

# Why Not Wireless?

## Connected Classroom Conference

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### Wireless What?

Desktop, Laptops, LAN/Hubs, WANs, MANs, Phones, Wrist Watches, & PDAs

### Why Wireless in Schools?

Some schools may find it impractical to use a wired network due to factors such as:

- Asbestos blocking the running of wires
- Cost of running wires makes a wired network too expensive
- Teachers moving from classroom to classroom
- Portable labs rolling into classrooms
- Students can be connected anywhere on campus

### Four types of wireless LAN devices

1. **Access points:** These devices connect the wireless network to the wired network. They have a standard 10/100-base-T connector and IP routing capabilities.
2. **Station Adapters:** These devices connect desktop computers to the access points via wireless communication.
3. **PCMCIA Adapter:** These devices connect laptops and any other PCMCIA Type 2 compatible devices to the access point.
4. **Antenna:** Used to extend the range of Access points and some adapters



### Technical Information

IEEE 802.11b	IEEE 802.11a
Frequency 2.4GHz	Frequency 5 GHz
Speed 2 - 11Mbps	Speed 54 Mbps
Direct Sequence Spread Spectrum (DSSS)	
Frequency Hopping Spread Spectrum (FHSS)	



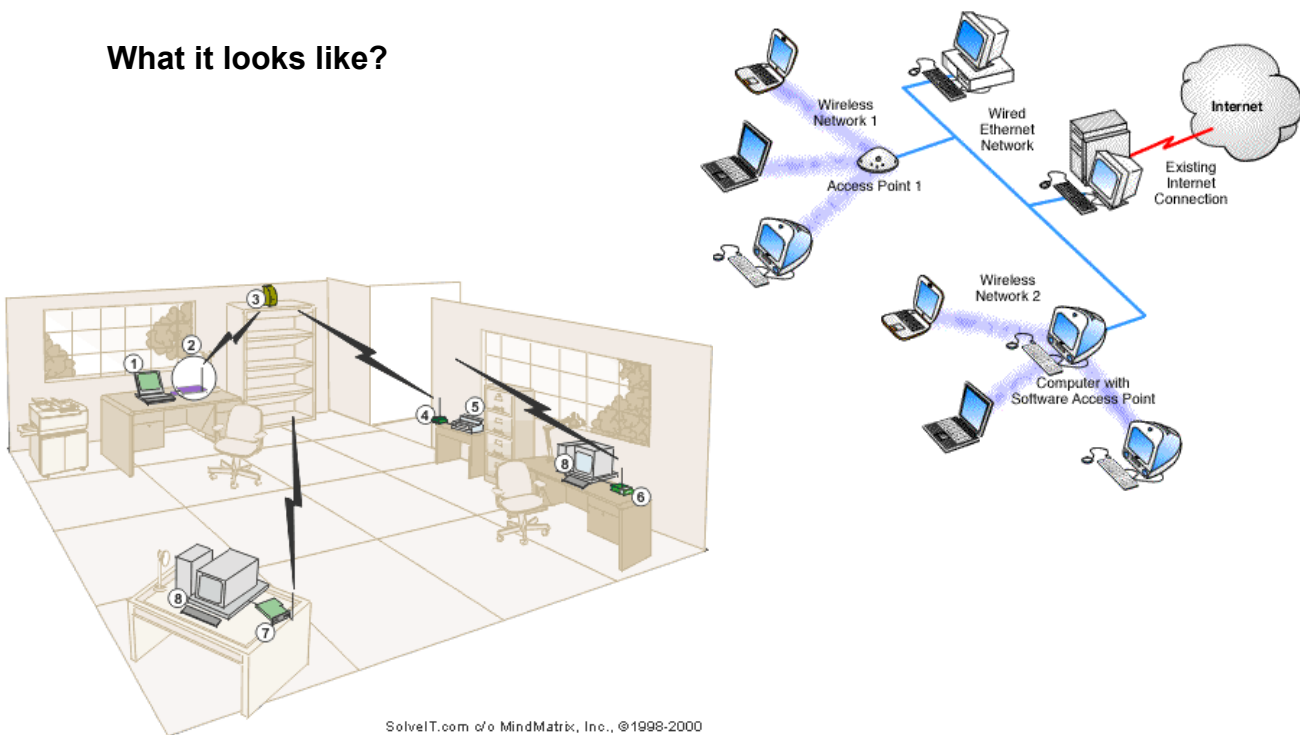
## Range

The range of access is an important consideration when installing a wireless network. Access point and station adapters have a range of 3,280 ft in open space and 200 ft-650 ft indoors. PCMCIA adapters have an open space range of 2200 ft and an indoor range of 300 ft. These ranges are affected by interferences such as microwaves and other radio interferences, as well as interference from structures such as walls and doors. Try to locate the hub away from radio frequency interference (RFI) and electromagnetic interference (EMI). This interference can come from 2.4GHz wireless phones (switch to 900 MHz wireless phones), wireless cameras/speakers, microwaves, electric motors and moving metal parts.

## Security

Since wireless communications has roots in military applications, security is a design criterion for wireless devices. Security provisions built into wireless LANs, makes them more secure than most wired LANs. Therefore, it is extremely difficult for unintended receivers (eavesdroppers) to listen in on wireless LAN traffic. Individual nodes must be security-enabled before they are allowed to participate in network traffic.

## What it looks like?



## Building-to-Building Antennae and Bridge

Distances can be as far as 30 miles (24 km) while your network remains safe, secure, and reliable without recurring monthly charges.

The 5.8 GHz unlicensed spread spectrum systems built around the Western Multiplex Tsunami radio can reach speeds up to 100 Mbps.

Ethernet bridges utilizing 2.4 GHz unlicensed spread spectrum radio technology will reach speeds up to 11 Mbps. The antenna below supports point-to-point and others are available for point-to-multipoint configurations.



### Wireless Radio Health Concerns

The following is stated in the IEEE standard: "No verified reports exist of injury to human beings who have been exposed to electromagnetic fields within the limits of frequency and [specific absorption rate] specified by previous ANSI standards, including ANSI C95.1-1982."

#### IEEE USAB Entity Position Statement

"Measurements have shown that routine exposure of users and other persons to low power portable and mobile transceivers and cellular telephones do not induce rates of [radio frequency] absorption that exceed any of the maximum permissible rates of energy absorption defined by these guidelines" [IEEE, ANSI]. Therefore, based on present knowledge, the exposures from low-power transceiver are considered to be without risk for the users and the public.

(Quoted from the IEEE USAB Entity Position Statement Human Exposure to Radio frequency Fields from Portable and Mobile Telephones and other Communication Devices, December 2, 1992.)

## Resources

Using Wireless Technology to Solve a Computer Classroom Design Problem

<http://www.ahsc.arizona.edu/wireless/>

[www.pdaed.com](http://www.pdaed.com)

Case Study: Franklin County School District goes Wireless

<http://www.thejournal.com/magazine/vault/A4022.cfm>

Building a Wireless Classroom

<http://is.asu.edu/r&d/wireless/wireless.html>

WLANA

<http://www.wlana.com>

Pinnacle Communications Inc.

<http://www.pinnaclecomm.com/>

IBM: Wireless Infrastructures for Schools

[http://www-1.ibm.com/industries/education/solution/SOLUTIONS\\_62910.html](http://www-1.ibm.com/industries/education/solution/SOLUTIONS_62910.html)

Intel: Going Wireless – Networks as Mobile as the Students who use them

[http://www.intel.com/education/teachtech/learning/casestudies/going\\_wireless.htm](http://www.intel.com/education/teachtech/learning/casestudies/going_wireless.htm)

## Notes: