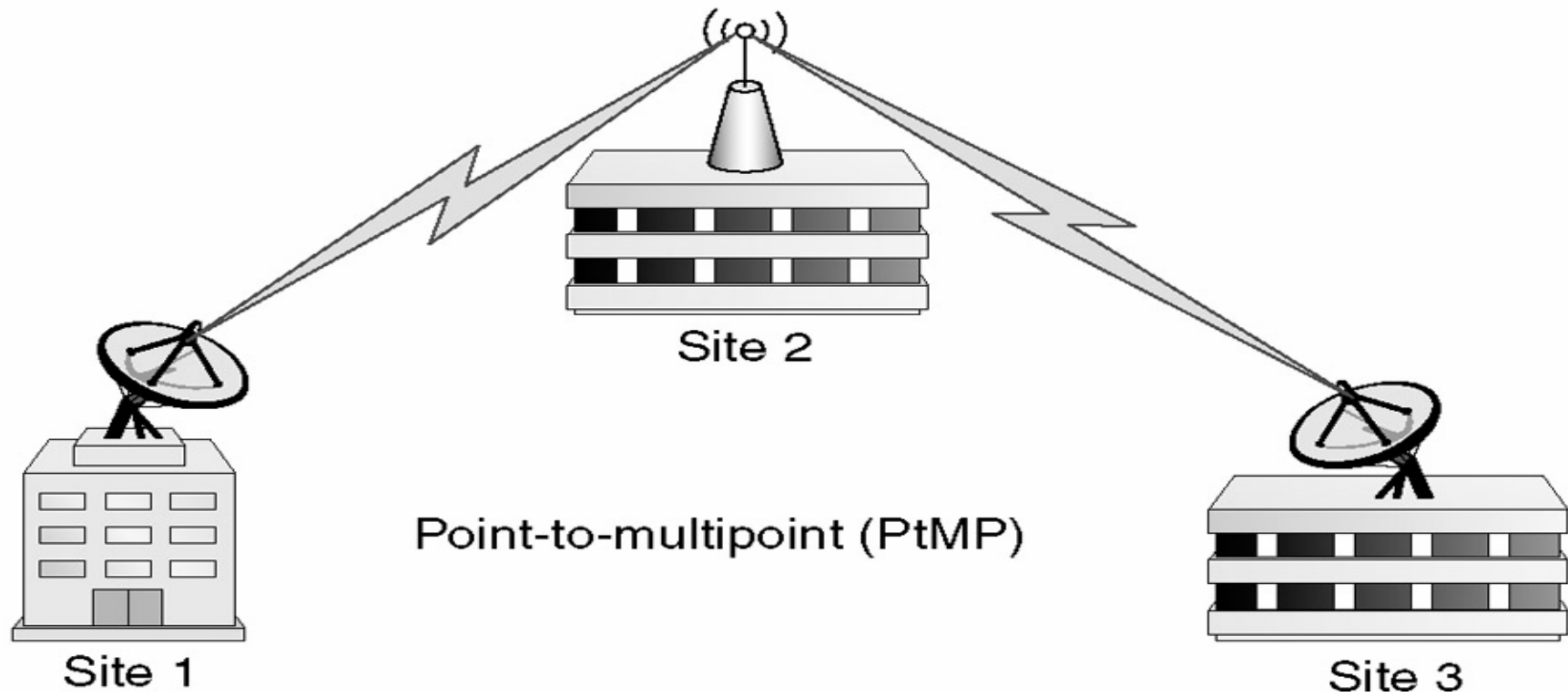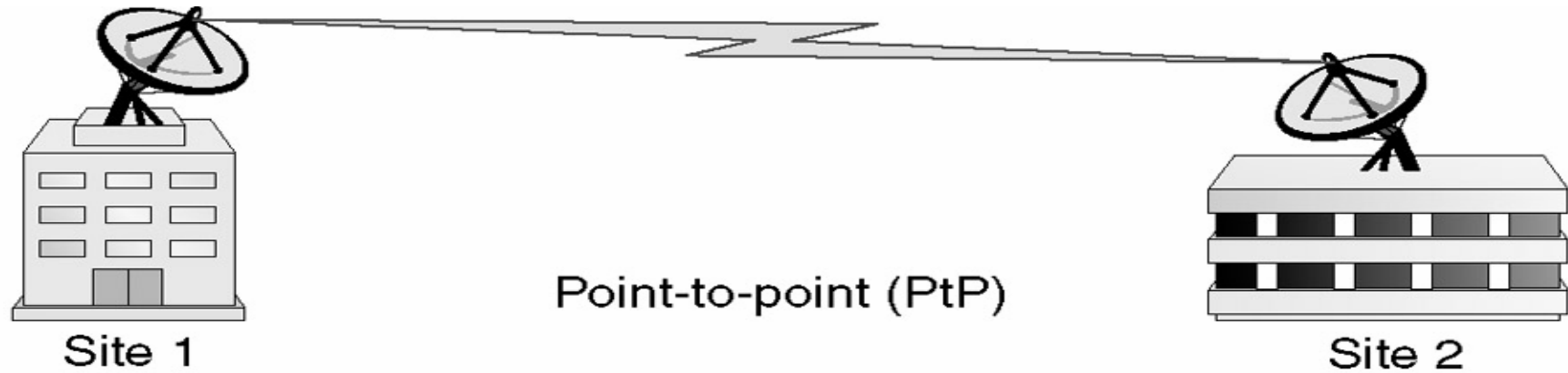# WLAN Design Models

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Site-to-Site Connections

When using WLAN technology to form site-to-site links, you will either create *point-to-point (PtP)* or *point-to-multipoint (PtMP)* links. This section describes both.

Point-to-Point (PtP)

- A PtP WLAN connection is a dedicated connection between two wireless devices. These two devices are usually bridges that allow for the bridging of two otherwise disconnected LANs. These wireless connections allow for the creation of large-scale campus networks and may even be used to create metropolitan networks that span cities. They provide the benefit of connecting disconnected LANs over some distance without the need for leased lines or running cable when the connection is created within a large campus or otherwise owned area . Figure 1 shows a PtP connection and a PtMP connection.

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Point-to-point (PtP)

Site 1

Site 2

Point-to-multipoint (PtMP)

Site 2

Site 1

Site 3

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These PtP connections will use semidirectional or highly directional antennas to form the connection. These antennas do focus the signal mostly in a desired direction so that more amplitude is available in that desired direction.

Point-to-Multipoint (PtMP)

A PtMP wireless link is created when more than one link is made into a central link location like that represented in Figure 1. An omni- or semidirectional antenna is usually used at the central location, and semidirectional or highly directional antennas are used at the other locations.

When creating outdoor or indoor bridge links, you will have to decide between these two topologies. When only one connection is needed, you will usually choose the PtP model, and when there is a need for multiple locations to link back to a central location, you will usually choose the PtMP model .

However, there are times when multiple PtP links may be justified instead of using the PtMP model. Specifically, this may be needed when you cannot accept the throughput constraints imposed by having a single antenna positioned centrally that is accessed by all remote locations.

Wireless Mesh Networks

Another wireless networking model is the *wireless mesh networking* model. In the database world, you have a one-to-one relationship model, and this is like the PtP model in WLANs. You also have a one-to-many relationship model, and this is like the PtMP model in WLANs. However, database theory also presents a many-to-many relationship model, and this is much like the mesh networking model in WLANs. Therefore, you could say that mesh networking is like a multipoint-to-multipoint (MPtMP) model.

In a *mesh network*, all APs can connect to all other stations that are turned on and within the range of each other. Additionally, data travels through each node so that each node is both a router/repeater and an end node at the same time. The benefits of a mesh networking model include:

- Communications within areas that would normally have many LOS obstructions
- Data routing redundancy

The <u>first</u> benefit is seen because mesh nodes are placed close enough to each other that a path will always be available around obstructions that would normally prevent wireless links.
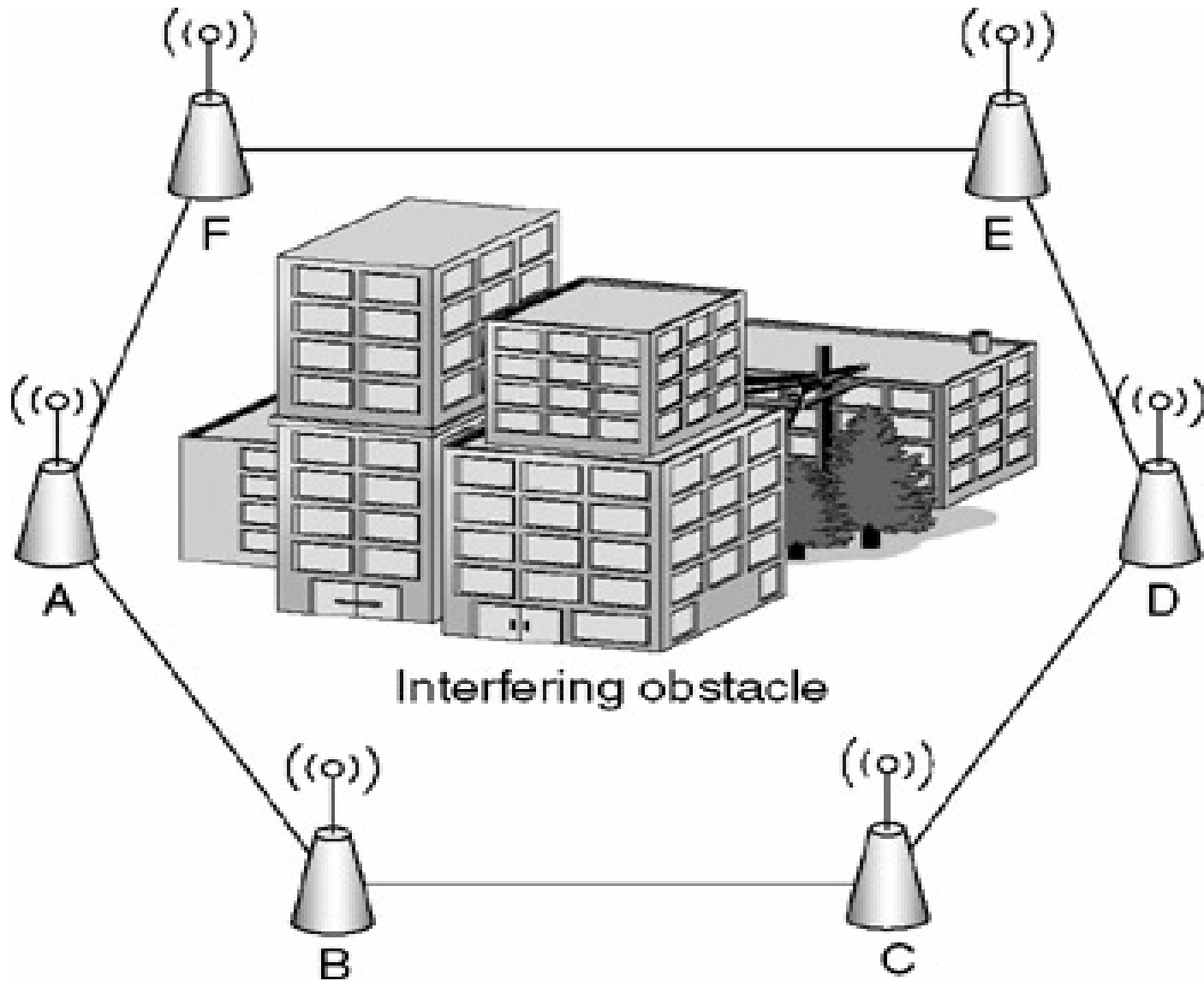
Figure 2 :Solving LOS issues with mesh networking

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Figure2 illustrates this benefit. Notice that data can travel from node A to node B and then to node C and finally to node D. If this were not a mesh network, there would be no clear path from node A to node D.

- The second benefit is also seen in Figure 2 If the route mentioned previously (A to B to C to D) was to become unavailable, there is data routing redundancy in that the route from A to F to E to D could be utilized.