Tutorials

Understanding Wireless LAN Bridges

By Jim Geier

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Access points are by far the primary components in wireless LAN infrastructures. The 802.11 standard defines an access point as a communication hub for users of a wireless device to connect to a wired distribution system, such as an Ethernet network. Access points also play a major role in providing better wireless security and control of users in the shared radio environment.

Several vendors offer what they refer to as wireless LAN *bridges*, which are somewhat different from access points. The 802.11 standard doesn't specifically define a bridge, so let's take a closer look at

what these bridges provide.

Bridge Basics

The industry-accepted definition of a bridge is a device that connects two networks that may use the same or a different Data Link Layer protocol (Layer 2 of the OSI Model). Bridges have been in use for decades, especially with wired networks. Remote bridges, for example, are generally at each end of a point-to-point link, such as those that interconnect two buildings. Other bridges within a local network may connect two different networks types, such as Ethernet and Token Ring.

LAN bridges have ports that connect two or more otherwise separate LANs. The bridge receives packets on one port and re-transmits them on another port. A bridge will not start re-transmission until it receives a complete packet. Because of this, stations on either side of a bridge can transmit packets simultaneously without causing collisions.

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Some bridges re-transmit every packet on the opposite port whether or not the packet is heading to a station located on the opposite network. A learning bridge, which is more common, examines the destination address of every packet to determine whether it should forward the packet based on a decision table that the bridge builds over time. This increases efficiency because the bridge will not re-transmit a packet if it knows that the destination address is on the same side of the bridge as the sending address. Learning bridges also age address table entries by deleting addresses that have not been heard from for a specified amount of time.

Bridges vs. Access Points

Access points connect multiple users on a wireless LAN to each other and to a wired network. For example, 20 users equipped with 802.11 network interface cards (NICs) may associate with a single access point that connects to an Ethernet network. Each of these users has access to the Ethernet network and to each other. The access point here is similar to a bridge device, but the access point interfaces a network to multiple users, not other networks.

Bridges, though, connect networks and are often less expensive than access points. For example, a wireless LAN bridge can interface an Ethernet network directly to a particular access point. This may be necessary if you have a few devices, possibly in a far reaching part of the facility, that are interconnected via Ethernet. A wireless LAN bridge plugs into this Ethernet network and uses the 802.11 protocol to communicate with an access point that's within range. In this manner, a bridge enables you to wirelessly connect a cluster of users (actually a network) to an access point.

Types of WLAN Bridges

- **Basic Ethernet-to-Wireless**. This type connects directly to a single device via an Ethernet port, and then provides a wireless connection to an access point. These types of connections offer a substitute for a radio NIC; making it useful when the device, such as a printer, PC, or video game console, has an Ethernet port and no 802.11 NIC. For example, D-Link offers an 802.11b compatible Ethernet-to-wireless bridge, model number DWL-810, for about $115. In some cases, you may have no way of adding a wireless NIC, which makes a basic bridge the only way to go wireless.
- **Workgroup Bridges**. Workgroup bridges are the answer for connecting wireless networks to larger, wired Ethernet networks. Essentially a workgroup bridge acts as a wireless client on the wireless LAN and then interfaces to a wired network. The wired side may connect directly with a single device (like an Ethernet-to-Wireless bridge) or to an Ethernet hub or switch that connects multiple devices. Generally, a workgroup bridge offers higher-end management and security utilities (with higher prices) as compared to a basic bridge. 3Com and Cisco offer 802.11b workgroup bridges, with prices of $349 to $629, respectively.
- **Access Point / Wireless Bridge Combos**. Some vendors offer access points that you can configure as a bridge, but not both at the same time. Linksys has this capability in their WAP11 Access Point. This access point can operate in point-to-point and point-to-multipoint bridge mode. Like any wireless bridge, the WAP11 lets you wirelessly connect two or more Ethernet LANs together. Other vendors such as Cisco and Proxim also offer the combo version of access points.

Wireless bridges are a very practical, easy, and in most cases inexpensive way to connect Ethernet LANs or extend the range of existing WLANs. They are quick to set up and easy to configure, making them an ideal choice to quickly set up voice and data networks.

Jim Geier *provides independent consulting services to companies developing and deploying wireless network solutions. He is the author of the book,* Wireless LANs *(SAMs, 2001) and offers computer-based training (CBT) courses on wireless LANs.*

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