**Technical white paper**

# WLAN Load Balancing

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# Overview

WLAN load balancing dynamically adjusts loads among APs to ensure adequate bandwidth for clients. It is typically used in high-density WLAN networks.

## Background

A client periodically scans wireless signals from APs. If it finds an AP that has stronger RSSI than the current AP, the client disassociates with the current AP and associates the new AP. This mechanism makes most wireless clients in an area associate with one AP, reducing client throughput.

Load balancing solves this problem.

## Benefits

WLAN load balancing has the following benefits:

- Maximizes throughput for each client.
- Avoids overload of APs.
- Frees administrators from configuring load balancing groups.

# Load balancing implementation

## Operating mechanism

Load balancing operates as follows:

1. The AC establishes a CAPWAP tunnel with each AP as follows:
   A. An AP gets the AC's IP address through a method such as DHCP.
   B. The AP and the AC establish a CAPWAP tunnel.
   C. The AP gets configurations from the AC and enters Run state.
2. The AC creates a dynamic load balancing group for each client.
   A dynamic load balancing group contains APs that detected scanning signals from a client.
   When an AP receives scanning signals from a client, it automatically informs the AC of the client's MAC address. The AC gets a list of APs that received signals from the client.
   To relieve traffic burden, APs only inform the AC of new wireless clients.
3. The AC determines whether to perform load balancing when an AP receives an association request from the client.
   The AC performs load balancing based on the following conditions:
   - The load of the requested AP crosses the maximum threshold.
   - In the dynamic load balancing group, the gap of loads between the requested AP and the AP with the lightest loads exceeds the gap threshold.

   The results are as follows:
   - If none or only one of the conditions exists, the requested AP accepts the client request.
   - If both conditions exit, the AP rejects the association request. The client must send association requests to another AP with lighter load to access the WLAN.

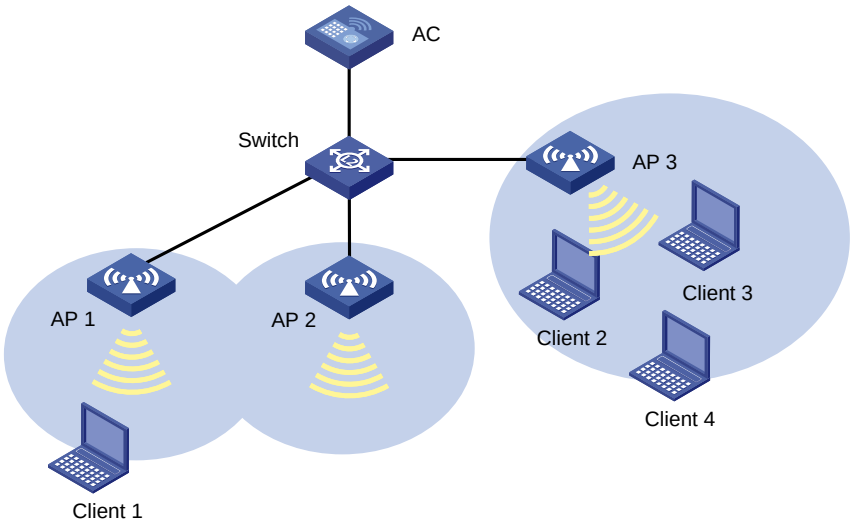
   To prevent a client from continuously sending association requests to the overloaded AP, the AC hides the overloaded AP from new clients.

## Restrictions

APs in a dynamic load balancing group must be managed by the same AC, and accessible to the clients.

Figure 1 shows a scenario where load balancing fails. Client 4 wants to associate with AP 3. AP 3 has reached its maximum load, so it rejects the association request. However, Client 4 cannot receive signals from AP1 and AP 2, so it has to resend an association request to AP 3.

**Figure 1.** Load balancing group




## HP WLAN load balancing benefits

HP WLAN load balancing has the following benefits:

- Real-time tracking of wireless clients and creation of dynamic load balancing groups.
- Centralized management.

  An AC centrally controls load balancing over all associated APs.

- Session-mode and traffic-mode.

  Many vendors support only session-mode load balancing. HP WLAN load balancing supports both session-mode and traffic-mode load balancing. In addition, you can enable or disable the load balancing function.

- Hiding of overloaded APs.

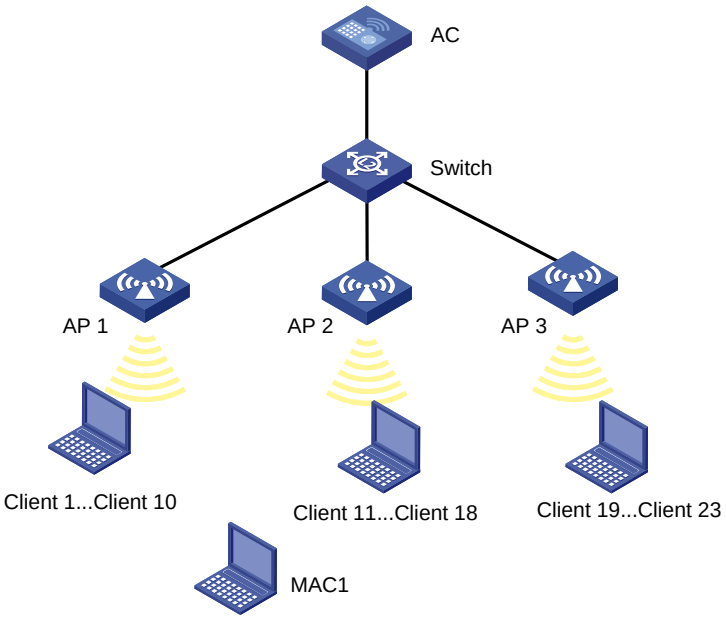
## Application scenarios

### Session-mode load balancing

As shown in Figure 2, session-mode load balancing is enabled. The dynamic load balancing group for MAC 1 includes AP 1, AP 2, and AP 3. There are 10, 8, and 5 clients associated with AP 1, AP 2, and AP 3, respectively. MAC 1 sends an association request to AP 1. The maximum threshold and the maximum gap are reached.

Therefore, AP 1 rejects the request and the AC hides AP 1 from MAC 1. MAC 1 must send association requests to AP 2 or AP 3 to access the network.

**Figure 2.** WLAN load balancing

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