WLAN Switches

Topics

- Objectives
- Comparative WLAN Architectures
- WLAN Switch Features
- Conclusion

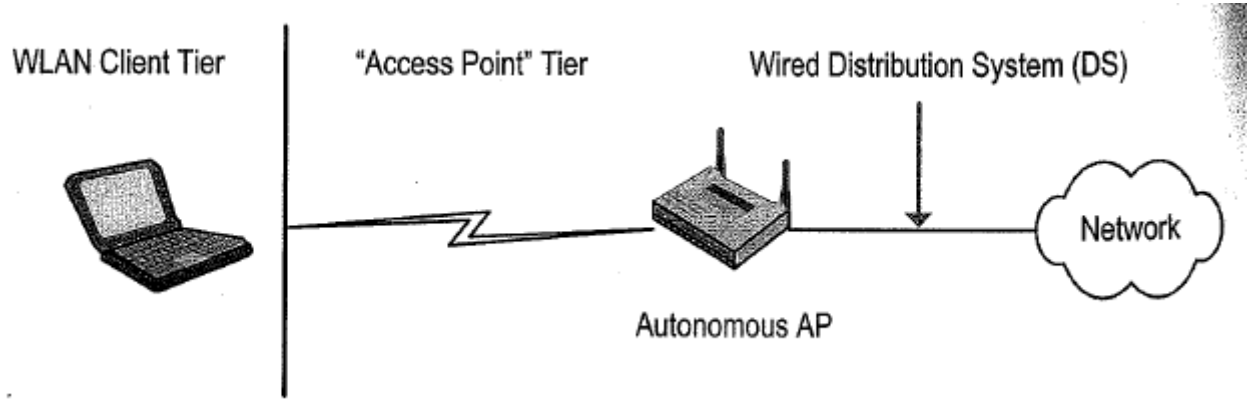
Objectives

- To understand the configuration of major feature sets in WLAN switches.
- Understand the centralized WLAN architecture and WLAN switches.

WLAN Architectures

- The three general architectures models include:
  - Autonomous WLAN Architecture
  - Distributed WLAN Architecture
  - Centralized WLAN Architecture.

Autonomous WLAN Architecture



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- Advantages of Autonomous WLAN Architecture:
  - Can provide easily configurable 802.11 WLAN functionally
  - Can provide a number of integrated services such as RADIUS services, VLAN Support.
  - Useful for addressing certain SOHO requirements.
- Disadvantages of Autonomous WLAN Architecture:
  - High Operational overhead for device management unless a centralized Management Tier is added to the solution.
  - Inability to provide advanced business services without additional features.

Distributed WLAN Architecture

- This architecture also referred to as Distributed Mesh Architecture or Mesh Networks.
- This includes wireless network functionality in which nodes communicate with each other in a peer-to-peer fashion.

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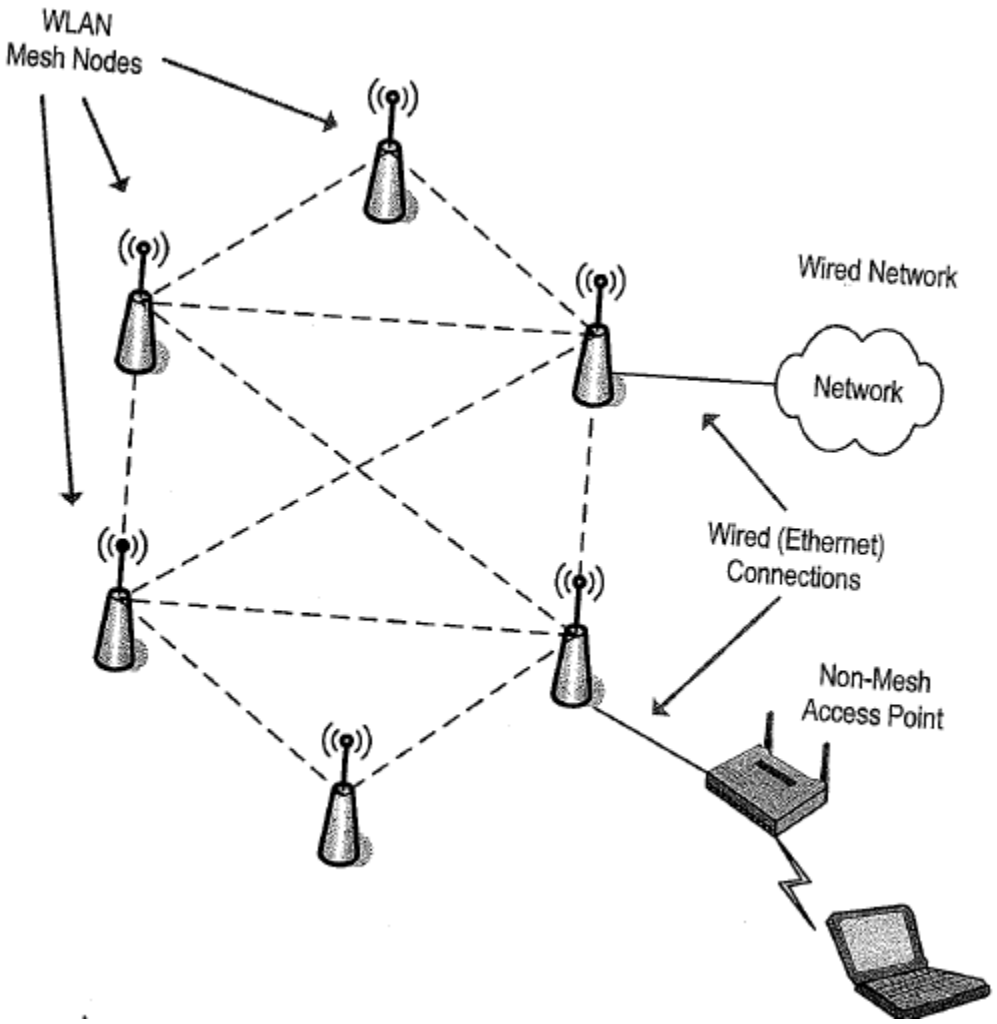
WLAN
Mesh Nodes
Wired Network
Network
Wired (Ethernet)
Connections
Non-Mesh
Access Point

Cont…

- Advantages of Distributed Mesh WLAN Architecture:
  - Nodes are auto-configuring which means that new devices can be quickly assimilated into an existing mesh network.
  - Self healing allows for nodes to dynamically route around broken links or connections without manual configuration.
  - Highly resilient network architecture.
- Disadvantages of Distributed Mesh WLAN Architecture:
  - Complex routing algorithms to make the best use of available resources.
  - Solutions can be hardware intensive.
  - Proprietary implementation options.
  - Slow standardization process

Centralized WLAN Architecture

- Centralized WLAN Architecture model splits the wireless processing into two components :
  - WLAN Access point
  - The Access Controller or WLAN switch
- AP is just an RF antenna and 802.11 PHY capable radio with some additional functionality.
- Essential WLAN processing and frame management is pushed to WLAN switches.

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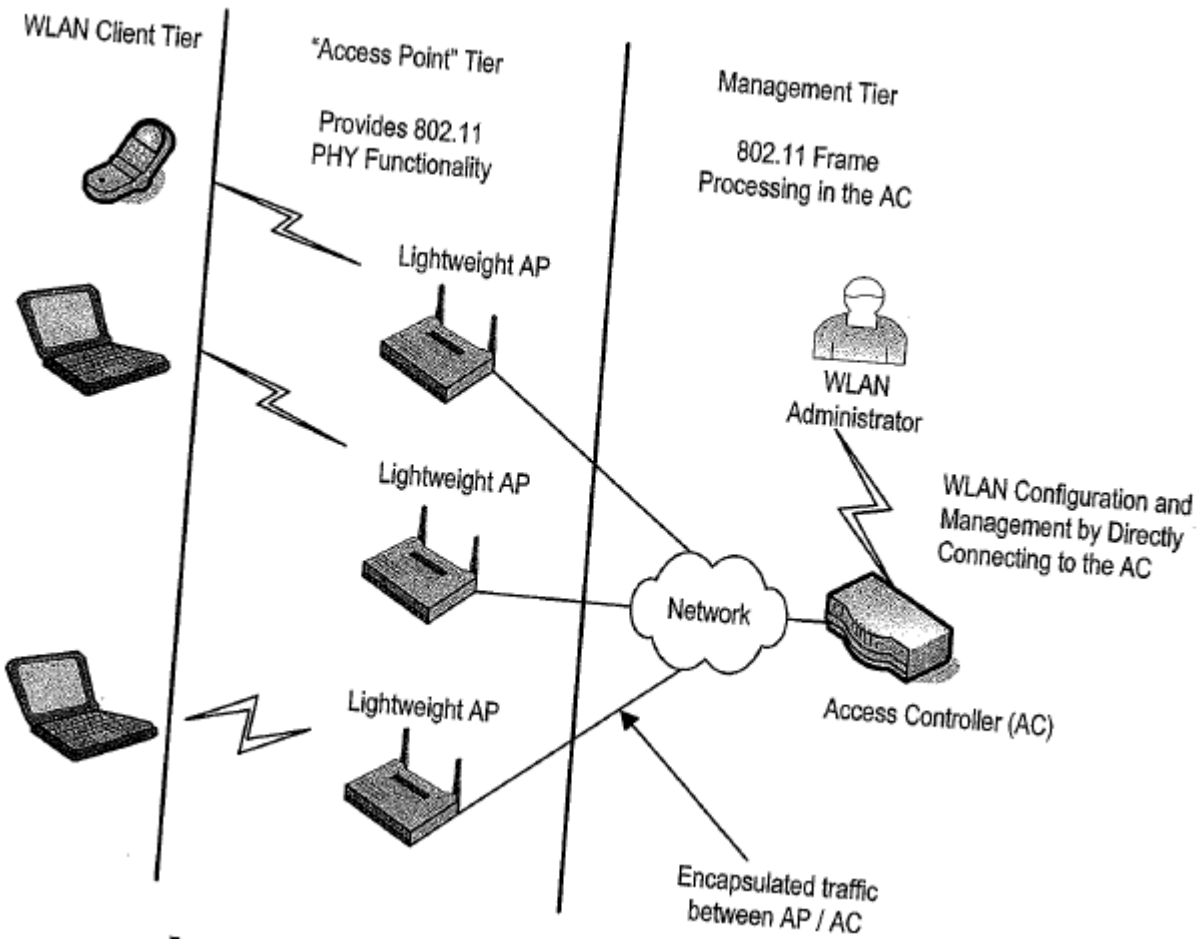
WLAN Client Tier
"Access Point" Tier
Provides 802.11
PHY Functionality
Management Tier
802.11 Frame
Processing in the AC
Lightweight AP
Lightweight AP
Lightweight AP
WLAN
Administrator
WLAN Configuration and
Management by Directly
Connecting to the AC
Network
Access Controller (AC)
Encapsulated traffic
between AP / AC

Cont…

- Advantages of Centralized WLAN Architecture:
  - Highly scalable to very large enterprise WLAN implementations.
  - Multiple centralized management options are available depending on the size of the architecture.
  - Lightweight APs do not typically contain sensitive data if they are stolen.
  - Advanced device location services are available to track wireless stations.
  - Support for advanced business services such as intrusion prevention, QoS and fast roaming.

Cont…

- Disadvantages of centralized WLAN architecture:
  - Lightweight APs push virtually all of the processing back to the AC and typically have little local awareness for services such as QoS.
  - Multiple controllers add additional hardware to the enterprise, each requiring management and connectivity.
  - The loss of a single controller could effectively disable many access points.

Features of WLAN Switches

- Intrusion Detection and Prevention System (WIDS/WIPS)
- Quality of Service (QoS)
- Automatic RF Management
- Power over Ethernet (PoE)
- VPN Termination
- Role Based Access Control (RBAC)

Intrusion Detection and Prevention System

- WIDS/WIPS are used to provide visibility into wireless environment by using the access points as sensors for listening to surrounding traffic.
- Sensors can identify potential “rogue” access points or clients.
- WIDS are used to identify potential harmful devices.
- WIPS are more capable of directly preventing rogue devices from communicating.

Quality of Service

- Voice or multimedia traffic can be jittery, delayed and potentially unstable.
- QoS is a framework for increasing the probability that specific traffic transmitted between devices with an acceptable time frame.
- Reserving network resources for certain traffic types to giving priority to specifically labeled traffic.
- Integration between the WLAN and wired infrastructure should converge to offer seamless communication system.

Automatic RF Management

- Centralized architecture systems can provide automatic monitoring and configuration of RF space.
- Information is obtained from APs back to centralized location.
- The data is analyzed in order to identify potential areas of optimization or trouble.
- Based on analysis, the devices configurations can be updated to enhance WLAN performance.

Power over Ethernet

- Defines a way to use the wired data cable to also provide electrical power to the end appliance.
- Each PoE source device only has a limited power budget that can be used to power devices.
- The power budget should be carefully calculated and monitored particularly for dense PoE implementations.

VPN Termination

- Access points can act as VPN termination points.
- Information encrypted on the client is sent in an encrypted form over the 802.11 PHY and is ultimately decrypted by the AP.
- Also the reverse, data from the AP is encrypted prior to transmission to the client.
- Traffic flow from the VPN termination point through the distribution system may not be encrypted at all since the connection is terminated.

Role Based Access Control

- Is used to segment types of users into groups based upon different authentication schemes.
- When a user provides a certain set of authentication credentials, is placed in a group and becomes authorized to perform pre-selected range of services.
- Series of privilege levels could be tied to specific SSIDs and VLANs.

Conclusion

- Understood the three key WLAN architectures : autonomous, distributed mesh and centralized architectures.
- Centralized or WLAN switch/Controller model is constructed from two basic building blocks, the access point and the access controller.
- Learnt the key features and functions that are commonly found in centralized architecture implementations.