IPoE Session over Pseudowire Headend in Broadband Network Gateway

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Introduction

This document describes the steps to configure IP over Ethernet (IPoE) sessions over Pseudowire Headend (PWHE) on ASR9K.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- MPLS Layer 2 VPN
- BNG Functionality on ASR9K

Tip: Refer to the Broadband Network Gateway Configuration Guide for Cisco ASR 9000 Series Cisco article in order to gain familiarity with BNG functionality.
Tip: Refer to the [MPLS Layer 2 VPNs Configuration Guide](#) Cisco article in order to gain familiarity with MPLS Layer 2 VPNs.

Components Used

This document is not restricted to specific software version but the line card which we used on ASR9K is A9K-MPA-20X1GE.

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, make sure that you understand the potential impact of any command.

Background Information

BNG provides subscriber support over PWHE. PWHE provides L3 connectivity to customer edge nodes through a pseudowire connection. PWHE terminates the L2VPN circuits that exists between the access-provide edge (A-PE) nodes, to a virtual interface, and performs routing on the native IP packet. Each virtual interface can use one or more physical interfaces towards the access cloud to reach customer routers through the A-PE nodes.

Note: This feature is supported for PPPoE PTA, PPPoE LAC Subscriber Over PWHE and IPoE subscribers.

Configure

Network Diagram
In order to perform this test, one ASR1K with version 154-3.S2 is employed and ASR9K with version IOS-XR 5.2.2. OSPF is used as routing protocol to reach each other loopback addresses.

ASR9K Loopback Address: 10.1.1.1/32

ASR1K Loopback Address: 10.2.2.2/32

```
 pseudowire-class MPLS
 encapsulation mpls

t interface GigabitEthernet1/0/0 no ip address media-type rj45 negotiation auto cdp enable
 xconnect 10.1.1.1 2020 encapsulation mpls pw-class MPLS end

ASR1K#show etherchannel summary
Flags:  D - down        P/bndl - bundled in port-channel
         I - stand-alone s/susp - suspended
         H - Hot-standby (LACP only)
         R - Layer3     S - Layer2
         U - in use      f - failed to allocate aggregator

         M - not in use, minimum links not met
         u - unsuitable for bundling
         w - waiting to be aggregated
         d - default port

Number of channel-groups in use: 1
Number of aggregators:          1

Group Port-channel  Protocol    Ports
-----------------------------------------------
20Po20(RU)LACP Gi1/0/1(bndl) Gi1/1/1(bndl)
```
interface Port-channel20
ip address 192.168.20.2 255.255.255.0
no negotiation auto
mpls ip
end

ASR9K

Here is the configuration from ASR9K, which acts as BNG PWHE.

ASR1K#show etherchannel summary
Flags:  D - down        P/bndl - bundled in port-channel
        I - stand-alone s/susp - suspended
        H - Hot-standby (LACP only)
        R - Layer3      S - Layer2
        U - in use      f - failed to allocate aggregator
        M - not in use, minimum links not met
        u - unsuitable for bundling
        w - waiting to be aggregated
        d - default port

Number of channel-groups in use: 1
Number of aggregators: 1

Group   Port-channel  Protocol    Ports
--------+-------------+-----------+-----------------------------------------------
20Po20(RU)LACP Gi1/0/1(bndl) Gi1/1/1(bndl)

RU - L3 port-channel UP State
SU - L2 port-channel UP state
P/bndl - Bundled
S/susp - Suspended

interface Port-channel20
ip address 192.168.20.2 255.255.255.0
no negotiation auto
mpls ip
end

Now, configure the xconnect between ASR1K and ASR9K. Specify the loopback address of ASR1K (10.2.2.2/32) as xconnect neighbor.

l2vpn router-id 10.1.1.1 pw-class ASR1K encapsulation mpls transport-mode ethernet  ! ! xconnect group PWHE p2p ASR1K
interface PW-Ether20 neighbor ipv4 10.2.2.2 pw-id 2020
    pw-class ASR1K
    !
    !
generic-interface-list BE20_ONLY
    interface Bundle-Ether20
    interface GigabitEthernet0/0/1/18
interface GigabitEthernet0/0/1/19
!

interface PW-Ether20
ipv4 address 192.168.1.1 255.255.255.0
attach generic-interface-list BE20_ONLY
!
Now, configure the subscriber control policy and apply on PW-Ethernet interface where subscriber is terminated.

dynamic-template
type ipsubscriber  WDAAR_PWHE_DT
ipv4 verify unicast source reachable-via rx
ipv4 unnumbered Loopback44
ipv4 unreachable disable
!
!
policy-map type control subscriber IPoE_WDAAR_PWHE
event session-start match-first
  class type control subscriber DHCPv4 do-until-failure
    5 authorize aaa list WDAAR identifier source-address-mac password cisco
    10 activate dynamic-template WDAAR_PWHE_DT
    
    
end-policy-map

interface PW-Ether20.250
ipv4 address 192.168.10.1 255.255.255.252
service-policy type control subscriber IPoE_WDAAR_PWHE
encapsulation dot1q 250
ipsubscriber ipv4 l2-connected
initiator dhcp
!
!
Verify

This section provides information that you can use in order to verify that your configuration works properly. Here are the commands you can employ to verify that xconnect is UP/UP on ASR9K.

RP/0/RSP0/CP00:ACDC-ASR9000-1#show l2vpn xconnect

<table>
<thead>
<tr>
<th>XConnect</th>
<th>Name</th>
<th>ST</th>
<th>Segment 1 Description</th>
<th>ST</th>
<th>Segment 2 Description</th>
<th>ST</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWHE</td>
<td>ASR1K</td>
<td>UP</td>
<td>PE20</td>
<td>UP</td>
<td>10.2.2.2</td>
<td>2020 UP</td>
</tr>
</tbody>
</table>

RP/0/RSP0/CP00:ACDC-ASR9000-1#show l2vpn xconnect brief

<table>
<thead>
<tr>
<th>AToM</th>
<th>Like-to-Like</th>
<th>UP</th>
<th>DOWN</th>
<th>UNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW-Ether</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Total: 1 UP, 0 DOWN, 0 UNRESOLVED
Once the xconnect is UP and IPoE session comes online on ASR9K you can see that Access-interface is PW-Ether.

Now, verify the Layer 3 connectivity of BNG subscriber over PWHE.
Troubleshoot

This section provides information that you can use in order to troubleshoot your configuration and verify the xconnect status on ASR9K.

Command to Verify the ASR9K Configuration

These commands can be used to verify the configuration is correct on ASR9K.

- `show running-configuration l2vpn`
- `show running-configuration int PW-Ether<Interface-Number>`
- `show running-configuration mpls ldp`
- `show running-configuration generic-interface-list`

Check L2VPN XC's

Check the xconnect. The xconnect (and therefore the AC and PW) has to be up. You can employ these commands to verify the status.

- `show l2vpn xconnect summary`

```
RP/R/0/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn xconnect summary
Thu May 21 05:40:05.068 UTC
Number of groups: 1
Number of xconnects: 1
   Up: 1  Down: 0  Unresolved: 0  Partially-programmed: 0
   AC-PW: 1  AC-AC: 0  PW-PW: 0  Monitor-Session-PW: 0
Number of Admin Down segments: 0
Number of MP2MP xconnects: 0
   Up 0  Down 0
   Advertised: 0  Non-Advertised: 0
Number of CE Connections: 0
Backup PW:
   Configured : 0
   UP : 0
   Down : 0
   Admin Down : 0
   Unresolved : 0
   Standby : 0
   Standby Ready: 0
Backup Interface:
   Configured : 0
   UP : 0
   Down : 0
```
Admin Down: 0
Unresolved: 0
Standby: 0

RP/O/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn xconnect summary
Thu May 21 05:40:05.068 UTC
Number of groups: 1
Number of xconnects: 1

Up: 1
Down: 0
Unresolved: 0
Partially-programmed: 0

AC-PW: 1
AC-AC: 0
PW-PW: 0
Monitor-Session-PW: 0

Number of Admin Down segments: 0
Number of MP2MP xconnects: 0
Up 0
Down 0

Advertised: 0
Non-Advertised: 0

Number of CE Connections: 0
Advertised: 0
Non-Advertised: 0

Backup PW:
Configured: 0
UP: 0
Down: 0
Admin Down: 0
Unresolved: 0
Standby: 0
Standby Ready: 0

Backup Interface:
Configured: 0
UP: 0
Down: 0
Admin Down: 0
Unresolved: 0
Standby: 0

RP/O/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn xconnect interface pw-eth20 detail
Thu May 21 05:40:55.789 UTC

Group PWHE, XC ASR1K, state is up; Interworking none
AC: PW-Ether20, state is up
Type PW-Ether
Interface-list: **BE20 ONLY**
Replicate status:
BE20: success
G10/0/1/18: success
G10/0/1/19: success
MTU 1500; interworking none
Internal label: 16001

**Statistics:**
packets: received 52970, sent 0
bytes: received 3485714, sent 0

PW: neighbor 10.2.2.2, PW ID 2020, state is up (established)
PW class asr1k, XC ID 0xc0000001
Encapsulation MPLS, protocol LDP
Source address 10.1.1.1
PW type Ethernet, control word disabled, interworking none
PW backup disable delay 0 sec
Sequencing not set

**PW Status TLV in use**

<table>
<thead>
<tr>
<th>MPLS</th>
<th>Local</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>16002</td>
<td>17</td>
</tr>
<tr>
<td>Group ID</td>
<td>0x920</td>
<td>unknown</td>
</tr>
</tbody>
</table>
Interface    PW-Ether20                     unknown
MTU          1500                           1500
Control word disabled                       disabled
PW type      Ethernet                       Ethernet
VCCV CV type 0x2                            0x2
   (LSP ping verification)        (LSP ping verification)
VCCV CC type 0x6                            0x6
   (router alert label)           (router alert label)
   (TTL expiry)                   (TTL expiry)

Incoming Status (PW Status TLV):
   Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
   Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 3221225473
Create time: 21/05/2015 02:52:43 (02:48:12 ago)
Last time status changed: 21/05/2015 05:21:17 (00:19:38 ago)
Last time PW went down: 21/05/2015 03:10:45 (02:30:10 ago)

Statistics:
   packets: received 52970, sent 0
   bytes: received 3485714, sent 0

Check the Interface List

Display the interface-list used by the PWHE: it should exist and have the appropriate interfaces.

   • show generic-interface-list name <NAME>

RP/0/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn xconnect interface pw-eth20 detail
Thu May 21 05:40:55.789 UTC

Group PWHE, XC ASR1K, state is up; Interworking none
  AC: PW-Ether20, state is up
     Type PW-Ether
    Interface-list: BE20_ONLY
   Replicate status:
     BE20: success
     G10/0/1/18: success
     G10/0/1/19: success
    MTU 1500; interworking none
    Internal label: 16001

Statistics:
   packets: received 52970, sent 0
   bytes: received 3485714, sent 0

PW: neighbor 10.2.2.2, PW ID 2020, state is up ( established )
  PW class asr1k, XC ID 0xc0000001
  Encapsulation MPLS, protocol LDP
  Source address 10.1.1.1
  PW type Ethernet, control word disabled, interworking none
  PW backup disable delay 0 sec
  Sequencing not set

PW Status TLV in use
     MPLS       Local                          Remote
                   ------------------------------ -----------------------------
Label        16002                          17
Group ID     0x920                           unknown
Interface    PW-Ether20                     unknown
MTU          1500                           1500
Control word disabled                       disabled
PW type      Ethernet                       Ethernet
VCCV CV type 0x2                            0x2
Incoming Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 3221225473
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Last time PW went down: 21/05/2015 03:10:45 (02:30:10 ago)

Statistics:
packets: received 52970, sent 0
bytes: received 3485714, sent 0

Check PWHE Used by an Interface List

The private output below indicates which member interfaces are "active" i.e. which ones have been downloaded to FIB.

- show l2vpn generic-interface-list name <NAME>
- show l2vpn generic-interface-list private

RP/0/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn xconnect interface pw-eth20 detail
Thu May 21 05:40:55.789 UTC

Group PWHE, XC ASR1K, state is up; Interworking none
AC: PW-Ether20, state is up
  Type PW-Ether
  Interface-list: BE20_ONLY
  Replicate status:
    BE20: success
    Gi0/0/1/18: success
    Gi0/0/1/19: success
  MTU 1500; interworking none
  Internal label: 16001

Statistics:
  packets: received 52970, sent 0
  bytes: received 3485714, sent 0

PW: neighbor 10.2.2.2, PW ID 2020, state is up (established)
  PW class asr1k, XC ID 0xc0000001
  Encapsulation MPLS, protocol LDP
  Source address 10.1.1.1
  PW type Ethernet, control word disabled, interworking none
  PW backup disable delay 0 sec
  Sequencing not set

PW Status TLV in use

<table>
<thead>
<tr>
<th>MPLS</th>
<th>Local</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Label</td>
<td>16002</td>
<td>17</td>
</tr>
<tr>
<td>Group ID</td>
<td>0x920</td>
<td>unknown</td>
</tr>
<tr>
<td>Interface</td>
<td>PW-Ether20</td>
<td>unknown</td>
</tr>
<tr>
<td>MTU</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Control word disabled</td>
<td>disabled</td>
<td></td>
</tr>
<tr>
<td>PW type</td>
<td>Ethernet</td>
<td>Ethernet</td>
</tr>
<tr>
<td>VCCV CV type</td>
<td>0x2</td>
<td>0x2</td>
</tr>
<tr>
<td>VCCV CC type</td>
<td>0x6</td>
<td>0x6</td>
</tr>
</tbody>
</table>
Incoming Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
Outgoing Status (PW Status TLV):
Status code: 0x0 (Up) in Notification message
MIB cpwVcIndex: 3221225473
Create time: 21/05/2015 02:52:43 (02:48:12 ago)
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Last time PW went down: 21/05/2015 03:10:45 (02:30:10 ago)

Statistics:
- packets: received 52970, sent 0
- bytes: received 3485714, sent 0

Check that MA has the PWHE with Right Information

Interface-list info, CW, VC-type etc., has to be set properly in MA.

```
RP/O/RSP0/CPU0:ACDC-ASR9000-1#show l2vpn ma pwhe interface PW-Ether 20 private
Thu May 21 05:36:28.170 UTC
Interface: PW-Ether20   Interface State: Up, Admin state: Up
   Interface handle 0x920
   MTU: 1514
   BW: 10000 Kbit
   Interface MAC addresses (1 address):
      10f3.1172.02c5
   IDB is not in Replicate Linked List
   IDB is not in Create Linked List
   IDB is not in Attr Linked List
   Opaque flags: 0xe
   Flags: 0x3c
      Valid : IFH, MTU, MAC, BW
   MA trace history [Num events: 32]

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Value</th>
<th>Sticky</th>
<th>Many</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/21/2015</td>
<td>Remove retry list</td>
<td>0x3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set State</td>
<td>0x1</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM publish attr</td>
<td>0x45</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM update init-data</td>
<td>0x1e</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>Remove retry list</td>
<td>0x3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set State</td>
<td>0</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM publish attr</td>
<td>0x45</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM publish attr</td>
<td>0x52</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM update init-data</td>
<td>0x1e</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>Remove retry list</td>
<td>0x3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>Remove retry list</td>
<td>0x3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM publish attr</td>
<td>0x45</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM publish attr</td>
<td>0x1e</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IM update init-data</td>
<td>0x1e</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set flag</td>
<td>0x3c</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>Remove retry list</td>
<td>0x3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015</td>
<td>IDB Set State</td>
<td>0x1</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
```
CLIENT MA trace history [Num events: 27]

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Value</th>
<th>Sticky</th>
<th>Many</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/21/2015 02:54:01</td>
<td>IM Notify Up</td>
<td>0x50049e10</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:54:01</td>
<td>FSM state change</td>
<td>0x200</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:54:01</td>
<td>FSM state change</td>
<td>0x2030d</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:54:02</td>
<td>Double restart detected</td>
<td>0x5</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>Intf list change</td>
<td>0x3000300</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>Intf add error</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>Intf add error</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>Replicate result</td>
<td>0x13fe</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>FSM state change</td>
<td>0x5060b</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>I/f up</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>I/f up</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:02</td>
<td>I/f up</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:02</td>
<td>I/f up</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 03:08:26</td>
<td>FSM state change</td>
<td>0x70605</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 03:09:54</td>
<td>FSM state change</td>
<td>0x60704</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 03:10:45</td>
<td>FSM state change</td>
<td>0x70605</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 05:21:17</td>
<td>FSM state change</td>
<td>0x60704</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 05:21:17</td>
<td>Fill VIMI attr</td>
<td>0x20002</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

PW-HE IDB client data

IDB handle 0x5016db2c
Dot1q vlan: 0x81000000
Label: 16001
Remote VC label: 17
Remote PE: 10.2.2.2
Use flow-label on tx: N
L2-overhead: 0

VC-type: 5
CW: N
FSM state: 'Up'(7)
Fwding is up: Y, got route update: Y
Use OWNEDRESOURCE fwding: N
OWNEDRESOURCE fwding is up: N
OWNEDRESOURCE data&colon; 0
Replication error msg has been printed: N
VIF MA reg_handle: 50049e10
PIC array:
   (nil)
Replicate retry count: 0
Configured i/f list name: 'BE20_ONLY'
From L2VPN i/f list name: 'BE20_ONLY', i/f list id: 1
   L3 i/f: 'Bundle-Ether20', idx=0, repl_status 1, fwding up:N, active:Y
Check PWHE Summary Info

Check that counters in output are correct:

- show l2vpn pwhe summary

```
RP/0/RSP0/CP0:ACDC-ASR9000-1#show l2vpn ma pwhe interface PW-Ether 20 private
Thu May 21 05:36:28.170 UTC
Interface: PW-Ether20   Interface State: Up, Admin state: Up
   Interface handle 0x920
   MTU:  1514  BW:  10000 Kbit
   Interface MAC addresses (1 address):
       10f3.1172.02c5
   IDB is not in Replicate Linked List
   IDB is not in Create Linked List
   Opaque flags: 0xe
   Flags: 0x3c
       Valid : IFH, MTU, MAC, BW
   MA trace history [Num events: 32]
   ------------------------------------------
   Time                Event                     Value  Sticky Many
   ====                =====                     ====== ====== ====
   05/21/2015 02:56:05 Remove retry list         0x3      No     No
   05/21/2015 02:56:05 IDB Set flag              0x3c     No     No
   05/21/2015 03:08:26 IM publish attr           0x45     No     No
   05/21/2015 03:08:26 IM update init-data       0x1e     No     No
   05/21/2015 03:08:26 IDB Set flag              0x3c     No     No
   05/21/2015 03:08:26 Remove retry list         0x3      No     No
   05/21/2015 03:08:26 IDB Set flag              0x3c     No     No
   05/21/2015 03:09:54 IDB Set State             0      No     No
   05/21/2015 03:09:54 IM publish attr           0x45     No     No
   05/21/2015 03:09:54 IM publish attr           0x52     No     No
   05/21/2015 03:09:54 IM update init-data       0x1e     No     No
   05/21/2015 03:09:54 IDB Set flag              0x3c     No     No
   05/21/2015 03:09:54 Remove retry list         0x3      No     No
   05/21/2015 03:09:54 IDB Set flag              0x3c     No     No
   05/21/2015 03:10:45 IDB Set State             0x1      No     No
```
CLIENT MA trace history [Num events: 27]

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Value</th>
<th>Sticky</th>
<th>Many</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/21/2015 02:54:01</td>
<td>IM Notify Up</td>
<td>0x50049e10</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:54:01</td>
<td>FSM state change</td>
<td>0x200</td>
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<td>No</td>
</tr>
<tr>
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<td>FSM state change</td>
<td>0x2030d</td>
<td>No</td>
<td>No</td>
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<tr>
<td>05/21/2015 02:54:02</td>
<td>Double restart detected</td>
<td>0x5</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>I/f created/added</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
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<td>Intf list change</td>
<td>0x3000300</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>Intf add error</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:00</td>
<td>Intf add error</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>FSM state change</td>
<td>0x30505</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>Replicate result</td>
<td>0x13fe</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>FSM state change</td>
<td>0x5060b</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>I/f up</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:01</td>
<td>I/f up</td>
<td>0x4000580</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:02</td>
<td>I/f up</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:55:02</td>
<td>I/f up</td>
<td>0x4000540</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:56:05</td>
<td>Added to peer</td>
<td>0x6060606</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>05/21/2015 02:56:05</td>
<td>FSM state change</td>
<td>0x60704</td>
<td>No</td>
<td>No</td>
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<td>05/21/2015 02:56:05</td>
<td>Fill VIMI attr</td>
<td>0x20002</td>
<td>No</td>
<td>No</td>
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FSM state: 'Up'(7)
Fwding is up: Y, got route update: Y
Use OWNEDRESOURCE Fwding: N
OWNEDRESOURCE Fwding is up: N
OWNEDRESOURCE data&colon; 0
Replication error msg has been printed: N
Check Labels

Check label in label table. You need to first get the internal labels from xconnect information with this command.

- show l2vpn xconnect detail
then search for internal Label in the output and then execute this show command to verify the label and interface association on ASR9K.

- show mpls label table label <internal_label> detail
Traffic Drop/Sessions do not come up

If session does not come up, check if packets dropped in NP. You can use these commands to see the packet drop in NP on ASR9K.

- clear counters
- show l2vpn xconnect detail | include packet
- clear controllers np counters all
- show controller np counters all

BNG Related Show Commands

Use these commands in order check the BNG related information on ASR9K.

- show subscriber session all summary
- show subscriber manager disconnect-history unique summary
- show subscriber manager statistics debug total
- show subscriber manager statistics summary total
- show subscriber manager trace event/error

Debugs to be Enabled

If session did not come up on ASR9K and you did not find any packet dropped on NP then you can enable these debugs on ASR9K to see why session is not coming up in ASR9K.

- debug l2vpn ea pwhe platform verbose
- debug l2vpn forwarding platform common all
- debug pm api location <location>
- debug pm error location <location>
- debug uidb api errors location <location>

**Escalation**

If you still have an issue please reach out to Cisco TAC and collect the Show tech from ASR9K.

- show tech-support subscriber
- show tech-support l2vpn