

# Networking Paradigm for Information Universe

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## I. MEGATRENDS

Internet is used by more than two billion people. In ten years, hundreds of billion devices and sensors will be on the Internet, together with four billion human users. They will use the Internet in a very different way than today. The Internet in its present form may not be adequate to support them in efficient and satisfactory way. Consequently researchers on Future Internet around the world work hard on new network architecture, new systems and new business models. However, goals and missions of the Future Internet are understood differently at different research groups, countries, and business sectors, and most of the solutions proposed so far are highly technical, lacking in big pictures for the Future Internet.

In this talk, more fundamental visions for the Future Internet derived from the predictions of the megatrends to the future IT will be discussed. Three megatrends that will impact the design of the Future Internet are 1) everything goes smart, 2) the interaction between people, machine, data will explode, and 3) the rate of information creation goes exponential.

“Smart” usually means intelligent, fast, and personalized, in IT world. However, “smart” in the future IT will be more about innovations invoking drastic societal changes. Examples are smart work, smart education, smart city etc. Social network services are changing the way we use the Internet. New modes of interactions between people, between human and machines, between machines, and between contents will emerge in the future. How to accommodate them will become a big challenge for the network designers.

The total volume of information on the globe will increase exponentially reaching 44 ZB in 2020, according to a recent forecast. This overwhelming pool of information is called “Information Universe (IU)”. As Internet is basically a medium for collaboration which is achieved by handling information (access, exchange, process, and store), the ever-expanding IU is an opportunity as well as a threat for Future Internet designers.

Korea has been at the forefront of experimenting and using various new Internet technologies. The three megatrends are highly apparent in Korea, and several examples (traffic explosion, video broadcasting, social network) will be discussed in the presentation.

## II. INTERNET IN 2030

Internet in the year 2030 will and should be very different from today’s Internet. What will be the keywords describing the Internet in 2030 ? We have heard many keywords so far ; secure Internet, video Internet, content-centric network. They are closely related to the network architecture. However, the technical keywords can be chosen easily, once we identify the keywords for the fundamental features of the Future Internet that are in good harmony with the megatrends.

Three keywords are proposed in this talk ; realtime Internet, quality Internet, and knowledge Internet. These are basic features required for the Future Internet, and various concrete architectures, algorithms, and implementations can be devised to realize the fundamental features.

Realtime is a feature hardly achieved in today’s Internet. However, to support tight collaboration among machines, humans, and contents, it is needed to provide impressions that the collaborating partners are nearby physically so that the communication can be carried out without any interrupting delays.

Quality has not been the number one priority in the present Internet. Best-effort packet delivery is one good example. But in order to support smartness, collaborations, and IU, reliable and secure Internet is indispensable. Good quality also needs overall supervision and control of the individual Internet sessions, devices, as well as the content quality.

It is reported that people spend more than twenty % of their office hour to search for right and good information. This happens because Internet itself has been regarded as a dumb pipe for sending and receiving bits. If the main use of the Internet is to extract knowledge from IU, then the way we design Internet, and the way we treat information in IU should change.

Internet stayed in its original form for too long. It is time to come up with a better one, but the new Internet should be able to stay long without causing troubles to the world.

(note) This work was prepared as a guideline for the Korean national R&D program for the Future Internet.