

## Public Wi-Fi access

### What it is and what it does

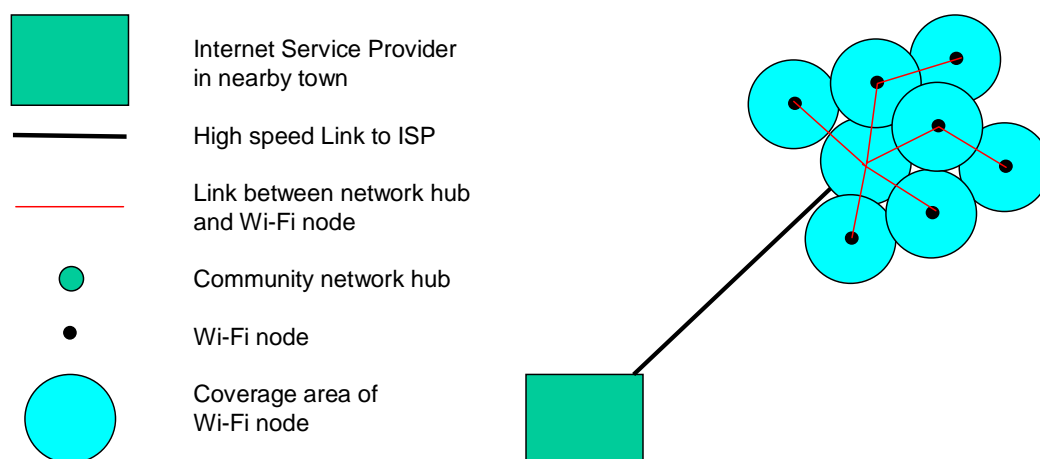
'Wi-Fi' is the popular name for the wireless Local Area Network (LAN) technology described in the briefing on 'Ethernet and other LANs'. The official name is IEEE 802.11b and it was originally designed for linking up computers within an office building or factory. However a Wi-Fi node operating at the maximum allowed power can broadcast its signal to an area with a radius of several hundred metres. Using transmitters of the same power, it is also possible to set up point-to-point links over distances of between 10 and 15km. In addition the Wi-Fi radio frequencies (~2.45GHz) can be used without a licence in most countries. As a result companies have been exploring how to use the technology for public broadband access services.

A Wi-Fi node operates at about 10Mbit/s so it can provide always-on broadband Internet access to a large number of users – over 50 of them if they are simply dealing with their e-mail or browsing the Internet. The connection is symmetrical, i.e. it offers the same upstream and downstream bit rate, so it can support good quality video in both directions as well as transferring large files very quickly.

The first services offered were in airports, conference centres and similar public spaces. Wi-Fi nodes were used to create 'Hot Spots' within the building, where people with Wi-Fi enabled laptop computers or PDAs could access the Internet. From the users' point of view, it is like using the office LAN. The connection procedure is similar and so is the speed at which they can browse the web or send and receive e-mail. In some cases the service is provided free. The Starbucks coffee shop chain has been offering its US customers free Wi-Fi Internet access for some time and has recently extended the service to some of its European branches. In other cases users have to sign up for the service in much the same way as they would buy credit for a prepayment cellular phone. Megabeam Networks, for example, offers business travellers anything from a one hour package at €7.50 to a one year subscription at €18.00.

### Key messages for SMEs

- Community networks using Wi-Fi technology can provide broadband services to rural villages
- They offer symmetrical 'always-on' Internet access at between 10 and 40 times the speed of a telephone line.
- Availability usually depends on a 'self-help' initiative by the local community
- Because the service is always on, you need to install fire-wall software to protect your system from malicious intruders



*Structure of a Wi-Fi community broadband network*

More recently a number of organisations have started to use Wi-Fi technology to create community broadband networks, offering broadband Internet access to businesses and individuals in small villages where other broadband technologies are not commercially viable or technically feasible. The community network consists of a number of Wi-Fi nodes, each covering an area of a few hundred metres in radius. These are connected to a central hub by point-to-point radio links. A high-speed leased line or point-to-point radio link is used to connect the hub to an Internet Service Provider in the nearest town or city. Customers are offered an always-on Internet connection at a bit rate of between

500kbit/s and 2 Mbit/s in both directions – i.e. 10 to 40 times faster than a 56kbit/s modem connected to a telephone line.

### Other related systems

Wi-Fi is currently based on a radio standard known as IEEE802.11b. There are other variants of this standard that are starting to emerge and that you may see mentioned.

**IEEE802.11a** provides a higher bandwidth than IEEE802.11b. It carries 54 Mb/s and therefore can move information around at about 5 times the speed of IEEE802.11b, or give 5 times as many users the same level of service. However, the part of the radio spectrum that this standard needs (about 5GHz) is not as freely available in Europe as it is in the USA, where the standard originated.

**IEEE802.11g** also provides the same higher bandwidth that IEEE802.11a does, but uses the same freely available part of the radio spectrum as IEEE802.11b. At the time this briefing is being written, the standard has not been completely agreed, although some manufacturers are introducing products based on an early view of the standard.

### Advantages and Disadvantages

As mentioned earlier, a public Wi-Fi network provides an ‘always-on’ connection to the Internet at between 10 and 40 times the speed of a conventional telephone line. This is also fast enough to deliver medium to high quality video. In addition the ‘always-on’ connection means that e-mails arrive instantly and that you can access a website without waiting 30 seconds or so to establish a connection to the Internet. But beware! The fact that your computer is permanently connected to the Internet means that hackers can try to interfere with it. They could steal commercially sensitive information or even delete every file on your hard disc. If you use a Wi-Fi network (or any other permanent connection to the Internet), you should install ‘anti-virus’ and ‘firewall’ software on your system. This will screen e-mails for viruses and prevent unauthorised access to your files.

Wi-Fi networks use a shared medium, in other words all of the customers served by one of the nodes share the bandwidth (~10 Mbit/s) that it provides. The quality of service also depends on the capacity of the high-speed link between the community network and the Internet Service Provider in the nearby town. This means that the bandwidth available to an individual user is not guaranteed but, in a well-designed network, it should be close to the quoted rate for most of the time.

Like mobile phone networks, Wi-Fi networks chop the individual customers’ messages into small packets of information, so it is difficult for an eavesdropper to intercept and read your messages. However it is not impossible so it is a good idea to consider encrypting any confidential e-mails or files that you send over the network.

### What to buy



*Example of customer's equipment*

Picture courtesy of [Invisible Networks](#)

Community broadband networks are a relatively new development and usually depend on a ‘self-help’ initiative by a local group of people and/or small businesses who want to bring broadband services to an area not served by a mainstream network operator. Some community networks are provided on a commercial basis by local co-operatives or not-for-profit companies. Others are run on a voluntary basis by local enthusiasts. In the latter case they may not be able to offer the quality of service and level of customer support that a small business would expect from a communications supplier. SMEs should make sure that they understand what kind of support is on offer before they use it for business communications.

The customer premises equipment for a community Wi-Fi network is similar to that used for a wireless

Local Area Network. The picture shows an external Wi-Fi interface unit that plugs into the USB socket on a PC and connects to a small wall mounted antenna. Other options include an interface card that fits inside the PC and an interface unit that connects to the office's LAN. All options use a wall-mounted antenna similar to the one in the picture. In principle you should be able to use any proprietary Wi-Fi interface unit or card but community network operators often recommend particular models. This ensures compatibility and simplifies installation and maintenance.

The cost of providing a Wi-Fi community broadband network is affected by both the remoteness of the community and how close together the potential customers are. [Fully commercial community networks](#) are being established in a number of rural villages between 10 and 20 km from the UK city of Cambridge. Depending on the service package selected by the customer, the installation charge for these networks is between £200 (€110) and £300 (€165) and the monthly fee is between £30 (€16.50) and £45 (€20).

Networks in other areas will have different cost structures and the charges will reflect this. Customers should expect to pay a little more than they would for an urban ADSL or cable modem service but significantly less than for a two-way satellite broadband service.

### ***Questions to ask suppliers***

- Is the service available in my area and, if not, when will it be available?
- What speeds are available and do you offer a minimum guaranteed bit rate?
- What is the installation cost and what is the monthly charge?
- What equipment do I need to connect to the network?
- Will you install and maintain it?
- Will the service be as reliable as my existing telephone service?
- How quickly will you respond to reports of faults?