# EVPN Virtual Private Wire Service (VPWS)

The EVPN-VPWS is a BGP control plane solution for point-to-point services. It implements the signaling and encapsulation techniques for establishing an EVPN instance between a pair of PEs. It has the ability to forward traffic from one network to another without MAC lookup. The use of EVPN for VPWS eliminates the need for signaling single-segment and multi-segment PWs for point-to-point Ethernet services.

EVPN-VPWS single homed technology works on IP and MPLS core; IP core to support BGP and MPLS core for switching packets between the endpoints.

**Note** Other than enabling RTC (route target constraint) with `address-family ipv4 rtfilter` command, there is no separate configuration needed to enable RTC for BGP EVPN.


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# Information About EVPN-VPWS Single Homed

The EVPN-VPWS single homed solution requires per EVI Ethernet Auto Discovery route. EVPN defines a new BGP Network Layer Reachability Information (NLRI) used to carry all EVPN routes. BGP Capabilities Advertisement used to ensure that two speakers support EVPN NLRI (AFI 25, SAFI 70) as per RFC 4760.

The architecture for EVPN VPWS is that the PEs run Multi-Protocol BGP in control-plane. The following image describes the EVPN-VPWS configuration:

- The VPWS service on PE1 requires the following three elements to be specified at configuration time:
  - The VPN ID (EVI)
  - The local AC identifier (AC1) that identifies the local end of the emulated service.
  - The remote AC identifier (AC2) that identifies the remote end of the emulated service.

  PE1 allocates a MPLS label per local AC for reachability.
- The VPWS service on PE2 is set in the same manner as PE1. The three same elements are required and the service configuration must be symmetric.

  PE2 allocates a MPLS label per local AC for reachability.
- PE1 advertise a single EVPN per EVI Ethernet AD route for each local endpoint (AC) to remote PEs with the associated MPLS label.

  PE2 performs the same task.
- On reception of EVPN per EVI EAD route from PE2, PE1 adds the entry to its local L2 RIB. PE1 knows the path list to reach AC2, for example, next hop is PE2 IP address and MPLS label for AC2.

  PE2 performs the same task.

# Configuring L2VPN EVPN Address Family Under BGP

Perform this task to configure L2VPN EVPN address family under BGP.

**Note** Other than enabling RTC (route target constraint) with `address-family ipv4 rtfilter` command, there is no separate configuration needed to enable RTC for BGP EVPN.

### SUMMARY STEPS

1. **configure**
2. **router bgp** *autonomous-system-number*
3. **address-family l2vpn evpn**
4. **neighbor** *ip-address*
5. **address-family l2vpn evpn**
6. Use the **commit** or **end** command.

### DETAILED STEPS

**Step 1** **configure**

**Example:**

```
RP/0/RP0/CPU0:router# configure
```

Enters the Global Configuration mode.

**Step 2** **router bgp** *autonomous-system-number*

**Example:**

```
RP/0/RP0/CPU0:router(config)# router bgp 100
```

Enters router configuration mode for the specified routing process.

**Step 3** **address-family l2vpn evpn**

**Example:**

```
RP/0/RP0/CPU0:router(config-bgp)# address-family l2vpn evpn
RP/0/RP0/CPU0:router(config-bgp-af)# exit
```

Specifies the L2VPN address family and enters address family configuration mode.

**Step 4** **neighbor** *ip-address*

**Example:**

```
RP/0/RP0/CPU0:router(config-bgp)# neighbor 10.10.10.1
```

Adds the IP address of the neighbor in the specified autonomous system.

**Step 5** **address-family l2vpn evpn**

**Example:**

```
RP/0/RP0/CPU0:router(config-bgp-nbr)# address-family l2vpn evpn
```

Specifies the L2VPN address family of the neighbor and enters address family configuration mode.

**Step 6** Use the **commit** or **end** command.

**commit** - Saves the configuration changes and remains within the configuration session.

**end** - Prompts user to take one of these actions:

- **Yes** - Saves configuration changes and exits the configuration session.
- **No** - Exits the configuration session without committing the configuration changes.
- **Cancel** - Remains in the configuration mode, without committing the configuration changes.

# Configuring EVPN-VPWS

Perform this task to configure EVPN-VPWS.

## SUMMARY STEPS

1. **configure**
2. **interface type** *interface-path-id*
3. **l2vpn**

4. **xconnect group** *group-name*
5. **p2p** *xconnect-name*
6. **interface** *type interface-path-id*
7. **neighbor evpn evi** *vpn-id***target** *ac-id* **source** *ac-id*
8. Use the **commit** or **end** command.

## DETAILED STEPS

**Step 1** **configure**

**Example:**

```
RP/0/RP0/CPU0:router# configure
```

Enters the Global Configuration mode.

**Step 2** **interface type** *interface-path-id*

**Example:**

```
RP/0/RP0/CPU0:router(config)# interface TenGigE0/1/0/12
```

Enters interface configuration mode and configures an interface.

**Step 3** **l2vpn**

**Example:**

```
RP/0/RP0/CPU0:router(config)# l2vpn
```

Enters Layer 2 VPN configuration mode.

**Step 4** **xconnect group** *group-name*

**Example:**

```
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group evpn-vpws
```

Configures a cross-connect group name using a free-format 32-character string.

**Step 5** **p2p** *xconnect-name*

**Example:**

```
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p evpn1
```

Enters P2P configuration submode.

**Step 6** **interface** *type interface-path-id*

**Example:**

```
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# interface TenGigE0/1/0/2
```

Specifies the interface type and instance.

**Step 7** **neighbor evpn evi** *vpn-id***target** *ac-id* **source** *ac-id*

**Example:**

```
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor evpn evi 100 target 12 source 10
```

Enables EVPN-VPWS endpoint on the p2p cross-connect.

**Step 8** Use the **commit** or **end** command.

**commit** - Saves the configuration changes and remains within the configuration session.

**end** - Prompts user to take one of these actions:

- **Yes** - Saves configuration changes and exits the configuration session.
- **No** - Exits the configuration session without committing the configuration changes.
- **Cancel** - Remains in the configuration mode, without committing the configuration changes.

# Configuring EVPN-VPWS: Example

The following example shows how to configure EVPN-VPWS service.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# l2vpn
RP/0/RP0/CPU0:router(config-l2vpn)# xconnect group evpn-vpws
RP/0/RP0/CPU0:router(config-l2vpn-xc)# p2p evpn1
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# interface TenGigE0/1/0/12
RP/0/RP0/CPU0:router(config-l2vpn-xc-p2p)# neighbor evpn evi 100 target 12 source 10
```