

Contents

Introduction	1
Prerequisites	1
General restrictions and guidelines	1
Example: Configuring DRNI using an Ethernet aggregate link as the IPL on EVPN VTEPs	2
Network configuration	2
Analysis	2
Applicable hardware and software versions	3
Restrictions and guidelines	4
Procedures	5
Configuring the system operating mode	5
Configuring routed (Layer 3) interfaces	5
Configuring OSPF	6
Disabling spanning tree	7
Configuring EVPN	7
Configuring DRNI	9
Configuring BGP to advertise BGP EVPN routes	11
Mapping Ethernet service instances to VSIs	12
Verifying the configuration	13
Verifying the configuration on a DR member device	13
Verifying the network connectivity of the VMs	15
Configuration files	15
Example: Configuring DRNI using a VXLAN tunnel as the IPL on EVPN VTEPs	22
Network configuration	22
Analysis	22
Applicable hardware and software versions	23
Restrictions and guidelines	24
Procedures	25
Configuring the system operating mode	25
Configuring Layer 3 interfaces	25
Configuring OSPF	26
Configuring EVPN	27
Configuring DRNI	28
Configuring BGP to advertise BGP EVPN routes	31
Mapping Ethernet service instances to VSIs	32
Configuring Monitor Link	33
Verifying the configuration	33
Verifying the configuration on a DR member device	33
Verifying the network connectivity of the VMs	35
Configuration files	35
Example: Configuring DRNI using an Ethernet aggregate link as the IPL on EVPN gateways	42
Network configuration	42
Analysis	42
Applicable hardware and software versions	43
Restrictions and guidelines	44
Procedures	45
Configuring the system operating mode	45
Configuring Layer 3 interfaces	45

Configuring OSPF	46
Disabling spanning tree	47
Configuring EVPN	47
Configuring distributed EVPN gateways	49
Configuring DRNI	52
Configuring BGP to advertise BGP EVPN routes	54
Mapping Ethernet service instances to VSIs	55
Verifying the configuration	56
Verifying the configuration on a DR member device	56
Verifying the network connectivity of the VMs	59
Configuration files	59

Example: Configuring DRNI using a VXLAN tunnel as the IPL on EVPN gateways..... 68

Network configuration	68
Analysis	69
Applicable hardware and software versions.....	69
Restrictions and guidelines	71
Procedures	72
Configuring the system operating mode.....	72
Configuring Layer 3 interfaces	72
Configuring OSPF	72
Disabling spanning tree	73
Configuring EVPN	74
Configuring distributed EVPN gateways.....	75
Configuring DRNI	78
Configuring BGP to advertise BGP EVPN routes	80
Mapping Ethernet service instances to VSIs	81
Configuring Monitor Link.....	82
Verifying the configuration	83
Verifying the configuration on a DR member device	83
Verifying the network connectivity of the VMs	86
Configuration files	86

Introduction

This document provides configuration examples for using Distributed Resilient Network Interconnect (DRNI) on an Ethernet Virtual Private Network (EVPN) network.

DRNI virtualizes two physical devices into one system through multichassis link aggregation. You can use DRNI to virtualize two VTEPs or EVPN gateways into one distributed-relay (DR) system to avoid single points of failure.

Prerequisites

The configuration examples were created and verified in a lab environment, and all the devices were started with the factory default configuration. When you are working on a live network, make sure you understand the potential impact of every command on your network.

The following information is provided based on the assumption that you have basic knowledge of DRNI and EVPN.

General restrictions and guidelines

Link aggregation group membership is mutually exclusive with Ethernet service instance-to-VSI mappings on a Layer 2 interface. Do not associate a VSI with an Ethernet service instance on a Layer 2 interface if the interface is in an aggregation group. Do not assign a Layer 2 interface to an aggregation group if the interface is configured with Ethernet service instances of VSIs.

Ethernet service instance bindings of VSIs are mutually exclusive with QinQ and VLAN mapping on a Layer 2 Ethernet interface or Layer 2 aggregate interface. Do not configure these features simultaneously on the same interface. Otherwise, the features cannot take effect.

Do not configure VLAN mapping, QinQ, or MAC-based VLAN on a Layer 2 Ethernet interface or Layer 2 aggregate interface that acts as the traffic outgoing interface of a VXLAN tunnel. Otherwise, the features cannot take effect.

If a manually created VXLAN tunnel and an automatically created VXLAN tunnel have the same destination IP address, do not assign the tunnels to the same VXLAN. For more information about manual VXLAN tunnel setup, see *VXLAN Configuration Guide*.

The VTEPs or EVPN gateways to form a DR system must have the same configuration, including the following:

- ACs.
- VSI and VXLAN mappings.
- Router MAC address, which is the EVPN global MAC address configured by using the **evpn global-mac** command or the MAC address assigned to L3VNI-associated VSI interfaces by using the **mac-address** command.

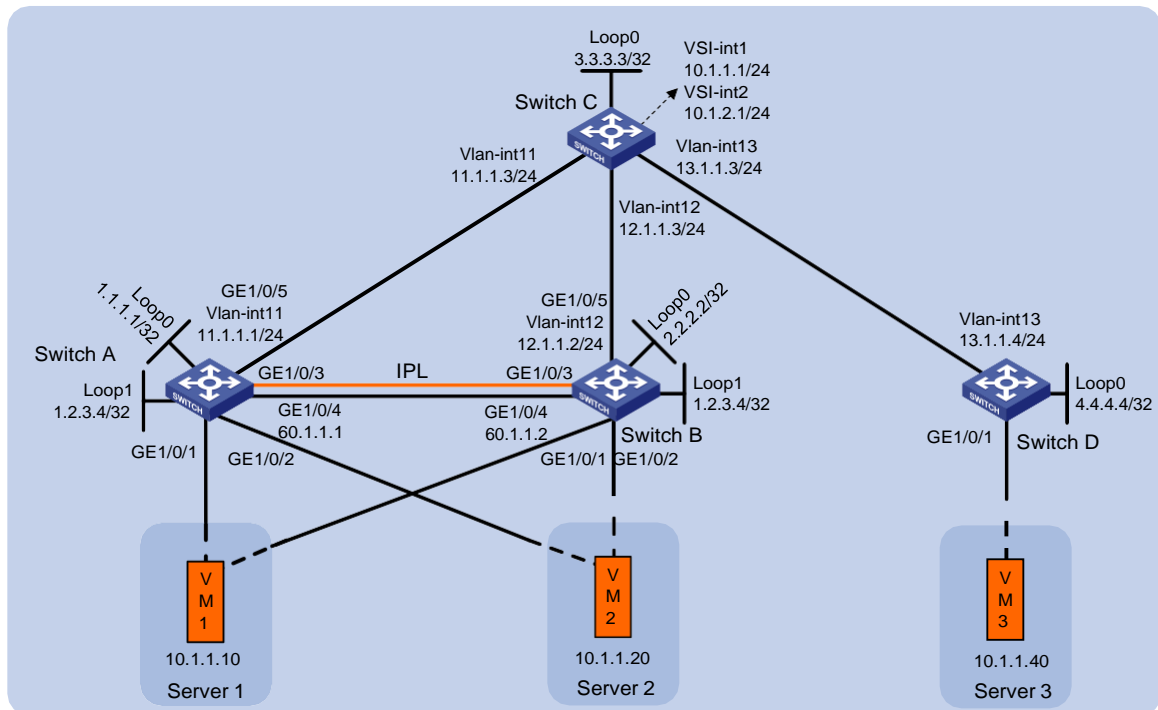
Example: Configuring DRNI using an Ethernet aggregate link as the IPL on EVPN VTEPs

Network configuration

As shown in [Figure 1](#), perform the following tasks to make sure the VMs can communicate with one another:

- Configure VXLAN 10 on Switch A, Switch B, and Switch D.
- Configure DRNI on Switch A and Switch B to virtualize them into one VTEP. Configure an Ethernet aggregate link as the IPL between the switches.
- Configure Switch C as a route reflector (RR).

Figure 1 Network diagram



Analysis

To make sure the overlay network has connectivity, configure a routing protocol on the switches to advertise routes for reaching their interfaces, including the loopback interfaces. In this example, OSPF is used.

To conserve resources, configure Switch C to reflect routes for Switch A, Switch B, and Switch D.

Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Restrictions and guidelines

Make sure the following settings are consistent on the DR member devices:

- Ethernet service instances and their match criterion on the DR interfaces in the same DR group or single-homed site-facing interfaces.
- VXLAN IDs of VSIs.

In addition, the Ethernet service instances must be created manually.

As a best practice, do not redistribute external routes on the DR member devices.

Use the **drni mad exclude interface** command to exclude all interfaces used by EVPN from the shutdown action by DRNI MAD. The interfaces include VSI interfaces, interfaces that provide BGP peer addresses, interfaces used for setting up the keepalive link, and transport-facing outgoing interfaces of VXLAN tunnels.

For EVPN to run correctly on a DR system, you must execute the **undo mac-address static source-check enable** command to disable static source check on the following interfaces:

- Layer 2 aggregate interfaces or Layer 2 Ethernet interfaces acting as the IPPs.
- Transport-facing physical interfaces.

As a best practice, use the IP address of a loopback interface as the virtual VTEP address.

You must disable spanning tree on the Layer 2 Ethernet interface that acts as the physical traffic outgoing interface of a VXLAN tunnel. If you enable spanning tree on that interface, the upstream device will falsely block the interfaces connected to the DR member devices.

Configure backup routes for directing traffic from one DR member device to the other DR member device upon uplink failure.

You can configure only the **encapsulation s-vid** *vlan-id* and **encapsulation untagged** frame match criteria and VLAN access mode for Ethernet service instances

Procedures

Configuring the system operating mode

Set the system operating mode to VXLAN on Switch A, and reboot the switch for the mode change to take effect.

```
<SwitchA> system-view
[SwitchA] switch-mode 1
Reboot device to make the configuration take effect.
[SwitchA] quit
<SwitchA> reboot
Start to check configuration with next startup configuration file, please wait..
.....DONE!
Current configuration may be lost after the reboot, save current configuration?
[Y/N]:y
This command will reboot the device. Continue? [Y/N]:y
```

Set the system operating mode of Switch B and Switch D to VXLAN. The method is the same as Switch A. (Details not shown.)

Configuring routed (Layer 3) interfaces

Configure the Layer 3 interfaces on Switch A.

```
<SwitchA> system-view
[SwitchA] interface loopback 0
[SwitchA-Loopback0] ip address 1.1.1.1 32
[SwitchA-Loopback0] quit
[SwitchA] interface loopback 1
[SwitchA-Loopback1] ip address 1.2.3.4 32
[SwitchA-Loopback1] quit
[SwitchA] vlan 11
[SwitchA-vlan11] port gigabitethernet 1/0/5
```

```
[SwitchA-vlan11] quit
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] ip address 11.1.1.1 24
[SwitchA-Vlan-interface11] quit
[SwitchA] interface gigabitethernet 1/0/4
[SwitchA-GigabitEthernet1/0/4] port link-mode route
[SwitchA-GigabitEthernet1/0/4] ip address 60.1.1.1 24
[SwitchA-GigabitEthernet1/0/4] quit
```

Configure the Layer 3 interfaces on other switches. (Details not shown.)

Configuring OSPF

Configuring Switch A

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchA] ospf 1 router-id 1.1.1.1
[SwitchA-ospf-1] area 0
[SwitchA-ospf-1-area-0.0.0.0] network 1.1.1.1 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchA-ospf-1-area-0.0.0.0] quit
[SwitchA-ospf-1] quit
```

Configure OSPF on VLAN-interface 100 for traffic to be redirected to an available DR member device when an uplink fails.

```
[SwitchA] vlan 100
[SwitchA-vlan100] quit
[SwitchA] interface Vlan-interface 100
[SwitchA-Vlan-interface100] ip address 100.1.1.1 255.255.255.0
[SwitchA-Vlan-interface100] ospf 1 area 0.0.0.0
[SwitchA-Vlan-interface100] quit
```

Configuring Switch B

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchB> system-view
[SwitchB] ospf 1 router-id 2.2.2.2
[SwitchB-ospf-1] area 0
[SwitchB-ospf-1-area-0.0.0.0] network 2.2.2.2 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchB-ospf-1-area-0.0.0.0] quit
[SwitchB-ospf-1] quit
```

Configure OSPF on VLAN-interface 100 for traffic to be redirected to an available DR member device when an uplink fails.

```
[SwitchB] vlan 100
[SwitchB-vlan100] quit
[SwitchB] interface Vlan-interface 100
[SwitchB-Vlan-interface100] ip address 100.1.1.2 255.255.255.0
[SwitchB-Vlan-interface100] ospf 1 area 0.0.0.0
[SwitchB-Vlan-interface100] quit
```

Configuring Switch C

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchC> system-view
[SwitchC] ospf 1 router-id 3.3.3.3
[SwitchC-ospf-1] area 0
[SwitchC-ospf-1-area-0.0.0.0] network 3.3.3.3 0.0.0.0
[SwitchC-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] quit
[SwitchC-ospf-1] quit
```

Configuring Switch D

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchD> system-view
[SwitchD] ospf 1 router-id 4.4.4.4
[SwitchD-ospf-1] area 0
[SwitchD-ospf-1-area-0.0.0.0] network 4.4.4.4 0.0.0.0
[SwitchD-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchD-ospf-1-area-0.0.0.0] quit
[SwitchD-ospf-1] quit
```

Disabling spanning tree

Configuring Switch A

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/5.

```
[SwitchA] interface gigabitethernet 1/0/5
[SwitchA-GigabitEthernet1/0/5] undo stp enable
[SwitchA-GigabitEthernet1/0/5] quit
```

Configuring Switch B

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/5.

```
[SwitchB] interface gigabitethernet 1/0/5
[SwitchB-GigabitEthernet1/0/5] undo stp enable
[SwitchB-GigabitEthernet1/0/5] quit
```

Configuring EVPN

Configuring Switch A

Enable L2VPN.

```
[SwitchA] l2vpn enable
```

Enable Layer 2 forwarding for VXLANs.

```
[SwitchA] undo vxlan ip-forwarding
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchA] vxlan tunnel mac-learning disable
```

```
[SwitchA] vxlan tunnel arp-learning disable
```

Create an EVPN instance on VSI **vpna**.

```
[SwitchA] vsi vpna
```



```
[SwitchA-vsi-vpna] arp suppression enable
[SwitchA-vsi-vpna] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchA-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchA-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchA-vsi-vpna-evpn-vxlan] quit

# Create VXLAN 10.
[SwitchA-vsi-vpna] vxlan 10
[SwitchA-vsi-vpna-vxlan-10] quit
[SwitchA-vsi-vpna] quit
```

Configuring Switch B

```
# Enable L2VPN.
[SwitchB] l2vpn enable

# Enable Layer 2 forwarding for VXLANs.
[SwitchB] undo vxlan ip-forwarding

# Disable remote MAC address learning and remote ARP learning.
[SwitchB] vxlan tunnel mac-learning disable
[SwitchB] vxlan tunnel arp-learning disable

# Create an EVPN instance on VSI vpna.
[SwitchB] vsi vpna
[SwitchB-vsi-vpna] arp suppression enable
[SwitchB-vsi-vpna] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchB-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchB-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchB-vsi-vpna-evpn-vxlan] quit

# Create VXLAN 10.
[SwitchB-vsi-vpna] vxlan 10
[SwitchB-vsi-vpna-vxlan-10] quit
[SwitchB-vsi-vpna] quit
```

Configuring Switch D

```
# Enable L2VPN.
[SwitchD] l2vpn enable

# Enable Layer 2 forwarding for VXLANs.
[SwitchD] undo vxlan ip-forwarding

# Disable remote MAC address learning and remote ARP learning.
[SwitchD] vxlan tunnel mac-learning disable
[SwitchD] vxlan tunnel arp-learning disable

# Create an EVPN instance on VSI vpna.
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] arp suppression enable
[SwitchD-vsi-vpna] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchD-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchD-vsi-vpna-evpn-vxlan] vpn-target auto
```

```
[SwitchD-vsi-vpna-evpn-vxlan] quit
# Create VXLAN 10.
[SwitchD-vsi-vpna] vxlan 10
[SwitchD-vsi-vpna-vxlan-10] quit
[SwitchD-vsi-vpna] quit
```

Configuring DRNI

Configuring Switch A

```
# Specify the virtual VTEP address as 1.2.3.4.
[SwitchA] evpn drni group 1.2.3.4

# Configure DR system parameters.
[SwitchA] drni system-mac 0001-0001-0001
[SwitchA] drni system-number 1
[SwitchA] drni system-priority 10
[SwitchA] drni restore-delay 180
[SwitchA] drni keepalive ip destination 60.1.1.2 source 60.1.1.1

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 3.
[SwitchA] interface bridge-aggregation 3
[SwitchA-Bridge-Aggregation3] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation3] quit

# Assign GigabitEthernet 1/0/3 to aggregation group 3.
[SwitchA] interface gigabitethernet 1/0/3
[SwitchA-GigabitEthernet1/0/3] port link-aggregation group 3
[SwitchA-GigabitEthernet1/0/3] quit

# Specify Bridge-Aggregation 3 as the IPP.
[SwitchA] interface bridge-aggregation 3
[SwitchA-Bridge-Aggregation3] port drni intra-portal-port 1
[SwitchA-Bridge-Aggregation3] undo mac-address static source-check enable
[SwitchA-Bridge-Aggregation3] quit

# Disable the static source check feature on GigabitEthernet 1/0/5.
[SwitchA] interface gigabitethernet 1/0/5
[SwitchA-GigabitEthernet1/0/5] undo mac-address static source-check enable
[SwitchA-GigabitEthernet1/0/5] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation4] quit

# Assign GigabitEthernet 1/0/1 to aggregation group 4.
[SwitchA] interface gigabitethernet 1/0/1
[SwitchA-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchA-GigabitEthernet1/0/1] quit

# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port drni group 4
[SwitchA-Bridge-Aggregation4] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation5] quit
```

Assign GigabitEthernet 1/0/2 to aggregation group 5.

```
[SwitchA] interface gigabitethernet 1/0/2
[SwitchA-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchA-GigabitEthernet1/0/2] quit
```

Assign Bridge-Aggregation 5 to DR group 5.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port drni group 5
[SwitchA-Bridge-Aggregation5] quit
```

Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.

```
[SwitchA] drni mad exclude interface loopback 0
[SwitchA] drni mad exclude interface gigabitethernet 1/0/4
[SwitchA] drni mad exclude interface gigabitethernet 1/0/5
[SwitchA] drni mad exclude interface vlan-interface 11
```

Configuring Switch B

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchB] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchB] drni system-mac 0001-0001-0001
[SwitchB] drni system-number 2
[SwitchB] drni system-priority 10
[SwitchB] drni restore-delay 180
[SwitchB] drni keepalive ip destination 60.1.1.1 source 60.1.1.2
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 3.

```
[SwitchB] interface bridge-aggregation 3
[SwitchB-Bridge-Aggregation3] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation3] quit
```

Assign GigabitEthernet 1/0/3 to aggregation group 3.

```
[SwitchB] interface gigabitethernet 1/0/3
[SwitchB-GigabitEthernet1/0/3] port link-aggregation group 3
[SwitchB-GigabitEthernet1/0/3] quit
```

Specify Bridge-Aggregation 3 as the IPP.

```
[SwitchB] interface bridge-aggregation 3
[SwitchB-Bridge-Aggregation3] port drni intra-portal-port 1
[SwitchB-Bridge-Aggregation3] undo mac-address static source-check enable
[SwitchB-Bridge-Aggregation3] quit
```

Disable the static source check feature on GigabitEthernet 1/0/5.

```
[SwitchB] interface gigabitethernet 1/0/5
[SwitchB-GigabitEthernet1/0/5] undo mac-address static source-check enable
[SwitchB-GigabitEthernet1/0/5] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] link-aggregation mode dynamic
```

```

[SwitchB-Bridge-Aggregation4] quit
# Assign GigabitEthernet 1/0/1 to aggregation group 4.
[SwitchB] interface gigabitethernet 1/0/1
[SwitchB-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchB-GigabitEthernet1/0/1] quit
# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port drni group 4
[SwitchB-Bridge-Aggregation4] quit
# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation5] quit
# Assign GigabitEthernet 1/0/2 to aggregation group 5.
[SwitchB] interface gigabitethernet 1/0/2
[SwitchB-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchB-GigabitEthernet1/0/2] quit
# Assign Bridge-Aggregation 5 to DR group 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port drni group 5
[SwitchB-Bridge-Aggregation5] quit
# Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface loopback 0
[SwitchB] drni mad exclude interface gigabitethernet 1/0/4
[SwitchB] drni mad exclude interface gigabitethernet 1/0/5
[SwitchA] drni mad exclude interface vlan-interface 12

```

Configuring BGP to advertise BGP EVPN routes

Configuring Switch A

```

# Configure BGP to advertise BGP EVPN routes.
[SwitchA] bgp 200
[SwitchA-bgp-default] peer 3.3.3.3 as-number 200
[SwitchA-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchA-bgp-default] address-family l2vpn evpn
[SwitchA-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchA-bgp-default-evpn] quit
[SwitchA-bgp-default] quit

```

Configuring Switch B

```

# Configure BGP to advertise BGP EVPN routes.
[SwitchB] bgp 200
[SwitchB-bgp-default] peer 3.3.3.3 as-number 200
[SwitchB-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchB-bgp-default] address-family l2vpn evpn
[SwitchB-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchB-bgp-default-evpn] quit

```

```
[SwitchB-bgp-default] quit
```

Configuring Switch C

Configure BGP to advertise BGP EVPN routes and configure the switch as an RR.

```
[SwitchC] bgp 200
[SwitchC-bgp-default] group evpn
[SwitchC-bgp-default] peer 1.1.1.1 group evpn
[SwitchC-bgp-default] peer 2.2.2.2 group evpn
[SwitchC-bgp-default] peer 4.4.4.4 group evpn
[SwitchC-bgp-default] peer evpn as-number 200
[SwitchC-bgp-default] peer evpn connect-interface loopback 0
[SwitchC-bgp-default] address-family l2vpn evpn
[SwitchC-bgp-default-evpn] peer evpn enable
[SwitchC-bgp-default-evpn] undo policy vpn-target
[SwitchC-bgp-default-evpn] peer evpn reflect-client
[SwitchC-bgp-default-evpn] quit
[SwitchC-bgp-default] quit
```

Configuring Switch D

Configure BGP to advertise BGP EVPN routes.

```
[SwitchD] bgp 200
[SwitchD-bgp-default] peer 3.3.3.3 as-number 200
[SwitchD-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchD-bgp-default] address-family l2vpn evpn
[SwitchD-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchD-bgp-default-evpn] quit
[SwitchD-bgp-default] quit
```

Mapping Ethernet service instances to VSIs

Configuring Switch A

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port link-type trunk
[SwitchA-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchA-Bridge-Aggregation4] service-instance 1000
[SwitchA-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI *vpna*.

```
[SwitchA-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchA-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port link-type trunk
[SwitchA-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchA-Bridge-Aggregation5] service-instance 1000
[SwitchA-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI *vpna*.

```
[SwitchA-Bridge-Aggregation5-srv1000] xconnect vsi vpna
```

```
[SwitchA-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch B

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port link-type trunk
[SwitchB-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchB-Bridge-Aggregation4] service-instance 1000
[SwitchB-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI *vpna*.

```
[SwitchB-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port link-type trunk
[SwitchB-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchB-Bridge-Aggregation5] service-instance 1000
[SwitchB-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI *vpna*.

```
[SwitchB-Bridge-Aggregation5-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch D

On GigabitEthernet 1/0/1, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchD] interface gigabitethernet 1/0/1
[SwitchD-GigabitEthernet1/0/1] port link-type trunk
[SwitchD-GigabitEthernet1/0/1] port trunk permit vlan 2
[SwitchD-GigabitEthernet1/0/1] service-instance 1000
[SwitchD-GigabitEthernet1/0/1] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI *vpna*.

```
[SwitchD-GigabitEthernet1/0/1] xconnect vsi vpna
[SwitchD-GigabitEthernet1/0/1] quit
```

Verifying the configuration

Verifying the configuration on a DR member device

The verification procedure uses Switch A as an example.

Verify that Switch A has BGP EVPN routes.

```
[Switch A]display bgp l2vpn evpn
BGP local router ID is 1.2.3.4
Status codes: * - valid, > - best, d - dampened, h - history
               s - suppressed, S - stale, i - internal, e - external
               a - additional-path
Origin: i - IGP, e - EGP, ? - incomplete
Total number of routes from all PEs: 1
Route distinguisher: 1:10
```

```

Total number of routes: 2
      Network          NextHop      MED      LocPrf    PrefVal Path/Ogn
* >  [3][0][32][1.2.3.4]/80
      1.2.3.4          0          100      32768    i
* >i [3][0][32][4.4.4.4]/80
      4.4.4.4          0          100      0        i

```

Verify that the VXLAN tunnel to Switch D is up, and the source address of the tunnel is the virtual VTEP address.

```

[SwitchA] display interface tunnel
Tunnel0
Current state: UP
Line protocol state: UP
Description: Tunnel0 Interface
Bandwidth: 64 kbps
Maximum transmission unit: 1464
Internet protocol processing: Disabled
Last clearing of counters: Never
Tunnel source 1.2.3.4, destination 4.4.4.4
Tunnel protocol/transport UDP_VXLAN/IP
Last 300 seconds input rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Last 300 seconds output rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Input: 0 packets, 0 bytes, 0 drops
Output: 0 packets, 0 bytes, 0 drops

```

Verify that ACs have been created on the IPP and mapped to VXLAN 10.

```

[SwitchA] display l2vpn vsi verbose
VSI Name: vpna
  VSI Index      : 0
  VSI State      : Up
  MTU            : 1500
  Bandwidth      : -
  Broadcast Restrain : -
  Multicast Restrain : -
  Unknown Unicast Restrain: -
  MAC Learning   : Enabled
  MAC Table Limit : -
  MAC Learning rate : -
  Drop Unknown   : -
  Flooding       : Enabled
  Statistics     : Disabled
  VXLAN ID       : 10
Tunnels:
  Tunnel Name    Link ID   State   Type      Flood proxy
  Tunnel0        0x5000000 UP       Auto      Disabled
ACs:
  AC              Link ID   State   Type
  BAGG4 srv1000   0        Up      Manual
  BAGG3 srv2      1        Up      Dynamic (DRNI)
  BAGG5 srv1000   2        Up      Manual

```

Verifying the network connectivity of the VMs

Verify that VM 1, VM 2, and VM 3 can communicate when both Switch A and Switch B are operating correctly. (Details not shown.)

Verify that VM 1, VM 2, and VM 3 can communicate when Switch A's or Switch B's links to the local site are disconnected. (Details not shown.)

Configuration files

- Switch A:

```
#
undo vxlan ip-forwarding
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 1.1.1.1
area 0.0.0.0
network 1.1.1.1 0.0.0.0
network 1.2.3.4 0.0.0.0
network 11.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 11
#
vlan 100
#
l2vpn enable
vxlan tunnel arp-learning disable
evpn drni group 1.2.3.4
#
vsi vpna
arp suppression enable
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface Bridge-Aggregation3
link-aggregation mode dynamic
port drni intra-portal-port 1
undo mac-address static source-check enable
#
```



```

interface Bridge-Aggregation4
  port link-type trunk
  port trunk permit vlan 1 to 2
  link-aggregation mode dynamic
  port drni group 4
#
  service-instance 1000
    encapsulation s-vid 2
    xconnect vsi vpna
#
interface Bridge-Aggregation5
  port link-type trunk
  port trunk permit vlan 1 3
  link-aggregation mode dynamic
  port drni group 5
#
  service-instance 1000
    encapsulation s-vid 3
    xconnect vsi vpna
#
interface LoopBack0
  ip address 1.1.1.1 255.255.255.255
#
interface LoopBack0
  ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface11
  ip address 11.1.1.1 255.255.255.0
#
interface Vlan-interface100
  ip address 100.1.1.2 255.255.255.0
  ospf 1 area 0.0.0.0
#
interface GigabitEthernet1/0/4
  port link-mode route
  ip address 60.1.1.1 255.255.255.0
#
interface GigabitEthernet1/0/1
  port link-mode bridge
  port link-type trunk
  port trunk permit vlan 1 to 2
  port link-aggregation group 4
#
interface GigabitEthernet1/0/2
  port link-mode bridge
  port link-type trunk
  port trunk permit vlan 1 3
  port link-aggregation group 5

```

```

#
interface GigabitEthernet1/0/3
  port link-mode bridge
  port link-aggregation group 3
#
interface GigabitEthernet1/0/5
  port link-mode bridge
  port access vlan 11
  undo stp enable
  undo mac-address static source-check enable
#
bgp 200
  peer 3.3.3.3 as-number 200
  peer 3.3.3.3 connect-interface LoopBack0
  #
  address-family l2vpn evpn
    peer 3.3.3.3 enable
  #
  drni keepalive ip destination 60.1.1.2 source 60.1.1.1
  drni restore-delay 180
  drni system-mac 0001-0001-0001
  drni system-number 1
  drni system-priority 10
#
  drni mad exclude interface LoopBack0
  drni mad exclude interface GigabitEthernet1/0/4
  drni mad exclude interface GigabitEthernet1/0/5
  drni mad exclude interface Vlan-interface11
#
return

```

- **Switch B:**

```

#
  undo vxlan ip-forwarding
#
  vxlan tunnel mac-learning disable
#
ospf 1 router-id 2.2.2.2
  area 0.0.0.0
    network 1.2.3.4 0.0.0.0
    network 2.2.2.2 0.0.0.0
    network 12.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 12
#

```

```

vlan 100
#
l2vpn enable
vxlan tunnel arp-learning disable
evpn drni group 1.2.3.4
#
vsi vpna
arp suppression enable
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface Bridge-Aggregation3
link-aggregation mode dynamic
port drni intra-portal-port 1
undo mac-address static source-check enable
#
interface Bridge-Aggregation4
port link-type trunk
port trunk permit vlan 1 to 2
link-aggregation mode dynamic
port drni group 4
#
service-instance 1000
encapsulation s-vid 2
xconnect vsi vpna
#
interface Bridge-Aggregation5
port link-type trunk
port trunk permit vlan 1 3
link-aggregation mode dynamic
port drni group 5
#
service-instance 1000
encapsulation s-vid 3
xconnect vsi vpna
#
interface LoopBack0
ip address 2.2.2.2 255.255.255.255
#
interface LoopBack1
ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface12
ip address 12.1.1.2 255.255.255.0
#

```

```

interface Vlan-interface100
 ip address 100.1.1.2 255.255.255.0
 ospf 1 area 0.0.0.0
#
interface GigabitEthernet1/0/4
 port link-mode route
 ip address 60.1.1.2 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 to 2
 port link-aggregation group 4
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 3
 port link-aggregation group 5
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port link-aggregation group 3
#
interface GigabitEthernet1/0/5
 port link-mode bridge
 port access vlan 12
 undo stp enable
 undo mac-address static source-check enable
#
bgp 200
 peer 3.3.3.3 as-number 200
 peer 3.3.3.3 connect-interface LoopBack0
#
 address-family l2vpn evpn
  peer 3.3.3.3 enable
#
 drni keepalive ip destination 60.1.1.1 source 60.1.1.2
 drni restore-delay 180
 drni system-mac 0001-0001-0001
 drni system-number 2
 drni system-priority 10
#
 drni mad exclude interface LoopBack0
 drni mad exclude interface GigabitEthernet1/0/4
 drni mad exclude interface GigabitEthernet1/0/5
 drni mad exclude interface Vlan-interface12
#

```

```

return
• Switch C:
#
ospf 1 router-id 3.3.3.3
 area 0.0.0.0
  network 3.3.3.3 0.0.0.0
  network 11.1.1.0 0.0.0.255
  network 12.1.1.0 0.0.0.255
  network 13.1.1.0 0.0.0.255
#
vlan 11 to 13
#
interface LoopBack0
 ip address 3.3.3.3 255.255.255.255
#
interface Vlan-interface11
 ip address 11.1.1.3 255.255.255.0
#
interface Vlan-interface12
 ip address 12.1.1.3 255.255.255.0
#
interface Vlan-interface13
 ip address 13.1.1.3 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 11
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 12
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port access vlan 13
#
bgp 200
 group evpn internal
 peer evpn connect-interface LoopBack0
 peer 1.1.1.1 group evpn
 peer 2.2.2.2 group evpn
 peer 4.4.4.4 group evpn
#
 address-family l2vpn evpn
  undo policy vpn-target
  peer evpn enable
  peer evpn reflect-client
#

```

```

return
• Switch D:
#
undo vxlan ip-forwarding
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 4.4.4.4
area 0.0.0.0
network 4.4.4.4 0.0.0.0
network 13.1.1.0 0.0.0.255
#
vlan 2
#
vlan 13
#
l2vpn enable
vxlan tunnel arp-learning disable
#
vsi vpna
arp suppression enable
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface LoopBack0
ip address 4.4.4.4 255.255.255.255
#
interface Vlan-interface13
ip address 13.1.1.4 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-type trunk
port trunk permit vlan 1 to 2
port link-mode bridge
#
service-instance 1000
encapsulation s-vid 2
xconnect vsi vpna
#
interface GigabitEthernet1/0/2
port link-mode bridge
port access vlan 13
#
bgp 200
peer 3.3.3.3 as-number 200

```

```

peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
peer 3.3.3.3 enable
#

```

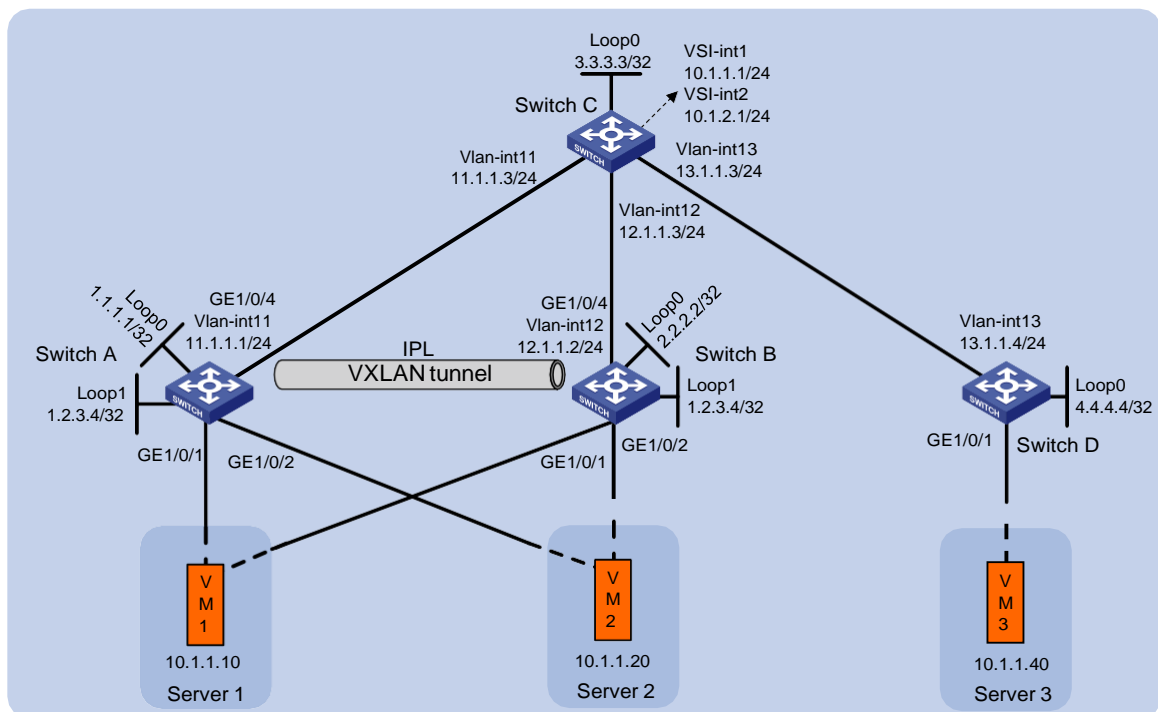
Example: Configuring DRNI using a VXLAN tunnel as the IPL on EVPN VTEPs

Network configuration

As shown in [Figure 2](#), perform the following tasks to make sure the VMs can communicate with one another:

- Configure VXLAN 10 on Switch A, Switch B, and Switch D.
- Configure DRNI on Switch A and Switch B to virtualize them into one VTEP. Manually set up a VXLAN tunnel as the IPL between the switches.
- Configure Switch C as an RR.

Figure 2 Network diagram



Analysis

To make sure the overlay network has connectivity,, configure a routing protocol on these switches to advertise routes for reaching their interfaces, including the loopback interfaces. In this example, OSPF is used.

To conserve resources, configure Switch C to reflect routes for Switch A, Switch B, and Switch D.

Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Restrictions and guidelines

Make sure the following settings are consistent on the DR member devices:

- Ethernet service instances and their match criterion on the DR interfaces in the same DR group or single-homed site-facing interfaces.
- VXLAN IDs of VSIs.

In addition, the Ethernet service instances must be created manually.

As a best practice, do not redistribute external routes on the DR member devices.

Use the **drni mad exclude interface** command to exclude all interfaces used by EVPN from the shutdown action by DRNI MAD. The interfaces include VSI interfaces, interfaces that provide BGP peer addresses, interfaces used for setting up the keepalive link, and transport-facing outgoing interfaces of VXLAN tunnels.

Use the **drni mad exclude interface** command to exclude VXLAN tunnel interfaces and their traffic outgoing interfaces from the MAD shutdown action by DRNI before you configure them as IPPs. If you have configured the VXLAN tunnel interfaces as IPPs before excluding them and their traffic outgoing interfaces from the MAD shutdown action, you must first remove the IPP configuration. After the VXLAN tunnel interfaces and their traffic outgoing interfaces come up, exclude the interfaces from the MAD shutdown action by DRNI. Then, configure the VXLAN tunnel interfaces as IPPs.

As a best practice, use the IP address of a loopback interface as the virtual VTEP address.

For EVPN to run correctly on a DR system, you must execute the **undo mac-address static source-check enable** command to disable static source check on the following interfaces:

- Layer 2 aggregate interfaces or Layer 2 Ethernet interfaces acting as the IPPs.
- Transport-facing physical interfaces.

You must disable spanning tree on the Layer 2 Ethernet interface that acts as the physical traffic outgoing interface of a VXLAN tunnel. If you enable spanning tree on that interface, the upstream device will falsely block the interfaces connected to the DR member devices.

Procedures

Configuring the system operating mode

Set the system operating mode to VXLAN on Switch A, and reboot the switch for the mode change to take effect.

```
<SwitchA> system-view
```

```
[SwitchA] switch-mode 1
```

Reboot device to make the configuration take effect.

```
[SwitchA] quit
```

```
<SwitchA> reboot
```

Start to check configuration with next startup configuration file, please wait..

.....DONE!

Current configuration may be lost after the reboot, save current configuration?

```
[Y/N]:y
```

This command will reboot the device. Continue? [Y/N]:y

Set the system operating mode of Switch B and Switch D to VXLAN. The method is the same as Switch A. (Details not shown.)

Configuring Layer 3 interfaces

Configure the Layer 3 interfaces on Switch A.

```
<SwitchA> system-view
```

```
[SwitchA] interface loopback 0
```

```
[SwitchA-Loopback0] ip address 1.1.1.1 32
```

```
[SwitchA-Loopback0] quit
```

```
[SwitchA] interface loopback 1
[SwitchA-Loopback1] ip address 1.2.3.4 32
[SwitchA-Loopback1] quit
[SwitchA] vlan 11
[SwitchA-vlan11] port gigabitethernet 1/0/5
[SwitchA-vlan11] quit
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] ip address 11.1.1.1 24
[SwitchA-Vlan-interface11] quit
```

Configure the Layer 3 interfaces on other switches. (Details not shown.)

Configuring OSPF

Configuring Switch A

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchA] ospf 1 router-id 1.1.1.1
[SwitchA-ospf-1] area 0
[SwitchA-ospf-1-area-0.0.0.0] network 1.1.1.1 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchA-ospf-1-area-0.0.0.0] quit
[SwitchA-ospf-1] quit
```

Configuring Switch B

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchB> system-view
[SwitchB] ospf 1 router-id 2.2.2.2
[SwitchB-ospf-1] area 0
[SwitchB-ospf-1-area-0.0.0.0] network 2.2.2.2 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchB-ospf-1-area-0.0.0.0] quit
[SwitchB-ospf-1] quit
```

Configuring Switch C

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchC> system-view
[SwitchC] ospf 1 router-id 3.3.3.3
[SwitchC-ospf-1] area 0
[SwitchC-ospf-1-area-0.0.0.0] network 3.3.3.3 0.0.0.0
[SwitchC-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] quit
[SwitchC-ospf-1] quit
```

Configuring Switch D

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchD> system-view
```

```
[SwitchD] ospf 1 router-id 4.4.4.4
[SwitchD-ospf-1] area 0
[SwitchD-ospf-1-area-0.0.0.0] network 4.4.4.4 0.0.0.0
[SwitchD-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchD-ospf-1-area-0.0.0.0] quit
[SwitchD-ospf-1] quit
```

Configuring EVPN

Configuring Switch A

Enable L2VPN.

```
[SwitchA] l2vpn enable
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchA] vxlan tunnel mac-learning disable
```

```
[SwitchA] vxlan tunnel arp-learning disable
```

Specify the reserved VXLAN as VXLAN 1234.

```
[SwitchA] reserved vxlan 1234
```

Create an EVPN instance on VSI **vpna.**

```
[SwitchA] vsi vpna
```

```
[SwitchA-vsi-vpna] arp suppression enable
```

```
[SwitchA-vsi-vpna] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchA-vsi-vpna-evpn-vxlan] route-distinguisher auto
```

```
[SwitchA-vsi-vpna-evpn-vxlan] vpn-target auto
```

```
[SwitchA-vsi-vpna-evpn-vxlan] quit
```

Create VXLAN 10.

```
[SwitchA-vsi-vpna] vxlan 10
```

```
[SwitchA-vsi-vpna-vxlan-10] quit
```

```
[SwitchA-vsi-vpna] quit
```

Configuring Switch B

Enable L2VPN.

```
[SwitchB] l2vpn enable
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchB] vxlan tunnel mac-learning disable
```

```
[SwitchB] vxlan tunnel arp-learning disable
```

Specify the reserved VXLAN as VXLAN 1234.

```
[SwitchB] reserved vxlan 1234
```

Create an EVPN instance on VSI **vpna.**

```
[SwitchB] vsi vpna
```

```
[SwitchB-vsi-vpna] arp suppression enable
```

```
[SwitchB-vsi-vpna] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchB-vsi-vpna-evpn-vxlan] route-distinguisher auto
```

```
[SwitchB-vsi-vpna-evpn-vxlan] vpn-target auto
```

```
[SwitchB-vsi-vpna-evpn-vxlan] quit
```

Create VXLAN 10.

```
[SwitchB-vsi-vpna] vxlan 10
[SwitchB-vsi-vpna-vxlan-10] quit
[SwitchB-vsi-vpna] quit
```

Configuring Switch D

Enable L2VPN.

```
[SwitchD] l2vpn enable
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchD] vxlan tunnel mac-learning disable
[SwitchD] vxlan tunnel arp-learning disable
```

Create an EVPN instance on VSI *vpna*.

```
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] arp suppression enable
[SwitchD-vsi-vpna] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchD-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchD-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchD-vsi-vpna-evpn-vxlan] quit
```

Create VXLAN 10.

```
[SwitchD-vsi-vpna] vxlan 10
[SwitchD-vsi-vpna-vxlan-10] quit
[SwitchD-vsi-vpna] quit
```

Configuring DRNI

Configuring Switch A

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchA] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchA] drni system-mac 0001-0001-0001
[SwitchA] drni system-number 1
[SwitchA] drni system-priority 10
[SwitchA] drni restore-delay 180
```

Create a tunnel to Switch B, and set the ToS of tunneled packets to 100.

```
[SwitchA] interface tunnel 1 mode vxlan
[SwitchA-Tunnel1] source 1.1.1.1
[SwitchA-Tunnel1] destination 2.2.2.2
[SwitchA-Tunnel1] tunnel tos 100
[SwitchA-Tunnel1] quit
```

Exclude Tunnel 1 from the shutdown action by DRNI MAD.

```
[SwitchA] drni mad exclude interface tunnel 1
```

Specify Tunnel 1 as the IPP

```
[SwitchA] interface tunnel 1
[SwitchA-Tunnel1] port drni intra-portal-port 1
[SwitchA-Tunnel1] quit
```

Disable the static source check feature on GigabitEthernet 1/0/4.

```
[SwitchA] interface gigabitethernet 1/0/4
[SwitchA-GigabitEthernet1/0/4] undo mac-address static source-check enable
[SwitchA-GigabitEthernet1/0/4] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation4] quit
```

Assign GigabitEthernet 1/0/1 to aggregation group 4.

```
[SwitchA] interface gigabitethernet 1/0/1
[SwitchA-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchA-GigabitEthernet1/0/1] quit
```

Assign Bridge-Aggregation 4 to DR group 4.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port drni group 4
[SwitchA-Bridge-Aggregation4] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation5] quit
```

Assign GigabitEthernet 1/0/2 to aggregation group 5.

```
[SwitchA] interface gigabitethernet 1/0/2
[SwitchA-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchA-GigabitEthernet1/0/2] quit
```

Assign Bridge-Aggregation 5 to DR group 5.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port drni group 5
[SwitchA-Bridge-Aggregation5] quit
```

Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.

```
[SwitchA] drni mad exclude interface tunnel 1
[SwitchA] drni mad exclude interface loopback 0
[SwitchA] drni mad exclude interface gigabitethernet 1/0/4
[SwitchA] drni mad exclude interface vlan-interface 11
```

Configuring Switch B

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchB] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchB] drni system-mac 0001-0001-0001
[SwitchB] drni system-number 2
[SwitchB] drni system-priority 10
[SwitchB] drni restore-delay 180
```

Create a tunnel to Switch A, and set the ToS of tunneled packets to 100.

```
[SwitchB] interface tunnel 1 mode vxlan
[SwitchB-Tunnel1] source 2.2.2.2
[SwitchB-Tunnel1] destination 1.1.1.1
```

```

[SwitchB-Tunnel1] tunnel tos 100
[SwitchB-Tunnel1] quit

# Exclude Tunnel 1 from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface tunnel 1

# Specify Tunnel 1 as the IPP
[SwitchB] interface tunnel 1
[SwitchB-Tunnel1] port drni intra-portal-port 1
[SwitchB-Tunnel1] quit

# Disable the static source check feature on GigabitEthernet 1/0/4.
[SwitchB] interface gigabitethernet 1/0/4
[SwitchB-GigabitEthernet1/0/4] undo mac-address static source-check enable
[SwitchB-GigabitEthernet1/0/4] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation4] quit

# Assign GigabitEthernet 1/0/1 to aggregation group 4.
[SwitchB] interface gigabitethernet 1/0/1
[SwitchB-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchB-GigabitEthernet1/0/1] quit

# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port drni group 4
[SwitchB-Bridge-Aggregation4] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation5] quit

# Assign GigabitEthernet 1/0/2 to aggregation group 5.
[SwitchB] interface gigabitethernet 1/0/2
[SwitchB-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchB-GigabitEthernet1/0/2] quit

# Assign Bridge-Aggregation 5 to DR group 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port drni group 5
[SwitchB-Bridge-Aggregation5] quit

# Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface tunnel 1
[SwitchB] drni mad exclude interface loopback 0
[SwitchB] drni mad exclude interface gigabitethernet 1/0/4
[SwitchB] drni mad exclude interface vlan-interface 12

```

Configuring BGP to advertise BGP EVPN routes

Configuring Switch A

Configure BGP to advertise BGP EVPN routes.

```
[SwitchA] bgp 200
[SwitchA-bgp-default] peer 3.3.3.3 as-number 200
[SwitchA-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchA-bgp-default] address-family l2vpn evpn
[SwitchA-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchA-bgp-default-evpn] quit
[SwitchA-bgp-default] quit
```

Configuring Switch B

Configure BGP to advertise BGP EVPN routes.

```
[SwitchB] bgp 200
[SwitchB-bgp-default] peer 3.3.3.3 as-number 200
[SwitchB-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchB-bgp-default] address-family l2vpn evpn
[SwitchB-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchB-bgp-default-evpn] quit
[SwitchB-bgp-default] quit
```

Configuring Switch C

Configure BGP to advertise BGP EVPN routes and configure the switch as an RR.

```
[SwitchC] bgp 200
[SwitchC-bgp-default] group evpn
[SwitchC-bgp-default] peer 1.1.1.1 group evpn
[SwitchC-bgp-default] peer 2.2.2.2 group evpn
[SwitchC-bgp-default] peer 4.4.4.4 group evpn
[SwitchC-bgp-default] peer evpn as-number 200
[SwitchC-bgp-default] peer evpn connect-interface loopback 0
[SwitchC-bgp-default] address-family l2vpn evpn
[SwitchC-bgp-default-evpn] peer evpn enable
[SwitchC-bgp-default-evpn] undo policy vpn-target
[SwitchC-bgp-default-evpn] peer evpn reflect-client
[SwitchC-bgp-default-evpn] quit
[SwitchC-bgp-default] quit
```

Configuring Switch D

Configure BGP to advertise BGP EVPN routes.

```
[SwitchD] bgp 200
[SwitchD-bgp-default] peer 3.3.3.3 as-number 200
[SwitchD-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchD-bgp-default] address-family l2vpn evpn
[SwitchD-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchD-bgp-default-evpn] quit
[SwitchD-bgp-default] quit
```

Mapping Ethernet service instances to VSIs

Configuring Switch A

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port link-type trunk
[SwitchA-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchA-Bridge-Aggregation4] service-instance 1000
[SwitchA-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI **vpna**.

```
[SwitchA-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchA-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port link-type trunk
[SwitchA-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchA-Bridge-Aggregation5] service-instance 1000
[SwitchA-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI **vpna**.

```
[SwitchA-Bridge-Aggregation5-srv1000] xconnect vsi vpna
[SwitchA-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch B

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port link-type trunk
[SwitchB-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchB-Bridge-Aggregation4] service-instance 1000
[SwitchB-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI **vpna**.

```
[SwitchB-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port link-type trunk
[SwitchB-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchB-Bridge-Aggregation5] service-instance 1000
[SwitchB-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI **vpna**.

```
[SwitchB-Bridge-Aggregation5-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch D

On GigabitEthernet 1/0/1, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchD] interface gigabitethernet 1/0/1
[SwitchD-GigabitEthernet1/0/1] service-instance 1000
[SwitchD-GigabitEthernet1/0/1] encapsulation s-vid 2
```



```
# Map Ethernet service instance 1000 to VSI vpna.
[SwitchD-GigabitEthernet1/0/1] xconnect vsi vpna
[SwitchD-GigabitEthernet1/0/1] quit
```

Configuring Monitor Link

Configuring Switch A

Create monitor link group 1 and assign the uplink and downlink interfaces to it.

```
[SwitchA] monitor-link group 1
[SwitchA-mtlk-group1] port gigabitethernet 1/0/1 downlink
[SwitchA-mtlk-group1] port gigabitethernet 1/0/2 downlink
[SwitchA-mtlk-group1] port gigabitethernet 1/0/4 uplink
[SwitchA-mtlk-group1] quit
```

Configuring Switch B

Create monitor link group 1 and assign the uplink and downlink interfaces to it.

```
[SwitchB] monitor-link group 1
[SwitchB-mtlk-group1] port gigabitethernet 1/0/1 downlink
[SwitchB-mtlk-group1] port gigabitethernet 1/0/2 downlink
[SwitchB-mtlk-group1] port gigabitethernet 1/0/4 uplink
[SwitchB-mtlk-group1] quit
```

Verifying the configuration

Verifying the configuration on a DR member device

The verification procedure uses Switch A as an example.

Verify that Switch A has BGP EVPN routes.

```
[Switch A]display bgp l2vpn evpn
BGP local router ID is 1.2.3.4
Status codes: * - valid, > - best, d - dampened, h - history
               s - suppressed, S - stale, i - internal, e - external
               a - additional-path
Origin: i - IGP, e - EGP, ? - incomplete
Total number of routes from all PEs: 2
Route distinguisher: 1:10
Total number of routes: 4
```

	Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* >	[3][0][32][1.1.1.1]/80	1.1.1.1	0	100	32768	i
* >	[3][0][32][1.2.3.4]/80	1.2.3.4	0	100	32768	i
* >i	[3][0][32][2.2.2.2]/80	2.2.2.2	0	100	0	i
* >i	[3][0][32][4.4.4.4]/80	4.4.4.4	0	100	0	i

Verify that the IPL Tunnel 1 is up, and Tunnel 0 to Switch D uses the virtual VTEP address as the source address.

```

[SwitchA] display interface Tunnel
Tunnel0
Current state: UP
Line protocol state: UP
Description: Tunnel0 Interface
Bandwidth: 64 kbps
Maximum transmission unit: 1464
Internet protocol processing: Disabled
Last clearing of counters: Never
Tunnel source 1.2.3.4, destination 4.4.4.4
Tunnel protocol/transport UDP_VXLAN/IP
Last 300 seconds input rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Last 300 seconds output rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Input: 0 packets, 0 bytes, 0 drops
Output: 0 packets, 0 bytes, 0 drops

Tunnel1
Current state: UP
Line protocol state: UP
Description: Tunnel1 Interface
Bandwidth: 64 kbps
Maximum transmission unit: 1464
Internet protocol processing: Disabled
Last clearing of counters: Never
Tunnel source 1.1.1.1, destination 2.2.2.2
Tunnel protocol/transport UDP_VXLAN/IP
Last 300 seconds input rate: 13 bytes/sec, 104 bits/sec, 0 packets/sec
Last 300 seconds output rate: 13 bytes/sec, 104 bits/sec, 0 packets/sec
Input: 332 packets, 36377 bytes, 0 drops
Output: 583 packets, 59132 bytes, 0 drops

```

Verify that the VXLAN tunnels have been assigned to VXLAN 10.

```

[SwitchA] display l2vpn vsi verbose
VSI Name: vpna
VSI Index          : 0
VSI State          : Up
MTU                : 1500
Bandwidth          : -
Broadcast Restrain : -
Multicast Restrain : -
Unknown Unicast Restrain: -
MAC Learning       : Enabled
MAC Table Limit    : -
MAC Learning rate  : -
Drop Unknown       : -
Flooding           : Enabled
Statistics         : Disabled
VXLAN ID           : 10
Tunnels:

```

Tunnel Name	Link ID	State	Type	Flood proxy
Tunnel0	0x5000000	UP	Auto	Disabled
Tunnel1	0x5000001	UP	Manual	Disabled

ACs:

AC	Link ID	State	Type
BAGG4 srv1000	0	Up	Manual
BAGG5 srv1000	2	Up	Manual

Verifying the network connectivity of the VMs

Verify that VM 1, VM 2, and VM 3 can communicate when both Switch A and Switch B are operating correctly. (Details not shown.)

Verify that VM 1, VM 2, and VM 3 can communicate when Switch A's or Switch B's links to the local site are disconnected. (Details not shown.)

Configuration files

- Switch A:


```
#
monitor-link group 1
#
undo vxlan ip-forwarding
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 1.1.1.1
area 0.0.0.0
network 1.1.1.1 0.0.0.0
network 1.2.3.4 0.0.0.0
network 11.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 11
#
l2vpn enable
reserved vxlan 1234
vxlan tunnel mac-learning disable
evpn drni group 1.2.3.4
#
vsi vpna
arp suppression enable
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
```

```

    vpn-target auto import-extcommunity
#
interface Bridge-Aggregation4
    port link-type trunk
    port trunk permit vlan 1 to 2
    link-aggregation mode dynamic
    port drni group 4
#
    service-instance 1000
        encapsulation s-vid 2
        xconnect vsi vpna
#
interface Bridge-Aggregation5
    port link-type trunk
    port trunk permit vlan 1 3
    link-aggregation mode dynamic
    port drni group 5
#
    service-instance 1000
        encapsulation s-vid 3
        xconnect vsi vpna
#
interface LoopBack0
    ip address 1.1.1.1 255.255.255.255
#
interface LoopBack1
    ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface11
    ip address 11.1.1.1 255.255.255.0
#
interface GigabitEthernet1/0/1
    port link-mode bridge
    port link-type trunk
    port trunk permit vlan 1 to 2
    port link-aggregation group 4
    port monitor-link group 1 downlink
#
interface GigabitEthernet1/0/2
    port link-mode bridge
    port link-type trunk
    port trunk permit vlan 1 3
    port link-aggregation group 5
    port monitor-link group 1 downlink
#
interface GigabitEthernet1/0/4
    port link-mode bridge
    port access vlan 11

```

```

undo stp enable
port monitor-link group 1 uplink
undo mac-address static source-check enable
#
interface Tunnell mode vxlan
port drni intra-portal-port 1
source 1.1.1.1
destination 2.2.2.2
tunnel tos 100
#
bgp 200
peer 3.3.3.3 as-number 200
peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
peer 3.3.3.3 enable
#
drni restore-delay 180
drni system-mac 0001-0001-0001
drni system-number 1
drni system-priority 10
#
drni mad exclude interface LoopBack0
drni mad exclude interface GigabitEthernet1/0/5
drni mad exclude interface Tunnell
drni mad exclude interface Vlan-interface 11
#
return

```

- **Switch B:**

```

#
monitor-link group 1
#
undo vxlan ip-forwarding
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 2.2.2.2
area 0.0.0.0
network 1.2.3.4 0.0.0.0
network 2.2.2.2 0.0.0.0
network 12.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 12
#

```

```

l2vpn enable
reserved vxlan 1234
evpn drni group 1.2.3.4
vxlan tunnel arp-learning disable
#
vsi vpna
  arp suppression enable
  vxlan 10
  evpn encapsulation vxlan
    route-distinguisher auto
  vpn-target auto export-extcommunity
  vpn-target auto import-extcommunity
#
interface Bridge-Aggregation4
  port link-type trunk
  port trunk permit vlan 1 to 2
  link-aggregation mode dynamic
  port drni group 4
#
  service-instance 1000
    encapsulation s-vid 2
    xconnect vsi vpna
#
interface Bridge-Aggregation5
  port link-type trunk
  port trunk permit vlan 1 3
  link-aggregation mode dynamic
  port drni group 5
#
  service-instance 1000
    encapsulation s-vid 3
    xconnect vsi vpna
#
interface LoopBack0
  ip address 2.2.2.2 255.255.255.255
#
interface LoopBack1
  ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface12
  ip address 12.1.1.2 255.255.255.0
#
interface GigabitEthernet1/0/1
  port link-mode bridge
  port link-type trunk
  port trunk permit vlan 1 to 2
  port monitor-link group 1 downlink
  port link-aggregation group 4

```

```

#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 3
 port monitor-link group 1 downlink
 port link-aggregation group 5
#
interface GigabitEthernet1/0/5
 port link-mode bridge
 port access vlan 12
 port monitor-link group 1 uplink
 undo mac-address static source-check enable
#
interface Tunnell mode vxlan
 port drni intra-portal-port 1
 source 2.2.2.2
 destination 1.1.1.1
 tunnel tos 100
#
bgp 200
 peer 3.3.3.3 as-number 200
 peer 3.3.3.3 connect-interface LoopBack0
#
 address-family l2vpn evpn
  peer 3.3.3.3 enable
#
 drni restore-delay 180
 drni system-mac 0001-0001-0001
 drni system-number 2
 drni system-priority 10
#
 drni mad exclude interface LoopBack0
 drni mad exclude interface GigabitEthernet1/0/5
 drni mad exclude interface Tunnell
 drni mad exclude interface Vlan-interface 12
#
return

```

- **Switch C:**

```

#
ospf 1 router-id 3.3.3.3
 area 0.0.0.0
  network 3.3.3.3 0.0.0.0
  network 11.1.1.0 0.0.0.255
  network 12.1.1.0 0.0.0.255
  network 13.1.1.0 0.0.0.255
#
vlan 11 to 13

```

```

#
interface LoopBack0
 ip address 3.3.3.3 255.255.255.255
#
interface Vlan-interface11
 ip address 11.1.1.3 255.255.255.0
#
interface Vlan-interface12
 ip address 12.1.1.3 255.255.255.0
#
interface Vlan-interface13
 ip address 13.1.1.3 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 11
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 12
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port access vlan 13
#
bgp 200
 group evpn internal
 peer evpn connect-interface LoopBack0
 peer 1.1.1.1 group evpn
 peer 2.2.2.2 group evpn
 peer 4.4.4.4 group evpn
#
 address-family l2vpn evpn
  undo policy vpn-target
 peer evpn enable
 peer evpn reflect-client
#
return

```

- **Switch D:**

```

#
 undo vxlan ip-forwarding
#
 vxlan tunnel mac-learning disable
#
ospf 1 router-id 4.4.4.4
 area 0.0.0.0
  network 4.4.4.4 0.0.0.0
  network 13.1.1.0 0.0.0.255

```



```

#
vlan 2
#
vlan 13
#
    l2vpn enable
    vxlan tunnel arp-learning disable
#
vsi vpna
    arp suppression enable
    vxlan 10
    evpn encapsulation vxlan
        route-distinguisher auto
    vpn-target auto export-extcommunity
    vpn-target auto import-extcommunity
#
interface LoopBack0
    ip address 4.4.4.4 255.255.255.255
#
interface Vlan-interface13
    ip address 13.1.1.4 255.255.255.0
#
interface GigabitEthernet1/0/1
    port link-type trunk
    port trunk permit vlan 1 to 2
    port link-mode bridge
#
    service-instance 1000
        encapsulation s-vid 2
        xconnect vsi vpna
#
interface GigabitEthernet1/0/2
    port link-mode bridge
    port access vlan 13
#
bgp 200
    peer 3.3.3.3 as-number 200
    peer 3.3.3.3 connect-interface LoopBack0
#
    address-family l2vpn evpn
        peer 3.3.3.3 enable
#
return

```

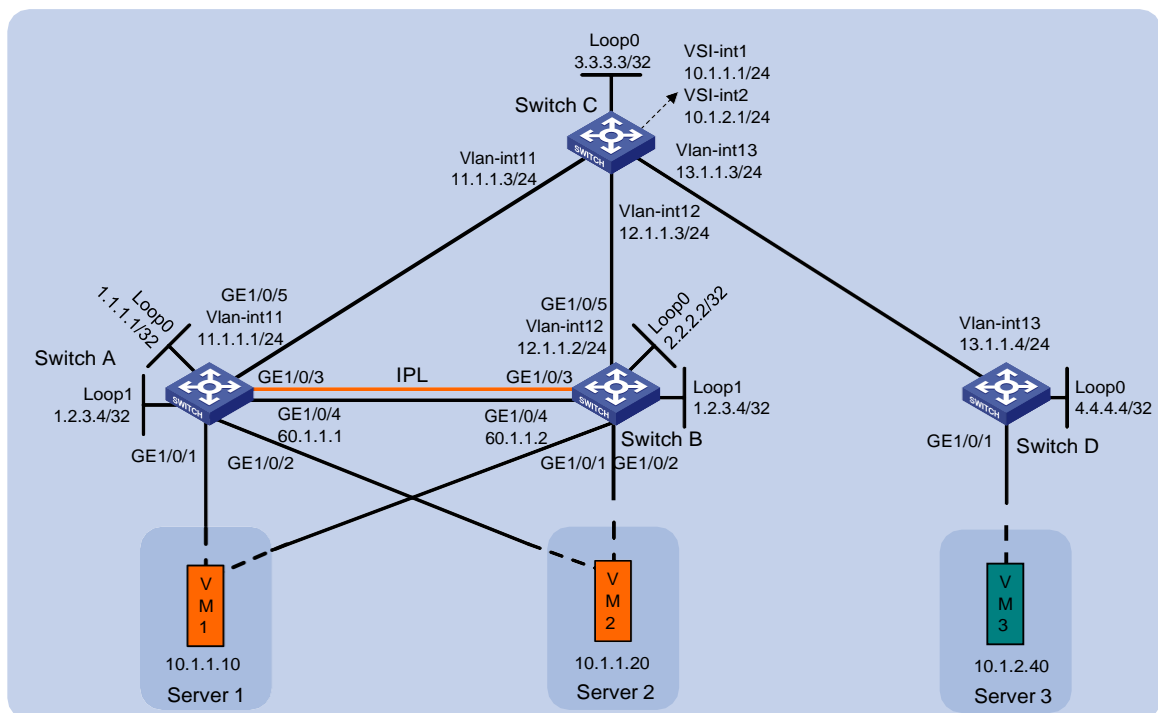
Example: Configuring DRNI using an Ethernet aggregate link as the IPL on EVPN gateways

Network configuration

As shown in [Figure 3](#), perform the following tasks to make sure the VMs can communicate with one another:

- Configure VXLAN 10 on Switch A, Switch B, and Switch D, and configure VXLAN 20 on Switch A and Switch B.
- Configure Switch A, Switch B, and Switch D as distributed EVPN gateways to provide Layer 3 forwarding service for the VMs.
- Configure DRNI on Switch A and Switch B to virtualize them into one VTEP. Configure an Ethernet aggregate link as the IPL between the switches.
- Configure Switch C as an RR.

Figure 3 Network diagram



Analysis

To make sure the overlay network has connectivity,, configure a routing protocol on these switches to advertise routes for reaching their interfaces, including the loopback interfaces. In this example, OSPF is used.

To conserve resources, configure Switch C to reflect routes for Switch A, Switch B, and Switch D.

Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Restrictions and guidelines

Make sure the following settings are consistent on the DR member devices:

- Ethernet service instances and their match criterion on the DR interfaces in the same DR group or single-homed site-facing interfaces.
- VXLAN IDs of VSIs.

In addition, the Ethernet service instances must be created manually.

As a best practice, do not redistribute external routes on the DR member devices.

Use the **drni mad exclude interface** command to exclude all interfaces used by EVPN from the shutdown action by DRNI MAD. The interfaces include VSI interfaces, interfaces that provide BGP peer addresses, interfaces used for setting up the keepalive link, and transport-facing outgoing interfaces of VXLAN tunnels.

For EVPN to run correctly on a DR system, you must execute the **undo mac-address static source-check enable** command to disable static source check on the following interfaces:

- Layer 2 aggregate interfaces or Layer 2 Ethernet interfaces acting as the IPPs.
- Transport-facing physical interfaces.

As a best practice, use the IP address of a loopback interface as the virtual VTEP address.

You must disable spanning tree on the Layer 2 Ethernet interface that acts as the physical traffic outgoing interface of a VXLAN tunnel. If you enable spanning tree on that interface, the upstream device will falsely block the interfaces connected to the DR member devices.

Configure backup routes for directing traffic from one DR member device to the other DR member device upon uplink failure.

You can configure only the **encapsulation s-vid** *vlan-id* and **encapsulation untagged** frame match criteria and VLAN access mode for Ethernet service instances

Procedures

Configuring the system operating mode

Set the system operating mode to VXLAN on Switch A, and reboot the switch for the mode change to take effect.

```
<SwitchA> system-view
[SwitchA] switch-mode 1
Reboot device to make the configuration take effect.
[SwitchA] quit
<SwitchA> reboot
Start to check configuration with next startup configuration file, please wait..
.....DONE!
Current configuration may be lost after the reboot, save current configuration?
[Y/N]:y
This command will reboot the device. Continue? [Y/N]:y
```

Set the system operating mode of Switch B and Switch D to VXLAN. The method is the same as Switch A. (Details not shown.)

Configuring Layer 3 interfaces

Configure the Layer 3 interfaces on Switch A.

```
<SwitchA> system-view
[SwitchA] interface loopback 0
[SwitchA-Loopback0] ip address 1.1.1.1 32
[SwitchA-Loopback0] quit
[SwitchA] interface loopback 1
[SwitchA-Loopback1] ip address 1.2.3.4 32
```

```
[SwitchA-Loopback1] quit
[SwitchA] vlan 11
[SwitchA-vlan11] port gigabitethernet 1/0/5
[SwitchA-vlan11] quit
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] ip address 11.1.1.1 24
[SwitchA-Vlan-interface11] quit
[SwitchA] interface gigabitethernet 1/0/4
[SwitchA-GigabitEthernet1/0/4] port link-mode route
[SwitchA-GigabitEthernet1/0/4] ip address 60.1.1.1 24
[SwitchA-GigabitEthernet1/0/4] quit
```

Configure the Layer 3 interfaces on other switches. (Details not shown.)

On VM 1, VM 3, and VM 5, specify 10.1.1.1 as the gateway address. On VM 2 and VM 4, specify 10.1.2.1 as the gateway address. (Details not shown.)

Configuring OSPF

Configuring Switch A

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchA] ospf 1 router-id 1.1.1.1
[SwitchA-ospf-1] area 0
[SwitchA-ospf-1-area-0.0.0.0] network 1.1.1.1 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchA-ospf-1-area-0.0.0.0] quit
[SwitchA-ospf-1] quit
```

Configure OSPF on VLAN-interface 100 for traffic to be redirected to an available DR member device when an uplink fails.

```
[SwitchA] vlan 100
[SwitchA-vlan100] quit
[SwitchA] interface Vlan-interface 100
[SwitchA-Vlan-interface100] ip address 100.1.1.1 255.255.255.0
[SwitchA-Vlan-interface100] ospf 1 area 0.0.0.0
[SwitchA-Vlan-interface100] quit
```

Configuring Switch B

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchB> system-view
[SwitchB] ospf 1 router-id 2.2.2.2
[SwitchB-ospf-1] area 0
[SwitchB-ospf-1-area-0.0.0.0] network 2.2.2.2 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchB-ospf-1-area-0.0.0.0] quit
[SwitchB-ospf-1] quit
```

Configure OSPF on VLAN-interface 100 for traffic to be redirected to an available DR member device when an uplink fails.

```
[SwitchB] vlan 100
```

```
[SwitchB-vlan100] quit
[SwitchB] interface Vlan-interface 100
[SwitchB-Vlan-interface100] ip address 100.1.1.2 255.255.255.0
[SwitchB-Vlan-interface100] ospf 1 area 0.0.0.0
[SwitchB-Vlan-interface100] quit
```

Configuring Switch C

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchC> system-view
[SwitchC] ospf 1 router-id 3.3.3.3
[SwitchC-ospf-1] area 0
[SwitchC-ospf-1-area-0.0.0.0] network 3.3.3.3 0.0.0.0
[SwitchC-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] quit
[SwitchC-ospf-1] quit
```

Configuring Switch D

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
<SwitchD> system-view
[SwitchD] ospf 1 router-id 4.4.4.4
[SwitchD-ospf-1] area 0
[SwitchD-ospf-1-area-0.0.0.0] network 4.4.4.4 0.0.0.0
[SwitchD-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchD-ospf-1-area-0.0.0.0] quit
[SwitchD-ospf-1] quit
```

Disabling spanning tree

Configuring Switch A

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/5.

```
[SwitchA] interface gigabitethernet 1/0/5
[SwitchA-GigabitEthernet1/0/5] undo stp enable
[SwitchA-GigabitEthernet1/0/5] quit
```

Configuring Switch B

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/5.

```
[SwitchB] interface gigabitethernet 1/0/5
[SwitchB-GigabitEthernet1/0/5] undo stp enable
[SwitchB-GigabitEthernet1/0/5] quit
```

Configuring EVPN

Configuring Switch A

Enable L2VPN.

```
[SwitchA] l2vpn enable
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchA] vxlan tunnel mac-learning disable
```

```
[SwitchA] vxlan tunnel arp-learning disable
# Configure the EVPN global MAC address as 0002-0003-0004.
[SwitchA] evpn global-mac 2-3-4
# Create an EVPN instance on VSI vpna.
[SwitchA] vsi vpna
[SwitchA-vsi-vpna] evpn encapsulation vxlan
# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchA-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchA-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchA-vsi-vpna-evpn-vxlan] quit
# Create VXLAN 10.
[SwitchA-vsi-vpna] vxlan 10
[SwitchA-vsi-vpna-vxlan-10] quit
[SwitchA-vsi-vpna] quit
# Create an EVPN instance on VSI vpnb.
[SwitchA] vsi vpb
[SwitchA-vsi-vpb] evpn encapsulation vxlan
# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchA-vsi-vpb-evpn-vxlan] route-distinguisher auto
[SwitchA-vsi-vpb-evpn-vxlan] vpn-target auto
[SwitchA-vsi-vpb-evpn-vxlan] quit
# Create VXLAN 20.
[SwitchA-vsi-vpb] vxlan 20
[SwitchA-vsi-vpb-vxlan-20] quit
[SwitchA-vsi-vpb] quit
```

Configuring Switch B

```
# Enable L2VPN.
[SwitchB] l2vpn enable
# Disable remote MAC address learning and remote ARP learning.
[SwitchB] vxlan tunnel mac-learning disable
[SwitchB] vxlan tunnel arp-learning disable
# Configure the EVPN global MAC address as 0002-0003-0004.
[SwitchB] evpn global-mac 2-3-4
# Create an EVPN instance on VSI vpna.
[SwitchB] vsi vpna
[SwitchB-vsi-vpna] evpn encapsulation vxlan
# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchB-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchB-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchB-vsi-vpna-evpn-vxlan] quit
# Create VXLAN 10.
[SwitchB-vsi-vpna] vxlan 10
[SwitchB-vsi-vpna-vxlan-10] quit
[SwitchB-vsi-vpna] quit
# Create an EVPN instance on VSI vpnb.
```

```
[SwitchB] vsi vpnb
[SwitchB-vsi-vpn] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchB-vsi-vpn-evpn-vxlan] route-distinguisher auto
[SwitchB-vsi-vpn-evpn-vxlan] vpn-target auto
[SwitchB-vsi-vpn-evpn-vxlan] quit

# Create VXLAN 20.
[SwitchB-vsi-vpn] vxlan 20
[SwitchB-vsi-vpn-vxlan-20] quit
[SwitchB-vsi-vpn] quit
```

Configuring Switch D

```
# Enable L2VPN.
[SwitchD] l2vpn enable

# Disable remote MAC address learning and remote ARP learning.
[SwitchD] vxlan tunnel mac-learning disable
[SwitchD] vxlan tunnel arp-learning disable

# Create an EVPN instance on VSI vpna.
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchD-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchD-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchD-vsi-vpna-evpn-vxlan] quit

# Create VXLAN 10.
[SwitchD-vsi-vpna] vxlan 10
[SwitchD-vsi-vpna-vxlan-10] quit
[SwitchD-vsi-vpna] quit
```

Configuring distributed EVPN gateways

Configuring Switch A

```
# Configure RD and route target settings for VPN instance vpna.
[SwitchA] ip vpn-instance vpna
[SwitchA-vpn-instance-vpna] route-distinguisher 1:1
[SwitchA-vpn-instance-vpna] address-family ipv4
[SwitchA-vpn-ipv4-vpna] vpn-target 2:2
[SwitchA-vpn-ipv4-vpna] quit
[SwitchA-vpn-instance-vpna] address-family evpn
[SwitchA-vpn-evpn-vpna] vpn-target 1:1
[SwitchA-vpn-evpn-vpna] quit
[SwitchA-vpn-instance-vpna] quit

# Configure VSI-interface 1 as a distributed gateway.
[SwitchA] interface vsi-interface 1
[SwitchA-Vsi-interfacel] ip binding vpn-instance vpna
[SwitchA-Vsi-interfacel] ip address 10.1.1.1 255.255.255.0
[SwitchA-Vsi-interfacel] mac-address 1-1-1
```



```
[SwitchA-Vsi-interface1] distributed-gateway local
[SwitchA-Vsi-interface1] local-proxy-arp enable
[SwitchA-Vsi-interface1] quit
```

Configure VSI-interface 2 as a distributed gateway.

```
[SwitchA] interface vsi-interface 2
[SwitchA-Vsi-interface2] ip binding vpn-instance vpna
[SwitchA-Vsi-interface2] ip address 10.1.2.1 255.255.255.0
[SwitchA-Vsi-interface2] mac-address 2-2-2
[SwitchA-Vsi-interface2] distributed-gateway local
[SwitchA-Vsi-interface2] local-proxy-arp enable
[SwitchA-Vsi-interface2] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance **vpna, and configure the L3 VXLAN ID as 1000 for the VPN instance.**

```
[SwitchA] interface vsi-interface 3
[SwitchA-Vsi-interface3] ip binding vpn-instance vpna
[SwitchA-Vsi-interface3] l3-vni 1000
[SwitchA-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI **vpna.**

```
[SwitchA] vsi vpna
[SwitchA-vsi-vpna] gateway vsi-interface 1
[SwitchA-vsi-vpna] quit
```

Specify VSI-interface 2 as the gateway interface for VSI **vpnb.**

```
[SwitchA] vsi vpnb
[SwitchA-vsi-vpnb] gateway vsi-interface 2
[SwitchA-vsi-vpnb] quit
```

Configuring Switch B

Configure RD and route target settings for VPN instance **vpna.**

```
[SwitchB] ip vpn-instance vpna
[SwitchB-vpn-instance-vpna] route-distinguisher 1:1
[SwitchB-vpn-instance-vpna] address-family ipv4
[SwitchB-vpn-ipv4-vpna] vpn-target 2:2
[SwitchB-vpn-ipv4-vpna] quit
[SwitchB-vpn-instance-vpna] address-family evpn
[SwitchB-vpn-evpn-vpna] vpn-target 1:1
[SwitchB-vpn-evpn-vpna] quit
[SwitchB-vpn-instance-vpna] quit
```

Configure VSI-interface 1 as a distributed gateway.

```
[SwitchB] interface vsi-interface 1
[SwitchB-Vsi-interfacel] ip binding vpn-instance vpna
[SwitchB-Vsi-interfacel] ip address 10.1.1.1 255.255.255.0
[SwitchB-Vsi-interfacel] mac-address 1-1-1
[SwitchB-Vsi-interfacel] distributed-gateway local
[SwitchB-Vsi-interfacel] local-proxy-arp enable
[SwitchB-Vsi-interfacel] quit
```

Configure VSI-interface 2 as a distributed gateway.

```
[SwitchB] interface vsi-interface 2
[SwitchB-Vsi-interface2] ip binding vpn-instance vpna
```

```
[SwitchB-Vsi-interface2] ip address 10.1.2.1 255.255.255.0
[SwitchB-Vsi-interface2] mac-address 2-2-2
[SwitchB-Vsi-interface2] distributed-gateway local
[SwitchB-Vsi-interface2] local-proxy-arp enable
[SwitchB-Vsi-interface2] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance **vpna, and configure the L3 VXLAN ID as 1000 for the VPN instance.**

```
[SwitchB] interface vsi-interface 3
[SwitchB-Vsi-interface3] ip binding vpn-instance vpna
[SwitchB-Vsi-interface3] l3-vni 1000
[SwitchB-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI **vpna.**

```
[SwitchB] vsi vpna
[SwitchB-vsi-vpna] gateway vsi-interface 1
[SwitchB-vsi-vpna] quit
```

Specify VSI-interface 2 as the gateway interface for VSI **vpnb.**

```
[SwitchB] vsi vpb
[SwitchB-vsi-vpb] gateway vsi-interface 2
[SwitchB-vsi-vpb] quit
```

Configuring Switch D

Configure RD and route target settings for VPN instance **vpna.**

```
[SwitchD] ip vpn-instance vpna
[SwitchD-vpn-instance-vpna] route-distinguisher 1:1
[SwitchD-vpn-instance-vpna] address-family ipv4
[SwitchD-vpn-ipv4-vpna] vpn-target 2:2
[SwitchD-vpn-ipv4-vpna] quit
[SwitchD-vpn-instance-vpna] address-family evpn
[SwitchD-vpn-evpn-vpna] vpn-target 1:1
[SwitchD-vpn-evpn-vpna] quit
[SwitchD-vpn-instance-vpna] quit
```

Configure VSI-interface 1 as a distributed gateway.

```
[SwitchD] interface vsi-interface 1
[SwitchD-Vsi-interface1] ip binding vpn-instance vpna
[SwitchD-Vsi-interface1] ip address 10.1.1.1 255.255.255.0
[SwitchD-Vsi-interface1] mac-address 1-1-1
[SwitchD-Vsi-interface1] distributed-gateway local
[SwitchD-Vsi-interface1] local-proxy-arp enable
[SwitchD-Vsi-interface1] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance **vpna and configure the L3 VXLAN ID as 1000 for the VPN instance.**

```
[SwitchD] interface vsi-interface 3
[SwitchD-Vsi-interface3] ip binding vpn-instance vpna
[SwitchD-Vsi-interface3] l3-vni 1000
[SwitchD-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI **vpna.**

```
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] gateway vsi-interface 1
```

```
[SwitchD-vsi-vpna] quit
```

Configuring DRNI

Configuring Switch A

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchA] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchA] drni system-mac 0001-0002-0003
```

```
[SwitchA] drni system-number 1
```

```
[SwitchA] drni system-priority 10
```

```
[SwitchA] drni restore-delay 180
```

```
[SwitchA] drni keepalive ip destination 60.1.1.2 source 60.1.1.1
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 3.

```
[SwitchA] interface bridge-aggregation 3
```

```
[SwitchA-Bridge-Aggregation3] link-aggregation mode dynamic
```

```
[SwitchA-Bridge-Aggregation3] quit
```

Assign GigabitEthernet 1/0/3 to aggregation group 3.

```
[SwitchA] interface gigabitethernet 1/0/3
```

```
[SwitchA-GigabitEthernet1/0/3] port link-aggregation group 3
```

```
[SwitchA-GigabitEthernet1/0/3] quit
```

Specify Bridge-Aggregation 3 as the IPP.

```
[SwitchA] interface bridge-aggregation 3
```

```
[SwitchA-Bridge-Aggregation3] port drni intra-portal-port 1
```

```
[SwitchA-Bridge-Aggregation3] undo mac-address static source-check enable
```

```
[SwitchA-Bridge-Aggregation3] quit
```

Disable the static source check feature on GigabitEthernet 1/0/5.

```
[SwitchA] interface gigabitethernet 1/0/5
```

```
[SwitchA-GigabitEthernet1/0/5] undo mac-address static source-check enable
```

```
[SwitchA-GigabitEthernet1/0/5] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.

```
[SwitchA] interface bridge-aggregation 4
```

```
[SwitchA-Bridge-Aggregation4] link-aggregation mode dynamic
```

```
[SwitchA-Bridge-Aggregation4] quit
```

Assign GigabitEthernet 1/0/1 to aggregation group 4.

```
[SwitchA] interface gigabitethernet 1/0/1
```

```
[SwitchA-GigabitEthernet1/0/1] port link-aggregation group 4
```

```
[SwitchA-GigabitEthernet1/0/1] quit
```

Assign Bridge-Aggregation 4 to DR group 4.

```
[SwitchA] interface bridge-aggregation 4
```

```
[SwitchA-Bridge-Aggregation4] port drni group 4
```

```
[SwitchA-Bridge-Aggregation4] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.

```
[SwitchA] interface bridge-aggregation 5
```

```
[SwitchA-Bridge-Aggregation5] link-aggregation mode dynamic
```

```
[SwitchA-Bridge-Aggregation5] quit
```

Assign GigabitEthernet 1/0/2 to aggregation group 5.

```
[SwitchA] interface gigabitethernet 1/0/2
[SwitchA-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchA-GigabitEthernet1/0/2] quit
```

Assign Bridge-Aggregation 5 to DR group 5.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port drni group 5
[SwitchA-Bridge-Aggregation5] quit
```

Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.

```
[SwitchA] drni mad exclude interface loopback 0
[SwitchA] drni mad exclude interface loopback 1
[SwitchA] drni mad exclude interface gigabitethernet 1/0/4
[SwitchA] drni mad exclude interface gigabitethernet 1/0/5
[SwitchA] drni mad exclude interface vlan-interface 11
[SwitchA] drni mad exclude interface vsi-interface 1
[SwitchA] drni mad exclude interface vsi-interface 2
```

Configuring Switch B

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchB] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchB] drni system-mac 0001-0002-0003
[SwitchB] drni system-number 2
[SwitchB] drni system-priority 10
[SwitchB] drni restore-delay 180
[SwitchB] drni keepalive ip destination 60.1.1.1 source 60.1.1.2
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 3.

```
[SwitchB] interface bridge-aggregation 3
[SwitchB-Bridge-Aggregation3] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation3] quit
```

Assign GigabitEthernet 1/0/3 to aggregation group 3.

```
[SwitchB] interface gigabitethernet 1/0/3
[SwitchB-GigabitEthernet1/0/3] port link-aggregation group 3
[SwitchB-GigabitEthernet1/0/3] quit
```

Specify Bridge-Aggregation 3 as the IPP.

```
[SwitchB] interface bridge-aggregation 3
[SwitchB-Bridge-Aggregation3] port drni intra-portal-port 1
[SwitchB-Bridge-Aggregation3] undo mac-address static source-check enable
[SwitchB-Bridge-Aggregation3] quit
```

Disable the static source check feature on GigabitEthernet 1/0/5.

```
[SwitchB] interface gigabitethernet 1/0/5
[SwitchB-GigabitEthernet1/0/5] undo mac-address static source-check enable
[SwitchB-GigabitEthernet1/0/5] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] link-aggregation mode dynamic
```

```

[SwitchB-Bridge-Aggregation4] quit
# Assign GigabitEthernet 1/0/1 to aggregation group 4.
[SwitchB] interface gigabitethernet 1/0/1
[SwitchB-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchB-GigabitEthernet1/0/1] quit
# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port drni group 4
[SwitchB-Bridge-Aggregation4] quit
# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation5] quit
# Assign GigabitEthernet 1/0/2 to aggregation group 5.
[SwitchB] interface gigabitethernet 1/0/2
[SwitchB-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchB-GigabitEthernet1/0/2] quit
# Assign Bridge-Aggregation 5 to DR group 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port drni group 5
[SwitchB-Bridge-Aggregation5] quit
# Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface loopback 0
[SwitchB] drni mad exclude interface loopback 1
[SwitchB] drni mad exclude interface gigabitethernet 1/0/4
[SwitchB] drni mad exclude interface gigabitethernet 1/0/5
[SwitchB] drni mad exclude interface vsi-interface 1
[SwitchB] drni mad exclude interface vsi-interface 2
[SwitchB] drni mad exclude interface vlan-interface 12

```

Configuring BGP to advertise BGP EVPN routes

Configuring Switch A

```

# Configure BGP to advertise BGP EVPN routes.
[SwitchA] bgp 200
[SwitchA-bgp-default] peer 3.3.3.3 as-number 200
[SwitchA-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchA-bgp-default] address-family l2vpn evpn
[SwitchA-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchA-bgp-default-evpn] quit
[SwitchA-bgp-default] quit

```

Configuring Switch B

```

# Configure BGP to advertise BGP EVPN routes.
[SwitchB] bgp 200
[SwitchB-bgp-default] peer 3.3.3.3 as-number 200

```

```
[SwitchB-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchB-bgp-default] address-family l2vpn evpn
[SwitchB-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchB-bgp-default-evpn] quit
[SwitchB-bgp-default] quit
```

Configuring Switch C

Configure BGP to advertise BGP EVPN routes and configure the switch as an RR.

```
[SwitchC] bgp 200
[SwitchC-bgp-default] group evpn
[SwitchC-bgp-default] peer 1.1.1.1 group evpn
[SwitchC-bgp-default] peer 2.2.2.2 group evpn
[SwitchC-bgp-default] peer 4.4.4.4 group evpn
[SwitchC-bgp-default] peer evpn as-number 200
[SwitchC-bgp-default] peer evpn connect-interface loopback 0
[SwitchC-bgp-default] address-family l2vpn evpn
[SwitchC-bgp-default-evpn] peer evpn enable
[SwitchC-bgp-default-evpn] undo policy vpn-target
[SwitchC-bgp-default-evpn] peer evpn reflect-client
[SwitchC-bgp-default-evpn] quit
[SwitchC-bgp-default] quit
```

Configuring Switch D

Configure BGP to advertise BGP EVPN routes.

```
[SwitchD] bgp 200
[SwitchD-bgp-default] peer 3.3.3.3 as-number 200
[SwitchD-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchD-bgp-default] address-family l2vpn evpn
[SwitchD-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchD-bgp-default-evpn] quit
[SwitchD-bgp-default] quit
```

Mapping Ethernet service instances to VSIs

Configuring Switch A

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port link-type trunk
[SwitchA-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchA-Bridge-Aggregation4] service-instance 1000
[SwitchA-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI vpna.

```
[SwitchA-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchA-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port link-type trunk
[SwitchA-Bridge-Aggregation5] port trunk permit vlan 3
```

```
[SwitchA-Bridge-Aggregation5] service-instance 1000
[SwitchA-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
# Map Ethernet service instance 1000 to VSI vpnb.
[SwitchA-Bridge-Aggregation5-srv1000] xconnect vsi vpnb
[SwitchA-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch B

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port link-type trunk
[SwitchB-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchB-Bridge-Aggregation4] service-instance 1000
[SwitchB-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI vpna.

```
[SwitchB-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port link-type trunk
[SwitchB-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchB-Bridge-Aggregation5] service-instance 1000
[SwitchB-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI vpnb.

```
[SwitchB-Bridge-Aggregation5-srv1000] xconnect vsi vpnb
[SwitchB-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch D

On GigabitEthernet 1/0/1, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchD] interface gigabitethernet 1/0/1
[SwitchD-GigabitEthernet1/0/1] port link-type trunk
[SwitchD-GigabitEthernet1/0/1] port trunk permit vlan 2
[SwitchD-GigabitEthernet1/0/1] service-instance 1000
[SwitchD-GigabitEthernet1/0/1-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI vpna.

```
[SwitchD-GigabitEthernet1/0/1-srv1000] xconnect vsi vpna
[SwitchD-GigabitEthernet1/0/1-srv1000] quit
```

Verifying the configuration

Verifying the configuration on a DR member device

The verification procedure uses Switch A as an example.

Verify that Switch A has BGP EVPN routes.

```
[Switch A]display bgp l2vpn evpn
BGP local router ID is 1.2.3.4
Status codes: * - valid, > - best, d - dampened, h - history
               s - suppressed, S - stale, i - internal, e - external
```

```

a - additional-path
Origin: i - IGP, e - EGP, ? - incomplete
Total number of routes from all PEs: 2
Route distinguisher: 1:1(vpna)
Total number of routes: 2

```

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* > [5][0][24][10.1.1.0]/80	1.2.3.4	0	100	32768	i
* > [5][0][24][10.1.2.0]/80	1.2.3.4	0	100	32768	i

```

Route distinguisher: 1:10
Total number of routes: 2

```

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* > [3][0][32][1.2.3.4]/80	1.2.3.4	0	100	32768	i
* >i [3][0][32][4.4.4.4]/80	4.4.4.4	0	100	0	i

```

Route distinguisher: 1:20
Total number of routes: 2

```

Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* > [3][0][32][1.2.3.4]/80	1.2.3.4	0	100	32768	i
* >i [3][0][32][4.4.4.4]/80	4.4.4.4	0	100	0	i

Verify that the VXLAN tunnel to Switch D is up, and the source address of the tunnel is the virtual VTEP address.

```

[SwitchA] display interface Tunnel
Tunnel0
Current state: UP
Line protocol state: UP
Description: Tunnel0 Interface
Bandwidth: 64 kbps
Maximum transmission unit: 1464
Internet protocol processing: Disabled
Last clearing of counters: Never
Tunnel source 1.2.3.4, destination 4.4.4.4
Tunnel protocol/transport UDP_VXLAN/IP
Last 300 seconds input rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Last 300 seconds output rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
Input: 0 packets, 0 bytes, 0 drops
Output: 0 packets, 0 bytes, 0 drops

```

Verify that ACs have been created on the IPP and mapped to VXLAN 10 and VXLAN 20.

```

[SwitchA] display l2vpn vsi verbose
VSI Name: Auto_L3VNI1000_3
VSI Index      : 1
VSI State      : Down

```



```

MTU : 1500
Bandwidth : -
Broadcast Restraining : -
Multicast Restraining : -
Unknown Unicast Restraining : -
MAC Learning : Enabled
MAC Table Limit : -
MAC Learning rate : -
Drop Unknown : -
Flooding : Enabled
Statistics : Disabled
Gateway Interface : VSI-interface 3
VXLAN ID : 1000

```

VSI Name: vpna

```

VSI Index : 0
VSI State : Up
MTU : 1500
Bandwidth : -
Broadcast Restraining : -
Multicast Restraining : -
Unknown Unicast Restraining : -
MAC Learning : Enabled
MAC Table Limit : -
MAC Learning rate : -
Drop Unknown : -
Flooding : Enabled
Statistics : Disabled
Gateway Interface : VSI-interface 1
VXLAN ID : 10

```

Tunnels:

Tunnel Name	Link ID	State	Type	Flood proxy
Tunnel0	0x5000000	UP	Auto	Disabled

ACs:

AC	Link ID	State	Type
BAGG4 srv1000	0	Up	Manual
BAGG3 srv2	1	Up	Dynamic (DRNI)

VSI Name: vpnb

```

VSI Index : 2
VSI State : Up
MTU : 1500
Bandwidth : -
Broadcast Restraining : -
Multicast Restraining : -
Unknown Unicast Restraining : -
MAC Learning : Enabled
MAC Table Limit : -

```

```

MAC Learning rate      : -
Drop Unknown           : -
Flooding               : Enabled
Statistics             : Disabled
Gateway Interface      : VSI-interface 2
VXLAN ID               : 20
Tunnels:
  Tunnel Name          Link ID   State   Type       Flood proxy
  Tunnel0              0x5000000 UP      Auto      Disabled
ACs:
  AC                   Link ID   State   Type
  BAGG5 srv1000        0       Up      Manual
  BAGG3 srv3           1       Up      Dynamic (DRNI)

```

Verifying the network connectivity of the VMs

Verify that the VMs can communicate when both Switch A and Switch B are operating correctly. (Details not shown.)

Verify that VM 1 and VM 5 can communicate when Switch A's or Switch B's links to the local site are disconnected. (Details not shown.)

Configuration files

- Switch A:


```

#
ip vpn-instance vpna
  route-distinguisher 1:1
#
address-family ipv4
  vpn-target 2:2 import-extcommunity
  vpn-target 2:2 export-extcommunity
#
address-family evpn
  vpn-target 1:1 import-extcommunity
  vpn-target 1:1 export-extcommunity
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 1.1.1.1
  area 0.0.0.0
    network 1.1.1.1 0.0.0.0
    network 1.2.3.4 0.0.0.0
    network 11.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#

```

```

vlan 11
#
vlan 100
#
    l2vpn enable
    vxlan tunnel arp-learning disable
    evpn drni group 1.2.3.4
    evpn global-mac 0002-0003-0004
#
vsi vpna
    gateway vsi-interface 1
    vxlan 10
    evpn encapsulation vxlan
        route-distinguisher auto
    vpn-target auto export-extcommunity
    vpn-target auto import-extcommunity
#
vsi vpnb
    gateway vsi-interface 2
    vxlan 20
    evpn encapsulation vxlan
        route-distinguisher auto
    vpn-target auto export-extcommunity
    vpn-target auto import-extcommunity
#
interface Bridge-Aggregation3
    link-aggregation mode dynamic
    port drni intra-portal-port 1
    undo mac-address static source-check enable
#
interface Bridge-Aggregation4
    port link-type trunk
    port trunk permit vlan 1 to 2
    link-aggregation mode dynamic
    port drni group 4
#
    service-instance 1000
        encapsulation s-vid 2
        xconnect vsi vpna
#
interface Bridge-Aggregation5
    port link-type trunk
    port trunk permit vlan 1 3
    link-aggregation mode dynamic
    port drni group 5
#
    service-instance 1000
        encapsulation s-vid 3

```

```

xconnect vsi vpnb
#
interface LoopBack0
 ip address 1.1.1.1 255.255.255.255
#
interface LoopBack1
 ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface11
 ip address 11.1.1.1 255.255.255.0
#
interface Vlan-interface100
 ip address 100.1.1.1 255.255.255.0
 ospf 1 area 0.0.0.0
#
interface GigabitEthernet1/0/4
 port link-mode route
 ip address 60.1.1.1 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 to 2
 port link-aggregation group 4
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 3
 port link-aggregation group 5
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port link-aggregation group 3
#
interface GigabitEthernet1/0/5
 port link-mode bridge
 port access vlan 11
 undo stp enable
 undo mac-address static source-check enable
#
interface Vsi-interface1
 ip binding vpn-instance vpna
 ip address 10.1.1.1 255.255.255.0
 mac-address 0001-0001-0001
 local-proxy-arp enable
 distributed-gateway local
#

```

```

interface Vsi-interface2
 ip binding vpn-instance vpna
 ip address 10.1.2.1 255.255.255.0
 mac-address 0002-0002-0002
 local-proxy-arp enable
 distributed-gateway local
#
interface Vsi-interface3
 ip binding vpn-instance vpna
 l3-vni 1000
#
bgp 200
 peer 3.3.3.3 as-number 200
 peer 3.3.3.3 connect-interface LoopBack0
#
 address-family l2vpn evpn
  peer 3.3.3.3 enable
#
 drni keepalive ip destination 60.1.1.2 source 60.1.1.1
 drni restore-delay 180
 drni system-mac 0001-0002-0003
 drni system-number 1
 drni system-priority 10
#
 drni mad exclude interface LoopBack0
 drni mad exclude interface GigabitEthernet1/0/4
 drni mad exclude interface GigabitEthernet1/0/5
 drni mad exclude interface Vlan-interface 11
 drni mad exclude interface Vsi-interfacel
 drni mad exclude interface Vsi-interface2
#
return

```

- **Switch B:**

```

#
ip vpn-instance vpna
 route-distinguisher 1:1
#
 address-family ipv4
  vpn-target 2:2 import-extcommunity
  vpn-target 2:2 export-extcommunity
#
 address-family evpn
  vpn-target 1:1 import-extcommunity
  vpn-target 1:1 export-extcommunity
#
 vxlan tunnel mac-learning disable
#
ospf 1 router-id 2.2.2.2

```

```

area 0.0.0.0
  network 1.2.3.4 0.0.0.0
  network 2.2.2.2 0.0.0.0
  network 12.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 12
#
vlan 100
#
  l2vpn enable
  vxlan tunnel arp-learning disable
  evpn drni group 1.2.3.4
  evpn global-mac 0002-0003-0004
#
vsi vpna
  gateway vsi-interface 1
  vxlan 10
  evpn encapsulation vxlan
    route-distinguisher auto
  vpn-target auto export-extcommunity
  vpn-target auto import-extcommunity
#
vsi vpnb
  gateway vsi-interface 2
  vxlan 20
  evpn encapsulation vxlan
    route-distinguisher auto
  vpn-target auto export-extcommunity
  vpn-target auto import-extcommunity
#
interface Bridge-Aggregation3
  link-aggregation mode dynamic
  port drni intra-portal-port 1
  undo mac-address static source-check enable
#
interface Bridge-Aggregation4
  port link-type trunk
  port trunk permit vlan 1 to 2
  link-aggregation mode dynamic
  port drni group 4
#
service-instance 1000
  encapsulation s-vid 2
  xconnect vsi vpna

```

```

#
interface Bridge-Aggregation5
 port link-type trunk
 port trunk permit vlan 1 3
 link-aggregation mode dynamic
 port drni group 5
#
service-instance 1000
 encapsulation s-vid 3
 xconnect vsi vpnb
#
interface LoopBack0
 ip address 2.2.2.2 255.255.255.255
#
interface LoopBack1
 ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface12
 ip address 12.1.1.2 255.255.255.0
#
interface Vlan-interface100
 ip address 100.1.1.2 255.255.255.0
 ospf 1 area 0.0.0.0
#
interface GigabitEthernet1/0/4
 port link-mode route
 ip address 60.1.1.2 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 to 2
 port link-aggregation group 4
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 3
 port link-aggregation group 5
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port link-aggregation group 3
#
interface GigabitEthernet1/0/5
 port link-mode bridge
 port access vlan 12
 undo stp enable

```

```

undo mac-address static source-check enable
#
interface Vsi-interface1
 ip binding vpn-instance vpna
 ip address 10.1.1.1 255.255.255.0
 mac-address 0001-0001-0001
 local-proxy-arp enable
 distributed-gateway local
#
interface Vsi-interface2
 ip binding vpn-instance vpna
 ip address 10.1.2.1 255.255.255.0
 mac-address 0002-0002-0002
 local-proxy-arp enable
 distributed-gateway local
#
interface Vsi-interface3
 ip binding vpn-instance vpna
 13-vni 1000
#
bgp 200
 peer 3.3.3.3 as-number 200
 peer 3.3.3.3 connect-interface LoopBack0
#
 address-family l2vpn evpn
  peer 3.3.3.3 enable
#
 drni keepalive ip destination 60.1.1.1 source 60.1.1.2
 drni restore-delay 180
 drni system-mac 0001-0002-0003
 drni system-number 2
 drni system-priority 10
#
 drni mad exclude interface LoopBack0
 drni mad exclude interface GigabitEthernet1/0/4
 drni mad exclude interface GigabitEthernet1/0/5
 drni mad exclude interface Vlan-interface 12
 drni mad exclude interface Vsi-interface1
 drni mad exclude interface Vsi-interface2
#
return

```

- **Switch C:**

```

#
ospf 1 router-id 3.3.3.3
 area 0.0.0.0
  network 3.3.3.3 0.0.0.0
  network 11.1.1.0 0.0.0.255
  network 12.1.1.0 0.0.0.255

```



```

    network 13.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 11 to 13
#
interface LoopBack0
 ip address 3.3.3.3 255.255.255.255
#
interface Vlan-interface11
 ip address 11.1.1.3 255.255.255.0
#
interface Vlan-interface12
 ip address 12.1.1.3 255.255.255.0
#
interface Vlan-interface13
 ip address 13.1.1.3 255.255.255.0
#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port access vlan 11
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port access vlan 12
#
interface GigabitEthernet1/0/3
 port link-mode bridge
 port access vlan 13
#
bgp 200
 group evpn internal
 peer evpn connect-interface LoopBack0
 peer 1.1.1.1 group evpn
 peer 2.2.2.2 group evpn
 peer 4.4.4.4 group evpn
#
 address-family l2vpn evpn
  undo policy vpn-target
  peer evpn enable
  peer evpn reflect-client
#
return

```

- **Switch D:**

```

#
ip vpn-instance vpna

```

```

route-distinguisher 1:1
#
address-family ipv4
  vpn-target 2:2 import-extcommunity
  vpn-target 2:2 export-extcommunity
#
address-family evpn
  vpn-target 1:1 import-extcommunity
  vpn-target 1:1 export-extcommunity
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 4.4.4.4
  area 0.0.0.0
    network 4.4.4.4 0.0.0.0
    network 13.1.1.0 0.0.0.255
#
vlan 2
#
vlan 13
#
l2vpn enable
  vxlan tunnel arp-learning disable
#
vsi vpna
  gateway vsi-interface 1
  vxlan 10
  evpn encapsulation vxlan
    route-distinguisher auto
    vpn-target auto export-extcommunity
    vpn-target auto import-extcommunity
#
interface LoopBack0
  ip address 4.4.4.4 255.255.255.255
#
interface Vlan-interface13
  ip address 13.1.1.4 255.255.255.0
#
interface GigabitEthernet1/0/1
  port link-type trunk
  port trunk permit vlan 1 to 2
  port link-mode bridge
#
service-instance 1000
  encapsulation s-vid 2
  xconnect vsi vpna
#
interface GigabitEthernet1/0/2

```

```

port link-mode bridge
port access vlan 13
#
interface Vsi-interface1
ip binding vpn-instance vpna
ip address 10.1.1.1 255.255.255.0
mac-address 0001-0001-0001
local-proxy-arp enable
distributed-gateway local
#
interface Vsi-interface3
ip binding vpn-instance vpna
13-vni 1000
#
bgp 200
peer 3.3.3.3 as-number 200
peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
peer 3.3.3.3 enable
#
return

```

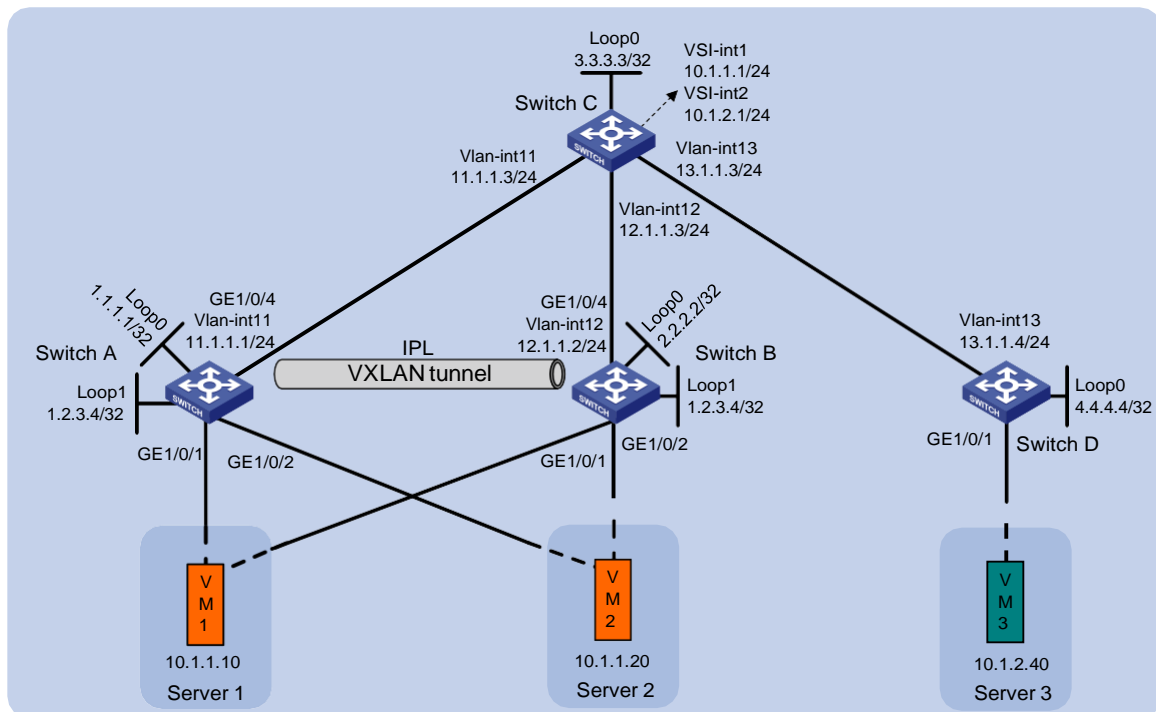
Example: Configuring DRNI using a VXLAN tunnel as the IPL on EVPN gateways

Network configuration

As shown in [Figure 4](#), perform the following tasks to make sure the VMs can communicate with one another:

- Configure VXLAN 10 on Switch A, Switch B, and Switch D, and configure VXLAN 20 on Switch A, and Switch B.
- Configure Switch A, Switch B, and Switch D as distributed EVPN gateways to provide Layer 3 forwarding service for VMs.
- Configure DRNI on Switch A and Switch B to virtualize them into one VTEP. Manually set up a VXLAN tunnel as the IPL between the switches.
- Create a monitor link group on Switch A and Switch B. Configure the transport-facing interfaces of Switch A and Switch B as uplink interfaces for the monitor link group, and member interfaces of DR interfaces as downlink interfaces.
- Configure Switch C as an RR.

Figure 4 Network diagram



Analysis

To make sure the overlay network has connectivity,, configure a routing protocol on these switches to advertise routes for reaching their interfaces, including the loopback interfaces. In this example, OSPF is used.

To conserve resources, configure Switch C to reflect routes for Switch A, Switch B, and Switch D.

Applicable hardware and software versions

The following matrix shows the hardware and software versions to which this configuration example is applicable:

Hardware	Software version
SC 3570 switch series	Not supported
SC 5525 switch series	Release 6615Pxx, Release 6628Pxx
SC 5520 switch series	Release 6615Pxx, Release 6628Pxx
SC 3170 switch series	Not supported
SC 3130 switch series	Not supported

Restrictions and guidelines

Make sure the following settings are consistent on the DR member devices:

- Ethernet service instances and their match criterion on the DR interfaces in the same DR group or single-homed site-facing interfaces.
- VXLAN IDs of VSIs.

In addition, the Ethernet service instances must be created manually.

As a best practice, do not redistribute external routes on the DR member devices.

Use the **drni mad exclude interface** command to exclude all interfaces used by EVPN from the shutdown action by DRNI MAD. The interfaces include VSI interfaces, interfaces that provide BGP peer addresses, interfaces used for setting up the keepalive link, and transport-facing outgoing interfaces of VXLAN tunnels.

Use the **drni mad exclude interface** command to exclude VXLAN tunnel interfaces and their traffic outgoing interfaces from the MAD shutdown action by DRNI before you configure them as IPPs. If you have configured the VXLAN tunnel interfaces as IPPs before excluding them and their traffic outgoing interfaces from the MAD shutdown action, you must first remove the IPP configuration. After the VXLAN tunnel interfaces and their traffic outgoing interfaces come up, exclude the interfaces from the MAD shutdown action by DRNI. Then, configure the VXLAN tunnel interfaces as IPPs.

For EVPN to run correctly on a DR system, you must execute the **undo mac-address static source-check enable** command to disable static source check on the following interfaces:

- Layer 2 aggregate interfaces or Layer 2 Ethernet interfaces acting as the IPPs.
- Transport-facing physical interfaces.

As a best practice, use the IP address of a loopback interface as the virtual VTEP address.

You must disable spanning tree on the Layer 2 Ethernet interface that acts as the physical traffic outgoing interface of a VXLAN tunnel. If you enable spanning tree on that interface, the upstream device will falsely block the interfaces connected to the DR member devices.

Procedures

Configuring the system operating mode

Set the system operating mode to VXLAN on Switch A, and reboot the switch for the mode change to take effect.

```
<SwitchA> system-view
[SwitchA] switch-mode 1
Reboot device to make the configuration take effect.
[SwitchA] quit
<SwitchA> reboot
Start to check configuration with next startup configuration file, please wait..
.....DONE!
Current configuration may be lost after the reboot, save current configuration?
[Y/N]:y
This command will reboot the device. Continue? [Y/N]:y
```

Set the system operating mode of Switch B and Switch D to VXLAN. The method is the same as Switch A. (Details not shown.)

Configuring Layer 3 interfaces

Configure the Layer 3 interfaces on Switch A.

```
[SwitchA] interface loopback 0
[SwitchA-Loopback0] ip address 1.1.1.1 32
[SwitchA-Loopback0] quit
[SwitchA] interface loopback 1
[SwitchA-Loopback1] ip address 1.2.3.4 32
[SwitchA-Loopback1] quit
[SwitchA] vlan 11
[SwitchA-vlan11] port gigabitethernet 1/0/5
[SwitchA-vlan11] quit
[SwitchA] interface vlan-interface 11
[SwitchA-Vlan-interface11] ip address 11.1.1.1 24
[SwitchA-Vlan-interface11] quit
```

Configure the Layer 3 interfaces on other switches. (Details not shown.)

On VM 1, VM 3, and VM 5, specify 10.1.1.1 as the gateway address. On VM 2 and VM 4, specify 10.1.2.1 as the gateway address. (Details not shown.)

Configuring OSPF

Configuring Switch A

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchA] ospf 1 router-id 1.1.1.1
[SwitchA-ospf-1] area 0
```

```
[SwitchA-ospf-1-area-0.0.0.0] network 1.1.1.1 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchA-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchA-ospf-1-area-0.0.0.0] quit
[SwitchA-ospf-1] quit
```

Configuring Switch B

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchB] ospf 1 router-id 2.2.2.2
[SwitchB-ospf-1] area 0
[SwitchB-ospf-1-area-0.0.0.0] network 2.2.2.2 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 1.2.3.4 0.0.0.0
[SwitchB-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchB-ospf-1-area-0.0.0.0] quit
[SwitchB-ospf-1] quit
```

Configuring Switch C

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchC] ospf 1 router-id 3.3.3.3
[SwitchC-ospf-1] area 0
[SwitchC-ospf-1-area-0.0.0.0] network 3.3.3.3 0.0.0.0
[SwitchC-ospf-1-area-0.0.0.0] network 11.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 12.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchC-ospf-1-area-0.0.0.0] quit
[SwitchC-ospf-1] quit
```

Configuring Switch D

Configure OSPF to advertise the networks attached to the Layer 3 interfaces.

```
[SwitchD] ospf 1 router-id 4.4.4.4
[SwitchD-ospf-1] area 0
[SwitchD-ospf-1-area-0.0.0.0] network 4.4.4.4 0.0.0.0
[SwitchD-ospf-1-area-0.0.0.0] network 13.1.1.0 0.0.0.255
[SwitchD-ospf-1-area-0.0.0.0] quit
[SwitchD-ospf-1] quit
```

Disabling spanning tree

Configuring Switch A

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/4.

```
[SwitchA] interface gigabitethernet 1/0/4
[SwitchA-GigabitEthernet1/0/4] undo stp enable
[SwitchA-GigabitEthernet1/0/4] quit
```

Configuring Switch B

Disable spanning tree on transport-facing physical interface GigabitEthernet 1/0/4.

```
[SwitchB] interface gigabitethernet 1/0/4
[SwitchB-GigabitEthernet1/0/4] undo stp enable
[SwitchB-GigabitEthernet1/0/4] quit
```

Configuring EVPN

Configuring Switch A

```
# Enable L2VPN.
[SwitchA] l2vpn enable

# Disable remote MAC address learning and remote ARP learning.
[SwitchA] vxlan tunnel mac-learning disable
[SwitchA] vxlan tunnel arp-learning disable

# Specify the reserved VXLAN as VXLAN 1234.
[SwitchA] reserved vxlan 1234

# Configure the EVPN global MAC address as 0002-0003-0004.
[SwitchA] evpn global-mac 2-3-4

# Create an EVPN instance on VSI vpna.
[SwitchA] vsi vpna
[SwitchA-vsi-vpna] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchA-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchA-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchA-vsi-vpna-evpn-vxlan] quit

# Create VXLAN 10.
[SwitchA-vsi-vpna] vxlan 10
[SwitchA-vsi-vpna-vxlan-10] quit
[SwitchA-vsi-vpna] quit

# Create an EVPN instance on VSI vpnb.
[SwitchA] vsi vpnb
[SwitchA-vsi-vpnb] evpn encapsulation vxlan

# Configure the switch to automatically generate an RD and a route target for the EVPN instance.
[SwitchA-vsi-vpnb-evpn-vxlan] route-distinguisher auto
[SwitchA-vsi-vpnb-evpn-vxlan] vpn-target auto
[SwitchA-vsi-vpnb-evpn-vxlan] quit

# Create VXLAN 20.
[SwitchA-vsi-vpnb] vxlan 20
[SwitchA-vsi-vpnb-vxlan-20] quit
[SwitchA-vsi-vpnb] quit
```

Configuring Switch B

```
# Enable L2VPN.
[SwitchB] l2vpn enable

# Disable remote MAC address learning and remote ARP learning.
[SwitchB] vxlan tunnel mac-learning disable
[SwitchB] vxlan tunnel arp-learning disable

# Specify the reserved VXLAN as VXLAN 1234.
[SwitchB] reserved vxlan 1234

# Configure the EVPN global MAC address as 0002-0003-0004.
[SwitchB] evpn global-mac 2-3-4
```


Create an EVPN instance on VSI *vpna*.

```
[SwitchB] vsi vpna
[SwitchB-vsi-vpna] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchB-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchB-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchB-vsi-vpna-evpn-vxlan] quit
```

Create VXLAN 10.

```
[SwitchB-vsi-vpna] vxlan 10
[SwitchB-vsi-vpna-vxlan-10] quit
[SwitchB-vsi-vpna] quit
```

Create an EVPN instance on VSI *vpnb*.

```
[SwitchB] vsi vpb
[SwitchB-vsi-vpb] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchB-vsi-vpb-evpn-vxlan] route-distinguisher auto
[SwitchB-vsi-vpb-evpn-vxlan] vpn-target auto
[SwitchB-vsi-vpb-evpn-vxlan] quit
```

Create VXLAN 20.

```
[SwitchB-vsi-vpb] vxlan 20
[SwitchB-vsi-vpb-vxlan-20] quit
[SwitchB-vsi-vpb] quit
```

Configuring Switch D

Enable L2VPN.

```
[SwitchD] l2vpn enable
```

Disable remote MAC address learning and remote ARP learning.

```
[SwitchD] vxlan tunnel mac-learning disable
[SwitchD] vxlan tunnel arp-learning disable
```

Create an EVPN instance on VSI *vpna*.

```
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] evpn encapsulation vxlan
```

Configure the switch to automatically generate an RD and a route target for the EVPN instance.

```
[SwitchD-vsi-vpna-evpn-vxlan] route-distinguisher auto
[SwitchD-vsi-vpna-evpn-vxlan] vpn-target auto
[SwitchD-vsi-vpna-evpn-vxlan] quit
```

Create VXLAN 10.

```
[SwitchD-vsi-vpna] vxlan 10
[SwitchD-vsi-vpna-vxlan-10] quit
[SwitchD-vsi-vpna] quit
```

Configuring distributed EVPN gateways

Configuring Switch A

Configure RD and route target settings for VPN instance *vpna*.

```
[SwitchA] ip vpn-instance vpna
```

```
[SwitchA-vpn-instance-vpna] route-distinguisher 1:1
[SwitchA-vpn-instance-vpna] address-family ipv4
[SwitchA-vpn-ipv4-vpna] vpn-target 2:2
[SwitchA-vpn-ipv4-vpna] quit
[SwitchA-vpn-instance-vpna] address-family evpn
[SwitchA-vpn-evpn-vpna] vpn-target 1:1
[SwitchA-vpn-evpn-vpna] quit
[SwitchA-vpn-instance-vpna] quit
```

Configure VSI-interface 1 as a distributed gateway.

```
[SwitchA] interface vsi-interface 1
[SwitchA-Vsi-interface1] ip binding vpn-instance vpna
[SwitchA-Vsi-interface1] ip address 10.1.1.1 255.255.255.0
[SwitchA-Vsi-interface1] mac-address 1-1-1
[SwitchA-Vsi-interface1] distributed-gateway local
[SwitchA-Vsi-interface1] local-proxy-arp enable
[SwitchA-Vsi-interface1] quit
```

Configure VSI-interface 2 as a distributed gateway.

```
[SwitchA] interface vsi-interface 2
[SwitchA-Vsi-interface2] ip binding vpn-instance vpna
[SwitchA-Vsi-interface2] ip address 10.1.2.1 255.255.255.0
[SwitchA-Vsi-interface2] mac-address 2-2-2
[SwitchA-Vsi-interface2] distributed-gateway local
[SwitchA-Vsi-interface2] local-proxy-arp enable
[SwitchA-Vsi-interface2] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance **vpna**, and configure the L3 VXLAN ID as 1000 for the VPN instance.

```
[SwitchA] interface vsi-interface 3
[SwitchA-Vsi-interface3] ip binding vpn-instance vpna
[SwitchA-Vsi-interface3] l3-vni 1000
[SwitchA-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI **vpna**.

```
[SwitchA] vsi vpna
[SwitchA-vsi-vpna] gateway vsi-interface 1
[SwitchA-vsi-vpna] quit
```

Specify VSI-interface 2 as the gateway interface for VSI **vpnb**.

```
[SwitchA] vsi vpb
[SwitchA-vsi-vpb] gateway vsi-interface 2
[SwitchA-vsi-vpb] quit
```

Configuring Switch B

Configure RD and route target settings for VPN instance **vpna**.

```
[SwitchB] ip vpn-instance vpna
[SwitchB-vpn-instance-vpna] route-distinguisher 1:1
[SwitchB-vpn-instance-vpna] address-family ipv4
[SwitchB-vpn-ipv4-vpna] vpn-target 2:2
[SwitchB-vpn-ipv4-vpna] quit
[SwitchB-vpn-instance-vpna] address-family evpn
[SwitchB-vpn-evpn-vpna] vpn-target 1:1
```

```
[SwitchB-vpn-evpn-vpna] quit
[SwitchB-vpn-instance-vpna] quit
```

Configure VSI-interface 1 as a distributed gateway.

```
[SwitchB] interface vsi-interface 1
[SwitchB-Vsi-interface1] ip binding vpn-instance vpna
[SwitchB-Vsi-interface1] ip address 10.1.1.1 255.255.255.0
[SwitchB-Vsi-interface1] mac-address 1-1-1
[SwitchB-Vsi-interface1] distributed-gateway local
[SwitchB-Vsi-interface1] local-proxy-arp enable
[SwitchB-Vsi-interface1] quit
```

Configure VSI-interface 2 as a distributed gateway.

```
[SwitchB] interface vsi-interface 2
[SwitchB-Vsi-interface2] ip binding vpn-instance vpna
[SwitchB-Vsi-interface2] ip address 10.1.2.1 255.255.255.0
[SwitchB-Vsi-interface2] mac-address 2-2-2
[SwitchB-Vsi-interface2] distributed-gateway local
[SwitchB-Vsi-interface2] local-proxy-arp enable
[SwitchB-Vsi-interface2] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance **vpna, and configure the L3 VXLAN ID as 1000 for the VPN instance.**

```
[SwitchB] interface vsi-interface 3
[SwitchB-Vsi-interface3] ip binding vpn-instance vpna
[SwitchB-Vsi-interface3] l3-vni 1000
[SwitchB-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI **vpna.**

```
[SwitchB] vsi vpna
[SwitchB-vsi-vpna] gateway vsi-interface 1
[SwitchB-vsi-vpna] quit
```

Specify VSI-interface 2 as the gateway interface for VSI **vpnb.**

```
[SwitchB] vsi vpnb
[SwitchB-vsi-vpnb] gateway vsi-interface 2
[SwitchB-vsi-vpnb] quit
```

Configuring Switch D

Configure RD and route target settings for VPN instance **vpna.**

```
[SwitchD] ip vpn-instance vpna
[SwitchD-vpn-instance-vpna] route-distinguisher 1:1
[SwitchD-vpn-instance-vpna] address-family ipv4
[SwitchD-vpn-ipv4-vpna] vpn-target 2:2
[SwitchD-vpn-ipv4-vpna] quit
[SwitchD-vpn-instance-vpna] address-family evpn
[SwitchD-vpn-evpn-vpna] vpn-target 1:1
[SwitchD-vpn-evpn-vpna] quit
[SwitchD-vpn-instance-vpna] quit
```

Configure VSI-interface 1 as a distributed gateway.

```
[SwitchD] interface vsi-interface 1
[SwitchD-Vsi-interface1] ip binding vpn-instance vpna
[SwitchD-Vsi-interface1] ip address 10.1.1.1 255.255.255.0
```

```
[SwitchD-Vsi-interface1] mac-address 1-1-1
[SwitchD-Vsi-interface1] distributed-gateway local
[SwitchD-Vsi-interface1] local-proxy-arp enable
[SwitchD-Vsi-interface1] quit
```

Create VSI-interface 3. Associate VSI-interface 3 with VPN instance `vpna`, and configure the L3 VXLAN ID as 1000 for the VPN instance.

```
[SwitchD] interface vsi-interface 3
[SwitchD-Vsi-interface3] ip binding vpn-instance vpna
[SwitchD-Vsi-interface3] l3-vni 1000
[SwitchD-Vsi-interface3] quit
```

Specify VSI-interface 1 as the gateway interface for VSI `vpna`.

```
[SwitchD] vsi vpna
[SwitchD-vsi-vpna] gateway vsi-interface 1
[SwitchD-vsi-vpna] quit
```

Configuring DRNI

Configuring Switch A

Specify the virtual VTEP address as 1.2.3.4.

```
[SwitchA] evpn drni group 1.2.3.4
```

Configure DR system parameters.

```
[SwitchA] drni system-mac 0001-0002-0003
[SwitchA] drni system-number 1
[SwitchA] drni system-priority 10
[SwitchA] drni restore-delay 180
```

Create a tunnel to Switch B, and set the ToS of tunneled packets to 100.

```
[SwitchA] interface tunnel 1 mode vxlan
[SwitchA-Tunnel1] source 1.1.1.1
[SwitchA-Tunnel1] destination 2.2.2.2
[SwitchA-Tunnel1] tunnel tos 100
[SwitchA-Tunnel1] quit
```

Exclude Tunnel 1 from the shutdown action by DRNI MAD.

```
[SwitchA] drni mad exclude interface tunnel 1
```

Specify Tunnel 1 as the IPP

```
[SwitchA] interface tunnel 1
[SwitchA-Tunnel1] port drni intra-portal-port 1
[SwitchA-Tunnel1] quit
```

Disable the static source check feature on GigabitEthernet 1/0/4.

```
[SwitchA] interface gigabitethernet 1/0/4
[SwitchA-GigabitEthernet1/0/4] undo mac-address static source-check enable
[SwitchA-GigabitEthernet1/0/4] quit
```

Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation4] quit
```

Assign GigabitEthernet 1/0/1 to aggregation group 4.

```

[SwitchA] interface gigabitethernet 1/0/1
[SwitchA-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchA-GigabitEthernet1/0/1] quit

# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port drni group 4
[SwitchA-Bridge-Aggregation4] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchA-Bridge-Aggregation5] quit

# Assign GigabitEthernet 1/0/2 to aggregation group 5.
[SwitchA] interface gigabitethernet 1/0/2
[SwitchA-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchA-GigabitEthernet1/0/2] quit

# Assign Bridge-Aggregation 5 to DR group 5.
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port drni group 5
[SwitchA-Bridge-Aggregation5] quit

# Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.
[SwitchA] drni mad exclude interface loopback0
[SwitchA] drni mad exclude interface gigabitethernet1/0/4
[SwitchA] drni mad exclude interface vsi-interface 1
[SwitchA] drni mad exclude interface vsi-interface 2
[SwitchA] drni mad exclude interface vlan-interface 11

```

Configuring Switch B

```

# Specify the virtual VTEP address as 1.2.3.4.
[SwitchB] evpn drni group 1.2.3.4

# Configure DR system parameters.
[SwitchB] drni system-mac 0001-0002-0003
[SwitchB] drni system-number 2
[SwitchB] drni system-priority 10
[SwitchB] drni restore-delay 180

# Create a tunnel to Switch A, and set the ToS of tunneled packets to 100.
[SwitchB] interface tunnel 1 mode vxlan
[SwitchB-Tunnel1] source 2.2.2.2
[SwitchB-Tunnel1] destination 1.1.1.1
[SwitchB-Tunnel1] tunnel tos 100
[SwitchB-Tunnel1] quit

# Exclude Tunnel 1 from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface tunnel 1

# Specify Tunnel 1 as the IPP
[SwitchB] interface tunnel 1
[SwitchB-Tunnel1] port drni intra-portal-port 1
[SwitchB-Tunnel1] quit

```

```

# Disable the static source check feature on GigabitEthernet 1/0/4.
[SwitchB] interface gigabitethernet 1/0/4
[SwitchB-GigabitEthernet1/0/4] undo mac-address static source-check enable
[SwitchB-GigabitEthernet1/0/4] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation4] quit

# Assign GigabitEthernet 1/0/1 to aggregation group 4.
[SwitchB] interface gigabitethernet 1/0/1
[SwitchB-GigabitEthernet1/0/1] port link-aggregation group 4
[SwitchB-GigabitEthernet1/0/1] quit

# Assign Bridge-Aggregation 4 to DR group 4.
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port drni group 4
[SwitchB-Bridge-Aggregation4] quit

# Create Layer 2 dynamic aggregate interface Bridge-Aggregation 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] link-aggregation mode dynamic
[SwitchB-Bridge-Aggregation5] quit

# Assign GigabitEthernet 1/0/2 to aggregation group 5.
[SwitchB] interface gigabitethernet 1/0/2
[SwitchB-GigabitEthernet1/0/2] port link-aggregation group 5
[SwitchB-GigabitEthernet1/0/2] quit

# Assign Bridge-Aggregation 5 to DR group 5.
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port drni group 5
[SwitchB-Bridge-Aggregation5] quit

# Exclude all interfaces used by EVPN from the shutdown action by DRNI MAD.
[SwitchB] drni mad exclude interface loopback0
[SwitchB] drni mad exclude interface gigabitethernet1/0/4
[SwitchB] drni mad exclude interface vsi-interface 1
[SwitchB] drni mad exclude interface vsi-interface 2
[SwitchB] drni mad exclude interface vlan-interface 12

```

Configuring BGP to advertise BGP EVPN routes

Configuring Switch A

```

# Configure BGP to advertise BGP EVPN routes.
[SwitchA] bgp 200
[SwitchA-bgp-default] peer 3.3.3.3 as-number 200
[SwitchA-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchA-bgp-default] address-family l2vpn evpn
[SwitchA-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchA-bgp-default-evpn] quit
[SwitchA-bgp-default] quit

```

Configuring Switch B

Configure BGP to advertise BGP EVPN routes.

```
[SwitchB] bgp 200
[SwitchB-bgp-default] peer 3.3.3.3 as-number 200
[SwitchB-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchB-bgp-default] address-family l2vpn evpn
[SwitchB-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchB-bgp-default-evpn] quit
[SwitchB-bgp-default] quit
```

Configuring Switch C

Configure BGP to advertise BGP EVPN routes and configure the switch as an RR.

```
[SwitchC] bgp 200
[SwitchC-bgp-default] group evpn
[SwitchC-bgp-default] peer 1.1.1.1 group evpn
[SwitchC-bgp-default] peer 2.2.2.2 group evpn
[SwitchC-bgp-default] peer 4.4.4.4 group evpn
[SwitchC-bgp-default] peer evpn as-number 200
[SwitchC-bgp-default] peer evpn connect-interface loopback 0
[SwitchC-bgp-default] address-family l2vpn evpn
[SwitchC-bgp-default-evpn] peer evpn enable
[SwitchC-bgp-default-evpn] undo policy vpn-target
[SwitchC-bgp-default-evpn] peer evpn reflect-client
[SwitchC-bgp-default-evpn] quit
[SwitchC-bgp-default] quit
```

Configuring Switch D

Configure BGP to advertise BGP EVPN routes.

```
[SwitchD] bgp 200
[SwitchD-bgp-default] peer 3.3.3.3 as-number 200
[SwitchD-bgp-default] peer 3.3.3.3 connect-interface loopback 0
[SwitchD-bgp-default] address-family l2vpn evpn
[SwitchD-bgp-default-evpn] peer 3.3.3.3 enable
[SwitchD-bgp-default-evpn] quit
[SwitchD-bgp-default] quit
```

Mapping Ethernet service instances to VSIs

Configuring Switch A

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchA] interface bridge-aggregation 4
[SwitchA-Bridge-Aggregation4] port link-type trunk
[SwitchA-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchA-Bridge-Aggregation4] service-instance 1000
[SwitchA-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI **vpna**.

```
[SwitchA-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchA-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchA] interface bridge-aggregation 5
[SwitchA-Bridge-Aggregation5] port link-type trunk
[SwitchA-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchA-Bridge-Aggregation5] service-instance 1000
[SwitchA-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI vpnb.

```
[SwitchA-Bridge-Aggregation5-srv1000] xconnect vsi vpnb
[SwitchA-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch B

On Bridge-Aggregation 4, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchB] interface bridge-aggregation 4
[SwitchB-Bridge-Aggregation4] port link-type trunk
[SwitchB-Bridge-Aggregation4] port trunk permit vlan 2
[SwitchB-Bridge-Aggregation4] service-instance 1000
[SwitchB-Bridge-Aggregation4-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI vpna.

```
[SwitchB-Bridge-Aggregation4-srv1000] xconnect vsi vpna
[SwitchB-Bridge-Aggregation4-srv1000] quit
```

On Bridge-Aggregation 5, create Ethernet service instance 1000 to match VLAN 3.

```
[SwitchB] interface bridge-aggregation 5
[SwitchB-Bridge-Aggregation5] port link-type trunk
[SwitchB-Bridge-Aggregation5] port trunk permit vlan 3
[SwitchB-Bridge-Aggregation5] service-instance 1000
[SwitchB-Bridge-Aggregation5-srv1000] encapsulation s-vid 3
```

Map Ethernet service instance 1000 to VSI vpnb.

```
[SwitchB-Bridge-Aggregation5-srv1000] xconnect vsi vpnb
[SwitchB-Bridge-Aggregation5-srv1000] quit
```

Configuring Switch D

On GigabitEthernet 1/0/1, create Ethernet service instance 1000 to match VLAN 2.

```
[SwitchD] interface gigabitethernet 1/0/1
[SwitchD-GigabitEthernet1/0/1] port link-type trunk
[SwitchD-GigabitEthernet1/0/1] port trunk permit vlan 2
[SwitchD-GigabitEthernet1/0/1] service-instance 1000
[SwitchD-GigabitEthernet1/0/1-srv1000] encapsulation s-vid 2
```

Map Ethernet service instance 1000 to VSI vpna.

```
[SwitchD-GigabitEthernet1/0/1-srv1000] xconnect vsi vpna
[SwitchD-GigabitEthernet1/0/1-srv1000] quit
```

Configuring Monitor Link

Configuring Switch A

Create monitor link group 1 and assign the uplink and downlink interfaces to it.

```
[SwitchA] monitor-link group 1
[SwitchA-mtlk-group1] port gigabitethernet 1/0/1 downlink
[SwitchA-mtlk-group1] port gigabitethernet 1/0/2 downlink
```



```
[SwitchA-mtlk-group1] port gigabitethernet 1/0/4 uplink
[SwitchA-mtlk-group1] quit
```

Configuring Switch B

Create monitor link group 1 and assign the uplink and downlink interfaces to it.

```
[SwitchB] monitor-link group 1
[SwitchB-mtlk-group1] port gigabitethernet 1/0/1 downlink
[SwitchB-mtlk-group1] port gigabitethernet 1/0/2 downlink
[SwitchB-mtlk-group1] port gigabitethernet 1/0/4 uplink
[SwitchB-mtlk-group1] quit
```

Verifying the configuration

Verifying the configuration on a DR member device

The verification procedure uses Switch A as an example.

Verify that Switch A has BGP EVPN routes.

```
[Switch A]display bgp l2vpn evpn
BGP local router ID is 1.2.3.4
Status codes: * - valid, > - best, d - dampened, h - history
               s - suppressed, S - stale, i - internal, e - external
               a - additional-path
Origin: i - IGP, e - EGP, ? - incomplete
Total number of routes from all PEs: 3
Route distinguisher: 1:1(vpna)
Total number of routes: 2
```

	Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* >	[5][0][24][10.1.1.0]/80	1.1.1.1	0	100	32768	i
* >	[5][0][24][10.1.2.0]/80	1.1.1.1	0	100	32768	i

```
Route distinguisher: 1:10
Total number of routes: 4
```

	Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
* >	[3][0][32][1.1.1.1]/80	1.1.1.1	0	100	32768	i
* >	[3][0][32][1.2.3.4]/80	1.2.3.4	0	100	32768	i
* >i	[3][0][32][2.2.2.2]/80	2.2.2.2	0	100	0	i
* >i	[3][0][32][4.4.4.4]/80	4.4.4.4	0	100	0	i

```
Route distinguisher: 1:20
Total number of routes: 3
```

	Network	NextHop	MED	LocPrf	PrefVal	Path/Ogn
--	---------	---------	-----	--------	---------	----------

```
* > [3][0][32][1.1.1.1]/80
1.1.1.1 0 100 32768 i
* > [3][0][32][1.2.3.4]/80
1.2.3.4 0 100 32768 i
* >i [3][0][32][2.2.2.2]/80
2.2.2.2 0 100 0 i
```

Verify that the IPL Tunnel 1 is up, and Tunnel 0 to Switch D uses the virtual VTEP address as the source address.

```
[SwitchA] display interface tunnel
```

```
Tunnel0
```

```
Current state: UP
```

```
Line protocol state: UP
```

```
Description: Tunnel0 Interface
```

```
Bandwidth: 64 kbps
```

```
Maximum transmission unit: 1464
```

```
Internet protocol processing: Disabled
```

```
Last clearing of counters: Never
```

```
Tunnel source 1.2.3.4, destination 4.4.4.4
```

```
Tunnel protocol/transport UDP_VXLAN/IP
```

```
Last 300 seconds input rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
```

```
Last 300 seconds output rate: 0 bytes/sec, 0 bits/sec, 0 packets/sec
```

```
Input: 0 packets, 0 bytes, 0 drops
```

```
Output: 0 packets, 0 bytes, 0 drops
```

```
Tunnel1
```

```
Current state: UP
```

```
Line protocol state: UP
```

```
Description: Tunnel1 Interface
```

```
Bandwidth: 64 kbps
```

```
Maximum transmission unit: 1464
```

```
Internet protocol processing: Disabled
```

```
Last clearing of counters: Never
```

```
Tunnel source 1.1.1.1, destination 2.2.2.2
```

```
Tunnel protocol/transport UDP_VXLAN/IP
```

```
Last 300 seconds input rate: 149 bytes/sec, 1192 bits/sec, 1 packets/sec
```

```
Last 300 seconds output rate: 379 bytes/sec, 3032 bits/sec, 3 packets/sec
```

```
Input: 398 packets, 46446 bytes, 0 drops
```

```
Output: 3597 packets, 363591 bytes, 0 drops
```

Verify that the VXLAN tunnels have been assigned to VXLAN 10 and VXLAN 20.

```
[SwitchA] display l2vpn vsi verbose
```

```
VSI Name: Auto_L3VNI1000_3
```

```
VSI Index : 1
```

```
VSI State : Down
```

```
MTU : 1500
```

```
Bandwidth : -
```

```
Broadcast Restrain : -
```

```
Multicast Restrain : -
```

```
Unknown Unicast Restrain: -
```

```

MAC Learning          : Enabled
MAC Table Limit       : -
MAC Learning rate     : -
Drop Unknown          : -
Flooding              : Enabled
Statistics            : Disabled
Gateway Interface     : VSI-interface 3
VXLAN ID              : 1000

```

VSI Name: vpna

```

VSI Index             : 0
VSI State             : Up
MTU                   : 1500
Bandwidth             : -
Broadcast Restrained  : -
Multicast Restrained  : -
Unknown Unicast Restrained: -
MAC Learning          : Enabled
MAC Table Limit       : -
MAC Learning rate     : -
Drop Unknown          : -
Flooding              : Enabled
Statistics            : Disabled
Gateway Interface     : VSI-interface 1
VXLAN ID              : 10

```

Tunnels:

Tunnel Name	Link ID	State	Type	Flood proxy
Tunnel0	0x5000000	UP	Auto	Disabled
Tunnel1	0x5000001	UP	Manual	Disabled

ACs:

AC	Link ID	State	Type
BAGG4 srv1000	0	Up	Manual

VSI Name: vpnb

```

VSI Index             : 2
VSI State             : Up
MTU                   : 1500
Bandwidth             : -
Broadcast Restrained  : -
Multicast Restrained  : -
Unknown Unicast Restrained: -
MAC Learning          : Enabled
MAC Table Limit       : -
MAC Learning rate     : -
Drop Unknown          : -
Flooding              : Enabled
Statistics            : Disabled
Gateway Interface     : VSI-interface 2

```

```

VXLAN ID                : 20
Tunnels:
  Tunnel Name           Link ID   State   Type       Flood proxy
  Tunnel1               0x5000001 UP      Manual     Disabled
ACs:
  AC                    Link ID   State   Type
  BAGG5 srv1000        0         Up      Manual

```

Verifying the network connectivity of the VMs

Verify that the VMs can communicate when both Switch A and Switch B are operating correctly. (Details not shown.)

Verify that VM 1 and VM 5 can communicate when Switch A's or Switch B's links to the local site are disconnected. (Details not shown.)

Configuration files

- Switch A:


```

#
monitor-link group 1
#
ip vpn-instance vpna
  route-distinguisher 1:1
#
address-family ipv4
  vpn-target 2:2 import-extcommunity
  vpn-target 2:2 export-extcommunity
#
address-family evpn
  vpn-target 1:1 import-extcommunity
  vpn-target 1:1 export-extcommunity
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 1.1.1.1
  area 0.0.0.0
    network 1.1.1.1 0.0.0.0
    network 1.2.3.4 0.0.0.0
    network 11.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 11
#
l2vpn enable
reserved vxlan 1234

```

```

vxlan tunnel arp-learning disable
evpn drni group 1.2.3.4
evpn global-mac 0002-0003-0004
#
vsi vpna
gateway vsi-interface 1
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
vsi vpnb
gateway vsi-interface 2
vxlan 20
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface Bridge-Aggregation4
port link-type trunk
port trunk permit vlan 1 to 2
link-aggregation mode dynamic
port drni group 4
#
service-instance 1000
encapsulation s-vid 2
xconnect vsi vpna
#
interface Bridge-Aggregation5
port link-type trunk
port trunk permit vlan 1 3
link-aggregation mode dynamic
port drni group 5
#
service-instance 1000
encapsulation s-vid 3
xconnect vsi vpnb
#
interface LoopBack0
ip address 1.1.1.1 255.255.255.255
#
interface LoopBack1
ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface11
ip address 11.1.1.1 255.255.255.0

```

```

#
interface GigabitEthernet1/0/1
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 to 2
 port link-aggregation group 4
 port monitor-link group 1 downlink
#
interface GigabitEthernet1/0/2
 port link-mode bridge
 port link-type trunk
 port trunk permit vlan 1 3
 port link-aggregation group 5
 port monitor-link group 1 downlink
#
interface GigabitEthernet1/0/4
 port link-mode bridge
 port access vlan 11
 undo stp enable
 port monitor-link group 1 uplink
 undo mac-address static source-check enable
#
interface Vsi-interface1
 ip binding vpn-instance vpna
 ip address 10.1.1.1 255.255.255.0
 mac-address 0001-0001-0001
 local-proxy-arp enable
 distributed-gateway local
#
interface Vsi-interface2
 ip binding vpn-instance vpna
 ip address 10.1.2.1 255.255.255.0
 mac-address 0002-0002-0002
 local-proxy-arp enable
 distributed-gateway local
#
interface Vsi-interface3
 ip binding vpn-instance vpna
 13-vni 1000
#
interface Tunnel1 mode vxlan
 port drni intra-portal-port 1
 source 1.1.1.1
 destination 2.2.2.2
 tunnel tos 100
#
bgp 200
 peer 3.3.3.3 as-number 200

```

```

peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
    peer 3.3.3.3 enable
#
drni restore-delay 180
drni system-mac 0001-0001-0001
drni system-number 1
drni system-priority 10
#
drni mad exclude interface LoopBack0
drni mad exclude interface GigabitEthernet1/0/5
drni mad exclude interface Tunnell
drni mad exclude interface Vlan-interface 11
drni mad exclude interface Vsi-interface1
drni mad exclude interface Vsi-interface2
#
return

```

- **Switch B:**

```

#
monitor-link group 1
#
ip vpn-instance vpna
    route-distinguisher 1:1
#
address-family ipv4
    vpn-target 2:2 import-extcommunity
    vpn-target 2:2 export-extcommunity
#
address-family evpn
    vpn-target 1:1 import-extcommunity
    vpn-target 1:1 export-extcommunity
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 2.2.2.2
    area 0.0.0.0
        network 1.2.3.4 0.0.0.0
        network 2.2.2.2 0.0.0.0
        network 12.1.1.0 0.0.0.255
#
vlan 2
#
vlan 3
#
vlan 12
#
l2vpn enable

```

```

reserved vxlan 1234
vxlan tunnel arp-learning disable
evpn drni group 1.2.3.4
evpn global-mac 0002-0003-0004
#
vsi vpna
gateway vsi-interface 1
vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
vsi vpnb
gateway vsi-interface 2
vxlan 20
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface Bridge-Aggregation4
port link-type trunk
port trunk permit vlan 1 to 2
link-aggregation mode dynamic
port drni group 4
#
service-instance 1000
encapsulation s-vid 2
xconnect vsi vpna
#
interface Bridge-Aggregation5
port link-type trunk
port trunk permit vlan 1 3
link-aggregation mode dynamic
port drni group 5
#
service-instance 1000
encapsulation s-vid 3
xconnect vsi vpnb
#
interface LoopBack0
ip address 2.2.2.2 255.255.255.255
#
interface LoopBack1
ip address 1.2.3.4 255.255.255.255
#
interface Vlan-interface12

```



```

ip address 12.1.1.2 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-mode bridge
port link-type trunk
port trunk permit vlan 1 to 2
port monitor-link group 1 downlink
port link-aggregation group 4
#
interface GigabitEthernet1/0/2
port link-mode bridge
port link-type trunk
port trunk permit vlan 1 3
port monitor-link group 1 downlink
port link-aggregation group 5
#
interface GigabitEthernet1/0/4
port link-mode bridge
port access vlan 12
undo stp enable
port monitor-link group 1 uplink
undo mac-address static source-check enable
#
interface Vsi-interface1
ip binding vpn-instance vpna
ip address 10.1.1.1 255.255.255.0
mac-address 0001-0001-0001
local-proxy-arp enable
distributed-gateway local
#
interface Vsi-interface2
ip binding vpn-instance vpna
ip address 10.1.2.1 255.255.255.0
mac-address 0002-0002-0002
local-proxy-arp enable
distributed-gateway local
#
interface Vsi-interface3
ip binding vpn-instance vpna
l3-vni 1000
#
interface Tunnell mode vxlan
port drni intra-portal-port 1
source 2.2.2.2
destination 1.1.1.1
tunnel tos 100
#
bgp 200

```

```

peer 3.3.3.3 as-number 200
peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
    peer 3.3.3.3 enable
#
drni restore-delay 180
drni system-mac 0001-0002-0003
drni system-number 2
drni system-priority 10
#
drni mad exclude interface LoopBack0
drni mad exclude interface GigabitEthernet1/0/5
drni mad exclude interface Tunnell
drni mad exclude interface Vlan-interface 12
drni mad exclude interface Vsi-interface1
drni mad exclude interface Vsi-interface2
#
return

```

- **Switch C:**

```

#
ospf 1 router-id 3.3.3.3
    area 0.0.0.0
        network 3.3.3.3 0.0.0.0
        network 11.1.1.0 0.0.0.255
        network 12.1.1.0 0.0.0.255
        network 13.1.1.0 0.0.0.255
#
vlan 11 to 13
#
interface LoopBack0
    ip address 3.3.3.3 255.255.255.255
#
interface Vlan-interface11
    ip address 11.1.1.3 255.255.255.0
#
interface Vlan-interface12
    ip address 12.1.1.3 255.255.255.0
#
interface Vlan-interface13
    ip address 13.1.1.3 255.255.255.0
#
interface GigabitEthernet1/0/1
    port link-mode bridge
    port access vlan 11
#
interface GigabitEthernet1/0/2
    port link-mode bridge

```

```

port access vlan 12
#
interface GigabitEthernet1/0/3
port link-mode bridge
port access vlan 13
#
bgp 200
group evpn internal
peer evpn connect-interface LoopBack0
peer 1.1.1.1 group evpn
peer 2.2.2.2 group evpn
peer 4.4.4.4 group evpn
#
address-family l2vpn evpn
undo policy vpn-target
peer evpn enable
peer evpn reflect-client
#
return

```

- **Switch D:**

```

#
ip vpn-instance vpna
route-distinguisher 1:1
#
address-family ipv4
vpn-target 2:2 import-extcommunity
vpn-target 2:2 export-extcommunity
#
address-family evpn
vpn-target 1:1 import-extcommunity
vpn-target 1:1 export-extcommunity
#
vxlan tunnel mac-learning disable
#
ospf 1 router-id 4.4.4.4
area 0.0.0.0
network 4.4.4.4 0.0.0.0
network 13.1.1.0 0.0.0.255
#
vlan 2
#
vlan 13
#
l2vpn enable
vxlan tunnel arp-learning disable
#
vsi vpna
gateway vsi-interface 1

```

```

vxlan 10
evpn encapsulation vxlan
route-distinguisher auto
vpn-target auto export-extcommunity
vpn-target auto import-extcommunity
#
interface LoopBack0
ip address 4.4.4.4 255.255.255.255
#
interface Vlan-interface13
ip address 13.1.1.4 255.255.255.0
#
interface GigabitEthernet1/0/1
port link-type trunk
port trunk permit vlan 1 to 2
port link-mode bridge
#
service-instance 1000
encapsulation s-vid 2
xconnect vsi vpna
#
interface GigabitEthernet1/0/2
port link-mode bridge
port access vlan 13
#
interface Vsi-interface1
ip binding vpn-instance vpna
ip address 10.1.1.1 255.255.255.0
mac-address 0001-0001-0001
local-proxy-arp enable
distributed-gateway local
#
interface Vsi-interface3
ip binding vpn-instance vpna
l3-vni 1000
#
bgp 200
peer 3.3.3.3 as-number 200
peer 3.3.3.3 connect-interface LoopBack0
#
address-family l2vpn evpn
peer 3.3.3.3 enable
#
return

```