Global Standardization Activities

Activities for WiMAX Standardization

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Abstract

WiMAX (worldwide interoperability for microwave access) is attracting growing attention as one of the candidates for next-generation wireless technology. This article introduces the latest standardization activities for WiMAX.

1. What is WiMAX?

WiMAX stands for worldwide interoperability for microwave access. It is a wide-area wireless technology that has been studied as a means to provide high-speed communication over the last one mile to business and consumer premises. While WiFi (IEEE802.11), a wireless technology widely used in the home or public wireless LAN (local area network) service market, covers only 20 to 100 m from the base station and achieves a communication speed of several tens of megabits per second, WiMAX typically covers 5 km from the base station and achieves a maximum speed of 75 Mbit/s. (The coverage and speed depend on the environment in which the system is used and on the particular system configuration.)

WiMAX is just a nickname. Formally, it is a system that conforms to IEEE 802.16, a wireless communication standard being standardized in IEEE [1]. To exploit the standard to ensure compatibility and interoperability between products of different vendors and between different service providers and to promote its widespread adoption in the market, a non-profit organization called the WiMAX Forum [2] was inaugurated in 2001. The nickname WiMAX was chosen by the WiMAX Forum for their standards-based systems.

The WiMAX Forum consists of various industry leaders and organizations. Its membership exceeded 300 as of July 2005. Representing the NTT Group companies, NTT Corporation joined the Forum in June 2005 and is collecting and studying information about the technology together with staff from other Group companies.

2. Organization of WiMAX Forum

The WiMAX Forum consists of the Board of Directors, which is responsible for the management and decision-making of the organization, and seven Working Groups, each covering a specific topic (**Fig. 1**). The membership is classified into Board Members, Principal Members, and Regular Members.

Most of the Board Members have been involved in the Forum from its inception. They include Intel Corporation, Alvarion, Airspan Networks, AT&T, BT, and Fujitsu Microelectronics America. The Board of Directors makes decisions for the Forum. Only those enterprises that are invited by the existing Board Members are eligible to become new Board Members. Principal Members can not only read and propose specifications but also have votes in Working Groups. Regular Members are only allowed to read and propose specifications. Therefore, most enterprises and organizations that participate in the Forum in order to collect information choose to be Regular Members. NTT is a Regular Member.

Besides NTT, major Japanese corporations that participate in the Forum include KDDI, Fusion Communications Corporation, eAccess Ltd., Yozan, NEC,

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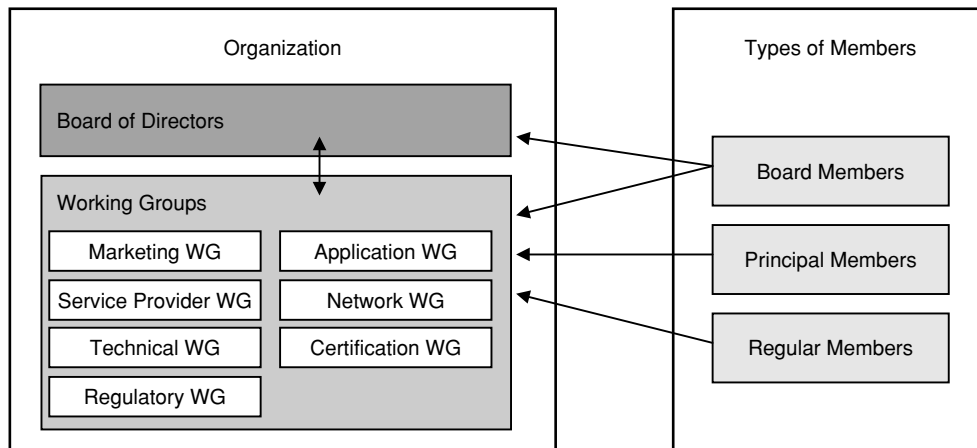 Chiyoda-ku, 100-8116 Japan
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Fig. 1.   Organizational structure of WiMAX Forum.

Fujitsu Microelectronics America, and Kyocera.

3.   Activities of Working Groups

The activities of the Working Groups are summarized below.
(1) Marketing WG
    Conducts public relations activities to build awareness of the WiMAX Forum and the WiMAX brand.
(2) Service Provider WG
    Defines requirements from the viewpoint of service providers and provides feedback to all the other Working Groups.
(3) Technical WG
    Develops interoperability specifications for WiMAX devices and establishes a test and certification infrastructure.
(4) Regulatory WG
    Ensures globally harmonized spectrum for WiMAX and works with regulators to develop flexible and technology-neutral regulatory frameworks.
(5) Application WG
    Clarifies requirements from the viewpoint of service provision and end users to help promote the development of WiMAX.
(6) Network WG
    Develops end-to-end WiMAX network specifications for fixed, nomadic, portable, and mobile environments.
(7) Certification WG
    Recommends the selection of test labs., coordinates on this with the Forum, and manages the WiMAX Forum Certification Program.

4.   Reasons for growing interest in WiMAX

The WiMAX specification was originally studied to provide high-speed communication as the last-mile access line. The latest specification is IEEE802.16-2004, which was adopted in June 2004. Since then, many vendors have been developing products, and service providers have been preparing for the introduction of fixed wireless access (FWA) services. However, these days the target of WiMAX is not confined to FWA, but has been broadened to embrace applications to mobile systems. Studies for these applications are in progress and are expected to result in the IEEE802.16e specification in autumn 2005 [3]. When this new specification is implemented, mobile applications covering two to three kilometers from the base station and achieving a communication speed of around 15 Mbit/s will become possible. (The coverage and speed depend on the environment in which the technology is used and on the particular system configuration.) IEEE802.16e assumes broadband access from cars and trains moving at a high speed (around 120 km/h). Such capability holds the potential for the emergence of entirely new service uses that exploit high mobility.

5.   Activities in Japan

In Japan, several carriers and service providers have begun to study the introduction of wireless broadband services using WiMAX. The Ministry of Internal Affairs and Communications (MIC) launched the "Study Group for the Promotion of Wireless Broadband Access" in November 2004. Through collaboration between the Study Group members and other

corporations, it is studying examples of services using a variety of next-generation wireless technologies with a view to building a ubiquitous network. Many corporations are already proposing new WiMAX-based services.

6. Frequency allocation issues

Among a number of issues standing in the way of the widespread use of WiMAX in Japan, the one considered to be the most serious is the choice of the frequency spectrum to use. Currently, the WiMAX Forum recommends three standard bands: 2.5, 3.5, and 5.8 GHz. In Japan, the 2.5-GHz band is already allotted to mobile phone providers, the 3.5-GHz band to broadcasters, and the 5.8-GHz band for intelligent transport systems (ITS). This means that there is currently no spare band that can be allotted for WiMAX. If Japan should choose to start services using non-standard bands, the devices used would become specific to Japan, which would make it difficult to reduce their costs and might prevent Japanese WiMAX devices being usable in other countries and vice versa.

7. Future directions

By the time this article is published, IEEE802.16e, a specification applicable to mobile applications, should have been established. This is expected to lead to much greater global interest in WiMAX. The NTT Group will collect and study new technologies, such as WiMAX, within the context of expanding its broadband environment and will take appropriate actions as the technology unfolds.

References

[1] http://www.ieee.org/
[2] http://www.wimaxforum.org/home
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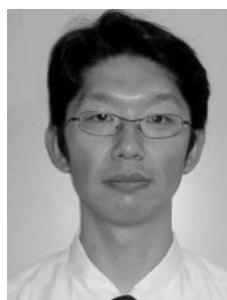
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