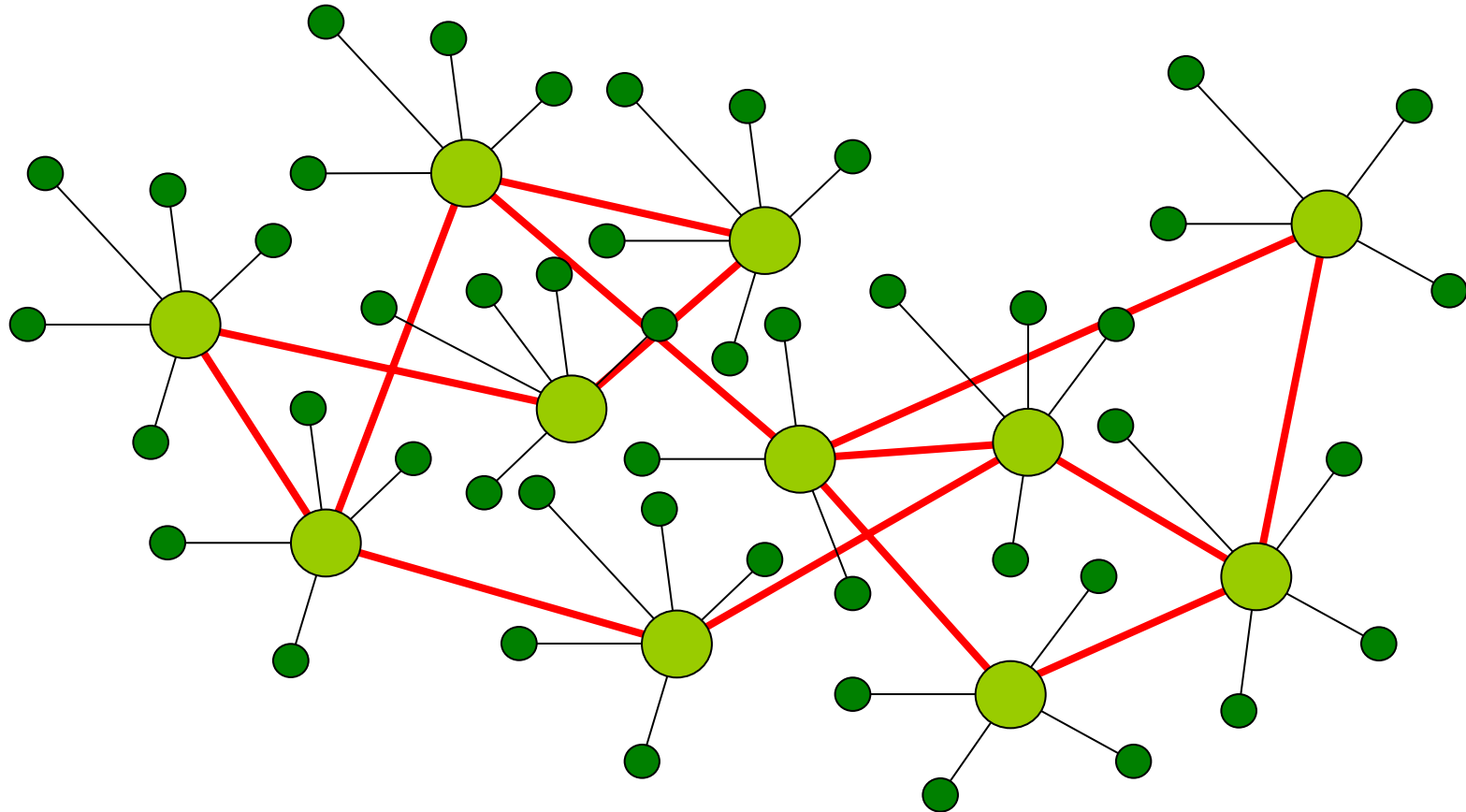


Community Wide Area Network

Until recently, the establishment of a Wide Area Network that provided for the interconnection of many computers over distance has required significant infrastructure investment. Overhead and underground cabling, satellites and telephone exchanges all incur large ongoing costs that are beyond the reach of the average user.

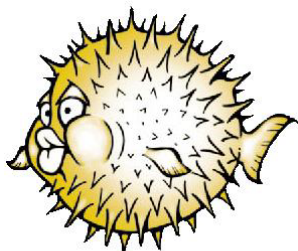


Off-the-shelf and Open Source

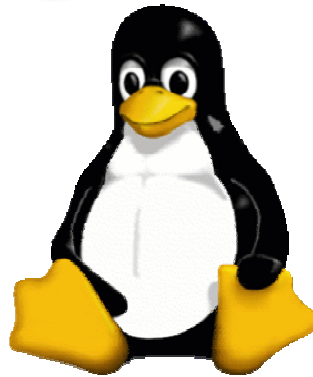
However since the recent advent of low-cost, off-the-shelf wireless network equipment utilising the 802.11 protocols, and the wide availability of open source systems, this is no longer the case and it is now possible for small groups of people to build large networks at very little cost..



FreeBSD



OpenBSD



gentoo linux™



A Community Network

Air-Stream is a not-for-profit community organisation, the first in South Australia, to build such a Wide Area Network using these technologies across Adelaide.

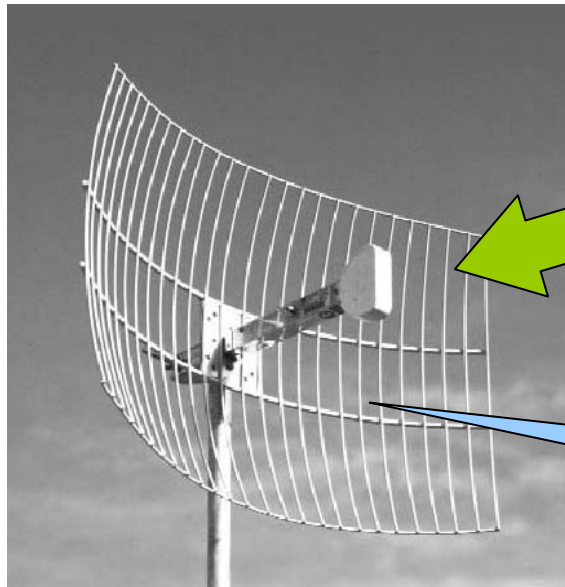


Currently, our membership includes IT professionals, engineers, radio amateurs, community groups, and enthusiasts, who are volunteering their time and resources to build and support this network.

The Network Infrastructure

The technology deployed uses low power 802.11 (class licence) spread spectrum devices and as such requires line-of-sight where the distance is greater than ≈ 400 metres.

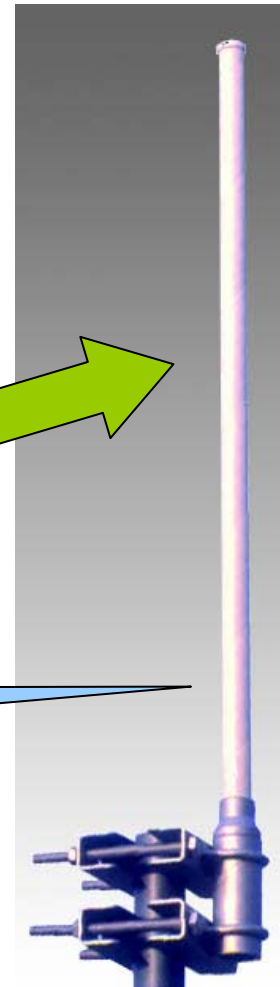
Nevertheless, due to the properties of microwaves the signal can be relatively easy to focus into a narrow beam allowing networks to be established over much greater distances, sometimes in excess of 20km with high gain antennas and the right conditions.



Direction Antenna

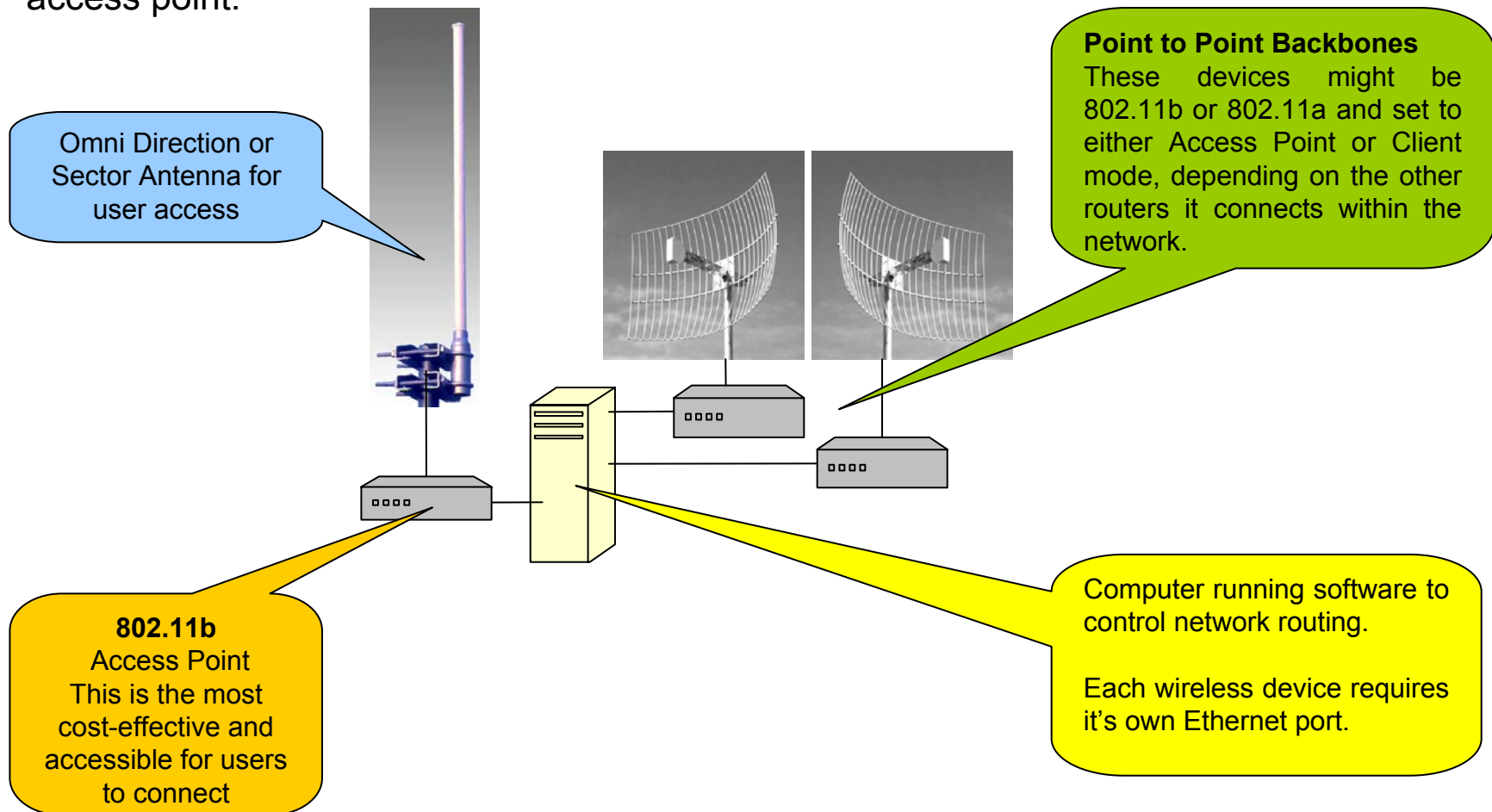
High Gain Antennas

Omni Direction Antenna

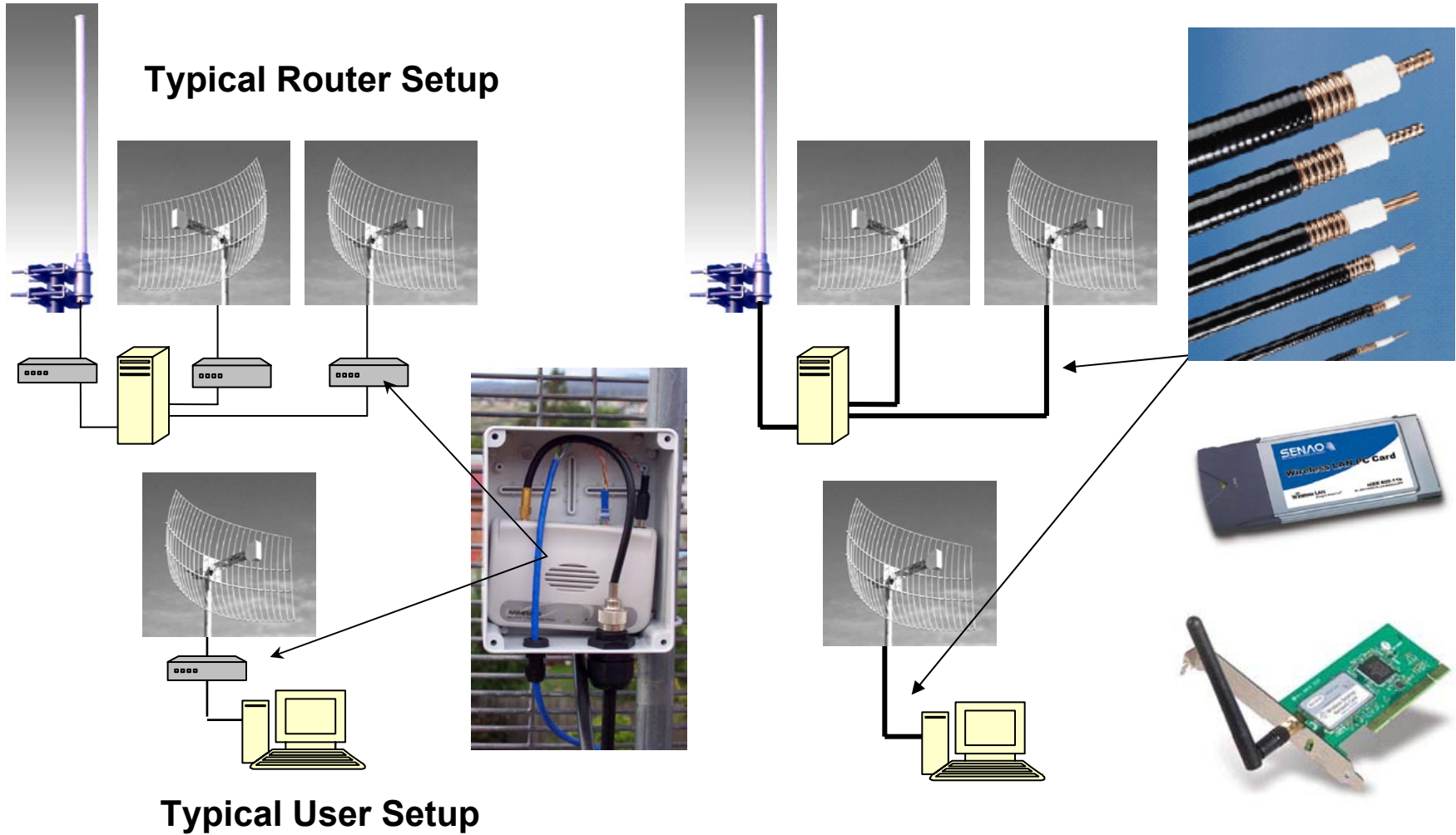


Cost of implementation

Using free open source software for dynamic routing, relatively low-end CPUs, and low cost of wireless devices make it possible to deploy multi backbone routers at each client access point.

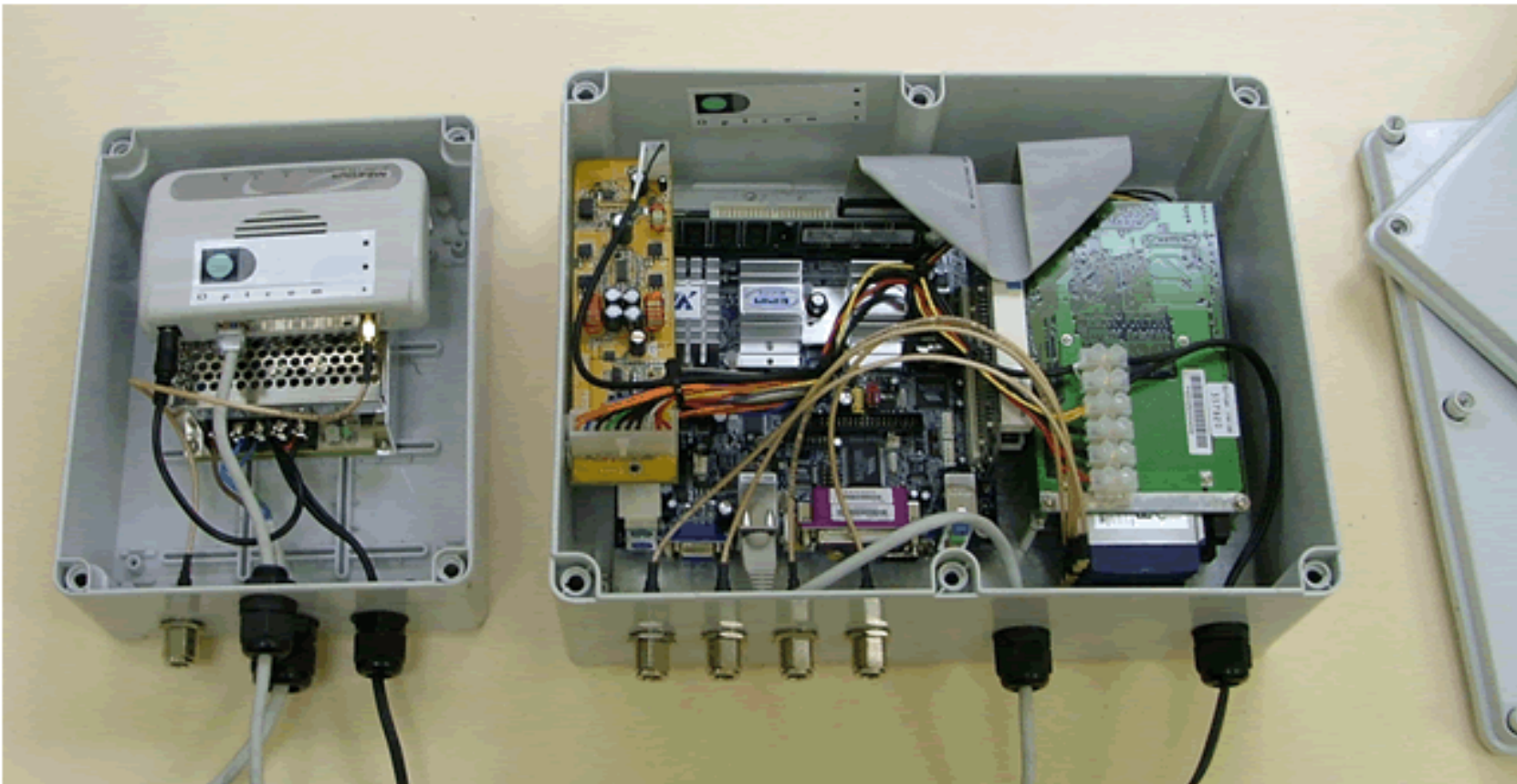


Types of configurations



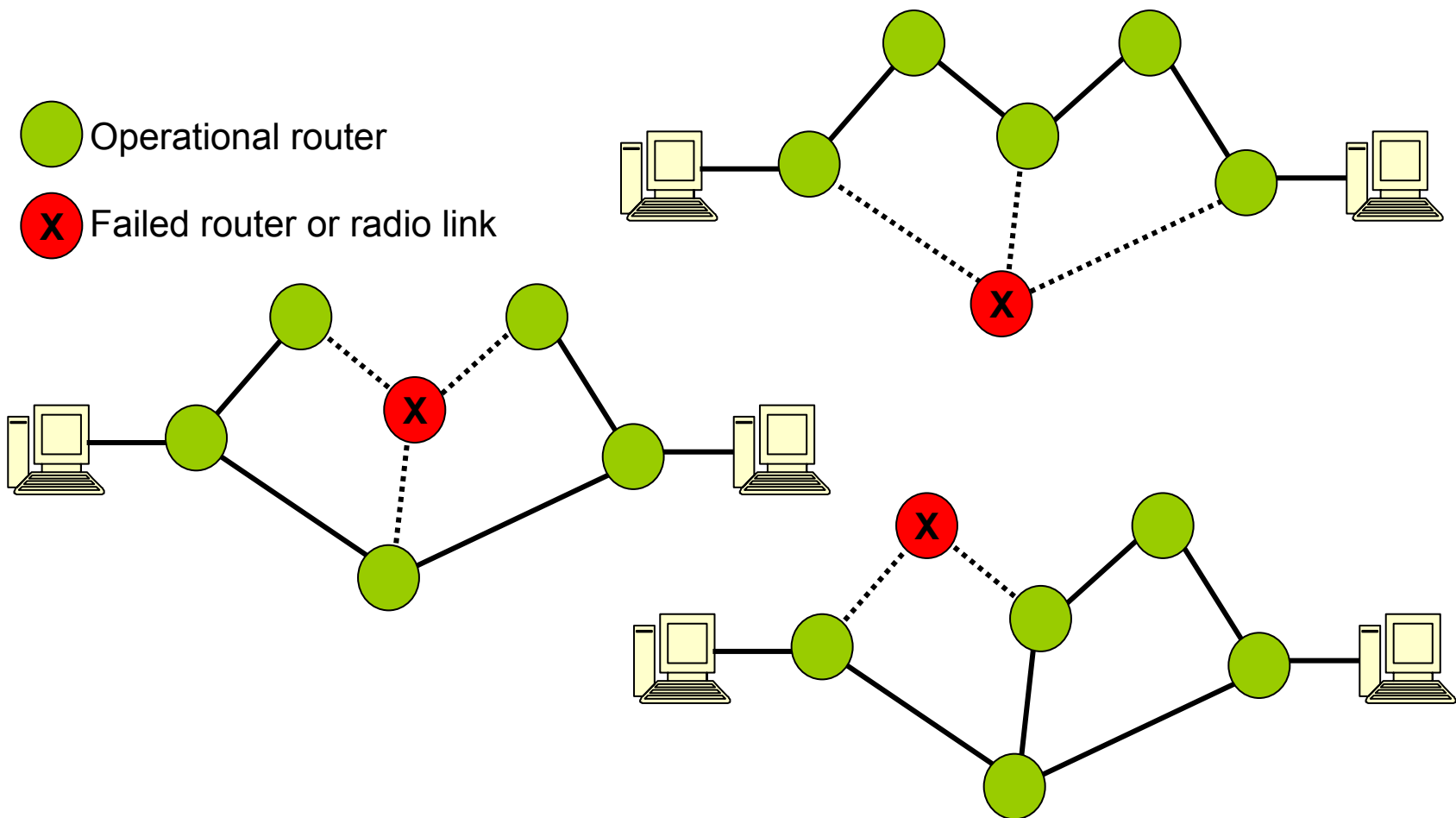
Routers

This picture is an router which can support five wireless links. It costs no more than a conventional computer but can support over hundred simultaneous high-speed network connections...



Redundancy is the solution

Dynamic routing can ensure maximum connectivity at all times, overcoming many of the limitations inherent in low power radio systems or issues of topography.



Network Security

Wireless networks operate in the same way as the Internet, so precautions should be taken to protect computers or LANs connected to it. This can be done on several levels and, as the network is tightly managed, it employs a number of security measures, such as:

Access point equipment can be encrypted providing security between the users and an access point.

Users may firewall and protect their computers using the same tools and applications available for the Internet.

Being a routed network, each AP manages its own subnet and traffic between each host can be highly controlled.

Users may also deploy encrypted virtual private networks (VPNs) as another layer, providing additional layer of security.



ACA carrier licence requirements

As a registered not for profit Air-Stream Network falls within the meaning of 'exempt network' under subsection 34 (3) of the Telecommunications Act 1997, the owner of the exempt network is not required to hold a carrier licence.

An exempt network includes a WLAN that is used for the sole purpose of supplying carriage services on a non-commercial basis.

The reference to sole purpose means that not only must it be shown that the network is used for supplying carriage services on a non-commercial basis, but that it is used only for that purpose. It is the use of the network to supply carriage services that must be solely non-commercial.



**Australian
Communications
Authority**



Class licence requirements

Under a class licence, all users operate in the same spectrum segment on a shared basis and are subject to the same conditions. A class license governs the frequencies that may be used, commonly prescribes equipment standards, and may specify other technical and operational parameters.

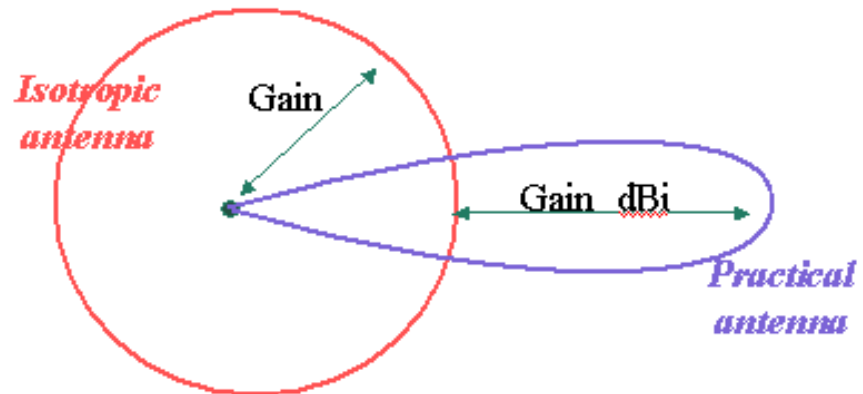
Spread spectrum devices are restricted the following frequency bands and power limits.

915 to 928Mhz is 1 watt

2400 to 2483.5Mhz is 4 watts (bandwidth greater than 1 Mhz)

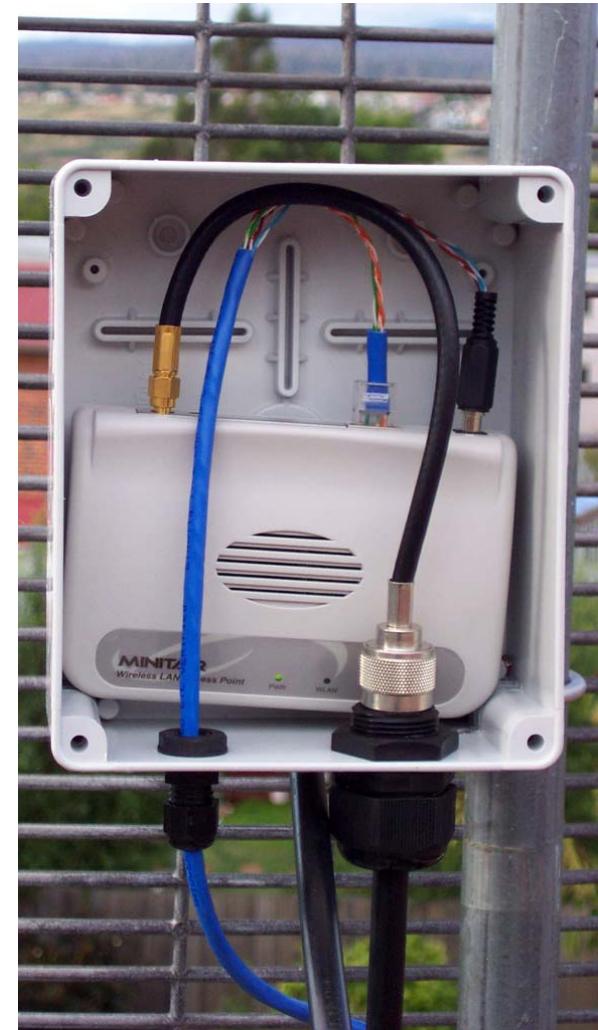
2400 to 2483.5Mhz is 500 milliwatts (bandwidth greater than 1M Mhz)

5725 to 5875Mhz is 1 watt



Air-Stream

Questions



www.air-stream.org

The screenshot shows a Mozilla Firefox browser window displaying the website www.air-stream.org. The browser's address bar shows the URL. The website header features the "Air-Stream" logo and the text "COMMUNITY WIRELESS NETWORK". Below the header is a navigation menu with buttons for "search", "join", "events", "forum", "about us", and "air-zine".

The main content area is divided into several sections:

- Quick Menu:** Includes links for "Getting Involved", "Technical Documentation", "User Connection Guide", and "Image Gallery".
- Navigation:** A list of links including "documentation", "image galleries", "most popular content", "recent posts", and "news aggregator".
- Upcoming Events:** Lists "Air-Stream Presents (1 day)", "Air-Stream Meeting (8 days)", and "Connecting Up 2005 (41 days)".
- Who's online:** States "There are currently 0 users and 6 guests online."
- User login:** Includes fields for "Username:" and "Password:".

The main article section features a post titled "ITShare helping to bridge the digital divide" submitted by "robert" on 21 March, 2005. The article includes an image of three stylized figures and the text: "ITSHARE Recycling technology to create access for all". Below the image, it states: "ITShare is a community organisation which is taking donated computer hardware, installs Linux and Open Source software, and donates to low income groups, communities, and individuals in South Australia." A link to "login or register" is provided.

Below this is another post titled "Air-Stream Presents" submitted by "robert" on 15 March, 2005. It lists the "Start" time as 23 March, 2005 - 8:00pm and the "Location" as Karawatha Community Hall, 12 Baden Terrace, O'Sullivan Beach. The text continues: "Air-Stream Wireless will be giving another presentation at the South Coast Amateur Radio Club Inc. <http://www.scarc.org.au>".

The browser's taskbar at the bottom shows several open applications: "LinuxSA - Mozilla Thund...", "Air-Stream Wireless...", and "Microsoft PowerPoint - ...". The system clock shows 2:33 PM.