Wireless Network Topologies

The IEEE 802.11 Standard is a standard that describes wireless LANs. Under this standard there are different types of WLANs, all with its own speed, frequency and transmission range. There are also different topologies within WLANs:

- Infrastructure (managed).
- Ad-hoc (unmanaged).
- Point-to-Point.
- Point-to-Multipoint
- Mesh.
- Hybrid.

1.2.6.1 Infrastructure (managed) Topology

An infrastructure topology is used to extend a wired LAN to include wireless devices. In this topology the devices communicate with the wired LAN via base stations called an AP, which acts as a bridge between wired and wireless LANs (WLANs).

BSS and ESS

Basic Service Set (BSS) – this describes at least one AP connected to the wired LAN and a set of wireless end stations.

Extended Service Set (ESS) – describes two or more BSS (above) combined (interconnected) to make a sub-net.

1.2.6.2 Ad-Hoc WLANs

Ad-hoc topology is a form of peer-to-peer wireless network, where all devices are connected to each other directly without an AP.

1.2.6.3 Point-to-Point WLANs (PtP)

In a PtP WLAN setup the communication is established from one node directly to another node. These are usually found in wireless backbone or as a replacement for a single wired LAN cable.

1.2.6.4 Point-to-Multipoint (PtMP)

A point-to-multipoint (PtMP) wireless connection is designed to link multiple wired networks. Signals in point-to-multipoint networks travel from a central node, such as a base station of a cellular system, an access point of a WLAN, or a satellite. The function of the multipoint wireless topology is to interconnect multiple locations enabling them to access and share resources. Multipoint networks use a base station as the “hub” and client networks as the connection points communicating with the base station. These point-to-multipoint networks are used in wireless Internet service providers (WISP), large corporate campuses, interconnected branch offices, and more.

The reliability of the PtMP network topology relies on the quality of the central node and each connecting node. The location of the central node is important to ensure the range and strength of the wireless signal.

1.2.6.5 Wireless Mesh

In a wireless mesh topology several APs are interconnected to one another in a similar way to the wired mesh topology, where each node is connected to every single node in the network to provide redundancy, however because it’s wireless it doesn’t incur the expensive costs that would’ve been incurred if a wired mesh were to be implemented.

1.2.6.6 Hybrid WLAN topology

This is similar to the wired hybrid; in fact we can say that they’re the same. In here we might see a wireless LAN connected to a wired LAN or a star topology connected to a bus topology. In another words it’s a mixture of topologies.

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