

Service Holding upon CAPWAP Link Disconnection

Technical White Paper

Issue 01

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About This Document

Change History

Changes between document issues are cumulative. The latest document issue contains all changes made in previous issues.

Changes in Issue 01 (2012-10-31)

Initial commercial release.

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1 Introduction

Definition

In the fit AP networking, an AP can retain data services of STAs when the Control and Provisioning of Wireless Access Points (CAPWAP) tunnel between an AP and AC is torn down. An AP establishes a CAPWAP tunnel with the AC after the AP is powered on. Control packets and data packets are transmitted between the AP and AC over the CAPWAP tunnel. When the CAPWAP tunnel is torn down, all services on the AP are interrupted. After service holding upon CAPWAP link disconnection is enabled, STA data services can still be transmitted in direct forwarding mode after the CAPWAP tunnel is torn down.

Purpose

Service holding upon CAPWAP link disconnection prevents data services on an AP from being interrupted when the CAPWAP tunnel between the AP and AC is torn down, which minimizes loss resulting from the CAPWAP link disconnection.

Benefits

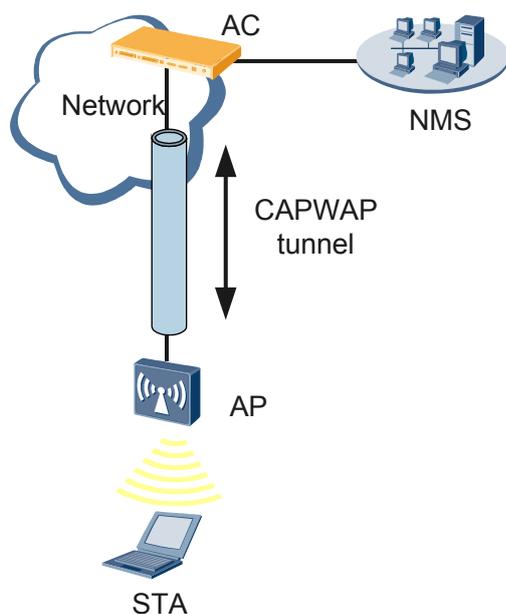
In direct forwarding mode, service holding upon CAPWAP link disconnection frees data service forwarding in a WLAN from the CAPWAP tunnel, enhancing service forwarding robustness and increasing benefits to the enterprise network.

2 Principles

CAPWAP Overview

The Control and Provisioning of Wireless Access Point (CAPWAP) protocol is used for communication between the AC and APs.

Figure 2-1 AC managing APs through CAPWAP tunnels

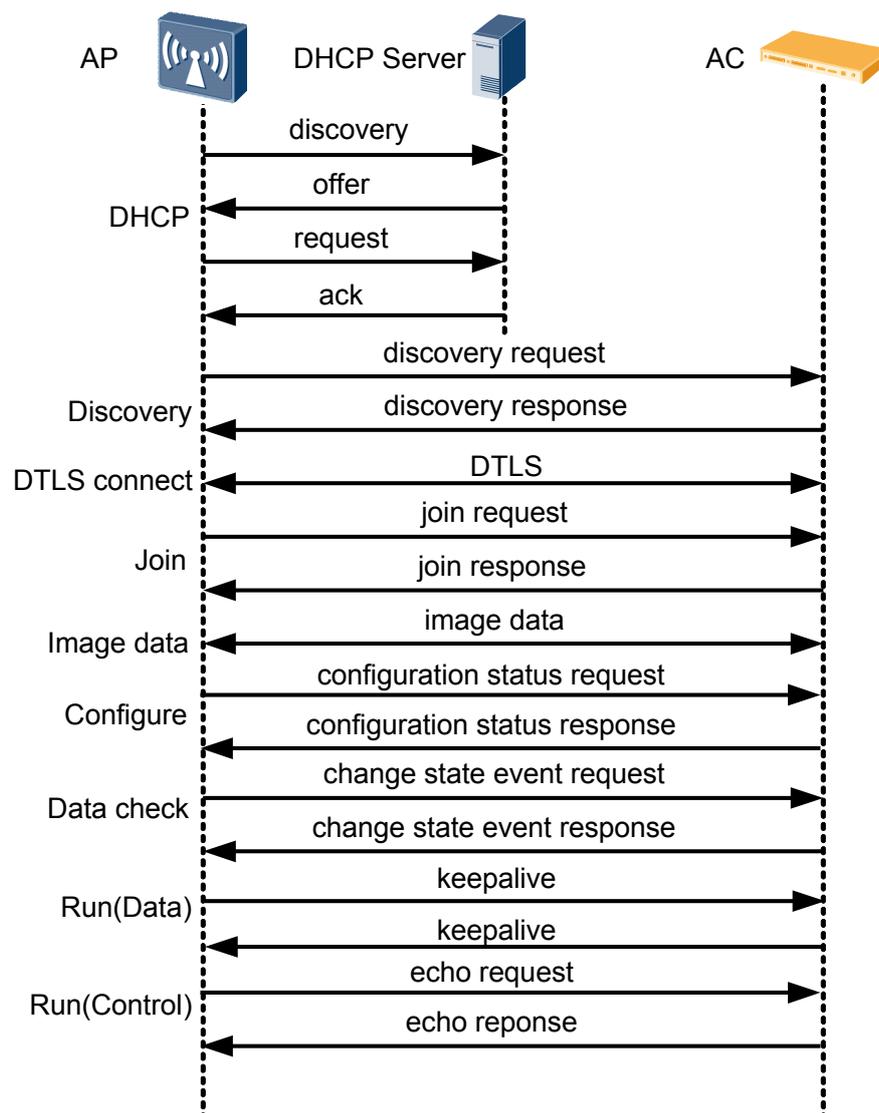


APs establish CAPWAP tunnels with the AC, including the data tunnel and control tunnel.

- The CAPWAP control tunnel transmits CAPWAP control packets.
- The CAPWAP data tunnel transmits CAPWAP data packets.

When CAPWAP tunnels are established between the APs and AC, the APs can go online.

Figure 2-2 CAPWAP tunnel establishment



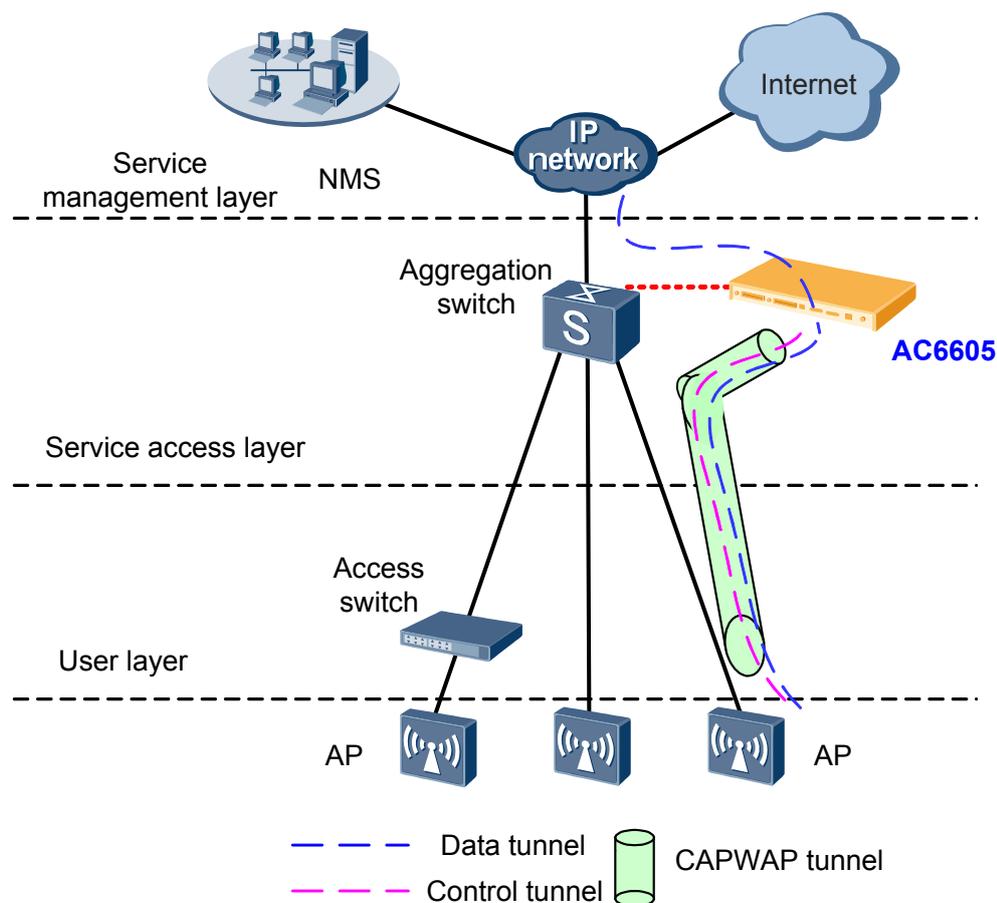
After a CAPWAP tunnel is established between an AP and AC, Keepalive or Echo packets are periodically transmitted between the AP and AC to check the CAPWAP tunnel. If the CAPWAP tunnel is torn down, the AC cannot connect to or manage the AP, and services on the AP are interrupted.

Data Forwarding Modes

In a WLAN, control packets are transmitted over the CAPWAP control tunnel, and data packets are transmitted over the CAPWAP data tunnel or are directly forwarded by the AP.

Data forwarding over the CAPWAP tunnel is also called centralized data forwarding, as shown in [Figure 2-3](#). Data packets are encapsulated and transmitted over the CAPWAP tunnel to the AC. The AC decapsulates the packets and forwards them to the upper-layer network.

Figure 2-3 Centralized data forwarding

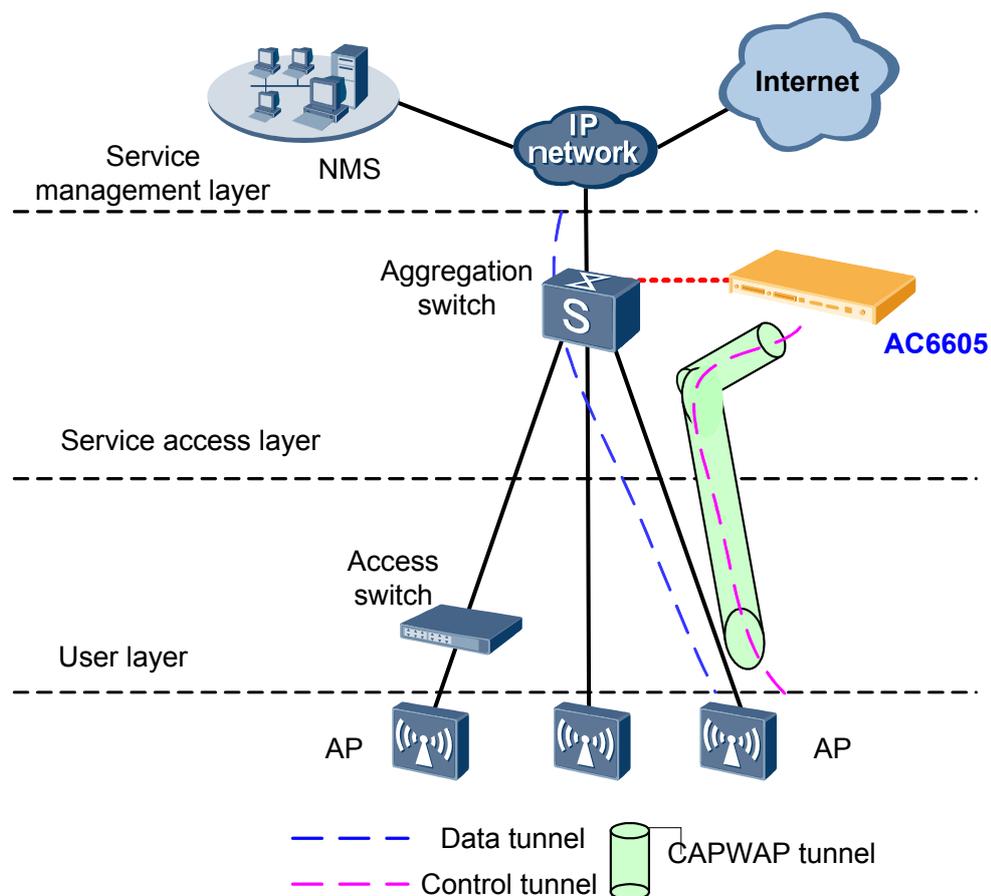


The centralized data forwarding mode has the following features:

- Service VLANs do not need to be configured for the WLAN service on the network devices between APs and ACs. This simplifies network configuration and reduces configuration errors.
- CAPWAP-encapsulated packets are encrypted using the Datagram Transport Layer Security (DTLS) protocol, ensuring security of WLAN service packets.
- WLAN service packets are delivered to the AC over CAPWAP tunnels and forwarded by the AC. All WLAN service packets pass through the AC so that the AC can perform WLAN packet rate limiting, monitoring, analysis, and filtering.

Direct data forwarding is also called local data forwarding, as shown in [Figure 2-4](#). Packets between the AC and APs are directly forwarded by the APs to the upper-layer network without being encapsulated over CAPWAP tunnels.

Figure 2-4 Local data forwarding



The local data forwarding mode has the following features:

- WLANs can be deployed flexibly based on network environments.
- WLAN service packets are not delivered to the AC, improving data forwarding efficiency. The AC is not the bottleneck of the network bandwidth.

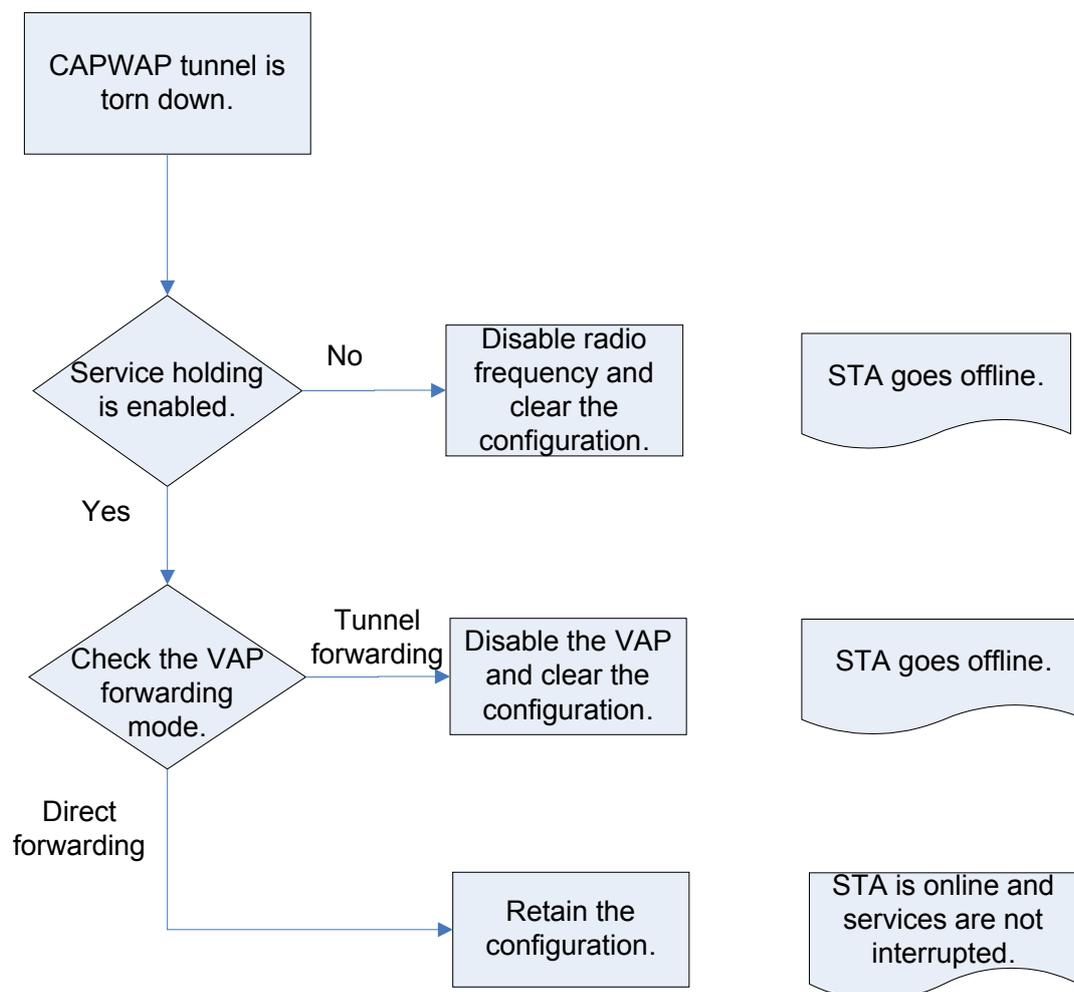
Service Holding upon CAPWAP Link Disconnection

When the CAPWAP tunnel between an AP and an AC is torn down, services on the AP are interrupted regardless of the forwarding mode.

When service holding upon CAPWAP link disconnection is enabled on an AP, the AP can still forward data in direct forwarding mode when the CAPWAP tunnel is torn down. STA data services are not interrupted.

This function depends on the data service holding function.

Figure 2-5 Implementation of service holding upon CAPWAP link disconnection



As shown in the preceding figure, if the CAPWAP tunnel between the AP and AC is torn down, the AP checks whether the data service holding function is enabled.

- If the data service holding function is disabled, the AP disables radios and clears the configuration. Services on STAs connected to the AP are interrupted and STAs are forced to go offline.

If the data service holding function is enabled, the AP checks the data forwarding mode of the current VAP.

- In tunnel data forwarding mode, the AP disables the VAP and clears the configuration. Services on STAs connected to the AP are interrupted and STAs are forced to go offline.
- In direct data forwarding mode, the AP retains the configuration. Services on STAs connected to the AP are not affected and STAs are still online.

NOTE

By default, the data service holding function is disabled. To enable the data service holding function, run the **keep-service enable** command in the AP view.

3 Applications

Scenario

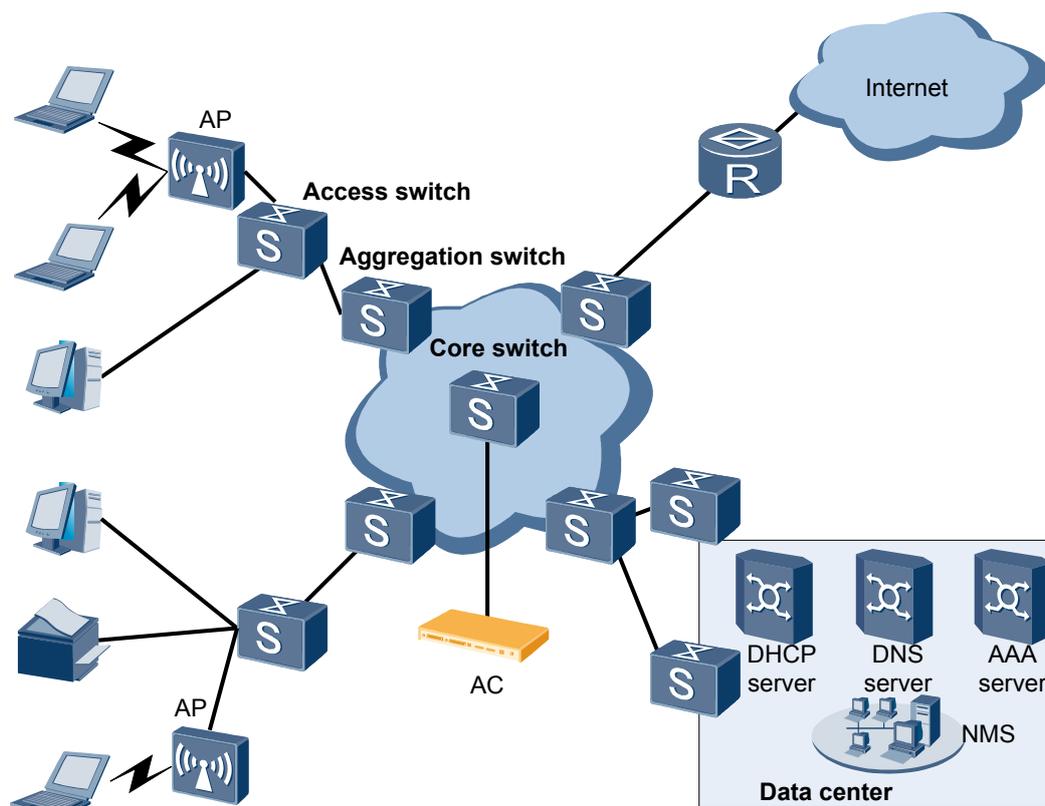
In some WLANs that require high data link quality, data service interruption may cause great loss to users.

To enhance robustness of WLAN data links, enable service holding upon CAPWAP link disconnection on APs. WLAN services are not affected if the CAPWAP tunnel between an AP and AC is torn down. User experience is improved.

Example

In an enterprise WLAN shown in [Figure 3-1](#), the AC connects to the core switch in bypass mode and manages all APs in the enterprise WLAN. APs directly forward data without passing through the AC. If the link between the AC and core switch is faulty, all APs stop WLAN services, causing great loss to the enterprise. To prevent the preceding situation, configure service holding upon CAPWAP link disconnection for each AP.

Figure 3-1 Enterprise WLAN network architecture



To configure service holding upon CAPWAP link disconnection for each AP, run the **keep-service enable** command.

An AP is used as an example:

```
<AC>sys
[AC] wlan
[AC-wlan] ap id 1
[AC-wlan-ap-1] keep-service enable
```

NOTE

To disable the service holding function of the AP, run the **undo keep-service enable** command.