



MPLS over Routed Pseudowire



Note This feature is supported only on the Cisco RSP3 Module.

Routed pseudowire provides the ability to route layer 3 in addition to the layer 2 bridge frames to and from pseudowire. Routed pseudowire is configured by assigning IP address under the bridge domain interface (BDI) in addition to the **vfi** command.

Multiprotocol Label Switching (MPLS), Label Distribution Protocol (LDP), and Border Gateway Protocol (BGP) configurations are supported over routed pseudowire BDI.

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Restrictions for MPLS over Routed Pseudowire

- IPv6 traffic is not supported over routed pseudowire.
- Loop Free Alternate/Remote Loop Free Alternate feature is not supported over routed pseudowire.
- Bidirectional Forwarding (BFD) is not supported over routed pseudowire.
- Precision Time Protocol (PTP) is not supported over routed pseudowire.
- QoS is not supported over routed pseudowire.
- Multicast is not supported over routed pseudowire.
- Virtual Router Redundancy Protocol (VRRP) and Hot Standby Redundancy Protocol (HSRP) is not supported over routed pseudowire.
- Access control lists (ACL) is not supported over routed pseudowire.

Configuring MPLS over Routed Pseudowire and VPLS

```

12 vfi VPLS100 manual
   vpn id 100
   bridge-domain 100
   neighbor 4.4.4.4 encapsulation mpls
   !

interface BDI100
 ip address 192.0.41.1 255.255.255.0
 ip ospf network point-to-point
 mpls ip
 !

```

MPLS over Routed Pseudowire and BDI Configuration

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface bdi** *bdi-number*
4. **ip address** *ip address subnet mask*
5. **mpls ip**
6. **no shut**
7. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: Device> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: Device# configure terminal	Enters global configuration mode.
Step 3	interface bdi <i>bdi-number</i> Example: Router(config)# interface bdi 3000	Configures the bridge domain interface.
Step 4	ip address <i>ip address subnet mask</i> Example: Router(config-if)# ip address 209.165.201.10 255.255.255.224	Specifies the IP address for the bridge domain.

	Command or Action	Purpose
Step 5	mpls ip Example: Router(config-if)# mpls ip	Enables MPLS support over bridge domain interface.
Step 6	no shut Example: Router(config-if)# no shutdown	Enables the bridge domain interface.
Step 7	end Example: Router(config-if)# end	Exits interface configuration mode.

Verify MPLS over Routed Pseudowire BDI Configuration

The following command shows the virtual circuit operational status:

```
router#show mpls l2transport vc
```

Local intf	Local circuit	Dest address	VC ID	Status
VFI VPLS100	vfi	209.165.201.1	100	UP

```
R1-Act#show mpls l2transport summary
```

```
Destination address: 209.165.201.1, total number of vc: 1167
```

```
0 unknown, 1167 up, 0 down, 0 admin down, 0 recovering, 0 standby, 0 hotstandby  
1167 ive vc on MPLS interface Te0/2/8
```

The following command shows the virtual circuit details:

```
router#show mpls l2transport vc 100 detail
```

```
Local interface: VFI VPLS100 vfi up
Interworking type is Ethernet
Destination address: 209.165.201.1, VC ID: 100, VC status: up
Output interface: Te0/2/8, imposed label stack {1204 794}
Preferred path: not configured
Default path: active
Next hop: 209.165.201.10
Create time: 1d17h, last status change time: 1d17h
Last label FSM state change time: 1d17h
Signaling protocol: LDP, peer 209.165.201.1:0 up
Targeted Hello: 209.165.201.2(LDP Id) -> 209.165.201.1, LDP is UP
Graceful restart: configured and enabled
Non stop routing: configured and enabled
Status TLV support (local/remote) : enabled/supported
LDP route watch : enabled
Label/status state machine : established, LruRru
Last local dataplane status rcvd: No fault
Last BFD dataplane status rcvd: Not sent
Last BFD peer monitor status rcvd: No fault
Last local AC circuit status rcvd: No fault
Last local AC circuit status sent: No fault
Last local PW i/f circ status rcvd: No fault
Last local LDP TLV status sent: No fault
```

```

Last remote LDP TLV      status rcvd: No fault
Last remote LDP ADJ     status rcvd: No fault
MPLS VC labels: local 2352, remote 794
Group ID: local n/a, remote 0
MTU: local 1500, remote 1500
Remote interface description:
Sequencing: receive disabled, send disabled
Control Word: On (configured: autosense)
SSO Descriptor: 209.165.201.1/100, local label: 2352
Dataplane:
  SSM segment/switch IDs: 25556223/16931917 (used), PWID: 2337
VC statistics:
  transit packet totals: receive 0, send 0
  transit byte totals:  receive 0, send 0
  transit packet drops:  receive 0, seq error 0, send 0

```

The following command shows the virtual forwarding instance details:

```

router#show l2vpn vfi detail
Legend: RT=Route-target, S=Split-horizon, Y=Yes, N=No

VFI name: VPLS100, state: up, type: multipoint, signaling: LDP
  VPN ID: 100
  Bridge-Domain 100 attachment circuits:
  Pseudo-port interface: pseudowire100001
  Interface          Peer Address      VC ID      S
  pseudowire100002  209.165.201.1    100        Y

```

The following command shows the MPLS LDP neighbor details:

```

router#show mpls ldp neighbor
Peer LDP Ident: 209.165.201.1:0; Local LDP Ident 209.165.201.2:0
TCP connection: 209.165.201.1.26053 - 209.165.201.2.646
State: Oper; Msgs sent/rcvd: 7022/5737; Downstream
Up time: 2d01h
LDP discovery sources:
  TenGigabitEthernet0/2/8, Src IP addr: 209.165.201.5
  Targeted Hello 209.165.201.2 -> 209.165.201.6, active, passive
Addresses bound to peer LDP Ident:
  209.165.201.1  209.165.201.3    209.165.201.4    209.165.201.5
  192.0.45.2    192.0.43.2        192.0.49.2        192.0.50.2
  192.0.56.2    192.0.55.2        192.0.62.2        192.0.48.2
  192.0.61.2    192.0.41.2        192.0.46.2        192.0.52.2
  192.0.63.2    192.0.60.2        192.0.57.2        192.0.58.2
  192.0.64.2    192.0.47.2        192.0.54.2        192.0.59.2
  192.0.51.2    192.0.42.2        192.0.65.2        192.0.44.2
  192.0.53.2

```

The following command shows the label allocated by the LDP protocol:

```

router#show mpls ldp bindings
lib entry: 209.165.201.7/24, rev 27617
  local binding:  label: imp-null
  remote binding: lsr: 209.165.201.1:0, label: imp-null

```

The following command shows the LFIB entries:

```

router#show mpls forwarding-table
Local      Outgoing  Prefix          Bytes Label  Outgoing  Next Hop
Label      Label     or Tunnel Id    Switched     interface
3543      1206     210.210.210.0/24 0              BD2778     209.165.201.10

```

The following command shows the PI CEF chain:

```
router#show ip cef 209.165.202.129 internal
209.165.201.7/24, epoch 3, flags [att, cnn, cover, deagg], RIB[C], refcnt 6, per-destination
sharing
sources: RIB
feature space:
  IPRM: 0x0003800C
  Broker: linked, distributed at 2nd priority
  LFD: 209.165.201.7/24 0 local labels
    contains path extension list
subblocks:
  gsb Connected chain head(1): 0x4E597FA0
  Covered dependent prefixes: 2
    need deagg: 2
ifnums:
  BDI100 (37)
path list 4DF8B8A8, 3 locks, per-destination, flags 0x49 [shble, rif, hwcn]
  path 4DC54A08, share 1/1, type connected prefix, for IPv4
    MPLS short path extensions: [none] MOI flags = 0x1 label implicit-null
    connected to BDI100, glean
output chain:
  glean
```

The following command shows the hardware programming for VPLS pseudowire:

```
router#show platform hardware pp active pw vpls
pw          : VFI557085844    bdomain      : 100        vsi          : 0x3
peer_ip     : 209.165.201.1    vc_id        : 100        has_cw       : 1
STP         : FWD              status        : Enabled     sh_group     : 0
local_label : 17                remote_label  : 16         sh_type      : Hub
imp_oce     : 0x28116624      disp_oce     : 0x25D9A014 label_oce    : 0x288241CC
pwe_lif     : 0x95FE           psn_fec      : 0x200004B1 encap_id     : 0x95FE
dest_gport  : 0x6C0000D1      ing_gport    : 0x189095FE egr_gport    : 0x18A095FE
imp_flow_label : No              disp_flow_label : No
```

The following command shows the BGP neighbourship status:

```
router#show ip bgp summary
BGP router identifier 13.13.13.13, local AS number 100
BGP table version is 9, main routing table version 9
8 network entries using 1152 bytes of memory
11 path entries using 968 bytes of memory
6/6 BGP path/bestpath attribute entries using 1008 bytes of memory
4 BGP rrinfo entries using 96 bytes of memory
2 BGP community entries using 48 bytes of memory
34 BGP extended community entries using 1360 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 4632 total bytes of memory
BGP activity 42/0 prefixes, 239/0 paths, scan interval 60 secs

Neighbor      V      AS MsgRcvd MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
209.165.202.129 4      100   1117   1122    9     0    0 16:49:00      0
```



Note With scaled up OSPF interfaces over router pseudowire, there is a possibility of OSPF PDU size going beyond egress interface default MTU, causing instability in OSPF adjacency. Hence, it is recommended to have higher egress interface MTU (> 1540 byte) over which the above sessions are created.

