802.11v

Information About 802.11v

The controller supports 802.11v amendment for wireless networks, which describes numerous enhancements to wireless network management.

One such enhancement is Network assisted Power Savings which helps clients to improve the battery life by enabling them to sleep longer. As an example, mobile devices typically use a certain amount of idle period to ensure that they remain connected to access points and therefore consume more power when performing the following tasks while in a wireless network.

Another enhancement is Network assisted Roaming which enables the WLAN to send requests to associated clients, advising the clients as to better APs to associate to. This is useful for both load balancing and in directing poorly connected clients.

Enabling 802.11v Network Assisted Power Savings

Wireless devices consume battery to maintain their connection to the clients, in several ways:

- By waking up at regular intervals to listen to the access point beacons containing a DTIM, which indicates buffered broadcast or multicast traffic that the access point delivers to the clients.

- By sending null frames to the access points, in the form of keepalive messages– to maintain connection with access points.

- Devices also periodically listen to beacons (even in the absence of DTIM fields) to synchronize their clock to that of the corresponding access point.

All these processes consume battery and this consumption particularly impacts devices (such as Apple), because these devices use a conservative session timeout estimation, and therefore, wake up often to send

keepalive messages. The 802.11 standard, without 802.11v, does not include any mechanism for the controller or the access points to communicate to wireless clients about the session timeout for the local client.

To save the power of clients due to the mentioned tasks in wireless network, the following features in the 802.11v standard are used:

- Directed Multicast Service

- Base Station Subsystem (BSS) Max Idle Period

Directed Multicast Service

Using Directed Multicast Service (DMS), the client requests the access point to transmit the required multicast packet as unicast frames. This allows the client to receive the multicast packets it has ignored while in sleep mode and also ensures Layer 2 reliability. Furthermore, the unicast frame is transmitted to the client at a potentially higher wireless link rate which enables the client to receive the packet quickly by enabling the radio for a shorter duration, thus also saving battery power. Since the wireless client also does not have to wake up at each DTIM interval in order to receive multicast traffic, longer sleeping intervals are allowed.

BSS Max Idle Period

The BSS Max Idle period is the timeframe during which an access point (AP) does not disassociate a client due to nonreceipt of frames from the connected client. This helps ensure that the client device does not send keepalive messages frequently. The idle period timer value is transmitted using the association and reassociation response frame from the access point to the client. The idle time value indicates the maximum time that a client can remain idle without transmitting any frame to an access point. As a result, the clients remain in sleep mode for a longer duration without transmitting the keepalive messages often. This in turn contributes to saving battery power.

Prerequisites for Configuring 802.11v

- Applies for Apple clients like Apple iPad, iPhone, and so on, that run on Apple iOS version 7 or later.

- Supports local mode; also supports FlexConnect access points in central authentication modes only.

Restrictions for 802.11v

Client needs to support 802.11v BSS Transition.

Enabling 802.11v BSS Transition Management

802.11v BSS Transition is applied in the following three scenarios:

- Solicited request—Client can send an 802.11v Basic Service Set (BSS) Transition Management Query before roaming for a better option of AP to reassociate with.

- Unsolicited Load Balancing request—If an AP is heavily loaded, it sends out an 802.11v BSS Transition Management Request to an associated client.

• Unsolicited Optimized Roaming request—If a client's RSSI and rate do not meet the requirements, the corresponding AP sends out an 802.11v BSS Transition Management Request to this client.

Note 802.11v BSS Transition Management Request is a suggestion (or advice) given to a client, which the client can choose to follow or ignore. To force the task of disassociating a client, turn on the disassociation-imminent function. This disassociates the client after a period if the client is not reassociated to another AP.

Configuring 802.11v BSS Transition Management (GUI)

Procedure

Step 1 Choose **Configuration** > **Tags & Profiles** > **WLANs**.

Step 2 Click **Add** to create WLANs.

The **Add WLAN** page is displayed.

Step 3 In the **Advanced** tab and **11v BSS Transition Support** section, select the **BSS Transition** check box to enable BSS transition per WLAN.

Step 4 Enable the **Dual Neighbor List** check box to include the neighbors of other radio slots of the same AP in the BSS transition response.

Note   This is applicable only for 2.4 GHz and 5 GHz radio slots.

Step 5 Enable the **BSS Max Idle Service** check box to help clients and APs efficiently decide how long to remain associated when no traffic is being transmitted. The device uses this information to preserve device battery life.

Step 6 Enable the **BSS Max Idle Protected** check box to enable the AP to accept only authenticated frames (encrypted with Robust Security Network (RSN) information) from the client to reset the BSS Max Idle period counter. Without protected mode, any data or management frame (encrypted or unencrypted) sent by the client will reset the idle timer for the client.

Step 7 Enable the **Directed Multicast Service** check box to request the AP to send a multicast stream as unicast, to any DMS capable client on this WLAN.

Step 8 Click **Save & Apply to Device**.

Configuring 802.11v BSS Transition Management (CLI)

802.11v BSS Transtion is applied in the following three scenarios:

Procedure

	Command or Action	**Purpose**
Step 1	**configure terminal** **Example:** Device# configure terminal	Enters the global configuration mode.
Step 2	**wlan** *profile-name* **Example:** Device(config)# wlan test-wlan	Configures WLAN profile and enters the WLAN profile configuration mode.
Step 3	**shut** **Example:** Device(config-wlan)# shut	Shutdown the WLAN profile.
Step 4	**bss-transition** **Example:** Device(config-wlan)# bss-transition	Configure BSS transition per WLAN.
Step 5	**bss-transition disassociation-imminent** **Example:** Device(config-wlan)# bss-transition disassociation-imminent	Configure BSS transition disassociation Imminent per WLAN.
Step 6	**no shutdown** **Example:** Device(config-wlan)# no shutdown	Enables the WLAN profile.
Step 7	**end** **Example:** Device(config-wlan)# end	Return to privilege EXEC mode. Alternatively, you can press **CTRL** + **Z** to exit global configuration mode.