



642-889^{Q&As}

Implementing Cisco Service Provider Next-Generation Edge Network Services

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QUESTION 1

When implementing EoMPLS PWs, which configuration is optional?

- A. matching PW ID on both ends
- B. Xconnect
- C. Cisco Express Forwarding
- D. control word

Correct Answer: D



Pseudowire Label Binding

An AToM pseudowire essentially consists of two unidirectional LSPs. Each is represented by a pseudowire label, also known as a VC label. The pseudowire label is part of the label stack encoding that encapsulates Layer 2 packets going over AToM pseudowires. Refer to Chapter 3 for an overview of an AToM packet.

The label distribution procedures that are defined in LDP specifications distribute and manage the pseudowire labels. To associate a pseudowire label with a particular Layer 2 connection, you need a way to represent such a Layer 2 connection. The baseline LDP specification only defines Layer 3 FECs. Therefore, the pseudowire emulation over MPLS application defines a new LDP extension—the Pseudowire ID FEC element—that contains a pseudowire identifier shared by the pseudowire endpoints. Figure 6-8 depicts the Pseudowire ID FEC element en-coding.



Figure 6-8 Pseudowire ID FEC Element

The Pseudowire ID FEC element has the following components:

- **Pseudowire ID FEC**—The first octet has a value of 128 that identifies it as a Pseudowire ID FEC element.
- **Control Word Bit (C-Bit)**—The C-bit indicates whether the advertising PE expects the control word to be present for pseudowire packets. A control word is an optional 4-byte field located between the MPLS label stack and the Layer 2 payload in the pseudowire packet. The control word carries generic and Layer 2 payload-specific information. If the C-bit is set to 1, the advertising PE expects the control word to be present in every pseudowire packet on the pseudowire that is being signaled. If the C-bit is set to 0, no control word is expected to be present.
- **Pseudowire Type**—PW Type is a 15-bit field that represents the type of pseudowire. Examples of pseudowire types are shown in Table 6-1.
- **Pseudowire Information Length**—Pseudowire Information Length is the length of the Pseudowire ID field and the interface parameters in octets. When the length is set to 0, this FEC element stands for all pseudowires using the specified Group ID. The Pseudowire ID and Interface Parameters fields are not present.
- **Group ID**—The Group ID field is a 32-bit arbitrary value that is assigned to a group of pseudowires.
- **Pseudowire ID**—The Pseudowire ID, also known as VC ID, is a non-zero, 32-bit identifier that distinguishes one pseudowire from another. To connect two attachment circuits through a pseudowire, you need to associate each one with the same Pseudowire ID.
- **Interface Parameters**—The variable-length Interface Parameters field provides attachment circuit-specific information, such as interface MTU, maximum number of concatenated ATM cells, interface description, and so on. Each interface parameter uses a generic TLV encoding, as shown in Figure 6-9.

**QUESTION 2**

Refer to the exhibit. If R1 is operating in a Cisco IOS XR environment, which task must you perform to complete the VPLS configuration?

```
R1
l2vpn
  bridge group 2
    bridge-domain PE1-VPLS-A
      GigabitEthernet0/1
        vfi 1
          neighbor 10.1.1.2 pw-id 1
          neighbor 10.1.1.3 pw-id 1
  interface loopback 0
    ipv4 address 10.1.1.1 255.255.255.255
```

- A. Enter the commit command to save the configuration
- B. Enter the exit command at the end of the loopback 0 configuration
- C. Change the bridge group number to match the loopback interface number
- D. Verify that other devices can reach the loopback interface

Correct Answer: A

QUESTION 3

You enter this configuration in an MPLS core network:

```
connect fr-fr-pw Serial6/0 225 l2transport
xconnect 10.55.55.2 1000 pw-class mpls
backup peer 10.55.55.3 1001 pw-class mpls
```

Which attachment circuit does this configuration indicate?

- A. HDLC attachment circuit xconnect with a backup pseudowire
- B. Ethernet attachment circuit xconnect with L2VPN IP interworking
- C. Frame Relay attachment circuit xconnect with a backup pseudowire
- D. PPP attachment circuit xconnect with L2VPN IP interworking

Correct Answer: C



Reference: https://www.cisco.com/c/en/us/td/docs/ios/12_2sb/12_2sba/feature/guide/sbpseudo.html

QUESTION 4

A customer requests Internet through its MPLS provider. Which Internet design model guarantees maximum security and easier provisioning?

- A. Internet access through global routing
- B. Internet access through route leaking
- C. Internet access through a separate VPN service
- D. Internet access through multisite

Correct Answer: C

QUESTION 5



Instructions

Enter the proper CLI commands and analyze the outputs on the Cisco routers to answer the multiple-choice questions.

From the network topology diagram, click on the router icon to gain access to the console of the router.

No console or enable passwords are required.

There are four multiple-choice questions with this task. Be sure to answer all four questions before selecting the Next button.

Not all the CLI commands or command options are supported or required for this simulation.

For example, the show running-config command is **NOT** supported in this simulation.

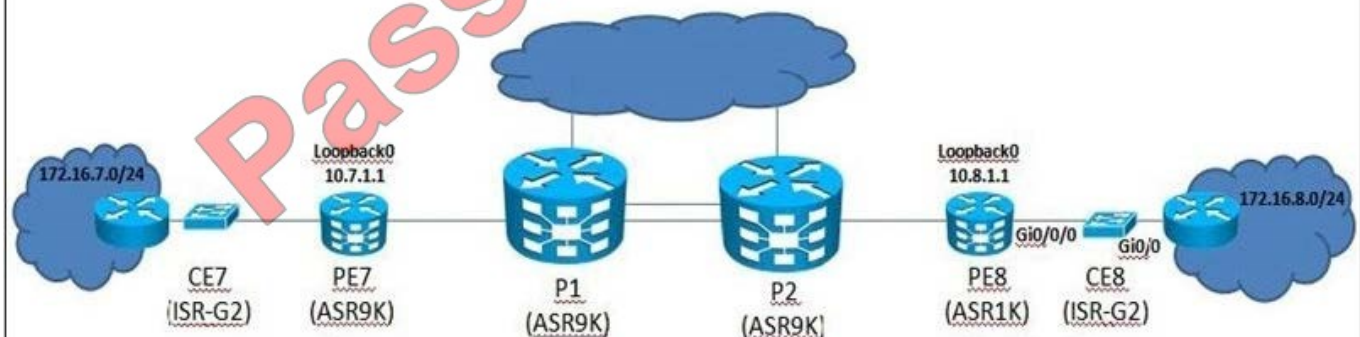
All the devices in this simulation have been pre-configured and you are not required to enter in any configurations.

Scenario

Referring to the network topology diagram shown in the exhibit, use the proper CLI commands on PE7 router and interpret the supported CLI commands outputs to answer the four multiple choice questions.

The PE7 router is an ASR9K router.

Topology



In this simulation, you will only have access to the PE7 router console
Click on the PE7 router icon to access the PE7 router console



On PE7, what is the pseudowire ID that connects to the 10.8.1.1 neighbor?

- A. 70
- B. 80
- C. 123
- D. 0x840001
- E. 0x4000080

Correct Answer: C

#show vfi

QUESTION 6

Which two Layer 2 VPN technologies support Frame Relay? (Choose two.)

- A. VPLS
- B. AToM



C. H-VPLS

D. IPLS

E. VPWS

Correct Answer: AB

QUESTION 7

A service provider is interconnecting two customer sites over one IPv4-only enabled area of its core network. The customer requires that the service provider honor the customer's original ToS markings on all hops across the network. Assume that the service provider deploys an L2TPv3 tunnel. Which two technique accomplishes the contractual obligations? (Choose two.)

A. ToS to IPP mapping

B. static ToS byte configuration

C. ToS to DSCP dynamic mapping

D. ToS byte reflection

Correct Answer: BD

QUESTION 8

When implementing VPLS on Cisco IOS XR routers, the VPLS PW neighbors can be statically defined under which configuration mode?

A. bridge group

B. bridge-domain

C. vfi

D. mpls ldp

E. l2transport

Correct Answer: C



Restrictions for Implementing Virtual Private LAN Services on Cisco IOS XR Software

The following restrictions are listed for implementing VPLS:

- All attachment circuits in a bridge domain on an Engine 3 line card must be the same type (for example, port, dot1q, qinq, or qinany), value (VLAN ID), and EtherType (for example, 0x8100, 0x9100, or 0x9200). The Cisco CRS-1 router supports multiple types of attachment circuits in a bridge domain.
- The Engine 3 line cards, cannot simultaneously have attachment circuits and MPLS-enabled on any one of its interfaces. The line card cannot be Edge-facing and Core-facing at the same time. Line cards on the Cisco CRS-1 router can be Edge-facing and Core-facing at the same time.
- The line card requires ternary content addressable memory (TCAM) Carving configuration. The Cisco CRS-1 router however, does not require the TCAM Carving configuration.
- Virtual Forwarding Instance (VFI) names have to be unique, because a bridge domain can have only one VFI.
- On the Cisco CRS-1 router, a VPLS pseudowire (PW) can be configured only under VFI.
- The Cisco CRS-1 router does not support VPLS with TE core tunnels.
- A PW cannot belong to both a peer-to-peer (P2P) cross-connect group and a VPLS bridge-domain. This means that the neighboring IP address and the pseudowire ID have to be unique on the router, because the pseudowire ID is signaled to the remote provider edge.
- You cannot manually set up a PW on one PE and use auto-discovery on the other PE to configure the same PW in the other direction. The auto-discovery feature is supported only on the Cisco XR 12000 Series Router.

QUESTION 9

Refer to the partial Cisco IOS XR PE router configuration exhibit for supporting a Layer 3 MPLS VPN customer using BGP as the CE-to-PE routing protocol.

```
router bgp 64500
address-family vpnv4 unicast
vrf Customer_A
address-family ipv4 unicast
!
neighbor 10.1.1.1
remote-as 64501
address-family ipv4 unicast
!
```

The service provider AS number is 64500, the customer AS number is 64501, and the customer CE router is 10.1.1.1. What is missing in the configuration?

- A. The route distinguisher has not been configured under router bgp 64500 vrf Customer_A.
- B. The import and export route targets have not been configured under router bgp 64500 vrf Customer_A.
- C. The 10.1.1.1 BGP neighbor has not been activated for IPv4 unicast routing.
- D. The 10.1.1.1 BGP neighbor has not been activated for the VPNv4 address family.

Correct Answer: A



Route Distinguisher

A router distinguisher (RD) creates routing and forwarding tables and specifies the default route distinguisher for a VPN. The RD is added to the beginning of an IPv4 prefix to change it into a globally unique VPN-IPv4 prefix. An RD can be composed in one of two ways: with an autonomous system number and an arbitrary number or with an IP address

and an arbitrary number. You can enter an RD in either of these formats:

?nter a 16-bit autonomous system number, a colon, and a 32-bit number. For example:

45000:3

?nter a 32-bit IP address, a colon, and a 16-bit number. For example:

192.168.10.15:1



	Command or Action	Purpose
Step 1	<code>enable</code> Example: Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none">• Enter your password if prompted.
Step 2	<code>configure terminal</code> Example: Router# configure terminal	Enters global configuration mode.
Step 3	<code>ip vrf vrf-name</code> Example: Router(config)# ip vrf vrf_name	Defines a VRF instance and enters VRF configuration mode.
Step 4	<code>rd route-distinguisher</code> Example: Router(config-vrf)# rd 45000:2	Creates routing and forwarding tables for a VRF and specifies the default RD for a VPN. <ul style="list-style-type: none">• Use the <code>route-distinguisher</code> argument to specify the default RD for a VPN. There are two formats you can use to specify an RD. For more details, see the "Route Distinguisher" section.• In this example, the RD uses an autonomous system number with the number 2 after the colon.
Step 5	<code>route-target {import both} route-target-ext-community</code> Example: Router(config-vrf)# route-target import 55000:5	Creates a route-target extended community for a VRF. <ul style="list-style-type: none">• Use the <code>import</code> keyword to import routing information from the target VPN extended community.• Use the <code>both</code> keyword to both import routing information from and export routing information to the target VPN extended community.• Use the <code>route-target-ext-community</code> argument to specify the VPN extended community.
Step 6	<code>route-target {export both} route-target-ext-community</code> Example: Router(config-vrf)# route-target export 55000:1	Creates a route-target extended community for a VRF. <ul style="list-style-type: none">• Use the <code>export</code> keyword to export routing information to the target VPN extended community.• Use the <code>both</code> keyword to both import routing information from and export routing information to the target VPN extended community.• Use the <code>route-target-ext-community</code> argument to specify the VPN extended community.
Step 7	<code>exit</code> Example: Router(config-vrf)# exit	Exits VRF configuration mode and returns to global configuration mode.
Step 8	Repeat Step 3 through Step 7 for each VRF to be defined.	—

Reference: http://www.cisco.com/en/US/docs/ios/12_2sr/12_2sra/feature/guide/srbgprid.html

**QUESTION 10**

When implementing MPLS Layer 3 VPNs with customers running OSPF as the CE-PE routing protocol, which situation will require a sham link to be implemented in the MPLS backbone?

- A. to connect customer sites in different OSPF areas
- B. to connect customer sites in the same OSPF area
- C. to prevent OSPF routing loops when a customer site has redundant CE-PE connections
- D. if there is a backdoor link between the CE routers, to ensure that the backdoor link is used only to back up the primary connection through the MPLS VPN

Correct Answer: D

QUESTION 11

A routing entry on a PE router has an ext-hop address of ::ffff:[IP ADDRESS]. Which service provider technology is being deployed?

- A. 6VPE
- B. 6PE
- C. 4to6 tunnel
- D. 6to4 tunnel

Correct Answer: B

QUESTION 12

A Cisco IOS XR device is acting as a PE. It must have an iBGP VPNv4 session with the other PE 2.2.2.2 using source loopback 0. Which configuration achieves this goal?



- A.
- ```
router bgp 100
 neighbor 2.2.2.2
 remote-as 100
 update-source Loopback0
 address-family vpnv4 unicast
```
- B.
- ```
router bgp 100
  address-family vpnv4 unicast
  neighbor 2.2.2.2
    remote-as 100
    update-source Loopback0
  address-family vpnv4 unicast
```
- C.
- ```
router bgp 100
 address-family vpnv4 unicast
 neighbor 2.2.2.2 remote-as 100
 neighbor 2.2.2.2 update-source Loopback0
 address-family vpnv4 unicast
```

A. B. C.

```
router bgp 100
 neighbor 2.2.2.2 remote-as 100
 neighbor 2.2.2.2 update-source Loopback0
 address-family vpnv4
 neighbor 2.2.2.2 activate
```

D.

Correct Answer: B

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