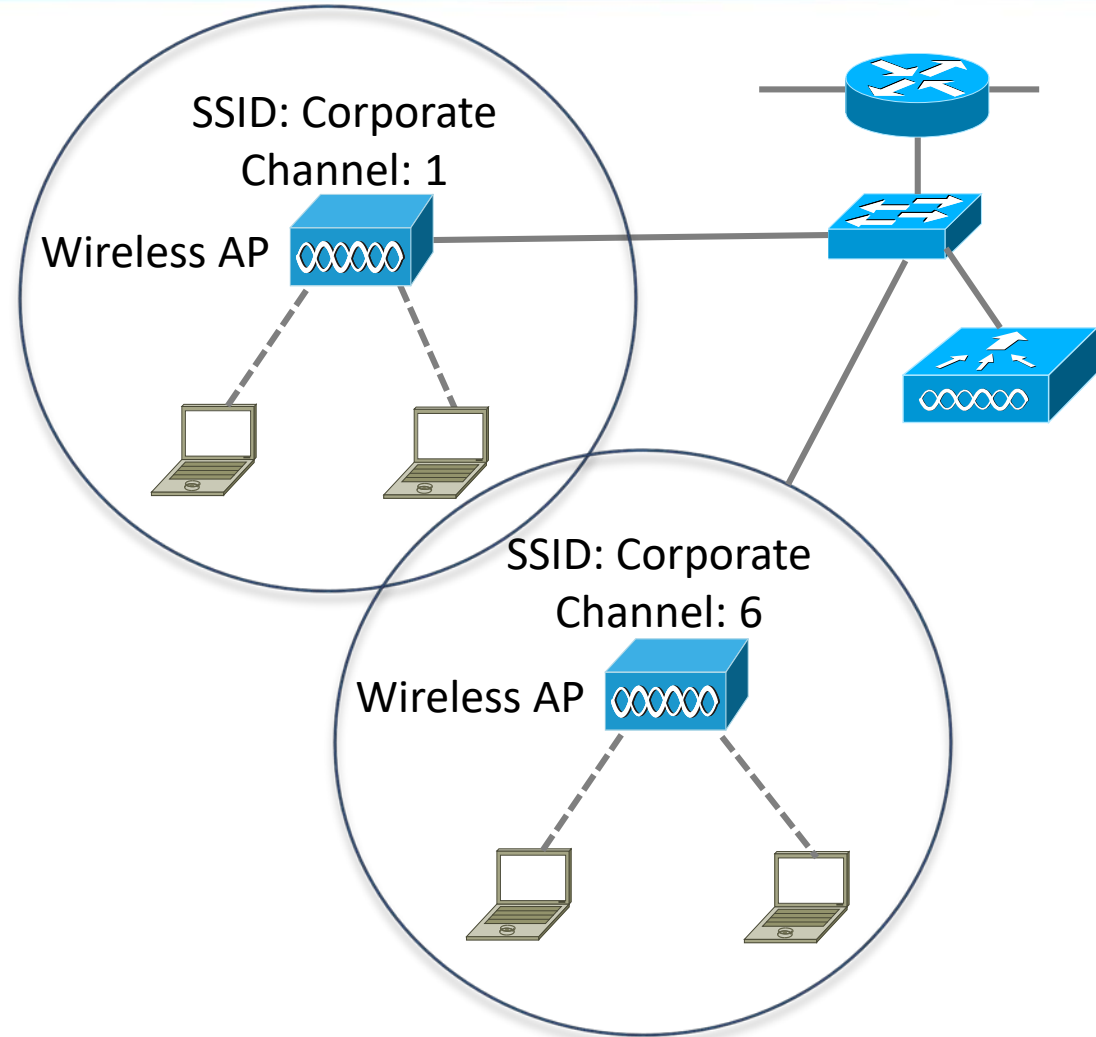
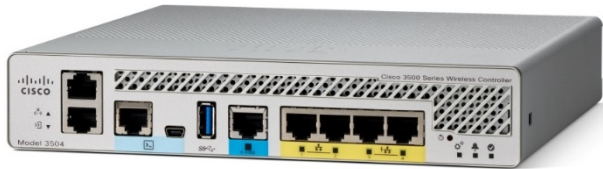


WLC Wireless LAN Controllers



- In a large campus, configuring a large amount of Access Points one by one becomes unmanageable
- A Wireless LAN Controller can be used as a central point of management

Wireless LAN Controllers



Virtual Wireless Controller is also available
Redundancy is supported

Autonomous vs Lightweight Access Points

- Standalone Access Points are known as Autonomous Access Points
- Access Points with a WLC are known as Lightweight Access Points
- The installed software image determines whether an Access Point is Autonomous or Lightweight

Zero Touch Provisioning



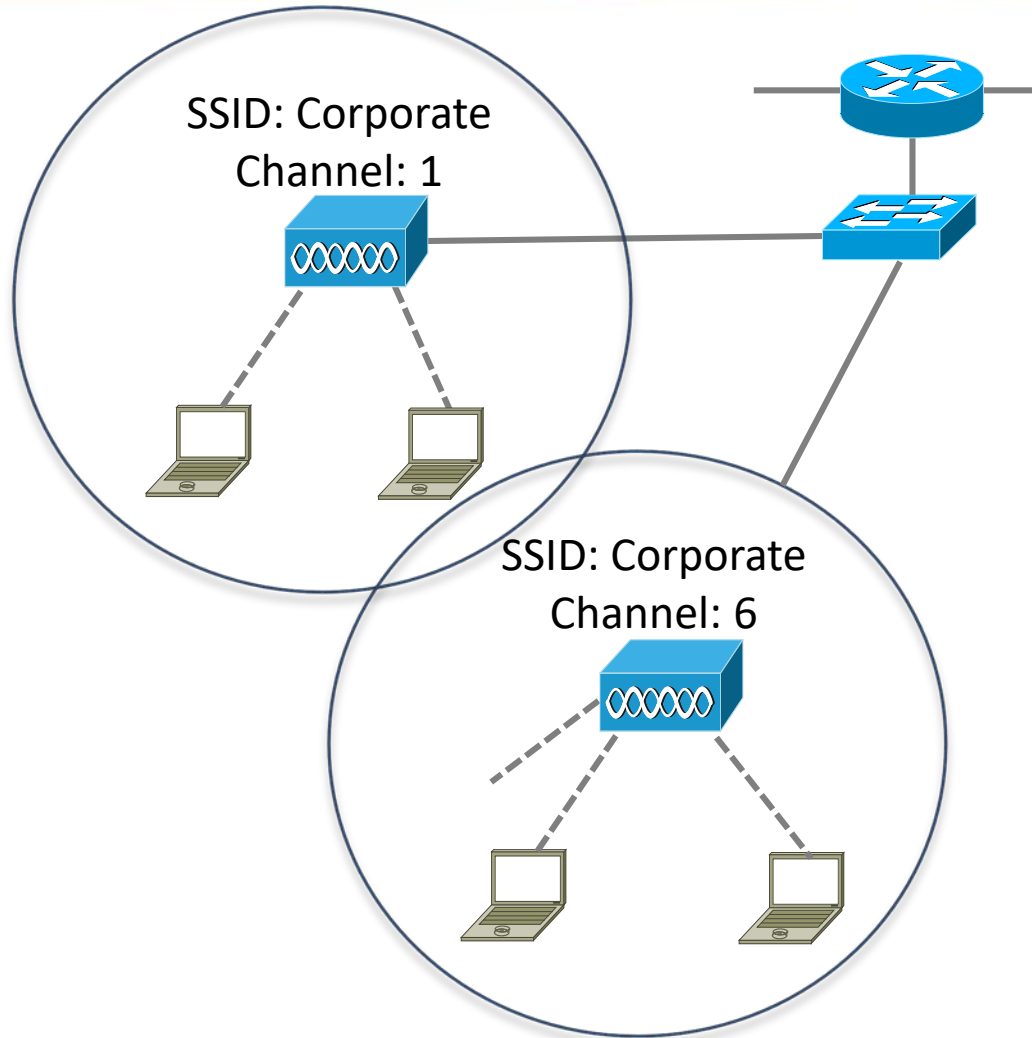
- Lightweight Access Points support Zero Touch Provisioning
- They discover their Wireless LAN Controller via these options:
 - DHCP - option 43 gives the IP address of the WLC
 - DNS – ‘cisco-capwap-controller’ resolves the IP address of the WLC
 - Local subnet broadcast

Wireless Access Points



- The lightweight Access Point downloads its configuration from the Wireless LAN Controller
- This includes what WLANs it should support and their settings
- The WLC also monitors the wireless quality and controls the channels and power of the Access Points
- It can also detect rogue APs

Roaming with Wireless LAN Controller



- Wireless stations can roam across Wireless APs supporting the same WLANs
- The infrastructure can be configured to make roaming seamless

CAPWAP



- Control And Provisioning of Wireless Access Points (CAPWAP) protocol is a standardized protocol that enables a Wireless LAN Controller to manage a collection of Wireless Access Points
- Communications are encrypted inside a DTLS CAPWAP tunnel
- It uses UDP ports 5246 and 5247

Split MAC



- Work is moved from the APs to the WLC which is why they are called Lightweight APs
- Real-Time traffic is still handled by the AP in order to provide suitable performance, the rest is handled by the WLC
- This is known as 'Split MAC'

Split MAC – AP Operations



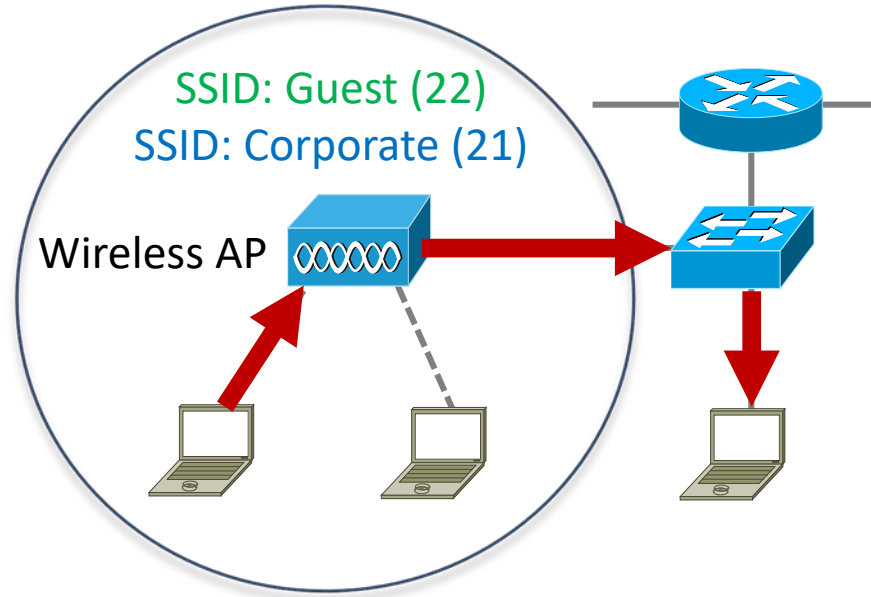
- Client handshake when connecting
- Beacons
- Performance monitoring
- Encryption and decryption
- Clients in power save

Split MAC – WLC Operations

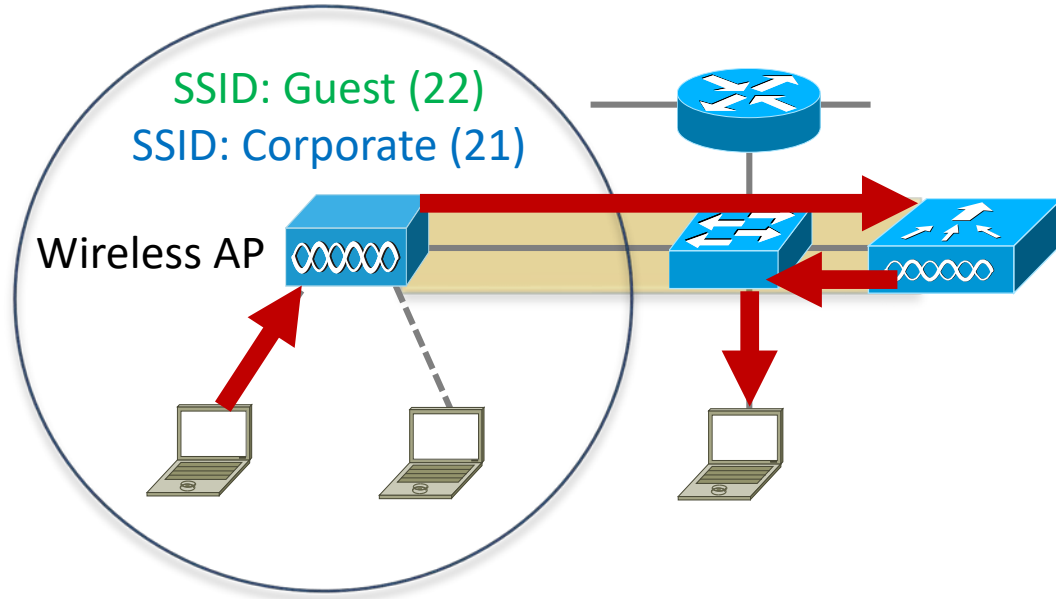


- Authentication
- Roaming control
- 802.11 to 802.3 communication
- Radio Frequency management
- Security management
- QoS management

Traffic Flow with Autonomous AP

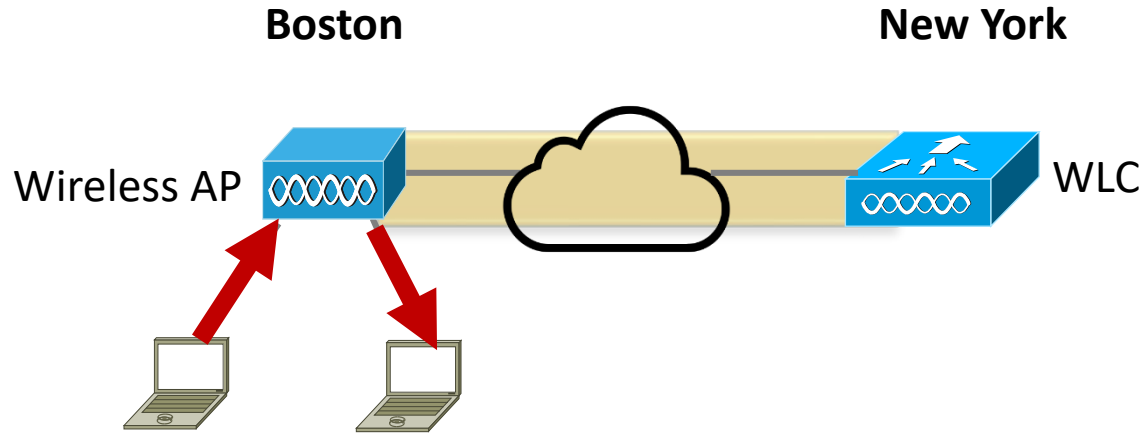


Traffic Flow with CAPWAP



- Management traffic between the AP and WLC also passes through the CAPWAP tunnel
- LAG Link Aggregation (Etherchannel) is often used on the WLC to switch link

FlexConnect



- Traffic is forwarded locally when FlexConnect is configured
- This is useful for small branch offices without a Wireless LAN Controller