The Future Internet Research Plan in Korea

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Abstract — We're faced with the various Internet problems such as traffic explosion, security, mobilty and QoS etc. Especially, traffic explosion problem caused by mobile Internet services and video contents services requires immediate solutions. Besides security attacks by DDOS or hacking to national infrastructure such as bank, government administration also threthen the society itself. Korea basically takes two type of approach. One is the approach to ameliorate the current Internet and the other is to pursue quantum leap toward revolutionary future Internet. Current Internet can be seen as "dumb pipe". The concept of "smart pipe" can improve the efficiency and security level of the Internet. We call it "Smart Internet". We have also long term plan for the researches on new future internet architectures including expereimental environments. The researches on future Internet are activated from this year 2011 and International collaborations are strongly encouraged in Korea.

I. INTRODUCTION

A. *Internet in Korea*

As all the other nations in the world are faced with traffic explosion problem, Korea has been experiencing the heavy traffic explosion. Average growth rate of Internet traffic reaches up to 34% exponentially, especially mobile Internet traffic surges up to 10 times within one year. Does traffic explosion leads revenue explosion? The answer is "No". The revenue of Korea Telecom, which is the biggest ISP of Korea, has been staying almost same since 2005 in spite of exponential traffic growth. This becomes a serious impediment to invest higher speed Internet facilities in response to traffic growth. The DDoS attack to major web site, hacking to bank and even GPS jamming attack has occurred quite frequently in Korea. We need both immediate solutions and long-term solution to these problems.

It is reported that required bandwidth for home will reach to 1Gbps in 2020. Korea has the plan to speed up the network to Maximum 200Mbps until 2012, 4Gbps until 2020. The various applications based upon high quality video such as HDTV, UDTV, Multi-view 3DTV and Holography will require those bandwidths. Then the question will be how future network can be integrated with the various services for Smart energy, Smart transport, Smart Health, Smart work and Smart education etc. We believe that future network need to be mingled with some component functions or services to be more efficient for applications than the solutions based upon end node devices. Those component functions can be either software functions or even special hardware based components. Those components should be open to public. We call it "Smart Network". For long-term solution, we expect that various new future internet architectures are suggested, and we will provide required experiment environments to test the concept of those new architectures.

B. *Research activities*

We have had small-scale future internet research projects on architectures, wireless internet and context aware services etc. The models for future networks focused on theoretical models are also under study. ETRI (Electronics and Telecommunications Research Institute) which is the government sponsored research center has developed the virtualized programmable testbed platform to test new network architectures. Two forums are actively leading future internet researches. Many expert groups share their knowledge and information, discussing the ideas on challenging issues at FIF (Future Internet Forum: http://fif.kr) forum founded in 2006. Three government sponsored institutes NIA (National Information Agency), ETRI, KISA (Korea Internet and Security Agency) founded FN2020 (Future Network 2020) for network technologies, security issues, applications and testbed. WDM-PON technologies are actively being developed for giga bps internet access.

II. RESERCH PLAN

A. *Smart Network*

As previously mentioned, smart network concept are major target technology to be developed within near future. Smart network node will contain integrated functional modules such as routing, processing, storage and signal processing for smart applications. First target services will be efficient content centric services and tele-presence services. Smart nodes will support also many types of virtualization and programmability including open flow capability.

B. *Revolutionary Future Internet Architecture*

We're seeking new internet architecture concept that can be fundamental solution for the current IP internet problems. We

expect that these new architecture can be evolved based on smart network architecture at the beginning since smart network will support certain level of virtualization and programmability. The research projects for content centric network, mobility, trustworthy network, highly reliable cloud networking are started in this year 2011. Research program includes the researches on context aware service composition within IoT (Internet of Thing) environment. We expect the researches on applications which apply semantic web and linked data technologies.

III. Conclusion

Internet traffic explosion problem mostly due to video and mobile applications needs immediate and long-term solutions. Security is also one of the focal issues in Korea. It is strongly believed that future applications are based on cloud computing and smart pipe kind of internet. We believe that these trends are not limited to Korea but to almost all the nations in the world. Global collaboration will be essential for future internet researches not only to ameliorate the current internet but also to new internet infrastructure for much better world.