

CYBERNETWORKSOLUTIONS

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The Basics Of Mesh Networking



Wireless mesh architecture is a first step towards providing high-bandwidth network over a specific coverage or geographical area. Wireless mesh architecture's infrastructure is, in effect, a router network minus the cabling between nodes. It's built of peer radio devices that don't have to be cabled to a wired port like traditional WLAN access points (AP) do which makes them extremely flexible.

Mesh architecture sustains signal strength by breaking long distances into a series of shorter hops therefore by passing some of the traditional wired network limitations. Intermediate nodes not only boost the network signal, but also cooperatively make forwarding decisions based on their knowledge of the network, i.e. perform routing. Such architecture may with careful design provide high bandwidth, spectral efficiency, and economic advantage over the coverage area.

Here Are A Few Examples Of Wireless Mesh Networks:

Infrastructure wireless mesh networks:

Mesh routers form an infrastructure for clients.

Client wireless mesh networks:

Client nodes constitute the actual network to perform routing and configuration functionalities.

Hybrid wireless mesh networks:

Mesh clients can perform mesh functions with other mesh clients as well as accessing the network.

Wireless mesh networks have a relatively stable topology except for the occasional failure of nodes or addition of new nodes. The traffic, being aggregated from a large number of end users, changes infrequently. Practically all the traffic in an infrastructure mesh network is either forwarded to or from a gateway, while in ad hoc networks or client mesh networks the traffic flows between arbitrary pairs of nodes.

Major Benefits:

Mesh networks are **self-healing**: the network can still operate even when a node breaks down or a connection goes bad. **As a result, this network is very reliable.** This concept is applicable to wireless networks, wired networks, and software interaction. A fully connected network is a mesh network in which each of the nodes is connected to each other. A fully connected network doesn't need to use switching nor broadcasting.

Deploying a mesh network is reliable and offers robust redundancy.

History:

Wireless mesh networks are the most topical application of mesh architectures. Wireless mesh was originally developed for military applications but has undergone significant evolution in the past decade. As the cost of radios plummeted, single radio products evolved to support more radios per mesh node with the additional radios providing specific functions- such as client access, backhaul service or scanning radios for high speed handover in mobility applications. The mesh node design also became more modular – one box could support multiple radio cards – each operating at a different frequency.

Current Application Examples:

U.S. military forces are now using wireless mesh networking to connect their computers, mainly ruggedized laptops, in field operations. It enables troops to know the locations and status of every soldier or marine, and to coordinate their activities without much direction from central command.

Electric meters now being deployed on residences transfer their readings from one to another and eventually to the central office for billing without the need for human meter readers or the need to connect the meters with cables.

The laptops in the one laptop per child program use wireless mesh networking to enable students to exchange files and get on the Internet even though they lack wired or cell phone or other physical connections in their area.

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