Interview with Mr. Charley K. Watanabe on "Cloud Computing in Japan – The Role of the Japanese Government"

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BISE: Mr. Watanabe, Japan is one of the most advanced ICT nations connecting physical environments with ICT. Examples are the use of wireless sensor networks for measuring their environment and conducting coordinating activities and the Japanese wireless broadband network infrastructure offering Internet services to over 113,000,000 subscribers in 2009. What is the current situation of the broadband network in Japan? Does the Japanese Government plan to bring mobile services and cloud computing together?

Watanabe: Japan provides the most affordable and high-speed broadband services in the world. In particular, cell-phone services have been developed and offered in 99% of Japan's area, and the 3G cell-phone now has a spread of over 90%. The appearance of various services using high-capacity contents except for conventional services such as sound communication and e-mail is anticipated by the beginning of the Long Term Evolution (LTE).

Communication traffic through the appearance of such new services is anticipated to increase approximately 200-fold from its current amount in the next ten years, and we are promoting research and development to solve these traffic issues. With this growth and development of mobile broadband, the mobile cloud service using smart phones is expected to spread along with the development and increase of value-added high-cloud service (the service using a cloud computing technology) making use of the world's most advanced broadband infrastructure.

BISE: What is the intention of the Japanese government to promote the spread and the development of cloud services?

Watanabe: Widespread use of cloud services is not the goal. The significance of cloud services lies in their ability to al-

low the entire social system, beyond the borders of companies and industries, to pool and share an enormous amount of information and knowledge, facilitating the development of a "knowledge and information society."

Toward this end of replacing existing systems with cloud services, the aim is to make the most of the ICT resources on the network to achieve high efficiency (to optimize the use of all resources) not only in the ICT industry but beyond the borders of companies and industries, and to develop and spread "next-generation cloud services" or "smart cloud services" that create new value-added knowledge by combining the massive storage of knowledge in the cloud, thereby making the overall social fabric more advanced and more sophisticated, improving the national standard of living, strengthening Japan's international competitive power, and alleviating the burden on the environment.

If cloud services are incorporated into social systems, regardless of the conventional frameworks of companies and industries, knowledge and information will be pooled and shared by the entire "eco-system"– involving a broad spectrum of stakeholders, including cloud service users, cloud service providers, central and local governments in Japan, and governments in other countries – as in the case of the Internet that is "autonomous, distributed, and collaborative" in essence. As a consequence, we expect people's lives to improve and that new economic growth will be achieved on the axis of ICT.

BISE: What is the function of the Japanese government in the spread of cloud services?

Watanabe: In Japan, two-way broadband networks have been developed and the world's most affordable broadband services are available. On the other hand, the usage of ICT lags behind in the fields of administration, medical care, education, and agriculture. To expedite sustained use of ICT in these fields, we should promote widespread use of cloud services, which excel economically, by taking advantage of Japan's network environment enabling cloud services.

It is likely that widespread use of cloud services will realize greater efficiency that extends beyond industrial frameworks, greater sophistication of social infrastructure, it will reduce the impact on the environment, and promote global corporate development.

Cloud services, as well as related technologies to provide such services, are developing. Therefore, it is necessary to ensure the diversity of service models, such as private cloud, public cloud, hybrid cloud, and multi-cloud, as well as the diversity of service components, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), and also the diversity of Service Level Agreements (SLAs). Hence, the basic concept of the Japanese government for the widespread use of cloud services is:

(a) The government should firstly promote the use of diverse cloud services.
(b) The government should launch the development of cloud-related technologies in the light of user needs and promote strategic initiatives to create innovations.
(c) The government should contribute to the spread of cloud computing, to the development of the environment necessary for the widespread use of cloud services, to public support for private-sector research and development efforts, and act as a procuring entity of cloud services.

BISE: The use of ICT in medical care lags behind, as you said. To what extent do you think this is due to unclear or lacking jurisdiction and privacy concerns? Is the Japanese government preparing new laws that regulate the use of medical and personal data in ICT?

Watanabe: In the field of medical care, we are aware that some regulations and systems hamper the utilization of ICT. Therefore, the government's expert panel in ICT Strategy Headquarters is considering to review some regulations and systems that block the utilization of ICT. Additionally, a new working group in the "Japan Cloud Consortium" is conducting a study on cloud service models in the field of healthcare. We expect that concrete problems and solution strategy will be advocated there.

BISE: You mentioned alleviating the burden on the environment. Sustainable Cloud Computing will ideally include two things: "green" hardware plus better protection of the environment through smart cloud services. From an environmental point of view, which Cloud scenarios and applications do you think will be most beneficial nationally and internationally?

Watanabe: From an environmental point of view, we can observe some important new services by utilizing cloud computing such as a smart grid that integrates and manages the flow of electricity and stream of information, next-generation Intelligent Transport Systems that can improve traffic congestion and reduce CO_2 emissions integrating the probe data produced by each vehicle, and wide spread sensor networks that integrate and manage various information such as that on rainfall and ground condition etc.

BISE: Particularly, which kinds of services do you anticipate will be promoted and spread by establishing cloud services?

Watanabe: Thorough use of ICT is expected for widespread application of cloud services particularly in medical care, education, agriculture, forestry, fishing industry, and other fields where the use of ICT lags behind.

- Medical care cloud: Electronic medical data can be centralized in a medical care cloud so that the data can be used to create new drugs and new treatments based on an enormous amount of medical evidence data. This cloud can also be used to build emergency medical systems. Using the cloud for triage in the event of a large-scale disaster is another possible option.
- Education cloud: Evaluation on school management and information service systems can be integrated into an education cloud to reduce expenditures and burdens. This cloud can be used nationwide to provide digital education materials and a knowledge database.
- Agriculture cloud: In light of the aging of farmers in Japan, an agriculture cloud is expected to be applied to pool farmers' expertise for the use by newcomers in agriculture. Additionally, with the application of sensor networks and satellite images, data pooled in the agriculture cloud can be utilized for farmland management and market exploration.
- Regional cloud: Local governments in cooperation with for instance Non-Profit-Organizations (NPOs) should promote the development of regional clouds to solve local issues in public services, including medical care, nursing care, welfare, disaster protection, and crime prevention. In making these efforts, and in order to encourage activities of NPOs, they may support the establishment of an "NPO cloud" which allows NPOs and other organizations engaged in similar activities to coordinate their efforts on a wide scale using cloud services.

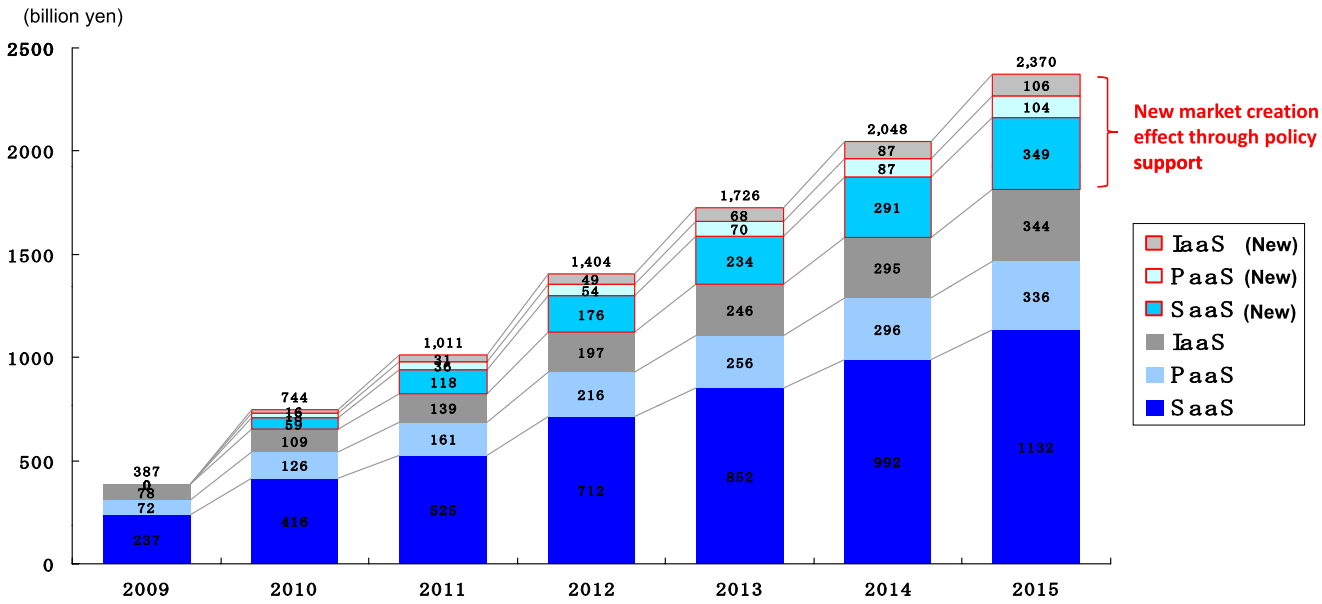

Fig. 1 The expected market size of cloud services in Japan

BISE: What is the problem when establishing cloud services in the field of the Japanese government?

Watanabe: In order to achieve the goals of improving the transparency of government services, promoting open government for the people, and renovating administration, we are of the opinion that the government should promote e-Government clouds, i.e., the "Kasumigaseki Cloud" of the central government and the "local government clouds" of local governments.

In developing such clouds, the government believes it needs initiatives for the provision of one-stop administration services which include: ensuring security and reliability, creating a national ID system which is not only compatible with private-sector ID systems but also allows the public to control personal information on its own, and coordinating and sharing corporate codes. As for highly cost-effective information systems, the government should consider using private-sector cloud services.

With regard to technologies for ensuring the security and reliability of the "Kasumigaseki Cloud" and other clouds to be developed by the government, it is necessary for the government to disclose the clouds' specifications, interface, and other technical specifics, and to promote their widespread use. In developing the "Kasumigaseki Cloud" and other clouds, the government should select international standards and technologies to be applicable to the clouds by opening decision-making procedures to the public. Moreover, when the government connects to its cloud with private-sector cloud services, it must direct maximum attention to the need for making the interface open to the public and take security measures against cyber attacks and other crimes.

BISE: You have mentioned cyber attacks and other crimes as threats to cloud services. Another threat may be natural disasters, in particular as Japan is threatened by earthquakes. A crisis would damage cloud services. How do you want to cope with such unavoidable threats and maintain the availability of cloud services?

Watanabe: To promote the use of cloud services, from the point of view of guarantee rights to cloud service users, it is necessary to formulate a guideline that, among others, indicates advantages and disadvantages depending on the type of cloud services, risks as well as responsibilities when using cloud services. So we are working on the formulation of the guideline. In the discussion, we propose the guideline should be able to handle the dispersion of risk, e.g., formulate a business continuity plan in order to deal with network decoupling caused by large earthquakes etc. In addition, for promoting the use of cloud services, it is important to concentrate on the development of next-generation cloud technologies that work safely and reliable. Therefore we have in research and development attempted to improve end-to-end safety and reliability also of the network.

BISE: What is the direction of the Japanese policy for the introduction of cloud services in the future?

Watanabe: It is necessary to maximize the use of cloud services (services that use cloud computing technology) to promote the wide-spread use of ICT and thus amass and share a wealth of information and knowledge beyond the boundaries of companies and industries across the entire social system, and thus achieve a "knowledge and information society," create new economic growth, and bolster Japan's international competitiveness. To promote the spread of cloud services, we will need to implement the following strategies: we must encourage (1) the use of cloud services (Utilization Strategy), (2) strategic research and development for next-generation cloud technology (Technology Strategy), and (3) an international consensus and global cooperation (International Strategy). We expect these strategies to help expand the size of the cloud services market from the current (2009) 390 billion yen (4.3 billion U.S. dollars[1]) to 2.4 trillion yen (26.0 billion U.S. dollars) by 2015, thereby creating a new market in the 2 trillion-yen (22.0 billion U.S. dollars) range (**Fig. 1**).

BISE: Mr. Watanabe, we thank you very much for this interesting interview.

[1] Converted at the rate of 91 yen/ U.S. dollar (as of June 1, 2010).