecommunications Regulatory Authority, United Arab Emirates welcomed all participants to the 7th GSR and expressed his honor in chairing an event with such a prestigious audience. He explained that the symposium will discuss the best methods in setting strategies and organizational measures for implementing Next-Generation Networks (NGN) and his expectation to achieve positive results which will encourage using NGNs more and more to help developing telecommunication sectors around the world.

He noted that the Telecommunication Regulatory Authority was established mid-2004 and since then the organizational outlines for the telecommunication system were set to create the right environment for competition within the sector attested by the expected launch of the new telecommunication operator in the UAE with the next couple of days.

He explained that they have high expectations that projects in the pipeline will play a major part in enhancing regional cooperation in the telecommunication sector and other sectors as well. The 4th Regional Regulators' Association Meeting held on Sunday, 4 February 2007 was a step forward to exchange expertise and views concerning the telecommunications and ICT sector.

He highlighted his expectations for the meeting including bringing clarity and common understanding to the subject of NGN which currently has different meanings for different people. But no matter how NGN may be defined, one thing that everyone agrees is that NGN is coming.

Another certainty is that NGN will be deployed in countries that are in various stages of liberalization and regulation. He noted the UAE example which is at the beginning stages of liberalization. The second operator is to be launched in the coming days, and the TRA has been functioning for only two years. In the first year alone, the TRA put into place a regulatory framework, licensed a second operator and initiated interconnection negotiations. They were able to do this so quickly by benefiting from world-wide regulatory experience. The UAE did not have to re-invent the wheel it just had to make the wheel fit the UAE circumstances.

Likewise, regulators don't have to make a new wheel for NGN. We just have to make sure the wheel we have will work with the new circumstances. We regulators have to make sure we understand what is going to change and how we need to adapt our wheel around it.

SESSION I: HOW CLOSE ARE WE TO AN NGN WORLD?

Moderator: Mohamed Al Ghanim, Director-General, TRA, UAE and GSR07 Chairperson

Presenter: GSR Discussion paper on NGN Overview:

Dr Tracy Cohen, Councillor, Independent Communications Authority of South Africa (ICASA)

Panelists: Maj. Gen. (Retd) Shahzada Alam Malik, Chairman, Pakistan Telecom Authority, Pakistan

Tomas Lamanauskas, Deputy Director, RRT, Lithuania

Héctor Osuna, President, Cofetel, Mexico

The moderator opened the session by highlighting the different definitions used to describe NGN. Drawing on Canada's contribution to the GSR Best Practice Guidelines for Next-Generation Network Migration, he noted that NGN has been alternatively defined as "seamlessly blending the public telephone and data networks into a multi-service network in which central office functionality was pushed to the network's edge" or "a packet-based network of multiple broadband Quality of Service (QoS)-enabled transport technologies, enabling unfettered access for users to networks and competing service providers" or "a network able to carry any application" or "a packet-switched architecture fostering provision of existing and new/emerging services through a loosely coupled, open and converged infrastructure".

Dr. Tracy Cohen, Councillor, Independent Communications Authority of South Africa (ICASA) presented the main themes and findings of the NGN Overview GSR discussion paper. She indicated that there are more questions than answers at this stage and numerous implementation challenges lay ahead. She outlined some of the basic technological underpinnings of NGN. She explained that in an NGN environment, there is a separation of the architecture from the service or application, and that there are both NGN core networks (backbone or transport networks) and NGN access networks. She highlighted the fact that most new networks being established are IP based. She mentioned that in OECD countries, full fixed NGN is expected by 2012 and mobile NGN by 2020.

She further noted that with the separation of infrastructure and services, new services can be defined directly at the service layer without considering the transport layer, meaning that the choice of technology no longer impacts the kinds and variety of services over the infrastructure. She also highlighted that fact that there isn't yet a single standard or reference point for benchmarking NGNs.

Different approaches have been taken by regulators with regard to PSTN and IP networks. Since NGN combines telecommunications and internet at the technical level, the regulatory approach must be able to cater for the co-existence of legacy and newer generation networks. The key question then is whether such a framework should be regarded as a choice between two different regulatory approaches, a hybrid system or an entirely new model? She answered that there is no definitive answer to this question.

She further noted that many of the challenges are not new but are being presented in a new way. She also pointed out that the development of NGN is closely linked to a country's national broadband policy. Countries like India, Pakistan and Malaysia that have adopted facilitative broadband policies make these markets ideal candidates for NGN migration. She added that NGN evolution may differ between developed and developing countries for at least two reasons: access and affordability since these remain pressing issues in developing countries.

She presented a break down of the general and specific supply and demand side drivers of NGNs for market players and consumers. She highlighted the opportunities and challenges NGN presents for incumbents, new entrants and end users, and the dilemma this represents for regulators and policy makers. NGN prompts an assessment of the regulatory approach and further raises the questions of which new services to regulate, the degree of regulation, its timing and sequencing. She concluded by providing general guiding principles.

The floor was then open for comments and discussion with panelists and the audience.

Mr. Héctor Osuna, President, Cofetel, Mexico explained that in comparison with traditional models, the NGN paradigm changes a lot, especially with regard to how to address investment. There is a need for regulators to question themselves about why they regulate and for what purposes. Regulators need to make it feasible for operators to enter isolated markets where no service is currently delivered. There is a need for a common understanding between operators, the regulator and the policy maker on how to address these questions. Regulators must provide confidence to investors for a stable and predictable future.

Mr. Tomas Lamanauskas, Deputy Director, RRT, Lithuania indicated that he views NGN as an opportunity. He added that when talking about NGN, regulators should not equate NGN only with IPTV, but should look at the services offered by the market and that end users demand. Developing countries want access to affordable services. New technologies like WIMAX, for example, provide a new impetus to regulators to give citizens what they want. He further noted that the importance of NGN is that while we will continue to speak about investment locally we should look at the global revolution of services in the NGN environment. Think about the opportunities that developing countries like India have seen to provide outsourced back office and programming services on a global basis. These opportunities will be enhanced by NGN, especially where citizens are educated to fully leverage the benefits of new technologies.

Maj. Gen. (Retd) Shahzada Alam Malik, Chairman, Pakistan Telecom Authority indicated that in Pakistan, the market was deregulated and liberalized in 2004. Local services and long distance markets were opened. As a result, new entrants have deployed NGN. He further stressed that when regulators issue a license they shouldn't require the technology to be provided in the switches. Pakistan did not mandate the technology to be used and new entrants therefore deployed soft switches. He added that this will lead the fixed incumbent to replace its circuit switches. He indicated that NGN is mainly deployed in the core. He also noted that new technologies are more cost-effective and that different paths are taken, therefore migration will vary from one country to another. There is no doubt that NGN is not here yet, but is around the corner; however bottlenecks are already here. He encouraged participants by remarking, "we should not be too depressed. NGN is attainable. If we have the right environment, investment will come."

The interactive discussion raised a number of questions and concerns:

- What areas will require regulation in an NGN environment?
- How can regulators ensure that NGN will provide good coverage, especially in rural and under-served areas?
- How can current quality of service levels and mobile number portability be achieved?
- What kind of pace and manner of NGN migration can developing countries expect, especially before a definition of NGN has been agreed by ITU-T Study Group 2?
- How to address security issues when different systems for different networks exist?

The interactive discussion raised the following points:

- Countries that do not use a market definition approach, as is used by countries in the European Union, will have to decide what kind of approach they will use to regulate NGN. This will depend to some degree on where regulatory intervention is required to avoid a market failure, and will also depend on the legal and regulatory framework in each country.
- Predictable, clear and transparent regulatory frameworks are needed to attract investment.
- Regulators may have to develop regulatory frameworks that apply where both legacy networks and NGNs co-exist.

- It will be necessary to evolve interconnection regulation to address the NGN world; this includes moving from current time- and distance-based practices to capacity-based interconnection, as is done in some countries.
- Some countries are adopting service- and technology-neutral licensing approaches in the context of convergence to prepare for the NGN world. In the NGN context, countries increasingly recognize that service and technology specific licensing regimes restrict the way in which technology is used and can prevent operators from benefiting from economies of scope. Where national policy has not yet matured organically, regulators and policy makers may consider classes and types of licenses to be used and whether this will require a new set of licensing criteria and conditions to be developed, or whether existing ones will suffice.
- Countries are encouraged to create NGN expert committees.
- Challenges raised by NGN include increasing the reach of access networks, making broadband available and affordable to most of the population in developing countries and ensuring universal access in urban and rural areas.
- There is no one-size-fits-all approach to NGN migration that can apply to all operators since each has its own network scale and topology. There will likely be several different migratory paths towards NGN. The introduction of competition in fixed lines will force operators to deploy NGN in their networks.
- The salient driver of NGN migration is the goal of reducing the costs of building and operating different networks for different services (e.g., dedicated mobile networks to provide mobile services, and dedicated fixed line networks to provide fixed line services). As fixed line voice revenue continues to decline, network evolution, consolidating existing legacy equipment regardless of the infrastructure, is a priority issue for operators. This will enable operators to optimize network resources by carrying a variety of services on a converged multi-service IP network, and by using node devices with higher processing and service interfacing capabilities to optimize the network structure.
- Developing countries can leapfrog to NGN. This will be done by new entrants as it may take a long time to migrate the network of the incumbent if it is widely deployed.

SESSION 2: NGN ROADMAP: UNDERSTANDING THE DIFFERENCE BETWEEN NGN AND TELECOM WORLDS

Moderator: Kathleen Q. Abernathy, Deputy Chairman of the Board and Director, TerreStar Networks, Bermuda

Presenters: GSR Discussion paper on Fixed-Mobile Convergence
Dr Jens Arnbak, Delft University of Technology, Faculty of Electrical Engineering, Mathematics & Informatics (EWI), the Netherlands
Ewan Sutherland, Telecommunication specialist, Belgium

Panelists:

- Dr Robert Pepper, Senior Managing Director, Global Advanced Policy, Cisco Systems, United States
- Dr Yuji Inoue, Chief Technology Officer, NTT, Japan
- Tom Phillips, Chief, Government & Regulatory Affairs Officer, GSM Association, United Kingdom
- Baohong He, Engineer, Ministry of Information Industry, China

The moderator, **Kathleen Abernathy**, former FCC Commissioner, opened the session.

She introduced the two presenters **Dr. Arnbak** as well as **Mr. Sutherland**. She explained that the session would focus on Migration to NGN and Fixed-Mobile Convergence (FMC). The presenters would also cover Voice over IP (VoIP), Core and Access Networks, as well as New services, and new opportunities.

Jens Arnbak gave a brief presentation entitled "NGN: technology changes, farewell to circuit switching - how soon? He began with an analysis of the economics behind the core and the access networks and the related investments on the trunking and local level. In explaining the revenue shift in fixed networks, he used the European example. At the end of the monopoly era (1994-1997), the average daily use per subscriber per line was very low: on average 12 minutes for national and five minutes for international. Rebalancing was mandated by the European Union and the Netherlands was the first country in the European Union to complete it in 1998. The incumbent KPN raised subscription fees by 27 per cent and the domestic minute rate was reduced by 27 per cent. A low-user scheme was introduced by the Netherlands in 1998 and expectations were high. Ten percent of the total subscribers were expected to join, but in the end only 1 per cent joined. He explained the process undertaken for rebalancing, but it was mitigated by competitive prepaid mobile offers. He explained that by the end of 2001, the price for international calls in the Netherlands, for example, had been reduced by 90 per cent. For national calls, in Sweden for example, prices had been reduced by 85 per cent. He gave an overview of circuit switching, as well as packet switching, and outlined the schematics for BT's NGN which consists of copper multi-service access nodes, fibre multi-service access nodes, wavelength division multiplexing, point of presence, all to be supported over IP. He concluded by stating that: NGNs should support any IP-based ICT-application. NG Core networks should have simple structure ("lasagna instead of spaghetti") to provide supply & support of a wider range of services, and saving of costs and maintenance time in the longer run. NG Access networks should provide bandwidth on (economic) demand; regulatory intervention may still be required for legacy access bottlenecks, which can seldom be replicated in an economic way (this could possibly be a case for continuing local-loop unbundling) and may, however, be bypassed by broadband wireless access (e.g., WiMax).

Ewan Sutherland presented the findings of the GSR discussion paper on Fixed-Mobile Convergence (FMC). He began by explaining some of the problems with terminology and that it can be vague and even misleading. Fixed, for example, may not always be fixed (e.g. DECT, call-forwarding and nomadic VoIP). Although termed the "mobile" service, cellular wireless handsets are often used for non-telecommunications functions and can more accurately be considered personal communications devices. They are so used frequently in fixed locations. In many developing countries and Least Developed Countries (LDCs) there are low fixed teledensities, with little prospect of further investment in traditional narrowband networks.

Nonetheless, there is progress towards convergence of voice and Internet access in developing countries, though with much greater emphasis on delivery of the services over wireless networks.

He explained that there are different classes of convergence that can be grouped as follows:

- Packets (everything carried by IP)
- Devices (everything in one device)
- Services (access from many devices to the same applications, programmes and search engines)
- Invoices (everything on the same bill)
- Companies (everything owned by one group)
- Globalisation (everything available everywhere)
- Legislation (everything under the same rules)

Regarding corporate networks, he explained that the market to supply corporations with networks and network services is much less susceptible to the whims of fashion than consumer markets, the trends are stronger and more predictable. The high levels of expenditure are subject to rigorous tests such as Return On Investment (ROI) and Total Cost of Ownership (TCO). Although FMC for corporations has been discussed for years, progress has proved limited and slow. Amongst the reasons for this are the high prices for the termination of calls on mobile networks in many countries, the very high cost of the cellular data service and the absence of Service Level Agreements (SLAs). While mobile network operators continue to stress substitution rather than convergence these issues will remain unresolved, causing corporations to look elsewhere for mobility or nomadicity, to Wi-Fi and DSL technologies.

In particular, he noted: fixed networks are the infrastructure of globalization; both voice and data are carried on Virtual Private Networks (VPNs), increasingly these are IP-VPNs using Multi-Protocol Label Switching (MPLS). They offer corporations a low and declining unit cost for traffic. MPLS allows the network to be configured to carry many different types of traffic, ensuring that policies about the priorities for particular traffic are enforced. In this way corporations can give an appropriate priority to voice and enterprise application software, while also allowing for video conferencing and messaging.

The supply of business communications services is weak in most of Africa and much of Central Asia, where there is limited demand and where wholesale access to infrastructure is limited. Even in rural areas of Europe and North America the global operators have problems in delivering services, being reliant on reselling infrastructure obtained from national incumbent operators. Nonetheless, the global and regional service providers will meet the requirements of a large customer regardless of the location, even if they are obliged to use unreliable infrastructure provided by a reluctant or less than fully cooperative local operator.

Cellular mobile is quite distinct. The mobile network operators make national offers and provide services country by country. Although a number of geographically extensive groups have developed footprints through acquisition and network construction, they continue to treat their customers as being national. Sometimes this is because the footprint is an incomplete patchwork. It is often aggravated by the lack of integration of national management teams.

Corporate mobility is now provided with a wide range of technologies, notably broadband access from homes and hotels, plus Wi-Fi hot spots where they are available, falling back on dial-up where there is nothing else available.

He highlighted consumer markets and explained that some operators are focusing attention there. Consumers have expressed clear preferences for brands in handsets and services, accessible from different platforms. Leading search engine companies have recently entered into deals with mobile operators and handset manufacturers to make their services available on mobile handsets. He highlighted triple play, quadruple play, and networking being added to non-telephones. Firms that were once considered to operate in separate markets now compete with one another as a result of platform-based competition and convergence in handsets.

The challenge at the policy level is to allow the markets to flow and, where it is appropriate, to converge without taking sides. This means removing obstacles, promoting competition and protecting consumers all without prejudicing outcomes. The biggest policy challenge lies in avoiding leverage of market power between markets: from fixed to mobile and mobile to fixed; from voice to television; and from content to broadcasting/distribution. These are not traditional telecommunications issues, but can be controlled with competition law tools. He noted that another problem is of concentration of market power in spectrum ownership.

Dr. Robert Pepper explained that connectivity is the ultimate goal. He focused on the main regulatory challenges around the migration towards next-generation access and next generation core networks. He explained the need to look at the regulatory models we are currently using and determine whether they serve the present situation or whether we need new rules for new realities. He emphasized the importance of flexibility in regulatory frameworks, the importance of technology neutrality, and having broad licenses.

Dr. Yuji Inoue gave an overview of the present situation in Japan. He explained that the incumbent often struggles with the other operators. He noted that in Japan the debate at present is focused on fixed mobile convergence. They estimated that by deploying NGN they will benefit from a 20 per cent cost reduction. On the regulatory front, regulations must be flexible. There is a balancing act between flexibility and competition. He emphasized the importance of achieving world-wide interoperability of NGN, and the need to look at security, reliability and quality of service issues for NGN.

Tom Phillips, of the GSM association, also raised the importance of looking at the existing regulation of the circuit-switched world and questioning how applicable it is when moving to an NGN world. He explained the need for technology and service neutrality. He emphasized the key role that mobile plays for consumers and in meeting the Millennium Development Goals and WSIS targets in terms of bridging the digital divide and enabling an Information Society for all. He noted the work underway by the GSMA to ensure interoperability and interconnection of mobile IP networks and services.

Baohong He provided and overview of NGN developments in China and their plans to craft a policy framework. He explained the need to look at service classification issues and how to classify basic versus value added, and the importance in addressing NGN numbering and addressing. Regulators and policy makers need to foresee flexibility in their numbering plans and to consider modifications to numbering policies and regulations to accommodate convergence and the migration towards IP-based NGN services.

The interactive discussion raised a number of questions and highlighted the following:

- Do we have a model for managed competition? There have been difficulties with duopolies.
- Regulators need to ask themselves who wants to come into their markets and who wants to invest.
- NGN migration – is it a political question or is it an engineering question?
- When do you really need to license (recognizing that for spectrum related services some form of authorization is required)?
- Developing countries may require assistance from other regulators as they begin to adapt their policies to an IP world.
- NGN is nomadic and should not be linked to a specific service.
- WiMax – do we need a standard? Spectrum harmonization will help WiMax.
- Consumer interests are of paramount importance for facilitating NGN deployment.
- The full range of NGN issues should be looked at such as ex ante access obligations to NGNs, IP-interconnection, competition issues, consumer issues including privacy issues, Emergency Telecommunications Services, Accessibility to users with disabilities, quality of service issues, monitoring and lawful interception (LI) compliance issues,

authorization issues, numbering, and the universal services implications of IP-based services, particularly voice.

- Regulators should define appropriate and transparent quality of service requirements.
- Regulators should consider whether to define appropriate parameters and methodologies for QOS measurements, which are applicable to networks supporting both IPv4 and IPv6.
- When defining appropriate quality of service standards, it is important to maintain an environment where consumers have the ability to choose services according to their specific needs.

Break-out A: INVESTMENT IN AN NGN WORLD

Moderator: Dr Tracy Cohen, Councillor, ICASA, South Africa

Panelists: Lynne A. Dorward, President, LADCOMM Corporation

Basuki Yusuf Iskandar, Director General of Posts and Telecommunications, Indonesia

Nasser Salim, Vice President, Network Development, Etisalat, UAE

The session started with a brief presentation made by **Nancy Sundberg**, Regulatory Specialist, on the Regulatory Reform Unit's (RRU's) products and services (such as the ICT Eye, the Trends in Telecommunication Reform Publications, G-REX and the ITU-*info*Dev ICT Regulation Toolkit). The presentation was followed by introductory remarks from **the moderator** who focused on:

- migration paths to NGN;
- the regulator's/policy-maker's role to ensure investment returns (e.g., regulatory holidays, sunset clause etc.);
- policy/regulation should recognize the risks of investment and consumers' demands.

Mr. S. Y. Iskandar, Director General, DGPOTEL, Indonesia provided the views of a regulator on what the government/regulators should do to attract investment in NGN. He indicated that the first question for the regulator is whether customers are ready for NGN. He explained that in Indonesia, network deployment is often supply-driven and not based on consumers' needs. As a large country with many islands, even basic telephony penetration is still very low. So, when are consumers ready? There is a need for public consultation and mapping of the social structure. The difficulty faced by Indonesia lies in the low teledensity in rural areas (99% of rural populations need access to basic telephony). One key problem is distribution since most services, including broadband, are only available in urban areas. NGN deployment could begin from rural areas to meet universal service obligations. There are two regimes in Indonesia: one for telecoms, the other for broadcasting. This presents a challenge for regulators in terms of converging laws and the regulatory structure since NGN enables service providers to offer a package of all services. To ensure NGN infrastructure development, an agreement on a clear policy direction is needed. A road map is being currently discussed with all operators in Indonesia.

Ms. L. A. Dorward, President, LADCOMM Co indicated that she doesn't see any specific risk related to NGN, since there is also risk associated with conventional networks. A major investment risk linked to NGN is the regulatory risk. She noted that there are different applications for different markets. The killer application, even for 3G, is improving voice quality. In theory, if a country begins the migration to NGN with not much in the way of legacy networks and without sunk costs, the killer application with a cheaper network can be high priced applications as is the case in certain developed countries. Thus, there is not a one-size-fits-all model. It should be dealt with country-by-country.

Mr. N. Salim, Vice President, Etisalat, UAE provided the views of an operator on the business strategy for NGN investment. He indicated that from a technological point, NGN will provide more services and this is the main driver. Investing in NGN will allow a reduction in complicated networks and a move toward a single unified network, which will result in reducing costs. He added that once operators begin to move to NGN, customers are expected to generate demand. He also noted that operators need a clear regulatory indication before moving to NGN. Major financial investments will take place in the local loop, as investment will be huge in the beginning, especially to deploy fibre for the last mile.

The interactive discussion raised a number of questions and highlighted the following:

- A killer application needs to be found by operators to spur NGN investment. Flat-rates and triple and quadruple play offers could be such a killer application, and many operators are already moving in that direction.

- When new services are marketed, international standards are needed especially for manufacturers, operators and regulators. Otherwise, it is very difficult to implement NGN services. Global standards and global harmonization of spectrum is needed to provide new services.
- Investments depend on the specificities of countries and markets.
- Legacy pricing mechanisms can't be applied to NGN, where services include voice, broadcast, internet, etc. It will be necessary to move from time-based to volume-based pricing.
- A government NGN migration policy roadmap that gives clear directions is needed to attract investment.
- In general, regulatory frameworks should be attractive for investment. The traditional regulatory approach will not be appropriate when looking at new value chains.
- Risks include political interference which delays implementation in many countries.
- The duty of regulators is to balance and reduce regulatory risks. In many countries, the current traditional network does not even have soft switches. What should the regulator do to introduce NGN, which will be run over traditional networks?
- It is not the regulators' role to protect incumbent operators, but rather to encourage them to migrate to NGN for the benefit of consumers.
- There is also a need to look at the multimedia sector and its convergence with this sector. There is also a need to come up with a combined and coordinated approach among the various regulators within a country.
- Many countries have separate content and telecom laws and institutions. The content industry also is very weak in many countries. There is a need for incentives from the government targeted to the content industry.
- The regulator's role is to set up the migration plan. Many regulators, however, lack experience. ITU can guide regulators to deal effectively with new technologies such as NGN.
- NGN will produce new revenue streams. There will be real revenues from new services that NGN can provide.

Break-out B: INTERCONNECTION IN AN NGN WORLD

Moderator: Alan Horne, Director General Designate, TRA, Bahrain

Panelists: J. Scott Marcus, Senior Consultant, WIK-Consult GmbH, Germany

Jeanine Vos, Public Policy Analyst, GSM Association, United Kingdom

Mohamed Elnawawy, Vice President, Telecom Egypt

The session began with a presentation by **Doreen Bogdan, Head RRU**, on the products and services offered by the RRU (such as the ICT Eye, the Trends in Telecommunication Reform Publications, G-REX and the ITU-*info*Dev ICT regulation toolkit).

The moderator introduced the session, noting that investment in NGNs is being driven by operators that wish to cut their costs of operation, due to rising competition and falling retail prices. NGN enables the provision of value-added and converged services. NGN can use the traditional copper pair for access networks. ADSL has given a new lease on life for the copper pair, and the greater use of the local loop will provide new revenues that can offset any access deficit. NGN also allows mobility within networks and by services. .Mobility -- meaning the end customer can be anywhere -- calls into question calling party pays (CPP) methods. Capacity based charges become more relevant in the NGN environment, but different cost structures will require different methods of calculation. Still, there will be operators with market dominance.

Opening comments by the panelists identified the following key concerns:

Mr. Scott Marcus discussed how to approach NGN regulation given that NGN is a blending of the Internet, which has been lightly regulated, and the PSTN, which has been heavily regulated. For circuit switched networks at the wholesale level, the Calling Party's Network Pays (CPNP) regime is based on minutes and distance. These arrangements will become increasingly difficult to carry forward in the NGN environment. The Internet, by contrast, uses commercially negotiated rates, and this is a likely model for the NGN world. How this might work in developing countries will depend on whether parties voluntarily interconnect as they do in the current Internet environment. Developing countries will likely see this as an issue to be addressed later. This will give developing countries an opportunity to see how those countries facing NGN interconnection more immediately address the issues, and learn from their success and failures. One possible solution for developing countries would be to adopt the model used in India which is to use CPNP, but keep mobile termination rates very low to achieve high user penetration.

Ms. Jeanine Vos stressed the importance of interoperability for the evolution of mobile networks to the IP environment. She noted that the GSMA has set up an extensive work programme of evolution to IP based services and designed a framework based on openness, quality, and cascading payments. This includes an IP-exchange (IPX) that would allow fixed and mobile networks as well as ISPs to interconnect at a central hub or by agreement; matching QoS to particular services (for example, voice could include different QoS levels than IPTV). The GSMA is also conducting SIP trials for mobile operators and vendors and has a parallel work-stream looking at IP interconnection.

Mr. Mohamed Elnawawy, suggested that competition law principles on essential facilities and refusal to deal could best address issues of collocation and that it may not be necessary to require local loop unbundling. It is important to address the sequence of regulation and consumer empowerment.

The interactive discussion raised a number of questions from the floor:

Botswana asked what interconnection charging arrangements other than minutes or distance-based charges could be considered. Mr. Marcus said that a variety of means could be used, and that firms negotiating with each other could decide. Charges could be based on capacity of traffic. Or, where traffic is balanced, no payments could be made, leading to lower retail prices. Alternatively, each operator's customers could pay for their own services.

Trinidad & Tobago asked how to achieve a fair and transparent IPX environment? Ms. Vos said that the IPX would be a central hub where operators and ISPs connect if they so wish,

and would enable multilateral agreements. Those interconnecting could also agree on QoS for different services, and that a standard framework could be established to ensure that all service providers get the QoS they requested all through the value chain.

The Dominican Republic asked how to negotiate interconnection between operators of state-of-the-art NGNs and legacy networks, and also how to handle uneven volumes of traffic. Mr. Marcus noted that where parties don't voluntarily agree to interconnect, operators can use a mix of peering and transit as long as there are two or three potential providers active in the market. Transit can be obtained at fair and competitive rates. In many developing countries, where the disparity between market players is too large some regulatory intervention will likely be required. Peering, he added, does not necessarily mean the lack of compensation. Peering arrangements can and do include compensation. Ms. Vos noted that Bill & Keep is best suited where costs, traffic and QoS are balanced. Where the terminating network has larger fees, the initiating party pays or RPP might be more appropriate. Mr. Elnawawy noted that there are many countries in the world where the cost of sending an email message is borne entirely by the sender. Users also may have to pay to receive messages, even if the message is spam. Asymmetrical internet interconnection makes more developed internet markets richer and creates a bigger gap for less developed internet markets.

Lithuania noted that Bill & Keep is usually applied to new networks, but after some time it doesn't send the right economic signals, and then CPNP is introduced. Will Bill & Keep be a temporary or long-term solution? Mr. Marcus predicted that CPNP would be a temporary solution and Bill & Keep will emerge as a long term solution. CPNP sends the wrong signals, distorts prices higher and usage downward. European countries migrated from Bill & Keep to CPNP due to the European Union regulatory framework. Ms. Vos argued that CPNP allocates costs more efficiently. She also noted that requiring the initiating party to pay has limited the volume of spam on mobile networks.

Alcatel observed that operators have not independently invested in access networks, but have leveraged historic investments in the PSTN. The success in increasing internet access in homes has been a result of the investment in PSTN networks. Mr. Marcus noted that the last mile access experience around world is different. In North America, for example, cable TV is the main provider of residential internet access. Mr. Elnawawy noted that requiring incumbents to provide local loop unbundling under regulatory prices removes innovation and the will to develop infrastructure. Developing countries are experiencing better fixed line growth in the absence of local loop unbundling requirements.

Indonesia noted that in many countries, reference interconnection offers (RIOs) are developed by the major supplier and approved by regulator. If NGN interconnection will be based on private negotiations, how much should the regulator interfere in these negotiations? Mr. Marcus noted that in some cases commercial negotiations will work, but in other cases the regulator will have to intervene, especially when PSTN interconnection is withdrawn. Ms. Vos agreed that regulators should let the players negotiate, then evaluate the level of competition, and use the regulatory framework and competition law to address problems. The regulator should only interfere where there's market failure. Mr. Elnawawy noted that competition law can do more than direct regulation.

Mauritius asked whether regulators should now move away from RIOs or standardized interconnection agreements. Mr. Elnawawy supports commercial negotiations that begin with a blank piece of paper, noting that competitive operators are getting larger. The moderator noted that RIOs may still be needed to ensure transparency. Mr. Marcus noted that Internet backbones don't use RIOs nor do United States mobile operators and non-dominant fixed line operators. They frequently agree on Bill & Keep arrangements, which do not necessarily mean no fees are paid. Ms. Vos recommended creating choice and competition.

Oman, noting that the World Trade Organization (WTO) General Agreement on Trade in Services (GATS) and Fair Trade Agreements with the United States require local loop unbundling, asked whether such obligations are likely to disappear in an NGN environment. Mr. Marcus explained that local loop unbundling is an access issue, not an interconnection issue, and that such obligations are unlikely to go away. Removing these obligations would assume that backbones are available on a competitive basis.

Egypt noted that abolishing RIOs in the telecommunication environment would produce problems, and that it is important to analyze significant market power (SMP) in Egypt. The moderator noted that an RIO is a good commercial document whether regulated or not regulated.

Afghanistan, indicating that experience shows that the cost per-minute of terminating a call is lower on an incumbent's network than a new operator's network, asked which rate a regulator should apply when it has to intervene -- the incumbent's lower rate or the new comer's higher rate? The moderator noted that although this could be left to commercial negotiations, regulators should be concerned about new market entrants facing operators with SMP. Mr. Marcus said that CPNP includes a subsidy at the wholesale level to correct for an imbalance at the retail level, but that it would be difficult to sustain this in an NGN environment because the parties at the retail level are not necessarily the same parties as at the wholesale level. Regulators will have to address SMP issues for a long time to come. Mr. Elnawawy indicated that regulatory intervention should be based on competition principles, and in today's environment it is no longer fixed line networks competing only with other fixed line operators, but all networks and operators competing against each other. Ms. Vos noted that if there is no SMP there is no need for regulatory intervention.

Morocco asked about the technical aspects of interconnection between different systems as well as addressing issues of emergency service in light of nomadicity capabilities. The panelists agreed that there are a range of technical solutions to address these issues, and that it is likely that PSTN and mobile circuit-switched networks will continue to co-exist for some time with NGN and other IP-based networks. At the same time, issues of market power will have to be addressed.

SESSION 3: PRICING AND INTERCONNECTION IN AN NGN MULTI-PLATFORM WORLD

Moderador: Matthias Kurth, President, Federal Network Agency, Germany

Presenter: GSR Discussion paper on NGN Interconnection and Access

J. Scott Marcus, Senior Consultant, WIK-Consult GmbH, Germany

Panelists: Halim Shafie, Chairman, MCMC, Malaysia

Rajesh Kumar Arnold, Secretary, TRAI, India

José Alfredo Rizek Vidal, Executive Director, Instituto Dominicano de las Telecomunicaciones, Dominican Republic

Dan Georgescu, President, ANRCTI, Romania

Hiroya Izumi, Director, International Economic Affairs Division, International Affairs Department, Telecommunications Bureau, Ministry of Internal Affairs and Communications (MIC), Japan

The moderator opened the session and invited Mr. Marcus to present the GSR Discussion Paper on Interconnection and Access.

Mr. Scott Marcus noted that NGN represents the marriage of the PSTN and the Internet. What regulatory framework should apply when these two worlds collide, given that Internet interconnection is usually left to commercial negotiations, while PSTN interconnection has been subject to regulatory intervention? NGN has major implications for regulation, since NGN introduces new forms of competition. NGN, however, does not necessarily eliminate traditional market power. It may even enable the emergence of new competitive bottlenecks.

On the wholesale level, current arrangements include Calling Party's Network Pays (CPNP), requiring a termination fee to the operator that completes the call. Under privately negotiated Bill and Keep, there is no regulatory obligation to pay a termination fee. On the retail level, the recipient of a call pays nothing under Calling Party Pays (CPP) arrangements. Receiving Party Pays (RPP) is rarely used. Flat rates are prevalent in Bill and Keep countries and for Internet services. Flat rate retail arrangements are attractive going forward. They better reflect costs in an industry with high sunk costs and consumers greatly prefer flat rates. CPNP, with high mobile termination rates, tends to lead to subsidies for mobile adoption, and thus rapid penetration, but low usage due to high retail prices which are also excluded from flat rate plans. While rapid penetration of CPNP is beneficial; the other aspects are harmful and lack an economic rationale in an NGN world.

If the deployment of mobile and fixed services is substantially complete, there is no advantage in continuing to promote CPNP, and it may harm consumers due to high retail charges and low use. Cross-subsidies from fixed to mobile networks also distort the development of the market, and may inhibit the evolution of the fixed network. The migration from PSTN to NGN represents an opportunity to consider migration from CPNP to Bill and Keep. Conventional CPNP is probably unsustainable anyway. Bill and Keep is sustainable and economically rational. If a change is needed anyway, it is probably best to migrate directly to the preferred end state.

For most developing countries, the migration to NGN is years in the future. The immediate abandonment of CPNP arrangements might be premature, especially since CPNP fosters faster penetration of mobile services. Maintaining CPNP, but with substantially lower termination rates (ideally less than 0.02 USD), may provide an appropriate balance between stimulating mobile penetration and encouraging use of services. Low termination rates will pave the way to later migration to Bill and Keep.

The Moderator asked Mr. Marcus how to achieve balanced infrastructure in a Bill and Keep environment.

Mr. Marcus noted that there are no existing examples of NGN interconnection and that we can only reason from existing PSTN and Internet arrangements. There are two or three ways

connectivity can be achieved. Sizes of networks don't have to be identical. As long as traffic is roughly equal, within a factor of two, there can be interconnection. Mobile operators in the United States use Bill & Keep as do non-dominant wired operators. Transit is another solution as long as there are sufficient peers. Transit is not necessarily more expensive than peering, even if payments are required. Transit means an operator doesn't have to invest in its own infrastructure as it does with peering.

Hong Kong, China asked what incentives there might be for Bill & Keep in its market that uses CPNP but has flat rate retail prices. If wholesale is deregulated where operators have market power would operators resolve issues themselves? **Mr. Marcus** noted that Hong Kong's termination rates are very low, which, on an economic level, is close to Bill & Keep. The real question is how much will market power get in the way.

Malaysia explained that it legalized VoIP operators in 2000. Today there are over 70 VoIP licensed operators, subject to class licensing. Eighteen of these have been allocated special numbering blocks (0154) for IP-to-IP and IP-to-PSTN calls. Malaysia had hoped that peering would lower costs and improve performance. Following a public enquiry in 2005, the regulator decided to leave interconnection to market forces and not to mandate termination and origination charges. Malaysia opted for ex post rather than ex ante regulation, and to intervene only where there were abuses. The regulator has discovered that there is no interconnection between the 0154 service providers and the fixed and mobile networks. The regulator now thinks is has to mandate prices. Where there is a failure of the market to operate the regulator has to introduce regulation, and the low termination rates suggested by Mr. Marcus may be a good idea.

India explained that regulation started in 1997 and mobile was introduced only slowly, first by licensing new operators, later by also authorizing incumbents to provide mobile services. To facilitate growth, the regulator started with a rigid position on tariffs and rebalanced. Within four years there was no need to regulate PSTN tariffs because competition took over. India is now adding more than 6 million mobile connections per month. The country is now assessing how to move forward and has created a committee of operators, customer groups, scientists and others trying to determine the interconnection framework as India moves to an IP environment. This committee is looking at whether termination charges will apply on IP networks, and if so, who should pay fees, and to whom? One possibility is that those that pull data on their request pay, and those that push data on their request pay.

The Dominican Republic explained that is has a very dynamic market, including fixed, mobile and 3G services, and will introduce WiMax soon. The Dominican Republic has both state-of-the-art operators with soft switches, and others that remain circuit-switched. Interconnection arrangements are now based on the PSTN system. Developing countries need to look at the cost of establishing new interconnection arrangements and the impact on end-users, including pre-paid users. The migration from one interconnection system to another is different in developing countries, and old and new systems will be used in parallel. Latin American countries first need to see concrete results from NGN and liberalize their markets.

Romania joined the European Union (EU) on 1 Jan 2007. In preparation for joining the EU, Romania passed legislation in 2002 that includes a general authorization regime. Romania now has over 2000 operators. It uses a Reference Interconnection Offer (RIO), and applies LRIC for fixed and mobile interconnection. Now that there is strong competition, the incumbent needs more freedom to fix its tariffs. As a result of its regulatory framework, Romania enjoys infrastructure competition, with strong Cable TV operators that offer a triple play of voice, Internet and TV services at 9 euros a month. Cable TV operators introduced NGN from the start and use no circuit switches. The result of the competitive pressure on the incumbent has been so strong, including the migration of subscribers to the Cable TV operators, that it pushed the incumbent to modernize its network and implement NGN. The incumbent plans to offer IPTV next year and invest in new network deployment. Romania also expects mobile operators to start providing mobile triple play, offering DVB-H, GPRS and HSDA internet services.

Japan has a dynamic broadband market, including fibre to the home (FTTH) and ADSL, with major investments in optical fibre expected to reach 33 million households by 2010. But the majority of the copper and FTTH accesses are owned by NTT, which plans to introduce NGN

service in the later half of 2007. Japan will continue to regulate operators with SMP. Only NTT (fixed) and NTT DoCoMo (mobile) are subject to interconnection regulation. Japan does not plan to change its basic policy. It is important to maintain fair competition in NGN, recognizing that because NGN is more standardized carriers have an incentive to provide vertically integrated services. Japan has not yet decided on interconnection pricing, but is watching what operators negotiate. If a problem emerges, the government will intervene. Japan is also evaluating how to handle the coexistence of legacy and NGN. Japan expects answers to NGN interconnection in a few years.

During the question and answer period, these key points were made:

- Should NGN migration be postponed? **The moderator** said regulators should remain technology neutral. There is no need to regulate in the absence of market dominance. **India** said that once the advantages of NGN in terms of lower operating costs and the convergence of video, voice and internet services are analyzed, it is not advisable to postpone the migration to NGN. But the migration can occur slowly and smoothly, knowing that ultimately we will arrive at NGNs. It's important to have a road map. **The Dominican Republic** spoke in favor of a technology neutral approach. In terms of NGN migration, even though the regulator can exercise influence the market should determine the migration which will result from the pressure of competition. If regulators ensure competition and a level playing field the market will support migration to different technologies. Telecommunications has experienced a revolution, and incumbents have implemented these changes to keep competitive.
- In addition to network costs, should regulators address content providers? Mr. Marcus said that although regulators have focused on last mile market issues, this does not mean that there's nothing to do at the service provider level. There are also issues of lawful intercept and emergency access, for example. In the future regulators may be less concerned about market power regulation and more concerned with these issues. The regulator's job will not go away, but the nature of regulation is likely to change.
- Will users have to pay for different levels of quality of service? Mr. Marcus noted that the GSR Discussion Paper addresses offering differentiated QoS at different prices. This is usually positive unless there are abuses due to market power.

The **moderator concluded** by noting that NGN interconnection is new and lots of questions are still pending. Many basic competition principles can be used to guide us in the future. Some regulators are taking a cautious approach to NGN regulation, while others are taking a proactive stance (e.g. the EU which seeks to regulate mobile roaming fees). It is important to develop an interconnection framework to avoid stranded investments. Some operators are asking for regulatory holidays. Some players are concerned about network neutrality, while others seek to charge different fees for different levels of quality of service. It may be important for regulators to develop a roadmap to guide the migration period.

SESSION 4: COMPETITION IN AN NGN WORLD

Moderator: Ernest Ndukwe, Chief Executive Officer, Nigerian Communications Commission

Presenter: GSR Discussion paper on NGN Enabling Environment

Janet Hernández, Senior Vice President, Telecommunications Management Group, Inc, United States

Panelists: Nicolas Curien, Member of the Board, ARCEP, France

Reinaldo Rodrigues Illera, President, CMT, Spain

Leong Keng Thai, Director-General & Deputy CEO, IDA, Singapore

Lorenzo Villegas Carrasquilla, Executive Director, Comisión de Regulación de Telecomunicaciones de Colombia

The session started with introductory remarks made by **the moderator**. Mr. Ndukwe launched the discussion by noting that while there is no agreement on NGN definition, there is agreement on the underlying technology component. He further emphasized the importance of promoting efficient competition, and the need for regulators to ensure that companies operate in a predictable environment. He also noted that while many developing countries don't have the infrastructure that is essential for NGN, these countries should evaluate why that is the case. He concluded by raising the need for multimedia regulators.

Ms. Janet Hernandez presented the findings of the GSR discussion paper she prepared on the NGN enabling environment. She indicated that the reasons why wireline providers are deploying NGN include cost efficiencies derived from a single all IP-based network vis-à-vis traditional networks, consumer demand for higher speed, and competition from facilities-based providers (i.e. cable providers, power utilities, municipal projects, and alternative service providers).

She added that whatever the reasons, NGN is the result of technological evolution that is a further step on the road to convergence in the telecom/ICT sector. As such, the regulator should create an environment conducive to the migration to NGN by striking the right balance between promoting competition on the one hand and efficient investment and innovation on the other hand, and maintaining regulatory certainty to accompany the transition.

She highlighted the modifications required in the regulatory framework which include:

- Eliminating or modifying market barriers that may impede operators from entering other markets;
- Shifting to more flexible licensing regimes with broader categories of licenses or to unified licensing;
- Adhering to technology-neutrality in licensing;
- Simplifying licensing processes;
- Introducing VoIP-specific regulation;
- Adopting a symmetrical interconnection approach;
- Assigning numbering resources for new technology;
- Promoting shared NGN deployment to reduce costs;
- Modifying the scope of universal service from voice to data service and broadband services, where it is required by the market and modifying sources of funding to include IP-based services, such as broadband and VoIP;
- Introducing flexible spectrum use (technology neutrality, trading, in-band migration);
- Taking into account the merging of broadcasting and telecommunications responsibilities into one entity;

- Involving all the stakeholders through awareness raising campaigns, using the comparative advantage of the industry to determine the way forward within the boundaries of the regulator's guiding principles.

Mr. Reinaldo Rodrigues Illera, CMT Spain indicated that Spain has adopted VoIP regulation. There are two types of VoIP telephony numbering: one based on national geographical location and the other one for nomadic use which is not linked to a geographical location. He also noted that network neutrality is one of the main challenges regulators will face as a result of convergence.

Mr. Leong Keng Thai, IDA, Singapore highlighted that the government should recognize that convergence and competition are different. All IP networks will bring more competition at the service level, which is what the government wants to achieve. Regulators seek to balance incentives for infrastructure investment and competition. They can use light touch regulation, promote competition, new infrastructure roll-out and consumer education.

Mr. Nicolas Curien, ARCEP, France noted that the transition to NGN raises two types of issues:

- the existing ones relating to the ability to replicate services, and
- the new ones relating to
- the physical and cost issues of interconnection at the level of the intelligent network as well as the need to avoid bottlenecks at this level which could be caused by operators with SMP.
- fair access to NGN information and infrastructure for external service providers

He added that the regulator's role is to establish appropriate rules for new products. He noted that a good balance is needed in the transition from ex ante to ex post regulation. At the level of the core NGN, a good balance is needed in the transition from asymmetric to symmetric interconnection. IP interconnection could become symmetric.

He explained that at the NGN access level, inter-modal competition and the sharing of passive infrastructure is needed as well as cooperation between operators. He further emphasized that adopting light regulation doesn't mean that the threat of tougher regulation is removed. He concluded by stating that consumers will have more opportunity to access content on NGNs. The world of content and telecoms is blurring.

Mr. Villegas Carrasquilla, CRT, Colombia provided an overview of the current regulatory situation in Colombia where broadcasting, telecoms and cable are regulated by different laws.

The interactive discussion raised a number of questions and highlighted the following:

- The importance of regulatory certainty as competition is increased is illustrated by the resulting increase in the number of mobile and internet subscribers that can be witnessed in some countries.
- It is important for the government to provide broad directives and a clear roadmap for NGN.
- The incumbent should not use the transport network to create a bottleneck in the intelligent network.
- The regulator should promote infrastructure sharing (at least of passive infrastructure).
- The boundary between content providers and capacity providers (telcos) continues to blur. Content providers should consider investing in the infrastructure and vice versa.
- As the definition of SMP is evolving, there is a need to look at it in an evolutionary way.
- The licensing regime should be flexible. Unified licenses provide greater flexibility. There is a shift from market entry fees to process fees (and this is resulting in a reduction in fees paid by operators).

SESSSION 5: CONSUMMER PROTECTION, QUALITY OF SERVICE, AND CYBERSECURITY ISSUES, WHAT CAN BE DONE?

Moderador: Valerie D'Costa, Program Manager, Information for Development Program (*info*Dev)

Presenter: GSR Discussion paper on Quality of Service and Consumer Protection in an NGN World

Rosalind Stevens-Strohmann, Consumer Policy Manager, Ofcom, United Kingdom

Panelists:

Mohd Ali Hanafiah Mohd Yunus, General Manager, Content, Consumer & Network Security Division, MCMC, Malaysia

Ahmed Khaouja, Directeur de la Concurrence, ANRT, Morocco
Xenia Herrera, Directora, Dirección de Protección al Consumidor, ARESEP, Costa Rica

Dr Olfat Abdel Monsef, Vice president, National Telecom Regulatory Authority (NTRA), Egypt

Ms. Valerie D'Costa introduced the session, noting that consumer protection is one of the main responsibilities of regulators the world over. The consumer protection issues regulators must address includes the extent to which the relationship between the regulator and consumer changes with NGN, and the extent to which the regulator can foster consumer empowerment, allowing consumers to make an informed choice. What QoS standards make sense in an NGN world? There is a bewildering array of choices consumers face. Will consumers start to think about getting what they pay for and paying for what they get? Are there minimum rules that should apply, for example, access to emergency services and ensuring consumer safety? Consumer protection is taking on a new dimension with new threats, such as identify theft and the theft and use of personal information. How can regulators respond to all of these issues?

Ms. Rosalind Stevens-Strohmann presented the GSR Discussion Paper on QoS and Consumer Protection in an NGN World, noting that her role as a consumer protection manager for Ofcom is to ensure that the UK regulator achieves the right balance between consumer protection and consumer empowerment. There are new opportunities to increase consumer choice. There are also new challenges, such as ensuring that consumers get the best deal possible. There is a range of approaches, with two different ends of the spectrum. One, which requires a sufficiently robust regulatory framework, is to take a tough enforcement approach in which the National Regulatory Authority (NRA) defines QoS standards and actively monitors and enforces them, and also ensures that standards do not become a barrier to market entry. The other end of the spectrum is to leave QoS for the market to decide. This approach assumes there is no market failure and perfect symmetry between the market and information. The United Kingdom has taken a middle approach. Industry provides comparable QoS information to consumers. PSTN operators are required to provide this information; mobile operators have been requested to do this, and they have complied. This is a self regulatory framework with the back stop that the regulator can require industry to do it.

Will QoS change with NGNs? Voice, video and email can each have different QoS levels. Is it important that consumers know about these differences? One example of information consumers do need to know about is service disruption during the migration to NGN. British Telecom has said that there shouldn't be any service disruption. Nevertheless, there is a website to announce when migration will happen and what to expect. Ninety-one percent of United Kingdom users agreed that all forms of voice service should provide emergency service. Some VoIP applications may not be able to do this, some may choose not to, or emergency service may not be available during a power failure. This is the kind of information consumers need to know.

Net neutrality concerns arise where retail providers have market power. How willing is the consumer to pay different amounts for different levels of QoS? The airline model offers differentiated QoS. Usually, consumers expect the call to go through on their phone at home

and may not tolerate degradation. However, consumers usually tolerate delay on mobile, email, and Instant Message services, but not for video conferencing. We don't necessarily know user expectations and how they will change in time. But if regulators ensure consumers are informed, consumers are empowered to switch providers in a competitive environment.

We can't say with certainty if there will be new issues in cyber security. We do know that with new transmission speeds and the personalization of services there are new opportunities for harm and threats. There already exist a whole host of international agreements on cyber crime, and European Union directives establish the boundaries of intrusion into personal data. The most effective way to combat harmful content is to take an industry-led approach. Industry forums can include a hotline that posts notices for ISPs to shut down harmful content.

Mr. Ahmed Khaouja noted that Moroccan operators that were awarded NGN licenses in 2005 are expected to begin commercial operations in February 2007. The fixed historic operator is progressively moving to NGN; mobile operators are slowly moving to NGN and new operators are quickly adopting NGN. The move to NGN poses number portability and number assignment challenges. Interconnection is more dynamic than in the past because of flat-rate offers. Regulators must decide whether to continue classic interconnection for NGN. There is a need to ensure QoS between interconnecting operators. If one operator is defiant it won't work unless the regulator can act and ensure licensing conditions are met. For consumers, number identification is important, especially to locate the calling person in an emergency. Cyber security deserves more attention. There should be a multi-pronged approach including revising the regulatory framework, the ability to impose fines, the use of filters by ISPs and consumer education. ITU declared last May 17 as World Cybersecurity Day. Cybersecurity is a continuous process.

Mr. Mohd Ali Hanafiah explained that the Malaysian regulator, MCMC, reports to the Ministry of Education, Water and Communications. The 1998 Communications and Multimedia Commission Act includes provisions on QoS, the resolution of consumer disputes and universal service. The MCMC has established QoS standards for seven services including PSTN, content and broadcasting services. These standards cover issues such as time for installation, time to restore service if it is interrupted, throughput and bandwidth. With regard to QoS on NGN, MCMC is focusing on a consumer awareness approach. One question is when is the best time to start consumer awareness? This depends on the stage of development of the country. Some of the NGN QoS challenges include whether consumers get what they pay for, for example, in terms of speed and bandwidth, and ensuring data protection, especially when consumers may lack the technical skills to ensure their protection. NGN QoS benefits include more service coverage and bundled services at lower fees. Customer Premise Equipment (CPE) may be another challenge. Some CPE may need to be replaced when NGN is deployed. Some CPE is still being subsidized. Malaysia may extend its seven QoS standards to NGN. MCMC may need to mandate these standards when NGN is introduced, and then take it back once NGN is well-developed and leave it open to market forces.

The Moderator noted that one approach would be to extend current QoS standards to NGN and then roll these back; another option is to adopt an industry led approach.

Ms. Xenia Herrera explained that consumer protection enforcement is more relevant in Costa Rica because telecommunications is a public monopoly. The regulator has developed norms and standards and conditions to deliver services because users are not well organized or informed. The regulator maintains a hotline for disseminating quality standards. It informs users, encourages the formation of user groups, contacts chambers of commerce and industry, ensures that access conditions are spelled out in contracts, and also works with students, trying to educate school children through theater and music. The regulator can intervene when operators don't respond to consumer complaints and impose sanctions.

Dr. Olfat Monsef explained that liberalization started in Egypt in 1999. The 2003 Telecom Act put in place the regulatory framework used today, which is an express ex ante framework. Consumer protection is included in licensing conditions. Looking forward to NGN, Egypt is trying to have a futuristic view, while addressing the licensing conditions of today. Egypt is looking at the European Union model in order to base its regulation on competition law. It is trying to make licenses technology neutral, except where spectrum is involved by using general licensing conditions and trying to lower barriers to entry. The third mobile operator is

launching a 3G network, the first step to NGN. One of the two existing 2G mobile operators is licensed for 3G. The request for proposal (RFP) for the third operator required national roaming and number portability. A MoU was signed by the operators before the RFP was issued. Egypt has introduced Wi-Fi and is conducting a consultation with industry and end users on introducing WiMax using existing licenses, while looking into spectrum to allow for growth and new technologies. Egypt is assessing its regulatory framework to address convergence and develop a common framework. Today media is under a different regulatory body and ministry. Egypt is trying to support investment .and is using competition law to address anticompetitive issues. The Egyptian market will grow quickly. Will the regulator be able to follow up on evolving markets as fast as they evolve? Do we need to regulate or are market forces enough?

The Moderator emphasized the need for the regulator to keep pace with developments.

During the question and answer period, these key points were made:

Not all regulators in developing countries necessarily work with consumer protection agencies. However, regulators in some countries, like Morocco, realize that the government cannot do everything, and mandate certain professional associations to protect consumers. In addition, the regulator can conduct annual consumer surveys. Regulators can work hand in hand with consumer protection agencies.

While all panelists emphasized greater reliance on market forces in addressing consumer issues, it is also necessary to ensure QoS between operators. This may require regulators to sanction operators that don't provide QoS.

In some countries, regulators take constant QoS measurements to ensure QoS for end users. They require mobile operators to refund money to consumers where there is more than a 2 per cent call drop. Regulators can further measure QoS in all areas where coverage is provided to ensure QoS in each and every area. Regulators can impose QoS and Service Level Agreements on operators. Where they don't have the authority to do this, they can ask that they be given this power. In other countries, where operators were slow to publish voice QoS parameters, the regulator published QoS information on its website. This kind of transparency put pressure on the operators to improve their QoS. Consumer awareness may be more effective than setting standards. Regulators can also maintain a help line to address complaints that are not answered by the operator. Consumers also need to be educated so they know their rights.

Some regulators have found number portability to be complicated and expensive for fixed line networks and worry if number portability will also be difficult on NGN. Egypt established national roaming rules in advance. It allowed these to be reached by commercial agreement, but set a four-month deadline. If no agreement was reached, the regulator could set the value. The regulator set the number portability fees in advance.

Should consumer protection rights differ between rural and urban areas? While consumer protection rights may not differ, the services offered may be different. Many rural areas may initially only want voice services. Malaysia, for example, is focused on bringing payphones to districts with penetration below national penetration rates. In the future, it is likely to introduce internet services in these areas too. Morocco noted the importance of reviewing universal service/access definitions periodically. In France, universal service definitions are reviewed every five years. Morocco subsidizes GSM and Internet services in "white" zones that have no commercially provided service. Morocco also plans progressively to reduce operator contributions to universal access funds until universal access is achieved.

What agencies handle network security issues? In the United Kingdom this is done by the Internet Watch Foundation along with voluntary measures of service provides. There are also initiatives on international and regional levels. Because the Internet is global and will be used by more people with NGN, it is also necessary to encourage international initiatives to foster cooperation among ISPs on security issues.

The Moderator in concluding noted the variety of approaches. The United Kingdom prefers an industry-led approach. Morocco mentioned that cyber security is an ongoing process and there is a need for an ongoing role for regulators. Regulators need to evaluate when is the right time to begin addressing NGN. In Egypt, the regulator is setting the ground for NGN. Should

cybersecurity be looked at on global basis? Or should regulators plug into national and regional and global initiatives.

Break-out C: UNIVERSAL ACCESS/SERVICE IN AN NGN WORLD

Moderator: William John Withers, Executive Chairman, Public Utilities Commission of Anguilla

Presenter GSR Discussion paper on NGN and Universal Access:
Susan Schorr, Regulatory Officer, RRU, BDT ITU

Panelists: Ceferino Namuncurá, Presidente, CNC, Argentina

B. Boldbaatar, Chairman, CRC,

Isidoro da Silva, Executive Secretary, Communications Regulators Association of Southern Africa (CRASA)

The moderator introduced the session and invited Ms. Schorr to present the GSR Discussion Paper on NGN and Universal Access.

Ms. Susan Schorr noted that a review of countries' universal access policies and practices is timely in light of the objectives set by the World Summit on the Information Society (WSIS) to connect all the world's villages by 2015, and because of the technological and market developments associated with NGN. Increasingly countries are finding that the range of universal access tools is expanding, and that greater reliance on sector reform can be used to achieve universal access. A number of universal access issues are raised by NGN: Since NGN means that transport and services are decoupled, should countries target their universal access policies only at transport infrastructure, or expand them to include services? Should broadband be included in the universal access definition? Today, only 16 percent of the world's population has access to Internet services; far less (3.3 per cent) have access to broadband services. The technological innovations associated with the transition to NGN have already started to transform the way universal access is being extended to rural and remote areas in both developed and developing countries, in particular, by the introduction of new wireless technologies such a Wi-Fi and Broadband Wireless Access (BWA). BWA services are being deployed in remote rural areas and on a city-wide basis as well. The success of new technologies in meeting universal access goals depends on the regulatory framework, including spectrum management, authorizing VoIP services and promoting fair interconnection regulation. Sector reform is increasingly important as the rise of VoIP and the decline of the accounting rate system have called into question the use of traditional universal access practices such as cross-subsidies and access deficit charges. Universal access funds have insulated many developing countries from the loss of traditional universal access revenue. But practices in the use of funds are also beginning to evolve. Early large-scale projects were frequently undertaken on a top-down, supply-driven approach where a single provider, often the incumbent, was selected to provide a standard set of services, using a narrow set of technologies, over a wide geographical area. The introduction of NGN-related technologies, such as BWA and Wi-Fi, has substantially reduced economies of scale in both the infrastructure and service segment, opening the field to a wider range of small or local providers to expand universal access from a bottom-up, demand driven angle. Micro credit also fills a funding gap that allows individuals and small enterprises to obtain financing so that they can provide much demanded services. There remains considerable scope for governments also to encourage the deployment of backhaul and backbone infrastructure to improve the quality of internet access. ITU and *info*Dev are developing a new module for the ICT Regulation Toolkit on Universal Access that will explore these trends.

Mr. Ceferino Namuncurá, presented a recent analysis of universal service funds produced by Regulatel (the Forum of Latin American Telecommunications Regulators), the World Bank, the Global Program on Output Based Aid, and the United Nations Economic Commission for Latin America and the Caribbean. The study is available in both English and Spanish on the Regulatel website at http://www.regulatel.org/miembros/ppiaf2.htm

The study examined the universal access policies and practices of the 19 members of Regulatel. The key recommendations highlighted in the study are that:

- there is a need for a redefinition of the concepts and goals of universal access and universal service programs;

- legal, regulatory and institutional reforms are needed,
- more effort needs to go into data collection and analysis regarding network and market conditions;
- universal service funds need to speed up, simplify and diversify how they use their funds; and
- a new generation of universal access programs should focus on infrastructure and services that use converged Internet-protocol (IP) platforms.

The Regulatel study shows that the main driver of improved telecommunications penetration, coverage and access in Latin America during the last decade has been private sector investments unleashed by privatization and liberalization initiatives. The study also showed that efficient market forces and regulatory practices could greatly improve mobile coverage in Latin America. The report estimates that the private sector could provide cellular signals on a commercial basis to cover more than 75 percent of the population in most countries in Latin America. In some countries regulatory barriers are hindering the use and deployment of new market and technological innovations, such as VoIP, Wi-Fi, WiMAX and other wireless technologies that could lower the cost and improve ICT access in rural areas. The study also found that the current coverage of broadband networks is comparable to that of the telephones in the early 1990s. Not surprisingly, costs to achieve universal access rise as universal access programs try to reach smaller towns. For instance, the study estimates that addressing the broadband access gap for towns over 300 inhabitants would cost approximately $26 per person, but that it would cost $297 per person to try to cover the entire population.

The report also credits universal access funds with great success in increasing community access to telephones and leveraging private investment. Smart subsidies have generally leveraged between one and four times the amount of private sector investment. Some universal access funds, however, are underutilized and disburse funds inefficiently due to a variety of reasons explored in the report.

The study recommends a variety of steps and innovations to improve the universal access programmess including stimulating the faster build-out and expansion of backbone networks beyond the major urban areas and the development of new wireless technologies as well as using universal access funds to support pilot projects as well as bottom-up and demand-side initiatives.

Mr. Isidoro Da Silva explained that CRASA, the first regional regulators association in Africa, is now 10 year old. Countries in his region face enormous challenges like the lack of infrastructure in rural areas. CRASA members need computers and terminals. The network is divided into distinct islands and new investments are needed. Competition makes it impossible for former monopoly providers to operate under market conditions of the past.

CRASA has a number of substantive committees, including one addressing universal access. CRASA helps member countries define national strategies and develop regulatory best practices and has developed model guidelines on universal access. CRASA seeks to promote competition to achieve network development. Where the market fails, countries need an alternative mechanism, such as dedicated funds for universal access.

Mr. B. Boldbaatar discussed the challenges of achieving universal access in a country that has a huge territory, but only 2.5 million inhabitants, many of whom live in rural areas and adhere to a nomadic lifestyle. Mongolia has established a universal service fund at the government level. Parliament has approved it, and the regulator, the CRC, will be responsible for implementing the fund. The fund will be financed by operator profits, not a percentage of revenue. Mongolia is implementing a pilot project with World Bank support that will target herder populations. The country fully expects to achieve universal access to voice services by 2010. Mongolia is giving rural areas spectrum free of charge for WiMax and Wi-Fi in order to improve internet access in rural areas.

During the question and answer period the following key points were made:

- Choices often have to be made in the kinds of services that will be funded by universal service funds. These funds can be used to install public payphone and

community internet access points, and the government can coordinate the use of funds.

- Universal service funds are not a magic solution, but a tool to be used when operators are not providing services.
- Rural areas need long-term projects to facilitate investment.
- Subsidies provided by universal service funds should be allocated through competitive bidding auctions with a view to providing sustainable services.
- Governments can make subsidies available on a technology-neutral basis, not selecting the technology to be deployed, but identifying the kinds of services to be provided.
- Some operators may claim that the cost of deploying NGN will make it unaffordable for them to provide universal access. It is important to bear in mind that Next-generation networks may not reach all areas and not all operators will migrate to NGN; other technologies can also be used to achieve universal access such as broadband wireless technologies. At the same time, soft switches are much cheaper than traditional switches, and technological developments and competitive pressure make it feasible for operators to provide services more cheaply. Regulators can ensure that all technologies are used to provide services, both fixed and mobile. Infrastructure sharing can further reduce the cost of providing services.

Break-out D: INTERNATIONAL INTERCONNECTION

Moderator: William Fagan, Executive Director, Supreme Council for Communications & Information Technology

Presenter GSR Discussion paper on International Internet Interconnection
Eric Lie, Telecommunications Specialist, Singapore

Panelists: Mohammed Gheyath, Manager Technical Affairs, TRA, United Arab Emirates
Mohamed Amir, Chief Executive, Telecommunication Authority of the Maldives
Richard Mwanza, Deputy Chief Executive Officer, Communications Authority, Zambia

The moderator, **William Fagan**, introduced the session and gave an overview of the topics to be covered in the session, including peering arrangements, internet exchange points, network access points and other innovative mechanisms, as well as how developing countries might negotiate cost-based arrangements.

He invited **Mr. Eric Lie** to present the GSR Discussion paper on International Internet Interconnection. Mr. Lie began with an introduction on how the accounting rate system works. He highlighted the fact that in the 1990s, the system produced significant revenue inflows for developing countries. During the period between 1993 and 1998, the ITU estimated that net flows of settlement payments from developed to developing countries amounted to some US$40 billion. He explained that since that period, the accounting rate system has come under sustained pressure. The wave of telecommunications sector liberalization that started in the late 1990s led to the entry of new competitive carriers. This made it possible for carriers in other countries to deal with more than one correspondent in the delivery of international calls. Arbitrage opportunities also allowed carriers to offer prices well below international accounting rates even for calls to countries without liberalized telecommunications markets. At the same time, the system also came under increased regulatory pressure. In 1997, the United States Federal Communications Commission (FCC) unilaterally reduced accounting rates by prohibiting US-based carriers from paying rates above its published benchmark levels.

The increasing use of VoIP, which bypasses the international accounting rate system, has further undermined the accounting rate system's relevance. While VoIP traffic still accounts for only a modest share of international voice traffic, that amount is rising as more carriers transition to NGN. As a whole, the accounting rate system has now been largely replaced by directly negotiated rates to terminate traffic. Electronic exchanges have emerged that enable the trading of international voice, data, and mobile capacity. In most cases the prices for terminating traffic around the world at such exchanges are significantly lower than even those prescribed by the FCC's benchmark rates. While the accounting rate system still exists, it is on a far more modest scale than a decade ago. The ITU estimates that only around 20 percent of international traffic still uses the accounting rate system.

Given that international NGN interconnection is unlikely to resemble the accounting rate system, it is important to take a better look at the current practices in the area of international internet interconnection. To a large extent ISPs interconnect internationally on the same peering and transit basis in domestic markets. While VoIP traffic itself is exchanged on the same peering or transit basis as other forms of packetized traffic, unlike other forms of IP traffic, however, VoIP interconnection with the PSTN remains a necessity as the vast majority of telecommunications users still use the latter. In most cases, major international VoIP operators such as Skype terminate traffic on the PSTN through termination agreements with telecommunications operators.

In recent years, VoIP operators have started to enter into their own specific peering arrangements with other VoIP operators. While the aim of these arrangements is to reduce costs through settlement free peering, such arrangements also have the potential to improve end-to-end VoIP service quality. It is this potential to provide different levels of quality for different IP-based services, that has led a number of network operators to question the

sufficiency of current internet interconnection practices regime when it comes to the delivery of traffic that require better than “best efforts”.

This possibility of differentiated charging has provoked a strong reaction from service and content providers such as Skype and Google, who fear that such differentiation could lead to discrimination when network providers enter into their downstream service markets.

In the United States, this issue forms part of the debate on “net neutrality” – a debate which revolves around the equitable treatment of network applications. While this debate remains largely domestic now, it will inevitably enter into the international market as more network operators seek to provide services with quality and security assurances internationally. Already a number of large network operators such as NTT, BT and France Telecom have indicated that they would be prepared to open service and control application layers to selected international interconnecting partners in order to allow end-to-end quality of service and security guarantees. Agreements such as these give rise to concerns on the part of smaller operators who do not carry the same market weight.

Changes to the internet landscape, in recent years, have led to a sharp decline in the cost of international internet connectivity for many countries. A major factor has been the new found popularity of public peering at public Network Access Points (NAPs) or Internet Exchange Points (IXPs) where Tier-2 ISPs inside and outside the US could peer with each other.

At the same time, competition for the provision of delivery in the US increased as the number of Tier-1 ISPs rose. The construction boom in high capacity fiber optic cables also greatly reduced international transmission costs. More importantly, fiber optic cables were deployed more evenly across the globe. Although the largest capacity increases were on East-West routes across the Atlantic and the Pacific, fibre optic submarine cables also became available between Asia and Europe via the Middle East, between South America and North America as well as along the West Coast of Africa to Europe.

To a large extent, it appears likely that there will be no fundamental shift away from commercially negotiated internet interconnection agreements towards any form of regulation for some time to come. Focus instead has shifted to the promotion and support of initiatives establishing regional high-speed backbone networks and IXPs as a means to reduce the cost of international connectivity for developing countries.

Current trends in international interconnection for the PSTN and the internet play a large role in shaping the development telecommunications markets in developing countries. The trend of falling settlement payments and the resulting decline in incumbent operator revenues has given rise to concerns regarding telecommunications infrastructure investment in developing countries. To some extent, revenue earned through settlement payments were used to fund universal service initiatives.

In developed countries, increased demand for internet access through dial-up and broadband have generally supplanted operator revenues previously earned from settlement payments and high international call rates. While this success story has been duplicated by many developing countries, as the examples of many Asian and Eastern European countries have shown, this has largely not been the case in the least developed countries. In these countries the cost of internet access remains prohibitively high due to a combination of factors which include the high cost of international internet connectivity. In such cases, however, the answer appears not to lie in maintaining subsidies through settlement payments, which was never conceived as a development tool, but in domestic sector reform efforts coupled with non-market distorting international development assistance.

As an aside, efforts to reform and improve the accounting rate system are still ongoing at the ITU. Study Group 3’s work now concentrates on refining the costing methodologies and settlement procedures that are based on its current recommendations. Its focus is also shifting towards an examination of mobile termination rates for international calls.

Although the average price for international internet bandwidth has fallen dramatically over the past few years, a number of developing countries still labor under bandwidth costs that can be up to 100 times higher than in developed countries (usually in cases where satellite access is relied on). In most developing countries, studies indicate that around 20 to 35 percent of

ISP costs come from international internet connectivity. This percentage is usually far higher for the least developed countries.

There are, however, a number of solutions that exist to reduce the cost of international internet connectivity in developing countries. The expansion of infrastructure in particular has made a profound impact on costs, especially in cases where high capacity terrestrial links replace more expensive satellite links.

However, access to facilities such as submarine cables at competitive prices is a necessary prerequisite for them to make a difference. In this respect, regulators have a large role to play in ensuring that a competitive environment exists. Such measures include ensuring open access to such facilities and the lowering of regulatory barriers to entry into international facilities markets, such as in the area of licensing.

In negotiations involving the purchase of transit for international internet connectivity, it is also important to note that lower prices and better conditions are usually available to ISPs who purchase capacity in large volumes. ISPs in developing countries typically generate low amounts of traffic, precluding them from such opportunities. Also, in the absence of local and regional infrastructure to exchange internet traffic, developing country ISPs often have to pay for international transit to deliver local and regional traffic, an effect described as "tromboning". This results in additional costs and increased latency.

As a result, the development of regional and local Internet Exchange Points (IXPs) has been strongly advocated as a good way to aggregate traffic and facilitate traffic exchange in order to reduce international internet connectivity costs and bring about service improvement. To a large extent, this approach has helped to reduce international internet connectivity costs dramatically for some developing countries in Asia, particularly in those where internet traffic is largely local because of language and cultural reasons. Nevertheless, the setting up of IXPs often involve a number of challenges, often involving the question of trust among competitors.

Mr. Mohammed Gheyath, gave an overview of developments in the UAE and in the GCC countries. He explained that the majority of Arab Internet activity is exchanged outside the Arab region through network access points in the United States and other countries, with the exception of some direct exchange of private peering activity between service providers, as well as some recent experiments on Internet exchange through access points. Connection points, through network access points outside the region, have limitations such as lack of optimal use of capacities, delay in transfer of information and loading of applications, possible occurrence of problems and service cut-offs, which results in undermining security; lower quality; and higher costs. He highlighted an important study that was undertaken together with ITU to provide access points to connect Arab Internet networks, such that traffic between Arab countries passes through those points. The study recommends that UAE host the NAP for the GCC countries. The study also recommended that a consortium has to be formed to operate the respective NAPs from the participating countries. This consortium has to focus on providing a high quality, redundant and resilient service to its clients (the IXP's, Telco's and ISPs of the participating countries) and will enter into peering relationships if it feels that such a relationship will be to the overall continuing benefit of the consortium and its clients.

He emphasized that the NAP project was an excellent example of cooperation.

Mohamed Amir, gave an overview of his country the Maldives which is comprised of 1200 islands, 200 of which are populated. There is 100% mobile coverage and prices are falling. International internet connectivity has historically been slow and expensive. Recent access to high capacity submarine cables, however, has substantially reduced latency and prices. One of the main policies as elaborated in the 2001 telecommunication policy was to introduce competition in telecommunication services that will lead to lower telecommunication charges, expansion of the services, improvement of quality and introduction of new services.

In the Maldives, the absence of competition in the telecommunication sector has resulted in expensive and slow expansion of services. The 2001 policy emphasized the important role of competition.

The 2006-2010 policy document emphasizes that telecommunication can play a vital role in linking dispersed communities and reduce the impact of geographical isolation and physical

separation that exists between island communities of the Maldives. Telecommunication will also play a major role in achieving the economic and social developmental objectives envisaged in the Vision 2020 of Maldives. This policy will facilitate sustainable development of telecommunication services for the next 5 years.

Richard Mwanza explained that Zambia had a population of approximately 10 million people. Illiteracy is high, and the government is in the midst of developing a new ICT policy. The licensing process is open and technology neutral. The use of VSATs has led to some problems because of accounting rates. There has been a 60% revenue decline by the incumbent. The incumbent, together with the railway system, is installing close to 3,000 kilometers of fibre optic cables and are offering broadband services. All local traffic is transited through ISPs. The ISPs were exchanging traffic internationally using VSATs which lead to high costs and traffic delays. They were not able to be Tier 1 subscribers because their traffic volume is not high enough. After careful study, they opted for an IXP so that the local Internet Services Providers (ISPs) can exchange local traffic. CISCO put in the first IXP, which is now hosted by the incumbent. The IXP will only be successful if the internal transit costs are reasonable. Regulators have an important role to play in IXPs.

During the Question and Answer period the following points were raised:

- In the Maldives, competition was successful because the framework was clear and transparent.
- The role of the regulator with regard to IXPs is to play a “promotional/facilitator” role, and remove entry barriers.
- The NAP project in the Arab States was initiated because there was not sufficient traffic to have peering arrangements or to be Tier 1.

The Speed Exchange Session provided additional opportunities for participants to meet informally and exchange views. A series of nine informal, moderated roundtable discussions was offered, each on a different issue, and participants were invited to spend twenty minutes at the table of their choice before moving to another roundtable discussion. Participants were able to participate in three different roundtable discussions during the Speed Exchange Session. Following the session, many participants expressed their view that speed exchanges should be included in future GSRs, but that discussions continue longer than twenty-minutes for each exchange. Some participants suggested that speed exchanges could be held several times throughout the next GSR, not just during one session. The topics and moderators of the roundtable discussions were:

- **Why hold a public consultation on NGN and establish NGN industry forums?** (Janet Hernández, Senior Vice President, Telecommunications Management Group Inc. United States)
- **Should regulators require operators to compensate one another for terminating traffic in an NGN world?** (J. Scott Marcus, Senior Consultant, WIK-Consult GmbH, Germany)
- **Bottlenecks and what you can do about them** (Jens Arnbak, Delft University of Technology, Faculty of Electrical Engineering, Mathematics & Informatics (EWI), the Netherlands)
- **Mobile Roaming** (Ewan Sutherland, Telecommunication specialist, Belgium)
- **Consumer Protection and Quality of Service** (Rosalind Stevens-Strohmann, Consumer Policy Manager, Ofcom, United Kingdom)
- **Legal and regulatory implications of VoIP** (Tracy Cohen, ICASA, South Africa) Bank)
- **WTO Telecom Negotiations: What's next?** (Lee Tuthill, World Trade Organization (WTO)
- **Regulatory Issues for Convergence** (Rajendra Singh, Senior Regulatory Specialist, Work Bank)
- **WSIS Action Line C5: Building confidence and security in the use of ICTs** (Robert Shaw, ITU)

SESSION VII: THE WAY FORWARD

Moderator: Mohamed Al Ghanim, Director-General, TRA, UAE and GSR07 Chairperson

Panelists: Ali Ghodbani, President, Instance Nationale des Télécommunications de Tunisie, Tunisia

John S. Nkoma, Director General, Tanzania Communications Regulatory Authority (TCRA)

Prof. Prasit Prapinmongkolkarn, Commissioner, National Telecommunications Commission (NTC), Thailand

Tomas Lamanauskas, Deputy Director, RRT, Lithuania

Gustavo Peña-Quinones, Secretario General, Foro Latinoamericano de Entes Reguladores de Telecomunicaciones (REGULATEL)

Sami Al Basheer Al Morshid, Director, ITU Telecommunication Development Bureau (BDT)

The Chairman opened this session by explaining the best practice consultation process. He reminded participants that these draft guidelines are the result of a consultative process. He turned the floor to the panelists to provide their views on the best practice guidelines proposed.

Mr Ghodbani, President, Instance Nationale des Télécommunications de Tunisie, Tunisia indicated that all the aspects discussed during this GSR are very important and all domains are covered in the guidelines. He noted that the objectives of NGN are to offer easy access to services in response to the needs of users. The role of the regulator is key to meeting these objectives. Transparency and stability are important as are other factors. There is a need to coordinate, evaluate and monitor technologies. He further stressed that developing countries have mobile infrastructure in place that often does not provide the required quality to migrate to NGN. There is a need to define the path to NGN. He indicated that the following measures taken in Tunisia: installation of a fiber optic backbone, unbundling the local loop and infrastructure sharing. He concluded by saying that this is not the first time the sector has undergone a transition. This also occurred in the past with the move to automation and digitalization.

Prof. Prasit Prapinmongkolkarn, Commissioner, National Telecommunications Commission (NTC), Thailand indicated that NGN has been in Thailand for almost three or four years. He noted that it promotes not only basic telecommunication needs but also video and data as well as e-government, e-education, e-industry and e-life programmes. He added that NTC has allocated spectrum for WiMax, and will award licenses to 3G and perhaps 3.5 G operators.

He indicated that the draft best practice guidelines are very inclusive. He raised a number of regulatory challenges posed by NGN, including the need to change regulations to adapt to the rise of convergence, the need to address quality of service for VoIP services which may not be equal to traditional fixed line or mobile services, and accounting confusion arising from the wide variety of services. He added that technical advice can solve these problems. He also added that after a few months of operation, NTC can ask VoIP providers to improve the level of QoS to meet the needs of end users.

He concluded by saying that as technology is converging and the world is changing, broadcasting and telecommunications regulators also have to converge and become a seamless integrated regulator.

Mr. Gustavo Peña-Quinones, REGULATEL, highlighted three points related to the best practice guidelines:

- The need for strong regulatory institutions with responsibility for all issues, such as spectrum. Some of the regulatory structures used in Latin America make it difficult for regulators to act in a comprehensive manner;
- NGN presents an opportunity to improve universal access and to replicate the success developing countries have seen in achieving widespread access to voice services

through mobile networks. The Maitland report identified teledensity objectives that were unattainable through fixed line networks. Colombia, however, was able to solve the problem of providing voice services thanks to pre-paid mobile services. NGN should enable us to deliver services to everyone.

- There is also a need to collect good statistical information regarding networks and market activities. This issue was raised by the report Regulatel conducted on universal access programmes in Latin America which can be found on www.regulatel.org

He concluded by stressing the need to give regulators the tools necessary for good regulation, including sound information and the possibility to exchange information among themselves. He invited all participants to come to Latin America.

Mr. John S. Nkoma, Director General, Tanzania Communications Regulatory Authority (TCRA) explained how Tanzania is preparing for NGN. Tanzania created a converged regulatory body in 2003 (created from the convergence of telecommunications, broadcasting, post, spectrum, numbering and ICTs). The ICT environment in Tanzania is competitive. Six mobile operators compete, of which four are NGN-ready, and the number of subscribers has increased rapidly in the last few years to 6 million out of 35 million inhabitants. TCRA introduced a converged licensing regime with four types of licenses. Regulatory certainty is an important issue as is indicated in the best practice guidelines: Service and technology neutrality are important because they offer operators flexibility. For example, in Tanzania one mobile operator is evolving from GSM to 3G and one towards CDMA, and they can do so without having to ask for an additional license because their license is technology-neutral. Interconnection and interoperability are big challenges. Tanzania is conducting research on what interconnection regimes will be applicable in the coming years and reached agreement on an open numbering scheme in consultation with the operators. Consumer protection is also important, and consumers are interested in choice, good quality and coverage in rural areas. A universal access fund is in place in Tanzania. Tanzania is laying terrestrial fiber and is interested in EASSy and alternative international sub-marine cables for the east coast of Africa.

Mr. Tomas Lamanauskas, Deputy Director, RRT, Lithuania pointed out that when new technologies are discussed, many wish to start with a definition, however there is no firm definition of NGN. There is also no firm definition of broadband, but this has not prevented us from talking about it. In any event, by the time definitions are agreed, technology will continue to evolve. Regulators should instead speak about what they want for regulation, what will be future proof, and what is adaptable for any technological developments that may emerge. We should create an enabling environment for what consumers want and need, be it voice, IPTV, e-education, etc. The environment should enable innovation. He added that when regulators speak about the enabling environment, they need to have a certain, clear and future proof regulatory framework; a clear and simple licensing regime; technologically neutral frameworks, sufficient spectrum for mobile services that are available anywhere and anytime, and the possibility for regulators to intervene only where there are clear market power issues. Bottlenecks are becoming more important to regulate. He further indicated that regulators will have to regulate more than the pipes, and also address content and vertical integration.

He noted that the GSR best practice guidelines are good for national policy discussions. When regulators engage in national policy discussions, it is often difficult for them to gain acceptance that their views represent best practices. But when regulators share the GSR Best Practice Guidelines, they can explain to all the stakeholders that the views are not theirs alone, but represent the international view. This makes them more compelling as they seek support for their national regulatory position.

In concluding, Mr. Lamanauskas suggested that a future GSR address not only technologies, but how technology can serve end-users, especially citizens in least developed countries and rural areas, and how the regulatory framework can help achieve this. As an example, he identified India's use of new technologies to provide veterinary services.

The Chairman noted that the guidelines reflect what regulators learned from the experts. They are consistent with WTO guidelines and cover the main points. He opened the floor for comments and encouraged editorial and translation issues to be handled off line.

The following countries thanked the UAE and Mr. Al Ghanim for the gracious hospitality and warm welcome with which delegates were received and also thanked the ITU for its strenuous efforts for the organization of this event: Saudi Arabia, Algeria, Serbia, Dominican Republic and Nigeria.

The 2007 GSR best practices guidelines were approved.

Looking towards the future, participants requested BDT to develop products and services aimed at the practical implementation of these guidelines. The Chairman suggested that BDT, through consultation with the host country and regulators, will decide the theme for the next GSR. The dialogue on the theme for the next GSR can continue after the close of the GSR.

The Chairman emphasized the need to organize speed exchanges in future GSRs.

The Dominican Republic and Thailand both offered to host the next GSR. **Mr. Al Basheer Al Morshid**, BDT Director, expressed his gratitude to both countries for their offers. He indicated that their proposals will be reviewed and that he will consult with them and inform them of the official decision. He noted that there are many years to come and that this important event can be moved around the world.

At the end of the session, all participants congratulated the Chairman, Mr Mohamed Al Ghanim, for his excellent stewardship of the GSR and for the warm and generous hospitality directed to all participants.

The Closing Ceremony

BDT Director Sami Al Basheer Al Morshid presented the **G-REX Awards,** given to those who were most active, both in asking and replying to questions on the ITU Global Regulators' Exchange (www.itu.int/grex). G-REX is the ITU password-protected website for regulators and policy makers which enables them to continue their dialogue following the GSR. Participants can pose questions and receive replies from their counterparts around the world.

The 2007 G-REX awards were given in order of level of activity, starting with the most active:

- The Telecom Regulatory Authority of India;
- The Pakistan Telecommunication Authority;
- The Organismo Supervisor de Inversión Privada en Telecomunicaciones de Peru;
- The Afghanistan Telecom Regulatory Authority;
- The National Telecommunications Regulatory Commission of Saint Vincent and the Grenadines;
- The Consejo Nacional de Telecomunicaciones del Ecuador;
- The Comisión Nacional de Telecomunicaciones de Venezuela;
- The National Telecommunications Corporation of Sudan;
- The Office of the Telecommunications Authority of Hong Kong, China;
- The Ethiopian Telecommunication Agency; and
- The Nepal Telecommunications Authority

The BDT Director awarded the Honourable Chairman award to Mr. Cuthbert Moshe Lekaukau, who recently retired from the Botswana Telecommunications Authority, in recognition of his service to the GSR, including chairing the very first GSR and his role in driving Plenipotentiary Resolution 138 which establishes the GSR as a regular meeting of the development sector, and his commitment to effective regulation.

In closing the GSR, the BDT Director noted that the GSR had attracted more than 470 participants, bringing together regulators, policy makers and service providers from some 100 countries, including the head of the regulatory authority from 60 countries, in addition to numerous regional, international, intergovernmental and non- governmental organizations, including the WTO and the World Bank, and of course, ITU's partner in the ICT Regulation Toolkit, *info*Dev, along with 31 valued ITU-D Sector Members (on Day One).

Mr. Al Basheer extended his warm thanks to the TRA and, in particular, to Mohamed Al Ghanim for the excellent organization provided by his staff and the warm hospitality displayed by everyone in the United Arab Emirates. The BDT Director reiterated his appreciation for the gala dinner TRA and Etisalat organized on Monday evening, as well as TRA for sponsoring all coffee breaks and lunches, TMG and CompasRose and the TRA for sponsoring the women's breakfast and Cisco for Tuesday night's reception. He also thanked all moderators, panelists, speakers and the GSR Discussion Paper authors for sparking such a fruitful dialogue, and reminded participants that they were welcome to provide their comments on the GSR Discussion Papers through 1 March 2007 by sending them to GSR07@itu.int.

The BDT Director noted that the approved Best Practice guidelines on regulatory practices for NGN migration promote the adoption of regulatory frameworks that foster innovation, investment and affordable access to NGNs and that facilitate the migration to NGNs. These best practices promise to deliver real benefits to citizens and consumers, including innovative new services and technologies made available at affordable prices. "Indeed I think we have much to look forward to in the future."

The topics examined in the 7th GSR are among *the* key issues facing the sector: keeping pace with technological developments, promoting investment in networks, devising flexible and fair interconnection regimes, ensuring competition, consumer protection, quality of service and cybersecurity, universal access and international internet interconnection. All participants have learned about the opportunities and challenges raised by NGN, and will continue to

discuss these issues in the years ahead as NGN begins to take shape around the world. The BDT Director encouraged all participants to continue to work together and to continue the dialogue among and between regulators through the ITU regional initiatives, the regional regulatory associations and other regional forums for regulation, and on the global level through G-REX and the GSR and in the ITU-D study groups on NGN migration, interconnection and universal access. He expressed his belief that that the GSR is one of the models for a new BDT that effectively and efficiently provides our members with much needed products and services.

Annex A:

Global Symposium for Regulators 2007

Best Practice Guidelines for Next-Generation Networks (NGNs) Migration

We, the regulators participating in the 2007 Global Symposium for Regulators, have identified and proposed best practice guidelines for the migration to NGNs. Our goal is to promote regulatory frameworks that foster innovation, investment and affordable access to NGNs and that facilitate the migration to NGNs. We believe the best practices outlined below can contribute to reaching this goal and deliver real benefits to citizens and consumers, including innovative new services and technologies.

An enabling regulatory regime that fosters innovation, investment and affordable access to NGNs and facilitates migration to NGNs

1. We encourage political support for creating a forward-looking and enabling environment for the development of NGNs at the highest government levels and expressed in national or regional policy goals.
2. We encourage the establishment of an effective regulator separated from the operator. Regulators are also encouraged to enhance their functionality by adopting clear and transparent regulatory processes, including those relating to the adoption and enforcement of rules for the sector.
3. We encourage regulators to adopt a coherent approach to regulating the converged information and communication technology (ICT) sector. One approach could be through the establishing of converged ICT regulatory authorities.
4. We believe that government policy should also promote and enable public/private sector partnerships to support and promote advancement in affordable and secure NGN infrastructure development, particularly where private investment alone is unlikely to lead to NGN deployment.
5. We encourage regulators to establish forward-looking regulatory regimes and to regularly reassess them in order to remove undue regulatory barriers to competition and innovation as well as to allow the regulatory framework to evolve with the objective of enabling users and providers to migrate to succeeding generations of networks when the market dictates.
6. We believe that regulatory flexibility and technology neutrality is needed to permit technological innovation and to support technical and service evolution and that there should be no undue distortion of competitiveness or of the discipline and efficiency of the market.
7. We encourage regulators to design regulatory frameworks that enable cost-based regulatory charging mechanisms, competitive network provision, and competitive infrastructure builds and to monitor for incidents of NGN network providers/operators restricting service level competition to their own undue advantage which could warrant a regulatory response. Such frameworks should also be aimed at ensuring that NGN network providers and operators maintain incentives for technological and market creativity and innovation.

8. We believe that establishing investment-friendly regulation while maintaining a level playing field and protecting consumer interests is of paramount importance for facilitating NGN deployment.
9. We encourage regulators to keep consumers informed on the transition to NGNs and the new services which may be on offer, in order to provide them with the necessary information to make well-informed choices.
10. We encourage regulators to keep in mind the need to create regulatory certainty for both incumbent and competing/alternative providers, in order not to stifle innovation. We recommend that they balance this goal with that of fostering robust, competitive markets and that contingency plans be in place.
11. We encourage regulators to closely monitor developments of radio access networks in general and the developments of their internal mobile and broadband markets in order to make the necessary policy decision to enable future deployment of systems that will accommodate the seamless transition between fixed and mobile settings in an NGN environment.
12. We believe that promoting diversification of access networks is a policy option and a strategy to promote infrastructure deployment and increase broadband penetration and competition and that promoting diversification of access networks such as wireless and cable television networks is a strategy directed at achieving robust inter-modal competition.
13. We encourage regulators to monitor local, regional and international developments regarding NGN-related issues, such as IP-interconnection, standardization, and numbering (including next-generation identification systems) and, to the extent possible, to participate in such initiatives by attending meetings and providing input and comments into the process. Regulators are also encouraged to implement to the greatest extent possible international best practices regarding NGN-related issues into their respective regulatory frameworks.

Innovative Regulatory Policies Must Be Developed To Facilitate NGNs

1. We believe that regarding the evolution of Next-Generation Networks, regulators should carefully analyse and as appropriate define innovative policies both in the short term (relating to, for example, parallel existence of PSTN/IP networks, VoIP services, triple play, etc.) and in the long term (with a more complete NGN environment) analyse issues including:
    a. the comparison between fixed, mobile & broadcast approaches to NGN deployment and develop convergent approaches to NGN in particular as regards access, interconnection, QoS, security and tariffs
    b. issues relating to Access and Core technology growth and development
    c. the co-existence of legacy, hybrid and NGN networks in the interest of consumers
    d. the changing nature of the relationship between networks, services and applications (including content)
    e. the emerging new services and the related challenges of maintaining competition and the ability to offer end-to-end innovative services across competitive NGNs
    f. the interdependence of NGN and the Internet.
    g. how NGN could be the engine for convergence
    h. standardization, interconnection and interoperability issues.
    i. how acceptable levels of Quality of Service can be maintained
    j. how to ensure universal access through NGN and broadband access
    k. how NGN services could enhance services to users with special needs

2. We recommend that regulators initiate consultations and promote awareness of NGNs through various regulatory processes and initiatives, including close collaboration with industry and that self-regulatory and co-regulatory measures are considered within such procedures.
3. We recommend that the dialogue between regulators and stakeholders include the full range of NGN issues such as ex ante access obligations to NGNs, IP-interconnection, competition issues, consumer issues including privacy issues, Emergency Telecommunications Services, Accessibility to users with disabilities, quality of service issues, monitoring and lawful interception (LI) compliance issues, authorization issues, numbering, and the universal services implications of IP-based services, particularly voice.
4. In view of protecting the consumer, we encourage regulators to consider applying symmetric regulation to all operators and providers of telephony services, notably in areas such as interoperability, interconnection, quality of service, numbering, portability, security and integrity of the network, information and consumer protection.
5. Competition: In order to create enabling regulation for the transition towards an NGN environment, regulators are also encouraged to analyze issues based on specific market conditions, in particular how best to foster a competitive environment, and what obstacles need to be addressed to sustain competition between incumbent operators and alternative/competitive providers.
6. Authorization:
    a. We encourage regulators to adopt licensing frameworks which are flexible and technology neutral, recognizing that these attributes are vital for the transition towards an NGN world, characterized by the decoupling of service/application provision from the underlying infrastructure.
    b. We encourage regulators to simplify procedural requirements to obtain a license by introducing registrations, notifications, and in certain instances, deregulation and to secure rights of way in order to facilitate the roll-out of NGN access networks. This will ultimately allow market players to make use of NGN to access global markets and consumers to benefit from such global competition in the provision of services.
7. Access:
    a. We believe that regulators may consider promoting competition by ensuring access as to assets that are enduring economic bottlenecks.
    b. We encourage regulators to carefully analyze whether to promote unbundling of core and access networks or infrastructure sharing among operators.
    c. We encourage regulators and policy makers to consider promoting the diversification of access networks as a policy option and to consider adopting a strategy to promote infrastructure deployment and increase broadband penetration and competition.
    d. Regulators may, however, also wish to take into consideration the existence of different cost-effective network topologies for both the urban and rural applications.
8. Interconnection and Interoperability:
    a. Recognizing that interconnection is the key to the success of the transition to a new environment, we urge regulators to promote, and as appropriate to design, flexible and accurate interconnection models so as to allow smooth transitioning to NGNs.
    b. We encourage regulators to analyze the full range of issues relating to the transition to NGN networks, including, for example: the definition of economic or relevant markets, changing interconnection charging models, end-to-end quality

as relating to interconnection in an IP environment and data or service interconnection as opposed to voice interconnection.

c. We encourage regulators to embrace regulatory initiatives that give rise to new business areas such as interconnection "carrier hotels" in which the "hotelier" offers a venue where telecommunications and network services providers and their customers can place their routers, network and storage equipment in proximity to one another.

d. We recognize that in an IP environment the any to any connection of all services is no longer a clear issue and that interoperability of services depends on a large number of technical parameters to be agreed upon between parties, as well as on peering policies and on possible special admission requirements. We encourage regulators to follow and analyze developments and as appropriate, to define regulatory policies concerning mandatory services.

9. Numbering and next-generation identification systems:

a. We encourage regulators to foresee flexibility in their numbering plans and to consider modifications to numbering policies and regulations to accommodate convergence and the migration towards IP-based NGN services, and to address issues such as whether numbering resources should be assigned for VoIP and whether traditional telephone service operator obligations should be imposed on VoIP providers.

b. We believe that given that the ENUM protocol, databases and services are a key element in routing communications in IP interconnection, regulators should closely follow and contribute to developments of different ENUM concepts and encourage the national and regional implementation of these.

10. Universal access:

a. Experience around the globe has shown that increased competition leads to lower prices and greater service penetration. Technological progress and the right choice of technology can transform a rural customer in a remote area into a profitable customer.

b. Where specific measures for the promotion of universal access still exist, regulators are encouraged to take into account the separation of network and service provision in an NGN environment and to design competitively neutral universal service policies that strictly define and are applicable only to the areas where the market is not seen to be able to ensure affordability of services, thus emphasizing the implementation of demand side promotion measures as opposed to the supply side subsidization.

11. Quality of service:

a. We believe that defining appropriate and transparent quality of service requirements can assist carriers in developing economies to provide quality services at affordable costs.

b. We recommend that regulators carefully analyze the full range of NGN quality of service issues, for example, traffic prioritization and shaping.

c. We recommend that regulators consider whether to define appropriate parameters and methodologies for QOS measurements, which are applicable to networks supporting both IPv4 and IPv6.

d. We believe that, when defining appropriate quality of service standards, it is also important to maintain an environment where consumers have the ability to choose services according to their specific needs.

12. Consumer awareness, security and protection:

a. We believe that regulators should focus on raising awareness of the benefits of NGN for the market and consumers, and at the same time carefully consider issues relating to security and consumer protection (for example personal and

data protection, protection of minors, the protection of end-users from the invasion of privacy, as well as e-commerce, law enforcement related issues and access to emergency telecommunications services.)

b. We believe that the security of communications will become increasingly important in a new IP based communication environment, and therefore encourage regulators to follow developments of security issues, and implement appropriate measures such as, for example consider requiring reports from relevant service providers on security incidents and failures.

c. We recommend that regulators should also define ways to inform consumers on security and privacy risks in IP/NGN environment and look for ways to increase consumer awareness on protection methods, including, for example, media campaigns and telecommunications fora and seminars.

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This document draws from the contributions of Argentina, Botswana, Bulgaria, Cameroon, Canada, Costa Rica, Côte D'Ivoire, Finland, France, Indonesia, Japan, Jordan, Kenya, Lithuania, Morocco, Nepal, Pakistan, Peru, Poland, Romania, Singapore, Tanzania, Thailand, Tunisia, the United Arab Emirates, the United Kingdom, and the United States. The Organization of Utility Regulators (OOCUR) and the World Bank also commented.

Annex B:

FOURTH ANNUAL MEETING OF REGIONAL REGULATORS' ASSOCIATIONS

DUBAI, UNITED ARAB EMIRATES, 4 FEBRUARY 2007

Dubai World Trade Centre

Chairman's Report

Introduction

The fourth annual meeting of Regional Regulatory Associations was held in Dubai, United Arab Emirates on 4 February 2007, under the theme Empowering Regulators: role of the global network of regional regulators' associations. More than seven regional Regulators Associations from around the world participated. Regional organisations and national administrations were also present. Mr. Mohamed Al Ghanim; the Director General of the Telecommunications Regulatory Authority in the United Arab Emirates and Chairman of the Arab Regulators Network chaired the meeting.

Opening Remarks

Brief opening statements were made by Mr. S. Al Basheer Al Morshid, Director of the Telecommunications Development Bureau of the International Telecommunication Union and Mr. M. Al Ghanim, Director General of the Telecommunications Regulatory Authority, United Arab Emirates, and Chairman of the Arab Regulators Network following his appointment as Chairman of the meeting.

Presentations and discussion

During the meeting, regional regulatory associations made presentations to identify their achievements in the past year, their challenges and future plans especially within the framework of the ITU regional initiatives. Presentations were made by: the Arab Telecom Regulators Network, the West Africa Telecommunications Regulators Association (WATRA), the ASEAN Telecommunication Regulators Council (ATRC), South Asian Telecommunications Regulators' Council (SATRC), the Communication Regulators Association of Southern Africa (CRASA), the Francophone Network for Telecommunications Regulation (FRATEL) and Foro Latinoamericano de Entes Reguladores de Telecomunicaciones (Regulatel).

Participants noted the following highlights: the Arab Regulators Network is working on harmonized standards and regulatory frameworks; ATRC announced the adoption of the Best practice guidelines on public consultations; WATRA announced that the best practice guidelines developed to create a harmonized common ICT market in West Africa were turned into decisions and adopted by ECOWAS Heads of States and Governments on 19 January 2007; SATRC has conducting a survey on wireless broadband spectrum and is currently doing one on 3G; CRASA announced it's 10th

anniversary and identified capacity building within regulatory institutions as the main challenge in implementing a conducive regulatory environment; Regulatel has carried out a study on Universal Access; and FRATEL announced they will be holding a workshop on NGN regulation during the 1st semester of 2007 in Cameroon and that their annual meeting will take place in Switzerland, in November 2007, and will focus on consumer protection and quality of service.

The Heads of the African and Asia-Pacific ITU Regional Offices presented the regional regulatory initiatives to be under taken in their respective regions highlighting the areas of collaboration and future cooperation with the associations.

During the second session, Presentations were made on the ITU World Bank ICT Regulatory Decision Clearinghouse Project[1], and by the World Bank's on the outline of the report on Regulatory Issues on Convergence. The purpose of both presentations was to seek feedback for Regulators. Participants shown great interest and some associations committed to provide feedback on the ICT Regulatory Decision Clearinghouse.

The ITU also encouraged the regional associations to continue the dialogue on G-Rex where a dedicated discussion forum is available (http://www.itu.int/ITU-D/grex/index.html) and identify the theme for next year's meeting.

[1] ICTDec is an online pilot resource that provides a one-stop access point to decisions originating from ICT decision making bodies such as telecommunications regulators, industry ombudsmen and specialized dispute resolution tribunals. It also includes a meta crawler allowing to search for decisions on specific topics. For more information see: http://www.ictdec.org