Cisco Enterprise Wireless Mesh

Extend connectivity for hard-to-wire environments

The Challenge

While wireless networks have become integral to many enterprises seeking to optimize productivity, providing full wireless coverage remains a challenge in a number of environments. To provide pervasive network connectivity, enterprises must be able to deploy wireless access points wherever necessary, often above ceilings or across millions of square feet. However, typical access points must connect to Ethernet cables that extend a mere 100 meters from the Ethernet port. Running Ethernet cable to every access point required to provide full coverage in hard-to-wire environments, from warehouses with expansive spaces to historic buildings requiring special care, is often too difficult, aesthetically undesirable, or simply impossible.

Originally developed for outdoor wireless backhaul, mesh technology now provides the same reach and scalability available in outdoor networks to indoor environments. Leveraging mesh networking technology for indoor networks provides a simple, flexible way to extend wireless connectivity to every part of an enterprise facility or structure. Because mesh access points do not require Ethernet connections, they create the basis of the indoor mesh network, which brings mobile connectivity to all users regardless of their environments.

The Solution

Cisco has leveraged its technology leadership in outdoor mesh networking to develop a robust indoor mesh networking solution. Cisco Enterprise Wireless Mesh introduces mesh networking functionality to the Cisco Aironet 1240 and 1130 Series Access Points, enabling enterprises to provide wireless connectivity to indoor areas that, until now, have been difficult or impossible to wire. These mesh access points deliver mobile connectivity to users located in previously inaccessible areas, while backhauling traffic to traditional access points connected to Ethernet ports.

Functioning as part of the Cisco Unified Wireless Network, the Cisco Aironet 1240 and 1130 Series Access Points are managed and monitored by wireless LAN controllers. The mesh capability is software which enhances the code base of the Aironet 1240 and 1130, eliminating the need for enterprises to invest in additional equipment. In their dual-radio configuration, these mesh access points deliver network access to users over the 2.4 GHz frequency and use the 5 GHz band to backhaul traffic. Based on intelligent wireless routing technology and a powerful self-organizing, self-healing, and self-configuring architecture, Cisco Enterprise Wireless Mesh is simple to deploy and manage, while offering comprehensive coverage and optimal network performance to a wide variety of environments.

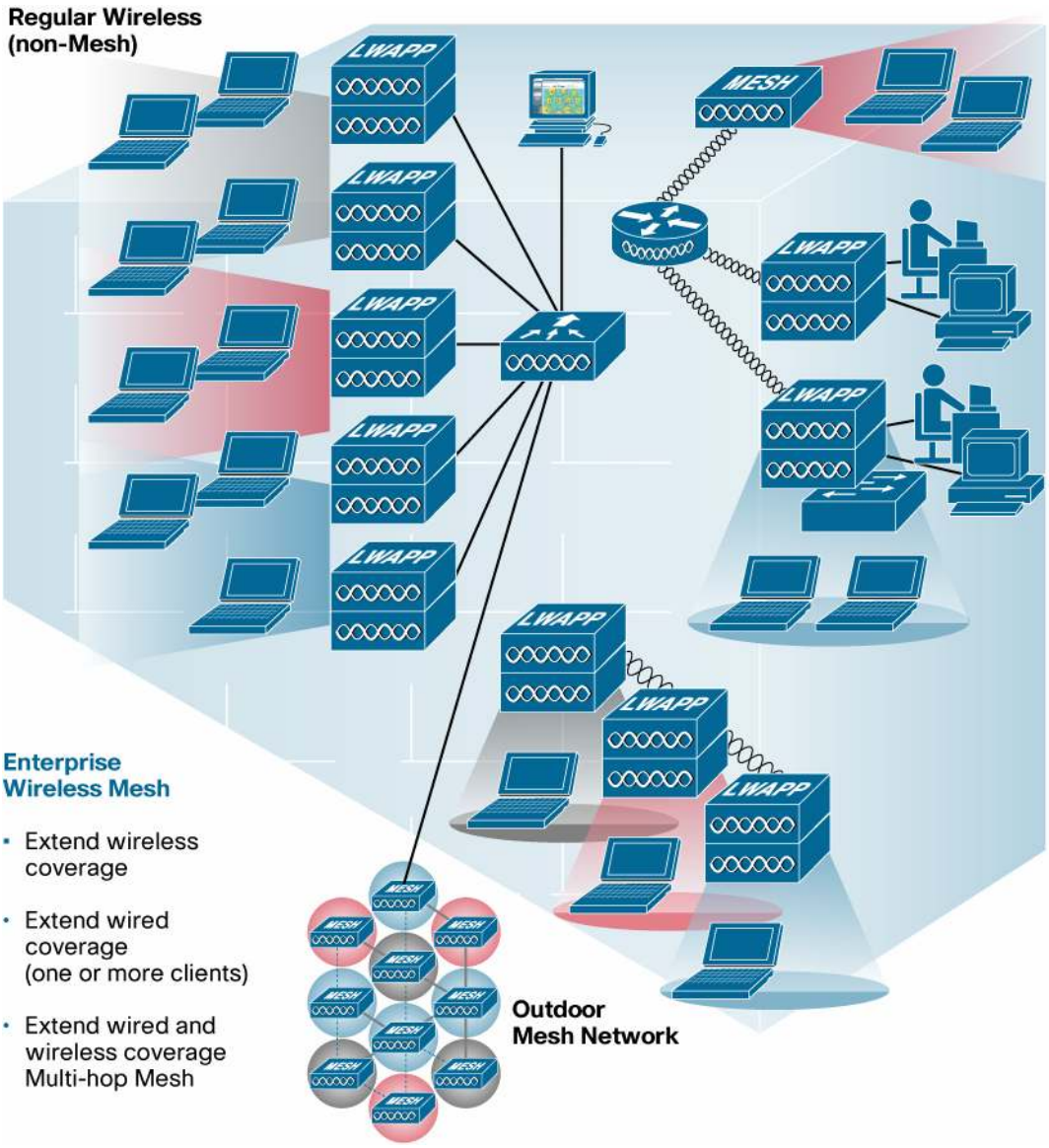
Access points operating in wireless mesh mode use the Adaptive Wireless Path Protocol (AWPP) to establish dynamic wireless connections to their neighboring access points. Using one radio, each access point can then provide wireless coverage for client devices within its area, while backhauling traffic through the second radio. Because it dynamically learns the best way to route

traffic wirelessly across multiple hops back to the wired network, the AWPP ensures maximum network availability.

Cisco Enterprise Wireless Mesh is ideal for extending connectivity to both wired and wireless client devices (see Figure 1).

- Extending wireless coverage: Cisco Enterprise Wireless Mesh provides network connectivity for wireless clients located in hard-to-wire areas and backhauls traffic to the wired network.
- Extending wired coverage to single clients: Access points can function as wireless bridges by connecting to wired devices and backhauling traffic to the wired network.
- Extending wired coverage to workgroups: To provide connectivity to multiple wired clients, access points can connect to a wired switch and backhaul workgroup traffic.

Figure 1. Deployment Options for Enterprise Wireless Mesh



Benefits

Cisco Enterprise Wireless Mesh provides a number of benefits to enterprises with difficult networking environments.

Flexible, comprehensive wireless coverage: Cisco Enterprise Wireless Mesh delivers wireless services to locations where coverage had not been possible due to wiring restrictions. By backhauling traffic to traditional access points, the mesh network overcomes the physical limitations of Ethernet cable and provides maximum flexibility in network design. Since Ethernet cabling no longer dictates where access points are to be located, they can be placed to maximize network performance and provide comprehensive coverage throughout entire facilities including difficult areas, such as staircases, parking structures, and retail areas lacking wiring crawl spaces.

Fast, easy deployment: Reducing the need to run Ethernet cable to every access point facilitates and expedites wireless deployments. Enterprises no longer have to worry about drilling holes, digging up floors, or running unsightly cable throughout their facilities to reach dead spots. Thanks to Cisco's AWPP, mesh enabled access points automatically find the nearest path the core network and the wireless LAN controller supports zero-configuration deployment, automatically detecting and configuring the access points once connected. This enables the nodes to join the network easily and securely, simplifying deployment and reducing costs.

Simplified management: Cisco Enterprise Wireless Mesh runs on one unified architecture that centralizes the key functions of the wireless LAN to provide the same management, security, and mobility capabilities to both outdoor and indoor networks. A single management framework simplifies WLAN design, administration, and operation.

Optimal network performance: The Adaptive Wireless Path Protocol (AWPP) used in Cisco's outdoor wireless mesh solutions is also employed by Cisco Enterprise Wireless Mesh. AWPP provides self-healing from and resiliency to interference and network outages, reducing management costs. Especially valuable to RF challenging environments, the protocol was designed to handle acute environmental interference and dynamically optimizes traffic routes between nodes to ensure high system capacity.

Connectivity for wired devices: Universal port capability enables enterprises to leverage the unused Ethernet port to configure access points within the mesh network to function as wireless bridges. With this capability, enterprises can bridge a wide range of wired devices, including cash registers, medical equipment, and printers, to the wireless network. The mesh access point attaches to the device via the unused Ethernet port and backhauls the traffic to the rest of the wireless network.. To provide network connectivity to multiple devices, the access point connects to a wired switch and backhauls workgroup traffic.

Unified indoor and outdoor mesh: Cisco's indoor and outdoor mesh network solutions leverage the same AWPP technology, and is delivered as one unified platform with a single management solution. This enables clients to roam seamlessly between indoor and outdoor networks, making it possible for users to continue using services and applications while they move from the indoor areas of a facility to its outdoor areas.

Applications

Cisco Enterprise Wireless Mesh brings tremendous value to wide range of enterprise environments that have battled with providing widespread mobile coverage to facilities with areas too difficult or impossible to wire.

Manufacturing environments: With production floors that span millions of square feet, high ceilings, and large machinery that can block radio signals, manufacturing plants are challenged to provide wireless connectivity throughout their facilities. Cisco Enterprise Wireless Mesh now enables facilities to deploy access points wherever they're needed, ensuring maximum coverage without the need to run Ethernet cable to each one.

Retail and warehousing: Cisco Enterprise Wireless Mesh offers fast, easy, and cost-effective wireless deployment to the retail sector—from shopping malls and small retail stores that are conscious of aesthetics to large retail distribution centers and warehouses concerned with continuous coverage. The solution provides a way to extend mobile coverage beyond 300 feet without having to make physical modifications, such as cutting through ceilings or drilling through walls. It also enables the quick creation of temporary networks that enable specialists to conduct inventory at client sites.

Hospitality and entertainment: To provide wireless connectivity to guests, large hotels often face the challenge of running Ethernet cable throughout each floor while facing structural challenges such as atriums and elevator shafts that interfere with RF networks. In addition, massive theme parks want to provide connectivity within each individual attraction which may not have a ready-made cable infrastructure. Cisco Enterprise Wireless Mesh facilitates these types of deployments. The ease and speed of deploying the mesh network also makes it ideal for conferences and events, where temporary networks are set up and torn down quickly.

Historic buildings and sites: Historic properties often present unique challenges to wireless network deployments. Cylindrical buildings, concrete structures, and high domes are a few of the structural elements making it difficult to provide consistent coverage. Since the preservation of these buildings is of utmost importance, making the modifications often required to run Ethernet cable is not possible. Cisco Enterprise Wireless Mesh provides the connectivity required, while keeping historic sites intact.

Solution Components:

- Cisco Unified Wireless Network
- Cisco Wireless LAN Controller
- Cisco Aironet 1240 or 1130 Series access points
- Cisco Aironet 1500 Series access points
- Cisco Wireless Control System

Why Cisco?

The Cisco Unified Wireless Network is the industry's only unified wired and wireless solution to deliver cost-effective wireless networks for business-critical mobility. This innovative, award-winning solution brings mobility to endpoint devices and users, providing them with anytime, anywhere network access. The solution also delivers industry-leading mobility services that enable innovative applications to streamline business operations and improve productivity. To find a Cisco wireless partner who can help you deploy with confidence, visit http://tools.cisco.com/WWChannels/LOCATR/jsp/partner_locator.jsp.

Cisco Services

Cisco and its network of Wireless LAN Specialized Partners offer a broad portfolio of end-to-end services based on proven methodologies for planning, designing, implementing, operating, and optimizing the performance of a variety of secure voice and data wireless network solutions, technologies, and strategies. Cisco Wireless LAN Specialized Partners bring application expertise to help deliver a secure enterprise mobility solution with a low total cost of ownership. For more information about Cisco Services for wireless LAN, visit http://www.cisco.com/go/wirelesslanservices.

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