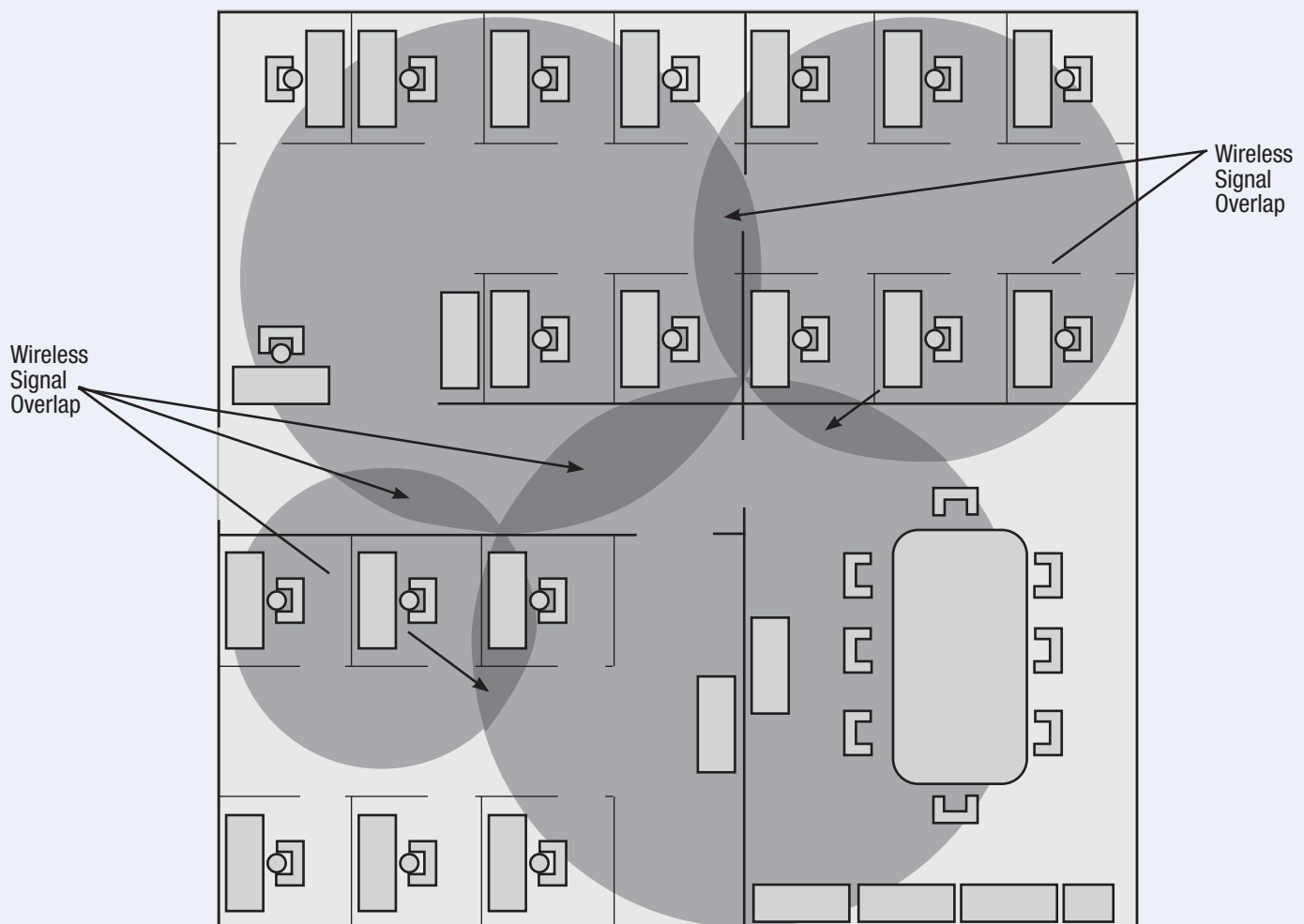


# Designing and Deploying a Wireless Network

When designing and deploying a wireless network, there are several factors to consider. Most manufacturers of wireless access points and routers indicate a typical range that their equipment can provide. Depending on the type of antenna used and the physical location of the access point or router, the range may vary significantly. It is important to consider obstacles such as walls, ceilings, furniture, and electronic interference from machinery, power lines and even microwave ovens as these all play a role in wireless signal reception. In wireless transmissions, reflections (when wireless signals “bounce” off objects) and multipath (when wireless signals travel in multiple paths arriving at the receiver at different times) are as important as signal strength in determining the success of an installation. A signal will also exhibit peaks and nulls in its amplitude and alteration of its polarization (vertical or horizontal) when propagating through walls, ceilings and reflecting off metallic objects.

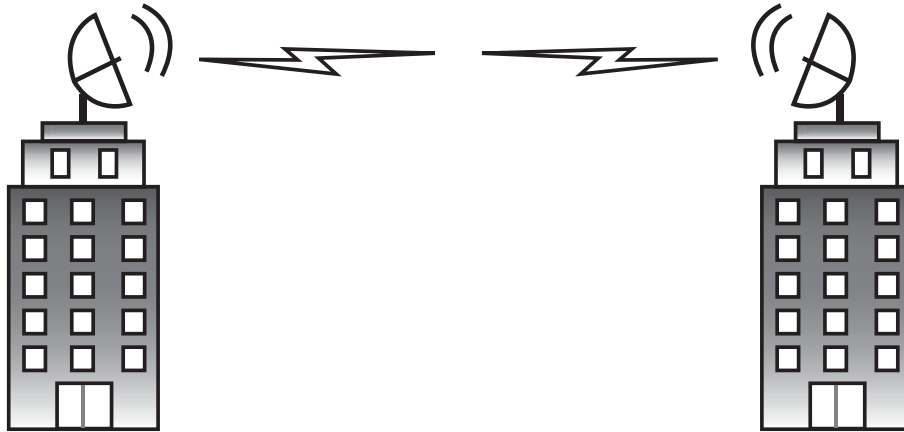
Wireless radios have special hardware and software to deal with multipath and signal level nulls, but if the antenna is in a poor location, the radio will not be able to communicate. When trying to get the best performance in a location with a lot of barriers or reflections, it is important to be able to move the antenna in all three axes in order to minimize the effects of multipath and optimize the signal strength. A good first step is to obtain a layout of the floor plan and then draw in access point locations. You will want to “overlap” the range of the access points so you have complete coverage. See diagram below.



# Antenna Position

## Directional

Yagi and parabolic grid antennas, typically used for point to point line of sight applications, must point directly at one another for maximum signal strength. Be sure to clear all obstructions that could distort or block the antenna beam. See diagram below.



By replacing the manufacturer's antenna with a higher dBi (gain) antenna you may be able to increase signal strength. Again, multipath and reflection must be considered as stated above.

## Omni-Directional

Omni-directional antennas should be mounted as far away as possible from all surfaces including walls, floors, ceilings etc. Additionally all Omni-directional antennas should be mounted at the same height for maximum performance and signal strength. See diagram below.



## Real Life Testing

There is no way to know the exact range of your wireless network without testing it first. Every obstacle placed between an access point or router and wireless PC will create signal loss. Leaded glass, metal, concrete floors, water, and walls will inhibit the signal and reduce the range. The best way to see the actual range and performance is to do a site survey by setting up a few access points and use a wireless laptop at different locations in the building. By moving the access points and/ or antennas you will see an increase or decrease in signal strength at a specific location.