Access point range and signal strength maximization

Wireless performance depends on a number of factors, making a definitive range hard to predict. For example, in an indoor setting the type and thickness of walls can impact the range of your network; fewer walls are better, or uninsulated drywall is better than concrete. The same principles also hold true for outdoor installations: the signal will be attenuated by trees, buildings and certain atmospheric conditions or weather, such as heavy rainfall or fog. Both indoor and outdoor deployments will also be affected by radio frequency interference. Cordless phones, microwave ovens, and neighboring wireless access points are common sources of interference.

Barring physical obstruction and radio interference, Cisco Meraki access points equipped with omnidirectional antennas typically reach 100 meters. Directional antennas (sometimes called "panel antennas") greatly extend range by concentrating power in a single direction. With line-of-sight and limited interference these links are known to reach 20 kilometers or more.

Although there isn't a silver bullet to maximize coverage, there are several rules of thumb to get the most from your equipment:

- Learn to use http://my.meraki.com. Visit this page while connected to a Cisco Meraki access point to see live statistics about the access point. What channel am I currently using? Is there a lot of radio interference on this channel? How fast is my connection to the access point? If the access point is a repeater, is the AP's path to the gateway strong? Write down these numbers, then make changes to your network and see if they improve or hurt your performance.

- Try moving access points to see if speed improves. When possible, arrange access points so they have direct line-of-sight with each other. Avoid placing access points near devices that emit radio interference. Try different antenna combinations. Some antennas produce a spherical coverage area (imagine a soccer ball with the access point directly in the center); other antennas concentrate signal on a single plane (imagine a pancake). While the former can be mounted in any direction, the latter should be mounted so that the antenna is perpendicular to the ground.

- Experiment with different channels. Often changing the channel of your network will avoid congestion and increase your network's speed and range. If your network has many gateways, consider enabling Auto Channel Spreading (Enterprise only). If your access points are capable of using both 2.4GHz and 5GHz antenna's consider using them. It's possible that a particular frequency is better at penetrating an obstruction.

- For long ranges, it's important to accurately place your access points on Dashboard. Geographic positions in Dashboard are used to tune radio parameters and improve performance.