Infrastructure Based WLAN

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Most companies, public hotspots, and homeowners implement infrastructure WLANs. An infrastructure WLAN, as shown in Figure 3-2, offers a means to extend a wired network. In this configuration, one or more access points interface wireless mobile devices to the distribution system.

Each access point forms a radio cell, also called a basic service set (BSS), which enables wireless users located within the cell to connect to the access point.

This allows users to communicate with other wireless users, as well as with servers and network applications connecting to the distribution system. A company, for example, can use this configuration to enable employees to access corporate applications and the Internet from anywhere within the facility.

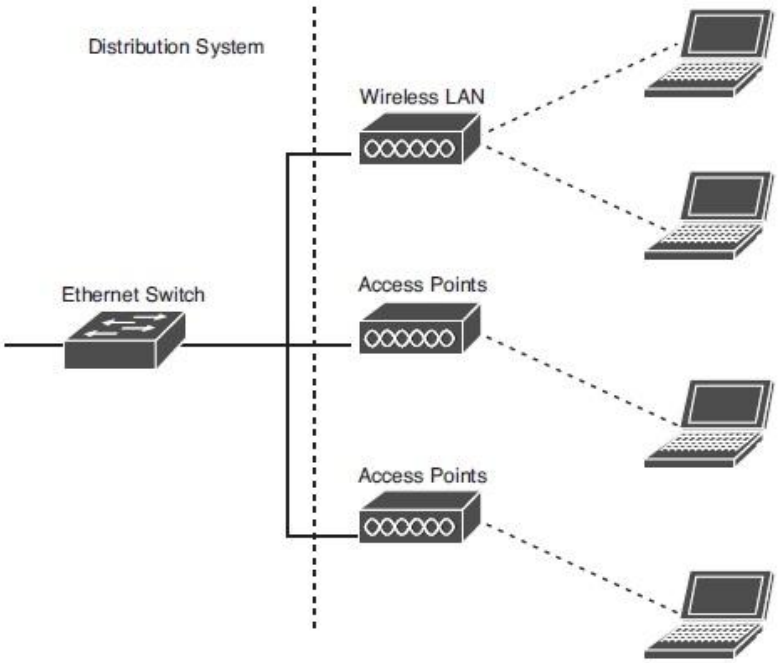

Figure 3-2 *An Infrastructure Wireless LAN Interfaces Client Devices to a Wired Distribution System and Extends Coverage Through Use of Access Points*

Each access point in the infrastructure WLAN broadcasts beacon frames, which identify the presence of the WLAN and synchronizes various events, such as 802.11 power management.

Each access point creates a radio cell, with a coverage area that depends on the construction of the facility, chosen PHY layer, transmit power, and antenna type. This range is typically 100 feet in most enterprise facilities, depending on the data rate and environmental factors, such as building construction.

The desired level of performance, however, can impact the effective range of the access points. Lower data rates offer longer range than do higher data rates.

If a company installs access points with overlapping radio cells, as shown in Figure 3-3, then users can roam throughout the facility without any noticeable loss of connectivity. The radio card within the user's mobile device will automatically re-associate with access points having stronger signals. For example, a user might begin downloading a file when associated with access point A. As the user walks out of the range of access point A and within the range of access point B, the client radio automatically re-associates the user to access point B and continues the downloading of the file through access point B. The user generally does not experience any noticeable delays, but voice-over WLAN phones might drop connections if the roaming delay exceeds 150 milliseconds.

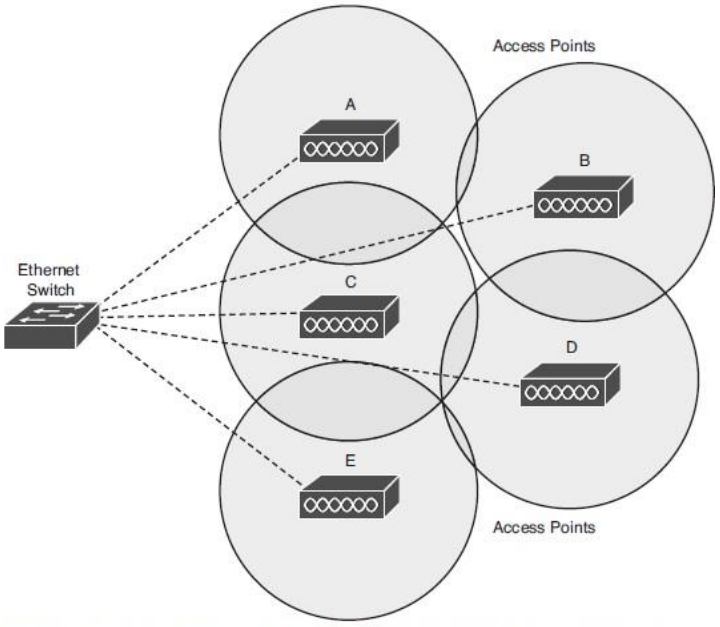

Figure 3-3 *Multicell Wireless LAN with Overlapping Cells Supports Roaming*

In infrastructure WLANs, data transmissions do not occur directly between the wireless clients. Data traffic going from one wireless user to another user must travel through an access point (see Figure 3-4). The access point receives the data traffic going from client A to client B, for example, and retransmits the data to client B. As a result, significant data traffic between wireless users decreases throughput because of the access point needing to relay the data to the destination user. If the source wireless user is sending data to a node on the distribution system, then the access point does not need to retransmit the data to other wireless users. The access point (if it is an autonomous type) delivers the data directly to the distribution system for routing to the applicable node. In the case of a

controller-based WLAN, the access point hands over the data to an applicable controller, and the controller delivers the data to the distribution system.

In addition to overlapping cells, the 802.11 standard also supports collocated and disjointed radio cells, as shown in Figure 3-5.

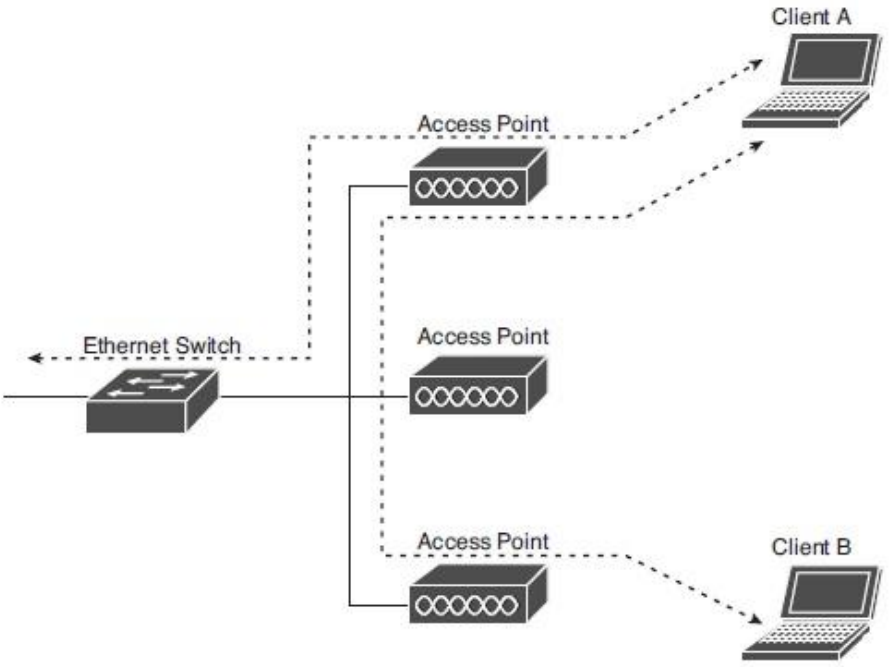

Figure 3-4 *Typical Flow of Data Through an Infrastructure Wireless LAN*

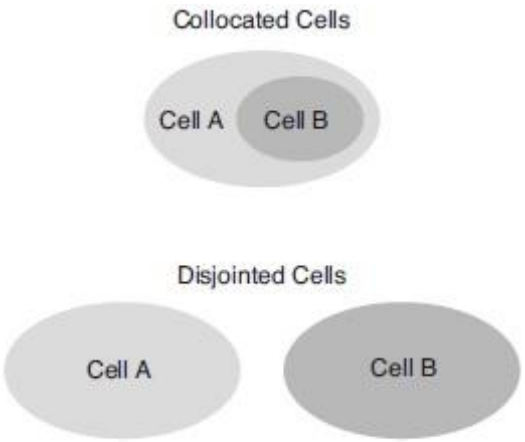

Figure 3-5 *Collocated and Disjointed Wireless LANs*

The collocated radio cell configuration is useful if a company needs greater capacity than a single access point can deliver. In this scenario, two or more access points are set up so that their radio cells overlap significantly. This works well if the access points are set to non-conflicting radio channels. A portion of the users in the

area, for example, associate with access point A, and the other users are associated with access point B. This boosts the capacity of that particular area.

A company can install disjointed access points when complete coverage throughout the facility is not necessary. For example, the company might install an access point in each conference room and not the rest of the building. If the radio cells are disjointed, then users will temporarily lose connection to the network and then re-associate when they come within range of another access point. An 802.11 network, though, supports this form of network, similar to roaming with overlapping radio cells. The re-association delay is a function of the time it takes the user to move into the range of the next access point. The wireless application in use, however, might or might not be able to tolerate this longer roaming delay.

References:

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