Understand Traffic Flow in Foreign-Anchor Setup between 9800 WLC

Contents

Introduction

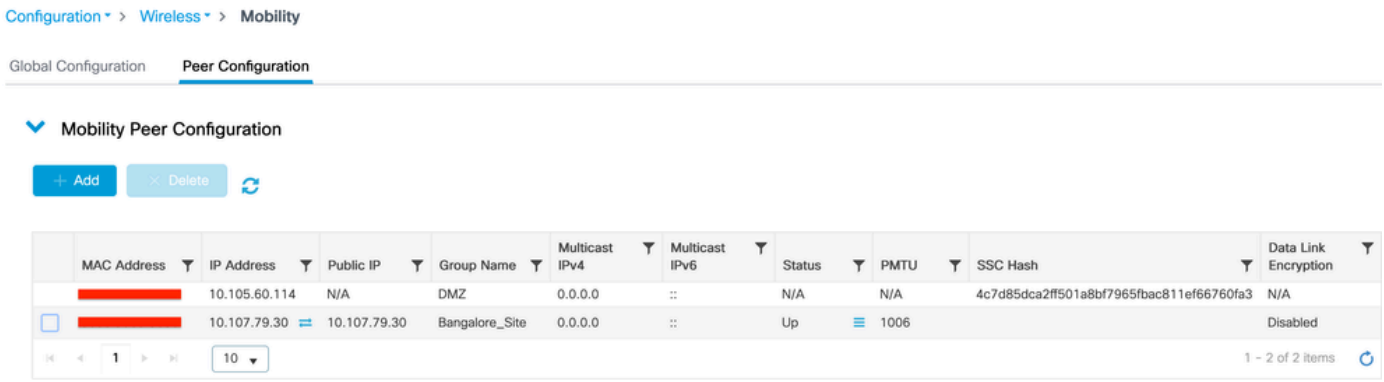
This document describes traffic flow in Foreign-Anchor setup between Cisco 9800 WLCs, covering L2/L3 client onboarding and troubleshooting.

Prerequisites

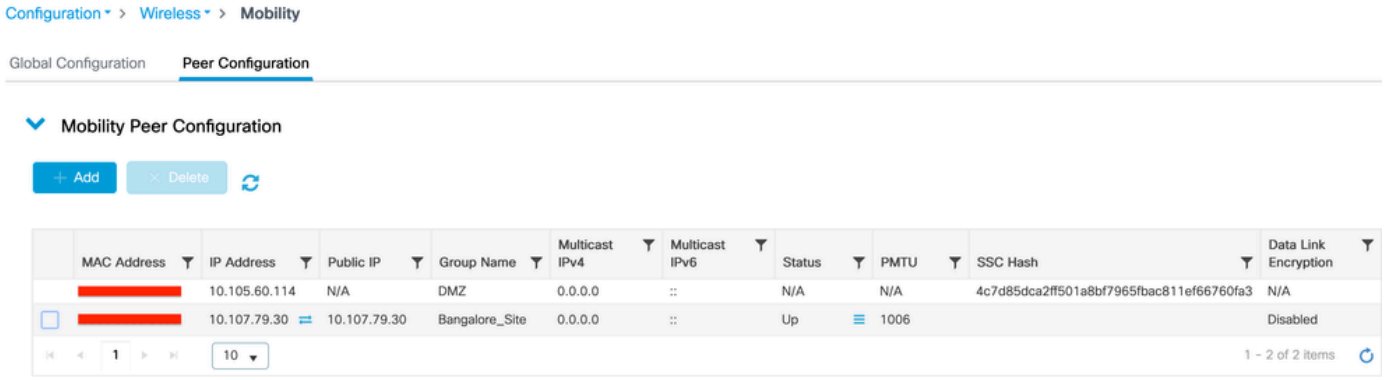
Mobility Tunnel between Foreign and Anchor Controller.

UDP port 16666 and 16667 allowed between both the WLC.

Policy profile configured for Central Switching.



Mobility Tunnel Status on Foreign WLC



Mobility Tunnel Status on Anchor WLC

Requirements

Cisco recommends that you have the knowledge of these topics:

- Command Line Interface (CLI) or Graphic User Interface (GUI) access to the wireless controllers
- Mobility on Cisco Wireless LAN Controllers (WLCs)
- 9800 Wireless Controllers

- Radioactive Traces and Packet capture on 9800 WLC

Components Used

The information in this document is based on these software and hardware versions:

- 9800 Model WLC
- Cisco IOS XE 17.15.5 version
- 9100 series AP Model

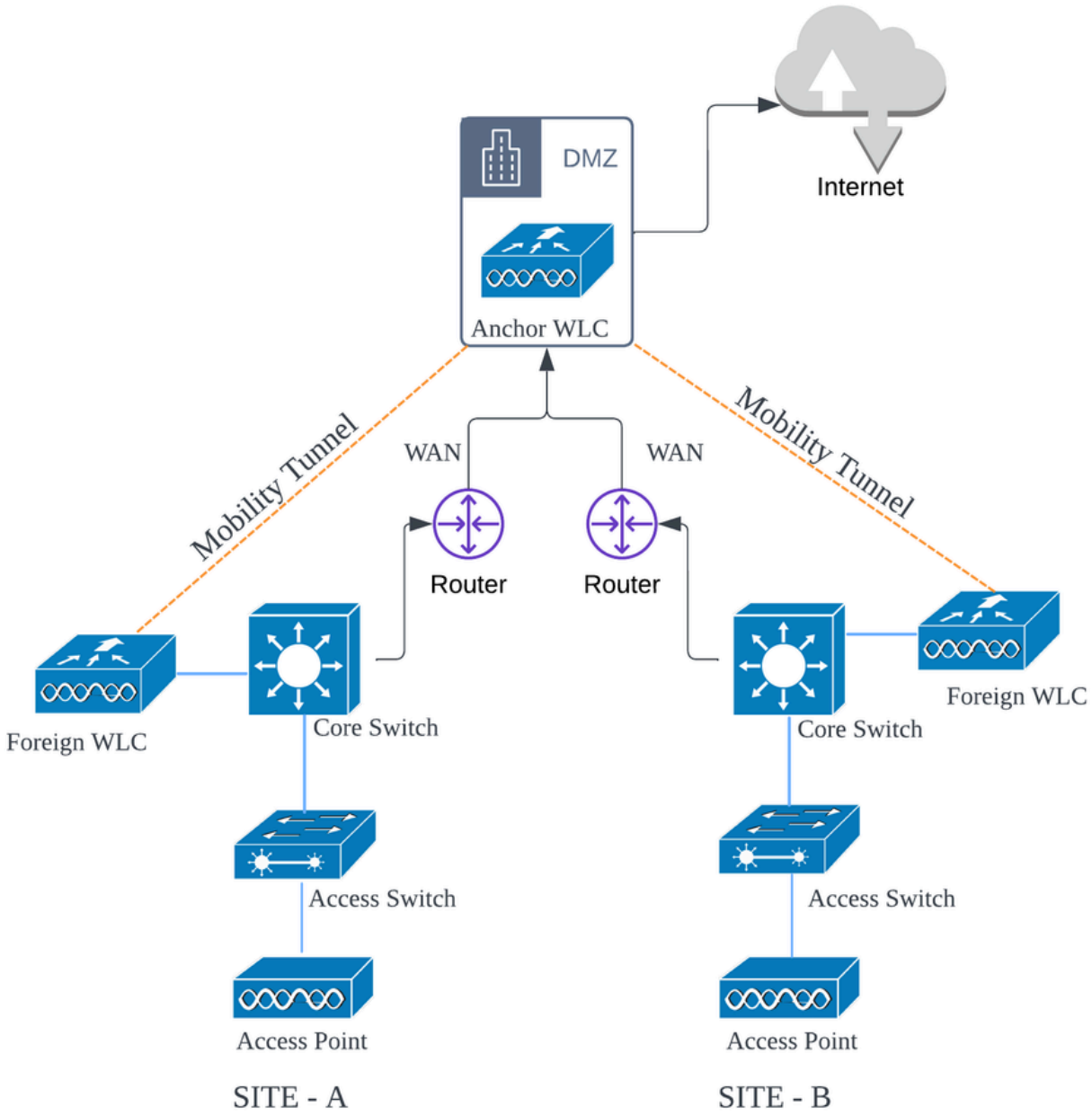
The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Overview of Foreign-Anchor Scenario

- Foreign Controller: This WLC manages Layer 2 or the wireless side of the network. It has access points connected to it, and all client traffic for the Anchored WLANs is encapsulated into the mobility tunnel and sent to the Anchor Controller. The traffic does not exit locally on the Foreign Controller.
- Anchor Controller: This serves as the Layer 3 exit point. It receives client traffic via mobility tunnel from the Foreign Controllers and decapsulates or terminates the client traffic into the exit point (VLAN). This is where clients are seen in the network.

Access points on the Foreign WLC broadcast the WLAN SSIDs and have a policy tag assigned that links the WLAN profile with the appropriate policy profile. When a wireless client connects to this SSID, the Foreign Controller sends both the SSID name and Policy Profile as part of the client information to the Anchor WLC. Upon receiving, the Anchor WLC checks its own configuration to match the SSID name as well as the Policy Profile name. Once the Anchor WLC finds a match, it applies the corresponding configuration and provides an exit point for the wireless client. Therefore, it is mandatory that the WLAN and Policy Profile names and configurations match on both the Foreign and Anchor 9800 WLCs, with the exception of the VLAN under the Policy Profile.

Topology



Foreign-Anchor Setup bewteen 9800 WLC

WLAN with Layer 2 Authentication

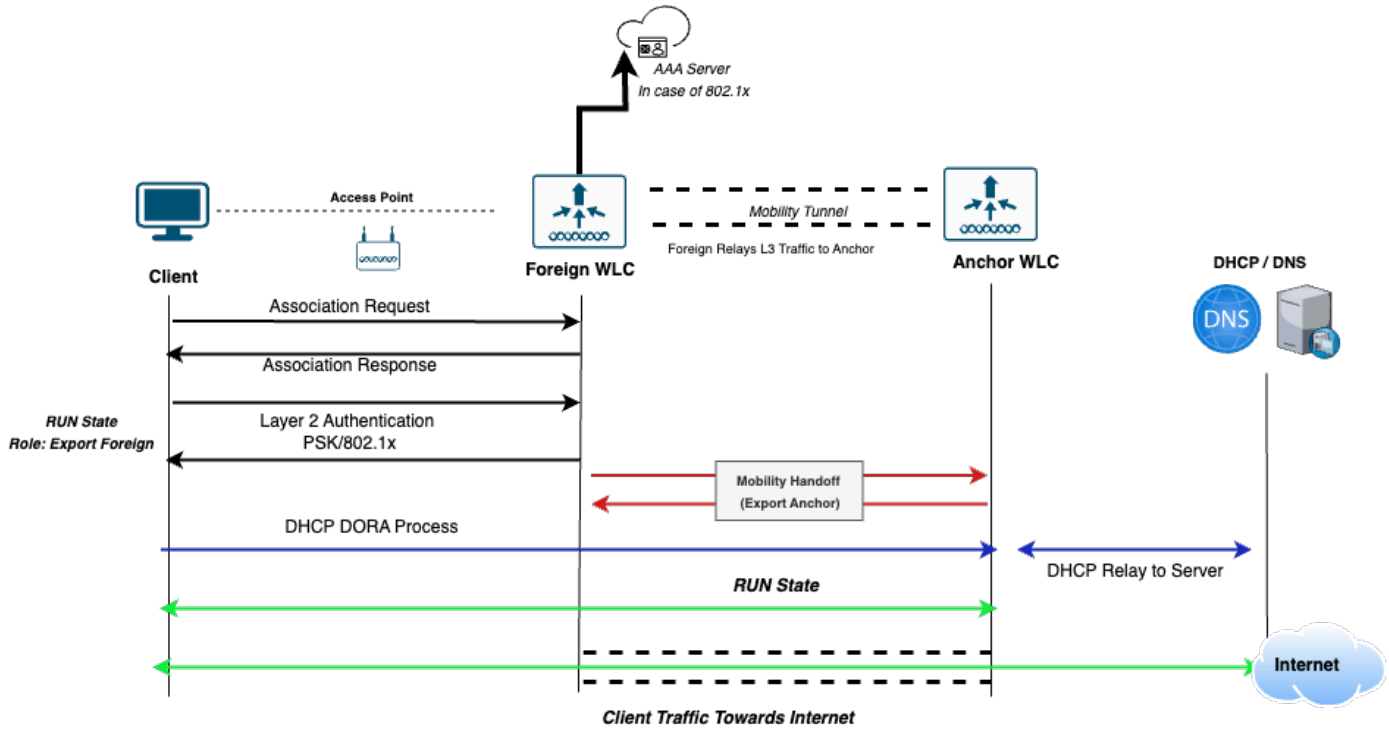
Configuration Requirement

1. Ensure that the WLAN name and configuration are identical on both the Foreign and Anchor WLCs and is configured for Layer 2 Authentication (PSK or 802.1x).
2. Create a Policy Profile with the same name on both the Foreign and Anchor WLCs with same configuration.
3. On the Foreign WLC, configure the Anchor WLC mapping within the respective Policy Profile.

4. On the Anchor WLC, configure the Policy Profile to designate the controller as an Export Anchor.
5. On the Foreign WLC, map the WLAN to the appropriate Policy Profile using a Policy Tag.

Flow for Layer 2 Foreign-Anchor based SSID

1. The client initiates a connection to the SSID broadcasteded by the Foreign WLC. The Foreign WLC performs Layer 2 authentication, validating credentials either locally or through an external AAA server, depending on the configured security policy.
2. Upon successful authentication, the client session is Anchored to the Anchor WLC. The client is assigned an IP address and transitions to the RUN state on the Anchor WLC.
3. Once the session is established, all client data traffic is tunneled from the Foreign WLC to the Anchor WLC, where it egresses into the network.



Layer 2 Foreign Anchor Based WLAN Flow Diagram

Analyzing Layer 2 SSID Flow in Foreign-Anchor Setup Through Logs

This section explanis the flow of Layer 2 client connectivity by using Radioactive Trace (RA Trace), Embedded Packet Captures (EPC), and client status on both the Foreign and Anchor controllers.

Logs from Foreign Controller

Radioactive Traces

```
!! Client Association started !!
[client-orch-sm] Association received. BSSID BSSID-addr, WLAN DMZ_PSK, Slot 1 AP AP_MAC, AP_NAME, Site
[dot11] [17047] (info) MAC Client-MAC dot11 send association response. Sending assoc response of length
[dot11] [17047] (info) MAC Client-MAC DOT11 state transition S_DOT11_INIT -> S_DOT11_ASSOCIATED□

!! Layer 2 Authentication started !!
[client-orch-state] Client state transition S_CO_ASSOCIATING -> S_CO_L2_AUTH_IN_PROGRESS
[client-auth] L2 Authentication initiated. method PSK, Policy VLAN 31, AAA override = 0, NAC = 0
[client-keymgmt] EAP key M1 Sent successfully
[client-keymgmt] M2 Status EAP key M2 validation success
[client-keymgmt]EAP key M3 Sent successfully
[client-keymgmt] M4 Status EAP key M4 validation is successful□
[client-keymgmt] EAP Key management successful. AKMPSK CipherCCMP WPA Version WPA2 >> !! client succesf

!! Mobility Handoff !!
□{mobilityd_R0-0}{1} [mm-dgram-io] [18401] (debug) MAC Client-MAC Sending message mobile_announce to gr
{mobilityd_R0-0}{1} [mm-pmtu] [18401] (debug) Peer IP Anchor-WLC-IP □{mobilityd_R0-0}{1} [mm-client] [1
{mobilityd_R0-0}{1} [mm-transition] MMFSM transition S_MC_WAIT_ANNOUNCE_RSP -> S_MC_ANNOUNCE_TIMEDOUT_P
□{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Received mobile_announce_nak, sub type 2 o
□{wncd_x_R0-0}{1} [mm-transition] [17047] (info) MAC Client-MAC MMIF FSM transition S_MA_INIT_WAIT_ANNO
{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Sending export_Anchor_req of XID (XID) to (
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RE
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Request successfully proce
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Sending export_Anchor_req of XID (176282
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_rsp, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RS
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Response successfully proc
□{wncd_x_R0-0}{1} [epm-misc] [17047] (info) Anchor Vlan-id 31 processed□[mm-client] [17047] (info) MAC
[mm-client] Mobility Successful. Roam Type L3 Requested, Sub Roam Type MM_SUB_ROAM_TYPE_NONE, Client IF
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_MOBILITY_DISCOVERY_IN_PROGRESS -> S_C

{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_DPATH_PLUMB_IN_PROGRESS -> S_CO_IP_LE
□{wncd_x_R0-0}{1} [client-orch-sm] [17047] (debug) MAC Client-MAC Received ip learn response. method IP

{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_IP_LEARN_IN_PROGRESS -> S_CO_RUN >> C
```

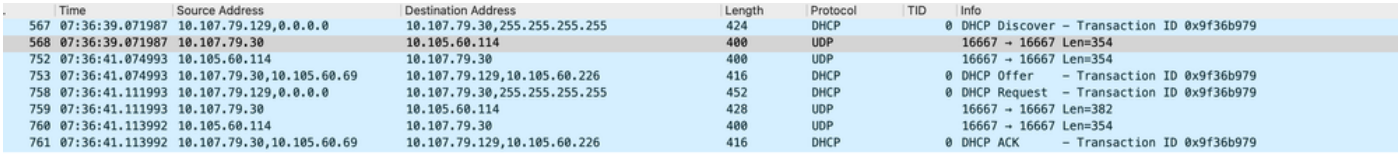
Packet capture

The client sends an association request and performs Layer 2 authentication, handled by the Foreign Controller.

	Time	Source Address	Destination Address	Length	Protocol	TID	Info
417	07:36:34.347973	10.107.79.129	10.107.79.30	272	802.11		Association Request, SN=1680, FN=0, Flags=....R..., SSID="DMZ_PSK"
418	07:36:34.347973	10.107.79.129	10.107.79.30	268	802.11		Association Request, SN=1680, FN=0, Flags=....R..., SSID="DMZ_PSK"
419	07:36:34.348980	10.107.79.30	10.107.79.129	211	802.11		Association Response, SN=0, FN=0, Flags=........
420	07:36:34.348980	10.107.79.30	10.107.79.129	215	802.11		Association Response, SN=0, FN=0, Flags=........
421	07:36:34.350979	10.107.79.129	10.107.79.30	110	LLC	0	U, func=UI; SNAP, OUI 0x000000 (Officially Xerox, but 0:0:0:0:0:0 is more commo
426	07:36:34.354977	10.107.79.30	10.107.79.129	203	EAPOL		Key (Message 1 of 4)
427	07:36:34.354977	10.107.79.30	10.107.79.129	207	EAPOL		Key (Message 1 of 4)
428	07:36:34.360973	10.107.79.129	10.107.79.30	217	EAPOL	0	Key (Message 2 of 4)
429	07:36:34.361980	10.107.79.129	10.107.79.30	213	EAPOL	0	Key (Message 2 of 4)
430	07:36:34.361980	10.107.79.30	10.107.79.129	237	EAPOL		Key (Message 3 of 4)
431	07:36:34.361980	10.107.79.30	10.107.79.129	241	EAPOL		Key (Message 3 of 4)
432	07:36:34.368968	10.107.79.129	10.107.79.30	195	EAPOL	0	Key (Message 4 of 4)
433	07:36:34.368968	10.107.79.129	10.107.79.30	191	EAPOL	0	Key (Message 4 of 4)

Client Association + Layer 2 Authentication Traffic

A mobility handoff triggers between the Foreign and Anchor Controllers via UDP port 16667. Upon a successful mobility event, the client state transitions to RUN with an Export Foreign role.
The Foreign Controller receives client DHCP traffic via the CAPWAP tunnel and forwards it to the Anchor Controller for further processing.



	Time	Source Address	Destination Address	Length	Protocol	TID	Info
567	07:36:39.071987	10.107.79.129,0.0.0.0	10.107.79.30,255.255.255.255	424	DHCP	0	DHCP Discover - Transaction ID 0x9f36b979
568	07:36:39.071987	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
752	07:36:41.074993	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
753	07:36:41.074993	10.107.79.30,10.105.60.69	10.107.79.129,10.105.60.226	416	DHCP	0	DHCP Offer - Transaction ID 0x9f36b979
758	07:36:41.111993	10.107.79.129,0.0.0.0	10.107.79.30,255.255.255.255	452	DHCP	0	DHCP Request - Transaction ID 0x9f36b979
759	07:36:41.111993	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
760	07:36:41.113992	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
761	07:36:41.113992	10.107.79.30,10.105.60.69	10.107.79.129,10.105.60.226	416	DHCP	0	DHCP ACK - Transaction ID 0x9f36b979

Client DHCP Traffic Received on Foreign Controller is Forwarded to Anchor Controller using Mobility Tunnel

Logs from Anchor 9800 Controller

Radioactive Traces from Anchor

```
!! Mobility Handoff !!
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Number of client is BELOW wlan limit
{mobilityd_R0-0}{1} [mm-transition] [26021] (info) MAC Client-MAC MMFSM transition S_MC_INIT -> S_MC_An
□{wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Roam type changed - None -> L3 Requested
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Export Anchor Response successfully proc
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Forwarding Anchor Response to Foreign.
{mobilityd_R0-0}{1} [mm-client] [26021] (info) MAC Client-MAC Forwarding export_Anchor_rsp, sub type 0
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.
{□wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Mobility role changed - Unassoc -> Export A
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.>> Client is successf

!! Client DHCP Traffic !!
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_MOBILIT
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_DPATH_P
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [client-iplearn] [24229] (note) MAC Client-MAC Client IP learn successful. Method DHCP
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Sending ipv4_address_update of XID (XID)
{wncd_x_R0-0}{1} [client-iplearn] [24229] (info) MAC Client-MAC IP-learn state transition S_IPLEARN_IN_
Complete

{wncd_x_R0-0}{1} [avc-afc] [24229] (info) ReAnchor [client MAC Client-MAC] Client has Anchor role {wncd
```

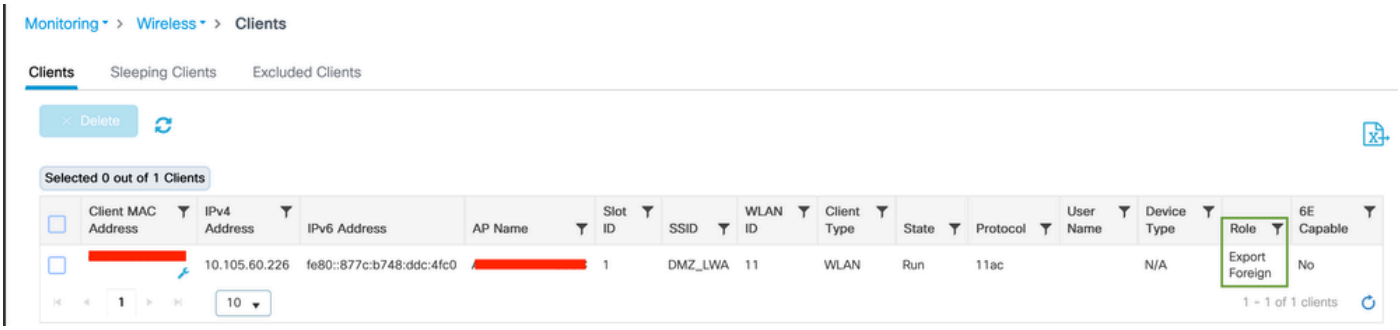
Packet capture on Anchor

After the mobility handoff, the Anchor Controller receives DHCP traffic from the Foreign Controller via the mobility tunnel.
Upon completion of the DORA process, the client enters RUN state with an Export Anchor role. From this point forward, the Anchor Controller serves as the exit point for client data traffic.

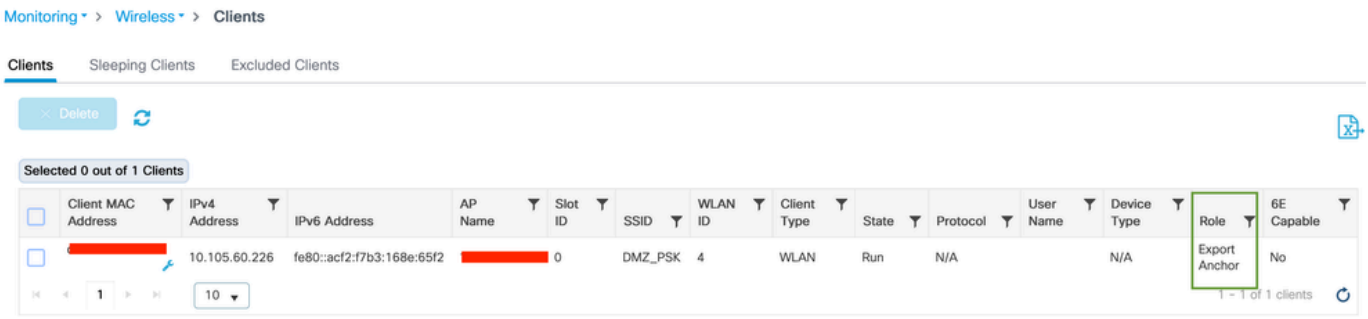
UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 3, 2025 07:36:39…	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
Jan 3, 2025 07:36:39…	0.0.0.0	255.255.255.255	346	DHCP		DHCP Discover - Transaction ID 0x9f36b979
Jan 3, 2025 07:36:41…	10.105.60.69	10.105.60.226	346	DHCP		DHCP Offer - Transaction ID 0x9f36b979
Jan 3, 2025 07:36:41…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354
Jan 3, 2025 07:36:41…	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
Jan 3, 2025 07:36:41…	0.0.0.0	255.255.255.255	374	DHCP		DHCP Request - Transaction ID 0x9f36b979
Jan 3, 2025 07:36:41…	10.105.60.69	10.105.60.226	346	DHCP		DHCP ACK - Transaction ID 0x9f36b979
Jan 3, 2025 07:36:41…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354

Client DHCP Traffic on Anchor Controller Recieved from Foreign Controller

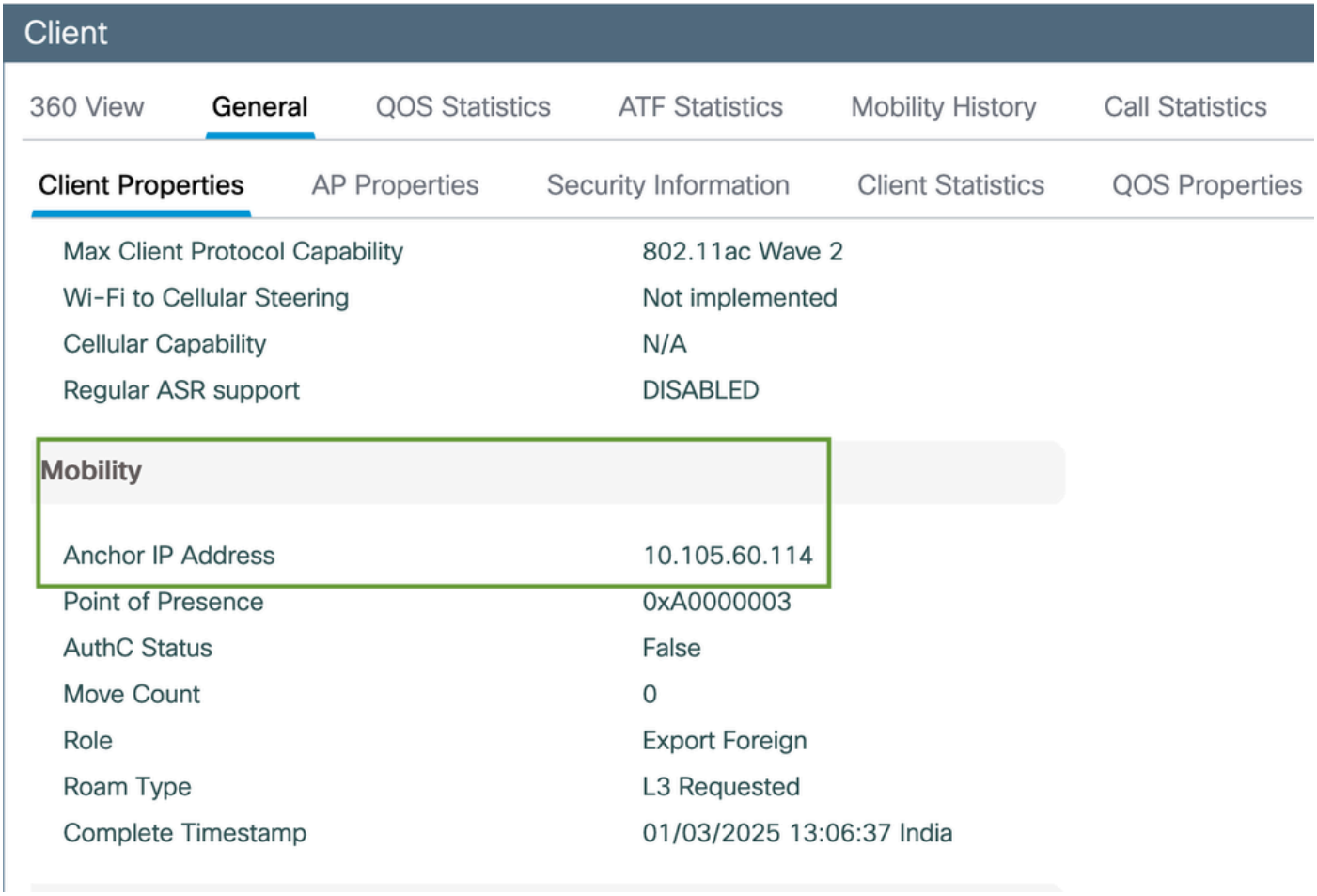
Client State on Both Foreign and Anchor Controller



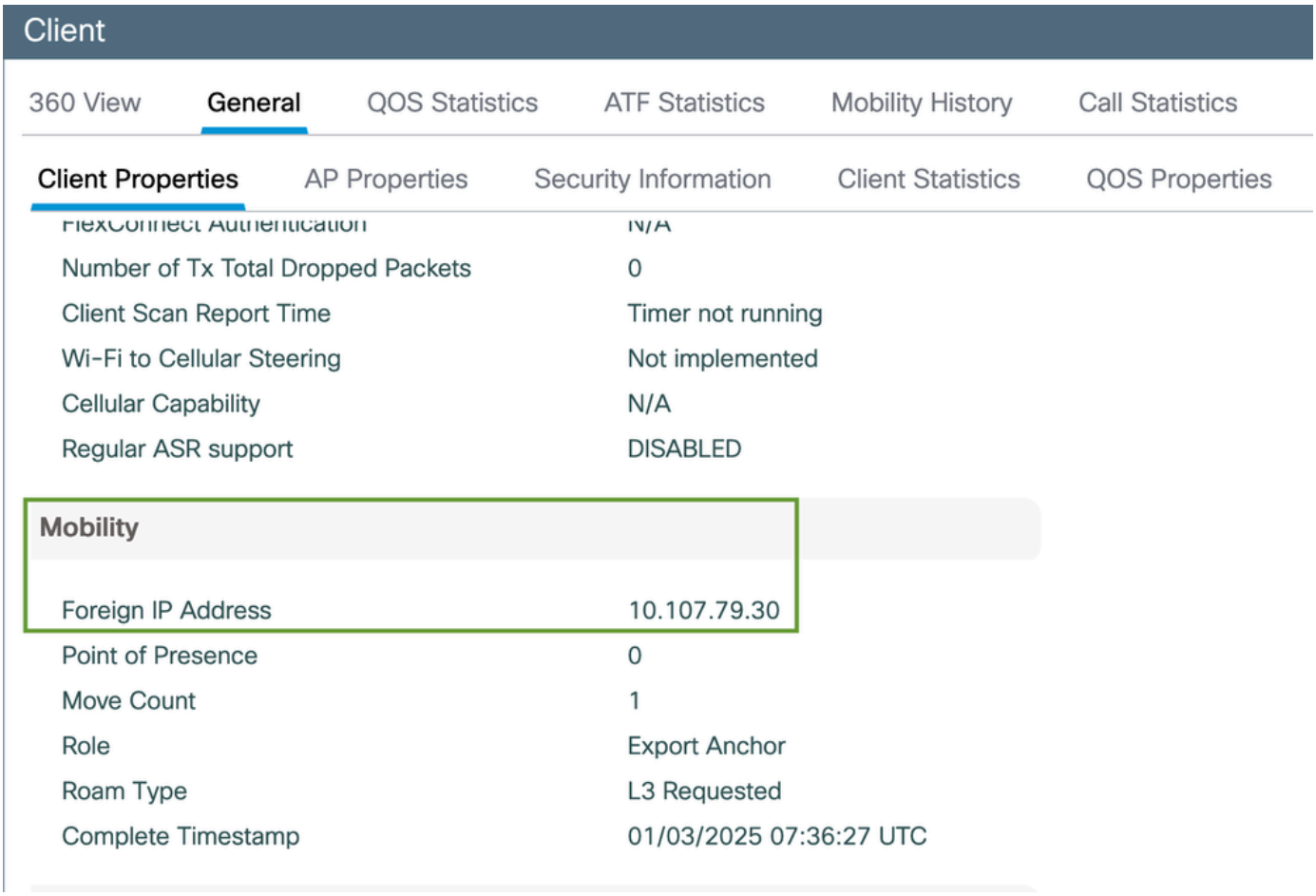
Client State on Foreign



Client State on Anchor



Client Properties on Foreign

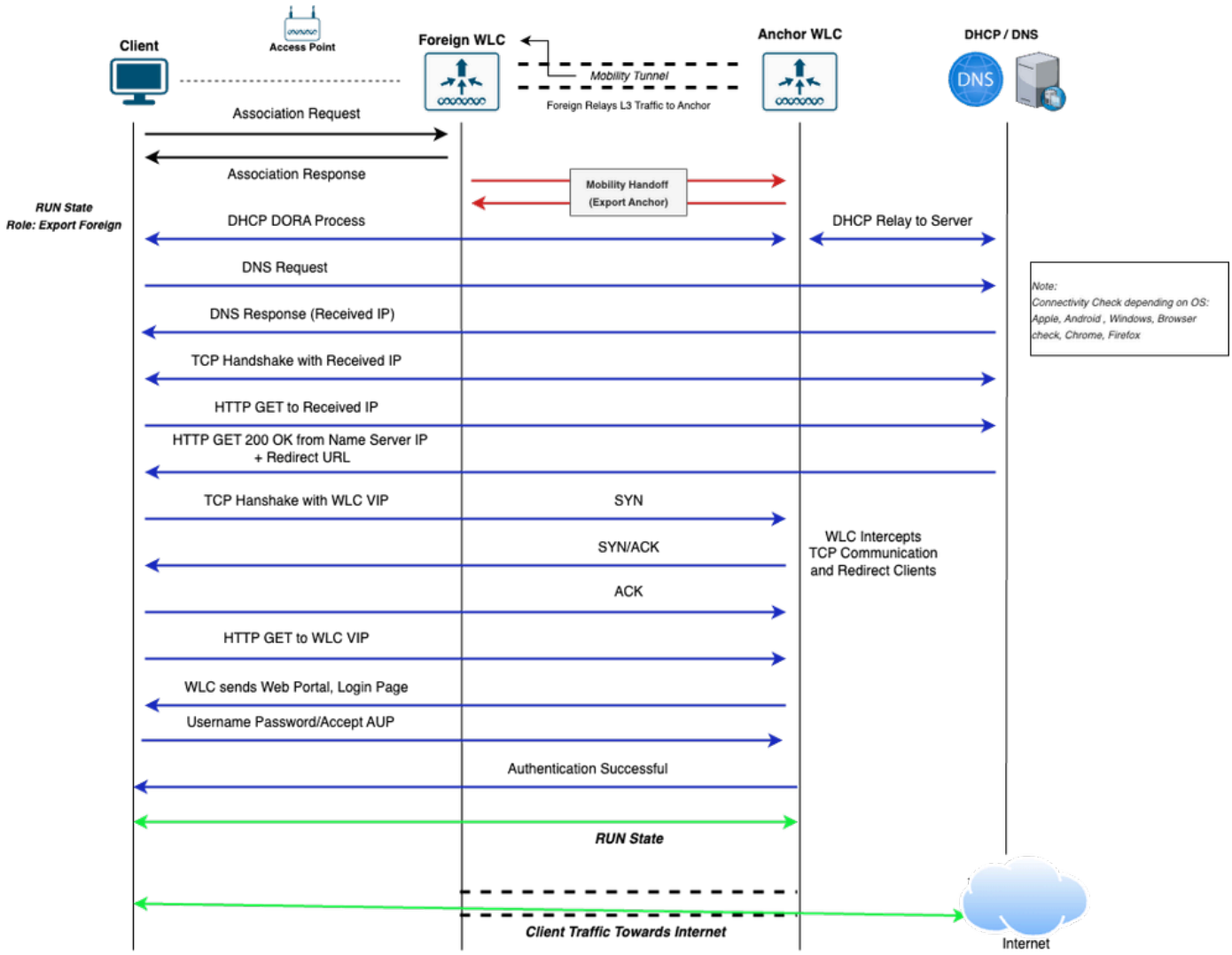


WLAN with Layer 3 Authentication

Local Web Authentication

Flow for Local Webauth SSID in Foreign-Anchor Setup

1. The client initiates a connection to the SSID advertised by the Foreign WLC.
2. As no Layer 2 authentication is performed, the client is straight away Anchored to the Anchor WLC. The client enters RUN state on the Foreign WLC, with its mobility role designated as Export Foreign.
3. The client obtains an IP address and is redirected to a web page. This traffic is handled by Anchor Controller.
4. Upon successful authentication at the portal, the client transitions to RUN state on the Anchor WLC, with the Export Anchor role.



Client Connectivity Flow Diagram for Local Webauth SSID in Foreign-Anchor Setup

Analyzing Local Webauth SSID Flow in Foreign-Anchor Setup through Logs

This section explanis the flow of client connectivity for Local Web Authentication SSID by using Radioactive Trace (RA Trace), Embedded Packet Captures (EPC), and client status on both the Foreign and Anchor controllers.

Logs from Foreign Controller

Radioactive Traces

```
!! Client Association Phase !!
{wncd_x_R0-0}{1}: [client-orch-sm] [17047]: (note): MAC: Client_MAC Association received. BSSID BSSID_MA
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_INI
{wncd_x_R0-0}{1}: [dot11] [17047]: (info): MAC: Client_MAC dot11 send association response. Sending asso

!! L2 Auth : None !!
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_ASS
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_L2_

!! Mobility Handoff Phase !!
□{mobilityd_R0-0}{1} [mm-dgram-io] [18401] (debug) MAC Client-MAC Sending message mobile_announce to gr
{mobilityd_R0-0}{1} [mm-pmtu] [18401] (debug) Peer IP Anchor-WLC-IP □{mobilityd_R0-0}{1} [mm-client] [1
{mobilityd_R0-0}{1} [mm-transition] MMFSM transition S_MC_WAIT_ANNOUNCE_RSP -> S_MC_ANNOUNCE_TIMEDOUT_PE
□{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Received mobile_announce_nak, sub type 2 o
□{wncd_x_R0-0}{1} [mm-transition] [17047] (info) MAC Client-MAC MMIF FSM transition S_MA_INIT_WAIT_ANNO
{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Sending export_Anchor_req of XID (XID) to (
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_REQ
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Request successfully proces
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Sending export_Anchor_req of XID (176282)
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_rsp, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RSP
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Response successfully proce
□{wncd_x_R0-0}{1} [epm-misc] [17047] (info) Anchor Vlan-id 31 processed□[mm-client] [17047] (info) MAC
[mm-client] Mobility Successful. Roam Type L3 Requested, Sub Roam Type MM_SUB_ROAM_TYPE_NONE, Client IF
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_MOBILITY_DISCOVERY_IN_PROGRESS -> S_CO
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_DPATH_PLUMB_IN_PROGRESS -> S_CO_IP_LEA
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_IP_

!! Client AAA Traffic handling !!
{mobilityd_R0-0}{1}: [mm-transition] [18401]: (info): MAC: Client_MAC MMFSM transition: S_MC_RUN -> S_MC
{mobilityd_R0-0}{1}: [mm-client] [18401]: (info): MAC: Client_MAC Forwarding aaa_handoff, sub type: 0 of
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Sending aaa_handoff of XID (10452) to
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC AAA Handoff successfully forwarded.
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Received aaa_handoff, sub type: 0 of XID
{wncd_x_R0-0}{1}: [mm-transition] [17047]: (info): MAC: Client_MAC MMIF FSM transition: S_MA_Foreign ->
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Mobile AAA Handoff update received.
{wncd_x_R0-0}{1}: [sanet-shim-miscellaneous] [17047]: (info): MAC: Client_MAC Received username=Guest1
{wncd_x_R0-0}{1}: [sanet-shim-miscellaneous] [17047]: (info): MAC: Client_MAC IPv6 Client payload is re
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Sending aaa_handoff_ack of XID (10452)
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Received aaa_handoff_ack, sub type:
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC AAA Handoff Ack successfully handled
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa_handoff_ack base check is VALID
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa_handoff_ack is VALID
```

```
{mobilityd_R0-0}{1}: [mm-transition] [18401]: (info): MAC: Client_MAC MMFSM transition: S_MC_RUN -> S_M
{mobilityd_R0-0}{1}: [mm-client] [18401]: (info): MAC: Client_MAC Forwarding aaa_handoff_ack, sub type:
{mobilityd_R0-0}{1}: [mm-pmtu] [18401]: (debug): Peer IP: Anchor-WLC-IP PMTU size is 1006 and calculate
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Sending aaa_handoff_ack of XID (1045
{wncd_x_R0-0}{1}: [auth-mgr] [17047]: (info): [Client_MAC:capwap_90000003] auth mgr attr add/change not
{wncd_x_R0-0}{1}: [auth-mgr-feat_acct] [17047]: (info): [Client_MAC:capwap_90000003] SM Notified attrib
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa handoff ack successfully forward
```

Packet Capture

The client sends an association request, which the Foreign Controller handles.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 12:21:41…	10.107.79.129	10.107.79.30	250	802.11		Association Request, SN=1705, FN=0, Flags=........, SSID="DMZ_LWA"
Jan 5, 2025 12:21:41…	10.107.79.129	10.107.79.30	246	802.11		Association Request, SN=1705, FN=0, Flags=........, SSID="DMZ_LWA"
Jan 5, 2025 12:21:41…	10.107.79.30	10.107.79.129	211	802.11		Association Response, SN=0, FN=0, Flags=........
Jan 5, 2025 12:21:41…	10.107.79.30	10.107.79.129	215	802.11		Association Response, SN=0, FN=0, Flags=........

Client Association Phase with Foreign Controller

A mobility handoff triggers between the Foreign and Anchor Controllers via port UDP 16667. Upon a successful mobility event, the client state transitions to RUN with an Export Foreign role.
The Foreign Controller receives client DHCP traffic via the CAPWAP tunnel and forwards it to the Anchor Controller for further processing.

Jan 5, 2025 12:21:42…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	424	DHCP	0	DHCP Discover - Transaction ID 0x9f36b979
Jan 5, 2025 12:21:42…	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
Jan 5, 2025 12:21:44…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 5, 2025 12:21:44…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP Offer - Transaction ID 0x9f36b979
Jan 5, 2025 12:21:44…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	452	DHCP	0	DHCP Request - Transaction ID 0x9f36b979
Jan 5, 2025 12:21:44…	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
Jan 5, 2025 12:21:44…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 5, 2025 12:21:44…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP ACK - Transaction ID 0x9f36b979

Client DHCP Traffic Received on Foreign Controller is Forwarded to Anchor Controller using Mobility Tunnel

Similarly, the client sends network connectivity status and web page access check traffic to the Foreign WLC via the CAPWAP tunnel; the Foreign WLC forwards this to the Anchor WLC using the mobility tunnel, where the Anchor Controller intercepts or processes the traffic.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 12:21:46…	10.107.79.129,10.105.60.226	10.107.79.30,DNS Server IP	165	DNS	0	Standard query 0x14e8 Connectivity Check URL
Jan 5, 2025 12:21:46…	10.107.79.30	10.105.60.114	141	UDP		16667 → 16667 Len=95
Jan 5, 2025 12:21:46…	10.105.60.114	10.107.79.30	291	UDP		16667 → 16667 Len=245
Jan 5, 2025 12:21:46…	10.107.79.30, DNS Server IP	10.107.79.129,10.105.…	307	DNS	0	Standard query response 0x14e8 Connectivity Check URL
Jan 5, 2025 12:21:46…	10.107.79.129,10.105.60.226	10.107.79.30, Resolved IP	148	TCP	0	52887 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:21:46…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:21:46…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:21:46…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	140	TCP	0	80 → 52887 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 5, 2025 12:21:46…	10.107.79.129,10.105.60.226	10.107.79.30, Resolved IP	136	TCP	0	52887 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 5, 2025 12:21:46…	10.107.79.129,10.105.60.226	10.107.79.30,	247	HTTP	0	GET /connecttest.txt HTTP/1.1
Jan 5, 2025 12:21:46…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:21:46…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	128	TCP	0	80 → 52887 [ACK] Seq=1 Ack=112 Win=64256 Len=0
Jan 5, 2025 12:21:46…	10.105.60.114	10.107.79.30	745	UDP		16667 → 16667 Len=699
Jan 5, 2025 12:21:46…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:21:46…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	761	HTTP	0	HTTP/1.1 200 OK (text/html)
Jan 5, 2025 12:21:46…	10.107.79.30,	10.107.79.129,10.105.…	128	TCP	0	80 → 52887 [FIN, ACK] Seq=634 Ack=112 Win=64256 Len=0

Network Connectivity Status Check on Foreign Controller

```
> Frame 2176: 761 bytes on wire (6088 bits), 761 bytes captured (6088 bits)
> Ethernet II, Src: Cisco_63:8b:8b (                    ), Dst: C                    )
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1415
> Internet Protocol Version 4, Src: 10.107.79.30, Dst: 10.107.79.129
> User Datagram Protocol, Src Port: 5247, Dst Port: 5264
> Control And Provisioning of Wireless Access Points - Data
> IEEE 802.11 QoS Data, Flags: ......F.
> Logical-Link Control
> Internet Protocol Version 4, Src:              , Dst: 10.105.60.226
> Transmission Control Protocol, Src Port: 80, Dst Port: 52887, Seq: 1, Ack: 112, Len: 633
v Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    Location: https://192.0.2.1/login.html?redirect=h                                  r\n
    Content-Type: text/html\r\n
  > Content-Length: 472\r\n
    \r\n
    [Request in frame: 2169]
    [Time since request: 0.001007000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: H                                  ]
    File Data: 472 bytes
> Line-based text data: text/html (9 lines)
```

Redirect URL Sent to Client

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	148	TCP	0	53024 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:22:25…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:22:25…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:22:25…	10.107.79.30,192.0.2.1	10.107.79.129,10.105.…	140	TCP	0	443 → 53024 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	136	TCP	0	53024 → 443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	1386	TCP	0	53024 → 443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 4991]
Jan 5, 2025 12:22:25…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25…	10.107.79.30,192.0.2.1	10.107.79.129,10.105.…	128	TCP	0	443 → 53024 [ACK] Seq=1 Ack=1251 Win=64128 Len=0
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	747	TLSv1…	0	Client Hello
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,142.250.…	148	TCP	0	53025 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:22:25…	10.107.79.30,192.0.2.1	10.107.79.129,10.105.…	128	TCP	0	443 → 53024 [ACK] Seq=1 Ack=1862 Win=64128 Len=0
Jan 5, 2025 12:22:25…	10.105.60.114	10.107.79.30	277	UDP		16667 → 16667 Len=231
Jan 5, 2025 12:22:25…	10.107.79.30,192.0.2.1	10.107.79.129,10.105.…	293	TLSv1…	0	Server Hello, Change Cipher Spec, Encrypted Handshake Message
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	143	TLSv1…	0	Alert (Level: Fatal, Description: Certificate Unknown)
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	148	TCP	0	53027 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	211	TLSv1…	0	Change Cipher Spec, Encrypted Handshake Message
Jan 5, 2025 12:22:25…	10.107.79.30	10.105.60.114	187	UDP		16667 → 16667 Len=141
Jan 5, 2025 12:22:25…	10.107.79.129,10.105.60.226	10.107.79.30,192.0.2.1	781	TLSv1…	0	Application Data
Jan 5, 2025 12:22:25…	10.107.79.30	10.105.60.114	757	UDP		16667 → 16667 Len=711
Jan 5, 2025 12:22:25…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25…	10.107.79.30,192.0.2.1	10.107.79.129,10.105.…	181	TLSv1…	0	Encrypted Alert

Certificate Verification for HTTPS Connection

Post HTTPS session details(client authentication)will be encrypted

Client Access to Local Webauth Page to Provide Authentication Details

Logs from Anchor Controller

Radioactive Traces

```
!! Mobility Handoff !!
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Number of client is BELOW wlan limit
{mobilityd_R0-0}{1} [mm-transition] [26021] (info) MAC Client-MAC MMFSM transition S_MC_INIT -> S_MC_An
□{wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Roam type changed - None -> L3 Requested

!! Session Created for Client !!
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_AS
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 0.0.0.0]Param-map used: global
```

```
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 0.0.0.0]Applying IPv4 i
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_CR
{wncd_x_R0-0}{1}: [mm-transition] [24229]: (info): MAC: Client_MAC MMIF FSM transition: S_MA_INIT -> S_
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Export Anchor Response successfully proc
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Forwarding Anchor Response to Foreign.
{mobilityd_R0-0}{1} [mm-client] [26021] (info) MAC Client-MAC Forwarding export_Anchor_rsp, sub type 0
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.
{□wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Mobility role changed - Unassoc -> Export A
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.>> Client is successf


!! Client DHCP Traffic !!
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_MOBILIT
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_DPATH_P
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [client-iplearn] [24229] (note) MAC Client-MAC Client IP learn successful. Method DHCP
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Sending ipv4_address_update of XID (XID)
{wncd_x_R0-0}{1} [client-iplearn] [24229] (info) MAC Client-MAC IP-learn state transition S_IPLEARN_IN_
Complete
{wncd_x_R0-0}{1}: [client-orch-sm] [24229]: (debug): MAC: Client_MAC Received ip learn response. method

!! Local Web Athentication !!
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_IP
{wncd_x_R0-0}{1}: [client-auth] [24229]: (note): MAC: Client_MAC L3 Authentication initiated. LWA
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52910/195
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52911/235
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52911/235
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse G
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read co
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State G
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52911/235
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52911/235
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52911/2
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52910/195
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse G
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read co
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State G
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52910/195
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52910/195
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52910/1
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52919/195
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52919/1
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52923/195
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52924/195
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]52924/195
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse G
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read co
```

```
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-ma
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State GE
{wncd_x_R0-0}{1}: [webauth-page] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Sending W
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53007/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53007/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53007/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]GET rcvd
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]HTTP GET
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read com
{wncd_x_R0-0}{1}: [webauth-error] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse le
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53007/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53007/19
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53008/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53009/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53009/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]GET rcvd
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]HTTP GET
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read com
{wncd_x_R0-0}{1}: [webauth-error] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Parse le
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53009/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53009/19
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53011/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53011/19
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53020/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53022/235 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/195 I
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/195 I
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]POST rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]get url
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Read com
{wncd_x_R0-0}{1}: [sadb-attr] [24229]: (info): Removing ipv6 addresses from the attr list -1526718499,sm
{wncd_x_R0-0}{1}: [caaa-authen] [24229]: (info): [CAAA:AUTHEN:4000544] NULL ATTR LIST
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-ma
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State LO
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/195 I
{wncd_x_R0-0}{1}: [sadb-attr] [24229]: (info): Removing ipv6 addresses from the attr list 1761615853,sm
{wncd_x_R0-0}{1}: [caaa-author] [24229]: (info): [CAAA:AUTHOR:4000544] NULL ATTR LIST
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-ma
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State AU
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Unapply IP
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raising ext evt Template De
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Unapply IP
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raising ext evt Template De
{wncd_x_R0-0}{1}: [llbridge-main] [24229]: (debug): MAC: Client_MAC Link-local bridging not enabled for
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Authc success from WebAuth
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raised event APPLY_USER_PRO
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raised event RX_METHOD_AUTH

{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : username 0 Guest1
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : aaa-author-type 0 1 (0x1)
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : aaa-author-service 0 16 (0x10)
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : clid-MAC-addr 0 Client_MAC
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : addr 0 0xa693ce2
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : method 0 1 [webauth]
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : clid-MAC-addr 0 Client_MAC
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : intf-id 0 2684354561 (0xa0000001)
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change no
{wncd_x_R0-0}{1}: [auth-mgr-feat_acct] [24229]: (info): [Client_MAC:mobility_a0000001] SM Notified attr
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Received User-Name Guest1
```

```
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change n
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Method webauth changing st
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Context changing state fro
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change n
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raised event AUTHZ_SUCCESS
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Context changing state fro
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Applying
{wncd_x_R0-0}{1}: [svm] [24229]: (info): SVM_INFO: Applying Svc Templ IP-Adm-V4-LOGOUT-ACL (ML:NONE)
{wncd_x_R0-0}{1}: [epm] [24229]: (info): [Client_MAC:mobility_a0000001] Feature (EPM URL PLUG-IN) has b
{wncd_x_R0-0}{1}: [svm] [24229]: (info): SVM_INFO: Response of epm is SYNC with return code Success
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raising ext evt Template A
{wncd_x_R0-0}{1}: [sanet-shim-miscellaneous] [24229]: (ERR): authc policy update from SANet vlan 31
{wncd_x_R0-0}{1}: [llbridge-main] [24229]: (debug): MAC: Client_MAC Link-local bridging not enabled for
{wncd_x_R0-0}{1}: [webauth-sess] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-ma
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]State A
{wncd_x_R0-0}{1}: [webauth-page] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]Sending
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/195
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/195
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.226]53023/1
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] SM will not send event Tem
{wncd_x_R0-0}{1}: [client-auth] [24229]: (note): MAC: Client_MAC L3 Authentication Successful. ACL:[]
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [rog-proxy-capwap] [24229]: (debug): Managed client RUN state notification: Client_MA
{wncd_x_R0-0}{1}: [avc-afc] [24229]: (info): ReAnchor [client MAC: Client_MAC] Client has Anchor role
{wncd_x_R0-0}{1}: [avc-afc] [24229]: (info): ReAnchor [client MAC: Client_MAC] Guest client detected. S
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_L3
```

Packet Capture

After the mobility handoff, the Anchor Controller receives DHCP traffic from the Foreign Controller via the mobility tunnel.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 07:21:49…	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
Jan 5, 2025 07:21:49…	0.0.0.0	255.255.255.255	346	DHCP		DHCP Discover - Transaction ID 0x9f36b979
Jan 5, 2025 07:21:51…	10.105.60.69	10.105.60.226	346	DHCP		DHCP Offer - Transaction ID 0x9f36b979
Jan 5, 2025 07:21:51…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354
Jan 5, 2025 07:21:51…	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
Jan 5, 2025 07:21:51…	0.0.0.0	255.255.255.255	374	DHCP		DHCP Request - Transaction ID 0x9f36b979
Jan 5, 2025 07:21:51…	10.105.60.69	10.105.60.226	346	DHCP		DHCP ACK - Transaction ID 0x9f36b979
Jan 5, 2025 07:21:51…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354

Client DHCP Traffic on Anchor Controller Received from Foreign Controller

The Anchor Controller receives connectivity checks, webpage access requests, and authentication details to process further.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 12:21:52…	10.107.79.30	10.105.60.114	141	UDP		16667 → 16667 Len=95
Jan 5, 2025 12:21:52…	10.105.60.226	DNS IP	83	DNS		Standard query 0x14e8 Connectivity Check URL
Jan 5, 2025 12:21:52…	DNS IP	10.105.60.226	237	DNS		Standard query response 0x14e8 Connectivity Check URL
Jan 5, 2025 12:21:52…	10.105.60.114	10.107.79.30	287	UDP		16667 → 16667 Len=245
Jan 5, 2025 12:21:52…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:21:52…	10.105.60.226	Resolved IP	70	TCP		52887 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:21:52…	Resolved IP	10.105.60.226	66	TCP		80 → 52887 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 5, 2025 12:21:52…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:21:52…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:21:52…	10.105.60.226	Resolved IP	58	TCP		52887 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 5, 2025 12:21:52…	10.107.79.30	10.105.60.114	223	UDP		16667 → 16667 Len=177
Jan 5, 2025 12:21:52…	10.105.60.226	Resolved IP	169	HTTP		GET /connecttest.txt HTTP/1.1
Jan 5, 2025 12:21:52…	Resolved IP	10.105.60.226	54	TCP		80 → 52887 [ACK] Seq=1 Ack=112 Win=64256 Len=0
Jan 5, 2025 12:21:52…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:21:52…	Resolved IP	10.105.60.226	687	HTTP		HTTP/1.1 200 OK (text/html)
Jan 5, 2025 12:21:52…	10.105.60.114	10.107.79.30	741	UDP		16667 → 16667 Len=699
Jan 5, 2025 12:21:52…	Resolved IP	10.105.60.226	54	TCP		80 → 52887 [FIN, ACK] Seq=634 Ack=112 Win=64256 Len=0
Jan 5, 2025 12:21:52…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66

Network Connectivity Status Check on Anchor Controller

```
> Frame 604: 687 bytes on wire (5496 bits), 687 bytes captured (5496 bits)
> Ethernet II, Src: [redacted], Dst: [redacted]
> Internet Protocol Version 4, Src: [redacted], Dst: 10.105.60.226
> Transmission Control Protocol, Src Port: 80, Dst Port: 52887, Seq: 1, Ack: 112, Len: 633
v Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    Location: https://192.0.2.1/login.html?redirect=http://[redacted]
    Content-Type: text/html\r\n
  > Content-Length: 472\r\n
    \r\n
    [Request in frame: 601]
    [Time since request: 0.000992000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: [redacted]]
    File Data: 472 bytes
> Line-based text data: text/html (9 lines)
```

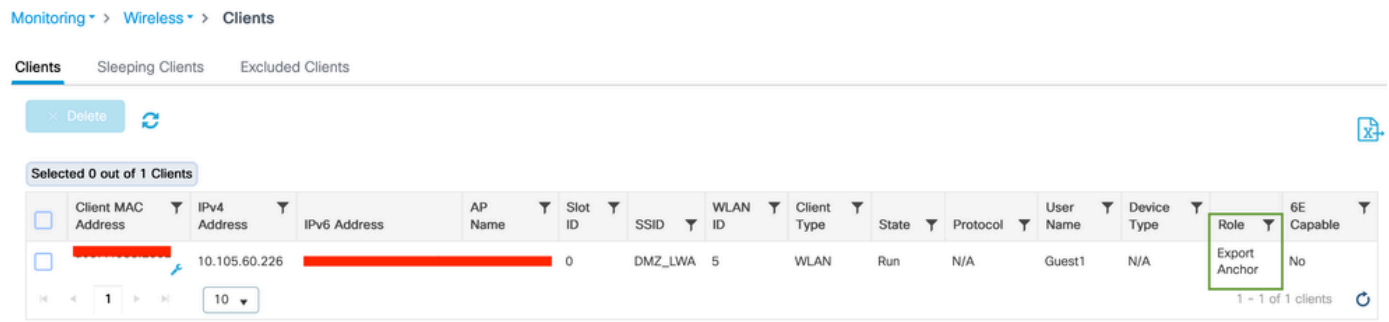
Redirect URL Sent to Client

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	70	TCP		53024 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	66	TCP		443 → 53024 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 5, 2025 12:22:25.…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	58	TCP		53024 → 443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	450	UDP		16667 → 16667 Len=404
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	1308	TCP		53024 → 443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 3273]
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	54	TCP		443 → 53024 [ACK] Seq=1 Ack=1251 Win=64128 Len=0
Jan 5, 2025 12:22:25.…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	723	UDP		16667 → 16667 Len=677
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	669	TLSv1…		Client Hello
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	54	TCP		443 → 53024 [ACK] Seq=1 Ack=1862 Win=64128 Len=0
Jan 5, 2025 12:22:25.…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	219	TLSv1…		Server Hello, Change Cipher Spec, Encrypted Handshake Message
Jan 5, 2025 12:22:25.…	10.105.60.114	10.107.79.30	273	UDP		16667 → 16667 Len=231
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	65	TLSv1…		Alert (Level: Fatal, Description: Certificate Unknown)
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	58	TCP		53024 → 443 [FIN, ACK] Seq=1869 Ack=166 Win=131072 Len=0
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	187	UDP		16667 → 16667 Len=141
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	133	TLSv1…		Change Cipher Spec, Encrypted Handshake Message
Jan 5, 2025 12:22:25.…	10.107.79.30	10.105.60.114	757	UDP		16667 → 16667 Len=711
Jan 5, 2025 12:22:25.…	10.105.60.226	192.0.2.1	703	TLSv1…		Application Data
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	107	TLSv1…		Encrypted Alert
Jan 5, 2025 12:22:25.…	10.105.60.114	10.107.79.30	161	UDP		16667 → 16667 Len=119
Jan 5, 2025 12:22:25.…	192.0.2.1	10.105.60.226	54	TCP		443 → 53027 [FIN, ACK] Seq=219 Ack=2678 Win=64128 Len=0

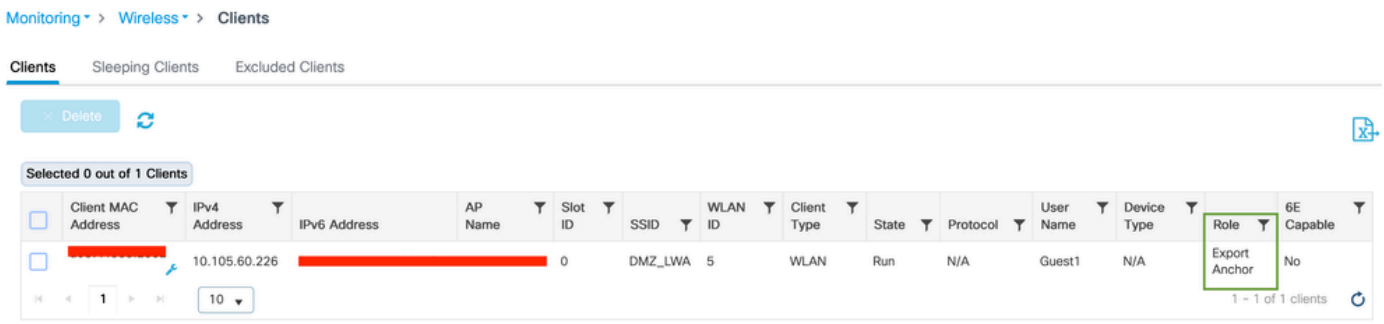
Client Access to Local Webauth Page to Provide Authentication Details

After successful Local Web authentication, the client enters RUN state with an Export Anchor role. From this point forward, the Anchor Controller serves as the exit point for client data traffic.

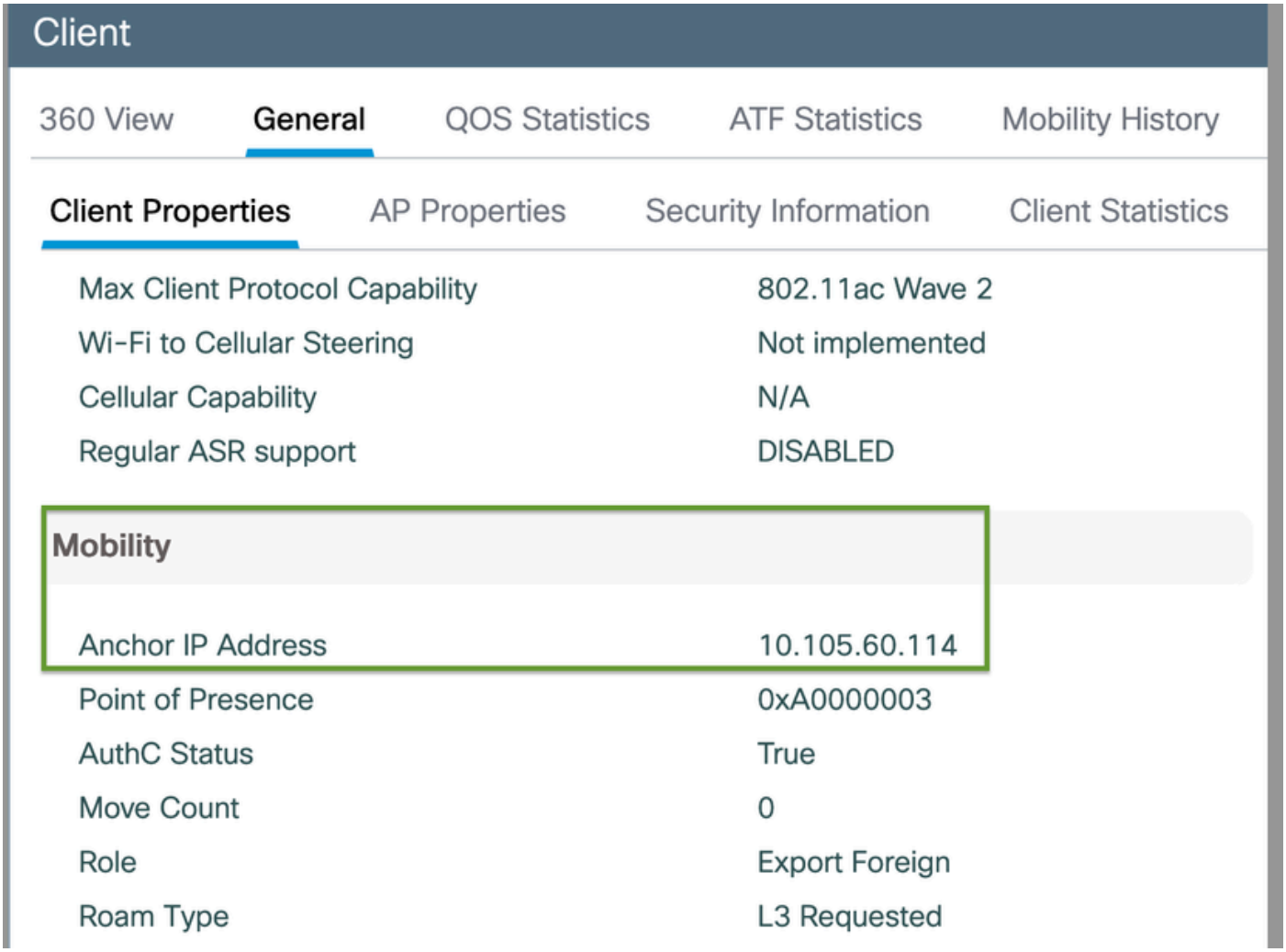
Client State on Both Foreign and Anchor Controller



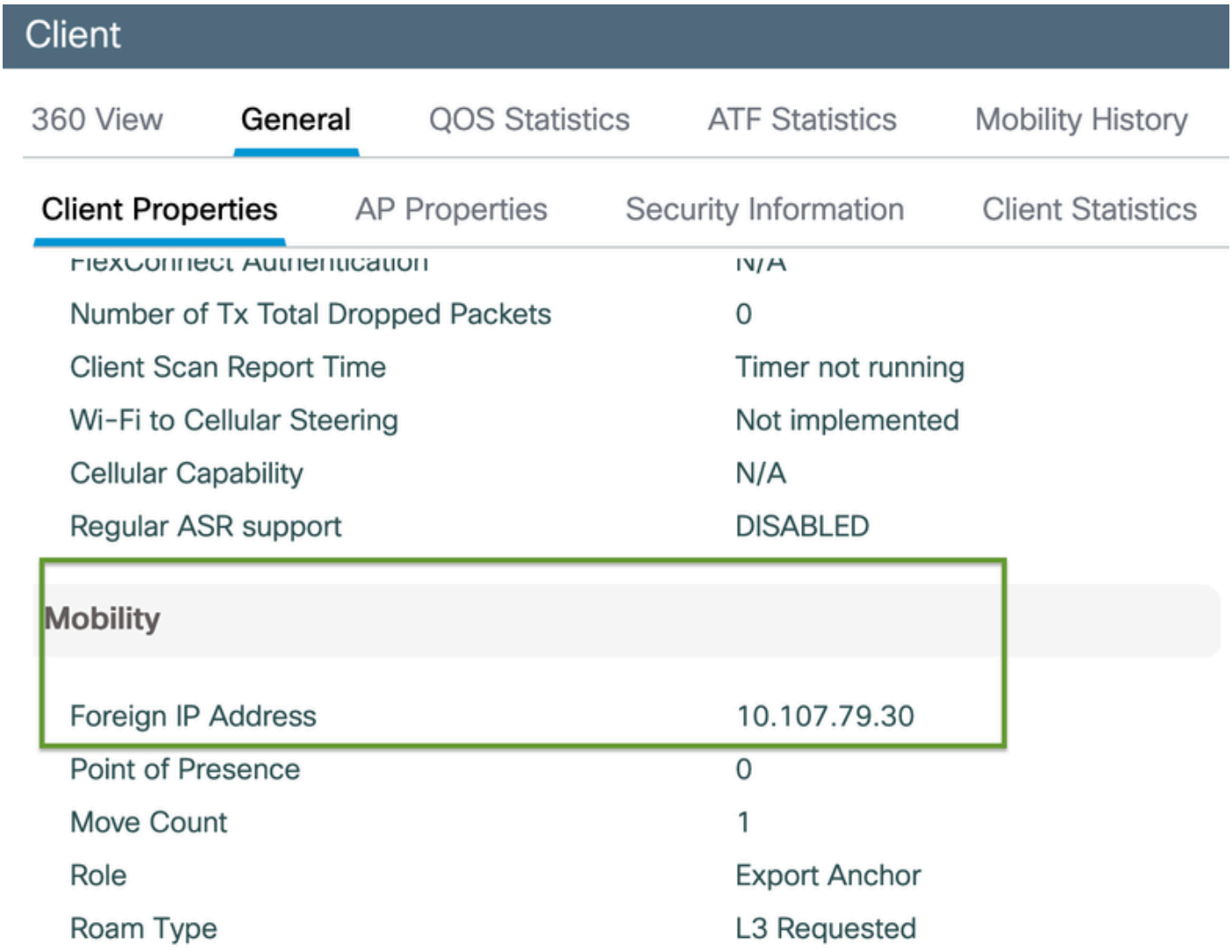
Client State on Foreign



Client State on Anchor



Client Properties on Foreign



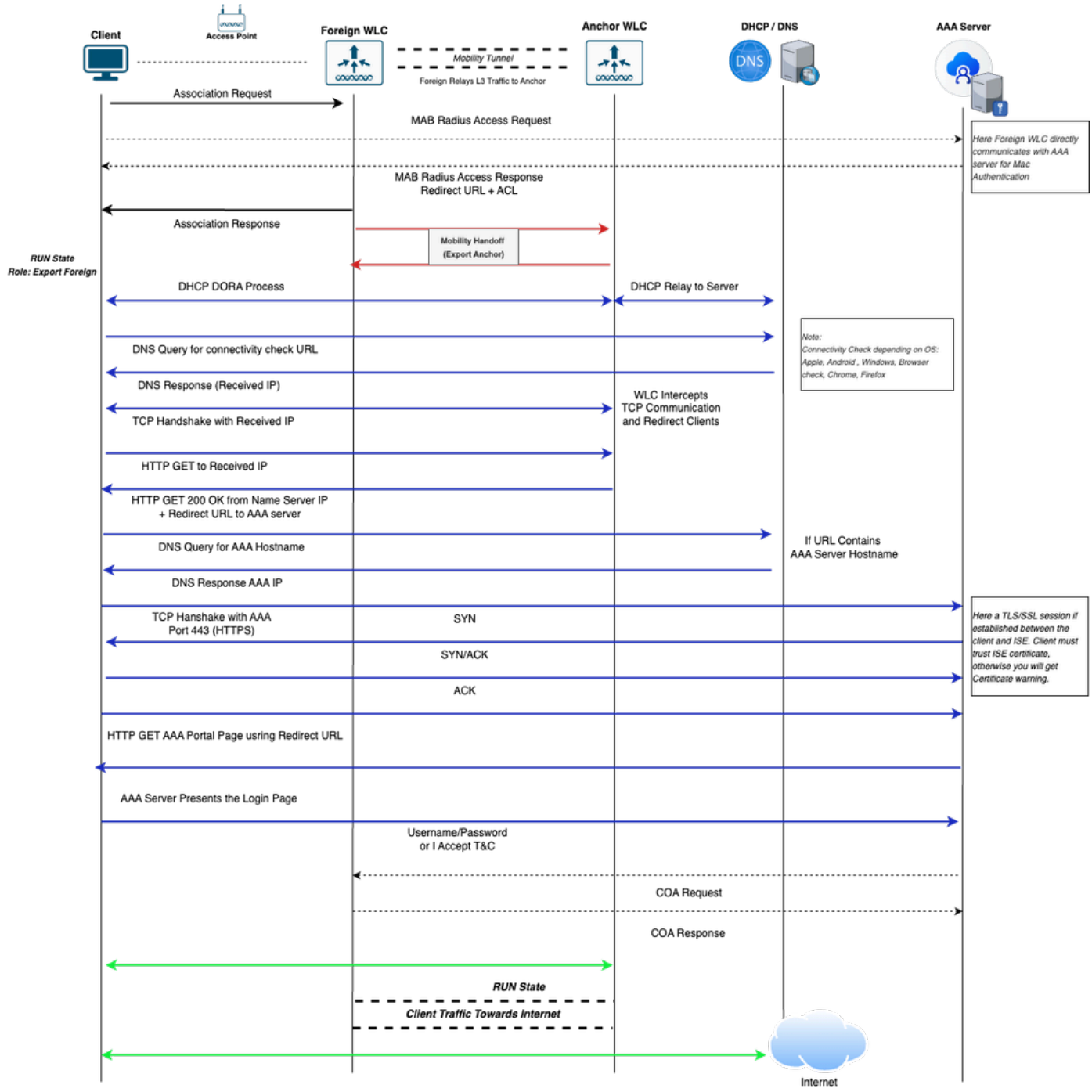
Client Properties on Anchor

Central Web Authentication

Flow for Central Webauth SSID in Foreign-Anchor Setup

1. The client sends an association request for the SSID broadcasted by the Foreign Wireless LAN Controller (WLC).
2. The Foreign WLC performs MAC Filtering by sending an Access-Request to the RADIUS server. The RADIUS server responds with an Access-Accept, which includes the necessary Redirect URL and Access Control List (ACL).
3. The Foreign WLC sends the association response to the client.
4. The client is Anchored to the Anchor WLC. The client enters the RUN state on the Foreign WLC, with the mobility role set to Export Foreign.
5. The client obtains an IP address. At this stage, the Anchor WLC handles the redirection traffic, directing the client to the authentication portal.
6. Once redirected, the client communicates directly with the RADIUS server. This traffic is tunneled through the Anchor WLC toward the RADIUS server.
7. The client enters authentication credentials to the RADIUS server. Upon successful authentication, the RADIUS server sends a Change of Authorization (CoA) request to the Foreign WLC.

8. The Foreign WLC sends a CoA response to the RADIUS server. The client transitions to the RUN state on the Anchor WLC, with the role set to Export Anchor.
9. All subsequent client traffic is tunneled from the Foreign WLC to the Anchor WLC, where it exits the network.



Client Connectivity Flow Diagram for Central Webauth SSID in Foreign-Anchor Setup

Analyzing Central Webauth SSID Flow in Foreign-Anchor Setup through Logs

This section explanis the flow of client connectivity for Central Web Authentication SSID by using Radioactive Trace (RA Trace), Embedded Packet Captures (EPC), and client status on both the Foreign and Anchor controllers.

Logs from Foreign Controller

Radioactive Traces

```
!! Client Association Phase !!
{wncd_x_R0-0}{1}: [client-orch-sm] [17047]: (note): MAC: Client_MAC Association received. BSSID BSSID_MA
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_INI

!! MAC Authentication !!
{wncd_x_R0-0}{1}: [dot11] [17047]: (info): MAC: Client_MAC DOT11 state transition: S_DOT11_INIT -> S_DOT
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_ASS
{wncd_x_R0-0}{1}: [client-auth] [17047]: (note): MAC: Client_MAC MAB Authentication initiated. Policy VI
{wncd_x_R0-0}{1}: [auth-mgr-feat_wireless] [17047]: (info): [Client_MAC:capwap_90000003] - authc_list: I
{wncd_x_R0-0}{1}: [auth-mgr-feat_wireless] [17047]: (info): [Client_MAC:capwap_90000003] - authz_list: I
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [mab] [17047]: (info): [Client_MAC:capwap_90000003] Received event 'MAB_CONTINUE' on
{wncd_x_R0-0}{1}: [caaa-author] [17047]: (info): [CAAA:AUTHOR:a30003a6] NULL ATTR LIST

{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Send Access-Request to 10.106.32.130:1812 id 0/245,
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: authenticator
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: User-Name [1] 14 user-MAC
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: User-Password [2] 18 *
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Service-Type [6] 6 Call Check [10]
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 31
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 25 service-type=Call Check
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Framed-MTU [12] 6 1485
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Message-Authenticator[80] 18 ...
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: EAP-Key-Name [102] 2 *
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 49
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 43 audit-session-id=1E4F6B0A000003E
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 18
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 12 method=mab
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 32
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 26 client-iif-id=3556776730
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: NAS-IP-Address [4] 6 10.107.79.30
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: NAS-Port-Type [61] 6 802.11 wireless [19]
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: NAS-Port [5] 6 141522
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 31
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 25 cisco-wlan-ssid=DMZ_CWA
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 33
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 27 wlan-profile-name=DMZ_CWA
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Called-Station-Id [30] 27 called-station-id
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Calling-Station-Id [31] 19 client-MAC
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Airespace [26] 12
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Airespace-WLAN-ID [1] 6 12
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Nas-Identifier [32] 16 ForeignSiteWLC
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Started 5 sec timeout
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Received from id 1812/245 10.106.32.130:0, Access-A
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: authenticator
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: User-Name [1] 19 Client_MAC
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Class [25] 56 ...
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Message-Authenticator[80] 18 ...
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 37
```

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{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 31 url-redirect-acl=REDIRECT_ACL
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 191
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 185 url-redirect=https://10.106.32
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Vendor, Cisco [26] 42
{wncd_x_R0-0}{1}: [radius] [17047]: (info): RADIUS: Cisco AVpair [1] 36 profile-name=Windows10-Workstat

{wncd_x_R0-0}{1}: [mab] [17047]: (info): [Client_MAC:capwap_90000003] MAB received an Access-Accept for
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-sm] [17047]: (debug): MAC: Client_MAC Processing MAB authentication resu
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_MA
{wncd_x_R0-0}{1}: [dot11] [17047]: (info): MAC: Client_MAC dot11 send association response. Sending ass
{wncd_x_R0-0}{1}: [dot11] [17047]: (info): MAC: Client_MAC DOT11 state transition: S_DOT11_MAB_PENDING
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_AS
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-sm] [17047]: (debug): MAC: Client_MAC L2 Authentication of station is su
{wncd_x_R0-0}{1}: [client-orch-sm] [17047]: (note): MAC: Client_MAC Mobility discovery triggered. Clien
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_L2

!! Mobility Handoff !!
□{mobilityd_R0-0}{1} [mm-dgram-io] [18401] (debug) MAC Client-MAC Sending message mobile_announce to gr
{mobilityd_R0-0}{1} [mm-pmtu] [18401] (debug) Peer IP Anchor-WLC-IP □{mobilityd_R0-0}{1} [mm-client] [1
{mobilityd_R0-0}{1} [mm-transition] MMFSM transition S_MC_WAIT_ANNOUNCE_RSP -> S_MC_ANNOUNCE_TIMEDOUT_P
□{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Received mobile_announce_nak, sub type 2 o
□{wncd_x_R0-0}{1} [mm-transition] [17047] (info) MAC Client-MAC MMIF FSM transition S_MA_INIT_WAIT_ANNO
{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Sending export_Anchor_req of XID (XID) to (
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RE
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Request successfully proce
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Sending export_Anchor_req of XID (176282
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_rsp, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RS
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Response successfully proc
□{wncd_x_R0-0}{1} [epm-misc] [17047] (info) Anchor Vlan-id 31 processed□[mm-client] [17047] (info) MAC
[mm-client] Mobility Successful. Roam Type L3 Requested, Sub Roam Type MM_SUB_ROAM_TYPE_NONE, Client IF
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_MOBILITY_DISCOVERY_IN_PROGRESS -> S_C
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_DPATH_PLUMB_IN_PROGRESS -> S_CO_IP_LE
□{wncd_x_R0-0}{1} [client-orch-sm] [17047] (debug) MAC Client-MAC Received ip learn response. method IP
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_IP_LEARN_IN_PROGRESS -> S_CO_RUN >> !

!! Post Succesful Web authentication, Change of Authorization !!
{wncd_x_R0-0}{1}: [client-auth] [17047]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [caaa-ch] [17047]: (info): [CAAA:COMMAND HANDLER:a30003a6] Processing CoA request und
{wncd_x_R0-0}{1}: [caaa-ch] [17047]: (info): [CAAA:COMMAND HANDLER:a30003a6] Reauthenticate request (0x
{wncd_x_R0-0}{1}: [sadb-attr] [17047]: (info): Removing ipv6 addresses from the attr list -50323943,sm_
{wncd_x_R0-0}{1}: [mab] [17047]: (info): [Client_MAC:capwap_90000003] MAB re-authentication started for
{wncd_x_R0-0}{1}: [auth-mgr] [17047]: (info): [Client_MAC:capwap_90000003] Context changing state from
{wncd_x_R0-0}{1}: [auth-mgr] [17047]: (info): [Client_MAC:capwap_90000003] Method mab changing state fr
{wncd_x_R0-0}{1}: [aaa-coa] [17047]: (info): radius coa proxy relay coa resp(wncd)
{wncd_x_R0-0}{1}: [aaa-coa] [17047]: (info): CoA Response Details
{wncd_x_R0-0}{1}: [aaa-attr-inf] [17047]: (info): << ssg-command-code 0 32 >>
{wncd_x_R0-0}{1}: [aaa-attr-inf] [17047]: (info): << formatted-clid 0 Client_MAC>>
{wncd_x_R0-0}{1}: [aaa-attr-inf] [17047]: (info): << error-cause 0 1 [Success]>>
{wncd_x_R0-0}{1}: [aaa-coa] [17047]: (info): server:10.107.79.30 cfg_saddr:10.107.79.30 udpport:51304 s
{wncd_x_R0-0}{1}: [caaa-ch] [17047]: (info): [CAAA:COMMAND HANDLER] CoA response sent
{wncd_x_R0-0}{1}: [caaa-ch] [17047]: (info): [CAAA:COMMAND HANDLER:a30003a6] Identity preserved: MAC (C
{wncd_x_R0-0}{1}: [mab] [17047]: (info): [Client_MAC:capwap_90000003] Received event 'MAB_REAUTHENTICAT
{smd_R0-0}{1}: [aaa-coa] [18867]: (info): ++++++ Received CoA response Attribute List ++++++
{smd_R0-0}{1}: [radius] [18867]: (info): RADIUS(00000000): Send CoA Ack Response to 10.106.32.130:51304
{smd_R0-0}{1}: [radius] [18867]: (info): RADIUS: authenticator
{smd_R0-0}{1}: [radius] [18867]: (info): RADIUS: Vendor, Cisco [26] 9
{smd_R0-0}{1}: [radius] [18867]: (info): RADIUS: ssg-command-code [252] 3 ...
{smd_R0-0}{1}: [radius] [18867]: (info): RADIUS: Calling-Station-Id [31] 16 Client_MAC
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{smd_RO-0}{1}: [radius] [18867]: (info): RADIUS: Dynamic-Author-Error-Cause[101] 6 Success [200]
{smd_RO-0}{1}: [radius] [18867]: (info): RADIUS: Message-Authenticator[80] 18 ...
{smd_RO-0}{1}: [aaa-pod] [18867]: (info): CoA response source port = 0, udpport = 51304,
{wncd_x_RO-0}{1}: [sadb-attr] [17047]: (info): Removing ipv6 addresses from the attr list 1627397682,sm
```

Packet capture

The client sends an association request and performs MAC authentication, this traffic is handled by the Foreign Controller.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:11…	10.107.79.129	10.107.79.30	250	802.11		Association Request, SN=695, FN=0, Flags=........, SSID="DMZ_CWA"
Jan 8, 2025 13:09:11…	10.107.79.129	10.107.79.30	246	802.11		Association Request, SN=695, FN=0, Flags=........, SSID="DMZ_CWA"
Jan 8, 2025 13:09:11…	10.107.79.30	10.106.32.130	412	RADIUS		Access-Request id=245
Jan 8, 2025 13:09:11…	10.107.79.30	10.106.32.130	416	RADIUS		Access-Request id=245, Duplicate Request
Jan 8, 2025 13:09:11…	10.106.32.130	10.107.79.30	429	RADIUS		Access-Accept id=245
Jan 8, 2025 13:09:11…	10.106.32.130	10.107.79.30	425	RADIUS		Access-Accept id=245, Duplicate Response
Jan 8, 2025 13:09:11…	10.107.79.30	10.107.79.129	211	802.11		Association Response, SN=0, FN=0, Flags=........
Jan 8, 2025 13:09:11…	10.107.79.30	10.107.79.129	215	802.11		Association Response, SN=0, FN=0, Flags=........

Client Association Phase on Foreign Controller with Wireless MAB

A mobility handoff triggers between the Foreign and Anchor Controllers via port UDP 16667. Upon a successful mobility event, the client state transitions to RUN with an Export Foreign role.

The Foreign Controller receives client DHCP traffic via the CAPWAP tunnel and forwards it to the Anchor Controller for further processing.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:12…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	424	DHCP	0	DHCP Discover - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:12…	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
Jan 8, 2025 13:09:14…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 8, 2025 13:09:14…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP Offer - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:14…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	452	DHCP	0	DHCP Request - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:14…	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
Jan 8, 2025 13:09:14…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 8, 2025 13:09:14…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP ACK - Transaction ID 0x9f36b979

Client DHCP Traffic Received on Foreign Controller is Forwarded to Anchor Controller using Mobility Tunnel

Similarly, the client sends network connectivity status and web page access check traffic to the Foreign WLC via the CAPWAP tunnel; the Foreign WLC forwards this to the Anchor WLC using the mobility tunnel, where the Anchor Controller intercepts or processes the traffic.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30, DNS IP	165	DNS	0	Standard query 0xd4c8 A Connectivity Check URL
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	100	UDP		16667 → 16667 Len=54
Jan 8, 2025 13:09:16…	10.105.60.114	10.107.79.30	291	UDP		16667 → 16667 Len=245
Jan 8, 2025 13:09:16…	10.107.79.30, DNS IP	10.107.79.129,10.105.…	307	DNS	0	Standard query response 0xd4c8 A Connectivity Check URL
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30 Resolved IP	148	TCP	0	59484 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:16…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:16…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	140	TCP	0	80 → 59484 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30, Resolved IP	136	TCP	0	59484 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30,	247	HTTP	0	GET /connecttest.txt HTTP/1.1
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	223	UDP		16667 → 16667 Len=177
Jan 8, 2025 13:09:16…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:16…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	128	TCP	0	80 → 59484 [ACK] Seq=1 Ack=112 Win=64256 Len=0
Jan 8, 2025 13:09:16…	10.105.60.114	10.107.79.30	117	UDP		16667 → 16667 Len=71
Jan 8, 2025 13:09:16…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:16…	10.107.79.30, Resolved IP	10.107.79.129,10.105.…	1045	HTTP	0	HTTP/1.1 200 OK (text/html)
Jan 8, 2025 13:09:16…	10.107.79.30,	10.107.79.129,10.105.…	128	TCP	0	80 → 59484 [FIN, ACK] Seq=918 Ack=112 Win=64256 Len=0
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30, Resolved IP	136	TCP	0	59484 → 80 [ACK] Seq=112 Ack=919 Win=130304 Len=0
Jan 8, 2025 13:09:16…	10.107.79.129,10.105.60.249	10.107.79.30,	136	TCP	0	59484 → 80 [FIN, ACK] Seq=112 Ack=919 Win=130304 Len=0
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:16…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66

Network Connectivity Status Check on Foreign Controller

```
> Frame 2176: 761 bytes on wire (6088 bits), 761 bytes captured (6088 bits)
> Ethernet II, Src: Cisco_63:8b:8b [redacted], Dst: Cisco_[redacted]
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1415
> Internet Protocol Version 4, Src: 10.107.79.30, Dst: 10.107.79.129
> User Datagram Protocol, Src Port: 5247, Dst Port: 5264
> Control And Provisioning of Wireless Access Points - Data
> IEEE 802.11 QoS Data, Flags: ......F.
> Logical-Link Control
> Internet Protocol Version 4, Src: [redacted]: 10.105.60.226
> Transmission Control Protocol, Src Port: 80, Dst Port: 52887, Seq: 1, Ack: 112, Len: 633
v Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    Location: https://192.0.2.1/login.html?redirect=[redacted]
    Content-Type: text/html\r\n
  > Content-Length: 472\r\n
    \r\n
    [Request in frame: 2169]
    [Time since request: 0.001007000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: [redacted]
    File Data: 472 bytes
> Line-based text data: text/html (9 lines)
```

Redirect URL Sent to Client

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	66	TCP		59500 → 8443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 8, 2025 13:09:22…	10.106.32.130	10.105.60.249	70	TCP		8443 → 59500 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1254 SACK_PERM WS=128
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	54	TCP		59501 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	1342	UDP		16667 → 16667 Len=1296
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	1304	TCP		59500 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 1162]
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	563	UDP		16667 → 16667 Len=517
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	505	TLSv1…		Client Hello
Jan 8, 2025 13:09:22…	10.106.32.130	10.105.60.249	1308	TCP		8443 → 59501 [ACK] Seq=1 Ack=1766 Win=33280 Len=1250 [TCP PDU reassembled in 1181]
Jan 8, 2025 13:09:22…	10.106.32.130	10.105.60.249	863	TLSv1…		Server Hello, Certificate, Server Key Exchange, Server Hello Done
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	962	UDP		16667 → 16667 Len=920
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	446	UDP		16667 → 16667 Len=404
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	54	TCP		59500 → 8443 [ACK] Seq=1702 Ack=2056 Win=131072 Len=0
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	119	UDP		16667 → 16667 Len=73
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	61	TLSv1…		Alert (Level: Fatal, Description: Certificate Unknown)
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	54	TCP		59501 → 8443 [ACK] Seq=1766 Ack=2056 Win=131072 Len=0
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	180	TLSv1…		Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
Jan 8, 2025 13:09:22…	10.106.32.130	10.105.60.249	64	TLSv1…		Change Cipher Spec
Jan 8, 2025 13:09:22…	10.106.32.130	10.105.60.249	103	TLSv1…		Encrypted Handshake Message
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	114	UDP		16667 → 16667 Len=72
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	153	UDP		16667 → 16667 Len=111
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	54	TCP		59503 → 8443 [ACK] Seq=1860 Ack=2107 Win=131072 Len=0
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	1095	TLSv1…		Application Data
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	1153	UDP		16667 → 16667 Len=1107
Jan 8, 2025 13:09:22…	10.105.60.114	10.107.79.30	936	UDP		16667 → 16667 Len=894
Jan 8, 2025 13:09:22…	10.107.79.30	10.105.60.114	1133	UDP		16667 → 16667 Len=1087
Jan 8, 2025 13:09:22…	10.105.60.249	10.106.32.130	1075	TLSv1…		Application Data

Client Access to Central Webauth Page to Provide Authentication Details

The Foreign Controller processes the CoA request After successful Central Web Authentication.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:33.…	10.106.32.130	10.107.79.30	248	RADIUS		CoA-Request id=2
Jan 8, 2025 13:09:33.…	10.106.32.130	10.107.79.30	244	RADIUS		CoA-Request id=2, Duplicate Request
Jan 8, 2025 13:09:33.…	10.107.79.30	10.106.32.130	111	RADIUS		CoA-ACK id=2
Jan 8, 2025 13:09:33.…	10.107.79.30	10.106.32.130	115	RADIUS		CoA-ACK id=2, Duplicate Response

Change of Authorization (COA) with Foreign Controller

Logs from Anchor Controller

Radioactive Traces

```
!! Mobility Handoff !!
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of X
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of X
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Number of client is BELOW wlan limit
{mobilityd_R0-0}{1} [mm-transition] [26021] (info) MAC Client-MAC MMFSM transition S_MC_INIT -> S_MC_An
□{wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Roam type changed - None -> L3 Requested

!! Session Created for Client !!
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_ASS
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-sm] [24229]: (debug): MAC: Client_MAC L2 Authentication of station is su
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_CRI
{wncd_x_R0-0}{1}: [mm-transition] [24229]: (info): MAC: Client_MACMMIF FSM transition: S_MA_INIT -> S_MA
{wncd_x_R0-0}{1}: [mm-client] [24229]: (info): MAC: Client_MACRoam type changed - None -> L3 Requested
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Export Anchor Response successfully proc
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Forwarding Anchor Response to Foreign.
{mobilityd_R0-0}{1} [mm-client] [26021] (info) MAC Client-MAC Forwarding export_Anchor_rsp, sub type 0
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.
{□wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Mobility role changed - Unassoc -> Export A
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.>> Client is successfu

!! Central Web Authentication Applied !!

{wncd_x_R0-0}{1}: [webauth-dev] [24229]: (info): Central Webauth URL Redirect, Received a request to cr
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 0.0.0.0]Param-map used: global
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 0.0.0.0]State Invalid State -> INIT
{wncd_x_R0-0}{1}: [epm-redirect] [24229]: (info): [0000.0000.0000:unknown] URL-Redirect = https://10.10
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: method 0 2 [mab]
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: clid-MAC-addr 0 Client_MAC
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: intf-id 0 2415919107 (0x9000000
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: username 0 D0-37-45-88-25-52
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: class 0 43 41 43 53 3a 31 45 34
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: url-redirect-acl 0 REDIRECT_ACL
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applied User Profile: url-redirect 0 https://10.106.3

!! Client DHCP Traffic !!
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_MOBILIT
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_DPATH_P
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [client-iplearn] [24229] (note) MAC Client-MAC Client IP learn successful. Method DHCP
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Sending ipv4_address_update of XID (XID)
{wncd_x_R0-0}{1} [client-iplearn] [24229] (info) MAC Client-MAC IP-learn state transition S_IPLEARN_IN_
Complete
{wncd_x_R0-0}{1}: [client-orch-sm] [24229]: (debug): MAC: Client_MAC Received ip learn response. method


!! Central Web Authentication !!

{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): [Client_MAC][ 10.105.60.249]59494/233 IO state NEW -> R
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): [Client_MAC][ 10.105.60.249]59495/235 IO state NEW -> R
```

```
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): [Client_MAC][ 10.105.60.249]59494/233 Read event, Messa
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): Captive bypass: No parameter map associated. Falling
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 10.105.60.249]Param-map used: global
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 10.105.60.249]State GET_REDIRECT -> GE
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): [Client_MAC][ 10.105.60.249]59494/233 IO state READING
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): [Client_MAC][ 10.105.60.249]59494/233 IO state WRITING
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): [Client_MAC][ 10.105.60.249]59494/233 Remove IO ctx
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC Sending export_anchor_rsp of XID (18
{wncd_x_R0-0}{1}: [client-auth] [24229]: (note): MAC: Client_MAC L3 Authentication Successful. ACL:[]
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_L3
```

Packet capture

After the mobility handoff, the Anchor Controller receives DHCP traffic from the Foreign Controller via the mobility tunnel.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:42…	10.107.79.30	10.105.60.114	396	UDP		16667 → 16667 Len=354
Jan 8, 2025 13:09:42…	0.0.0.0	255.255.255.255	286	DHCP		DHCP Discover - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:44…	10.105.60.69	10.105.60.249	286	DHCP		DHCP Offer - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	424	UDP		16667 → 16667 Len=382
Jan 8, 2025 13:09:44…	0.0.0.0	255.255.255.255	286	DHCP		DHCP Request - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:44…	10.105.60.69	10.105.60.249	286	DHCP		DHCP ACK - Transaction ID 0x9f36b979
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354

Client DHCP traffic on Anchor Controller Recieved from Foreign Controller

The Anchor Controller receives connectivity checks, webpage access requests, and authentication details to process further.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	114	UDP		16667 → 16667 Len=72
Jan 8, 2025 13:09:44…	10.105.60.249	DNS IP	83	DNS		Standard query 0xd4c8 Connectivity Check URL
Jan 8, 2025 13:09:44…	DNS IP	10.105.60.249	237	DNS		Standard query response 0xd4c8 A Connectivity Check URL rafficma
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	287	UDP		16667 → 16667 Len=245
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:44…	10.105.60.249	Resolved IP	70	TCP		59484 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 8, 2025 13:09:44…	Resolved IP	10.105.60.249	66	TCP		80 → 59484 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	223	UDP		16667 → 16667 Len=177
Jan 8, 2025 13:09:44…	10.105.60.249	Resolved IP	58	TCP		59484 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 8, 2025 13:09:44…	10.105.60.249		169	HTTP		GET /connecttest.txt HTTP/1.1
Jan 8, 2025 13:09:44…	Resolved IP	10.105.60.249	54	TCP		80 → 59484 [ACK] Seq=1 Ack=112 Win=64256 Len=0
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:44…	Resolved IP	10.105.60.249	971	HTTP		HTTP/1.1 200 OK (text/html)
Jan 8, 2025 13:09:44…		10.105.60.249	54	TCP		80 → 59484 [FIN, ACK] Seq=918 Ack=112 Win=64256 Len=0
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:44…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:44…	10.105.60.249	Resolved IP	58	TCP		59484 → 80 [ACK] Seq=112 Ack=919 Win=130304 Len=0
Jan 8, 2025 13:09:44…	10.105.60.249		58	TCP		59484 → 80 [FIN, ACK] Seq=112 Ack=919 Win=130304 Len=0
Jan 8, 2025 13:09:44…	Resolved IP	10.105.60.249	54	TCP		80 → 59484 [ACK] Seq=919 Ack=113 Win=64256 Len=0
Jan 8, 2025 13:09:44…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66

Network Connectivity Status Check on Anchor Controller

```
> Frame 864: 971 bytes on wire (7768 bits), 971 bytes captured (7768 bits)
> Ethernet II, Src: [redacted], Dst: [redacted]
> Internet Protocol Version 4, Src: [redacted] Dst: 10.105.60.249
> Transmission Control Protocol, Src Port: 80, Dst Port: 59484, Seq: 1, Ack: 112, Len: 917
v Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    […]Location: https://10.106.32.130:8443/portal/gateway?sessionId=1E4F6B0A000003D247203276&portal=d06bc2
    Content-Type: text/html\r\n
  > Content-Length: 614\r\n
    \r\n
    [Request in frame: 861]
    [Time since request: 0.001007000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: [redacted]
    File Data: 614 bytes
> Line-based text data: text/html (9 lines)
```

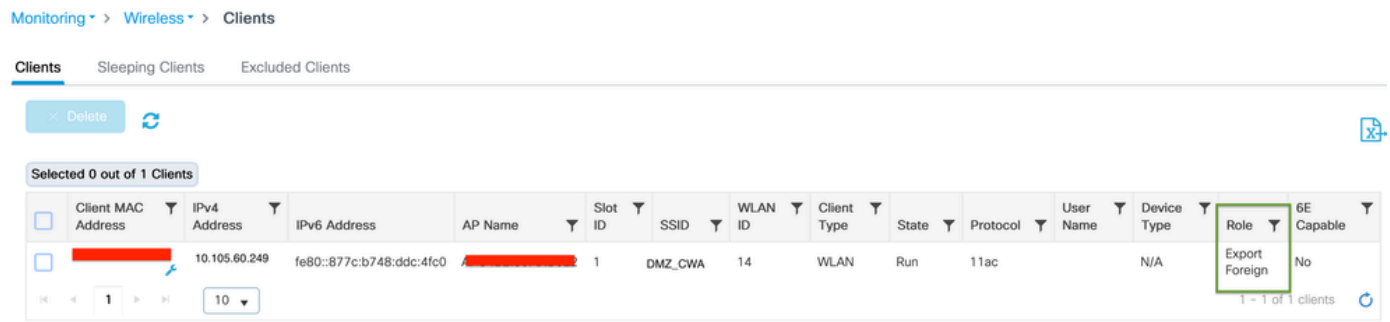
Redirect URL Sent to Client

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	148	TCP	0	59501 → 8443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	140	TCP	1	8443 → 59501 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1254 SACK_PERM WS=128
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	136	TCP	0	59501 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	1386	TCP	0	59501 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 1420]
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	651	TLSv1…	0	Client Hello
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	627	UDP		16667 → 16667 Len=581
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	1342	UDP		16667 → 16667 Len=1296
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	450	UDP		16667 → 16667 Len=404
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	917	UDP		16667 → 16667 Len=871
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	1378	TCP	0	8443 → 59500 [ACK] Seq=1 Ack=1702 Win=34688 Len=1250 [TCP PDU reassembled in 1432]
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	933	TLSv1…	0	Server Hello, Certificate, Server Key Exchange, Server Hello Done
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	917	UDP		16667 → 16667 Len=871
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	1378	TCP	0	8443 → 59501 [ACK] Seq=1 Ack=1766 Win=33280 Len=1250 [TCP PDU reassembled in 1437]
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	143	TLSv1…	0	Alert (Level: Fatal, Description: Certificate Unknown)
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	136	TCP	0	59501 → 8443 [ACK] Seq=1766 Ack=2056 Win=131072 Len=0
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	119	UDP		16667 → 16667 Len=73
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	262	TLSv1…	0	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	118	UDP		16667 → 16667 Len=72
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	157	UDP		16667 → 16667 Len=111
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	134	TLSv1…	0	Change Cipher Spec
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	173	TLSv1…	0	Encrypted Handshake Message
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	1177	TLSv1…	0	Application Data
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	1153	UDP		16667 → 16667 Len=1107
Jan 8, 2025 13:09:21…	10.105.60.114	10.107.79.30	940	UDP		16667 → 16667 Len=894
Jan 8, 2025 13:09:21…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.…	956	TLSv1…	0	Application Data
Jan 8, 2025 13:09:21…	10.107.79.129,10.105.60.249	10.107.79.30,10.106.3…	1157	TLSv1…	0	Application Data
Jan 8, 2025 13:09:21…	10.107.79.30	10.105.60.114	1133	UDP		16667 → 16667 Len=1087

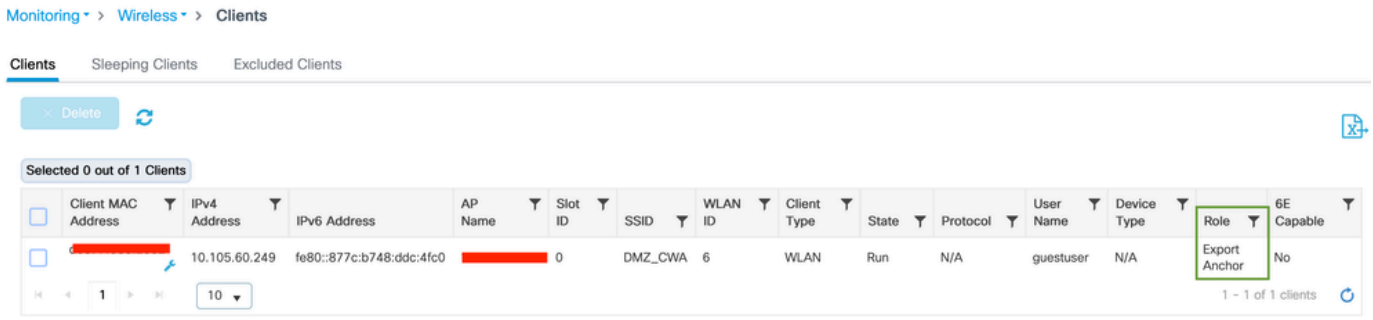
Client Access to Local Webauth page to Provide Authentication Details

When Central Web authentication succeeds, a Change of Authorization (CoA) triggers. After a successful CoA, the client transitions to RUN state with an Export Anchor role.

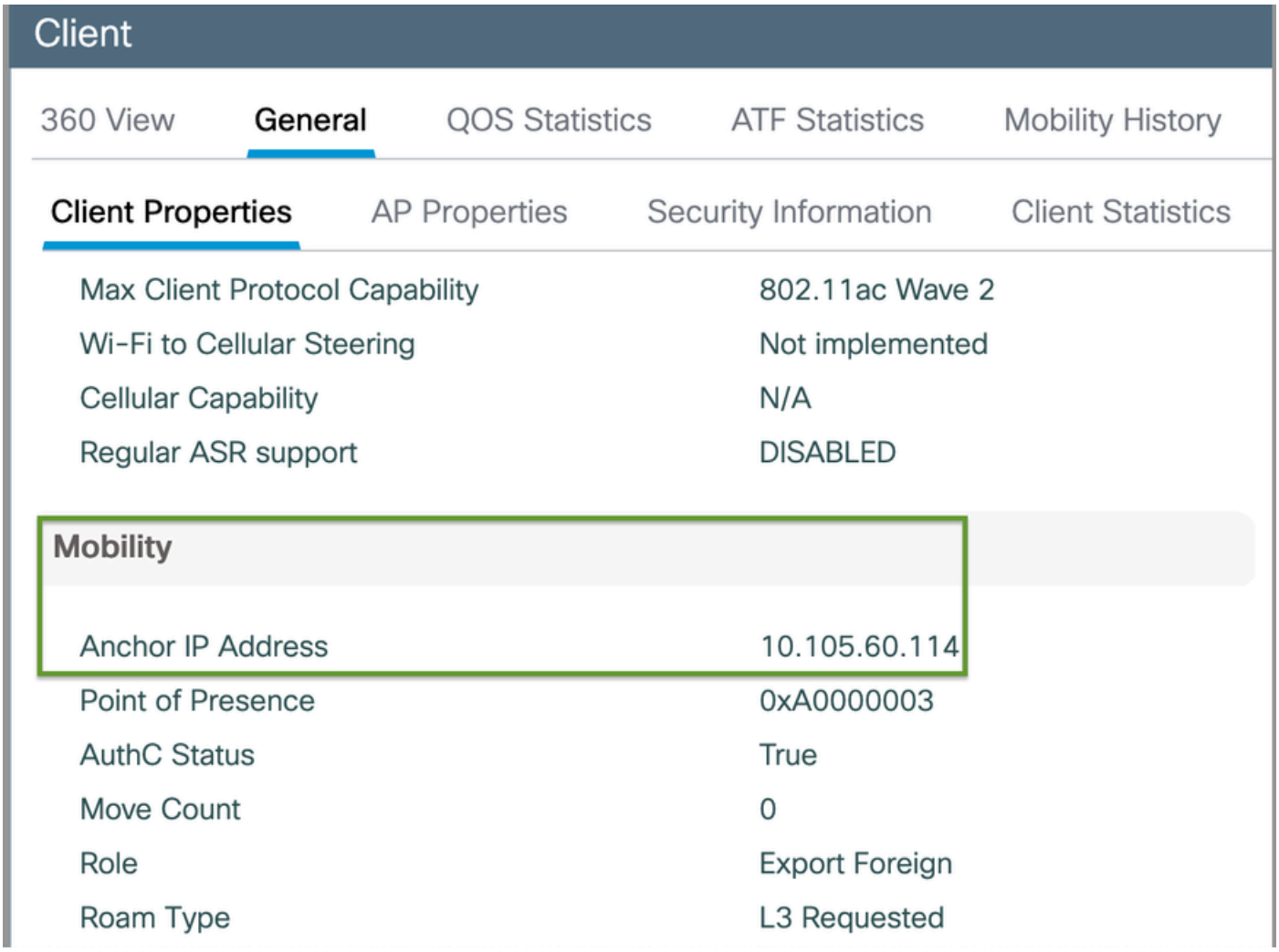
Client State on Both Foreign and Anchor Controller



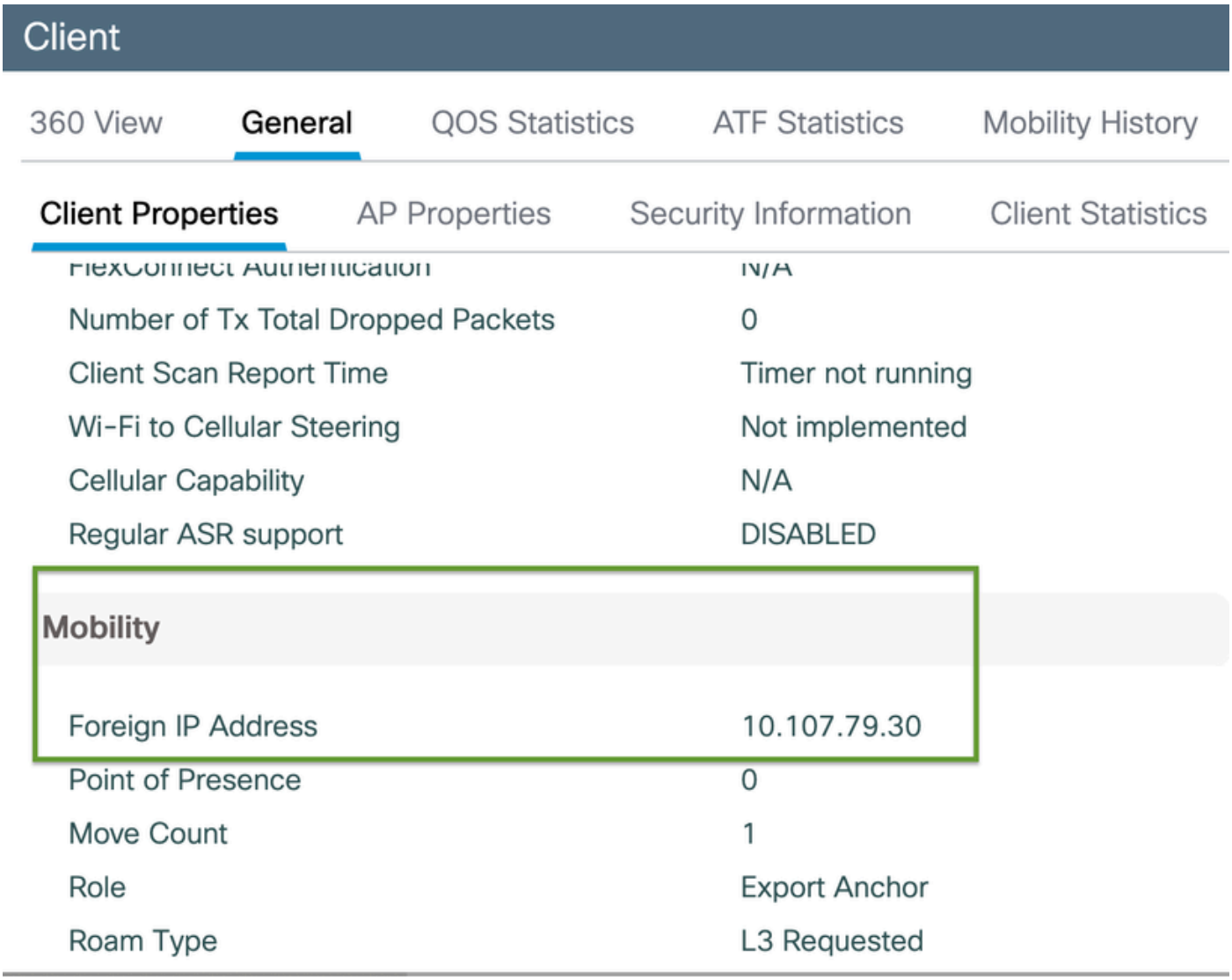
Client State on Foreign



Client State on Anchor



Client Properties on Foreign

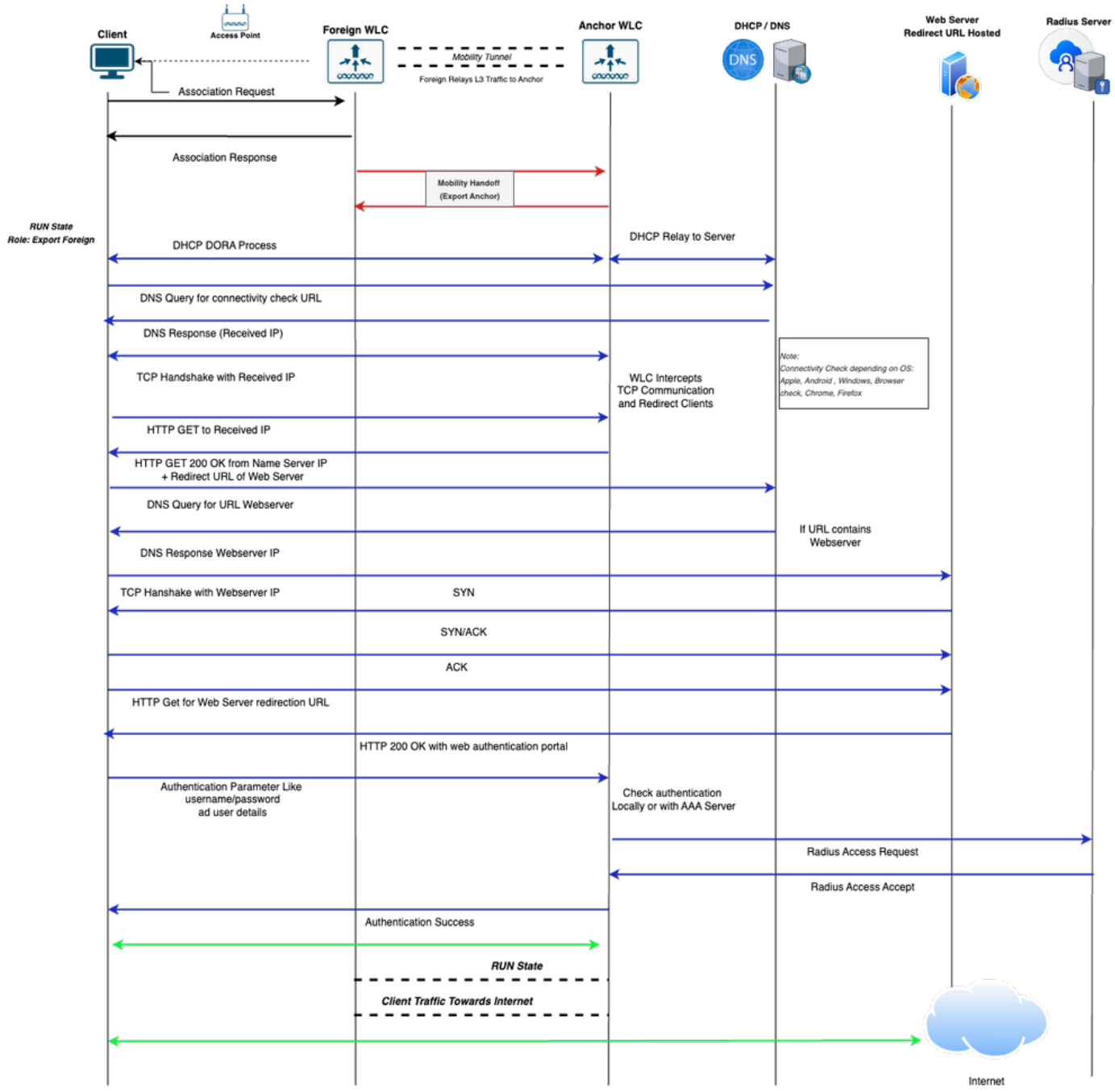


Client Properties on Anchor

External Webauthentication

Flow for External Webauth SSID in Foreign-Anchor Setup

1. The client initiates a connection to the SSID broadcasted by the Foreign WLC.
2. As no Layer 2 authentication is required, the client is Anchored to the Anchor WLC. The client transitions to the RUN state on the Foreign WLC, with the mobility role designated as Export Foreign.
3. The client acquires an IP address. The Anchor WLC intercepts the traffic and redirects the client to the external web server portal as defined in the web-authentication parameters.
4. The client submits authentication credentials via the portal. These credentials are validated either locally on the WLC or via an external authentication server, depending on the configured security policy.
5. Upon successful authentication, the client transitions to the RUN state on the Anchor WLC, assuming the Export Anchor role.
6. After successful authentication, all subsequent client traffic is tunneled from the Foreign WLC to the Anchor WLC, where it egresses the network.



Client Connectivity Flow Diagram for External Webauth SSID in Foreign-Anchor Setup

Analyzing External Webauth SSID Flow in Foreign-Anchor Setup through Logs

This section explanis the flow of client connectivity for External Web Authentication SSID by using Radioactive Trace (RA Trace), Embedded Packet Captures (EPC), and client status on both the Foreign and Anchor controllers.

Logs from Foreign Controller

Radioactive Traces

```
!! Client Association Phase !!
{wncd_x_R0-1}{1}: [client-orch-sm] [17162]: (note): MAC: Client_MAC Association received. BSSID BSSID_MA
{wncd_x_R0-1}{1}: [client-orch-state] [17162]: (note): MAC: Client_MAC Client state transition: S_CO_INI
{wncd_x_R0-1}{1}: [dot11] [17162]: (info): MAC: Client_MAC dot11 send association response. Sending asso
{wncd_x_R0-1}{1}: [dot11] [17162]: (note): MAC: Client_MAC Association success. AID 1, Roaming = False,
{wncd_x_R0-1}{1}: [dot11] [17162]: (info): MAC: Client_MAC DOT11 state transition: S_DOT11_INIT -> S_DOT

!! Layer 2 Authentication None !!
{wncd_x_R0-1}{1}: [client-orch-state] [17162]: (note): MAC: Client_MAC Client state transition: S_CO_ASS
{wncd_x_R0-1}{1}: [client-auth] [17162]: (note): MAC: Client_MAC L2 Authentication initiated. method WEB
{wncd_x_R0-1}{1}: [client-auth] [17162]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-1}{1}: [client-auth] [17162]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-1}{1}: [client-auth] [17162]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-1}{1}: [client-orch-sm] [17162]: (debug): MAC: Client_MAC L2 Authentication of station is su
{wncd_x_R0-1}{1}: [client-orch-sm] [17162]: (note): MAC: Client_MAC Mobility discovery triggered. Client
{wncd_x_R0-1}{1}: [client-orch-state] [17162]: (note): MAC: Client_MAC Client state transition: S_CO_L2_
{wncd_x_R0-1}{1}: [client-orch-state] [17162]: (note): MAC: Client_MAC Client state transition: S_CO_MOB

!! Mobility Handoff !!
{mobilityd_R0-0}{1} [mm-dgram-io] [18401] (debug) MAC Client-MAC Sending message mobile_announce to grou
{mobilityd_R0-0}{1} [mm-pmtu] [18401] (debug) Peer IP Anchor-WLC-IP □{mobilityd_R0-0}{1} [mm-client] [1
{mobilityd_R0-0}{1} [mm-transition] MMFSM transition S_MC_WAIT_ANNOUNCE_RSP -> S_MC_ANNOUNCE_TIMEDOUT_PE
□{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Received mobile_announce_nak, sub type 2 o
□{wncd_x_R0-0}{1} [mm-transition] [17047] (info) MAC Client-MAC MMIF FSM transition S_MA_INIT_WAIT_ANNO
{wncd_x_R0-0}{1} [mm-client] [17047] (debug) MAC Client-MAC Sending export_Anchor_req of XID (XID) to (
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_REQ
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Request successfully proce
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Sending export_Anchor_req of XID (176282)
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Received export_Anchor_rsp, sub type 0 o
{mobilityd_R0-0}{1} [mm-transition] [18401] (info) MAC Client-MAC MMFSM transition S_MC_WAIT_EXP_ANC_RSP
{mobilityd_R0-0}{1} [mm-client] [18401] (debug) MAC Client-MAC Export Anchor Response successfully proc
□{wncd_x_R0-0}{1} [epm-misc] [17047] (info) Anchor Vlan-id 31 processed□[mm-client] [17047] (info) MAC
[mm-client] Mobility Successful. Roam Type L3 Requested, Sub Roam Type MM_SUB_ROAM_TYPE_NONE, Client IP
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_MOBILITY_DISCOVERY_IN_PROGRESS -> S_CO
{wncd_x_R0-0}{1} [client-orch-state] Client state transition S_CO_DPATH_PLUMB_IN_PROGRESS -> S_CO_IP_LEA
{wncd_x_R0-0}{1}: [client-orch-state] [17047]: (note): MAC: Client_MAC Client state transition: S_CO_IP_

!! Client AAAA Traffic !!
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Received aaa_handoff, sub type: 0 of
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa_handoff base check is VALID
{mobilityd_R0-0}{1}: [mm-transition] [18401]: (info): MAC: Client_MAC MMFSM transition: S_MC_RUN -> S_MC
{mobilityd_R0-0}{1}: [mm-client] [18401]: (info): MAC: Client_MAC Forwarding aaa_handoff, sub type: 0 of
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Sending aaa_handoff of XID (38840) to
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC AAA Handoff successfully forwarded.
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Received aaa_handoff, sub type: 0 of XID
{wncd_x_R0-0}{1}: [mm-transition] [17047]: (info): MAC: Client_MAC MMIF FSM transition: S_MA_FOREIGN ->
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Mobile AAA Handoff update received.
{wncd_x_R0-0}{1}: [sanet-shim-miscellaneous] [17047]: (info): MAC: Client_MAC Received username=Test321
{wncd_x_R0-0}{1}: [sanet-shim-miscellaneous] [17047]: (info): MAC: Client_MAC IPv6 Client payload is re
{wncd_x_R0-0}{1}: [mm-client] [17047]: (debug): MAC: Client_MAC Sending aaa_handoff_ack of XID (38840)
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC Received aaa_handoff_ack, sub type:
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC AAA Handoff Ack successfully handled
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa_handoff_ack base check is VALID
{mobilityd_R0-0}{1}: [mm-client] [18401]: (debug): MAC: Client_MAC aaa_handoff_ack is VALID
{mobilityd_R0-0}{1}: [mm-transition] [18401]: (info): MAC: Client_MAC MMFSM transition: S_MC_RUN -> S_MC
{mobilityd_R0-0}{1}: [mm-client] [18401]: (info): MAC: Client_MAC Forwarding aaa_handoff_ack, sub type:
```

Packet capture

The client sends an association request, which the Foreign Controller handles.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:18:59…	10.107.79.236	10.107.79.30	250	802.11		Association Request, SN=209, FN=0, Flags=........, SSID="DMZ_EWA"
Jan 14, 2025 16:18:59…	10.107.79.236	10.107.79.30	246	802.11		Association Request, SN=209, FN=0, Flags=........, SSID="DMZ_EWA"
Jan 14, 2025 16:18:59…	10.107.79.30	10.107.79.236	211	802.11		Association Response, SN=0, FN=0, Flags=........
Jan 14, 2025 16:18:59…	10.107.79.30	10.107.79.236	215	802.11		Association Response, SN=0, FN=0, Flags=........

Client Association Phase with Foreign Controller

A mobility handoff triggers between the Foreign and Anchor Controllers via port UDP 16667. Upon a successful mobility event, the client state transitions to RUN with an Export Foreign role.
The Foreign Controller receives client DHCP traffic via the CAPWAP tunnel and forwards it to the Anchor Controller for further processing.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:19:01…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	424	DHCP	0	DHCP Discover - Transaction ID 0x9f36b979
Jan 14, 2025 16:19:01…	10.107.79.30	10.105.60.114	400	UDP		16667 → 16667 Len=354
Jan 14, 2025 16:19:03…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 14, 2025 16:19:03…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP Offer - Transaction ID 0x9f36b979
Jan 14, 2025 16:19:03…	10.107.79.129,0.0.0.0	10.107.79.30,255.255.…	452	DHCP	0	DHCP Request - Transaction ID 0x9f36b979
Jan 14, 2025 16:19:03…	10.107.79.30	10.105.60.114	428	UDP		16667 → 16667 Len=382
Jan 14, 2025 16:19:03…	10.105.60.114	10.107.79.30	400	UDP		16667 → 16667 Len=354
Jan 14, 2025 16:19:03…	10.107.79.30,10.105.60.69	10.107.79.129,10.105.…	416	DHCP	0	DHCP ACK - Transaction ID 0x9f36b979

Client DHCP Traffic Received on Foreign Controller is Forwarded to Anchor Controller using Mobility Tunnel

Similarly, the client sends network connectivity status and web page access check traffic to the Foreign WLC via the CAPWAP tunnel; the Foreign WLC forwards this to the Anchor WLC using the mobility tunnel, where the Anchor Controller intercepts or processes the traffic.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30, DNS IP	165	DNS	0	Standard query 0x389b Connectivity Check URL
Jan 14, 2025 16:19:05…	10.107.79.30	10.105.60.114	149	UDP		16667 → 16667 Len=103
Jan 14, 2025 16:19:05…	10.105.60.114	10.107.79.30	291	UDP		16667 → 16667 Len=245
Jan 14, 2025 16:19:05…	10.107.79.30, DNS IP	10.107.79.129,10.105.60.254	307	DNS	0	Standard query response 0x389b A Connectivity Check URL
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30, Resolved IP	148	TCP	0	62437 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 14, 2025 16:19:05…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:05…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:05…	10.107.79.30, Resolved IP	10.107.79.129,10.105.60.254	140	TCP	0	80 → 62437 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30, Resolved IP	136	TCP	0	62437 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30,	247	HTTP	0	GET /connecttest.txt HTTP/1.1
Jan 14, 2025 16:19:05…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:05…	10.107.79.30, Resolved IP	10.107.79.129,10.105.60.254	128	TCP	0	80 → 62437 [ACK] Seq=1 Ack=112 Win=64256 Len=0
Jan 14, 2025 16:19:05…	10.105.60.114	10.107.79.30	961	UDP		16667 → 16667 Len=915
Jan 14, 2025 16:19:05…	10.107.79.30, Resolved IP	10.107.79.129,10.105.60.254	977	HTTP	0	HTTP/1.1 200 OK (text/html)
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30, Resolved IP	136	TCP	0	62437 → 80 [FIN, ACK] Seq=112 Ack=850 Win=130304 Len=0
Jan 14, 2025 16:19:05…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:05…	10.105.60.114	10.107.79.30	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:05…	10.107.79.30, Resolved IP	10.107.79.129,10.105.60.254	128	TCP	0	80 → 62437 [FIN, ACK] Seq=850 Ack=113 Win=64256 Len=0
Jan 14, 2025 16:19:05…	10.107.79.129,10.105.60.254	10.107.79.30, Resolved IP	136	TCP	0	62437 → 80 [ACK] Seq=113 Ack=851 Win=130304 Len=0
Jan 14, 2025 16:19:05…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66

Network Connectivity Status Check on Foreign Controller

```
> Frame 794: 977 bytes on wire (7816 bits), 977 bytes captured (7816 bits)
> Ethernet II, Src: Cisco_[redacted], Dst: Cisco_[redacted]
> 802.1Q Virtual LAN, PRI: 0, DEI: 0, ID: 1415
> Internet Protocol Version 4, Src: 10.107.79.30, Dst: 10.107.79.129
> User Datagram Protocol, Src Port: 5247, Dst Port: 5264
> Control And Provisioning of Wireless Access Points - Data
> IEEE 802.11 QoS Data, Flags: ......F.
> Logical-Link Control
> Internet Protocol Version 4, Src: [redacted], Dst: 10.105.60.254
> Transmission Control Protocol, Src Port: 80, Dst Port: 62437, Seq: 1, Ack: 112, Len: 849
v Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    Location: https://10.106.32.130:8443/portal/PortalSetup.action?portal=d06bc251-f644-4fc3-b09f-dae9bd8a86
    Content-Type: text/html\r\n
  > Content-Length: 580\r\n
    \r\n
    [Request in frame: 788]
    [Time since request: 0.000991000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: [redacted]
    File Data: 580 bytes
> Line-based text data: text/html (9 lines)
```

Redirect URL Sent to Client

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	148	TCP	0	62448 → 8443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:11…	10.105.60.114	10.107.79.30	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:11…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.60.254	140	TCP	1	8443 → 62448 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1254 SACK_PERM WS=128
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	136	TCP	0	62448 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	1386	TCP	0	62448 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 1180]
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	683	TLSv1…	0	Client Hello
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	659	UDP		16667 → 16667 Len=613
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	1342	UDP		16667 → 16667 Len=1296
Jan 14, 2025 16:19:11…	10.105.60.114	10.107.79.30	450	UDP		16667 → 16667 Len=404
Jan 14, 2025 16:19:11…	10.105.60.114	10.107.79.30	917	UDP		16667 → 16667 Len=871
Jan 14, 2025 16:19:11…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.60.254	1378	TCP	0	8443 → 62448 [ACK] Seq=1 Ack=1798 Win=33280 Len=1250 [TCP PDU reassembled in 1192]
Jan 14, 2025 16:19:11…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.60.254	933	TLSv1…	0	Server Hello, Certificate, Server Key Exchange, Server Hello Done
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	136	TCP	0	62448 → 8443 [ACK] Seq=1798 Ack=2056 Win=131072 Len=0
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	143	TLSv1…	0	Alert (Level: Fatal, Description: Certificate Unknown)
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	136	TCP	0	62448 → 8443 [FIN, ACK] Seq=1805 Ack=2056 Win=131072 Len=0
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	262	TLSv1…	0	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:11…	10.105.60.114	10.107.79.30	118	UDP		16667 → 16667 Len=72
Jan 14, 2025 16:19:11…	10.105.60.114	10.107.79.30	157	UDP		16667 → 16667 Len=111
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	136	TCP	0	62449 → 8443 [ACK] Seq=1860 Ack=2107 Win=131072 Len=0
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	1143	TLSv1…	0	Application Data
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	1119	UDP		16667 → 16667 Len=1073
Jan 14, 2025 16:19:11…	10.107.79.30,10.106.32.130	10.107.79.129,10.105.60.254	1378	TCP	0	8443 → 62449 [ACK] Seq=8357 Ack=2867 Win=37120 Len=1250 [TCP PDU reassembled in 1267]
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	136	TCP	0	62449 → 8443 [ACK] Seq=2867 Ack=10564 Win=131072 Len=0
Jan 14, 2025 16:19:11…	10.107.79.129,10.105.60.254	10.107.79.30,10.106.32.130	1168	TLSv1…	0	Application Data
Jan 14, 2025 16:19:11…	10.107.79.30	10.105.60.114	1144	UDP		16667 → 16667 Len=1098

Client Access to External Webauth Page to Provide Authentication Details

Logs from Anchor Controller

Radioactive Traces

```
!! Mobility Handoff !!
{mobilityd_RO-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_RO-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received mobile_announce, sub type 0 of
{mobilityd_RO-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Received export_Anchor_req, sub type 0 o
{mobilityd_RO-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Number of client is BELOW wlan limit
{mobilityd_RO-0}{1} [mm-transition] [26021] (info) MAC Client-MAC MMFSM transition S_MC_INIT -> S_MC_An

!! Session Created for Client !!
{wncd_x_RO-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_AS
```

```
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): [Client_MAC][ 0.0.0.0]Param-map used: global
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 0.0.0.0]Applying IPv4 i
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_CR
{wncd_x_R0-0}{1}: [mm-transition] [24229]: (info): MAC: Client_MAC MMIF FSM transition: S_MA_INIT -> S_
□{wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Roam type changed - None -> L3 Requested
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Export Anchor Response successfully proc
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Forwarding Anchor Response to Foreign.
{mobilityd_R0-0}{1} [mm-client] [26021] (info) MAC Client-MAC Forwarding export_Anchor_rsp, sub type 0
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.
{□wncd_x_R0-0}{1} [mm-client] [24229] (info) MAC Client-MAC Mobility role changed - Unassoc -> Export A
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Client is AnchorED.>> Client is successf


!! Client DHCP Traffic !!
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_MOBILIT
{wncd_x_R0-0}{1} [client-orch-state] [24229] (note) MAC Client-MAC Client state transition S_CO_DPATH_P
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface mobility_a0000001 on vlan 31 Src MAC Client-MAC
{wncd_x_R0-0}{1} [sisf-packet] RX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [sisf-packet] TX DHCPv4 from interface Tw0/0/1 on vlan 31 Src MAC DHCP-Reply-Source-MA
{wncd_x_R0-0}{1} [client-iplearn] [24229] (note) MAC Client-MAC Client IP learn successful. Method DHCP
{mobilityd_R0-0}{1} [mm-client] [26021] (debug) MAC Client-MAC Sending ipv4_address_update of XID (XID)
{wncd_x_R0-0}{1} [client-iplearn] [24229] (info) MAC Client-MAC IP-learn state transition S_IPLEARN_IN_
Complete
{wncd_x_R0-0}{1}: [client-orch-sm] [24229]: (debug): MAC: Client_MAC Received ip learn response. method

!! External Web Authentication !!
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_IP
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62441/235
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Parse G
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Read co
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]State L
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Parse G
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Read co
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]State L
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62440/233
{wncd_x_R0-0}{1}: [sisf-packet] [24229]: (info): RX: IPv6 DHCP from intf mobility_a0000001 on vlan 31 S
{wncd_x_R0-0}{1}: [sisf-packet] [24229]: (info): TX: IPv6 DHCP from intf mobility_a0000001 on vlan 31 S
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62480/238
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62481/239
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/238
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/238
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]GET rcv
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]HTTP GE
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Parse G
```

```
{wncd_x_R0-0}{1}: [sadb-attr] [24229]: (info): Removing ipv6 addresses from the attr list -654303708,sm
{wncd_x_R0-0}{1}: [caaa-authen] [24229]: (info): [CAAA:AUTHEN:910007e3] NULL ATTR LIST
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]State L
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/238
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Send Access-Request to 10.106.32.130:1812 id 0/3, l
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: authenticator
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Calling-Station-Id [31] 19 Client_MAC
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: User-Name [1] 9 Test321
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Vendor, Cisco [26] 49
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Cisco AVpair [1] 43 audit-session-id=723C690A000007
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Framed-IP-Address [8] 6 10.105.60.254
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Cisco AVpair [1] 12 vlan-id=31
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: NAS-IP-Address [4] 6 10.105.60.114
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: NAS-Port-Type [61] 6 Virtual [5]
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: NAS-Port [5] 6 0
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Vendor, Cisco [26] 31
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Cisco AVpair [1] 25 cisco-wlan-ssid=DMZ_EWA
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Vendor, Cisco [26] 33
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Cisco AVpair [1] 27 wlan-profile-name=DMZ_EWA
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Called-Station-Id [30] 27 Called-Station-ID
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Vendor, Airespace [26] 12
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Airespace-WLAN-ID [1] 6 7
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Nas-Identifier [32] 12 DMZSiteWLC
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Started 5 sec timeout
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Received from id 1812/3 10.106.32.130:0, Access-Acc
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: authenticator
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: User-Name [1] 9 Test321
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Class [25] 56 ...
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Message-Authenticator[80] 18 ...
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Vendor, Cisco [26] 42
{wncd_x_R0-0}{1}: [radius] [24229]: (info): RADIUS: Cisco AVpair [1] 36 profile-name=Windows10-Workstat
{wncd_x_R0-0}{1}: [radius] [24229]: (info): Valid Response Packet, Free the identifier
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]State A
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Unapply I
{wncd_x_R0-0}{1}: [webauth-acl] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Unapply I
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : username 0 Test321
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : class 0 43 41 43 53 3a 37 32 33
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : Message-Authenticator 0 <hidden>
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : method 0 1 [webauth]
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : clid-MAC-addr 0 d0 37 45 88 25 5
{wncd_x_R0-0}{1}: [aaa-attr-inf] [24229]: (info): Applying Attribute : intf-id 0 2684354561 (0xa0000001
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change n
{wncd_x_R0-0}{1}: [auth-mgr-feat_acct] [24229]: (info): [Client_MAC:mobility_a0000001] SM Notified attr
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Received User-Name Test321
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change n
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Method webauth changing st
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Context changing state fro
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] auth mgr attr add/change n
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Raised event AUTHZ_SUCCESS
{wncd_x_R0-0}{1}: [auth-mgr] [24229]: (info): [Client_MAC:mobility_a0000001] Context changing state fro
{wncd_x_R0-0}{1}: [webauth-sess] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-ma
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Param-m
{wncd_x_R0-0}{1}: [webauth-state] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]State A
{wncd_x_R0-0}{1}: [webauth-page] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]Sending
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/238
{wncd_x_R0-0}{1}: [webauth-io] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/238
{wncd_x_R0-0}{1}: [webauth-httpd] [24229]: (info): mobility_a0000001[Client_MAC][ 10.105.60.254]62482/2
{wncd_x_R0-0}{1}: [client-auth] [24229]: (note): MAC: Client_MAC L3 Authentication Successful. ACL:[]
{wncd_x_R0-0}{1}: [client-auth] [24229]: (info): MAC: Client_MAC Client auth-interface state transition
```

```
{wncd_x_R0-0}{1}: [client-orch-state] [24229]: (note): MAC: Client_MAC Client state transition: S_CO_L3

{wncd_x_R0-0}{1}: [mm-transition] [24229]: (info): MAC: Client_MAC MMIF FSM transition: S_MA_ANCHOR -> S
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC Received aaa_handoff, sub type: 0 of
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC aaa_handoff base check is VALID
{mobilityd_R0-0}{1}: [mm-transition] [26021]: (info): MAC: Client_MAC MMFSM transition: S_MC_RUN -> S_MC
{mobilityd_R0-0}{1}: [mm-client] [26021]: (info): MAC: Client_MAC Forwarding aaa_handoff, sub type: 0 of
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC Sending aaa_handoff of XID (38840) to
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC AAA Handoff successfully forwarded.
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC Received aaa_handoff_ack, sub type: 0
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC AAA Handoff Ack successfully handled
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC aaa_handoff_ack base check is VALID
{mobilityd_R0-0}{1}: [mm-client] [26021]: (debug): MAC: Client_MAC aaa_handoff_ack is VALID
{mobilityd_R0-0}{1}: [mm-transition] [26021]: (info): MAC: Client_MAC MMFSM transition: S_MC_ANCHOR_WAIT
```

Packet capture

After the mobility handoff, the Anchor Controller receives DHCP traffic from the Foreign Controller via the mobility tunnel.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 15:59:04…	10.107.79.30	10.105.60.114	396	UDP		16667 → 16667 Len=354
Jan 14, 2025 15:59:04…	0.0.0.0	255.255.255.255	286	DHCP		DHCP Discover - Transaction ID 0x9f36b979
Jan 14, 2025 15:59:06…	10.105.60.69	10.105.60.254	286	DHCP		DHCP Offer - Transaction ID 0x9f36b979
Jan 14, 2025 15:59:06…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354
Jan 14, 2025 15:59:06…	10.107.79.30	10.105.60.114	424	UDP		16667 → 16667 Len=382
Jan 14, 2025 15:59:06…	0.0.0.0	255.255.255.255	286	DHCP		DHCP Request - Transaction ID 0x9f36b979
Jan 14, 2025 15:59:06…	10.105.60.69	10.105.60.254	286	DHCP		DHCP ACK - Transaction ID 0x9f36b979
Jan 14, 2025 15:59:06…	10.105.60.114	10.107.79.30	396	UDP		16667 → 16667 Len=354

Client DHCP Traffic on Anchor Controller Recieved from Foreign Controller

The Anchor Controller receives connectivity checks, webpage access requests, and authentication details to process further.

UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:19:06…	10.107.79.30	10.105.60.114	141	UDP		16667 → 16667 Len=95
Jan 14, 2025 16:19:06…	10.105.60.254	DNS IP	83	DNS		Standard query 0x389b Connectivity Check URL
Jan 14, 2025 16:19:06…	DNS IP	10.105.60.254	237	DNS		Standard query response 0x389b A Connectivity Check URL
Jan 14, 2025 16:19:06…	10.105.60.114	10.107.79.30	287	UDP		16667 → 16667 Len=245
Jan 14, 2025 16:19:06…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:06…	10.105.60.254	Resolved IP	70	TCP		62437 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 14, 2025 16:19:06…	Resolved IP	10.105.60.254	66	TCP		80 → 62437 [SYN, ACK] Seq=0 Ack=1 Win=64240 Len=0 MSS=1460 SACK_PERM WS=128
Jan 14, 2025 16:19:06…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:06…	10.107.79.30	10.105.60.114	223	UDP		16667 → 16667 Len=177
Jan 14, 2025 16:19:06…	10.105.60.254	Resolved IP	58	TCP		62437 → 80 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 14, 2025 16:19:06…	10.105.60.254		169	HTTP		GET /connecttest.txt HTTP/1.1
Jan 14, 2025 16:19:06…	Resolved IP	10.105.60.254	903	HTTP		HTTP/1.1 200 OK (text/html)
Jan 14, 2025 16:19:06…	10.105.60.114	10.107.79.30	957	UDP		16667 → 16667 Len=915
Jan 14, 2025 16:19:06…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:06…	10.105.60.254	Resolved IP	58	TCP		62437 → 80 [FIN, ACK] Seq=112 Ack=850 Win=130304 Len=0
Jan 14, 2025 16:19:06…	Resolved IP	10.105.60.254	54	TCP		80 → 62437 [FIN, ACK] Seq=850 Ack=113 Win=64256 Len=0
Jan 14, 2025 16:19:06…	10.105.60.114	10.107.79.30	108	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:06…	10.105.60.254	Resolved IP	58	TCP		62437 → 80 [ACK] Seq=113 Ack=851 Win=130304 Len=0

Network Connectivity Status Check on Anchor Controller

```
Frame 426: 903 bytes on wire (7224 bits), 903 bytes captured (7224 bits)
Ethernet II, Src: [redacted], Dst: [redacted]
Internet Protocol Version 4, Src: [redacted], Dst: 10.105.60.254
Transmission Control Protocol, Src Port: 80, Dst Port: 62437, Seq: 1, Ack: 112, Len: 849
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
    Location: https://10.106.32.130:8443/portal/PortalSetup.action?portal=d06bc251-f644-4fc3-b09f-dae9bd8a86
    Content-Type: text/html\r\n
    Content-Length: 580\r\n
    \r\n
    [Request in frame: 423]
    [Time since request: 0.000000000 seconds]
    [Request URI: /connecttest.txt]
    [Full request URI: [redacted]]
    File Data: 580 bytes
Line-based text data: text/html (9 lines)
```

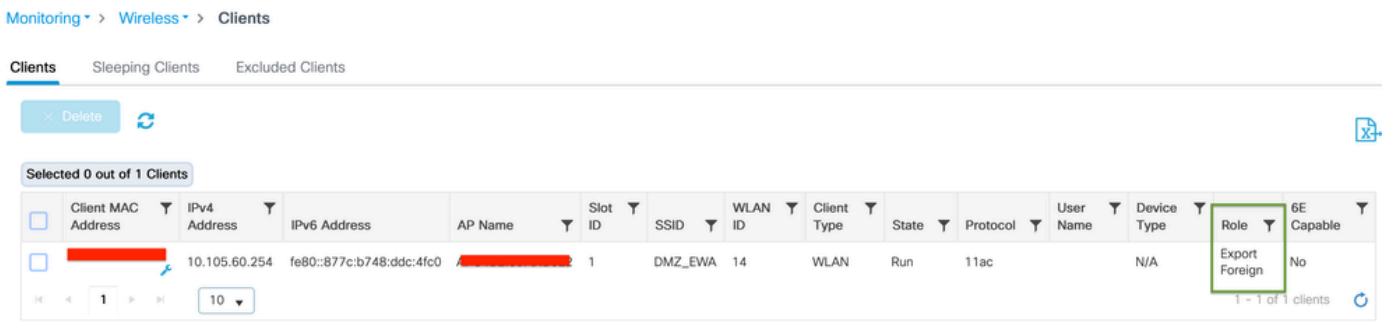
Redirect URL Sent to Client

The client submits authentication credentials via the portal. These credentials are validated either locally on the WLC or via an external authentication server, depending on the configured security policy.

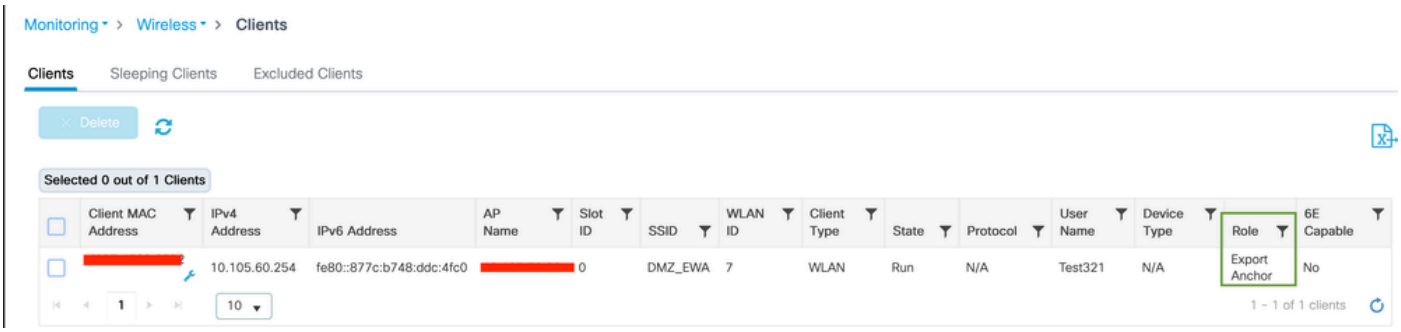
UTC Arrival Time	Source Address	Destination Address	Length	Protocol	TID	Info
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	124	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	66	TCP		62448 → 8443 [SYN] Seq=0 Win=64240 Len=0 MSS=1250 WS=256 SACK_PERM
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	70	TCP		8443 → 62448 [SYN, ACK] Seq=0 Ack=1 Win=29200 Len=0 MSS=1254 SACK_PERM WS=128
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	120	UDP		16667 → 16667 Len=78
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	54	TCP		62448 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=0
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	659	UDP		16667 → 16667 Len=613
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	1342	UDP		16667 → 16667 Len=1296
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	1304	TCP		62449 → 8443 [ACK] Seq=1 Ack=1 Win=131072 Len=1250 [TCP PDU reassembled in 717]
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	537	TLSv1…		Client Hello
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	1308	TCP		8443 → 62449 [ACK] Seq=1 Ack=1734 Win=34688 Len=1250 [TCP PDU reassembled in 724]
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	446	UDP		16667 → 16667 Len=404
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	863	TLSv1…		Server Hello, Certificate, Server Key Exchange, Server Hello Done
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	913	UDP		16667 → 16667 Len=871
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	54	TCP		62449 → 8443 [ACK] Seq=1734 Ack=2056 Win=131072 Len=0
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	180	TLSv1…		Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	64	TLSv1…		Change Cipher Spec
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	103	TLSv1…		Encrypted Handshake Message
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	114	UDP		16667 → 16667 Len=72
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	153	UDP		16667 → 16667 Len=111
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	54	TCP		62449 → 8443 [ACK] Seq=1860 Ack=2107 Win=131072 Len=0
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	112	UDP		16667 → 16667 Len=66
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	1119	UDP		16667 → 16667 Len=1073
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	1061	TLSv1…		Application Data
Jan 14, 2025 16:19:12.…	10.106.32.130	10.105.60.254	1015	TLSv1…		Application Data
Jan 14, 2025 16:19:12.…	10.105.60.114	10.107.79.30	962	UDP		16667 → 16667 Len=920
Jan 14, 2025 16:19:12.…	10.107.79.30	10.105.60.114	1144	UDP		16667 → 16667 Len=1098
Jan 14, 2025 16:19:12.…	10.105.60.254	10.106.32.130	1086	TLSv1…		Application Data
Jan 14, 2025 16:19:25.…	10.105.60.114	10.106.32.130	460	RADIUS		Access-Request id=3
Jan 14, 2025 16:19:25.…	10.105.60.114	10.106.32.130	460	RADIUS		Access-Request id=3, Duplicate Request
Jan 14, 2025 16:19:25.…	10.106.32.130	10.105.60.114	191	RADIUS		Access-Accept id=3
Jan 14, 2025 16:19:25.…	10.106.32.130	10.105.60.114	187	RADIUS		Access-Accept id=3, Duplicate Response

Client Access to External Webauth Page to Provide Authentication Details

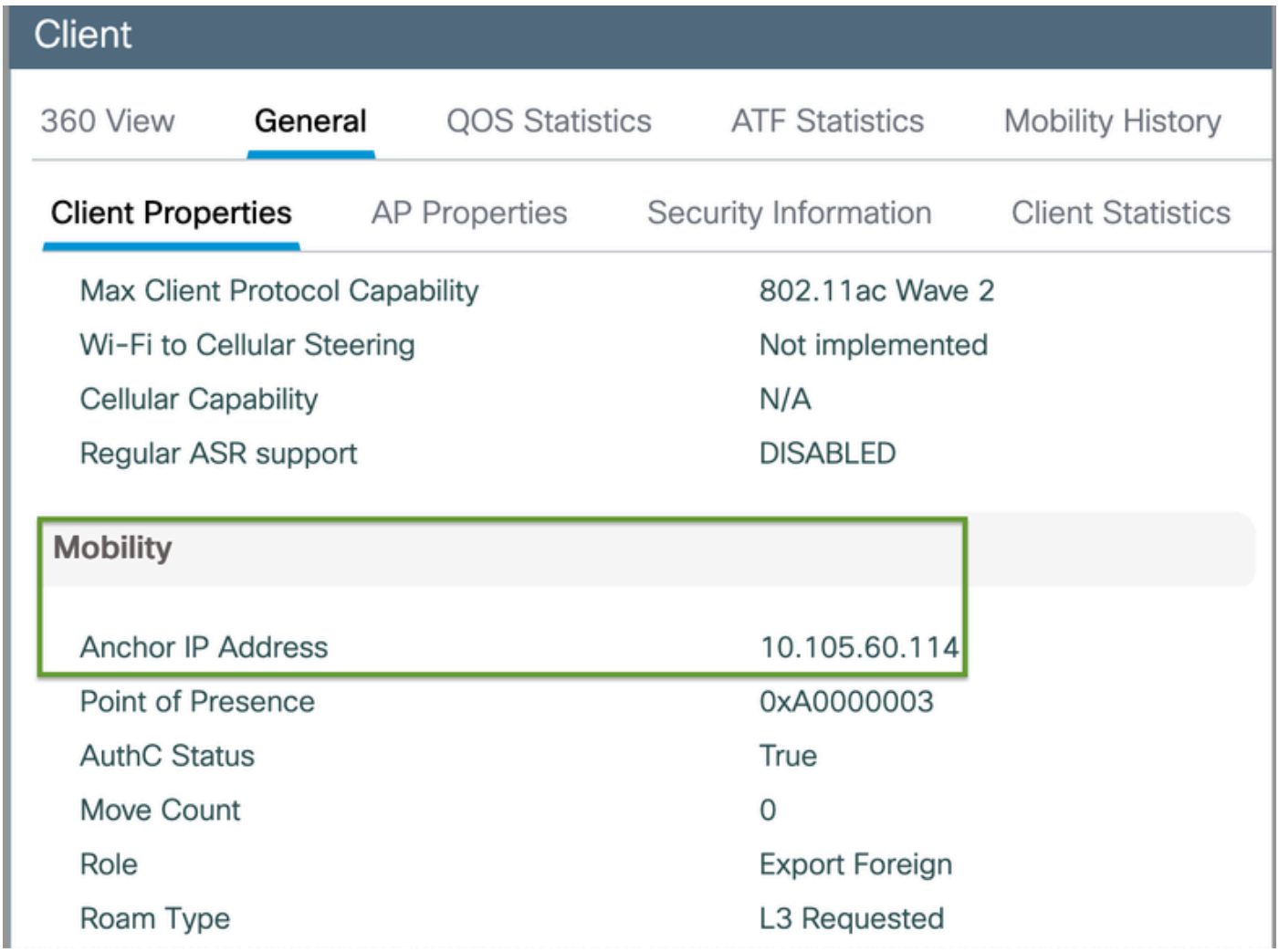
Client State on Both Foreign and Anchor Controller



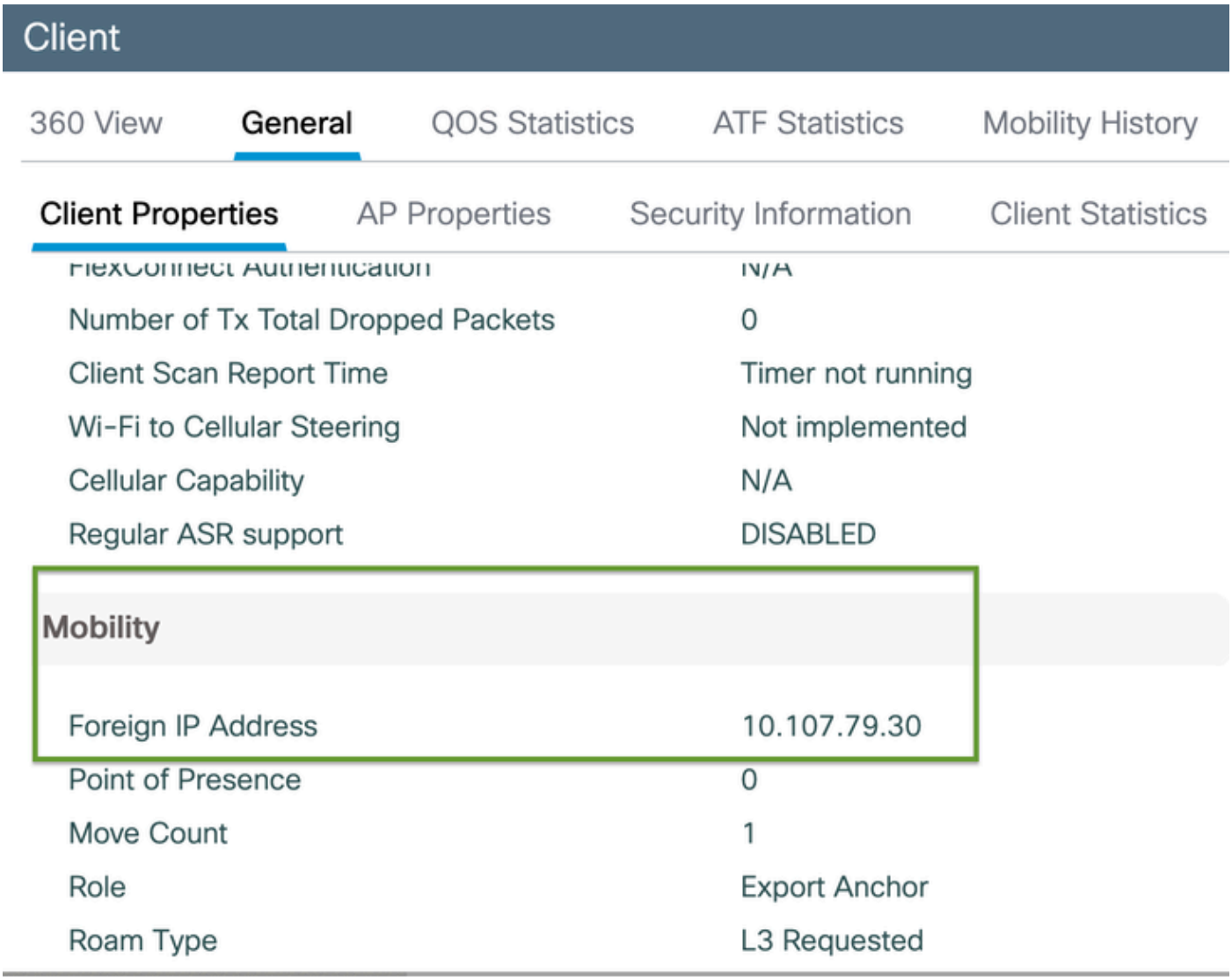
Client State on Foreign



Client State on Anchor



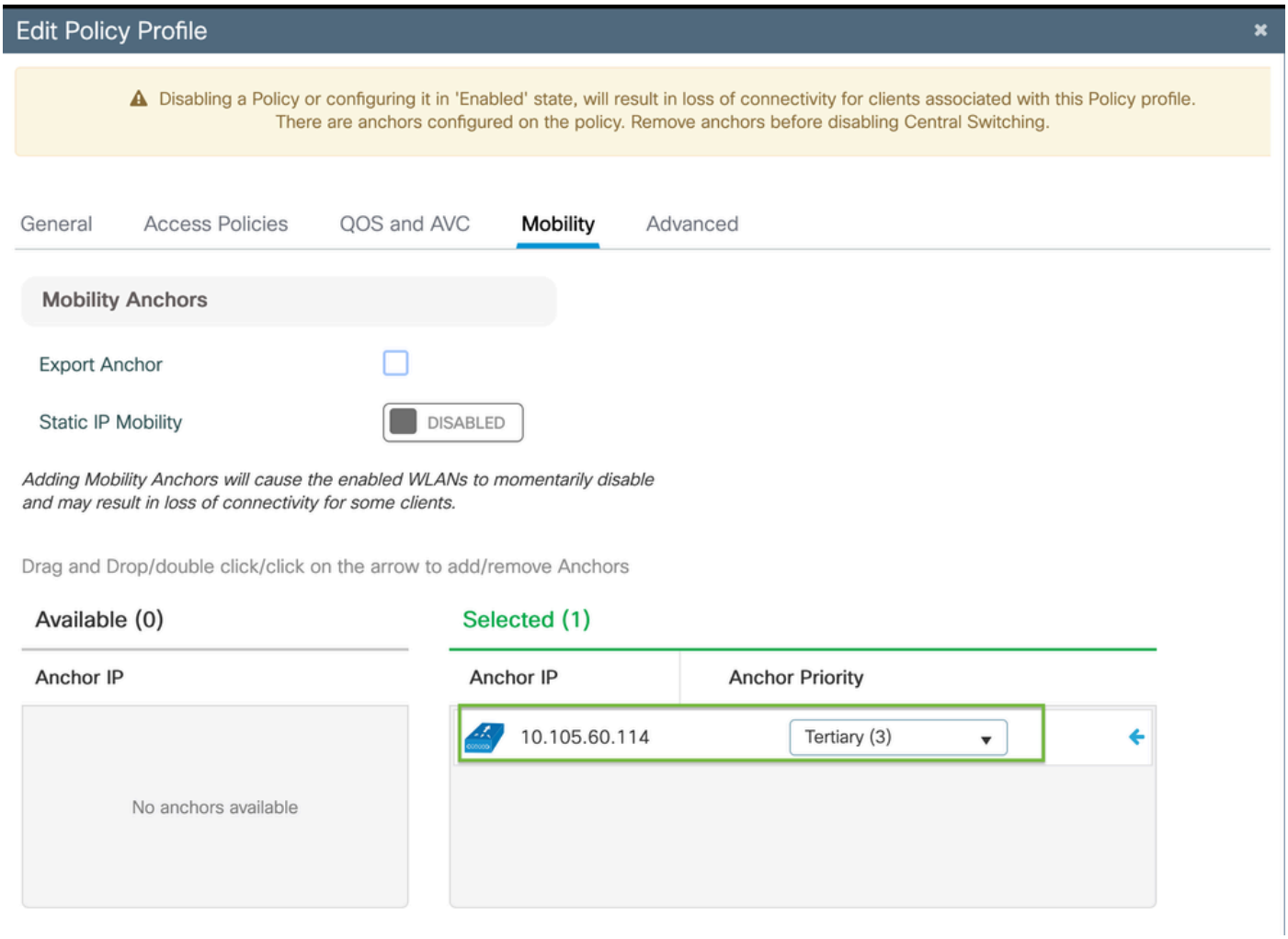
Client Properties on Foreign



Client Properties on Anchor

Load Balancing Between Multiple Anchor Controller

When more than one Anchor Controller is mapped to a single WLAN, traffic distribution depends on priority. Three priority levels can be configured: Primary, Secondary, and Tertiary. The guest Anchor priority feature provides a mechanism for active/standby load distribution among the Anchor Controllers. This is achieved by assigning a fixed priority to each Anchor Controller: load is distributed to the highest-priority controller, and in round-robin fashion among controllers that share the same priority value.



Mapping Anchor Priority

Note: By default the priority tertiary is configured during the Anchor Controller mapping on Foreign Controller.

Troubleshooting Client Connectivity in Foreign-Anchor Scenario

1. Client Onboarding Issues
    i. Tunnel Status: Verify that the mobility tunnel between the Foreign and Anchor Controllers remains active.
    ii. Configuration Mismatch: Ensure configuration parity between both controllers. Discrepancies in WLAN names, Policy Profile names, or advanced settings—such as AAA override, IPv4 DHCP requirements, and NAC—lead to profile mismatch or Anchor deny errors.
    iii. Other: If Tunnel is up without any configuration issue, troubleshooting approach is similar to normal client connectivity issue ensuring to check on the respective controller which handles the affected traffic.

2. Intermittent Connectivity
    i. Tunnel Flaps: If keepalive packets between the two controllers fail to arrive, the tunnel flaps, preventing the client from maintaining a connection to the SSID.
    ii. Low Bandwidth: If the Path MTU (PMTU) between mobility peers drops to lower value (576),

clients experience performance degradation. This usually happens when path mtu keepalive messages are missed between both the mobility peer

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Note: The controller with the lower mobility MAC address initiates both the standard keepalive and the Path MTU keepalive messages.

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3. Specific Website Access Issues
    i. Mobility traffic headers include mobility group identifiers, MAC addresses, IP addresses, and encrypted CAPWAP DTLS packets exchanged over UDP ports 16666 and 16667. This overhead adds to the existing CAPWAP header. For TCP traffic, post adjusting TCP MSS configured for AP, if the packet size exceeds the Mobility PMTU (maximum 1385 bytes) due to this additional overhead, fragmentation occurs.While fragmentation is generally handled by the network, issues arise if packets arrive out-of-order or late. These conditions impact packet re-assembly and result in data accessibility failures for specific websites.

Log Collection from Foreign and Anchor Controller

1. Enable **term exec prompt timestamp** to have time reference for all the commands.
2. Use **show tech-support wireless !!** to review the configuration.
3. You can check the mobility tunnel status **show wireless mobility summary !!**
4. Statistics for Mobility Peer that includes link status, client data and events, keep-alive statistics **show wireless mobility peer ip <IP>**
5. Enable radioactive trace for **Mobility Peer IP/MAC address** and client MAC address.

    Via CLI:

    debug wireless {MAC | ip} {aaaa.bbbb.cccc | x.x.x.x } {monitor-time} {N seconds} !! Setting time allows us to enable traces for up to 24 days .

    no debug wireless {MAC | ip} {aaaa.bbbb.cccc | x.x.x.x !! To disable the debugging

    WLC generates a debug trace file with Client_info, command to check for debug trace file generated **dir bootflash: | i debug !!**

    

    Warning: The conditional debugging enables debug-level logging which in turn increases the volume of the logs generated. Leaving this running reduces how far back in time you can view logs from. So, it is recommended to always disable debugging at the end of the troubleshooting session.

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6. In order to disable all debugging, run these commands:

    # clear platform condition all !!

    # undebug all !!
    Via GUI:

    Step 1. Navigate to **Troubleshooting > Radioactive Trace**.

Step 2. Click **Add** and enter a **Mobility Peer MAC/IP address** or **client MAC address** that you want to troubleshoot.
Step 3. When you are ready to start the radioactive tracing, click **Start**. Once started, debug logging is written to disk about any control plane processing related to the tracked MAC addresses.
Step 4. When you reproduce the issue you want to troubleshoot, click **Stop**.
Step 5. For each MAC address debugged, you can **generate** a log file collating all the logs pertaining to that MAC address by clicking Generate.
Step 6. Choose how long back you want your collated log file to go and click **Apply to Device**.
Step 7. You can now download the file by clicking the **small icon** next to the file name. This file is present in the boot flash drive of the controller and can also be copied out of the box through CLI.

7. Embedded Captures

Via CLI:
monitor capture MYCAP clear !!
monitor capture MYCAP interface Po1 both !!
monitor capture MYCAP buffer size 100 !!
monitor capture MYCAP match access-list name !! (if tracking mobility tunnel traffic between WLC)
monitor capture MYCAP match any/ipv4/ipv6.MAC !!
monitor capture MYCAP start !!
!!Reproduce
monitor capture MYCAP stop
monitor capture MYCAP export flash:|tftp:|http:.../filename.pcap

Via GUI:

Step 1. Navigate to **Troubleshooting > Packet Capture > +Add**.
Step 2. Define the name of the packet capture. A maximum of 8 characters is allowed.
Step 3. Define filters, if any.
Step 4. Check the **box** to Monitor Control Traffic if you want to see traffic punted to the system CPU and injected back into the data plane.
Step 5. Define buffer size. A maximum of 100 MB is allowed.
Step 6. Define limit, either by duration which allows a range of 1 - 1000000 seconds or by number of packets which allows a range of 1 - 100000 packets, as desired.
Step 7. Choose the **interface** from the list of interfaces in the left column and select the **arrow** to move it to the right column.
Step 8. Click **Save and Apply to Device**.
Step 9. To start the capture, select **Start**.
Step 10. You can let the capture run to the defined limit. To manually stop the capture, select **Stop**.
Step 11. Once stopped, an Export button becomes available to click with the option to download the capture file (.pcap) on the local desktop via HTTP or TFTP server or FTP server or local system hard disk or flash.

Related Information

Configure Mobility Topologies on Catalyst 9800 WLCs

Configure WLAN Anchor Mobility Feature on Catalyst 9800

Technical Support & Documentation - Cisco Systems