□□ WiFi Bridge vs. □□ WiFi Mes Understanding the Difference and Use Cases □□



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When it comes to expanding network coverage without the need for extensive cabling, both WiFi bridges and WiFi mesh systems offer viable solutions. However, they serve different purposes and are suited to different scenarios.

The Challenge of Wired Connections

Many IT professionals prefer to use wired connections for access points due to their reliability and performance. However, in many situations, running cables isn’t practical. The costs of trenching and installing cables, as well as the aesthetic concerns of visible trunking and drilled walls, can make wireless alternatives more appealing. This is where WiFi bridges and mesh networks come into play.

What is a WiFi Bridge?

A WiFi bridge functions as a replacement for ethernet cabling, designed for specific, fixed configurations. It essentially connects two points wirelessly, simulating the presence of a physical cable between them. WiFi bridges are commonly used in outdoor environments to connect two distant points, such as buildings or campuses. However, they can also be utilized indoors, where they connect access points in different rooms or from an outdoor location to an indoor one.

In a point-to-point setup, the bridge operates by carrying data from one location to another, often across several hundred meters or even miles. Typically, these setups use sector antennas or specialized equipment like LigoWaves DLB series or Ubquiti airFiber for example. Importantly, a WiFi bridge in bridge mode does not connect to WiFi clients like an access point would; its sole purpose is to link two stations.

A practical use case for a WiFi bridge might involve the need to secure traffic over the bridge using VLANs, or to operate in a point-to-multipoint configuration where multiple stations connect to a central bridge.

What is Mesh WiFi?

Mesh WiFi offers a more versatile solution by not only connecting an AP wirelessly to another but also allowing client devices to connect directly to the APs within the mesh network. This makes mesh WiFi more multipurpose compared to a bridge. With mesh networking, you can connect multiple APs across an area, such as an outdoor park, without the need for individual cabling for each AP. The mesh technology is integrated into the APs, eliminating the need for a separate radio for bridging.

However, mesh networking has its own set of challenges. In high-density environments where high data throughput is required, it might be more effective to use a different radio frequency or technology, such as combining mesh with a 60GHz E-band bridge at the root. This approach can help handle the load in demanding scenarios where meshing alone might not suffice. Additionally, while meshing reduces the need for cabling, the APs still require power, which might be provided via existing infrastructure or power over ethernet (PoE).

One limitation of mesh networks is the performance hit on the root AP. Since the root AP is responsible for backhauling data from other uncabled APs, as well as supporting client devices, the network performance can degrade if the demand is too high. For sites with lower data requirements, mesh networking can be an ideal solution. But in cases where performance is critical, meshing might not be the best choice.

The Role of 60GHz in WiFi Bridging and Mesh Networks

When considering performance and security, especially in demanding environments, 60GHz technology can be a game-changer. Operating in the millimeter-wave band, 60GHz offers ultra-high bandwidth and low latency, making it ideal for high-throughput applications. This frequency is particularly useful in WiFi bridging, where long-distance, high-capacity links are required. For instance, a 60GHz bridge can provide gigabit speeds over several kilometers, which is perfect for scenarios like connecting different buildings within a campus or supporting high-density environments.

In mesh networks, 60GHz can be utilized to enhance backhaul performance, reducing the load on the root AP and improving overall network efficiency. However, 60GHz does have limitations in terms of penetration and range, as it is more affected by obstacles compared to lower frequencies like 2.4GHz and 5GHz. This means careful planning is required to ensure line-of-sight connections and to maximize the benefits of this technology.

Final Thoughts

Choosing between a WiFi bridge and a WiFi mesh network depends on your specific needs. WiFi bridges are ideal for fixed, point-to-point connections where high performance and security are critical, while mesh networks offer flexibility and ease of deployment for broader, multipurpose coverage. Incorporating 60GHz technology can further enhance the performance of both bridges and mesh networks, particularly in high-demand environments where speed and reliability are paramount.

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