

Wireless Radio Technology WLAN topologies

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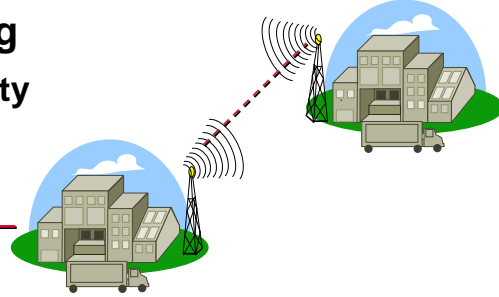
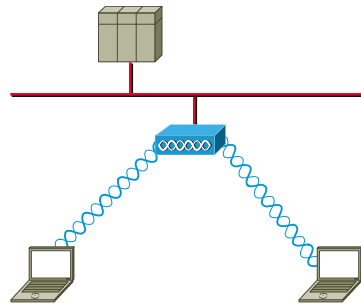
IEEE 802.11 Standards Activities

- 802.11a:** 5GHz, 54Mbps
- 802.11b:** 2.4GHz, 11Mbps
- 802.11d:** Multiple regulatory domains
- 802.11e:** Quality of Service (QoS)
- 802.11f:** Inter-Access Point Protocol (IAPP)
- 802.11g:** 2.4GHz, 54Mbps
- 802.11h:** Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC)
- 802.11i:** Security
- 802.11j:** Japan 5GHz Channels (4.9-5.1 GHz)
- 802.11k:** Measurement

Wireless LAN Implementations

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Wireless Networking
Mobile user connectivity



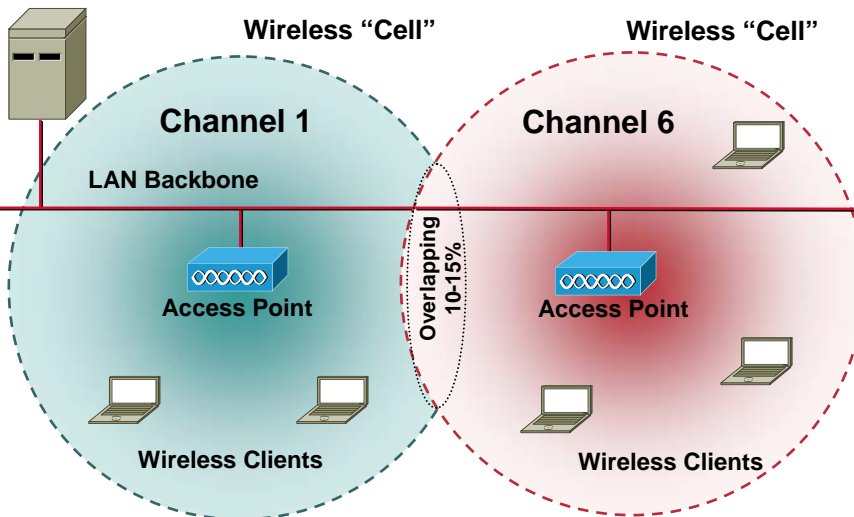
Wireless Bridging
LAN-to-LAN connectivity

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Typical WLAN Topologies

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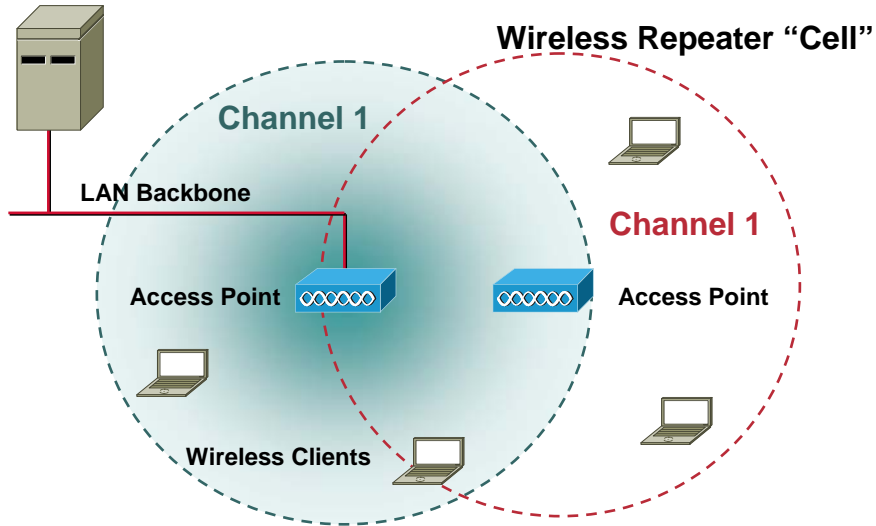


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Wireless repeater

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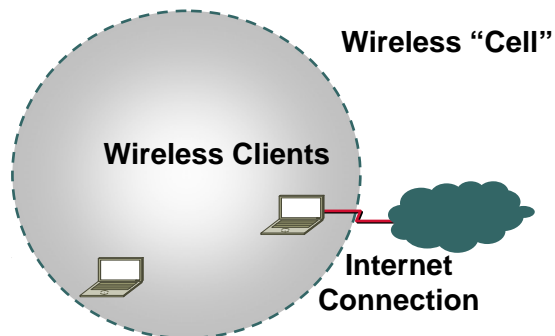
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Alternative Peer-to-Peer Topology

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Peer-to-Peer Configuration (ad hoc mode)



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Scalability

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- **Scalability is the ability to locate more than one access point in the same area. This will increase the available bandwidth of that area for all users local to that access point.**
- **Depending on the number and speed of the available channels, cells can achieve higher data rates.**
 - **With 802.11b, there are 3 separate, 11-Mbps channels, yielding up to a theoretical 33 Mbps per cell. User devices operate at a maximum theoretical value of 11Mbps, since they can only connect to one AP at any given time.**
 - **802.11a has 8 54 Mbps channels, yielding a theoretical 432 Mbps.**

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Channel Setup Overview

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- **Good WLAN deployment:**
Determine number and placement of access points or bridges. Very few gaps in the coverage should be left. These gaps are essentially dead air and the client will lack connectivity in these locations.
- **Remember: 802.11b has 3 channels, 802.11a has 8 channels.**

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Bridge Topologies Root modes

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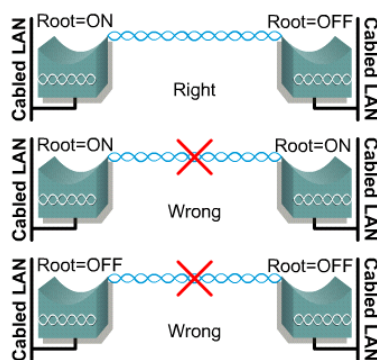
- Access points and bridges have two different root modes, in which to operate the following:
 - Root = ON: The bridge or AP is a root. If it is a bridge, then it is called the master bridge.
 - Root = OFF: The bridge or AP is not a root.
- This setting controls when associations and communication between different infrastructure devices will be allowed.

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Bridge Root Modes

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Root=ON

- Accepts association and communication with clients and repeaters
- Will not communicate with other Root=On devices.

Root=OFF

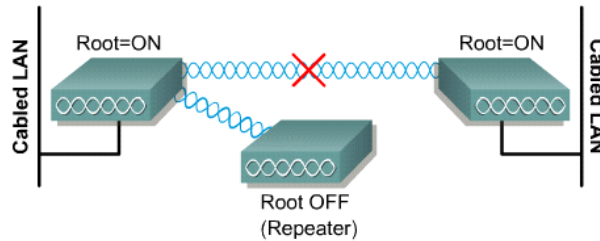
- Associates and communicates with Root=ON master bridge only.

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Access Point Root Modes

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Access Point - Root Mode

Root=ON (Root)

- Accepts association and communicates with ONLY clients and repeaters.
- Will NOT communicate with other Root=ON devices
- There can be any number of Root=ON per RF system

Root=OFF (Repeater)

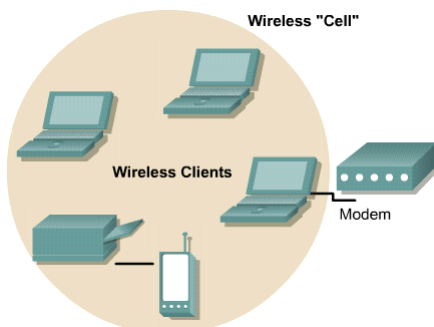
- Associates and communicates to a Root=ON or another Root=OFF that is associated to a Root=ON
- Accepts association and communicates with ONLY clients and repeaters, as long as it is registered to a Root=ON
- The Ethernet interface is disabled

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Ad Hoc Topology

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Peer-to-Peer (Ad Hoc) Topology (IBSS)

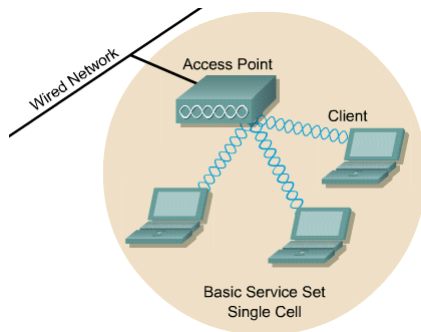
- Can consist of 2 or more PCs with wireless network adapters.
- Sometimes called an Independent BSS.
- Limited range.

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Basic Infrastructure Topology (BSS)

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- Building block of an 802.11 LAN that covers a single cell
- When a device moves out of its BSS, it can no longer communicate with other members of the BSS.
- Uses infrastructure mode, requires an access point (AP).

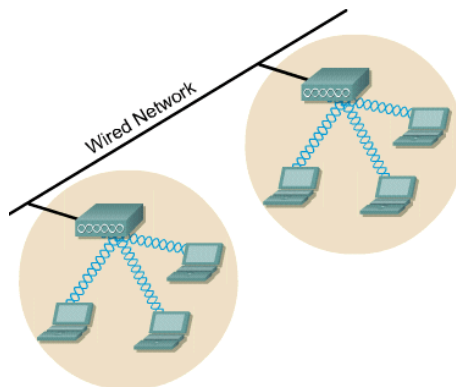
- All stations communicate through the AP, not directly with peers.
- A BSS has one service set ID (SSID).

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Extended Infrastructure Topology (ESS)

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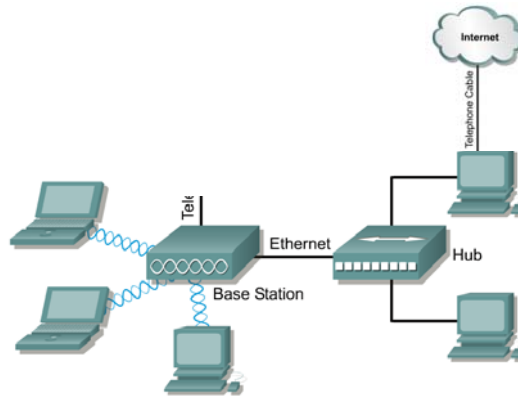
- 2 or more BSSs that are connected by a common distribution system
- Allows the creation of a wireless network of arbitrary size and complexity.
- All packets in an ESS must go through one of the APs.

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Base Station-Dial-up

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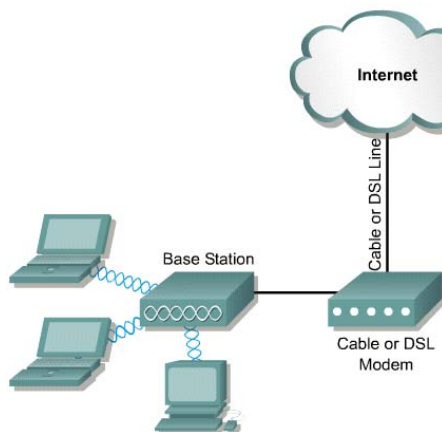
Designed for the small office/home office (SOHO). Gives telecommuters, SOHOs, and home users the convenience of wireless connectivity.

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Base Station—DSL

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- Offers support for a Cable or DSL modem
- Will only support wireless clients.
- DHCP functionality is supported, but access to the wired network is not provided, as the Ethernet port must be used to connect to the Cable/DSL modem.
- Support for PPP over Ethernet.

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Campus Topologies

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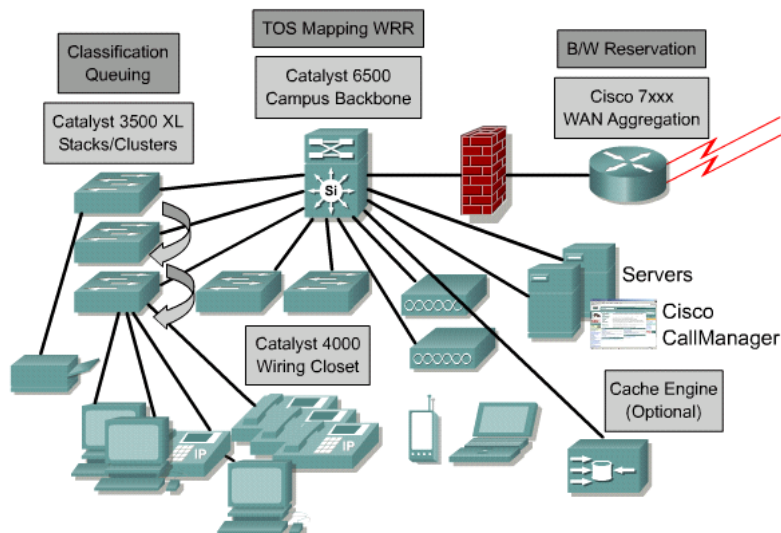
- Serves as an access system that incorporates complete mobility.
- Allows users to access information from unwired places outdoors, in dining halls or informal study spaces, from classroom seats and, even, the athletic fields
- Not a replacement for the wired LAN.
- Provides networking in hard-to-reach and/or temporary locations.
- Allows users to work together in common areas will maintaining network access.

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Campus topologies

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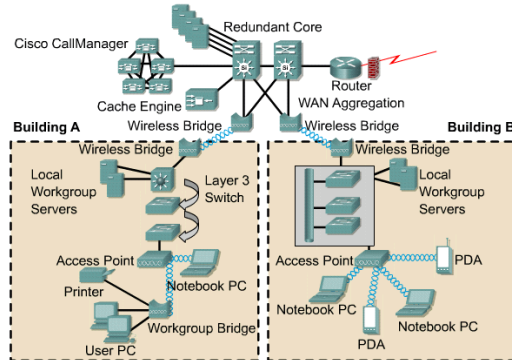


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WLAN addition to AVVID

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- **WLANs are part of Cisco's Architecture for Voice, Video, and Integrated Data (AVVID). AVVID provides the roadmap for combining business and technology strategies into one cohesive model.**

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VLAN features

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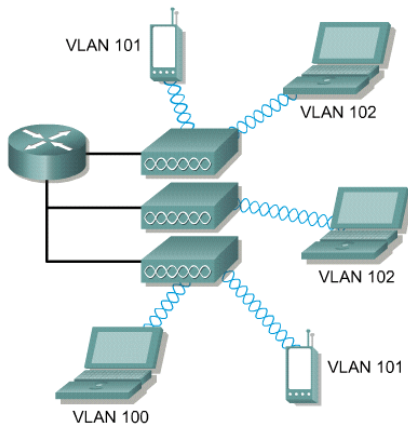
- **Security**—separating systems that have sensitive data from the rest of the network.
- **Departments/job types**—VLANs set up for departments that are heavy network users or a VLAN that is dedicated to specific types of employees.
- **Broadcasts/Traffic flow**—Since a principle element of a VLAN is the fact that it does not pass broadcast traffic to nodes that are not part of the VLAN, it automatically reduces broadcasts.
- **WLANs can now fit nicely into the larger network** because VLANs have been enabled on the Access Points. This allows WLAN users to roam from access point to access point maintaining connectivity to the proper VLAN.

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VLANs in the Wireless network

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- **VLAN 100** allows guest access.
- **VLAN 101** supports barcode scanners with WEP security.
- **VLAN 102** supports 802.1x EAP security.

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