

# Wireless Networks

## Lecture 4:

## Wireless Networking Devices

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- wireless LAN adapter cards
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- wireless routers

# Wireless LAN Network Adapters

A wireless LAN network adapter represents the hardware device that turns a desktop computer into a participant, or station, on a wireless LAN.

The term “station” is commonly used to refer to a computer communicating via a wireless LAN network adapter..

The antenna of the wireless PC card enables transmission and reception of radio frequency (RF) communications.



The SMC Networks 2602W Wireless PCI Card



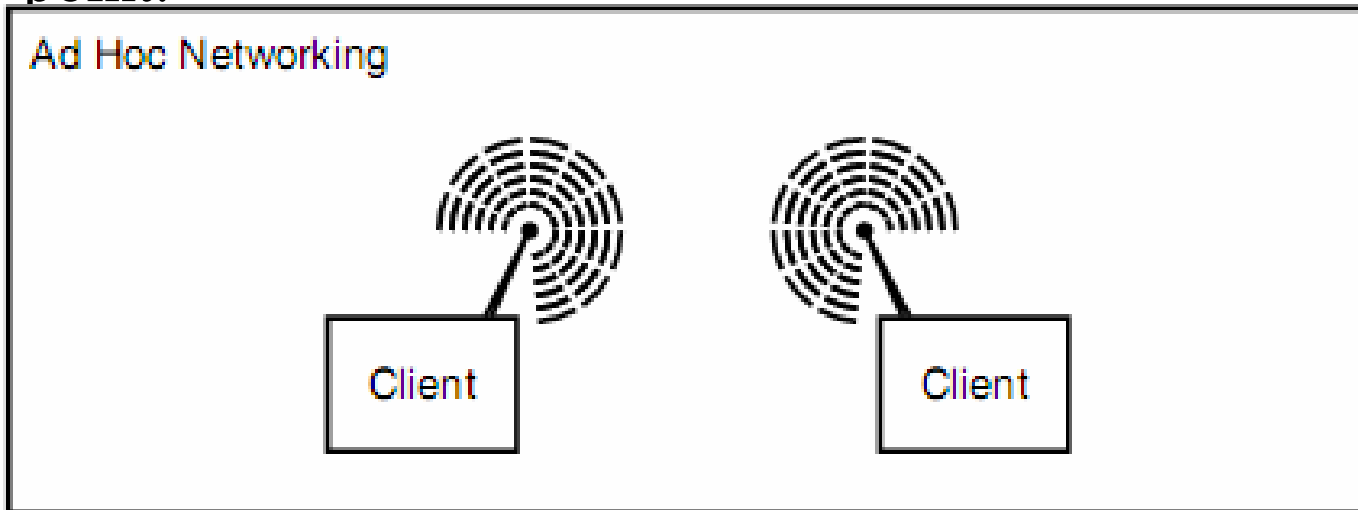
# Access Point

An access point can be considered to represent a bridge between a wired and wireless network. Access point functions as a LAN bridge, broadcasting frames that flow on the wired LAN on the air while frames received over the air are transmitted on the wired LAN.

# Types of Networking

Two basic types of wireless LAN networking are available — Ad Hoc and Infrastructure.

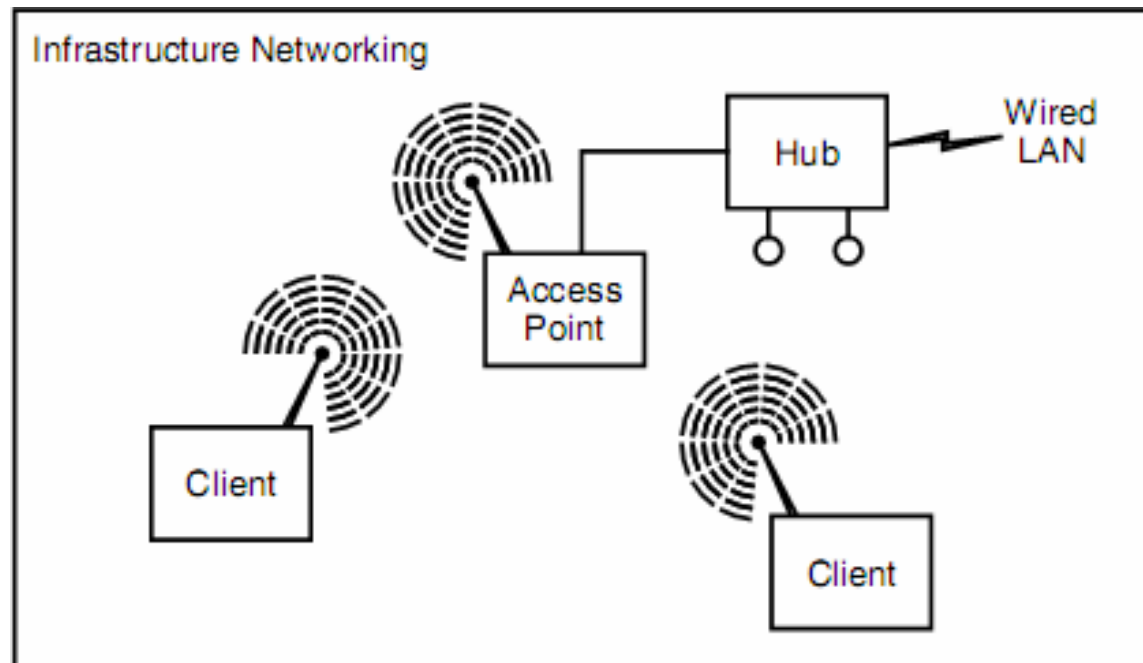
In an **Ad Hoc networking** environment, two or more clients communicate with one another without having to use an access point.



# Types of Networking

The second type of wireless LAN networking is referred to as **Infrastructure networking**.

In this networking environment, clients communicate with one another or wired devices through the facilities of an access point.





# Wireless Networks Devices

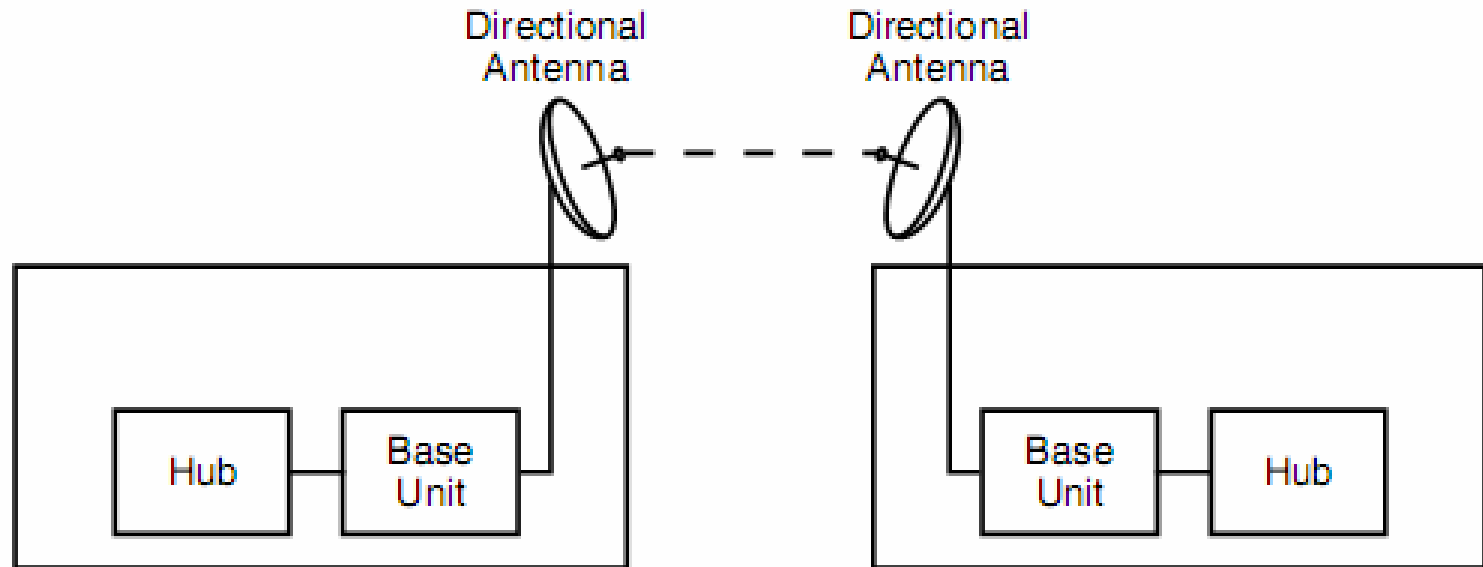
Some wireless devices (to include LAN adapters and access points) have two antennas. The device includes intelligence either in firmware or software that examines the signal received by each antenna and selects the better of the two received signals. The technical name for dual antennas is space diversity.

# Wireless Bridge

We can view a **wireless bridge** as a **wireless gateway** between LANs. While similar to an access point, the wireless bridge commonly consists of two components: a **base station** and a **directional antenna**.

The base station can be considered to represent an access point without an antenna that is cabled to a wired LAN. The base unit is also cabled to a directional antenna, with the latter typically mounted on the outside of a building.

# Wireless Bridge



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**Using Wireless Bridges to Interconnect Wired LANs**

# Wireless Bridge

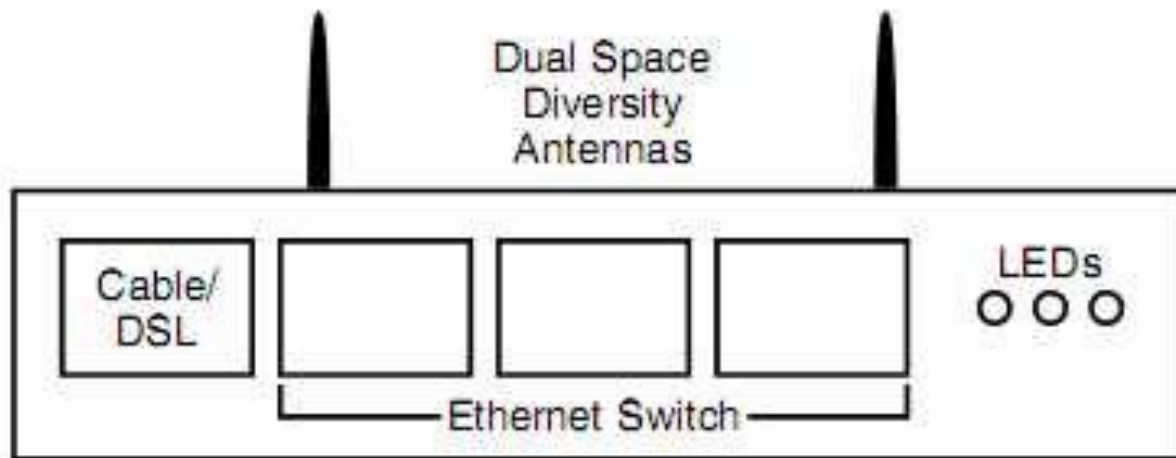
Through the use of a very sensitive directional antenna, it becomes possible to extend the transmission distance of a wireless LAN. That extension can be from a few thousand feet up to approximately ten miles, with the latter based on obtaining a line-of-sight capability between each wireless bridge antenna.

# Wireless Bridge

There are other terms used to reference a wireless bridge. Some vendors refer to this device as an **outdoor router** or **outdoor point-to-point router**, while other vendors use the term “**gateway**” to reference this functionality.

# Wireless Routers

The wireless router represents an access point that includes a routing capability and may include a built-in Ethernet switch capability.



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**A Generic Wireless Router with a Three-Port Built-In Ethernet Switch**

# Wireless Access Server

The last wireless product is the one that is gaining a significant degree of interest due to security problems associated with the **Wired Equivalent Privacy (WEP)** Protocol used to provide security in IEEE 802.11 networks.

**WEP** is a shared key system, which uses a common key for both encryption and authentication.

# Wireless LAN Advantages

The key advantage associated with the use of wireless LANs is based on the name of this technology, that is, a wireless LAN represents a communications network formed without the use of wires.

One of the key advantages associated with the utilization of wireless LANs is **economics**.

A large portion of economic savings associated with the use of this technology results from the ability to use the air instead of having to cable clients to a hub in a wired LAN environment. By minimizing the need for conventional metallic based twisted pair wiring, you avoid not only the cost of the wire, but also the cost of installing the wire.



# Wireless LAN Advantages

Another major advantage associated with the use of wireless LANs is networking flexibility (**Adds, Moves, and Changes**)

# Basic Service Set

The Basic Service Set (BSS) is a set of all stations that can communicate with each other. There are two types of BSS:

Independent BSS and Infrastructure BSS.

Every BSS has an id called the BSSID, it is the MAC address of the access point servicing the BSS .

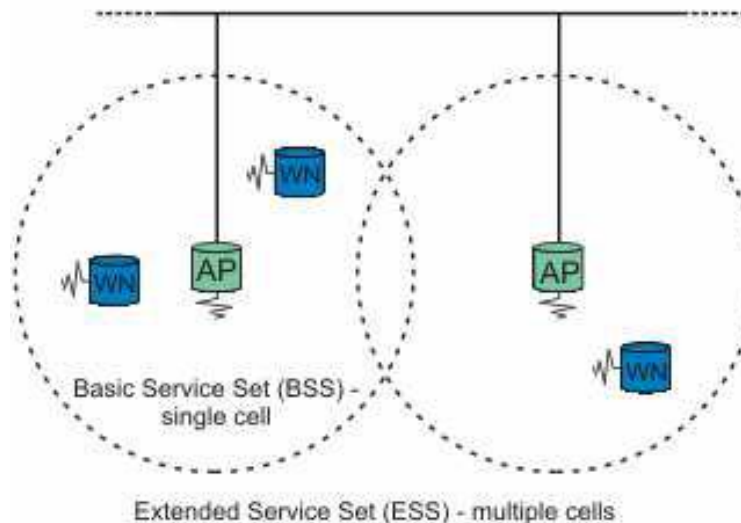
# Independent Basic Service Set

Independent BSS are an ad-hoc network that contain no Access Points. Since they do not use Access Points they can not connect to any other basic service set.

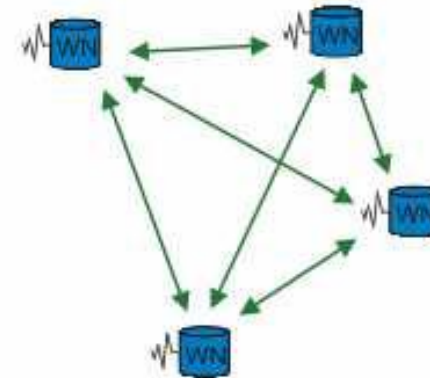
# Infrastructure Basic Service Set

An Infrastructure BSS can communicate with other stations not in the same basic service set by communicating to each other through Access Points.

Infrastructure Mode:



IEEE Ad-hoc Mode:



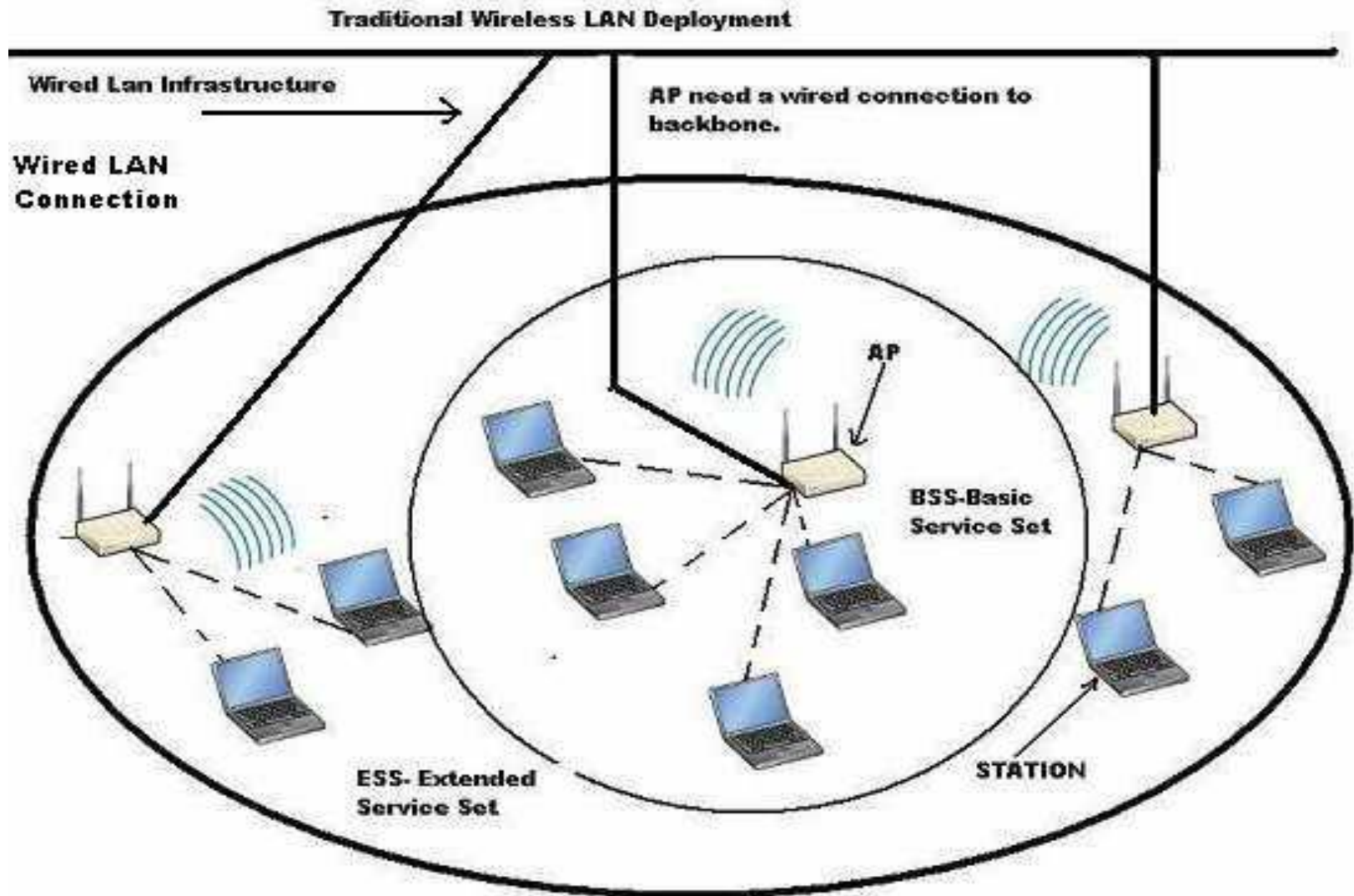
# Extended Service Set

An Extended Service Set (ESS) is a set of connected BSS. Access Points in an extended service set are connected by a distribution system. Each ESS has an ID called the SSID which is a 32 byte (maximum) character string.

# Distribution System

A distribution system connects Access Points in an extended service set. A distribution system is usually a wired LAN but can be a wireless LAN .

# Distribution System



*Thank You*