ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Directorate for Science, Technology and Industry
Committee for Information, Computer and Communications Policy

OECD Policy Guidance on Convergence and Next Generation Networks

OECD Ministerial Meeting
on the Future of the Internet Economy

Seoul, Korea, 17-18 June 2008

Hosted by 방송통신위원회 KOREA COMMUNICATIONS COMMISSION

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Introduction

The digitalisation of content, the emergence of IP, and the increasing adoption of high-speed broadband by end-users, has enabled the convergence of networks, services and devices we are experiencing today. These converged services often are appearing in markets as "triple" or "quadruple" play offers which provide data, television, fixed and mobile voice services. As the Internet evolves and platforms converge, it is increasingly important to ensure that end-users continue to have ready access to the Internet in a way that is supportive of the end-to-end principle.[1]

Next generation networks (NGN) are providing the platform facilitating convergence. The term "NGN" encompasses two levels of networks: *"core"* and *"access"*. NGN core networks provide the application and switching layer for a multitude of services, while next generation access networks (NGA), will facilitate the delivery of innovative services.

The convergence of a range of previously distinct applications and services, such as telephony, video, and data communications, on a single network, yields significant changes in the way networks are built and the way services delivered. The separation of distinct core network "layers" (transport, control, service and applications functions) allows for competition and innovation at each horizontal level in the NGN structure, however it may also create strong commercial incentives for network operators to increase vertical integration and might lead to the leveraging of their market power across these layers. At the same time, while new transmission networks can provide significant benefits to users in terms of capacity and bandwidth symmetry, the development of NGA may also create new barriers to competition and investment depending on the network topology and the level of investment operators require to deploy these new networks.

Policy makers and regulators may need to monitor and reassess the effectiveness of legacy policy and regulatory frameworks to reap the benefits of next generation access networks and convergence while also minimising any costs which may arise from these new developments (see the background report on *Convergence and Next Generation Networks*). Legacy policy frameworks should not hamper convergence, investment and choice in the market place. New technologies and services can bring significant benefits to end users, however policy makers may want to monitor the deployment of these technologies, so that the development of competition in these markets is safeguarded.

1. Where the intelligence and processing power of a network reside at the outer edges while the inner network itself remains as simple as possible.

Two main objectives should be considered by policy makers in monitoring regulatory frameworks:

- Economic goals: regulation is aimed at ensuring effectively competitive markets and encouraging continued innovation and investment.
- Social objectives: many of the social objectives of existing regulatory frameworks are likely to be viewed as still valid in a new technological and service environment. These include, *inter alia*, universal service issues, access, quality of service, emergency calls, media plurality, cultural diversity and protection of consumer and other users.

This document presents a number of principles which could be used by national policy makers and regulators as a guide when addressing the ongoing challenges posed by convergence and the shift towards next generation access and core networks.

Principles

1) Market developments: encouraging investment, competition and growth

Policy makers should aim to create a favourable environment for investment and innovation and ensure a predictable legal and regulatory environment for market participants. In this context, they may want to consider a series of possible barriers to competition and investment that may arise following the deployment of NGN. There are a number of instruments to help adequately address these barriers. In particular, policy makers should:

- Recognise that policy and regulatory measures to promote competition in a next generation environment should be based on a sound economic assessment of specific market conditions and local factors.
- Recognise the need for regulators to consider possible market dominance resulting from the bundling of services.
- In addition, if adequate facility-based competition does not develop, where LLU has been mandated, policy makers should:
- Consider difficulties that may arise in replicating next generation access networks which could lead to the creation of new bottlenecks for competition, which may require policy makers to take appropriate steps to ensure there is no undue discrimination in access to these networks. This is particularly relevant in countries relying on unbundling to promote competition since it may be more difficult to meaningfully unbundle next generation access networks.
- Recognise that in certain circumstances service-based competition may provide an important first step to encourage competition in the market and investment by new entrants.
- Consider the need to ensure that service and application providers have non-discriminatory access to network resources where there are limited choices for network access.

2) Access to passive infrastructure

- Recognise that as a large part of the cost of deploying fibre networks is in civil works, appropriate policies should be in place to ensure fair and non-discriminatory access to ducts, poles and rights of way. Policies should facilitate access to the ducts and poles of incumbent communication operators (wireline and wireless telephone and cable operators) and utility companies. Access to rights of way and ducts should be available on a non-discriminatory basis and on cost-based terms.
- Recognise that without adequate facility-based competition, fibre rollouts closer to users may introduce new bottlenecks such as curb-side cabinets and the inside wiring of apartment buildings. Depending on local factors, these new bottlenecks may require regulatory action such as sub-loop unbundling and sharing of optical line termination equipment points at apartments/buildings.

3) Technology neutral regulation

Following the convergence of network and services, it is important to ensure that the market is open for different technologies to compete on equal terms. In this context:

- Governments should encourage, to the extent possible, the development of technologically neutral regulation, particularly in converged areas.
- In the cable and mobile sectors, regulators should consider where the move from technology-specific licences to service-neutral authorisation frameworks would be beneficial in terms of efficient management of scarce resources, spectrum allocation, and achievement of relevant public interest objectives.

4) Interconnection

Interconnection also plays an important role in a NGN environment because it needs to take place at all functional levels in order for all service providers to be able to access the new networks and provide their content, service and applications to end-users. Commercial markets for the exchange of IP traffic have developed well without regulatory intervention. Policy makers should therefore:

- Monitor the future development of NGN markets to encourage seamless and non-discriminatory exchange of traffic between networks, and consider where regulatory intervention is still necessary.
- Re-examine the functioning and evolution of the existing interconnection system and the evolution in the transition to NGNs through industry and user consultations.

5) Numbering, naming and addressing

IP addresses, telephone numbers, and other addresses are crucial resources for communication and access to the market. In particular, the availability of new address space is necessary for the growth of the Internet. Governments should:

- Encourage the adoption of the new version of the Internet protocol (IPv6), in particular through its timely adoption by governments as well as important private sector users of IPv4 addresses, in view of the impending IPv4 depletion.
- Review numbering plans to increase flexibility, facilitate new converged services, and improve the nomadicity of persons.

- Monitor the use of ENUM as a routing and interconnection mechanism between networks.

6) Spectrum allocation

Wireless technologies, including those using unlicensed spectrum, are becoming an important part of the telecommunications landscape. Effective spectrum management is becoming a key policy issue as the range of technologies making demands on spectrum is growing rapidly. This may require policy makers to:

- Encourage the rapid transition to digital broadcasting and make parts of the released spectrum (digital dividend) available for new and innovative wireless communication and broadcasting services.
- Reform spectrum allocation and use market mechanisms and other schemes that reflect the economic value of spectrum in spectrum markets, where feasible taking into account public interest objectives such as interoperability, promotion of cultural and linguistic diversity and media pluralism.
- Review institutional structures for spectrum planning and allocation to ensure that they are better co-ordinated with the needs of the market and with the requirements of efficient regulation.

7) Universal service

Universal service is an evolving concept that may change over the years to reflect advances in technologies and usage. Policy makers may need to review definitions of universal service to determine whether changes need to be made and, if so, what services and access would be required. They must also decide whether funding mechanisms should change. In this context, governments should:

- Review universal service obligations and the mechanisms to achieve them in the context of convergence.
- Ensure that contributions to universal service funds respect the trend towards convergence of network and services, and review how universal service is funded.

8) Digital divide

The deployment of NGN may create new asymmetries in access in areas not reached by high-speed broadband infrastructures. This can raise new concerns about regional competitiveness and economic growth.

- Governments should encourage the development of nation-wide high-speed broadband networks to avoid the creation of access asymmetries within countries, which can be particularly pronounced between urban and rural areas. In this context it is important that alternative networks are encouraged. Public-private partnerships may provide a solution in some areas to reduce investment costs given that the cost of providing fibre to homes in rural and remote areas may be high with current prices and technologies.

9) Emergency services

There is an increased risk of confusion as to whether or not users have access to emergency call services with the convergence of platforms and devices, increased mobility and the shift to IP-based communication. Steps should be taken to:

- Ensure that users of innovative voice services are appropriately informed regarding access to emergency services and that some kind of access to emergency services is guaranteed to users of VoIP services. These provisions should also take into consideration the technical difficulties of providing such services and should not constitute an excessive burden or obstacle to the development of innovative services and applications.

10) Quality of service

Quality of service remains important in a converged next generation environment where information travels across multiple networks. In this context, policy makers should:

- Ensure that convergence benefits consumers and businesses, providing them sufficient choices with respect to connectivity, access and use of Internet applications, terminal devices and content, as well as clear and accurate information about the quality and costs of services to enable them to make informed choices.

11) Telecommunication and broadcasting convergence

Convergence allows different types of content and communication services to be delivered through the same network and consumed over a variety of platforms and user devices. The evolution of technology does not necessarily change many of the underlying social and cultural objectives but may change the way these objectives are achieved. The evolution of technology may also allow for increased market liberalisation, while maintaining core policy goals. To this end governments should:

- Reconsider existing platform-specific obligations in light of the convergence of telecommunication and broadcasting and develop cross-media policies for a multi-platform environment so as to ensure consistency of regulation.
- Facilitate the diffusion of content through different devices.

12) Cross-border issues

Governments may need to address cross-border issues as services are increasingly geographically and network independent. This creates significant challenges for policy makers. In particular, they might need to:

- Review consumer protection frameworks, content regulation measures, the protection of intellectual property rights, the protection of privacy and personal data, and legal interception.