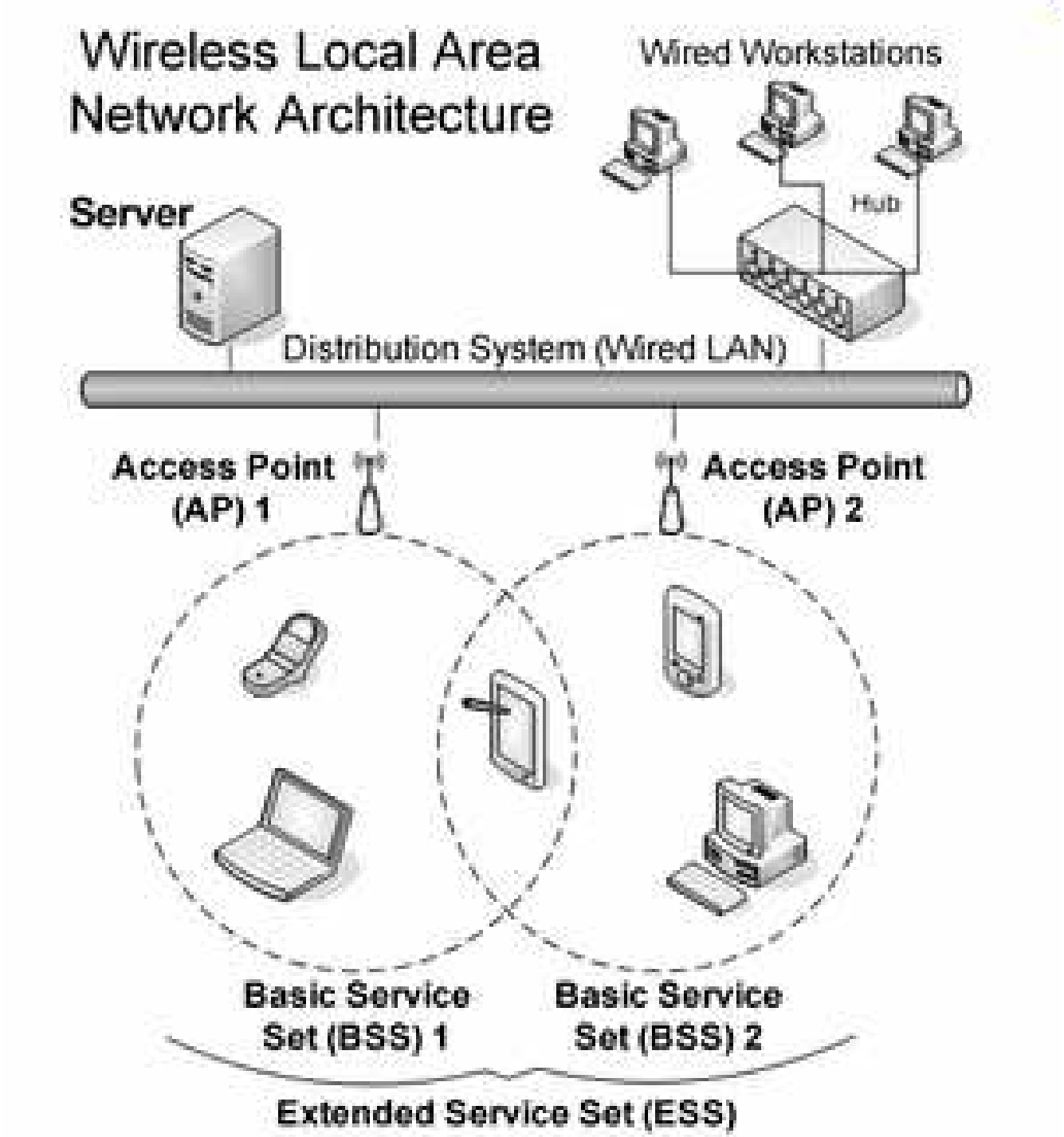
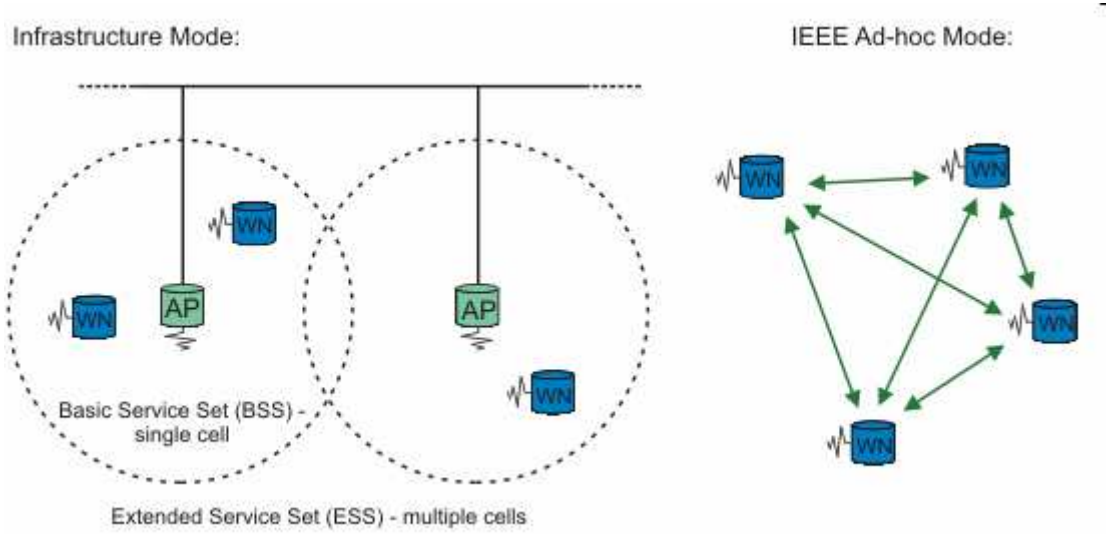
Basic Service Set

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 .


Wireless Local Area Network Architecture
Wired Workstations
Server
Hub
Distribution System (Wired LAN)
Access Point (AP) 1
Access Point (AP) 2
Basic Service Set (BSS) 1
Basic Service Set (BSS) 2
Extended Service Set (ESS)

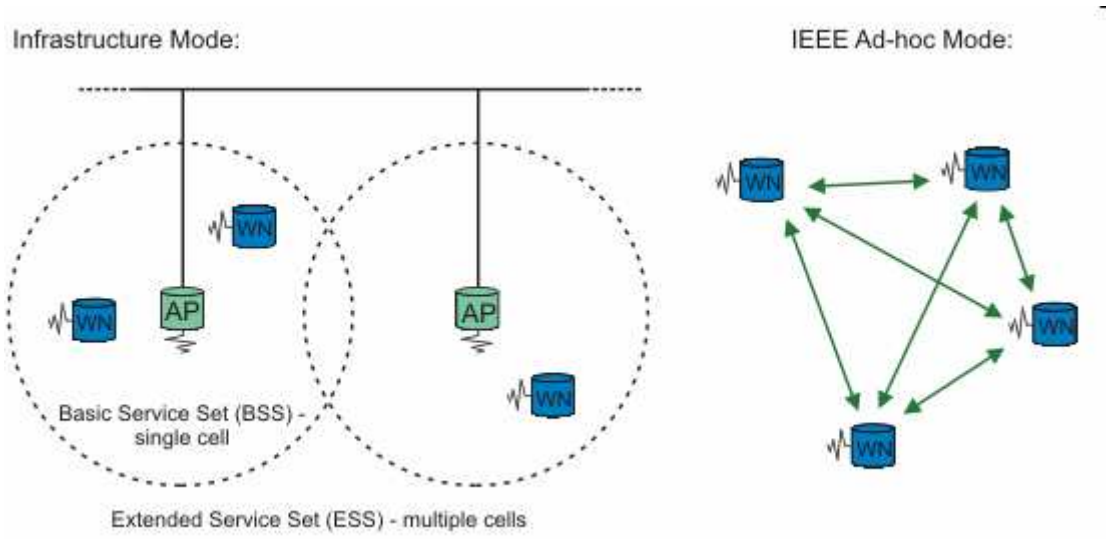
Independent Basic Service Set

- 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.

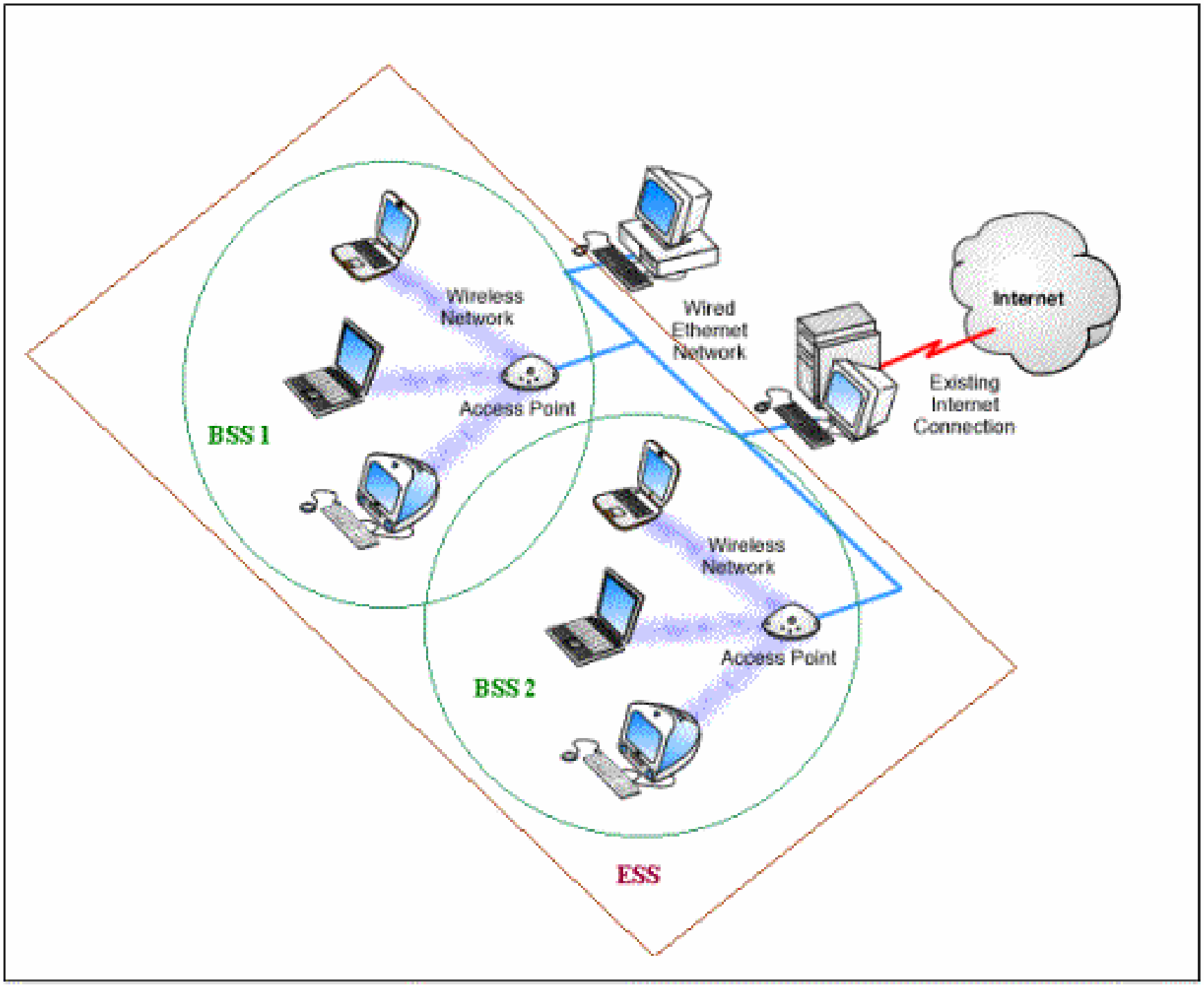


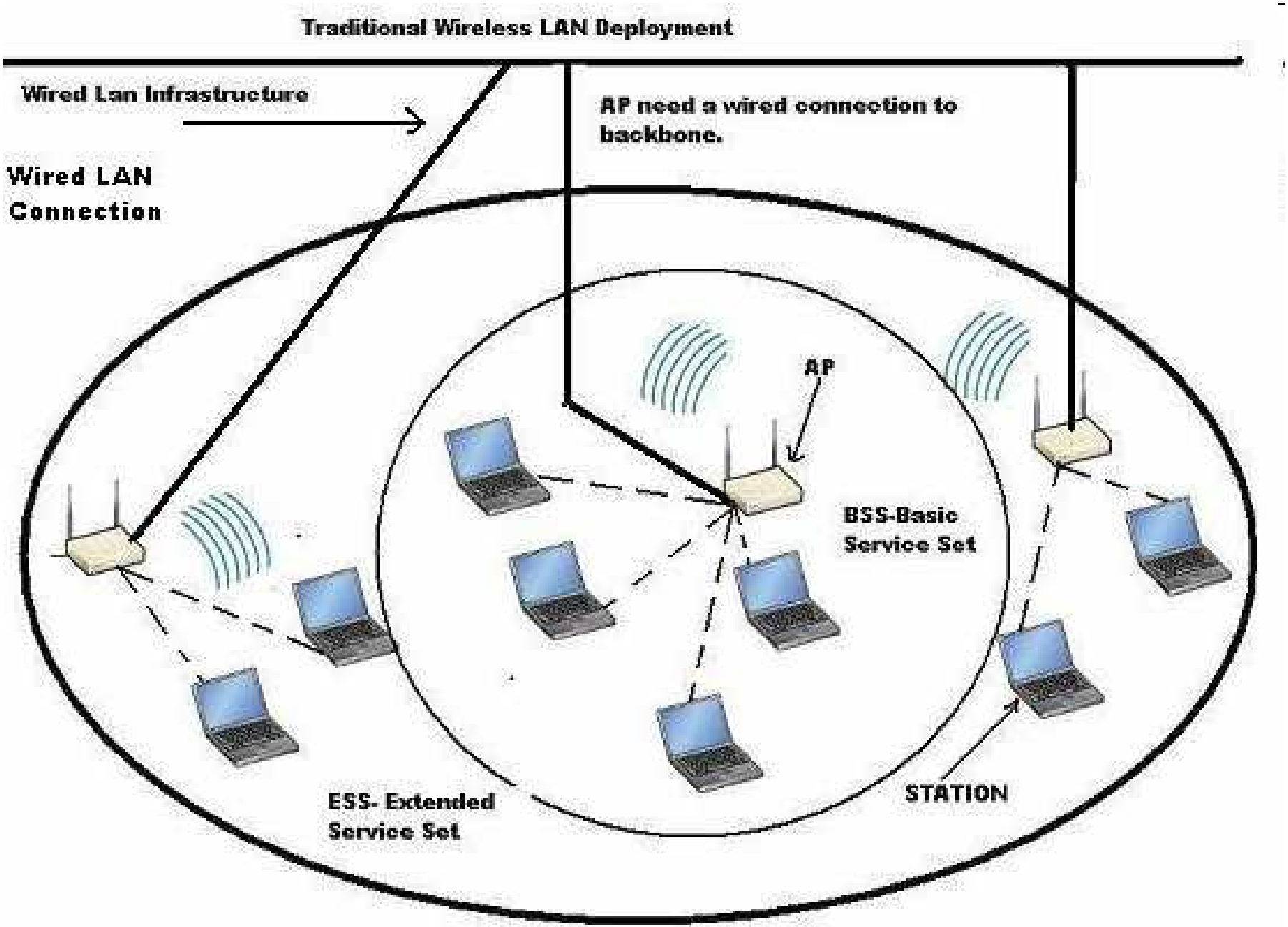
Extended Service Set

- 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 .


Wireless
Network
Access Point
BSS 1
Wired
Ethernet
Network
Internet
Existing
Internet
Connection
Wireless
Network
Access Point
BSS 2
ESS


Traditional Wireless LAN Deployment
Wired Lan Infrastructure
AP need a wired connection to backbone.
Wired LAN Connection
AP
BSS-Basic Service Set
ESS- Extended Service Set
STATION

Basic Communications Concepts

Frequency

- The term “frequency” is used to denote the number of periodic oscillations or waves that occur per unit time.
- Wireless devices operate at a predefined frequency or set of frequencies within a band that is defined by a regulatory agency.

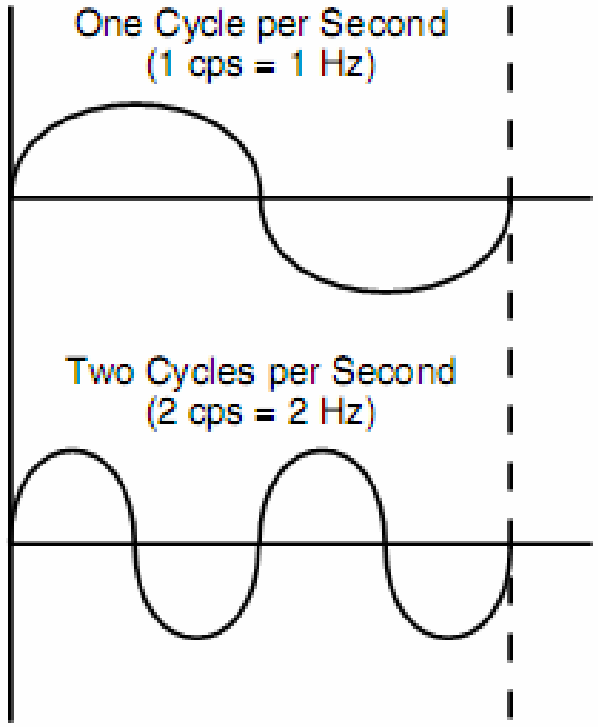


Exhibit 1. Frequency

- The time required for a signal to be transmitted over a distance of one wavelength is referred to as the period (T) of a signal. From Exhibit 1 we note that the period or duration of a cycle is inversely proportional to the frequency of a wave. That is, as the frequency increases, the period decreases. Similarly, as the frequency decreases, the period or duration of the wave increases. Thus, if T represents the period of a wave and f represents its frequency, the relationship between the two can be denoted as follows:

$$T = 1/f$$

- The preceding formula expresses the period of a wave in terms of its frequency.

We can also express the frequency of a wave in terms of its period. Doing so, we obtain: $f = 1/T$

Wavelength

One common term to reference the period of an oscillating signal is wavelength.

- The wavelength of a signal is obtained by dividing the speed of light (3 × 108 m/sec) by the frequency of a signal in Hertz. The result is the wavelength of an oscillating signal in meters (m). That is,

$$\lambda\ (m) = (3 \times 108)/f\ (Hz)$$

- wireless transmission occurs at very high frequencies, resulting in very small wavelengths.
- modern wireless LANs operates at frequency in the gigahertz (GHz) ranges.

- To illustrate the use of the preceding relationship, let's consider the frequency of 2.4 GHz, which represents the beginning of one modern wireless LAN communications band of allocated frequencies. Then, the wavelength of the 2.4-GHz signal becomes:

$$\lambda \text{ (cm)} = 30/2.4 \text{ (GHz)} = 1.24 \text{ cm}$$

- The use of the preceding equations can be used to explain the length of antennas.

- At very low frequencies, the wavelength is very long, requiring a very long antenna to be deployed.

Bandwidth

- Bandwidth represents a range of frequencies, and not a single frequency. If Fh is the high frequency in a band of frequencies and Fl is the low frequency, then the bandwidth becomes:

$$B = f_{\mathrm{H}} - f_{\mathrm{L}}$$

- Wireless LANs transmit at a predefined frequency; however, that frequency can vary based on the modulation method and coding technique employed.