

Architecture

1-Stations

All components that can connect into a wireless medium in a network are referred to as stations.

All stations are equipped with wireless network interface cards (WNICs).

Wireless stations fall into one of two categories: access points, and clients.

Access points (APs), normally routers, are base stations for the wireless network. They transmit and receive radio frequencies for wireless enabled devices to communicate with.

Wireless clients can be mobile devices such as laptops, personal digital assistants, IP phones, or fixed devices such as desktops and workstations that are equipped with a wireless network interface.

2-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 (also referred to as IBSS), and infrastructure BSS.

Every BSS has an identification (ID) called the BSSID, which is the MAC address of the access point servicing the BSS.

An independent BSS (IBSS) is an ad-hoc network that contains no access points, which means they can not connect to any other basic service set.

An infrastructure can communicate with other stations not in the same basic service set by communicating through access points.

3-Extended service set

An extended service set (ESS) is a set of connected BSSes. Access points in an ESS are connected by a distribution system. Each ESS has an ID called the SSID which is a 32-byte (maximum) character string.

4-Distribution system

A distribution system (DS) connects access points in an extended service set. The concept of a DS can be used to increase network coverage through roaming between cells.

Types of wireless LANs

1-Peer-to-peer

Peer-to-Peer or ad-hoc wireless LAN An ad-hoc network is a network where stations communicate only peer to peer (P2P). There is no base

and no one gives permission to talk. This is accomplished using the Independent Basic Service Set (IBSS).

A peer-to-peer (P2P) network allows wireless devices to directly communicate with each other. Wireless devices within range of each other can discover and communicate directly without involving central access points. This method is typically used by two computers so that they can connect to each other to form a network.

If a signal strength meter is used in this situation, it may not read the strength accurately and can be misleading, because it registers the strength of the strongest signal, which may be the closest computer.

Hidden node problem: Devices A and C are both communicating with B, but are unaware of each other. IEEE 802.11 define the physical layer (PHY) and MAC (Media Access Control) layers based on CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance). The 802.11 specification includes provisions designed to minimize collisions, because two mobile units may both be in range of a common access point, but out of range of each other.

The 802.11 has two basic modes of operation: Ad hoc mode enables peer-to-peer transmission between mobile units. Infrastructure mode in which mobile units communicate through an access point that serves as a bridge to a wired network infrastructure is the more common wireless LAN application the one being covered. Since wireless communication uses a more open medium for communication in comparison to wired LANs, the

802.11 designers also included shared-key encryption mechanisms: Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA, WPA2), to secure wireless computer networks.

2-Bridge

A bridge can be used to connect networks, typically of different types. A wireless Ethernet bridge allows the connection of devices on a wired Ethernet network to a wireless network. The bridge acts as the connection point to the Wireless LAN.

3-Wireless distribution system

A Wireless Distribution System is a system that enables the wireless interconnection of access points in an IEEE 802.11 network. It allows a wireless network to be expanded using multiple access points without the need for a wired backbone to link them, as is traditionally required. The notable advantage of WDS over other solutions is that it preserves the MAC addresses of client packets across links between access points.[4]

An access point can be either a main, relay or remote base station. A main base station is typically connected to the wired Ethernet. A relay base station relays data between remote base stations, wireless clients or other relay stations to either a main or another relay base station. A remote base station accepts connections from wireless clients and passes them to relay or main stations. Connections between "clients" are made using MAC addresses rather than by specifying IP assignments.

All base stations in a Wireless Distribution System must be configured to use the same radio channel, and share WEP keys or WPA keys if they are used. They can be configured to different service set identifiers. WDS also requires that every base station be configured to forward to others in the system.

WDS may also be referred to as repeater mode because it appears to bridge and accept wireless clients at the same time (unlike traditional bridging). It should be noted, however, that throughput in this method is halved for all clients connected wirelessly.

When it is difficult to connect all of the access points in a network by wires, it is also possible to put up access points as repeaters.