DHCP Relay on 6200 Switch

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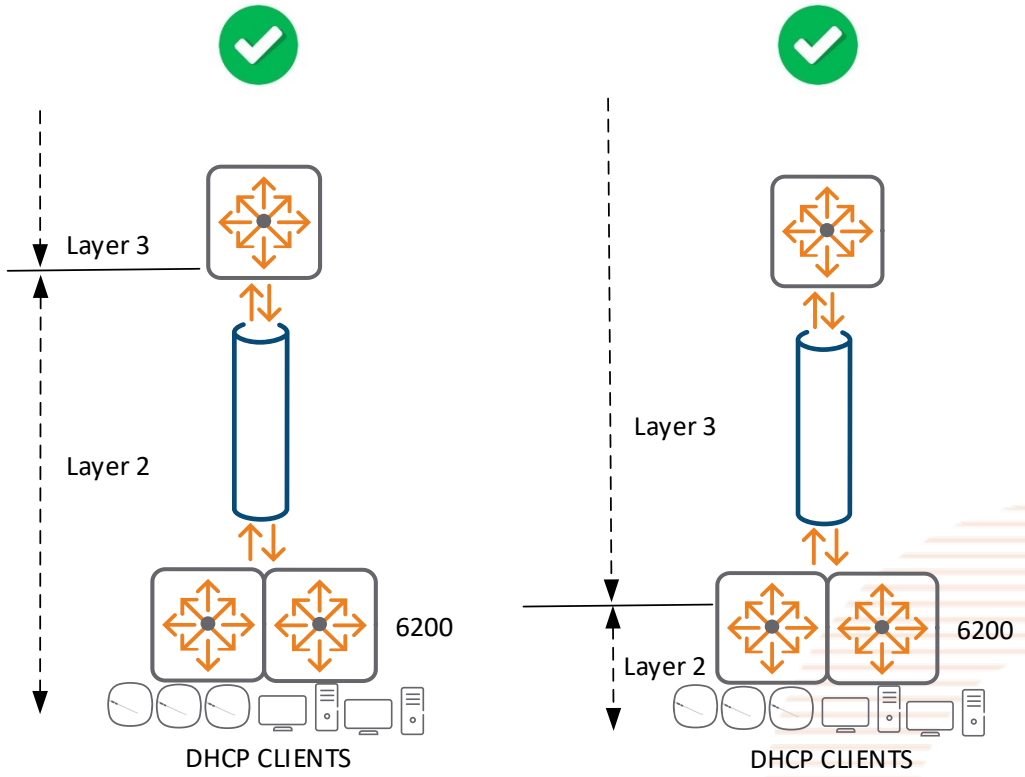
Agenda

1. Overview
2. Configuration Refresher
3. Troubleshooting Refresher
4. Demo

Overview

- DHCP Relay was NOT available across 6200 platform prior to 10.06
- DHCP Relay uniformity with current CX portfolio
- 6200 DHCP Relay supports both IPv4 and IPv6
- IPV4 is default relay mechanism i.e V6 switch on explicitly in global
- Introduction of this feature to this platform allows competitive & flexible architectures at the “edge”

- Notable Considerations & Caveats
  - V6 multicast helper not available 10.06(6200) under consideration CR
  - Option 82 Snooping takes precedence over Option 82 Relay when coexisting per vlan.
  - Remember Single default VRF /Global
  - No ROP, L3 SVI Only
  - No DHCP Server
  - No Multicast Routing



Both Valid Use Case

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Configuration Refresher

Configuration Refresher

```
interface vlan 115
    ip address 10.69.15.1/24
    ip helper-address 10.69.253.3
    ip helper-address 10.69.253.5
    ip helper-address 10.6.25.3
    ip ospf 1 area 0.0.0.0
```

Enable relay for V4 under VLAN

Up to 8 IPv4 helpers per SVI

```
dhcpv6-relay

interface vlan 116
    ipv6 address 2001:db8:116::1/64
    ipv6 nd prefix default valid 4294967295 preferred 4294967295 no-autoconfig
    ipv6 nd ra managed-config-flag
    no ipv6 nd suppress-ra
    ipv6 helper-address unicast 2001:db8:8400::1
    ipv6 helper-address unicast 2001:db8:8402::2
    ipv6 helper-address unicast 2001:db8:8401::3
    ipv6 ospfv3 2 area 0.0.0.0
```

Enable V6 relay, **off by default**

DHCPV6 statefull config (RA & ND) under VLAN.
Client IPv6 and DNS address defined by DHCP Server

A flag Off

M flag On

Allow RA

V6 relay to DHCP server address 2001:db8:840X::Y
Up to 8 IPv6 helpers per SVI

```
interface vlan 117
    ip address 10.69.117.1/24
    ipv6 address 2001:db8:117:6200::1/64
!Config omitted here
    ipv6 helper-address unicast 2001:db8:8400::1
    ipv6 helper-address unicast 2001:db8:8402::2
    ip helper-address 10.69.253.3
    ip helper-address 10.69.253.5
```

Up to 8 IPv4 helpers per SVI

Up to 8 IPv6 helpers per SVI

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Troubleshooting Refresher

Feature/Solution Troubleshooting Refresher

Relay commands

```
show dhcp-relay

show ip helper-address [interface <interface-name>]

show dhcp-relay bootp-gateway [interface <interface-name>]

show tech dhcp-relay

diag-dump dhcp-relay basic

debug dhcprelay all
```

```
show dhcpv6-relay

show ipv6 helper-address [interface <interface-name>]

show tech dhcpv6-relay

diag-dump dhcpv6-relay basic

debug dhcpv6relay all
```

Feature/Solution Troubleshooting Refresher

```
show dhcp-relay

 DHCP Relay Agent                  : enabled
 DHCP Request Hop Count Increment  : enabled
 Option 82                         : disabled
 Source-Interface                  : disabled
 Response Validation               : disabled
 Option 82 Handle Policy           : replace
 Remote ID                         : mac

 DHCP Relay Statistics:

  Valid Requests Dropped Requests Valid Responses Dropped Responses
  -------------- ---------------- --------------- ----------------
  5489           1                5337            0

 DHCP Relay Option 82 Statistics:

  Valid Requests Dropped Requests Valid Responses Dropped Responses
  -------------- ---------------- --------------- ----------------
  910            0                910             0
```

“Quick view “relay enabled and options

```
show dhcpv6-relay

 DHCPV6 Relay Agent : enabled
 Option 79          : disabled
```

Feature/Solution Troubleshooting Refresher

```
show ip helper-address interface vlan112

 IP Helper Addresses

 Interface: vlan112
  IP Helper Address                  VRF
  -----------------                 -----------------
  10.69.253.3                        default
```

“Quick “configuration check

```
show ipv6 helper-address interface vlan116

 Interface: vlan116
 IP Helper Address                                  Egress Port
 -------------------------------------------------  -----------
 3003::1
default
```

show tech sub command “single view” of all

```
show tech dhcp-relay
==================================================
Show Tech executed on Sun Oct 11 10:53:05 2020
==================================================
==================================================
[Begin] Feature dhcp-relay
==================================================


*********************************
Command : show dhcp-relay
*********************************

 DHCP Relay Agent                 : enabled
 DHCP Request Hop Count Increment : enabled
 Option 82                        : disabled
 Source-Interface                 : disabled
 Response Validation              : disabled
 Option 82 Handle Policy          : replace
 Remote ID                        : mac
```

```
 DHCP Relay Statistics:

  Valid Requests Dropped Requests Valid Responses Dropped Responses
  -------------- ---------------- --------------- -----------------
  5547           1                5395            0

 DHCP Relay Option 82 Statistics:

  Valid Requests Dropped Requests Valid Responses Dropped Responses
  -------------- ---------------- --------------- -----------------
  910            0                910             0
*********************************
Command : show ip helper-address
*********************************

 IP Helper Addresses

 Interface: vlan115
  IP Helper Address                  VRF
  -----------------                 -----------------
  10.69.253.3                        default
```

Feature/Solution Troubleshooting Refresher

```
diagnostics
diag-dump dhcp-relay basic
================================================================================
[Start] Feature dhcp-relay Time : Sun Oct 11 10:24:07 2020
================================================================================
--------------------------------------------------------------------------------
[Start] Daemon hpe-relay
--------------------------------------------------------------------------------
DHCP Relay : 1
DHCP Relay hop-count-increment : 1
DHCP Relay Option82 : 0
DHCP Relay Option82 validate : 0
DHCP Relay Option82 policy : replace
DHCP Relay Option82 remote-id : mac
DHCP Relay Option82 Source Intf : Disable
System Mac [10:4f:58:f7:19:c0]
vsx: Not Present

Interface vlan115: 1
Selected Gateway Intf IP- 10.69.15.1
Intf IP-NODE's IP- 10.69.15.1
Selected Mac [10:4f:58:f7:19:c0] & Virtual Mac [00:00:00:00:00:00]

  Client Packet Statistics:
!
Output omitted
!

Interface vlan112: 1
Selected Gateway Intf IP- 10.69.112.1
Intf IP-NODE's IP- 10.69.112.1
Selected Mac [10:4f:58:f7:19:c0] & Virtual Mac [00:00:00:00:00:00
```

```
Client Packet Statistics:

  Valid        Dropped      O82_Valid    O82_Dropped   vsx_drops
  -----        -------      ---------    -----------   ---------
  5492         1            910          0             0

  Server Packet Statistics:

  Valid        Dropped      O82_Valid    O82_Dropped   Invalid_IP_Drops   To_Dsnoop
  -----        -------      ---------    -----------   ----------------   ---------
  5359         0            910          0             0                  0

client request dropped packets with extn option 82 = 0
client request valid packets with extn option 82 = 0
server request dropped packets with extn option 82 = 0
server request valid packets with extn option 82 = 0
Port 67 - 10.69.253.3,4
Source VRF:default, table_id:0

--------------------------------------------------------------------------------
[End] Daemon hpe-relay
--------------------------------------------------------------------------------
================================================================================
[End] Feature dhcp-relay
================================================================================
Diagnostic-dump captured for feature dhcp-relay
```

Feature/Solution Troubleshooting Refresher

diag-dump dhcpv6-relay basic

```
================================================================================
[Start] Feature dhcpv6-relay Time : Sun Oct 11 10:47:54 2020
================================================================================
--------------------------------------------------------------------------------
[Start] Daemon hpe-relay
--------------------------------------------------------------------------------
DHCPv6 Relay : 1
DHCPv6 Relay Option79 : 0
vsx: Not Present
Interface vlan113: 0
Intf ifindex - 113 and kernel ifindex - 115
  Client Packet Statistics:

  Valid        Dropped      vsx_drops
  -----        -------      ---------
  0            0            0

  Server Packet Statistics:

  Valid        Dropped      To_Dsnoop
  -----        -------      ---------
  0            0            0
Interface vlan116: 1
Intf ifindex - 116 and kernel ifindex - 1213003::1,1,egress = (null)

  Client Packet Statistics:

  Valid        Dropped      vsx_drops
  -----        -------      ---------
  332          0            0

  Server Packet Statistics:

  Valid        Dropped      To_Dsnoop
  -----        -------      ---------
  222          0            48
Interface vlan112: 0
Intf ifindex - 112 and kernel ifindex - 117
  Client Packet Statistics:

  Valid        Dropped      vsx_drops
  -----        -------      ---------
  0            0            0

  Server Packet Statistics:

  Valid        Dropped      To_Dsnoop
  -----        -------      ---------
  0            0            0

--------------------------------------------------------------------------------
[End] Daemon hpe-relay
--------------------------------------------------------------------------------
================================================================================
[End] Feature dhcpv6-relay
================================================================================
Diagnostic-dump captured for feature dhcpv6-relay
BLDG02-F1(config-if-vlan)#
```

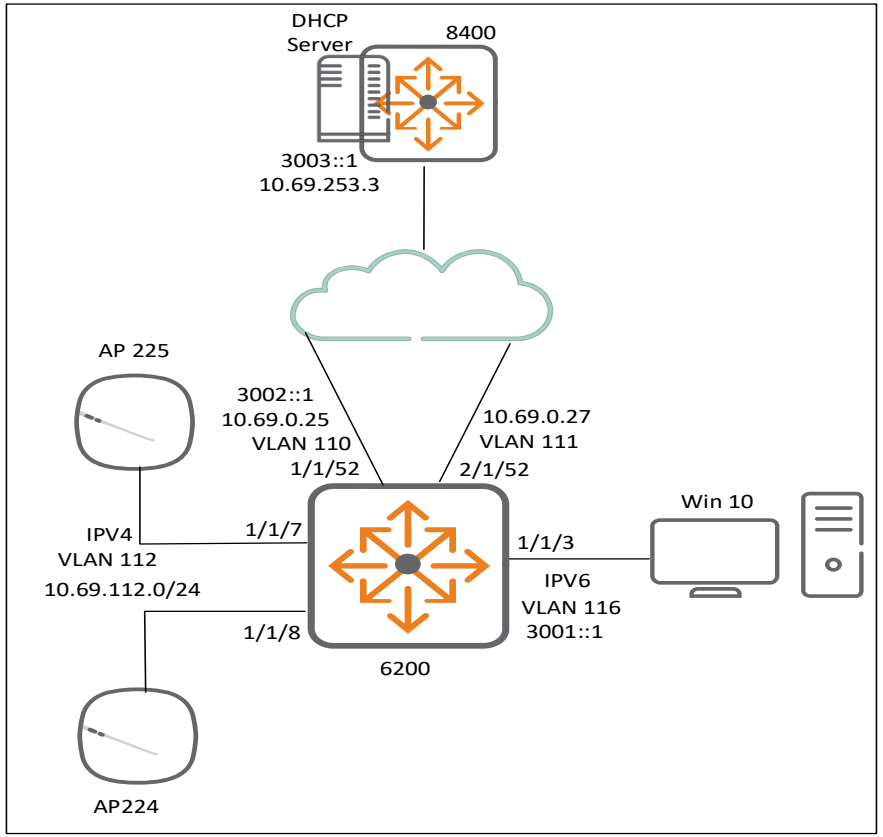
Feature/Solution Troubleshooting Refresher

debug dhcpv6relay all

show debug buffer reverse

```
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
show debug buffer
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
2020-10-08:17:31:55.911480|ndmd|LOG_ERR|MSTR|1|NDM|NDM_NBRTABLE|[nd_nbr_mgr_process_icmp6_rcv_na_event(2275)] [Port vlan116] Nbr not found for 3001::18
2020-10-08:17:31:54.606557|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to client fe80::507b:6066:9fa8:3cad from server 3003::1 successfully via interface vlan116.
2020-10-08:17:31:54.606457|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from Server 3003::1 to client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:31:54.606429|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received from Server 3003::1.
2020-10-08:17:31:54.605845|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:31:54.605768|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:27:00.909772|ndmd|LOG_ERR|MSTR|1|NDM|NDM_NBRTABLE|[nd_nbr_mgr_process_icmp6_rcv_na_event(2275)] [Port vlan116] Nbr not found for 3001::18
2020-10-08:17:26:59.736118|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to client fe80::507b:6066:9fa8:3cad from server 3003::1 successfully via interface vlan116.
2020-10-08:17:26:59.736051|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from Server 3003::1 to client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:26:59.736021|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received from Server 3003::1.
2020-10-08:17:26:59.735360|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:26:59.735284|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:26:58.734059|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to client fe80::507b:6066:9fa8:3cad from server 3003::1 successfully via interface vlan116.
2020-10-08:17:26:58.733778|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from Server 3003::1 to client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:26:58.733509|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received from Server 3003::1.
2020-10-08:17:26:58.732934|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:26:58.732858|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:21:41.721576|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:21:41.721500|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:19:01.719788|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:19:01.719708|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:17:41.718543|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
2020-10-08:17:17:41.718464|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet received on interface vlan116 from client fe80::507b:6066:9fa8:3cad.
2020-10-08:17:17:01.718132|hpe-relay|LOG_DEBUG|MSTR|1|DHCPV6RELAY|DHCPV6RELAY|Packet sent to  server 3003::1 from client fe80::507b:6066:9fa8:3cad successfully.
```

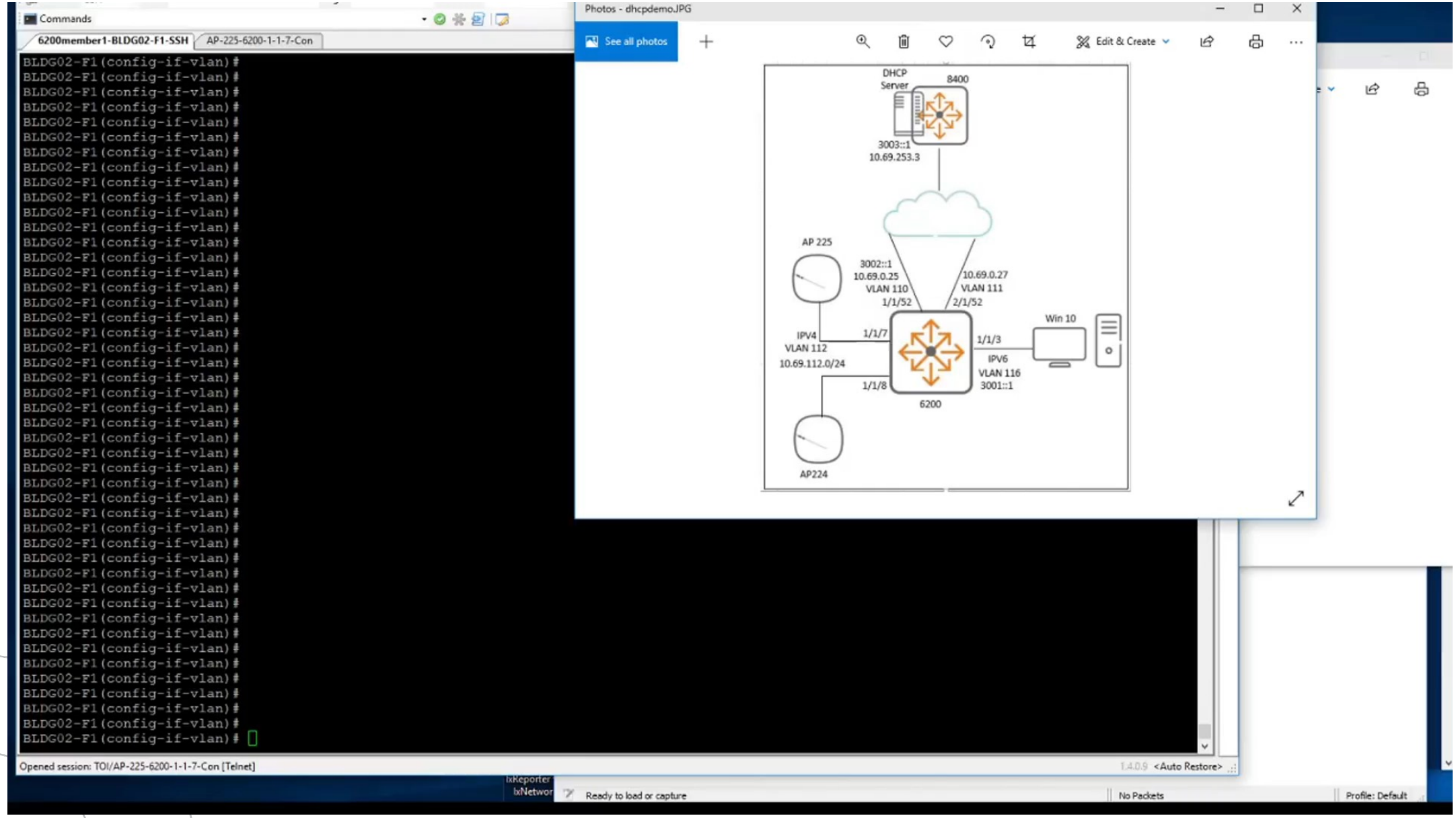
Demo-Reference



- Show commands quick view
- V6 client assignment on Win 10
- V6 Wireshark trace and relay debug
- V4 APs with Dsnoop with show & debug

```
!
configuration omitted
!
dhcpv4-snooping
dhcpv4-snooping authorized-server 10.69.0.12
dhcpv4-snooping authorized-server 10.69.0.14
dhcpv4-snooping authorized-server 10.69.253.3
!
vlan 110
    description transit_vlan_uplink
    dhcpv4-snooping
vlan 111
    description transit_vlan_uplink
    dhcpv4-snooping
vlan 112
    description AP_vlan
    dhcpv4-snooping
vlan 116
    description ipv6_user
vlan 117
!
configuration omitted
!
interface 1/1/3
    no shutdown
    description v6endpoints
    vlan access 116
!
configuration omitted
!
interface 1/1/7
    no shutdown
    energy-efficient-ethernet
    description AP225
    vlan access 112
interface 1/1/8
    no shutdown
    energy-efficient-ethernet
    description AP224
    vlan access 112
!
configuration omitted
!
interface 1/1/52
    no shutdown
    vlan access 110
    dhcpv4-snooping trust
!
configuration omitted
!
interface 2/1/52
    no shutdown
    vlan access 111
    dhcpv4-snooping trust
interface loopback 0
    ip address 10.69.253.9/32
    ip ospf 1 area 0.0.0.0
!
configuration omitted
!
interface vlan 110
    ip address 10.69.0.25/31
    ipv6 address 3002::2/64
    ip ospf 1 area 0.0.0.0
    no ip ospf passive
    ip ospf network point-to-point
    ipv6 ospfv3 2 area 0.0.0.0
    ipv6 ospfv3 network point-to-point
interface vlan 111
    ip address 10.69.0.27/31
    ip ospf 1 area 0.0.0.0
    no ip ospf passive
    ip ospf network point-to-point
interface vlan 112
    description AP_vlan
    ip address 10.69.112.1/24
    ip helper-address 10.69.253.3
    ip ospf 1 area 0.0.0.0
!
configuration omitted
!
interface vlan 116
    description Client_vlan
    ipv6 address 3001::1/64
    ipv6 nd prefix default valid 4294967295
preferred 4294967295 no-autoconfig
    ipv6 nd ra managed-config-flag
    no ipv6 nd suppress-ra
    ipv6 helper-address unicast 3003::1
    ipv6 ospfv3 2 area 0.0.0.0
!
configuration omitted
!
dhcpv6-relay
!
configuration omitted
!
router ospf 1
    router-id 10.69.253.9
    passive-interface default
    area 0.0.0.0
router ospfv3 2
    router-id 10.69.253.9
    area 0.0.0.0
```

Demo


Commands
6200member1-BLDG02-F1-SSH
AP-225-6200-1-1-7-Con
BLDG02-F1(config-if-vlan)#
Opened session: TOI/AP-225-6200-1-1-7-Con [Telnet]
Photos - dhcpdemoJPG
See all photos
Edit & Create
DHCP Server
8400
3003::1
10.69.253.3
AP 225
3002::1
10.69.0.25
VLAN 110
1/1/52
10.69.0.27
VLAN 111
2/1/52
IPV4
VLAN 112
10.69.112.0/24
1/1/7
1/1/3
Win 10
IPV6
VLAN 116
3001::1
1/1/8
6200
AP224
Ready to load or capture
No Packets
Profile: Default

aruba
a Hewlett Packard
Enterprise company

Demo

aruba
a Hewlett Packard
Enterprise company

Thank you