Summary Minutes of the 5th Meeting of the Study Group on Network Architecture

1. Time & Date: 10:00 – 12:00, Friday, April 20, 2007

2. Place: Special Meeting Room #1, 8th Floor, Ministry of Internal Affairs and Communications

3. Attendees

(Members) (in Japanese alphabetical order, with honorifics omitted)

Tomonori Aoyama, Takashi Matsumoto (on behalf of Youichi Isokawa), Gota Iwanami, Hiroshi Esaki, Yoshiro Okamoto, Hideo Okinaka, Toshifuku Yoshioka (on behalf of Mitsuo Kawato), Hideshige Komatsu, Shinji Shimojo, Yasubumi Chimura (on behalf of Harushige Sugimoto), Yoshiyuki Takeda, Tetsuo Takemura, Toshitaka Tsuda, Yasuhiro Katsube (on behalf of Miwako Doi), Hideyuki Tokuda (Chairperson), Akihiro Nakao, Shu Maruno (on behalf of Takashi Hanazawa), Michitaka Hirose, Yayoi Hirose, Masaki Fujihata, Hiroshi Fujiwara, Motoo Matsuda, Takamichi Miyoshi, Ryuichi Yamamoto, Tetsuya Yuge, Makoto Yokozawa

(Total: 26)

(Ministry of Internal Affairs and Communications)

Kazufumi Taniguchi (Parliamentary Secretary for Internal Affairs and Communications), Shun Sakurai (Director-General of the Telecommunications Business Department), Katsuya Watanabe (Director of the Telecommunications Systems Division), Yasuo Tawara (Director of the Research and Development Office, Technology Policy Division), Naohiko Hagiwara (Assistant Director of the Telecommunications Systems Division), Manabu Nakazato (Assistant Director of the Research and Development Office, Technology Policy Division)

4. Agenda

(1) Presentations

(2) Other

5. Summary of Discussions

[Presentations]

○ Member Shimojo presented “Network in the Post-ubiquitous Age” (Handout 5-2).

○ Member Takemura presented “Challenges for the New-generation Network” (Handout 5-3).

○ Free Discussion (Details to follow below)

6. Next Meeting

The next meeting is scheduled for the middle of May. The Secretariat will announce the details at a later date.

[Main comments and remarks made during free discussion after the presentations]

○ In Mr. Shimojo's presentation, the story of the experiment in Hirosaki was very interesting. While we can think of communities of various sizes, in what size does Mr. Shimojo believe this set-up would be effective, although it may all depend on the infrastructure, etc.?

○ That is very hard to answer. The experiment we conducted covered a community a little larger than a chonaikai, or neighborhood association. The core population of the community was local residents, and then it was joined by people who love the area and come to it, and others who have some kinds of relationship with them. Interestingly, these different kinds of people are connecting with each other seamlessly, and this community did not depend on only the Internet.

○ Referring to ALF, which was mentioned in the presentation, it is important to point out that, in environments where a lot of information goes upwards, the system needs to be stateless. In an experiment conducted in Kurashiki, a router designed to withstand 10-Gbps multicast failed in handling a 10-byte/s data multicast. This was because they performed state management using a totally different paradigm. We will therefore need to pay special attention to state management in a grand-scale design.

○ NGN seems to be stateful. However, it is not a good idea to place too much emphasis on this fact. I'm afraid that, In terms of QoS and reliability, even stupid networks will do as long as there is enough bandwidth, which may nullify the advantages advocated by David Clark.
I have a question regarding the economic system as part of the service domain mentioned in Mr. Takemura's presentation. Does the "market dealings" term refer to market dealings within communication services or to the broader economic system covering such areas as financial services and ordinary commercial services?

○ How much can be controlled remains to be seen. Looking at the commercial business scene in 2015 or 2020, I would imagine that discrete items would be scattered here and there on networks and need to be matched together. This is, I believe, what the users expect of the network.

○ We seem to be repeating the discussion of the platform we had at the last meeting, on what functions should be allocated to the network and whether business services should be offered on a separate layer.

○ In Japan, the anonymous feature of Winny has raised social concerns, significantly degrading the public image of P2P. In the U.S., this is not the case. P2P has demonstrated that caching data in various places is extremely effective in data transmission. In the U.S., KaZaA, a file exchange application for MP3 files is widely used. The success of Skype came from the application of KaZaA to VoIP. Joost applies KaZaA to television broadcasting. These are good examples of good applications. We need to take care to ensure that negative images about new technologies such as overlay do not set in.

○ In the industry at least, the Winny problems have already been solved, as is known among the members of the P2P committee. The only problem left now is the lack of laws and regulations

addressing the issue, which has again given the U.S. an advantage.

○ Regarding the argument of "Is QoS necessary at all, in the first place?" it is important to discuss whether QoS is necessary. There are things that the network can do and things that the network cannot do. When the current network was converted to packet switching, the difficulty of QoS was already known. If, in the midst of this situation, a killer application emerges that requires QoS, then the argument that QoS should be included in the next-generation network will gain momentum.

○ The presentation addresses QoS in a very narrow sense, such as that in data streaming, and does not intend at all to deny the significance of QoS. The point is that, if the network cannot guarantee QoS, we can resort to other means, such as caching in P2P and the use of broadcasting waves, as a social aspect. In addition, we are raising a question as to whether real-time data streaming is really necessary when giga- and tera-class HD recorders are emerging. The point is that we need to take a balanced view rather than pursuing only QoS.

○ The argument about QoS should not be one of dichotomy, that is, one way or the other, or whether it is necessary or not. Take an example of traveling by air. While it is possible to choose directly between first class and business class on a flight, it is also possible to leave everything up to a travel agency as a total package, including the choice of the hotel and seats. Either way will do. Would it not be necessary to think flexibly, including financial choices? When I visited NSF last year, a distinguished network expert stressed the necessity of controlled transparency. He did not specifically say who should control what. It would be necessary also to discuss such issues with these experts.

○ The QoS discussed here should be taken as quality of service. What falls in this category in the network field is rather limited to the control of bandwidth and delay. Now that intelligence is at issue, other factors such as servers need to be considered in order to guarantee QoS on an end-to-end basis. We should therefore think about what service control should look like at the platform level. The essence of the design of an architecture lies in designing its interfaces, and we need to determine not only what protocol the architecture should employ, but also what interfaces it should support.

○ ISP's and the carriers' networks secure QoS through combinations of functions and layers. Unless we clearly comprehend these facts, we might end up with arguments of dichotomy. Meanwhile, studies that can only be done in Japan include those based on the analysis of data held by commercial providers. In the U.S., carriers can never supply their data. This is the area where Japan can beat the U.S. By providing a domain where we can do some adventurous experiments while understanding the situations of the networks, we would elicit totally different requirements. Such an approach, instead of first drafting the specifications, might be a good idea.

○ Since this is a study group on the network we should not disregard QoS. For example, communication in the medical field requires much higher resolutions than those on YouTube. Likewise, many fields have their own requirements. Listening to everybody's requirements

will end up creating a mess. We need to sort them out systematically.

○ High quality does not necessarily mean just high image resolution; it may also mean the suitability of handling symbols in the image. The computer has traditionally been dealing with numerical and text information. Now how to handle images is becoming an issue of global concern. Image resolution on television has just the right amount of information for image symbols. The lower the resolution, the more easily the symbol information can be conveyed. What we need now would be some kind of fundamentals, such as that which served as the basis for the NTSC television system.

○ The interface is indeed an important issue. In the OS, all big things are done in the user's land (domain). We should determine a placement structure for functionality, namely, to which layers certain functions should be allocated.

○ That is very true and it is making us think hard. When a new function comes up, it sometimes works better if we put it in the user's land instead of in the OS. I am afraid that trying to relegate application-specific issues to the network may not work. I feel that IP has turned out to be a platform where everything is well put together, and we need to think out a similar model, although much depends on the type of the network. We need to think about whether we can come up with an architecture that can accommodate changes in applications.

○ Talking about how far we should pursue things, as for QoS, it depends on the required conditions. We should consider it as a total system, including cost and reliability. I would say, however, that if everything becomes connected to each other in the age of ubiquitous systems, something of an ecosystem could be expected.

○ QoS depends on the needs of the end users. There is no need to worry about entirely new services designed to work on existing networks. When old services are to be renewed, you may be prone to encounter problems.

○ Some say that an increase in the resolution of home image terminals will enable HD images to be broadcast via IPTV, and others speak of broadcasting at 4K. Needs are emerging with regard to the transmission of high-resolution images. In studying the design of the future network, we need to take all these factors and trends into consideration.

○ Apart from the future of the rich media, there can be a future for the poor media also—for example, it is possible to use characters to convey a lot of information, each having a small amount of information. It is very important to be able to send, receive, or view something, even with bad quality, rather than being unable to view anything.

○ People in social sciences have a "quality of life" viewpoint, which is an end user's viewpoint. Whereas today's discussion focused on the quality of services, we will also need to think of how the quality of satisfaction will improve as the quality of services improves.