Global Standardization Activities

Activities of HGI and the OSGi Alliance

Nobuo Fujii† *and Ryutaro Kawamura*

Abstract
This article gives an overview of HGI (Home Gateway Initiative) and the OSGi Alliance and discusses their current activities.

1. Introduction

A home gateway is an appliance that interconnects a home network with the networks of various operators. HGI (Home Gateway Initiative) is a forum that was established to discuss the requirements for developing common specifications for these home gateways. The OSGi Alliance* is developing open specifications for middleware that totally manages diversified appliances and equipment connected to home or enterprise networks. It has enhanced the middleware specifications and extended their application areas. These standards will enable home users to easily access diversified services.

2. HGI

2.1 Overview

HGI [1] is an open forum that was established by European telecommunications operators in December 2004 to develop requirements for common home-gateway specifications using the technical standards of other forums. The founding members were nine operators (Belgacom, France Telecom, Deutsche Telecom, British Telecom, KPN, NTT, Telecom Italia, Telephonica, and Telesonera). The membership reached 50 companies after the first plenary meeting in April 2005. The new members are manufacturers and some telecom operators. In Europe, some European operators now provide triple-play services that bundle data, voice, and broadcasting services using DSL (digital subscriber line) technologies. Once the common requirements for home-gateway specifications have been established, more economical and integrated home gateways will become available. Additionally, home gateways will meet security, quality of service, and home automation requirements.

2.2 Policy

HGI is focused on developing requirements for common home-gateway specifications using the technical standards of other standard bodies. HGI itself will not develop its own technical standards. Its relationship with other standard bodies is outlined in **Fig. 1**. Related access network standards will be imported from the DSL Forum [2] and audio-visual appliance interconnection requirements will follow DLNA (Digital Living Network Alliance) [3]. The goal of HGI is to establish a home-gateway reference architecture by incorporating existing standards. This architecture will clearly identify the specification requirements.

† NTT Cyber Solutions Laboratories
   Yokosuka-shi, 239-0847 Japan
   E-mail: fujii.nobuo@lab.ntt.co.jp

* The OSGi Alliance is an open forum, whose mission is to specify, create, advance, and promote an open service platform for the delivery and management of multiple applications and services to all types of networked devices in home, vehicle, mobile, and other environments. The letters OSGi originally meant open services gateway initiative, but today, they represent an abstract attribute label (modifier) for objects associated with the organization. In repositioning its public image to better align with its true mission, the advancement of an open, portable, standardized service platform for cross-industry use, the OSGi Alliance wanted to retain the recognition achieved by the organization since its formation in 1999, while clarifying that its specifications and other work products were applicable for uses, venues, and devices far beyond the domains usually associated with typical "gateways". http://www.osgi.org/

2.3 Organization and schedule

The management committee formed from the founding members will manage the forum. Under the management committee are business and technical requirements groups. Furthermore, the business requirements group itself includes the operators' sub-group. Business requirements developed by the operators' sub-group will become core requirements. The business requirements will be further enhanced following discussions with manufacturers in the business requirements group. The technical requirements group will develop the reference architecture conforming to the business requirements with the objective that requirements from telecom operators will be represented. Considering the inclusion of set-top box (STB) functions in home gateways, DSL-based home-gateway requirements will be developed by the end of 2005 and products that comply with these requirements are expected to be available by the middle of 2006. As a second step, extended requirements that incorporate other access technologies, such as Ethernet, FTTH (fiber to the home), and service gateway functions, will be available by the end of 2006. **Figure 2** illustrates a future home network environment proposed by HGI.
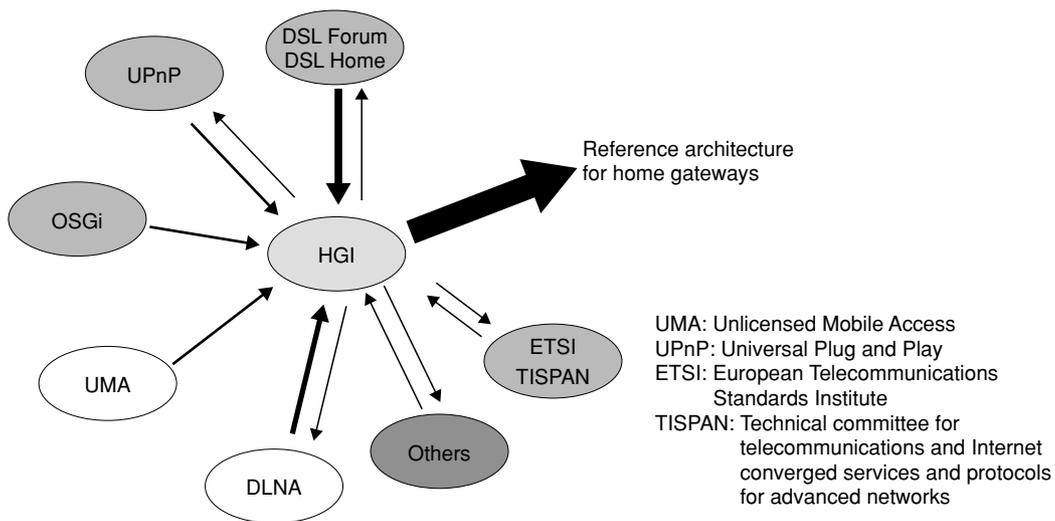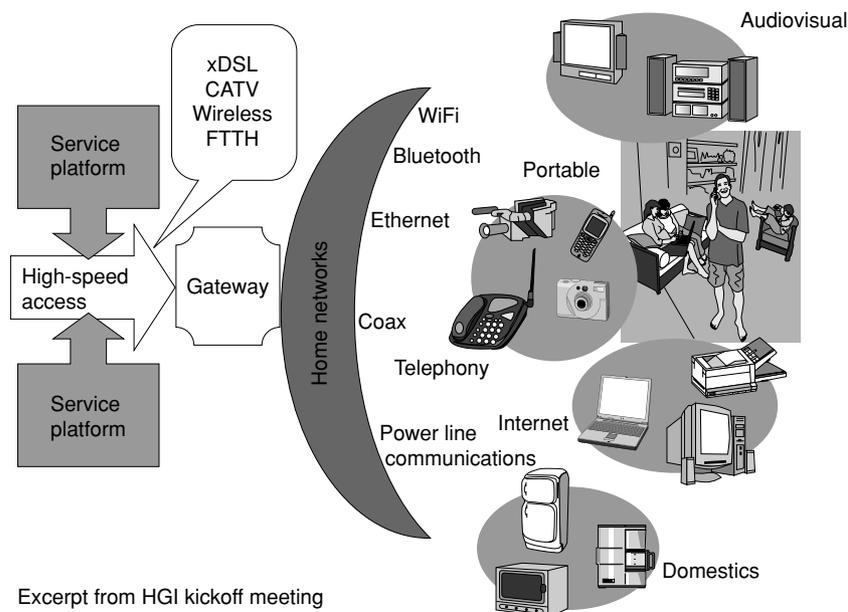

UMA: Unlicensed Mobile Access
UPnP: Universal Plug and Play
ETSI: European Telecommunications
      Standards Institute
TISPAN: Technical committee for
      telecommunications and Internet
      converged services and protocols
      for advanced networks

Fig. 1.   Relationships with other forums.

Excerpt from HGI kickoff meeting

Fig. 2.   Home network environment.

3. OSGi

3.1 Overview

OSGi is developing "OSGi service platform" specifications and promoting its applications in various areas. The service platform will follow open and multipurpose software component technologies, based on Java. OSGi was established in 1999 and currently has 41 active members. There are eight members from Japan, and NTT plays a key role as a board member.

The OSGi service platform is illustrated in **Fig. 3**. In OSGi, networked appliance functions are achieved using a set of software components called "bundles". Networked appliances include home gateways, automobiles, and mobile phones. By downloading new bundles to these appliances through networks, users can easily add new services, enhance existing functions, customize user-based functions, and repair malfunctioning appliances. OSGi application areas include home (automation and security) and ubiquitous environments, mobile telecommunication, ecology, health care, telematics, and education. An example of an OSGi home gateway is shown in **Fig. 4**. In this example, the home-gateway downloads bundles from a service provider and flexibly adapts to the new services. The standardization activities of OSGi have already been reported in this journal [4].

3.2 Standards and business trends

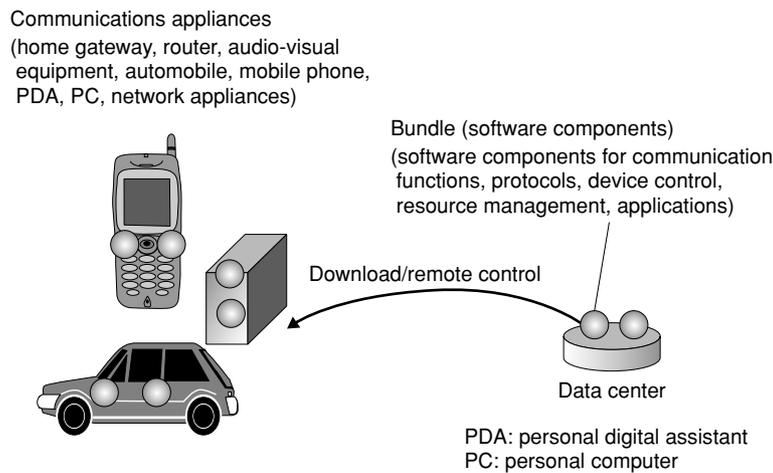The current release of the OSGi standards is

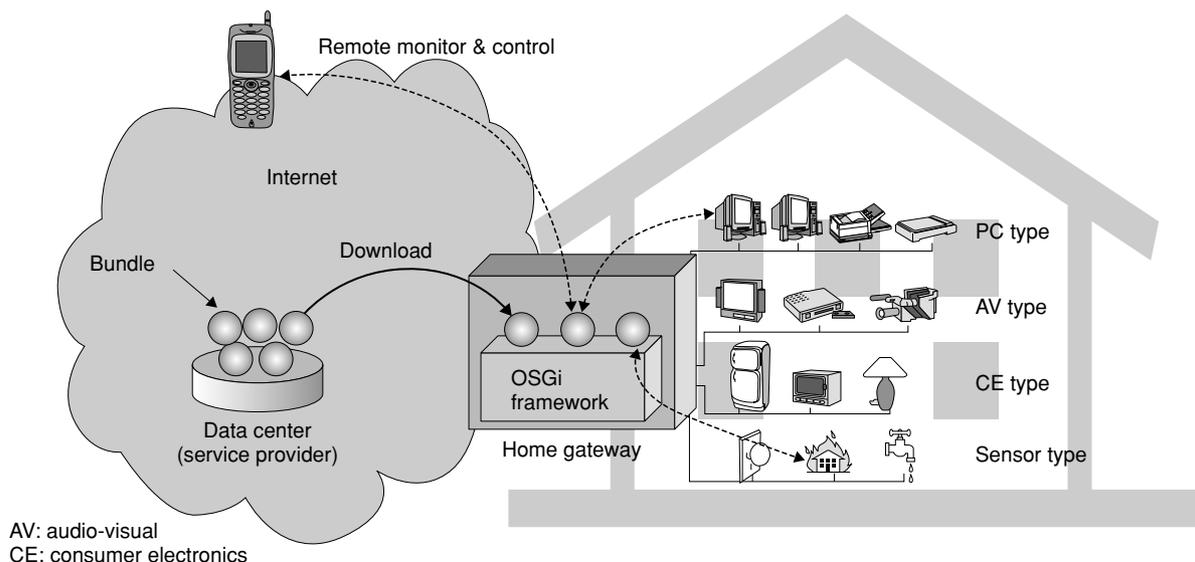
Fig. 3.   OSGi concept.

Fig. 4.   OSGi control model (home application example).

release 3. The main purpose of release 4 is to include new functions that will enable it to be used on mobile phones. Users will be able to easily change their mobile phone functions and services by downloading bundles. Release 4 is scheduled to be available by the end of this year.

The OSGi service platform has been used for various businesses worldwide, especially for home applications in North America, South Korea, and Europe. In addition, companies in the automobile industries, such as BMW, have started to use it for mobile navigation and audio-visual appliances. In Japan, building and factory automation and energy-saving applications are the current business areas. In an effort to promote the use of OSGi service platforms in other business areas, the "OSGi Users' Forum Japan" was established in September 2004 [5]. It currently has 45 member organizations who contribute to workshops and interoperability test activities. OSGi Users' Forum Japan was the first forum for OSGi users to be established. Since then, South Korea, France, and Germany have also established such forums and are planning to collaborate with the others.

4. Directions of home gateway standards

The OSGi service platform enables home gateways to timely adapt their diversified service requirements in multi-play environments. While the short-term objective of HGI assumes existing access network environments that rely on DSL technologies, a more flexible home-gateway architecture is needed to expand its application markets in the next step where broadband network environments, including Ethernet and FTTH, will be available. NTT Laboratories will propose that HGI adopt the OSGi service platform and seek collaborators to help create new services and make OSGi-based products available in the telecommunications market.

References

[1]   http://www.homegatewayinitiative.org/
[2]   http://www.dslforum.org/
[3]   http://www.dlna.org/
[4]   R. Kawamura and H. Maeomichi, "Standardization Activity of OSGi (Open Services Gateway Initiative)," NTT Technical Review, Vol. 2, No. 1, pp. 94-97, 2004.
[5]   http://www.osgi-ufj.org/ (in Japanese).

Nobuo Fujii
Executive Manager, NTT Cyber Solutions Laboratories.
He received the B.E. and M.E degrees in applied physics from Osaka University, Suita, Osaka in 1977 and 1979, respectively. In 1979, he joined the Electrical Communication Laboratories, Nippon Telegraph and Telephone Public Corporation (now NTT), Yokosuka ECL. Since then, he has been working on network management and operations technologies R&D including digital cross-connect systems, transport networks, multipoint video conferencing services, and home networks and services. He received awards from the Information Technology Standards Committee of Japan and the ITU Association of Japan for his significant international standardization activities in ISO/IEC/JTC1/SC21 and ITU-T in 1996 and 2000, respectively. He is a member of IEEE and the Institute of Electronics, Information and Communication Engineers (IEICE) of Japan. He is a vice-chairman of ITU-T SG4, chairman of the standards committee of the Telecommunication Technology Committee (TTC) of Japan, and chairman of the technical committee on telecommunication management of IEICE.

Ryutaro Kawamura
Senior Manager, Network Appliance and Services Project, NTT Cyber Solutions Laboratories.
He received the B.S. and M.S. degrees in precision engineering and the Ph.D. degree in electronics and information engineering from Hokkaido University, Sapporo, Hokkaido in 1987, 1989, and 1996, respectively. In 1989, he joined NTT Optical Network Systems Laboratories. From 1998 to 1999, he was a visiting researcher at CTR in Columbia University. He is engaged in research on network reliability techniques, network control and management, high-speed computer networks, active networks, network middleware and the next-generation Internet architecture. He has been on the Board of Directors of the OSGi Alliance since 2003. He is a member of the IEEE Communications Society and IEICE.