12TH GLOBAL SYMPOSIUM FOR REGULATORS (GSR)

COLOMBO, SRI LANKA, 2 – 4 OCTOBER 2012

CHAIRMAN'S REPORT

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Table of Contents

EXECUTIVE SUMMARY

The 12th Global Symposium for Regulators (GSR-12), organized by the Telecommunication Development Bureau (BDT) of the International Telecommunication Union (ITU), in collaboration with the Telecommunication Regulatory Commission of Sri Lanka (TRCSL), was held in Colombo, Sri Lanka, from 2 to 4 October 2012.

His Excellency Mr Mahinda Rajapaksa, President of the Democratic Socialist Republic of Sri Lanka, presided over the opening ceremony, accompanied by Dr Hamadoun Touré, Secretary-General of ITU and Mr Lalith Weeratunga, Chairman, Telecommunication Regulatory Commission of Sri Lanka (TRCSL).

The Opening Debate was moderated by Mr Brahima Sanou, Director of BDT. The panel members included Dr Hamadoun Touré, Secretary-General of ITU, Mr Lalith Weeratunga, Chairman, Telecommunication Regulatory Commission of Sri Lanka (TRCSL), Mr Eugene Kaspersky, Chief Executive Officer, Kaspersky Lab, Ms Magdalena Gaj, President, Office of Electronic Communications (UKE), Poland, Dr Robert Pepper, Vice-President, Global Technology Policy, CISCO, and Ms Zohra Derdouri, President, Autorité de Régulation de la Poste et des Télécommunications (ARPT), Algeria.

GSR-12 was chaired by Mr Lalith Weeratunga, Chairman, Telecommunication Regulatory Commission of Sri Lanka. The first two days associated the private sector in the Global Regulator Industry Dialogue (GRID), while the third day was reserved to regulators. This year's event attracted 446 participants, bringing together regulators, policy-makers, industry representatives and service providers from 77 countries and ten regional and international organizations.

The theme of GSR-12 was *Why regulate in a networked society?* The symposium examined several aspects that regulators must face in a new world, which is or tends to be completely networked and converged, where ICTs are the cross-cutting facilitators of many other sectors of the society such as health, finance, education, trade, agriculture, tourism, etc. and where there is growing need for the necessary bandwidth and investments to deploy it.

Panellists and participants examined smart opportunities to face traditional issues like spectrum policy, net neutrality, market definition, broadband implementation, public private partnerships (PPP), roaming, as well as hot topics like cloud computing and its safety and security problems. The last session, the regulatory consulting room, gave all regulators the opportunity to have a frank exchange of views on all topics of interest to them.

This year's symposium consisted of ten plenary sessions and a session on the way forward. An online networking platform facilitated delegates' interaction throughout the meeting, as well as enabling them to make room reservations online.

As in all previous GSRs, the national regulatory authorities (NRAs) present reached a consensus on an output document: *GSR12 Best-practice guidelines on regulatory approaches to foster access to digital opportunities through cloud services.* The final text of the best-practice guidelines is attached to this report (Annex A).[1]

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[1]   A series of GSR discussion papers were issued. These discussion papers, the GSR12 Best Practice Guidelines and the presentations referred to in this report are available on the symposium website at: www.itu.int/ITU-D/treg/Events/Seminars/GSR/GSR12/documents.html

The meeting started with the arrival of His Excellency **Mr Mahinda Rajapaksa**, President of the Democratic Socialist Republic of Sri Lanka.

Mr Lalith Weeratunga, Chairman, Telecommunication Regulatory Commission of Sri Lanka (TRCSL) welcomed the President of Sri Lanka, the Ministers of the Government of Sri Lanka, ITU Secretary General Dr Hamadoun Touré, the ITU Deputy Secretary General Mr Houlin Zhao, the BDT Director Mr Brahima Sanou, the ITU staff and participants.

Dr Hamadoun I. Touré, Secretary-General, International Telecommunication Union (ITU) warmly thanked the President of Sri Lanka noting that the GSR has over the years brought together all major stakeholders of the ICT and, in addition to the Regulatory Associations meeting, he drew attention to the innovative GRID meeting, and the meeting of the Chief Regulatory Officers (CROs) of ITU-D Sector Members.
He noted that this year's GSR discussions will cover some of the themes of the World Conference on International Telecommunications (WCIT-12), including climate change, efficiency of network services and applications, promotion of an international environment that drives innovation, reduction of the cost of international mobile roaming, prevention of fraud and misuse of telephone numbering systems, and consumer empowerment. The ultimate goal of the UN and the ITU is to put information and ICTs in the hands of the people of the world, including persons with disabilities, at affordable prices, and to move from the mobile revolution to the broadband revolution.
He congratulated Sri Lanka for the sound regulatory environment put in place that allows for competition, growth and innovation in the sector. He thanked the TRCSL for their hospitality and the facilities offered and wished everyone present a very successful symposium.

His Excellency Mr Mahinda Rajapaksa, President of the Democratic Socialist Republic of Sri Lanka thanked Dr Touré. New technologies, he said, can be very useful and enlightening for children but underlined the importance of the attention parents should pay to the possible dangers. He also noted that ICTs have played an important role in the recent peace process and today, Sri Lanka is a promising environment for investors in various sectors, such as agriculture, ICTs, tourism, and that the country furthermore aims to have a national broadband policy and plan that will help in the development of many other sectors of the society, such as education, health, media, agriculture. The President thanked ITU for giving Sri Lanka the privilege and opportunity to host the GSR and wished for successful deliberations.

OPENING DEBATE: MAKE THE WORLD ONE: REGULATION IN THE GLOBAL VILLAGE

The opening debate took the form of an interactive panel and was moderated by **Mr Brahima Sanou**, Director, Telecommunication Development Bureau (BDT), International Telecommunication Union (ITU), who thanked the President of Sri Lanka and the GSR Chairman, welcomed the participants, and introduced the six panellists: **Dr Hamadoun Touré, Mr Lalith Weeratunga, Mr Eugene Kaspersky** Chief Executive Officer, Kaspersky Lab, **Ms Magdalena Gaj**, President, Office of Electronic Communications (UKE), Poland, **Ms Zohra Derdouri**, President, *Autorité de Régulation de la Poste et des Télécommunications (ARPT)*, Algeria and **Dr Robert Pepper**, Vice-President, Global Technology Policy, Cisco Systems.

The moderator outlined the importance of ICTs and how they can be a factor of national cohesion, can empower rural people and provide a better future for young generations. The ICT sector is still experiencing many growing pains. For example with over 6 billion mobile subscriptions, representing a global penetration rate of 86 per cent, with 78 per cent penetration in developing countries, there is much pressure from spectrum demand and its management.

ITU's management view is that a one size fits all solution is not possible even if the 159 regulators around the world need to have a set of common key principles. The situation is like to a football match where the referee needs to watch over and respect the rules, but does not need to overly intervene given that the rules of the game are clear. Freedom, security and privacy need to be considered together.

The ICT industry is becoming very complicated in the converged era. The public switched telephone network which was associated with voice telephony needs now to accommodate telephony, television and Internet. ISPs also need to accommodate telephony and TV. Cable TV networks are not the focus of quality of service regulations, but if they start to offer IP-based services they might have to observe such regulations, and with convergence, regulations need to be changed to achieve the objective of effective competition, quality of service, and protection of consumers.

On the security point of view, the cyber world is extremely vulnerable: everyday life is controlled by hundreds of computers and this makes us vulnerable, where a malfunction of the computer infrastructure could cause major damage. The combination of technical solutions and international regulation is essential to prevent exploitation of vulnerabilities in cyberspace, yet, the importance of the freedom of the Internet should not be neglected and therefore there is a need to find the right balance between freedom and regulation.

On how to stimulate operator investment, in Poland, there is still practically an incumbent monopoly, so the role of the regulator is very difficult. The regulator and the operators must collaborate, but in addition the market should ensure a reasonable return to the investment of the operators. The regulatory model should be predictable and transparent, and consultation with the market is very important. Co-regulation is also crucial. An agreement between regulator and incumbent is needed to avoid discrimination in the market.

New networks and services and the Internet have completely changed the ICT environment, and that this has both a positive and negative impact. International cooperation has progressed well thanks to new services such as e-health, e-governance, e-commerce. The introduction of e-services has lowered costs, increased economic growth, and the creation of jobs. However, the development of cybercrime has flourished at the national and international level. The massive diffusion of spam causes a huge waste of resources for the world economy and responses are difficult to find.

The private sector expects an explosion in the traffic of data, with billions of devices and people connected, but is unsure of how all people in the world will be connected. 70 per cent of content will be advanced cloud based services. Considering that for every 10 per cent increase in broadband adoption in an emerging country, there is a 3 per cent increase in GDP, how can we connect the missing 4 to 5 billion people to broadband?

In the discussion that followed, it was noted that although today the cyber world can be dangerous, in five or ten years more secure platforms will be used, and although regulation is needed, too much of it will have a negative impact on innovation. International organizations were called on to communicate with the private sector and Interpol to prevent cybercrime. This applies to all environments, but in particular to the highly technological sectors. The protection of data and confidentiality in the era of convergence is essential and has become a national, international, and global concern. The protection against the negative effects of globalization was also mentioned, together with the need to include all stakeholders in the global village.

It was suggested that governments, as investment in ICT infrastructure comes mainly from the private sector, should not just limit their role to regulation and law making.

The importance of policy and regulatory stability to encourage the private sector was noted (as expressed by the Chief Regulatory Officers of the private sector meeting on 1 October) and the need for a close partnership between the government and the private sector was also discussed. It was also suggested that regulators and operators still think in terms of PSTN concepts such as voice, length and distance and establish tariffs based on this. The panel highlighted the need for further international cooperation on cyberspace issues, including freedom, security and respect, as the need for technological neutrality in producing effective regulation.

Session I was moderated by **Mr Anusha Palpita**, Director General of the Telecommunications Regulatory Commission of Sri Lanka (TRCSL).

Panelists for this Sessions were: **Mr Jacques Stern**, Board Member, *Autorité de Régulation des Communications Electroniques et des Postes (ARCEP)*, France; **Mr Rajan S. Mathews**, Director-General, Cellular Operators Association of India and **Mr Pablo Pfost**, Director of corporate strategies and regulatory services,

Mr Malcom Webb, Partner, Webb Henderson, author of the GSR discussion paper on *Net neutrality: a regulatory perspective*, addressed the issue of net neutrality and traffic management and expressed the difficulty of adequate regulatory response. Regulators should ensure competition among IP service providers, traffic practices should be made transparent, and ISPs should be transparent about their traffic management techniques.

On the regulator's point of view, while some want a completely free Internet, others see a friction due to the growing traffic on the networks; consumers want free access to information, and service providers want a return on investment. Some regulators did not impose regulations on net neutrality but established a set of principles of freedom, quality, and non-discrimination, where traffic management must be pertinent, transparent, equitable and non-discriminatory.

Some other regulators have already or are in the process of establishing a law on net neutrality. Such law normally covers principles such as user rights, quality of service, possible blocking of content within networks. The principles of free access and non-discrimination among operators are also covered. This doesn't mean that all users will have the same right of access to the networks: operators may offer packages depending on the needs of the users, but if the operators change their offer conditions they have to notify the users who have the right to repudiate their contract without charges.

On the operator's side, especially in developing countries, the challenge concerns the need for private and foreign capital investment to satisfy the high demand for new infrastructure, in addition to the cost of spectrum. This causes a disproportionate burden on the cost of the network access. There is a need to focus on local content providers, and to reduce the cost of handsets. Regulators should look at the enforcement of standards in terms of quality of service; the government approach should be narrowed and a mutual approach between access networks and content providers should be taken.

In developed countries, telecommunication operators are the only industry category suffering from too much demand. Freedom in the market permits low income consumers to access the network, and no discrimination among operators and content providers facilitates this access.

The principle governing net neutrality needs to be the same for fixed and mobile networks, even if the tools used for the management of these networks are completely different. There is need for flexibility, as net neutrality does not have to be a barrier to new business models, which may create new collaborative tools and win-win solutions.

SESSION II: SETTING SPECTRUM POLICIES IN A DIGITAL MOBILE WORLD

The Session was moderated by **Mr François Rancy**, Director of the ITU Radiocommunication Bureau

Panellists were: **Mr Philipp Metzger**, Deputy Director-General, *Office fédéral de la communication* (OFCOM), Switzerland; **Ms Mignon Clyburn**, Commissioner, Federal Communications Commission (FCC), United States; **Ms Chris Perera**, Senior Director, Spectrum Policy & Regulatory Affairs, Asia Pacific, GSMA; **Mr Norifumi Yamaguchi**, Director of International Frequency Policy Office, Ministry of Internal Affairs and Communications, Japan and **Mr Guy Christiansen**, Senior Director Regulatory Affairs & Market Access, Inmarsat SA.

Mr Robert Horton, author of the GSR discussion paper on *Spectrum Policy in a hyperconnected digital mobile world,* described how the forces of convergence, digitization, globalization, use of the Internet, and the increasing demand for broadband and mobility called

for a rethinking of spectrum policy. Traditional business models and concepts of regulation were also being challenged by the rapid growth in mobile data, emerging machine-to-machine communications, and over-the-top services. These changes have huge implications particularly for developing countries. Spectrum policy therefore needs to be reviewed. If nothing is done to meet the growing demand for spectrum, many mobile carriers will be out of business. He noted that some of the high-level principles produced by GSR at its meeting in Tunisia in 2005 are still valid today. What is needed now is to develop new implementation approaches that flow from these durable high-level principles. Regulators are increasingly evaluating alternative uses of spectrum, including re-use and refarming. In this third-generation regulation, network and spectrum sharing is crucial, as is technological neutrality.

The Swiss Regulator noted that all the recommendations contained in the discussion paper have already been applied in Switzerland. The auction process has produced tangible results in terms of supporting the information society. There are three mobile operators, with a portfolio of frequencies until 2028, providing a healthy basis for top-quality mobile services for end users and a competitive marketplace. OFCOM's "big bang" auction process for awarding mobile licences has been professional, transparent and non-discriminatory. Such processes has been complex, and required extensive consultations to ensure reliable and transparent results. Talking about spectrum policies brings two words to mind – recognition and acceptance. The engagement with mobile broadband has been transformative, and just reallocating spectrum is not enough to address the associated increase in spectrum usage. Finding more spectrum is not enough either. There is a need to use spectrum more efficiently. Vacant spectrum between television channels should be made available, and mechanisms need to be put in place to offer more opportunities for spectrum sharing. Regulators must be open to all these mechanisms and need to find other innovative approaches to enable technology to play its core role in all nations.

The mobile operators point of view is that WRC-12 took very good decisions in response to the pressing demand arising from the growth in mobile data traffic. The outcomes of WRC-12 discussions under conference agenda item 1.1, looking at future bands that could be identified for mobile, and agenda item 1.2, concerning the second digital dividend allocation band after 2015 for Region 1 (Africa and Europe), are positive for the mobile industry. Reaching agreement on the future harmonization of more spectrum for the mobile services was a great success story.

The regulator from Japan introduced an auction system for spectrum but has not yet started the auctions for the 700 MHz. A task force established in 2001 estimated that mobile services would need an extra 600 MHz in 2010 and an extra 1600 MHz in 2016. The question remains of how to obtain this spectrum. Operators could be forced to evacuate some spectrum in the coming decade, and government would set aside funds to compensate them for the transition, if necessary.

From a satellite operator point of view, although the satellite industry has been caught in the financial crisis, satellites are crucial to any national broadband policy and plan. While satellite networks cannot replace terrestrial networks, they can complement them, particularly in rural and sparsely populated areas. Also, only satellite networks can serve moving devices such as ships or aircraft and are essential in case of disaster or emergency.

The panellists further discussed the need to take decisions rapidly and the need to follow international trends in spectrum management. It was suggested that unused but already harmonized bands should be assigned rapidly. The legacy problem with neighbouring countries was also raised, as was the need of consultation with stakeholders. Spectrum trading was seen as a possible option for any country, and such an approach could be taken at any time. Speakers advocated a combination of market-based solutions, including a mixture of competition and innovation. They stressed that spectrum trading should be technology neutral, and care should be taken to avoid problems of interference.

SESSION III: INTERNATIONAL MOBILE ROAMING IN A BROADBAND ECONOMY

The Session was moderated by **Dr Amr Badawi**, Executive President, National Telecom Regulatory Authority (NTRA), Egypt. He noted that termination rates for voice and data have

always constituted a problem, underlined the importance of roaming for consumers and asked to what extent there is a need to regulate, and when is it better to allow the market act on its own?

Panellists for this Session were: **Mr Jaume Salvat**, Chief Executive Officer, *Servei de Telecomunicacions d'Andorra (STA);* **Mr Gustavo Peña**, Secretary-General, Regulatel; **Dr Cris Seecheran**, Chief Executive Officer, Telecommunications Authority of Trinidad and Tobago (TATT) and **Mr Saddig Al Tayeb**, Assistant Deputy Governor for Competition Affairs, Communication and Information Technology Commission (CITC), Saudi Arabia.

Mr Dimitri Ypsilanti, Senior ICT expert and author of the GSR discussion paper on *International roaming services: a review of best practice policies* stated that roaming is not a new issue. The main problem is that while within countries mobile services are competitive, roaming is not really submitted to competition. In the international mobile market, regulators have very little power. Distance is not an important cost factor, but origination and termination are. What actions can regulators take? Operators could unlock mobile phones to allow the consumers to buy foreign SIM cards. Network neutrality and VoIP are other solutions. Structural measures should be taken at national, regional and international levels, and the quickest way forward could be through the use of bilateral agreements, even if international agreements are more comprehensive.

Regulators noted that charges for international roaming should be calculated based on the use of applications rather than volume, and that the policy of each country impacts the costs of services which vary depending on the location. A solution in roaming matters should be found very quickly, otherwise technology will find a solution that will go beyond regulators' institutional role and revenues may diminish.
It was noted that in the WCIT-12 preparatory process there are several proposals concerning roaming. Several regional telecommunication Organizations have identified roaming as a priority item to be treated in order to reduce costs to users: the first measures should be related to users' information's on tariffs.
Collaboration on roaming within specific regions like the Gulf area has already started, and citizen can know in advance how much they will pay for roaming services. This experiment has so far reduced costs to consumers by 33 per cent and negotiations are starting on data tariffs, considering the new smartphone generation.

The discussion outlined that in some regions of the world the majority (almost 95%) of mobile phones have prepaid cards with no roaming facilities or needs. Some countries allow roaming for voice and data for prepaid cards because it is in the interest of the operators. A solution should be found to contain high costs associated with roaming, otherwise people will move to other services. Harmonization of prices and tariffs is a different issue. The need for transparency on roaming tariffs was generally recognized.

SESSION IV: BLURRING BOUNDARIES: GLOBAL AND REGIONAL IP INTERCONNECTION

The session was moderated by **Dr Eugene Juwah**, Executive Vice Chairman and CEO, Nigeria Communications Commission (NCC), who noted that even if IP interconnection remains largely unregulated; its importance is increasing due to the effect of convergence. Traditional services like voice and mobile have been regulated and these regulations are expected to move to converged platforms.

Panellists for this Sessions were: **Dr Suthipon Thaveechaiyagarn**, Commissioner, National Broadcasting and Telecommunications Commission (NBTC), Thailand; **Mr Khaled Naguib Sedrak**, SVP, Gulf Bridge International Group (GBI), a new submarine cable operator; **Mr Harinderpal Singh Grewal,** Director, Next Generation National Broadband InfoComm Development Authority of Singapore (IDA) and **Mr Eric Loeb**, Vice President, International External Affairs, AT&T.

Mr Dennis Weller, Senior Advisor, Navigant Economics and author of the *GSR discussion paper on Global and regional IP interconnection* said that the development of the Internet has been the major factor of economic development, but the benefits have not been uniform across the regions. Increases of Internet exchange points (IXPs) have provided local low cost

hubs where traffic can be exchanged avoiding the need to send traffic to a distant exchange point and are a focal point for investment in Internet assets like DNS servers or web sites. Content delivery networks (CDNs) have improved quality granting direct transport of content to terminating networks and bringing content close to the recipient. There are new methods of delivering content, and often peering agreements are preferred to charging practices. The voluntary nature of the agreements in this market is essential for the success of the development of Internet. In developing countries, however, a set of best practices to promote a virtuous circle of development should include liberalization, low barriers to access international gateways, low license fees, public investment where appropriate, support for the development of IXPs, constraints on anticompetitive behaviour by the incumbent, openness to foreign direct investment, and promotion of demand for broadband services.

The new Thailand Regulator tried to liberalize the telecommunication sector establishing a single independent multi-sector commission for both telecommunication and broadcasting, with five commissioners for broadcasting, five for telecommunication, plus a Chairman.
In the Gulf area all stakeholders are working together and negotiations involve regulators, government related agencies, operators, new market entrants, submarine cable companies, IXPs, and new operators. The CROs meeting called by ITU on 1 October was very important because it gave the operators an opportunity to voice their thoughts to regulators. For regulators it is important to adopt global policies instead of purely local solutions.
It was noted that the mentioned trust in the peering agreements between already established operators does not always work for new entrants. In Singapore for example there is an operator with significant market power, which is obliged to offer transit business as an operator of last resort. It therefore has no interest in offering peering to new operators that can suffer from tromboning effects. To remedy this situation the regulator has set up a multi-operator Internet peering point, even if operators still negotiate peering among themselves. IP interconnection has been encouraged but has not happened.
For the operators, the concept of interconnection has been evolving, including the related traffic flows, for over 20 years, while originally all traffic was tromboned to the United States. Over time traffic has taken other ways in Europe and the Asia Pacific region, but the tromboning phenomenon in Africa and Latin America still exists. Traffic requirements should be localized lowering the costs, improving the performance, and making it more attractive for local content.

The discussion highlighted the issues of number portability for IP, and high termination rates that do not know if a number is coming from a normal network or is IP-based, as the lack of standards. Even if more and more operators are moving to NGN networks, these are closed networks, where regulatory decisions could generate a terminating monopoly and market failures. Regulators may have a mediation function in the creation of an IXP and should intervene *ex post*. Today, IP market is mirroring what happened years ago in the telephony environment: incumbent operators are opposing entry of other operators to the market.

SESSION V: DEMYSTIFYING REGULATION IN THE CLOUD: OPPORTUNITIES AND CHALLENGES FOR CLOUD COMPUTING

The session was moderated by **Ms Marianne Treschow**, Representative of the Commonwealth Telecommunications Organisation (CTO), described mobility, broadband and cloud services as the pillars of the networked society and suggested that the massive growth of data today made cloud technology a requirement, but emphasized that quality control and security are needed for both content and the transport of information.

Panellists for this Sessions were: **Mr Leslie Martinkovics**, Director, International Public Policy and Regulatory Affairs, Verizon Communications Inc.; **Mr Godfrey Mutabazi**, Executive Director, Uganda Communications Commission (UCC), Uganda; **Mr Sanjaya Karunasena**, Chief Technology Officer, Information and Communication Technology Authority (ICTA), Sri Lanka and **Dr Krishna Oolun**, Executive Director, Information and Communication Technologies Authority (ICTA), Mauritius.

Dr Ian Walden, Professor of Information and Communications Law and Head, Institute of Computer and Communications Law, Queen Mary, University of London, author of *the GSR*

discussion paper on Demystifying regulation in the cloud: opportunities and challenges for cloud computing said that cloud computing provides flexible, location-independent access to computing resources on demand. Typically, cloud services are generally allocated from a pool of physical resources shared by customers, but can be dedicated for a single user or shared, and charging is access based in proportion to the resources used. Resources are now being delivered as services, but delivery depends on telecommunication providers, and there is a legal and regulatory uncertainty created by the shift from a resource to a service. Much of the cloud computing market may fall outside telecommunications law, but governments and regulators could facilitate its uptake by removing the perceived barriers. Consumer protection, lock-in, data and application portability, competition law, standards, public procurement rules, open access, enforcement and jurisdiction concerns have to be taken into account in a cloud environment. But the major concern remains the security of the metadata generated by use of cloud services. Equally crucial are questions of privacy, data retention or deletion, quality standards, and PATRIOT Act problems. While the cloud computing market is still too immature to identify best practice, there is a need for an adequate broadband infrastructure, cloud standards, security, transparency, clear contractual terms and appropriate regulatory treatment.

Cloud service providers are of the view that the deployment of broadband is essential to increasing cloud availability. For most of the world, access to the Internet happens through mobile devices, and that affects the cloud. Spectrum and backbone infrastructure are needed for mobile phones and the World Radiocommunication Conference (WRC-12) made significant progress by putting on the agenda of the next conference the harmonization of new bands for mobile services. Data portability and international standards should have time to mature before regulations are imposed on clouds, and industry should have an opportunity to find its own way.

In Africa, mobile penetration has progressed rapidly because of the ease of deployment, but there are still service quality concerns that affect the introduction of cloud computing. Furthermore, not many people with average incomes can afford smartphones, so that service is not widely accessible. Cloud regulation has not yet been considered in most African countries, but security and trust are evidently priorities.

In some developing countries some organizations have good IT infrastructure, while others do not even have computers. A real advantage of cloud computing technology is that it offers everybody the same infrastructure, with reliable and secure services at affordable prices. From a security point of view, the data stored on the cloud are no less secure than data stored in the IT department of a company. The cloud service provider does not have access to the data, but knows only that some binary data have been transmitted. There is no one-size-fits-all solution for cloud services, nor is there a single model that always applies. Along with the approaches of regulations that are prescriptive, descriptive and facilitating, it is necessary to add a fourth regulatory approach, where regulators, at the national level, must become partners and regulation should be global.

The discussion highlighted the importance of striking a balance between regulation and innovation, with flexibility being the keyword. The regulator should have all the tools available and should in general carry out a monitoring function, intervening only if necessary. On the question of jurisdiction, in cases of dispute, European law, for example, protects consumers, so the law of the country of the consumer prevails over the law of the country of the service provider. In general, however, if a service provider takes steps to bring a service into a jurisdiction, then disputes are submitted to that jurisdiction. It is preferable to determine the applicable jurisdiction in advance, but that is not often done. The difference between public and private cloud also needs to be taken into consideration, as private cloud comprises data transferred from existing data centres that are already subject to specific rules governing the use of the technology. The question was raised as to what extent existing legislation about health or financial information needs to be changed in the cloud context.

The need for a balance between regulation and innovation was reiterated.

SESSION VI: DARK CLOUDS: SAFETY AND SECURITY ON THE NET

The moderator for the Session, **Dr Imad Hoballah**, Acting Chairman and CEO, Telecommunications Regulatory Authority (TRA), Lebanon, noted the emergence of cloud computing as a paradigm for economic development and how it constitutes an opportunity especially for developing countries which can use cloud computing services to accelerate development through the provision of e-health, e-commerce, e-education, and e-government services. The introduction of less expensive devices can further encourage trade. Cloud computing does however raise several security and Internet governance questions. Is self-regulation sufficient to promote innovation or is government regulation needed? Opinions on this vary, even if flexibility is one of the main keys to allowing for rapid change.

Panellists for this Session were: **Mr Max Thomas**, Chief Executive Officer, The Cyber Guardian Pty Ltd., **Mr Thierno Alassane Sall**, Director General, *Autorité de Régulation des Télécommunications et des Postes* (ARTP), Senegal and **Dr Kalamullah Ramli**, Adviser of the Minister of ICT Indonesia for Technology, Indonesia

Ms Stephanie Liston, Senior Counsel, Charles Russell and author of the GSR discussion paper on *The Cloud: data protection and privacy: whose cloud is it anyway?,* outlined that the challenge is to protect the legitimate right to privacy without losing the opportunities that cloud services and technology provide. The information explosion, Internet and the cloud require a re-evaluation of existing regulations and legislation. However, to protect privacy and enhance security, the best practical solutions have the disadvantage of raising costs. A consensus is building for a global approach to cloud and other Internet services and there is need for a balance to be reached between protection of personal data and national security issues.

It was suggested that for developing countries, cloud computing could be at the centre of the ICT development opportunity, and effective privacy regulation should be part of the development agenda. A set of possible recommendations to this extent could include: an accountability approach as preferable to the "data controller/data processor" approach; the geography-based approach limiting transfers to listed countries as it is the case in the EU should be revised. Private enhancing technologies, self-regulatory certifications and bilateral or multilateral arrangements have an important role to play. The determination of which law is applicable is also very important. Regulators and policy makers should educate consumers about the opportunities and the dangers presented by the cloud services. Laws should be up to date with technologies and responsibilities clearly allocated. Laws impossible to monitor or enforce should be changed. Finally, the need for an international approach to security in the cloud is a must because the cloud is a global, digital eco-system.

As technology evolves, filtering the information is not enough to protect children online. Technology needs to be easily accessible by parents, needs to work through all devices and environments and has to be multicultural and adapt to all languages and religions. All people going on Internet for the first time, from children to people with disabilities, are vulnerable and this needs to be considered.

Regulators consider that Internet is a big opportunity for developing countries but also a threat to their security. When a threat is generated within a state, it is an internal affair of such state, but when it is generated outside the national territory international cooperation is essential. In the aviation sector, for example, strict regulation is essential for the good functioning and development of the sector. There should be a minimum regulatory framework in every country, and ITU could facilitate the establishment of this framework.

In some countries cloud computing is dealt with like the transportation sector: the service provider is responsible for the safety and protection of the consumer data. Datacentres are needed in urban areas, but technical support is needed also in rural and remote areas.

The discussion highlighted that the question of privacy regulation is currently considered at the national level but in ten years there will be a need of a significant global response. An ITU-T task force exists to consider technical aspects of cloud but a regulatory task force could also be created. A coordinated international approach is needed, limitations to data transfers should be avoided, and security standards for cloud computing are required. It was mentioned that security is not incompatible with costs or development, and while existing rules should be

applied to transactions on the cloud it is difficult to identify or validate who the other party is. Questions were raised concerning the guarantees that service providers can give on the physical location of data, their availability and the security they provide. Both public and private cloud service providers rely on users' trust and therefore have a vested interest in ensuring that services are secure and reliable. The need for a balance between the free flow of information and privacy, and the need for international cooperation and a regulatory transformation were pinpointed.

SESSION VII: PUBLIC-PRIVATE-PARTNERSHIP (PPP): INNOVATION STRATEGIES FOR BRINGING BROADBAND CLOSE

The session was opened and moderated by **Mr Ananda Raj Khanal**, Director (Acting Chief of Office), Nepal Telecommunications Authority (NTA), Nepal and Chairman of RA.

Panellists for this Session were: **Ms Gabrielle Gauthey**, Executive Vice-President Global Government & Public Affairs, Alcatel-Lucent; **Mr Ralph Corey**, Global Director, World Ahead Program, Intel Corporation and **Mr Mohamed Sharil Tarmizi**, Chairman, Malaysian Communications and Multimedia Commission (MCMC).

Dr Matt Yardley, Partner, Analysis Mason and author of the *ITU Broadband Report on Developing successful Public-Private Partnerships to foster investment in universal broadband networks* reported on his findings. He identified a series of best practices, including the need to: conduct a public consultation; consider multiple investment models and funding approaches; ensure technology neutrality; conduct pilot projects; provide funding in line with milestones and targets; mandate open access and monitor compliance; and consider setting up parallel initiatives to stimulate demand. Although there is no single best model for broadband deployment, it is clear that private-sector investment alone cannot deliver universal broadband. Policy-makers and government must intervene.

Mr Axel Leblois, Executive Director, G3ict, Global Initiative for Inclusive ICTs, explained that non-adopters of broadband make up about one-third of the world population, one-third of the non-adopters of broadband are persons with disabilities, and 80 per cent of people with disabilities are in developing countries. However, a growing number of technologies exist to cater for most kinds of disabilities can be made available at reasonable prices or free of charge, and many regulators, some using universal service funds, around the world have taken steps to reach people with disabilities. There is need for public private-partnerships to promote accessibility, that encompasses infrastructure, content and services, and all partners need to be involved.

The discussion outlined the need for collaboration between the public and private sector to optimize the potential of all parties and to develop applications. Non-adopters and people with disabilities represent untapped potential, and regulators and the ICT industry have a responsibility to reach and serve those people.

The private sector noted that the dramatic growth in data is both a challenge and an opportunity. There are varying approaches to public intervention; however, with ICT becoming crucial to governments for economic and social development it is natural to see tensions between the public and private sectors when the market finds it difficult to meet the needs of less developed areas. Governments can step in to manage scarce resources such as spectrum, and some innovative solutions are apparent in developing countries. Public intervention must operate to stimulate private investment, while minimizing public funding.

A private investor, before deciding to enter into a public-private partnership project, needs to check that there is a national overall ICT plan in place with time limits, measurable goals and an implementation plan, in addition to high-level political will and national coordination. A company should see whether a market extension programme or a programme to fill a service connection gap exists. Also, an open and transparent methodology, involving all stakeholders is essential. Normally multiple services delivered on the same broadband platform will make projects sustainable.

A clear policy and regulatory framework is required to create a successful public-private partnership, as stated by the Asia-Pacific Ministerial Conference on Public Private Partnerships

for Infrastructure Development, and by the Jakarta Declaration.

In some countries, like in Malaysia, the public-private partnership model worked because neither the private sector nor the government could finance broadband deployment on its own. There is no one-size-fits-all model of a public-private partnership. Every country should examine its own situation and decide the path to take. In Malaysia, Broadband is treated like a public utility, such as water or electricity. The country is divided into zones, and in Zone 1 — with big cities and a high-population density — there is no need for public funds, while in Zones 2 and 3 some initiatives are being financed through the universal service fund. At the same time, the Malaysian authorities are pushing ahead on the demand side, distributing 1.5 million notebooks to children from 14 to 17 years old. Those initiatives have produced tangible positive results.

In the ensuing discussion, participants examined the Malaysian experience in greater depth, noting that the model for that country includes deploying carrier neutral networks in rural and suburban areas that are covered by universal service provisions, and calling on service providers for bids. Local communities are involved at every stage of the project. Even though service providers share roaming facilities, problems still remain on the support side. Under the access regime framework, all service providers are requested to allow access to one another, and prices are regulated. Participants considered that the role of regulators in regard to public-private partnership programmes is to promote dialogue and stimulate investment.

On public-private partnership, once again, there is no single model, and the specific circumstances of each country have to be taken into account.

Mr Brahima Sanou, Director of ITU's Telecommunication Development Bureau, closing the first part of GSR, which constituted the Global Regulators Industry Dialogue (GRID), expressed his satisfaction for the two days of intense discussions. The key to this success lays in strengthening the dialogue between all stakeholders. What is needed now is dialogue with other sectors that benefit from ICT, such as education, health, agriculture and trade. There is also a need to coordinate with ministers responsible for planning and finance. He expressed the hope that the two days of open dialogue had been beneficial to both regulators and the private sector. And as GRID is synonymous with network, he hoped that the event had also provided an occasion for people to meet and network. He thanked all the experts for their high-quality presentations that stimulated the discussions and announced that the next Global Symposium for Regulators would be held in Poland from 3 to 5 July 2013.

SESSION VIII: DEFINING MARKETS: A REGULATORY LADDER OF INTERVENTION IN A CONVERGED DIGITAL ENVIRONMENT

The session was moderated by **Ms Kathleen Riviere-Smith**, Chief Executive Officer, Utilities Regulation and Competition Authority (URCA), Bahamas. In her remarks she wondered whether or not regulators can stick to their traditional models or if they have to adapt and move towards deregulation to allow innovation. An important objective for regulators and policy makers is to achieve sustainable competition with a balance of ex-ante and ex-post regulation, but in many countries, regulatory and competition authorities are different, fact which sometimes causes confusion in terms of competences, and which in turn operators use to their advantage.

The Session benefited of the interventions of **Mr Mohamed Bubashait**, General Director, Telecommunications Regulatory Authority (TRA), Bahrain; **Mr Md Abdus Samad**, Commissioner, Bangladesh Telecommunication Regulatory Commission (BTRC), Bangladesh and **Mr Oumar Said Koulibaly**, Deputy Director-General, *Autorité de Régulation des Postes et Télécommunications* (ARPT), Guinea.

Dr Christian Koboldt, Co-Founder, DotEcon and author of the *ITU Broadband Report on competition and regulation in a converged broadband world,* outlined some key points about convergence, its implication for the market definition, for significant market power (SMP) designation and for regulatory policy. The demand for bandwidth is growing strongly as is the demand for spectrum. In a converged environment, the same operator can offer a variety of services, but such bundling complicates the market definition. Finally, there is a range of

different broadband ecosystems. The implication for market definition is the need to concentrate on marginal customers who can switch to different products depending on price; it also means that different products may be available in the same market. Different types of networks can give access to the same service; it is the service that drives the network choice. An artefact of regulatory intervention in a converged environment is that wholesale markets and products may be different from retail markets. The competition effects are complex and their implications for the designation of SMP are evident. The growing demand for bandwidth requires investment, and thus caution should be exercised when imposing wholesale or other kind of obligations that could influence investments. Vertical and bundling arrangements can influence the SMP designation: the source of market power may be outside the market, while bundling agreements can broaden efficiency but discourage competition. In this situation the traditional cost models are not sufficient, and services not traditionally covered by regulation, or covered by different regulators, require close cooperation between regulators and competition authorities, and the rules and boundaries of the various regulatory authorities need to be clear in a market where one size does not fit all, and there is no single regulatory approach that can be prescribed.

Speaking about video content, like sport and movies, they are key drivers in the take up of services. What regulators do if they have no jurisdiction on video content depends on the surrounding jurisdiction. Broadcast content is more content regulation that access regulation, and only an efficient competition law can deal with this.

Some countries have established an independent and fully empowered regulator, with no political pressure on the regulator in performing its duties. In Bahrain, for example, TRA conducts market reviews, critical for the regulators of the region aiming at understanding the competition mechanisms and emerging issues among the operators, and has published extensive guidelines on how to define markets and assist competition. Even if in Bahrain there is no competition commission, TRA has the power to enforce ex-post provisions in the telecommunication sector. A similar situation exists in Bahamas.

In Bangladesh the BTRC conducted in 2009 together with ITU a study on significant market power, which stimulates competition mechanisms with some regulatory boundaries, like price regulation, to ensure the sustainability of minor market players, as a strategy for the medium term, while for the long-term the aim is to have a free open market with no regulatory interventions.

In Guinea fixed services remained under monopoly, while mobile telephony was opened to competition with 5 operators in 2012. Now, mobile services are substituting fixed services even though, compared to the rest of the region, the level of penetration is relatively low. Market can be defined as a place where offer and demand meet. With the rapid growth of the converged market. Its definition is difficult but needed as is the definition of 'dominant operator' to determine if there is effective competition.

The discussion outlined that, on the separation of competencies between the regulatory authorities and the competition authorities, the two authorities can co-operate. On the ex-ante measures taken by the regulator and their effects on the market, a good market structure does not always have the desired effects and measures are more efficient when taken in the retail market than in the wholesale market. The evidence of obstacles to competition and the concept of significant market power are difficult to determine in liberalized markets, but regulators need to intervene only when there is a dominant position in the market. The debate also outlined that national competition laws are in force within the boundaries of a single country, while international service providers act across several jurisdictions. For ICT services, though, the markets seem to be national. A possible competition to an incumbent operator by a strong international service provider should be to the benefit of the consumer and hence seen as positive by the regulatory authority.

SESSION IX: BROADBAND IMPLEMENTATION: COUNTRY CASE STUDIES

The session was moderated by **Dr Rahul Khulla**r, Chairman, Telecom Regulatory Authority of India (TRAI), India. He introduced the session by noting the range of international experiences taking place in broadband implementation and by sharing India's experience. A digitalization

programme for cable and television is being implemented and a national fibre network is being established to be completed by 2016 using funds from the Universal Service Funds (USF). The auctions for Broadband wireless access (BWA) and 3G spectrum have already been conducted and wireless broadband should be rolled out next year.

Intervened in this Section **Mr Mario Maniewicz**, Chief, Department of Infrastructure, Enabling Environment and E-Applications, BDT/ITU, **Mr Mohan Jayasekere**, Director, Telecommunication Regulatory Commission of Sri Lanka (TRSCL), **Prof. Milan Jankovic**, Director, Republic Agency for Electronic Communications (RATEL), Serbia and **Ms Magdalena Gaj**, President, Office of Electronic Communications (UKE), Poland

ITU presented the series of nine country case studies on broadband implementation, jointly implemented by ITU/BDT and the Broadband Commission Secretariat, that provide an in-depth review of the state of broadband development. The studies show that adopting strategies and effective regulation play a key role in boosting access, availability and affordability and that some governments are providing incentives to foster network deployment such as taxes reduction, infrastructure sharing and fostering public-private partnerships and public infrastructure investment, based on a leased model open to all operators.

The case of Sri Lanka is characterized by the early allocation of 3G spectrum and the development of several initiatives to foster broadband development. Since 2010, initiatives have been taken to foster NGN and broadband deployment including NGN and broadband policies. Monitoring broadband quality of service has resulted in greater competition, higher broadband speeds and reduced broadband prices for subscribers, and separate QoS standards will be introduced for both fixed and mobile services. TRCSL is also conducting a "Connect a school - Connect a community" pilot project with ITU.

In Serbia, a recent work was conducted on broadband technology with the ITU and UNESCO. There is a need to establish a public state owned company to deal with broadband, with the goal of having the country connected by 2020, with all citizens and institutions connected in one network, and where one state company guarantees the service. A new law has been introduced to facilitate financing possibilities between the public and private sectors.

In Poland, the implementation of NGN networks is an important priority for modernization and economic growth, and the agreements between the regulator and the operators (fixed and mobile), models of co-investment, and infrastructure sharing based on symmetric regulation by the two main mobile operators seem to work well. Important is the UKE Inventory Database that maps infrastructure, used for many purposes, including by the European Commission and the investors as an important source of information.

In the discussion participants outlined the importance of broadband in fostering socio-economic development, of financing broadband through co-investment, of infrastructure sharing and use of universal service funds as well as the importance of demand stimulation. Here again, no single solution fits all for broadband deployment as it depends on national circumstances, network development and financial issues.

SESSION X: THE REGULATORY CONSULTING ROOM: BRINGING IT ALL TOGETHER, FOSTERING INCLUSIVE AND SUSTAINABLE GROWTH

The moderator, **Mr Cristhian Lizcano**, Senior Telecommunications Expert and Chairman of GSR11 launched the discussion noting that traditionally the role of the regulator is to promote competition, investment and broadband deployment, but now with the adoption of national broadband plans by governments, their role has changed as ICTs impact the development of the economy and social welfare and expands to other sectors such health, education, finance, trade, etc. In this changing environment, what should be the role of the regulators towards these other sectors, and in a converged ICT environment, where new players and business models are arising, should regulators allow the market to be completely free or should they intervene?

Participated in this debate: **Mr Alan Horne**, Telecommunications Regulator, Telecommunications and Radiocommunications Regulator (TRR), Vanuatu, **Dr Dražen Lučić**, Executive Director, Croatian Post and Electronic Communications Agency (HAKOM) and **Mr**

Kwong-Cheung Lau, Assistant Director, Office of the Communications Authority (OFCA), Hong Kong, China.

In small islands, citizens now understand the importance of communications, but there is still need to educate citizens on the social and economic benefits of the Internet. The regulators have an important role to play in meeting the Millennium Development Goals the content and application providers need to be recognized as drivers of broadband internet take-up.

In Croatia the key question is how to balance regulation and investment. Broadband penetration distribution is unequal, and this prevents development. The Croatian regulator encouraged investment in rural areas and incentivized operators, pushing all measures including technology neutral licenses and creation of a fund to develop broadband infrastructure and applications.

Hong Kong, even if it is a very small area of seven million people, is still striving for universal broadband coverage. The telecom regulator coordinates with other agencies in areas like education, finance, health, etc., but the major role of the regulator is to promote fair competition in the market, to foster investment, and to facilitate the roll out of broadband infrastructure.

The discussion focused on the facilitator role the regulator should play to promote access to infrastructure in rural areas and generate incentives for industry to come to those remote areas with universal service funds. At the same time, regulators need to provide impetus to the industry to develop content on existing infrastructure as part of the USF. In terms of content, their role is to make sure that the structures/pipes are in place. The operators themselves will know the capacity of the pipes they will need depending on the demand they have and the service providers they host. Participants also discussed the analogue to digital switchover and the opportunities offered for spectrum reallocation.

Infrastructure sharing is very important with the aim of promoting social goals, but should regulators impose a coverage obligation? The various regulatory mechanisms used to facilitate the promotion of broadband coverage as USFs, spectrum allocation, infrastructure sharing and deployment of public infrastructure to incentivize cooperation with private investment wwere also mentioned, as was the importance of flexible regulations linked to new forms of content and applications. Regulators have a complementary role in establishing market rules and pushing for better mechanisms to foster innovation.

CLOSING SESSION – THE WAY FORWARD

The closing session was moderated by **Mr Sanou**, Director of BDT.

Mr Raj Khanal, Director and Acting Chief of Office, Nepal Telecommunication Authority (NTA), Chairman of South Asian Telecommunication Regulatory Council (SATRC), and Chairman of the Regulatory Associations' meeting provided feedback on the meeting held on 1 October 2012, and attended by 35 participants from ten regulatory associations. The meeting called for the BDT to support regulatory association activities to establish best practices and to make roaming tariffs more affordable for users. The meeting also expressed the wish that ITU in collaboration with the GSM Association conduct studies on the issue of stolen and counterfeit devices and provide guidelines and recommendations, and recommended stronger cooperation among regulators of the same regulatory association and between associations.

The **BDT Director** said that the ITU Regional Offices Directors attending the GSR will take note of the report from the meeting. Mr Sanou introduced the GSR12 Best Practice Guidelines on regulatory approaches to foster access to digital opportunities through cloud services, noting that the massive introduction of cloud service needs appropriate regulation. He thanked Mr Weeratunga for coordinating the consultation process and all regulators for their contributions.

Mr Weeratunga stressed that cloud computing allows significant cost savings and investment returns, represents an opportunity for all consumers and the deployment of services in un-served and underserved areas, and that access to cloud computing services must be offered on a non-discriminatory basis. He also underlined the importance of spectrum harmonization in

an era of network and service convergence. Other issues faced by content and applications providers, challenges related to market power, enforcement, data protection and dispute resolution, cloud transparency and net neutrality, competition law, quality of services, applications and data portability and security, interoperability, research and development, and international cooperation, all needed to be addressed.

Mr Sanou nominated Mr Weeratunga as the new Ambassador of the *GSR12 Best Practice Guidelines* and requested him to bring the agreed Guidelines to the attention of all forums that he deems appropriate. Mr Sanou informed participants that the GSR 2013 will be held in July due to the heavy ITU meeting schedule in the second half of 2013.

Ms Gaj thanked everybody for the enriching meeting noting that many items required further discussion, and invited all participants to Warsaw, Poland, from 3 to 5 July 2013 for GSR13.

Mr Weeratunga thanked all delegates for their active participation. He noted that ITU had provided Sri Lanka with much encouragement, and thanked ITU and all participants for their contributions and kindness. The adopted best practice guidelines, he said, will assist everyone's work.

Mr Sanou, on behalf of Dr Touré, Mr Zhao, and Mr Rancy, noted that for more than ten years the GSR has been generating relevant discussions of growing importance. He noted that this year's GSR had attracted 446 participants from 77 countries and ten regional and international organizations. He thanked Sri Lanka for the hospitality and the excellent working conditions that have fostered outstanding results. He extended his gratitude to the TRCSL, Mr Weeratunga, Mr Palpita, Mr Karu, the interpreters, the technicians, the security staff, the personnel of the hotel and ITU colleagues. He then declared the meeting **closed**.

ANNEX A

GSR12 BEST PRACTICE GUIDELINES ON REGULATORY APPROACHES TO FOSTER ACCESS TO DIGITAL OPPORTUNITIES THROUGH CLOUD SERVICES2

The growth of cloud computing has the potential to offer tremendous cost savings, efficiency and innovation for government, businesses and individuals around the globe. For entrepreneurs and businesses, big and small, cloud computing delivers unique economic leverage that means investment can translate into impressive returns and costs savings. With the advent of cloud computing, digital resources are now becoming accessible over multiple networks anywhere, anytime. Yet, reaping the full potential of cloud computing requires cooperation and collaboration between governments, industry and consumers to build confidence in cloud-based services. Importantly, the growth of cloud computing will depend on ubiquitous and affordable broadband networks to which service providers have access on a non-discriminatory basis.

We, the regulators participating in the 2012 Global Symposium for Regulators, recognize that effective and dynamic regulation can facilitate cloud computing uptake and allow it to thrive and act as catalyst for economic growth. Therefore, we have identified and endorsed these regulatory best practice guidelines to promote innovation, investment and competition in cloud infrastructure and services, and protect consumer interests.

Awareness raising and promotion of uptake by the public sector: Cloud services and the opportunities and savings they make available to governments around the world should be actively pursued and promoted. Bringing awareness of these opportunities will generate economic opportunities and provide great value to citizens, consumers and businesses.

Broadband infrastructure: Regulators need to work to reduce barriers to broadband deployment, actively facilitate build-out of national fibre-optic networks and international connectivity links, including submarine cables, and promote infrastructure sharing and coordination of civil works, including across sectors, as well as policies to speed rights of way access, and installing data-centre infrastructure. This will provide incentives for content delivery networks and data-center companies to install locally. It is also necessary to ensure the deployment of services in unserved and underserved areas, including emergency and accessibility-enhanced services.

IP interconnection: Regulators should seek to ensure that all users derive maximum benefit in terms of choice, price and quality of service and to minimize any distortion or restriction of competition.

Spectrum: For the future of cloud computing services, several actions could be taken to release additional, critically-needed spectrum for wireless broadband, including repurposing spectrum, opening white spaces to unlicensed use, or conducting incentive auctions. In addition, policies that generally encourage the harmonization of international spectrum and communications device approvals must be encouraged.

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2   The Guidelines are based on contributions from Algeria, AREGNET/Lebanon, Burkina Faso, Colombia, Egypt, France, Mauritius, Poland, Sri Lanka, Sudan, Swaziland, Switzerland, Thailand, United States, and Zimbabwe.

Market definition in a converged cloud: Taking into account network and service convergence, promoting migration to NGN and encouraging competition, regulators may consider adopting a light-touch approach to new ICT sector players, such as content and application providers, while carefully assessing the impact of their decisions on all market players.

Market power: Regulators need to ensure that communication providers do not engage in conduct that constrains the provision of cloud services for reasons that are not transparent, objective, non-discriminatory and proportionate.

Enforcement: Regulators need to establish a means of identifying breaches to ensure they are able to respond effectively. This may be achieved through (1) self-regulatory mechanisms, content service providers notifying the appropriate regulator of breaches of security, (2) ideally changes to certain aspects of data protection legislation which is impossible to monitor and hence unenforceable in practice; and (3) mechanisms for complaint handling and resolution of disputes, including alternative dispute resolution mechanisms, which are effective, fair, proportionate, protecting the rights of all stakeholders and conducive to cooperation among them.

Cloud transparency: Regulators may consider encouraging cloud service providers (CSPs) or introducing specific obligations with regard to notifying users of the chain of providers that underpin the provision of cloud services. Regulators also need to ensure that ISPs provide customers with greater transparency about the traffic management practices being followed by companies on their networks.

Consultative process: Regulators need to consult with CSPs and other market players about the appropriate regulatory treatment and classification of certain cloud services, with a view to issuing guidance providing legal certainty for market entrants and cloud users, for example through conducting multi-stakeholder fora to develop best practices for protecting consumers.

Net neutrality: A certain level of traffic management is necessary to minimise network congestion. Regulators and policy makers should seek to implement measures to oversee the use of traffic management techniques to ensure that those do not unfairly discriminate between market players.

Regulators also need to review existing competition laws to determine whether the regulatory tools, such anti-discriminatory law or regulations that are already in place adequately address the competition issues that tend to impact net neutrality.

Quality of service and experience (QoSE): A number of regulators enforce minimum QoSE requirements to ensure that customers and edge providers have reliable and uninterrupted services, including access to personal information in the cloud. In order to deliver these services, network and service providers will have to ensure transparent and clear terms and conditions of contracts signed by costumers. Regulators also need to ensure the publication of comparable information on the availability and QoSE and, when necessary, introduce minimum requirements for QoSE in order to avoid degradation of the quality provided to customers.

Consumer empowerment: Policymakers need to ensure that consumers are empowered to control their personal data and protect their privacy through facilitating Cloud Literacy. Cloud users need to be sure that information stored or processed in the cloud will not be used or disclosed in harmful or unanticipated ways.

Privacy & data protection: International agencies as well as national policy makers and regulators must work together to develop efficient, effective, proportionate and readily enforceable laws to protect consumers' reasonable expectation of privacy. Responsibility should also be devolved to stakeholders developing self-regulation, for example establishing privacy policies that are transparent and appropriate for the services they provide. Governments should also continue to work together to ensure no single entity adopts privacy regulations that are so burdensome that they restrict the free flow of information or prevent CSPs from maximizing the cost saving inherent in those services.

Cloud standards: The development and widespread adoption of appropriate national, regional and international technical and organizational standards are required to address a range of concerns among cloud providers and users, including the integration of legacy systems with cloud interfaces; data and application portability and security.

Data portability: Proprietary cloud computing application programming interfaces (APIs) can limit customers' ability to switch to a different provider (lock-in effect). Standardizing APIs would facilitate data portability and would allow greater reliability by allowing the same functions to be performed by multiple cloud computing providers.

Interoperability: Interoperability is key for consumers of cloud computing services as it facilitates information flows with appropriate security and privacy protections. Therefore, governments need to support the development of standards and measures that will speed the arrival to markets of communications devices and ensure seamless wireless connectivity and services. Eliminating unnecessary restrictions on the trans-border flow of data is of particular importance.

Demand stimulation: Governments must lead the way in the adoption of cloud-based computing. In addition, efforts need to be deployed to overcome barriers to broadband adoption, pursuing multiple initiatives targeted at both consumers and small businesses.

Capacity building: As cloud computing is expected to be one of the main drivers of future growth of digital economies, regulators and policy makers can actively contribute to the development of a new generation of educated and technology-savvy workforce by ensuring the timely and effective introduction and spread of new and improved products and processes in the economy, reinforcing the ability of individuals and businesses to continuously create wealth, and putting a premium on all forms of learning, with close attention to both indigenous knowledge and the transfer of knowledge.

Research and development (R&D): Promoting R&D activities in the field of cloud computing is an essential tool for designing future-proof digital economies. Close regional and international cooperation with relevant international bodies as well as universities should be encouraged.

Regulatory cooperation: Cloud services impact on a range of regulatory areas, both within jurisdictions and across multiple jurisdictions. Regulators should cooperate and coordinate regulatory decision-making that is targeted at CSPs.

Internationally, governments need to collaborate to increase regulatory predictability related to the cloud and develop common core policy principles that will assist the development and adoption of cloud computing services while avoiding the creation of regulatory barriers to market entry.

Regional cloud: Regional clouds represent a unique opportunity for a group of countries to cooperate in order to promote cloud computing services and take advantage of its benefits while reducing security, confidentiality and other vital concerns through the establishment of regional regulatory frameworks and other protective measures for businesses and consumers.

To that end, a sub-regional approach could be encouraged whereby regulators' associations promote efforts to harmonize regulatory instruments among their member countries.