



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

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It is also possible to optimize roaming for non-802.11k clients. You can generate a prediction neighbor list for each client without the client requiring to send an 802.11k neighbor list request. When this is enabled on a WLAN, after each successful client association/re-association, the same neighbor list optimization is applied on the non-802.11k client to generate the neighbor list and store the 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 different neighbors. Because clients usually probe before any association or re-association, this list is constructed with the most updated probe data and predicts the next AP that the client is likely to roam to.

We discourage 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.

Similar to aggressive load balancing, there is a switch to turn on the assisted roaming feature both on a per-WLAN basis and globally. The following options are available:

- 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 be activated.

## CLI Configuration for Prediction Based Roaming

<pre>assisted-roaming prediction</pre> <p><b>Example:</b></p> <pre>Controller(wlan)# assisted-roaming prediction</pre>	<p>Configures assisted roaming prediction list feature for a WLAN. By default, the assisted roaming prediction list is disabled.</p> <p><b>Note</b> A warning message is displayed and load balancing is disabled for the WLAN if load balancing is already enabled for the WLAN.</p>
<pre>wireless assisted-roaming prediction-minimum count</pre> <p><b>Example:</b></p> <pre>Controller# wireless assisted-roaming prediction-minimum</pre>	<p>Configures the minimum number of predicted APs required for the prediction list feature to be activated. The default value is 3.</p> <p><b>Note</b> If the number of the APs 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.</p>
<pre>wireless assisted-roaming denial-maximum count</pre> <p><b>Example:</b></p> <pre>Controller# wireless assisted-roaming denial-maximum 8</pre>	<p>Configures the maximum number of times a client can be denied association if the association request is sent to an AP that does not match any AP on the prediction. The valid range is from 1 to 10, and the default value is 5.</p>
<pre>wireless assisted-roaming prediction-minimum count</pre> <p><b>Example:</b></p> <pre>Controller# wireless assisted-roaming prediction-minimum</pre>	<p>Configures the minimum number of predicted APs required for the prediction list feature to be activated. The default value is 3.</p> <p><b>Note</b> If the number of the APs 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.</p>

### Configuration Example

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

```
Controller# configure terminal
Controller(config)# wlan test
Controller(config)(wlan)# assisted-roaming prediction
```

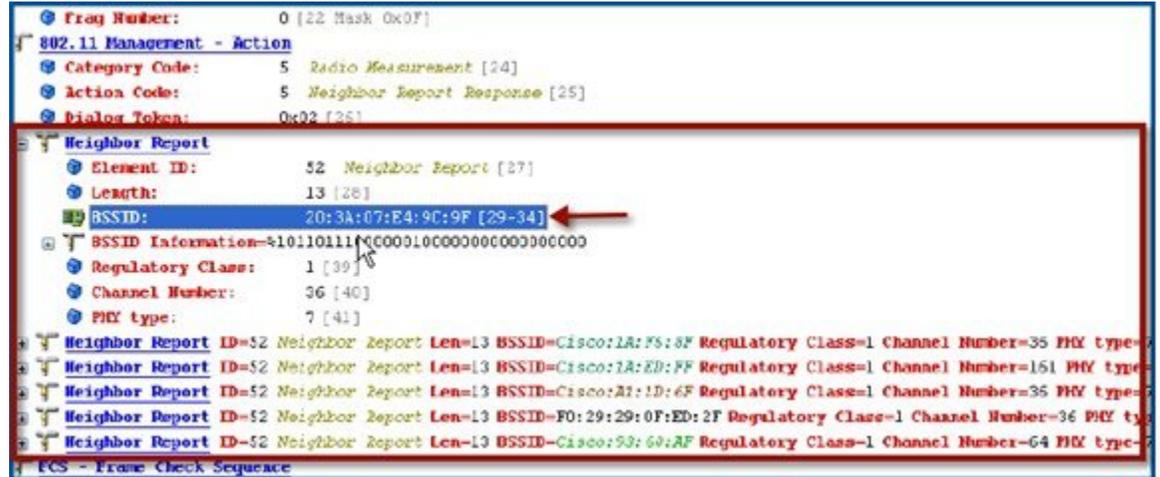
This example shows how to configure the prediction list based on assisted roaming prediction threshold and maximum denial count on a specific WLAN:

```
Controller(config)# wireless assisted-roaming prediction-minimum 3
Controller(config)# wireless assisted-roaming denial-maximum 3
```

### Neighbor List Response

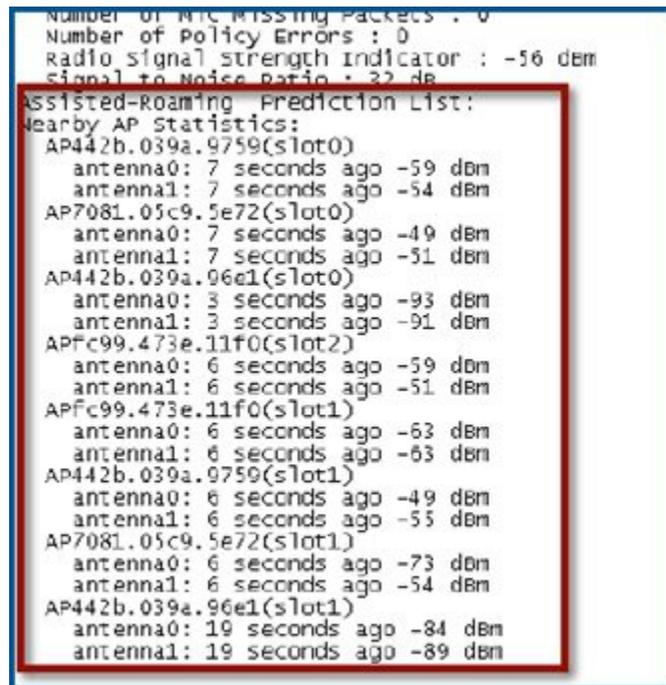
The neighbor list includes information about BSSID, channel and operation details of the neighboring radios as shown in the Wireshark capture below:

Figure 1: 802.11k Neighbor Report



The 802.11k Neighbor list per client can be seen by running the command `show wireless client mac-address <> detail`

Figure 2: Nearby AP Statistics CLI Output



## Limitations

- In this release the following features are not supported:
  - TSF Offset
  - TPC request/response
  - Beacon request/response
  - Quiet element with hardware beacon
  - 11v Location Tracking
- No GUI configuration support
- Since both load balancing and prediction based roaming are designed to influence the AP that a client associates with, it is not possible to enable both the options at the same time on a WLAN.

## Troubleshooting Support

The following debug and trace commands can be used to troubleshoot this feature:

```

Controller# debug dot11 dot11k ?
  all          all
  detail      802.11k detail
  errors      802.11k errors
  events      802.11k events
  optimization 802.11k optimization
  simulation   802.11k simulation

Controller# set trace dot11 dot11k ?
  detail      Dot11k Detailed debugging
  errors      Dot11k Errors debugging
  events      Dot11k Events debugging
  filter      Trace Adapted Flag Filter
  history     Dot11k History debugging
  level       Trace Level
  optimization Dot11k Optimization debugging
  simulation   Dot11k Simulation debugging

```