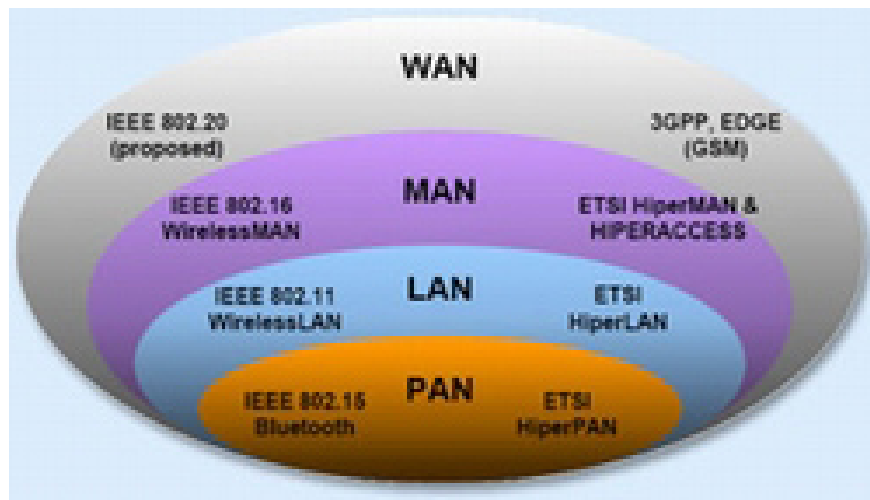


World wireless technology

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Wireless technology is everywhere. With any application or service related to data transport, there is a wireless solution.

Newly prepared technologies are expected to promise a completely wireless world, so eventually the looming wires behind your computer and home stereo systems You can be thrown into storage because you probably will never use them again.



Wireless WAN

Do you remember the time when 3G was at the highest peak of its cycle? There has been a lot of talk about mobile video conferencing, Internet access and online newspaper reading while on the train in the morning and sending e-mails while sitting on a beach somewhere. How does it work for everyone?

But new wireless broadband services are making dreams about the Internet anywhere and everywhere come true. Today, you can achieve fast speeds like ADSL when accessing the Internet at home or on the road without having a coaxial or copper wire. With the introduction of WiMax in the future, it is hoped that wireless access speed can compete with ADSL.

The future for wireless broadband can be summed up in one word: WiMax, also known as IEEE 802.16. We are still in the advertising phase for WiMax and the results from real-world tests are not much, but the core technical features for this protocol are impressive.

The term WiMax can be understood similarly to Wi-Fi, although while the range of Wi-Fi is measured in meters, the range of WiMax is measured in kilometers. With the wide range of WiMax, service providers will be able to cover all urban areas with just a few towers. WiMax is not the only solution for wireless broadband networks - Europe's Hiperman (High-performance Wireless Metropolitan Area Network) is being developed but is not considered a heavyweight candidate.

Although not happening at this stage, WiMax will have enterprise applications, replacing Wi-Fi in businesses is very feasible. The added range of WiMax will make it possible for an entire building or campus to be covered because only a centrally managed single access point is possible.

WiMax supporters have previously talked about ranges of up to 50 kilometers from the base station. However, the fact that these ranges narrowed a bit. Previous practical tests have shown that a radius of 7 to 15 kilometers can be achieved from well-installed antennas and this is still a significant range.

Of course, the biggest gain for consumers is that the introduction of WiMax will result in the device no longer being proprietary and therefore cheaper. Intel has plans to produce chipsets that incorporate WiMax technology and most of the other "big guys" in the industry have expressed their support for WiMax.

The speed of WiMax, like the speed of current proprietary technologies, will depend greatly on the magnitude of the spectrum that service providers are willing to buy and use and the number of cells (cells) that they are ready to buy. WiMax is designed to operate on a broad spectrum so theoretically at least the overall data rate up to 70Mbit / s or higher is possible. However, the radio spectrum is not cheap at all and we hope that service providers will make every effort to keep up with ADSL, not run far beyond it.

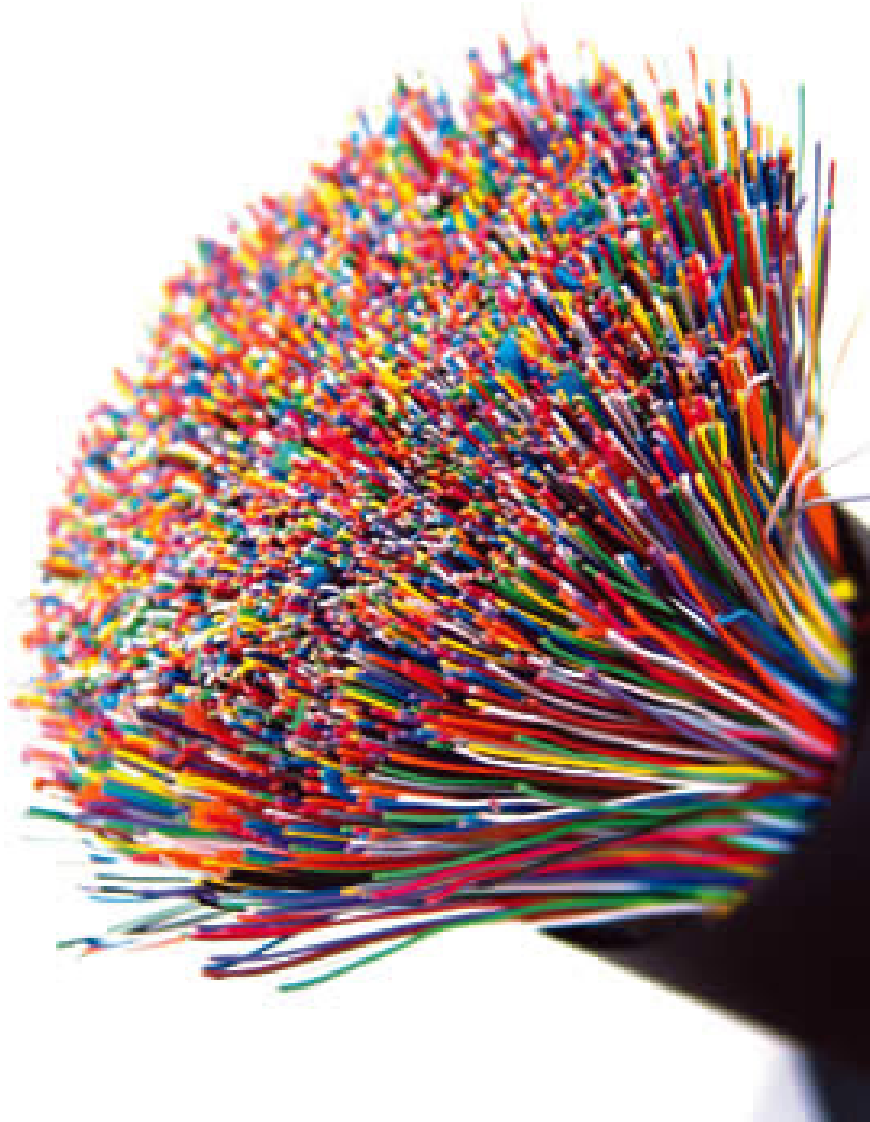
There are actually a few "flavors" of WiMax. First of all, the 802.16 standard specifies that WiMax operates in the range of 10 to 66GHz. 802.16 is followed by 802.11a, which extends the spectrum to a range of 2 to 11GHz, which is more realistic because this is the range that most vendors already have. It may operate in unlicensed strips but may encounter serious interference in these bands.

However, the standard that attracted the most attention of service providers is that the 802.16e standard has not yet been adopted (at least until this point). The Institute of Electrical and Electronics Engineers, with their usual slow pace, can finally confirm this standard by the end of this year or early next year. 802.16e integrates mobile features, providing services comparable to mobile broadband services such as iBurst / IntelliCell and 3G.

In the long run, the main challenge for wireless broadband networks will not be the delivery technology but the means to support those who want to use it. Wireless broadband, like other forms of wireless technology, operates in a shared environment. As a user, you are competing to take space on the airwaves with others who are also trying to use it. 70Mbit / s on a cell with WiMax sounds a lot but it is 70Mbit / s shared between people using that cell.

Suppose we currently have ADSL services that provide speeds of 12Mbit / s. At that rate, only 6 people can simultaneously use a WiMax cell - not necessarily a case of supplier savings (of course, vendors with too many subscribers will assume that not Everyone will use the service at the same time. However, as the number of subscribers increases, it will be interesting to see how wireless broadband providers handle the problems of a good shared system.

Wireless LAN



The little secret of today's wireless LAN technologies is that they work differently than advertised. The box will record 54 Mbit / s or 108Mbit / s, but at the end you will only get 10% of that speed. If you're in a high-density area, you might be in interwoven wireless networks, all fighting to get the same wireless spectrum you want to use to transfer files or download images. Your video photo.

Today, we have three main types of wireless LANs: 802.11b, 802.11g and 802.11a. Operating at 11Mbit / s, 802.11g is the standard we know best with the name Wi-Fi. 802.11g and 802.11a came into being later. 802.11g, using the same spectrum spectrum as 802.11b and backwards compatible with it, has become the most popular wireless LAN technology today. IEEE 802.11a, often referred to as the "less" cousin of 802.11g, works quite similarly (including having a 108 Mbit / s "Turbo" mode) but using a different spectrum.

The formidable inefficiencies of 802.11a / b / g are the result of a series of factors: severe cramping and noise in the 2.4GHz band; poor handling of return signals; similar Ethernet dispute mechanisms; needs high encryption to ensure security. All of these factors have led to a service that is not the same as advertised.

The solution to this poor performance is the mission of 802.11n - a standard currently being debated by IEEE members. It is not known when a standard must be born (some time in 2006 is a formal deadline), but some competing groups must agree with each other before the problem is finally resolved.

What everyone has agreed on is the use of MIMO antenna technology (multiple input, multiple output, temporary translation: multiple output outputs) to deliver much greater throughput and spectrum performance than Existing technologies.

MIMO is a technical solution that uses multiple send and receive antennas, combined with multiplexing and modulation techniques similar to those used by digital TV transmitters. Besides a technique called segmented multiplexing (SDM), which uses the physical separation of multiple antennas to multiplex signals, it uses multicast signals to increase throughput or reduce errors. in wireless transmission. MIMO can deliver at 6 times the speed of 802.11g transmitters and with 8 times the range.

However, there was an inappropriate trend to combine MIMO technology and 802.11n into one. This makes it possible for many technology customers called "Pre-N" to meet. Belkin (USA) encountered this problem late last year when it launched Belkin Pre-N routers. This router uses chips from Airgo Networks and has three antennas.

Based on an outline of the 802.11n specification, according to the results of many practical tests, Pre-N routers make up to 40% of its capacity compared to its 108Mbit / s specification. . This number is equivalent to the capacity provided by Fast Ethernet and is certainly enough to provide continuous video signals, even high-bandwidth video streams.

The problem with other Belkin Pre-N products and other Pre-N wireless access points and routers, is that it only works with its own proprietary wireless cards. There is no official standard yet, so Belkin only "filled the gap" as before. When this standard is approved, it is possible that Belkin will not communicate with 802.11n devices.

There are two main groups struggling to implement 802.11n: the WWiSE group (WorldWide Spectrum Efficiency) and the TGn Sync group (Task Group N Synchronization). The WwiSE group wants to use the ISM band used by 802.11b / g and make it backwards compatible. And TGn Sync wants to use 5GHz spectrum (used by 802.11a) and promote basic bandwidth levels.

Both groups have a minimum goal of 100Mbit / s continuous maintenance flux with high spectral efficiency. Members of the TGn Sync Group believe that their plan can be increased to 500Mbit / s using four transmitters, although the speed of 250Mbit / s using two transmitters is considered an existing target. more real.

The WWiSE team wants to use less spectrum (20MHz bands - the range that 802.11g operates - versus TGnSync's 40MHz bands) and this will preserve the ever-increasing precious radio spectrum. The result will be speeds of about 135Mbit / s at the beginning, with a long-term target of 540Mbit / s.

Wireless PAN network

Since Bluetooth was deployed, there has been a lot of talk about wireless personal area networks, but not much action has been taken. Most concerns for the PAN network are related to its use in smart mobile phones, such as to synchronize with computer software or to use wireless headsets. It also began to be used for devices such as headsets with wireless microphones, with digital audio transmission providing clear sound.

The deployment of Bluetooth technology now tends to use it as a replacement of peripheral cables for a limited number of devices, rather than a tool to allow a large number of devices in the home or The office can communicate directly.

But the long-term perspective is much larger. Many home devices that can benefit from wireless connectivity are not even considered. We talk about game consoles that can talk wirelessly with routers, digital transmission

boxes that can transmit digital TV signals to your computer or to multiple indoor monitors, servers The transmission line can broadcast music radio to arbitrary headsets within transmission range, cameras that can communicate directly with printers and portable MP3 players that can be sent Music files to your home audio system. These are the kinds of interconnection applications that consumer electronics are dreaming about but still have not had the opportunity to use.

Part of that is because Bluetooth has not done its job properly. Bluetooth has made some progress, especially in the field of wireless audio transmission. For example, the Bluetooth A2DP standard (Advanced Audio Distribution Profile) allows a standard-assisted PDA to communicate directly with wireless microphone-attached headsets without an intermediate base station.

But Bluetooth is not fast enough for video applications, and certainly never. Bluetooth is currently only capable of transmitting at speeds of 1 to 2 Mbit / s in a range of about 100 meters with an output power of about 100mW. Such is too good for audio and for printers and entry devices but digital TV requires a minimum speed of 7Mbit / s. If you want to transmit high resolution TV signals, you need a system capable of handling 20-24Mbit / s.

The current outstanding technology for personal area networks is UWB, also known as 802.15.3a (another IEEE standard). Unfortunately, UWB has recently been transformed from a promising technology into a preconceived story about unsuccessful processes of standards, Ultra Wideband has been circled around in IEEE for more than a year. Now, there is not much progress. This is considered the PAN technology that all other PAN technologies have to overcome, but we have not yet seen it appear in the real world. The good news is that in June, a group called the MultiBand OFDM Alliance joined the IEEE ultra-broadband working group and began to push the standard.

The reason they are so concerned is because UWB has a lot of potential. UWB transmits extremely short data - less than one nanosecond - across a broad spectrum. In the US, the spectrum has been approved for use by this technology.

In very short distances, UWB technology is capable of transmitting data at speeds up to 1Gbit / s with a low power source (about 1mW). With its wide spectrum, UWB is less likely to be affected by distorted reasoning than wireless technologies, and because of that low transmission capacity, it causes very little noise in other devices.

Its intended range is only about 10 meters and because of its standard problems, it is expected that UWB technology will have a place in both the wireless version of USB and in the next iteration of the public. wireless technology.

Although a lot of suggestions have been resolved, USB is expected to take advantage of this much of the capital authentication workflow integrated into 802.11 standards. For example, it would be important if your UWB transmission server could not be compromised by someone passing by.

Intel and other UWB supporters are predicting that UWB will act as a kind of versatile transport layer for short-range wireless applications. In this forecast, a future version of Bluetooth uses UWB as its transport and access control layer, just like using wireless USB. Higher-level protocols take care of application-specific deployment. UWB is considered a core component of the wirelessly connected world, controlled by open standards that allow all devices to communicate with each other. In short range, we have UWB; medium range 802.11n; and at long range WiMax will bring high-speed Internet access to our home or wherever we are.

Minh Chung - (*Post and Telecommunications Magazine & IT*)

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