Assisted Roaming

802.11k Neighbor List and Assisted Roaming

The 802.11k standard allows an AP to inform 802.11k-capable clients of neighboring BSSIDs (APs in the same SSID). This can help the client to optimize its scanning and roaming behavior. Additionally, the Assisted Roaming Prediction Optimization feature can be used with non-802.11k clients, to discourage them from roaming to suboptimal APs.

Prediction Based Roaming - Assisted Roaming for Non-802.11k Clients

You can optimize roaming for non-802.11k clients by generating a prediction neighbor list for each client without sending an 802.11k neighbor list request. When prediction based roaming enables a WLAN, after each successful client association/re-association, the same neighbor list optimization applies on the non-802.11k client to generate and store the neighbor list in the mobile station software data structure. Clients at different locations have different lists because the client probes are seen with different RSSI values by the different neighbors as the clients usually probe before any association or re-association. This list is created with the most updated probe data and predicts the next AP that the client is likely to roam to.

The wireless infrastructure discourages clients from roaming to those less desirable neighbors by denying association if the association request to an AP does not match the entries on the stored prediction neighbor list.

- Denial count: Maximum number of times a client is refused association.
- Prediction threshold: Minimum number of entries required in the prediction list for the assisted roaming feature to activate.

For more information, see https://www.cisco.com/c/en/us/td/docs/wireless/controller/8-5/Enterprise-Mobility-8-5-Design-Guide/Enterprise_Mobility_8-5_Deployment_Guide/Chapter-11.html#pgfId-1140097.

Restrictions for Assisted Roaming

- This feature is supported only on 802.11n capable indoor access points. For a single band configuration, a maximum of 6 neighbors are visible in a neighbor list. For dual band configuration, a maximum of 12 neighbors are visible.
- You can configure assisted roaming only using the device CLI.

How to Configure Assisted Roaming

Configuring Assisted Roaming (CLI)

Procedure

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 2	**wireless assisted-roaming floor-bias** *dBm* **Example:** `Device(config)# wireless assisted-roaming floor-bias 20`	Configures neighbor floor label bias. The valid range is from 5 to 25 dBm, and the default value is 15 dBm.
Step 3	**wlan** *wlan-id* **Example:** `Device(config)# wlan wlan1`	Enters the WLAN configuration submode. The *wlan-name* is the profile name of the configured WLAN.
Step 4	**assisted-roaming neighbor-list** **Example:** `Device(wlan)# assisted-roaming neighbor-list`	Configures an 802.11k neighbor list for a WLAN. By default, assisted roaming is enabled on the neighbor list when you create a WLAN. The **no** form of the command disables assisted roaming neighbor list.
Step 5	**assisted-roaming dual-list** **Example:** `Device(wlan)# assisted-roaming dual-list`	Configures a dual-band 802.11k dual list for a WLAN. By default, assisted roaming is enabled on the dual list when you create a WLAN. The **no** form of the command disables assisted roaming dual list.

	Command or Action	Purpose
Step 6	**assisted-roaming prediction** **Example:** `Device(wlan)# assisted-roaming prediction`	Configures assisted roaming prediction list feature for a WLAN. By default, the assisted roaming prediction list is disabled. **Note** A warning message is displayed and load balancing is disabled for the WLAN if load balancing is already enabled for the WLAN.
Step 7	**wireless assisted-roaming prediction-minimum** *count* **Example:** `Device# wireless assisted-roaming prediction-minimum`	Configures the minimum number of predicted APs required for the prediction list feature to be activated. The default value is 3. **Note** If the number of the AP in the prediction assigned to the client is less than the number that you specify, the assisted roaming feature will not apply on this roam.
Step 8	**wireless assisted-roaming denial-maximum** *count* **Example:** `Device# wireless assisted-roaming denial-maximum 8`	Configures the maximum number of times a client can be denied association if the association request is sent to an AP does not match any AP on the prediction. The valid range is from 1 to 10, and the default value is 5.
Step 9	**end** **Example:** `Device(config)# end`	Returns to privileged EXEC mode. Alternatively, you can also press **Ctrl-Z** to exit global configuration mode.

Verifying Assisted Roaming

The following command can be used to verify assisted roaming configured on a WLAN:

Command	Description
show wlan id *wlan-id*	Displays the WLAN parameters on the WLAN.

Configuration Examples for Assisted Roaming

This example shows how to configure the neighbor floor label bias:

```
Device# configure terminal
Device(config)# wireless assisted-roaming floor-bias 10
```

```
Device(config)# end
Device# show wlan id 23
```

This example shows how to disable neighbor list on a specific WLAN:

```
Device# configure terminal
Device(config)# wlan test1
Device(config (wlan)# no assisted-roaming neighbor-list
Device(config)(wlan)# end
Device# show wlan id 23
```

This example shows how to configure the prediction list on a specific WLAN:

```
Device# configure terminal
Device(config)# wlan test1
Device(config)(wlan)# assisted-roaming prediction
Device(config)(wlan)# end
Device# show wlan id 23
```

This example shows how to configure the prediction list based on assisted roaming prediction threshold and maximum denial count on a specific WLAN:

```
Device# configure terminal
Device(config)# wireless assisted-roaming prediction-minimum 4
Device(config)# wireless assisted-roaming denial-maximum 4
Device(config)(wlan)# end
Device# show wlan id 23
```