Ensuring Reliable Wi-Fi in a High Ceiling or Long Range Wireless Network

Accessing Wi-Fi in venues with high ceilings, such as auditoriums Wi-Fi, convention centers wireless networks, warehouse wireless network and indoor sports arenas wireless networking and entertainment arenas, can be challenging. To provide sufficient wireless network coverage and capacity, IT leaders must consider several issues when deploying networks in these areas. First, high ceilings, open spaces and structural obstacles can all contribute to limited or no radio frequency (RF) propagation in some areas of the warehouse wireless network. Next, in settings where large concentrations of mobile device users gather, capacity per user device becomes a significant issue. Finally, many venues require that Wi-Fi infrastructure be deployed in the least conspicuous, most aesthetically-pleasing means possible so that it does not disrupt décor. Several new products have been introduced on the market to help IT administrators alleviate these challenges.

Select the Correct Wi-Fi Antenna
There are two types of wireless access points; those with the antennas integrated, and those with ports to connect to external antennas. Access points with integrated antennas exhibit omni-directional radiation patterns and provide uniform coverage in all directions. However, these internal antennas provide limited coverage because the antenna gain is typically lower than the gain for external antennas. Also, access points with internal antennas must be mounted on the ceiling in order to maintain the proper radiation pattern for coverage. Access Points with integrated antennas are recommended for warehouse wireless networking, large home wireless network, or extending the range of your 802.11n or 802.11ac indoor wireless network. Using access points that are connected to external antennas allows greater placement flexibility and provides improved coverage and capacity, especially in high-ceiling venues. For general coverage within a local area, medium gain omni-directional external antennas are a good choice. These antennas can be ceiling or wall mounted. If higher capacity is needed, directional antennas are a better choice because they offer a broader range of gain and beam width options. Placement of wireless access points, with directional antennas are also useful in outdoor wireless network applications, such as campground wireless networks, rv park wireless networking, and marina, long range wireless networking. In addition, the use of external antennas allows the APs to be concealed, usually above the ceiling or inside the wall. An aesthetically-pleasing solution is more easily achieved when the access points are hidden and only the antennas are visible. This becomes equally important in very cold weather, wireless network environments, where a customer would like to keep the access point inside a weather proof enclosure, and extend the antenna only, outside the weatherproof enclosure. A high gain omni-directional, or high gain directional antenna can then be used.

Using 802.11n wireless access points with integrated antennas at heights greater than 25 feet is not an option. The low gain of the integrated antenna creates a very small coverage cell, compared to external antennas or antennas mounted at lower heights, that is insufficient for providing coverage that will reach the floor. Higher gain external antennas are needed to provide adequate coverage and capacity. External omni-directional antennas with higher gain will offer an increased coverage area but may not provide the capacity required. Directional antennas offer narrower coverage areas but will increase capacity for the areas covered. This ensures each coverage area in your wireless network will have increased speed, and wireless network performance. This is the reason sector antennas, high gain directional antennas, and high gain patch antennas are used for marina wireless networks, rv park Wi-Fi, marina WiFi, and camground long range wireless networks. The high gain sector antennas for 802.11N and 802.11AC, outdoor wireless networks increases speed and provides for a long range WiFi network.

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Ensure Adequate Capacity in Densely Populated Venues

High-ceiling venues often have large concentrations of mobile device users. High-density networks can ensure adequate coverage and capacity by addressing the issue of interference, which is the most significant cause of limited performance in these environments. This is accomplished by "mapping" users into smaller RF cells of operation. These narrower cells are created by using external antennas with narrow beam width and higher gain. Fewer users per AP helps to minimize channel-to-channel interference and maximize the use of available spectral capacity.   This type of setup utilizes high gain, directional patch antennas, and high gain sector antennas to increase wireless network range, wireless network speed, and provides for long range wireless networking at campgrounds and RV parks. The narrow beam width of the antennas provides for increased wireless networking speed and performance.

Ensure Optimum Aesthetics

Wi-Fi infrastructure in interior venues must be deployed in the most aesthetically-pleasing manner possible. Fortunately, today there are a number of ways to inconspicuously install access points and antennas. To minimize the overall infrastructure footprint, the AP can be installed within the ceiling or wall, leaving only the antenna visible. Another option is to conceal both the AP and the antenna by disguising them in the ceilings, walls or even furniture. This option is possible only if the concealment structure will not interfere with RF propagation. The third option is to choose an antenna with a small form factor that blends into the area. Today, antennas are available that are as small as four inches. Finally, co-locating mounts can conceal APs and cabling as well to simplify installation. Today, seamless network access is expected everywhere, even in challenging high-ceiling venues. IT leaders can mitigate the challenges by selecting the correct external antennas and mounts. For more information please visit www.gnswireless.com, or call us to discuss your wireless network application.

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