



Exam : 642-611

Title : Implementing Cisco MPLS Exam (MPLS)

Ver : 09-28-07

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**QUESTION 1:**

Which statement is true about the hardware requirements of MPLS?

- A. Because you do not need to run a routing protocol on P-routers, they require less memory than routers supporting classic IP routing.
- B. Because of the additional processing and memory requirements needed to build the LFIB, MPLS is only available on high end routers.
- C. MPLS is available on low end routers, built their use is limited because of the additional processing and memory requirements needed to build the LFIB.
- D. Because P-routers do not need to carry routes outside the MPLD domain, they require less memory than routers that support the same application using classic IP routing.

Answer: C

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**QUESTION 2:**

If aggregation (summarization) were to be used on a network with ATM LSRs. What would result?

- A. LSPs would be broken in two.
- B. There would be extra LFIB entries.
- C. The size of the LFIB table would increase.
- D. There would be extra LIB entries

Answer: A

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**QUESTION 3:**

What is true of MPLS TE?

- A. Only the ingress LSR must see the entire topology of the network.
- B. Every LSR needs additional information about links in the network, available resources, and constraints.
- C. Every core router must be able to create an LSP tunnel on demand.
- D. Both RSVP and CR-LDP are used in conjunction to establish traffic engineering (TE) tunnels and to propagate the labels.

Answer: B

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**QUESTION 4:**

What is a major drawback of using traditional IP routing over an ATM network when connecting multiple sites?

- A. Each ATM switch in the path has to perform Layer 3 routing lookup.
- B. ATM virtual circuits have to be established between the different sites.
- C. There is high ATM management overhead between the ATM switch and the router at each site.
- D. Each ATM switch has to be manually configured to participate in Layer 3 routing.
- E. There is high PNNI overhead.-

Answer: B

Explanation:

Drawbacks of Traditional IP Forwarding IP over ATM

- 1) Layer 2 devices have no knowledge of Layer 3 routing information - virtual circuits must be manually established.
- 2) Layer 2 topology may be different from Layer 3 topology, resulting in suboptimal paths and link use.
- 3) Even if the two topologies overlap, the hub-and-spoke topology is usually used because of easier management.

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#### **QUESTION 5:**

What is true of MPLS TE?

- A. Only the ingress LSR must see the entire topology of the network.
- B. Every LSR needs additional information about links in the network, available resources, and constraints.
- C. Every core router must be able to create an LSP tunnel on demand.
- D. Both RSVP and CR-LDP are used in conjunction to establish traffic engineering (TE) tunnels and to propagate the labels.

Answer: B

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#### **QUESTION 6:**

In order for MPLS to be implemented on ATM switches, what requirements must the ATM switch meet? Select two.

- A. become Layer 3 aware by running a routing protocol
- B. use MPLS LDP or TDP to distribute and receive MPLS label information
- C. use BGP to exchange MPLS VPN labels in the data plane
- D. use RSVP to exchange MPLS traffic-engineering labels in the data plane
- E. establish a full mesh of Layer 2 ATM virtual circuits between all the ATM switches in the MPLS domain
- F. use cell-mode MPLS and insert MPLS label in the ATM AAL5 header

Answer: A, B

**QUESTION 7:**

When running basic MPLS in conjunction with VPNs, how many labels does each packet contain?

- A. Each packet contains one label that identifies the VPN.
- B. Each packet contains at least two labels. One label identifies the path to the egress router and one that identifies the VPN.
- C. Each packet contains at least three labels. One label identifies the ingress router, one identifies the egress router and one identifies the path that will be taken.
- D. Each packet contains at least three labels. One label identifies the ingress router, one label identifies the path to the egress router, and one identifies the VPN.

Answer: B

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**QUESTION 8:**

On ingress, a label is imposed to a packet. Which process is responsible for this function?

- A. LDP process.
- B. Control plane process
- C. Penultimate hop process.
- D. Forwarding plane process.

Answer: B

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**QUESTION 9:**

How could you check for potential MTU size issues on the path taken by a PE-to-PE LSP?

- A. Because MPLS packets are label switched, MTU problems can only be detected by the user applications.
  - B. Use the ping vrf command with packet size set to the largest MTU along the path and DF bit set from the local PE-router to ping the remote PE-router.
  - C. Use the ping vrf command with packet size set to the smallest MTU along the path and DF bit set from the local PE-router to ping the remote PE-router.
  - D. Because MPLS packets are label switched, packets are automatically fragmented and reassembled by the PE-routers.
- Therefore, there are no potential MTU issues.

Answer: A D

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**QUESTION 10:**

Which one of the following is true regarding MPLS independent control label allocations?

- A. The LSR can always assign a label for a destination prefix, even if it has no downstream label.
- B. The LSR can assign a label for a destination prefix only if it has already receives a label from the next-hop LSR, otherwise, it must request a label from the next-hop LSR.
- C. The LSR will assign a label to a destination prefix only when asked for a label by an upstream LSR.
- D. The label for a destination prefix is allocated and advertised to all LDP peers, regardless of whether the LDP peers are upstream or downstream LSRs for the destination prefix.
- E. The LSR stores the receives label in its LIB, even when the label is not received from the next-hop LSR.
- F. The LSR stores only the labels received from the next-hop LSR, all other labels are ignored.

Answer: A

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**QUESTION 11:**

Which two statements are true about the label stack used for MPLS VPNs? (Choose two)

- A. The first label in the label stack is the VPN label assigned by the egress PE router.
- B. The first label in the label stack is the LDP label used to reach the egress PE router.
- C. The first label in the label stack is the VPN label used to reach the egress PE router.
- D. The second label in the label stack is the VPN label assigned by the egress PE router.
- E. The second label in the label stack is the LDP label used to each the egress PE router.
- F. The second label in the label stack is the VPN label assigned by the ingress PE router and tells the ingress PE router how to forward the incoming VPN packet.

Answer: B, D

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**QUESTION 12:**

What is true about how MPLS implementations support different applications?

- A. The applications only differ in the control plane.
- B. The forwarding plane is customized for each application.
- C. MPLS VPNs require RSVP.
- D. In general a FEC is assigned to a label.

Answer: A

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**QUESTION 13:**

MPLS supports which three applications? (Choose three)

- A. VPN
- B. CDN
- C. QoS
- D. Broadcast
- E. Traffic engineering

Answer: A, C, E

Explanation:

MPLS is used in many different applications:

- 1) Unicast IP routing
- 2) Multicast IP routing
- 3) MPLS TE
- 4) QoS
- 5) MPLS VPNs
- 6) AToM

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#### **QUESTION 14:**

What are two methods to achieve differentiated QoS in MPLS? (Choose two)

- A. By creating a separate Label Switch Path for each class.
- B. By using the experimental bits to identify the different classes.
- C. By using the DiffServ Codepoints to identify the different classes.
- D. By using the TOS bits in the Layer 3 header to identify the different classes.

Answer: B C

Explanation:

Two general approaches are used to mark MPLS traffic for QoS handling within an MPLS network in the first method, the DiffServ "coloring" information is carried in the experimental (EXP) field of the MPLS shim header. This field allows for eight different QoS markings. Label Switched Paths (LSPs) using this approach are called E-LSPs, signifying that QoS information is inferred from the EXP field. Alternatively, IETF specifications allow for a second method of carrying the DiffServ information. Here, the label associated with each MPLS packet carries the portion of the DiffServ marking that specifies how a packet should be queued. The dropping precedence portion of the DiffServ marking is carried either in the EXP field, if an MPLS shim header is being used, or on fields available for this purpose on underlying technologies (for example, CLP bit for ATM and DE bit for Frame Relay). Switching paths within the MPLS network using this approach are called L-LSPs, signifying that QoS information is inferred, in part, from the MPLS label.

LSPs supporting DiffServ may be established with bandwidth reservation. That

is, bandwidth requirements for a label switched path could be signaled at LSP establishment time. Bandwidth reservation could be used to perform admission control on the DiffServ resources that have been provisioned. Though admission control can be performed on an LSP basis, the QoS design within the MPLS network is DiffServ-based, taking advantage of the scalability benefits implicit in that QoS architecture.

Reference:

[http://www.cisco.com/en/US/tech/CK436/CK428/technologies\\_white\\_paper09186a00800a4455.shtml](http://www.cisco.com/en/US/tech/CK436/CK428/technologies_white_paper09186a00800a4455.shtml)

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### **QUESTION 15:**

How does a core LSR operating in the default frame mode advertise labels?

- A. The core LSR advertises a label for every destination in its FIB.
- B. The core LSR only advertises labels for destinations inside the MPLS domain.
- C. The core LSR only advertises labels for destinations outside the MPLS domain.
- D. The core LSR does not advertise labels. Label advertisements is only done by the PE-router.

Answer: A

Explanation:

Core LSRs receive this labeled packet and use label forwarding tables to exchange the inbound label in the incoming packet with the outbound label corresponding to the same FEC.

Reference: MPLS and VPN Architectures (Cisco Press) page 25

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### **QUESTION 16:**

In frame-relay MPLS, where is the label imposed?

- A. Between Layer 1 and Layer 2 headers.
- B. Between Layer 2 and Layer 3 headers.
- C. In the VPI/VCU fields.
- D. In the VPI field alone.

Answer: B

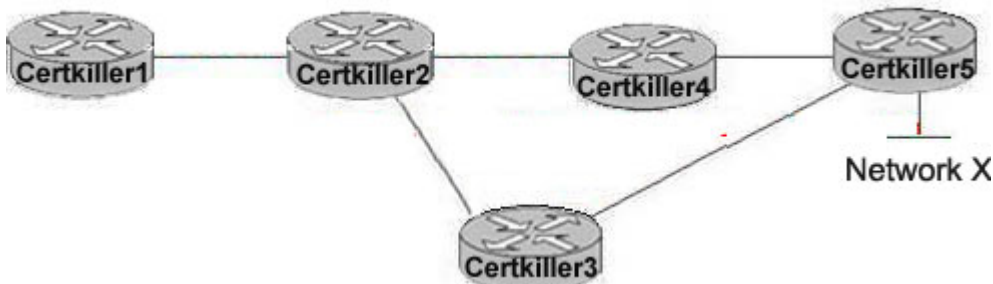
Explanation:

MPLS labels are assigned to packets based on groupings or forwarding equivalency classes (FECs) at the ingress eLSR. A FEC is a group of packets from a source IP address that are all going to the same destination. The MPLS label is imposed between Layer 2 and Layer 3 headers in a frame-based packet environment, or in the Layer 2 virtual path identifier/virtual channel identifier (VPI/VCI) field in cell-based networks like ATM.

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**QUESTION 17:**

Network topology exhibit



Liberal label retention and unsolicited downstream distribution is being used in the frame-mode MPLS network shown in the exhibit. The best to network X as defined by the IGP for network is Certkiller 1- Certkiller 2- Certkiller 4- Certkiller 5. What will Router Certkiller 3 and rout

- A. Both routers will add it to their LIB.
- B. Both routers will ignore it.
- C. Router Certkiller 3 will add the label to its LIB. Router Certkiller 4 will ignore it.
- D. Router Certkiller 4 will add the label to its LIB. Router Certkiller 3 will ignore it.

Answer: A

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**QUESTION 18:**

What is true about the label in frame-mode MPLS?

- A. 32 bit label with an 8 bit label field.
- B. 32 bit label with a 20 bit label field.
- C. 20 bit label with a 3 bit Bottom of Stack field.
- D. 20 bit label with a 1 bit TTL field.

Answer: B

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**QUESTION 19:**

Which two statements about TDP and LDP are true? (Choose two)

- A. TDP and LDP populate the same LFIB.
- B. TDP operates over UDP while LDP operates over TCP.
- C. TDP and LDP both operate over TCP, but use different port numbers.
- D. While TDP and LDP are functionally equivalent, they use a different label format.

Answer: A, C

Explanation:



According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1153-01) Volume 1, version 1.0, page 2-51.

TDP vs. LDP:

- MPLS and Tag switching are equal on the data plane ( for me it means that they populate the same FIB and LFIB)
  - The only difference is on the control plane, where tag switching uses Cisco proprietary TDP and MPLS uses standard LDP
  - TDP and LDP are functionally equivalent but not compatible
  - TDP use UDP and TCP port number 711
  - LDP uses UDP and TCP port number 646
- Not D: LDP and TDP use the same label format.

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**QUESTION 20:**

Which command should you use to display the contents of LFIB?

- A. show tag routes
- B. show tag tdp lfib
- C. show tag bindings
- D. show tag forwarding-table

Answer: D

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**QUESTION 21:**

To whom does a PE-router advertise labels, when operating in the default frame mode?

- A. The PE-router advertises a label to all of its neighbors.
  - B. The PE-router only advertises labels to its neighbors in the MPLS domain.
  - C. The PE-router only advertises labels to its neighbors outside the MPLS domain.
  - D. The PE-router does not advertise labels.
- Label advertisement is only done by the core LSR.

Answer: B

Explanation:

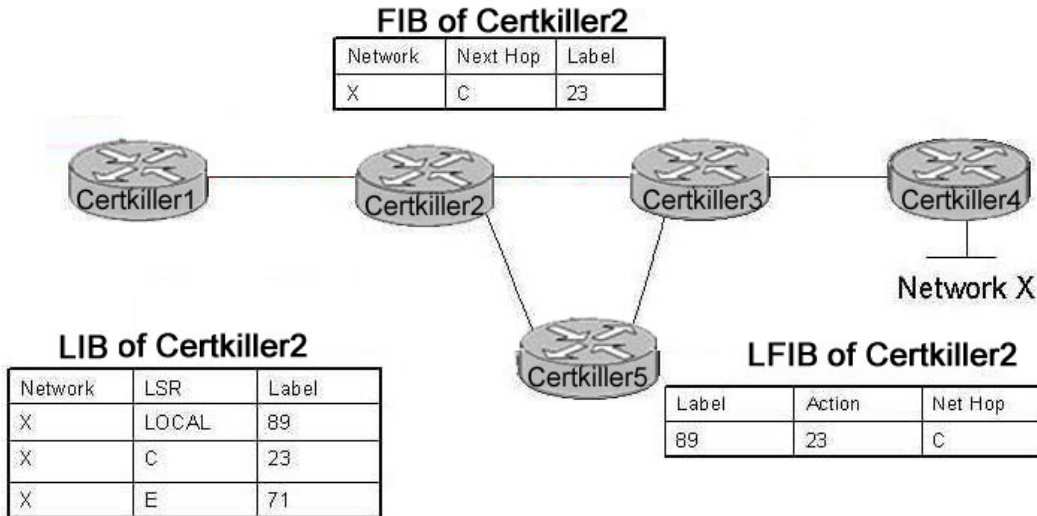
The Ingress Edge-LSR receives an IP packet, classifies the packet into a forward equivalence class (FEC), and labels the packet with the outgoing label stack corresponding to the FEC. For unicast destination-based IP routing, the FEC corresponds to a destination subnet and the packet classification is a traditional layer 3 lookup in the forwarding table.

Reference: MPLS and VPN Architectures (Ciscopress) page 25

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**QUESTION 22:**

Network topology Exhibit



The relevant entries in the FIB, LIB, and LFIB tables for a frame-mode MPLS network is shown. If the link between Routers B and C was lost, what would be the relevant entries in the LFIB table for label, action, and next hop?

- A. 89, 71, Certkiller 5
- B. 71, 89, Certkiller 5
- C. 89,23, Certkiller 4
- D. 71,23, Certkiller 4

Answer: A

### QUESTION 23:

In cell-mode MPLS, where is the label imposed?

- A. Between Layer 1 and Layer 2 headers.
- B. Between Layer 2 and Layer 3 headers.
- C. In the VPI/VCI fields
- D. In the VPI field alone

Answer: C

### QUESTION 24:

Which statements are correct about configuring MPLS over an ATM virtual path on a cell-mode router? Select three.

- A. An LC-ATM interface must be created
- B. The ATM VPI value must be set to the virtual path number.
- C. The virtual path number has to match between the peers.
- D. The control VC must use a VPI value of 1 to match the default VPI value.

Answer: A, B, C

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**QUESTION 25:**

The ATM LSR forwards based upon the \_\_\_\_\_.

- A. Label
- B. VPI / VCI
- C. Route defined in the routing table.
- D. Layer 2 address of the destination.

Answer: B

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**QUESTION 26:**

When using MPLS on an MPLS aware ATM network, which two statements are true? (Choose two)

- A. VPI and VCI are used as labels.
- B. PVCs must be manually created between end devices.
- C. The ATM devices become aware of Layer 3 by running a Layer 3 routing protocol.
- D. When running BGP, it is no longer necessary to establish logical connection between BGP neighbors.

Answer: A,B

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**QUESTION 27:**

Why would you explicitly define the VPI/VCI when deploying cell-mode MPLS?

- A. To reduce the number of labels required.
- B. Because cell-mode MPLS only runs over defined VPI/VCIs.
- C. To ease a migration by connecting an MPLS-enabled ATM network to the old ATM network.
- D. Because MPLS is needed and parts of the private network cross a non-MPLS aware network.

Answer: A

Explanation:

A is the only possible answer. A technique (VC merge) actually exists to help reduce the number of labels (and thus VC) created. by mapping multiple incoming label values to a specific outgoing label, the number of VCs can be reduced. of course i am not sure the meaning of the word "explicitly" since VC merge seem to do all the mapping automatically.

Incorrect Answers:

B: B is false, as the reference states ...with some hardware platforms supporting only approximately 1000 VCs. The very small number of VCs supported over an ATM interface makes these circuits a scarce resource that must be tightly controlled. If 1000 is only a small number, and if option B is true, then according to the question, all 1000 VCs must be explicitly defined, which is not possible, so we may "assume" that VCs can be dynamically assigned.

C: C doesn't seem to be correct. Explicitly defining VCs require careful designs.

D: Option D is wrong, since a LSP requires all devices to be able to distribute labels, if non-MPLS aware switches are used, they cannot fulfill the downstream-on-demand feature. In this situation, only Frame (but not Cell) mode can be used.

### QUESTION 28:

Which two statements about cell-mode MPLS loop prevention mechanisms are true?  
(Choose two)

- A. MPLS relies on the loop prevention mechanism MP-BGPB.
- Loop detection algorithms in LDP ensure that loops are not present.
- C. MPLS relies on the loop prevention mechanisms embedded in the IGP.
- D. MPLS labels contain a Time-To-Live (TTL) field that prevents packets from looping indefinitely.

Answer: B, D

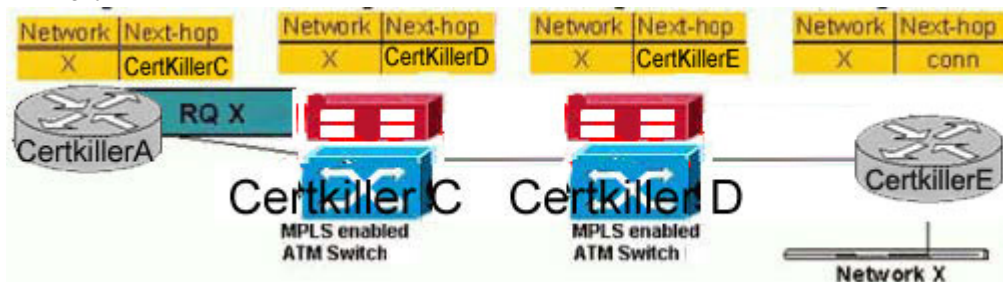
Explanation:

Not A: A is not correct too since running cell mode MPLS doesn't require neither MPLS VPN nor MP-iBGP.

Not C: C is not correct as ATM switches cannot run IGP.

### QUESTION 29:

Exhibit



Study the exhibit which displays an MPLS cell-mode network that is using default label distribution.

When the label request for Network X is sent from router Certkiller A to the

MPLS-enabled ATM Switch Certkiller C, which if the following statements are true?

- A. The MPLS-enabled ATM switch Certkiller C will reply with the local label if it already has the next-hop label. Or it will not reply with the local label if it does not have the next-hop label and it will forward the label request to the MPLS-enabled ATM Switch Certkiller D.
- B. The MPLS-enabled ATM switch Certkiller C will reply with the local label then it will send its own label request to MPLS-enabled switch Certkiller D.
- C. Since MPLS-enabled ATM Switch Certkiller C cannot perform IP routing lookup, it will forward the label request to router Certkiller E (an ATM edge LSR) and Router Certkiller E will then reply with its local label to Router CertkillerA (also an ATM edge LSR).
- D. Since the MPLS-enabled ATM Switch Certkiller C cannot perform IP routing lookup, it will reject the label request from Certkiller A.

Answer: A

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### QUESTION 30:

#### DRAG DROP

Label allocation and distribution in a frame-mode MPLS network is accomplished by the following actions. While some of the actions do occur periodically in a network, initially some of these actions require that other actions have already completed. Drag the actions on the left to the boxes on the right in which these actions must initially occur.

IP routing protocols build IP routing tables
Local labels are generated for the LIB and LFIB
LSRs announce their assigned labels to all other LSRs
Next-hop labels are inserted into the LIB, FIB, and LFIB tables
Routing information is exchanged using IP routing protocols

#### Place here

Place first action here
Place <b>second</b> action here
Place third action here
Place fourth action here
Place last action here

Answer:

**Place here**

Local tables are generated for the LIB and LFIB

Routing information is exchanged using IP routing protocols.

IP routing protocols build IP routing tables

Next-hop labels are inserted into the LIB, FIB, and LFIB tables

LSRs announces their assigned labels to all other LSRs

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**QUESTION 31:**

Which one of the following MPLS label allocation methods is the least secure?

- A. per-interface label space
- B. per-platform label space
- C. per-VRF label space
- D. per-LIB label space
- E. per-LFIB label space

Answer: B

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**QUESTION 32:**

How does a PE-router operating in the default frame mode distribute labels?

- A. The PE-router distributes a label for every destination in its FIB.
- B. The PE-router only distributes labels for destinations inside the MPLS domain.
- C. The PE-router only distributes labels for destinations outside the MPLS domain.
- D. The PE-router does not distribute labels. Label distribution is only done by the core LSR.

Answer: A

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**QUESTION 33:**

Given the following command:

Tag-switching advertise-tags for list1 to list2

Which statement is true?

- A. List1 specifies for which networks labels will be advertised.
- B. List1 specifies for which LSR neighbor labels will be advertised.
- C. List2 specifies the ending network address for which labels will be advertised.
- D. List1 specifies the starting network address for which labels will be advertised.

Answer: A

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**QUESTION 34:**

When is the conditional label distribution used?

- A. To block access between two MPLS VPNs.
- B. To advertise a label only when a network is available.
- C. To prevent advertising of a label when a link is overloaded.
- D. To save memory space by not advertising a label for the MPLS WAN links.

Answer: D

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**QUESTION 35:**

Given the following access list:

```
ip access-list 100 deny tcp any any eq 646
```

```
ip access-list 100 permit ip any any
```

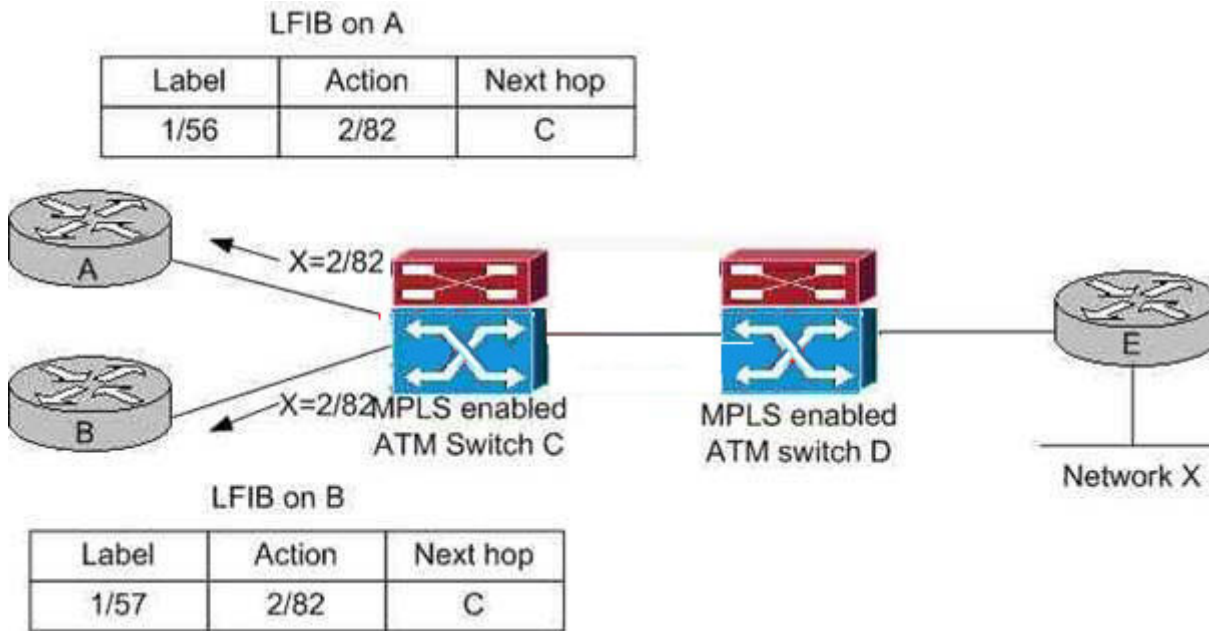
Which statement is true?

- A. The access list blocks Telnet session and should be applied as an input filter on all of the VT interfaces for security reasons.
- B. The access list blocks LDP traffic and should be applied as an input filter on the PE-router's interface connected to the CE to block an attempt by an outside source from exchanging labels with the PE-router.
- C. The access list blocks TCP and should be applied as an input filter on the PE-router's interfaced to the CE to block an attempt by an outside source from using programs link traceroute to identify the core routers.
- D. The access list blocks UDP and should be applied as an input filter on the PE-router's interfaced to the CE to block an attempt by an outside source from using programs link traceroute to identify the core routers.

Answer: B

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**QUESTION 36:**



Refer to the graphic.

What is a potential problem if the MPLS-enabled ATM switch C reuses an already allocated local label (2/82) for the second upstream LDP peer (router B)?

- A. Cell interleaving issues at egress of MPLS-enabled ATM switch C.
- B. Security concerns at the ingress of the MPLS-enabled ATM switch C.
- C. Label lookup issues at the ingress of MPLS-enabled ATM switch C if per-interface label allocation is not used.
- D. Label lookup issues at the ingress of MPLS-enabled ATM switch C if per-platform label allocation is not used.

Answer: A

### QUESTION 37:

Which two of the following statements regarding LDP are true? Select two

- A. LDP can also be used between nonadjacent routers using multicast LDP hello messages.
- B. LDP does not require periodic hello messages once the LDP session has been established between the LDP peers.
- C. LDP hello messages use TCP packets with a destination port of number of 646.
- D. Multiple sessions can be established between a pair of LSRs if they use multiple label spaces.
- E. Per-platform label space can be identified by label space ID of 0 in the LDP identifier field.

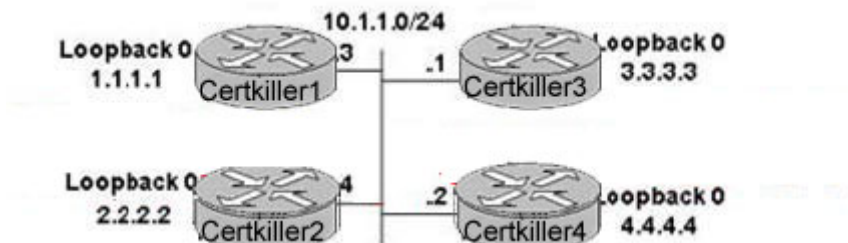


Answer: D, E

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**QUESTION 38:**

Exhibit



Study the exhibit. All four routers on the Certkiller Ethernet LAN sent out LDP hello messages.

What is the set of TCP sessions that will be initiated?

- A. Certkiller 1 to Certkiller 2, Certkiller 3 and Certkiller 4
- B. Certkiller 2 to Certkiller 1, Certkiller 3 and Certkiller 4
- C. Certkiller 3 to Certkiller 1, Certkiller 2 and Certkiller 4
- D. Certkiller 4 to Certkiller 1, Certkiller 2 and Certkiller 3

Answer: D

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**QUESTION 39:**

Which statement about TDP/LDP neighbors is true?

- A. Neighbor discovery is done automatically under both TDP and LDP.
- B. Neighbor configuration is done manually when using TDP. It is automatic when using LDP.
- C. On point-to-point links, neighbor assignment is not needed. However, on broadcast links, you must assign neighbors as you do in BGP.
- D. Because LDP operates under TCP, neighbors must be assigned. Because TDP uses UDP it operates in a broadcast mode and does not use neighbors.

Answer: A

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**QUESTION 40:**

What is the proper syntax for enabling Cisco Express Forwarding (CEF)?

- A. router(config)# ip cef
- B. router(config)# cef ip
- C. router(config)# cef enable
- D. router(config-if)# cef ip enable

Answer: A

Explanation:

To enable CEF on the route processor card, use the ip cef global command in global configuration mode. To disable CEF, use the no form of this command:

- ip cef [distributed]
- no ip cef [distributed]

To enable CEF operation on an interface after the CEF operation has been disabled, use the ip route-cache cef command in interface configuration mode. To disable CEF operation on an interface, use the no form of this command.

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**QUESTION 41:**

The FIB table is different from other fast-switching caches. It does NOT contain the information about the outgoing interface and the corresponding Layer 2 header.

Where is this information stored?

ARP table

- A. Neighbor table
  - B. Adjacency table
  - C. The above statement is false.
- The Layer 2 header is part of the FIB.

Answer: C

Explanation:

Adjacency Tables

Nodes in the network are said to be adjacent if they can reach each other with a single hop across a link layer. In addition to the FIB, CEF uses adjacency tables to prepend Layer 2 addressing information. The adjacency table maintains Layer 2 next-hop addresses for all FIB entries.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products\\_configuration\\_guide\\_chapter09186a00800c](http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_configuration_guide_chapter09186a00800c)

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**QUESTION 42:**

What is a benefit of CEF switching?

- A. CEF supports IP source prefix-based switching using the FIB.
- B. CEF uses less memory than fast switching uses.
- C. CEF is less CPU intensive than fast switching is.
- D. CEF provides Netflow statistics with minimum CPU overhead.
- E. CEF allows multiple data planes to share a common control plane.

Answer: C

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**QUESTION 43:**

Which statement about Cisco Express Forwarding's (CEF's) default operations is true?

- A. CEF is enabled by default on all Cisco routers.
- B. CEF's default operation are router dependent.
- C. CEF is disabled by default on all Cisco routers.
- D. CEF is enabled at a global level, but is disabled at an interface level.

Answer: D

Explanation:

To enable CEF on the route processor card, use the ip cef global command in global configuration mode. To disable CEF, use the no form of this command:

- ip cef [distributed]
- no ip cef [distributed]

To enable CEF operation on an interface after the CEF operation has been disabled, use the ip route-cache cef command in interface configuration mode. To disable CEF operation on an interface, use the no form of this command.

Reference: Cisco Press - Implementing CISCO MPLS study guide v2.0

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**QUESTION 44:**

Which two are the proper syntax for enabling MPLS on an interface? (Choose two)

- A. router(config-if)# mpls ip
- B. router(config-if)# mpls enable
- C. router(config-if)# tag-switching
- D. router(config-if)# tag-switching ip
- E. router(config)# tag-switching int s0/0

Answer: A,D

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**QUESTION 45:**

In frame-mode MPLS, which statement is true?

- A. MPLS inserts a 32-bit label after the Layer 3 header.
- B. MPLS replaces the Layer 2 header with a 32-bit label.
- C. MPLS replaces the Layer3 header with a 32-bit label.
- D. MPLS inserts 32-bit label between the Layer 2 and Layer 3 headers.

Answer: D

---

**QUESTION 46:**

What is the first step to enable MPLS on an IOS-based device?

- A. Enable MPLS at a global level.
- B. Enable tag-switching at the global level.
- C. Enable MPLS switching on the affected interfaces.
- D. Enable Cisco Express Forwarding (CEF) at the global and affected interfaces.

Answer: D

Explanation:

To enable MPLS, you must first enable CEF switching. Depending on the Cisco IOS software version, you may need to establish the range for the label pool.

Reference: Cisco Press "Implementing Cisco MPLS" p.3-17

---

**QUESTION 47:**

What are two mandatory configuration steps to enable MPLS in an all Cisco networks?  
(Choose two)

- A. router (config)# mpls
- B. router (config)# ip cef
- C. router (config-if)# mpls ip
- D. router (config-if)# mpls label protocol ldp

Answer: B, C

Explanation:

ip cef

To enable Cisco Express Forwarding (CEF) on the route processor card, use the ip cef command in global configuration mode.

ipcef [distributed]

mpls ip (interface configuration)

To enable MPLS forwarding of IPv4 packets along normally routed paths for a particular interface, use the mpls ip interface configuration command.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products\\_command\\_reference\\_chapter09186a008008](http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_command_reference_chapter09186a008008)

---

**QUESTION 48:**

When running MPLS in the frame mode over an Ethernet, how does the receiving

device identify that the frame contains MPLS information?

- A. MPLS frames are sent over a reserved session.
- B. MPLS is identified in the protocol port of the Layer 3 header.
- C. MPLS frames are sent in a special frame with a multicast address similar to CDP.
- D. The Ether Type of PID in the Layer 2 header identifies the frame as an MPLS frame.

Answer: D

Explanation:

1) According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1153-01) Volume 1, version 1.0, page 2-31.

A label does not contain any information about the layer 3 protocol being carried in a packet. A new protocol identifier is used for MPLS-enabled Layer 3 protocol.

The following list shows the ethertype values used to identify Layer 3 protocols with most Layer 2 encapsulations.:

- Unlabeled IP unicast: PID=0x0800 identifies that the frame payload is an IP packet
- Labeled IP unicast: PID=0x8847 identifies that the frame payload is a unicast IP packet with a least one label preceding the IP header. The Bottom-of-stack bit indicates when the IP header actually starts.
- Labeled IP multicast: PID=0x8848 identifies that the frame payload is a multiicast IP packet with at least one label preceding the IP header. The Bottom-of-stack bit indicates when the IP header actually starts.

Summary: Protocol identifier in a layer 2 header specifies that the payload starts with a label (labels) and is followed by an IP header.

2) According to the RFC 3032 - MPLS lable stack encoding

<<http://www.rfc-editor.org/rfc/rfc3032.txt>

Transporting Labeled Packets over LAN Media:

Exactly one labeled packet is carried in each frame.

The label stack entries immediately precede the network layer header, and follow any data link layer headers, including, e.g., any 802.1Q headers that may exist.

The ethertype value 8847 hex is used to indicate that a frame is carrying an MPLS unicast packet.

The ethertype value 8848 hex is used to indicate that a frame is carrying an MPLS multicast packet.

Not B: Option B cannot be correct as the question is asking frames on ethernet, this obviously means identification should be done at layer 2.

---

### QUESTION 49:

Given the following MPLS configuration to enable frame-mode MPLS over ATM:

interface atm 0/0.2 point-to-point

pvc auto

ip unnumbered loopback 0

tag-switching ip

Which command is using incorrect syntax?

- A. pvc auto
- B. tag-switching ip
- C. ip unnumbered loopback 0
- D. interface atm 0/0.2 point-to-point

Answer: A

---

**QUESTION 50:**

Why would a system administrator use the tag-switching atm maxhops global configuration command?

- A. In large ATM-MPLS networks, the LFIB can become too large. Because of this, it is necessary to limit the maximum diameter of the MPLS network.
- B. TDP relies exclusively on hop-count carried in the TDP request and replay packets to detect loops during the downstream-on-demand label allocation.
- C. LDP does not support using Router ID to detect routing information in ATM networks during the downstream-on demand label allocation process.
- D. Because end-to-end delay can cause problems with some voice applications, it is necessary to limit the maximum diameter of the MPLS network.

Answer: B

Explanation:

1) According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1153-01) Volume 1, version 1.0, page 6-11.

tag-switching atm maxhops: Router ID can be used in LDP to detect routing information loops in ATM networks during downstream-on-demand label allocation process. TDP does not support this option and relies exclusively on hop-count carried in the TDP requests and reply packets to detect loop during the downstream-on-demand label allocation.

2) According to cisco: see the following website

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1828/products\\_command\\_reference\\_chapter09186a00](http://www.cisco.com/en/US/products/sw/iosswrel/ps1828/products_command_reference_chapter09186a00)

tag-switching atm maxhops To limit the maximum hop counts to a value you have specified, use the tag-switching

atm maxhops global configuration command. Use the no form of this command to ignore the hop count.

tag-switching atm maxhops [number]

no tag-switching atm maxhops

Syntax Description

number(Optional) Maximum hop count.Defaults

The default is 254.

Command Modes

Global configuration

Command History

Release Modification 11.1 CTThis command was introduced.Usage Guidelines

When an ATM TSR receives a BIND REQUEST, it does not send a BIND back if the value in the request is equal to the maxhops value. Instead, the ATM TSR or TSR returns an error that specifies that the hop count has been reached.

When an ATM-TSR initiates a request for a tag binding, it includes a parameter specifying the maximum number of hops that the request should travel before reaching the edge of the ATM Tag Switching region. This is used to prevent forwarding loops in setting up tag paths across the ATM region.

Examples

The following example sets the hop count limit to 2:

tag-switching atm maxhops 2

Related Commands

Command Description show tag-switching atm-tdp bindingsDisplays the requested entries from the ATM TDP tag binding database.

---

### QUESTION 51:

You should run frame-mode MPLS over an ATM network \_\_\_\_\_. (Choose two)

- A. In situations where ATM SVCs are not available.
- B. On low end routers that cannot support the number of virtual circuits needed to run cell mode.
- C. In situations where the labeled packets must traverse ATM networks that do not support MPLS.
- D. In a migration scenario where the network is moving a classic IP over ATM to an MPLS aware ATM network.

Answer: B,C

---

### QUESTION 52:

Which two enable LC-ATM control on a Catalyst interface? (Choose two)

- A. router (config-if) # ld pip
- B. router (config-if) # td pip
- C. router (config-if) # mpls ip
- D. router (config-if) # tag-switching ip

Answer: C, D

---

### QUESTION 53:

What does the NEGOTIATED field in the output of the show tag-switching atm-tdp capability command indicate?

- A. It indicates that the VC merge capability has been successfully negotiated.

- B. It indicates a set of options that both LDP peer devices have agreed to share on this interface.
- C. It indicates that both TDP peer devices have completed the negotiation phase and have agreed on the TDP/LDP distribution.
- D. It indicates that the negotiated allocation scheme is UNDIR, if and only if, both peer devices have UNIDIR capability (otherwise it is BIDIR).

Answer: B

Explanation:

Negotiated - Set of options that both LDP peer devices have agreed to share on this interface. For example, the VPI or VCI allocation on either peer device remains within the negotiated ranges.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products\\_command\\_reference\\_chapter09186a008008](http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_command_reference_chapter09186a008008)

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#### **QUESTION 54:**

Which statement about configuring frame MPLS over an ATM PVC is true?

- A. The VPI/VCI must be manually assigned using a value from the label pool.
- B. The VCI/VPI are assigned dynamically by LDP using a value from the label pool.
- C. The VPI/VCI must be manually assigned using a value supported by the local ATM switch.
- D. The interface automatically learns the VPI/VCI from the local ATM switch and associates it with the defined MPLS.

Answer: B

Explanation:

Label switching Controlled ATM interface (LC-ATM interface) is an interface on a router or an ATM switch in which the VPI/VCI value is assigned through MPLS control products (TDP or LDP).

Reference: MPLS and VPN Architectures (Cisco Press) page 50

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#### **QUESTION 55:**

When using IP over ATM, which three statements are true? (Choose three)

- A. Layer 3 PVCs must be established to provide routing paths.
- B. A Layer 2 hub and spoke topology is usually used because it is easier to manage.
- C. Layer 2 devices have no knowledge of Layer 3 routing information. Virtual circuits must be established.
- D. Layer 2 topology may be different than the Layer 3 topology, resulting in suboptimal



paths and link utilization.

Answer: A C D

Explanation:

When trying to fit MPLS architecture into the limitations of ATM technology, a number of obstacles must be overcome:

1. There is no mechanism for direct exchange of IP packets between two adjacent MPLS nodes over an ATM interface. All data exchange over an ATM interface must take place over an ATM virtual circuit (VC).
2. ATM switches cannot perform MPLS label lookup or layer 3 lookup. The only capability of an ATM switch is to map the incoming VC in a cell to an outgoing VC and an outgoing interface.

Reference: MPLS and VPN Architectures (Cisco Press) page 49

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### **QUESTION 56:**

Which statement about operating frame MPLS over an ATM PVC is true?

- A. LDP sessions are established over a reserved PVC.
- B. The attached ATM switch is aware of the MPLS traffic.
- C. A TDP or LDP neighborship is established between the two PVC endpoint routers.
- D. Switching is performed based on the VPI/VCI value in the ATM header established by LDP.

Answer: D

Explanation:

In certain circumstances, such as during a transition to a full IP=ATM MPLS environment, or if transit ATM switches do not support MPLS, it might be desirable to run MPLS in Frame-mode across ATM PVCs. This is perfectly valid configuration although it suffers from the same scaling issues (due to the high number of VCs) as running IP over ATM in an overlay mode.

---

### **QUESTION 57:**

What is a good definition of Cisco's implementation of an ATM Virtual Path as related to LC-ATM MPLS support?

- A. Designed to establish switch-to-switch connectivity between parts of a public ATM network over a private network.
- B. Designed to establish switch-to-switch connectivity between parts of a private ATM network over a public network.
- C. Designed to establish router-to-router connectivity between parts of a private ATM network over a public network.
- D. Designed to establish router-to-router connectivity between parts of a public ATM network over a private network.

network over a private network.

Answer: B

---

**QUESTION 58:**

What does the global configuration command interface atm 0/0.1 mpls do?

- A. enables frame-mode MPLS operations on the ATM subinterface
- B. creates a cell-mode LC-ATM subinterface
- C. enables both LDP and TDP on the ATM subinterface
- D. enables LDP only on the ATM subinterface
- E. creates an ATM subinterface that can support both frame-mode and cell-mode operations

Answer: B

---

**QUESTION 59:**

What is a good definition of Cisco's implementation of an ATM Virtual Path as related to LC-ATM MPLS support?

- A. Designed to establish switch-to-switch connectivity between parts of a public ATM network over a private network.
- B. Designed to establish switch-to-switch connectivity between parts of a private ATM network over a public network.
- C. Designed to establish router-to-router connectivity between parts of a public ATM network over a public network.
- D. Designed to establish router-to-router connectivity between parts of a public ATM network over a private network.

Answer: B

---

**QUESTION 60:**

Which two enable LC-ATM control on a router interface? (Choose two)

- A. router (config-if) # ldp ip
- B. router (config-if) # tdp ip
- C. router (config-if) # mpls ip
- D. router (config-if) #tag-switching ip

Answer: C, D

---

**QUESTION 61:**

What does the REMOTE field in the output of the show tag-switching atm-ldp summary command indicate?

- A. The number of ATM labels assigned by this LSR on this interface.
- B. The number of ATM labels assigned to outgoing labels on this interface.
- C. The number of ATM labels contained in incoming labels on this interface.
- D. The number of ATM labels assigned by the neighbor LSR on this interface.

Answer: D

Explanation:

remote- The number of ATM labels assigned by the neighbor LSR on this interface.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products\\_command\\_reference\\_chapter09186a008008](http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_command_reference_chapter09186a008008)

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### **QUESTION 62:**

What does the show mpls atm-ldp capability command display?

- A. Capabilities negotiated between MPLS-ATM and LDP neighbors for label-controlled ATM (LC-ATM) interfaces.
- B. Capabilities specified from the ATM label binding database.
- C. Capabilities of the Multiprotocol Label Switching (MPLS) label forwarding information base (LFIB).
- D. Capabilities of tunnels announced to the Interior Gateway Protocol (IGP), including interface, destination, and bandwidth.

Answer: A

Explanation:

To display the MPLS ATM capabilities negotiated with LDP neighbors for LC-ATM interfaces, use the show mpls atm-ldp capability command in privileged EXEC mode.

Reference: Cisco Press - Implementing Cisco MPLS p.3-120

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### **QUESTION 63:**

When the show mpls atm-ldp command is used, which keyword will display specified entries from the ATM database?

- A. summary
- B. bindings
- C. capability
- D. database

Answer: B

Explanation:

To display specified entries from the ATM label-binding database, use the show mpls atm-ldp bindings command in privileged EXEC mode. The ATM label-binding database contains entriief for LVCs on LC-ATM interfaces:

- show mpls atm-ldp bindings [network {mask | length}] [ local-label vpi vci][remote-label vpi vci][neighbor interface]

Reference: Cisco Press "Imlementing Cisco MPLS study guide" p.3-119.

---

**QUESTION 64:**

Which IOS command displays the LC-ATM capabilities of an IOS device?

- A. show mpls atm capability
- B. show mpls atm-lc capability
- C. show tag-switching lc-atm capability
- D. show tag-switching atm-tdp capability

Answer: D

Explanation:

To display the MPLS ATM capabilities negotiated with LDP neighbors for LC-ATM interfaces, use the show mpls atm-ldp capability command in privileged EXEC mode:

-show mpls amt-ldp capability

Reference: Cisco Press "Implementing Cisco MPLS study guide" p.3-120

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**QUESTION 65:**

Which command is used to display summary information on ATM tag bindings?

- A. show tag-switching vpi summary
- B. show tag-switching vpi bindings
- C. show tag-switching atm-tdp summary
- D. show tag-switching atm-tdp bindings

Answer: D

---

**QUESTION 66:**

Which IOS command should you use to display the contents of Label information Base (LIB or TIB)?

- A. show tag tdp tib
- B. show tag tdp label
- C. show tag tdp detail
- D. show tag tdp bindings

Answer: D

---

**QUESTION 67:**

Which IOS command is used to display the entries from the ATM TDP tag-binding database?

- A. show tag-switching vpi database
- B. show tag-switching vpi bindings
- C. show tag-switching atm-tdp database
- D. show tag-switching atm-td.p bindings

Answer: D

---

**QUESTION 68:**

As related to VPNs, what is a CE-router?

- A. A CE-router is a router in the C-network with a link to the P-network.
- B. A CE-router is a router in the P-network that provides the link to the customer's site.
- C. A CE-router is a router in the P-network that servers as the customer's entry point to the SP network.
- D. A CE-router is a router in the customer's site that provides the address translation necessary to ensure that there is no overlap in the addressing scheme.

Answer: C

Explanation:

The customer connects to the service provider network through a Customer Premises Equipment device. The CPE is usually a Packet Assembly and Disassembly (PAD) device that provides plain terminal connectivity, a bridge, or router. The CPE device is also sometimes called a Customer Edge (CE) device.

Reference: MPLS and VPN Architectures (Ciscopress) page 131

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**QUESTION 69:**

Since route distinguishers (RD) can not identify participation in more than one VPN, what is required to support complex MPLS VPNs?

- A. route targets (RT)
- B. route tags
- C. route maps
- D. dedicated PE routers
- E. site of origin (SOO)

Answer: A

---

**QUESTION 70:**

What are three benefits of an MPLS VPN? (Choose three)

- A. It provides a network-based VPN service.
- B. It provides equivalent security to Frame Relay.
- C. It eliminates the need for multiple routing protocols.
- D. It offers a more scalable solution than other VPN technologies.

Answer: A,B,D

---

**QUESTION 71:**

As related to VPNs, what is a P-network?

- A. The P-network is the part of the network under the SP's control.
- B. The P-network is the part of the network under the PTO's control.
- C. The P-network is the part of the network that is controlled using P-mib.
- D. The P-network is the part of the network that has been partitioned into an SP domain.

Answer: A

---

**QUESTION 72:**

What is the impact of MPLS VPN on CE-routers?

- A. The CE-routers are not MPLS VPN aware.
- B. The CE-routers must support the same IGP as the P-network.
- C. The CE-routers must use EBGp as the CE to PE routing protocol.
- D. The CE-routers must be upgraded to version 12.0 or later to support MPLS.

Answer: A

---

**QUESTION 73:**

Which two statements about MPLS VPN implementations and traditional peer-to-peer VPN implementations are true? (Choose two)

- A. In MPLS VPNs, the PE-routers are aware of the customer routes.
- B. In MPLS VPNs, the PE-routers are not aware of the customer routes.
- C. In traditional peer-to-peer VPN implementations, the PE-routers are aware of the customer routes.
- D. In traditional peer-to-peer VPN implementations, the PE-routers are not aware of the

customer routes.

Answer: A, C

Explanation:

A: Since in MPLS VPN, PE and CE still need to exchange routing information then propagate through MP-iBGP. in peer-to-peer VPNS, PE and P routers ARE in customer's network, of course they exchange routing information. Peer-to-peer routers are visible to customers because they are INSIDE the customer network, so B cannot be correct.

---

**QUESTION 74:**

Which two are IP-based overlay VPN technologies? (Choose two.)

- A. MPLS.
- B. Frame Relay
- C. IP Security (IPSec)
- D. Generic Route Encapsulation (GRE)

Answer: C, D

Explanation:

Two well-known tunneling technologies are IP Security (IPSec) and generic routing encapsulation (GRE). GRE is fast and simple to implement and supports multiple routed protocols, but it provides no security and is thus unsuitable for deployment over the Internet. An alternative tunneling technology is IPSec, which provides network-layer authentication and optional encryption to make data transfer over the Internet secure. IPSec supports only the IP routed protocol.

Reference: Cisco Press - Implementing Cisco MPLS study guide p.4-19

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**QUESTION 75:**

What is the VPN type where sites of two different companies are connected together via Frame Relay virtual circuits?

- A. Overlay intranet VPN
- B. Overlay extranet VPN
- C. Peer-to-peer access VPN
- D. Peer-to-peer Internet VPN
- E. MPLS simple VPN
- F. MPLS overlapping VPN

Answer: B

---

**QUESTION 76:**

Which VPN implementation is achieved with technology such as Frame Relay and ATM?

- A. Layer 1 overlay VPN
- B. Layer 2 overlay VPN
- C. Layer 3 overlay VPN
- D. Peer-to-peer VPN

Answer: B

---

**QUESTION 77:**

Which term is used to describe a VPN in which the service provider does not participate in the customer routing?

- A. MPLS simple VPN
- B. overlay VPN
- C. shared PE peer-to-peer VPN
- D. dedicated PE peer-to-peer VPN
- E. MPLS complex VPN

Answer: B

Explanation:

From the Layer 3 perspective, the P-network is invisible to the customer routers, which are linked with emulated point-to-point links. The routing protocols runs directly between customer routers that establish routing adjacencies and exchange routing information.

The service provider is not aware of customer routing and has no information about customer routes. The responsibility of the service provider is purely the point-to-point data transport between customer sites.

Reference: Cisco Press - Implementing Cisco MPLS Study guide p.4-21

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**QUESTION 78:**

Which three statements are correct regarding Layer 2 overlay VPNs and peer-to-peer VPNs? (Choose three.)

- A. Peer-to-peer VPNs require the establishment of virtual circuits to connect the different customer sites together.
- B. Peer-to-peer VPNs require the service provider to participate in the customer routing, accepting customer routes, transporting them across the service provider backbone, and finally propagating them to other customer sites.
- C. With peer-to-peer VPNs, the service provider is responsible for transport of Layer 2 frames between customer sites, and the customer takes responsibility for all higher layers.
- D. The implementation of Layer 2 overlay VPNs is the traditional switch-WAN model,



implemented with technologies like X.25, Frame Relay or ATM.

E. With Layer 2 overlay VPNs, the service provider is not aware of customer routing has no information about customer routers.

F. It is simple to implement Layer 2 overlay VPNs because the Customer Edge (CE) router just needs a connection to the Service Provider's Edge (PE) router.

Answer: B, D, E

---

**QUESTION 79:**

What is the VPN type where sites of two different companies are connected together via Frame Relay virtual circuits

- A. overlay intranet VPN
- B. overlay extranet VPN
- C. peer-to-peer access VPN
- D. peer-to-peer Internet VPN
- E. MPLS simple VPN
- F. MPLS overlapping VPN

Answer: B

---

**QUESTION 80:**

Which type of VPN implementation is simple and cost effective because all sites connect only to the PE router and as a result optimum routing between sites is enabled by default?

- A. peer-to-peer VPN
- B. overlapping VPN
- C. hub-and-spoke overlay VPN
- D. fully-meshed overlap VPN
- E. client-server VPN

Answer: A

Explanation:

The first peer-to-peer VPN solution appeared with the widespread deployment of IP in service provider networks. Architectures similar to that of the Internet were used to build them. Special provisions were taken into account to transform the architecture, which was targeted toward public backbones (Internet), into a solution in which customers would be totally isolated and able to exchange corporate data securely.

The more common peer-to-peer VPN implementation allowed a PE router to be shared between two or more customers. Packet filters were used on the shared PE routers to isolate the customers. In this implementation, it was common for the service provider to allocate a portion of its address space to each customer and manage the packet filters on

the PE routers to ensure full reachability between sites of a single customer and isolation between separate customers.

Reference: Cisco Press - Implementing Cisco MPLS study guide p.4-23

---

**QUESTION 81:**

Which kind of link does a Layer 3 overlay VPN use?

- A. emulated point-to-point
- B. dedicated point-to-point
- C. point-to-multipoint
- D. permanent virtual circuits

Answer: A

---

**QUESTION 82:**

Which statement about MPLS VPN implementations and traditional peer-to-peer VPN implementations is true?

- A. MPLS and traditional peer-to-peer VPNs require the service provider to participate in the customer routing.
- B. MPLS and traditional peer-to-peer VPNs require that the customer routing is transparent to the service provider.
- C. MPLS VPNs require the use of link-state routing protocols, traditional peer-to-peer VPN implementations require distance vector protocols.
- D. MPLS VPNs are constructed using dynamic routing protocols; traditional peer-to-peer VPN implementations are constructed using static routes.

Answer: A

Explanation:

Peer-to-Peer VPN's require the SP to participate in customer routing, accepting customer routes, transporting them across the SP backbone and propagating to customer sites. The Provider routers carry all the customers routes, they are easy to implement, optimum routing is enabled between sites by default as a result.

---

**QUESTION 83:**

Which statement is true about implementing a hub-and-spoke overlay VPN?

- A. A hub-and-spoke overlay VPN has no single point of failure.
- B. A spoke site has direct connectivity to the other spoke sites.
- C. If a dynamic routing protocol like RIP is used, split horizon must be disabled at the hub router, or point-to-point sub-interfaces must be used.
- D. The total number of virtual circuits required to implement a hub-and-spoke overlay

VPN is  $N(N-1)/2$  where  $N$  = number of sites.

Answer: C

Explanation:

If a dynamic routing protocol such as RIP is used, split-horizon updates must be disabled at the hub router or point-to-point subinterfaces must be used at the hub router to overcome the split-horizon problem.

Reference: Cisco Press - Implementing Cisco MPLS study guide p.4-36

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**QUESTION 84:**

DRAG DROP

Match the following VPN type to its description.

Simple VPN	Some sites can participate in more than one vpn.	Place here
Overlapping VPN	All sites can communicate with a common server but not with each other.	Place here
Central services VPN	Sometimes it is called a "rainbow" VPN implementation.	Place here
Managed network VPN	Every site can communicate with every other site.	Place here

Answer:

Some sites can participate in more than one vpn.	Overlapping VPN
All sites can communicate with a common server but not with each other.	Central services VPN
Sometimes it is called a "rainbow" VPN implementation.	Simple VPN
Every site can communicate with every other site.	Managed network VPN

Explanation:

Intranet VPN-Connects sites within an organization

Managed network-A dedicated VPN is established by the service provider to manage customer edge routers

Simple VPN-Every site can communicate with every other site

Extranet VPN-Connects different Organization in a secure way

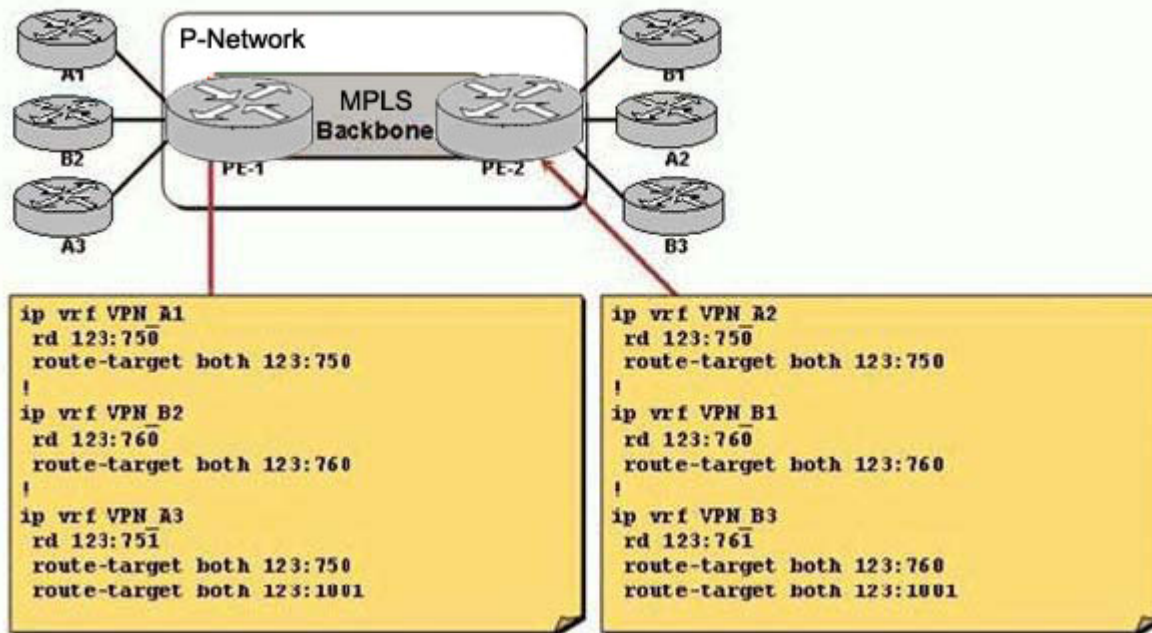
Overlapping VPN-Some sites participate in more than one simple VPN

Central services VPN-All sites can communicate with central servers but not with each other

Access VPN-VPDialN provides dialup access into the customer network

**QUESTION 85:**

Exhibit:



Refer to the exhibit.

In which type of MPLS VPN are customers A and B participating?

- A. Overlapping MPLS VPN.
- B. Simple MPLS VPN.
- C. Central services MPLS VPN.
- D. Overlay MPLS VPN.
- E. Managed CE service MPLS VPN.

Answer: A

**QUESTION 86:**

Which MPLS VPN implementation allows selected sites in one simple VPN to communicate with selected sites of a second VPN?

- A. Central services VPN
- B. Managed CE router services VPN
- C. Overlapping VPN
- D. Managed PE router services VPN

Answer: C

**QUESTION 87:**

Which type of overlay VPN is simplest to implement?

- A. Fully-meshed
- B. Hub-and-spoke
- C. Partial-mesh
- D. Redundant hub-and-spoke

Answer: B

Explanation:

The hub-and spoke topology is the simplest overlay VPN topology - all sites are linked with a single virtual circuit to a central CE router. The routing is also extremely simple-static routing or a distance vector protocol such as Routing Information Protocol (RIP) is more than adequate. If a dynamic routing protocol such as RIP is used, split-horizon updates must be disabled at the hub router or point-to-point subinterfaces must be used at the hub router to overcome the split-horizon problem.

Reference: Cisco Press - Implementing Cisco MPLS study guide p.4-36

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**QUESTION 88:**

Which statement is true about implementing a hub-and-spoke overlay VPN?

- A. A hub-and-spoke overlay VPN has no single point of failure
- B. A spoke site has direct connectivity to other spoke sites.
- C. If a dynamic routing protocol like RIP is used, split horizon must be disabled at the hub router, or point-to-point sub-interfaces must be used.
- D. The total number of virtual circuits required to implement a hub-and-spoke overlay VPN is  $(N(N-1))/2$  where  $N$  = number of sites.

Answer: C

Explanation:

If a dynamic routing protocol such as RIP is used, split-horizon updates must be disabled at the hub router or point-to-point subinterfaces must be used at the hub router to overcome the split-horizon problem.

Reference: Cisco Press - Implementing Cisco MPLS study guide p.4-36

---

**QUESTION 89:**

DRAG DROP

You work as network administrator at CertKiller.com. Your CertKiller boss asks you to match the VPN types to the appropriate descriptions.

**Select from these**

overlapping VPN

Central services VPN

Managed network VPN

Simple VPN

**Place here**

Some sites can participate in more than one VPN

*Place here*

All sites can communicate with a common server but not with each other.

*Place here*

Sometimes it is called a "rainbow" VPN implementation.

*Place here*

Every site can communicate with every other site.

*Place here*

Answer:

Some sites can participate in more than one VPN

overlapping VPN

All sites can communicate with a common server but not with each other.

Central services VPN

Sometimes it is called a "rainbow" VPN implementation.

Managed network VPN

Every site can communicate with every other site.

Simple VPN

---

**QUESTION 90:**

Which routers in an MPLS VPN service provider's network are used to connect to the customer's routers?

- A. P routers
- B. CE routers
- C. PE routers
- D. P and PE routers

Answer: C

---

**QUESTION 91:**

Which component of MPLS architecture exchanges Layer 3 routing information and labels?

- A. control plane
- B. data plane
- C. forwarding plane
- D. routing plane

Answer: A

---

**QUESTION 92:**

Which component of MPLS architecture is a simple label-based forwarding engine that is independent of the type of routing protocol or label exchange protocol?

- A. control plane
- B. data plane
- C. routing plane
- D. forwarding plane

Answer: B

---

**QUESTION 93:**

How many routing table PE have

- A. A PE has one routing table for each VRF
- B. A PE has one global routing table for all VRFs
- C. A PE has a global routing table and additional routing table for each VRF
- D. A PE has a CEF global routing table and additional routing table for each VRF

Answer: C

---

**QUESTION 94:**

Which two planes make up the MPLS architecture? (Choose two)

- A. Packet plane
- B. Control plane
- C. Routing plane
- D. Forwarding plane
- E. Data plane

Answer: B, E

Explanation:  
Architecture comprises of data & control plane

---

**QUESTION 95:**

Which component of MPLS architecture uses protocols such as the label distribution protocol (LDP) and tag distribution protocol (TDP) to exchange labels?

- A. Control plane
- B. Data plane
- C. Routing plane
- D. Forwarding plane

Answer: A

---

**QUESTION 96:**

Which well-known tunnel technology is fast, simple to implement, supports multiple routed protocols, but it provides no security?

- A. GRE
- B. IPSec
- C. Peer-to-peer
- D. Layer 2 forwarding
- E. Layer 2 tunneling

Answer: A

---

**QUESTION 97:**

Which well-known tunneling technology provides network layer authentication and optional encryption to make data transfer over the Internet secure?

- A. Layer 2 tunneling
- B. GRE
- C. IPSec
- D. Peer-to-peer



E. Layer 2 forwarding

Answer: C

### QUESTION 98:

DRAG DROP

Match each item to its correct description.

VPNv4 address	96 bits long.
Route Target (RT)	Uses to make potentially overlapping IPv4 addresses globally unique.
Route Distinguisher (RD)	Used to prevent loops.
Site of Origin (SOO)	Attached to the VPNv4 routes to indicate VPN membership.

Answer:

96 bits long.	VPNv4 address
Uses to make potentially overlapping IPv4 addresses globally unique.	Route Distinguisher (RD)
Used to prevent loops.	Route Target (RT)
Attached to the VPNv4 routes to indicate VPN membership.	Site of Origin (SOO)

Explanation:

Routing Loop Mechanisms for redistribution between MP-BGP & OSPF - down bit, time to live field (TTL), Site of Origin field (SOO) & tag field (in external OSPF routes is used to detect cross-domain routing loops). OSPF routes with the down bit set are never entered in the backbone's IGP routing table. SOO is only needed for multihomed customer sites. In cases where VPN customers run OSPF and have areas that are multihomed into P network, set the OSPF down bit on egress to the multihomed area from the PE.

### QUESTION 99:

Which component of MPLS architecture uses protocols such as the label distribution (LDP) and tag distribution protocol (TDP) to exchange labels?

A. Control pane

- B. Data plane
- C. Routing plane
- D. Forwarding plane

Answer: A

---

**QUESTION 100:**

Since route distinguishers (RD) can not identify participation in more than one VPN, what is required to support complex MPLS VPNs?

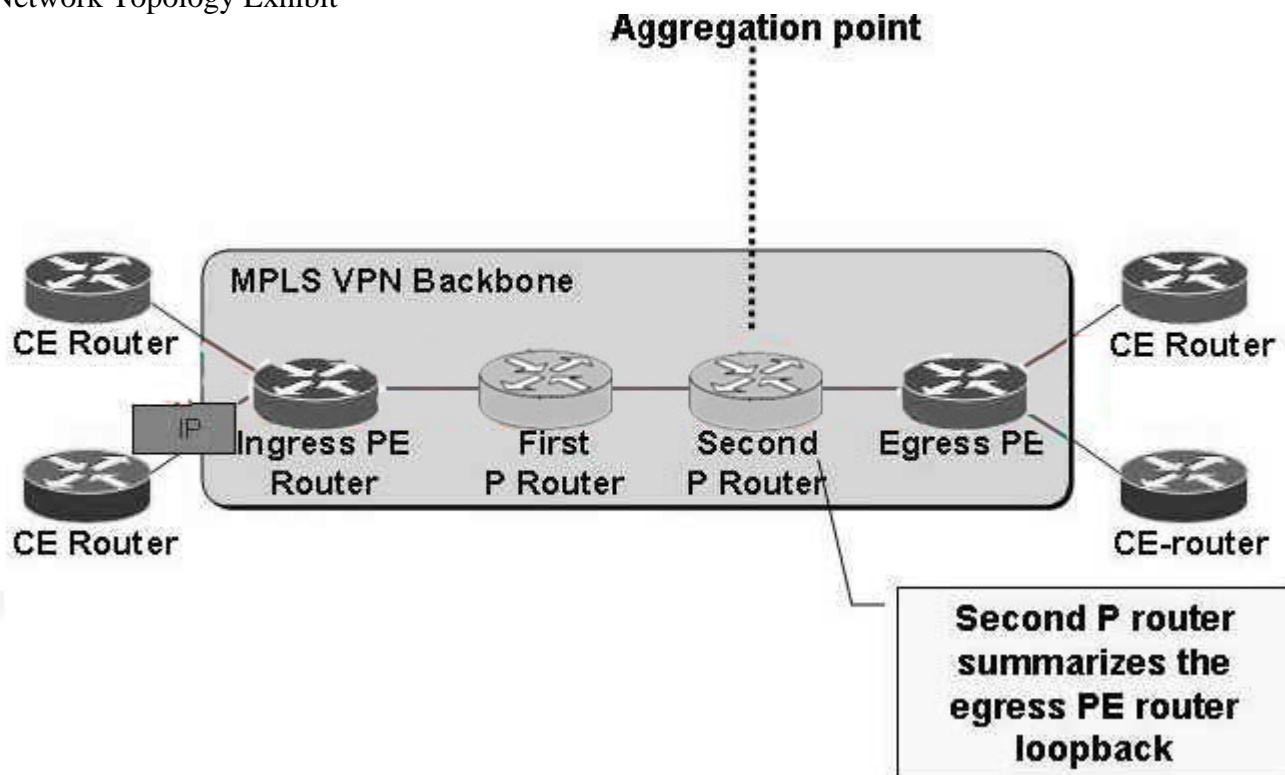
- A. Route target (RT)
- B. Route tags
- C. Route maps
- D. Dedicated PE routers
- E. Site of origin (SOO)

Answer: A

---

**QUESTION 101:**

Network Topology Exhibit



What problem can be caused by the second P router summarizing the loop address of the egress PE router?

- A. The first P router will be faced with a VPN label which it does not understand.

- B. The second P router will be faced with a VPN label which it does not understand.
- C. The egress PE router will not be able to establish a label switch path (LSP) to the ingress PE router.
- D. A label switch path (LSP) will be established from the ingress PE router to the egress PE router, an event that is not desirable.
- E. The ingress PE router will not be able to receive the VPN label the egress PE router via MP-IBGP.

Answer: B

---

**QUESTION 102:**

Which prefix-list statement can be used to deny all Class C Private IP addresses?

- A. ip prefix-list blkc seq 5 deny 192.168.0.0
- B. ip prefix-list blkc seq 5 deny 192.168.0.0/24
- C. ip prefix-list blkc seq 5 deny 192.168.0.0/32 le 32
- D. ip prefix-list blkc seq 5 deny 192.168.0.0/16 le 32

Answer: D

---

**QUESTION 103:**

Which prefix will be permitted by the following prefix-list?  
ip prefix-list test permit 10.1.0.0/16 le 22

- A. 10.2.2.0 255.255.255.0
- B. 10.1.32.0 255.255.240.0
- C. 10.1.1.64 255.255.255.240
- D. 10.0.0.0 255.255.0.0
- E. 10.1.3.0 255.255.255.0

Answer: B

---

**QUESTION 104:**

What can happen if a P router (LSR) within an LSP performs route summarization and suppresses the more specific networks?

- A. Route summarization will cause every LSR along the LSP to perform a routing lookup.
- B. Route summarization will help reduce the size of the LIB and LFIB and will not affect MPLS label switching operations.
- C. Route summarization will cause the P router (LSR) that performs the route summarization to perform PHP (penultimate-hop popping).
- D. Route summarization will break an LSP into two segments, and the P router (LSR)

that performs the route summarization will need to perform a routing lookup.

Answer: D

---

**QUESTION 105:**

In reference to MPLS VPNs, what is a routing protocol context?

- A. Routing protocol contexts are specified in the MPLS RFC as OSPF, BGP, and ISIS.
- B. It is how separate isolated copies of VPN routing instances are created by the IOS.
- C. It is the interface parameters and timers values used to determine which routes are exported.
- D. It is the display keyword used with the show ip route vpnv4 command to display the routing protocol parameters for a particular VRF

Answer: B

Explanation:

1) According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 8-6.

-Routing context=routing protocol run in one vrf

-Routing contexts were introduced in Cisco IOS software to support the need for separate isolated copies of VPN routing protocols. They can be implemented as separate routing processes (OSPF), similar to traditional Cisco IOS software implementation, or as separate isolated instances of the same routing protocol (EBGP, RIPv2).

2) According to the book "MPLS and VPN Architectures, CCIP Edition "by Jim Guichard , Ivan Pepelnjak.

In chapter 5: To support overlapping VPNs, the routing protocol must be limited to a single VPN routing and forwarding (VRF) table. Each PE router must be configured so that any routing information learned from an interface can be associated with a particular VRF. This is done through the standard routing protocol process and is known as the routing context. A separate routing context is used per VRF.

Some routing protocols (for example, RIP) support several instances (or routing contexts) of the same protocol, with each instance running in a different VRF. Other protocols (for example, OSPF) require a separate copy of the routing protocol process for each VRF.

---

**QUESTION 106:**

What is the P-router perception of end-to-end MPLS VPN routing?

- A. The P-router is not MPLS VPN aware.
- B. The P-router forwards packets based upon the RT contained in the label.
- C. The P-router perceives the end-to-end MPLS VPN routing as an extension of its own IGP routing.
- D. The P-router provides separate routing instances for its own IGP and the end-to-end MPLS VPN routing.

Answer: A

Explanation:

P-routers are not MPLS-VPN aware.

---

**QUESTION 107:**

How many routing tables reside on a P-router?

- A. The P-router has a single global routing table.
- B. A P-router has one routing table for each VRF.
- C. A P-router has a global routing table for each VRF.
- D. A P-router has a global routing table and one additional routing table for each VRF.

Answer: A

Explanation:

A, obviously. since it is a P router but not a PE router. It is used to transfer the route to other PE routers as part of the path. It does not "inject" the routes to any of their routing tables. Since it is just part of a path, it needs ONLY a global routing table to inter-connect PE devices.

Not D: Option D is true for PE-router.

---

**QUESTION 108:**

How are customer routes exchanged across the P-network?

- A. LDP is used to exchange customer routes across the P-network.
- B. IBGP is used to exchange customer routes across the P-network.
- C. OSPF is used to exchange customer routes across the P-network.
- D. MP-BGP is used to exchange customer routes across the P-network.

Answer: D

Explanation:

It must be D, OSPF can only be used as in IGP within P network and does not have the capabilities to carry any customer route.

---

**QUESTION 109:**

Which three statements about MPLS VPNs are true? (Choose three.)

- A. PE routers do not participate in customer routing.
- B. MPLS VPN is similar to using the peer-to-peer dedicated PE router approach.
- C. Customer can use overlapping addresses.
- D. Each customer is assigned an independent routing table (virtual routing and

forwarding table - VRF).

E. The P Router's routing table contains both the global IP routes and the customer routes.

F. CE routers connect directly to the service provider's P routers.

Answer: B, C, D

---

**QUESTION 110:**

Assuming TTL propagation is enabled, how does MPLS ensure the integrity of the TTL loop detection mechanism in IP?

A. The TTL field in the MPLS header is set to 255. This field is decremented at each hop in the MPLS cloud. If the TTL has not expired, its value is copied back into the IP header.

B. The TTL field in the IP header is copied to the TTL field in the MPLS header. This field is passed transparently through the MPLS cloud. The TTL value is copied back into the IP header.

C. The TTL field in the IP header is copied to the TTL field in the MPLS header. This field is decremented by one in the MPLS cloud. If the TTL has not expired its value is copied back into the IP header.

D. The TTL field in the IP header is copied to the TTL field in the MPLS header. This field is decremented at each hop in the MPLS cloud. If the TTL has not expired, its value is copied back into the IP header.

Answer: D

---

**QUESTION 111:**

Which MPLS plane is responsible for packet forwarding?

A. packet plane

B. control plane

C. routing plane

D. forwarding plane

Answer: D

Explanation:

MPLS compliments IP technology. It is designed to leverage the intelligence associated with IP Routing, and the Switching paradigm associated with Asynchronous Transfer Mode (ATM). MPLS consists of a Control Plane and a Forwarding Plane. The Control Plane builds what is called a "Forwarding Table," while the Forwarding Plane forwards packets to the appropriate interface (based on the Forwarding Table).

Reference:

[http://www.cisco.com/en/US/tech/CK436/CK428/technologies\\_white\\_paper09186a00800b010f.shtml](http://www.cisco.com/en/US/tech/CK436/CK428/technologies_white_paper09186a00800b010f.shtml)

**QUESTION 112:**

What is penultimate hop popping?

- A. A process run on the ingress router that assigns the label to the packet.
- B. A process run on the P-router that removes a label before forwarding the packet to the egress router.
- C. A process run the ingress router that sets the TTL value to 255 to hide the core routers from a traceroute.
- D. A process run on the egress router that pops (sets) the TTL value in the Layer 3 header to the value that is contained in the top label TTL value.

Answer: B

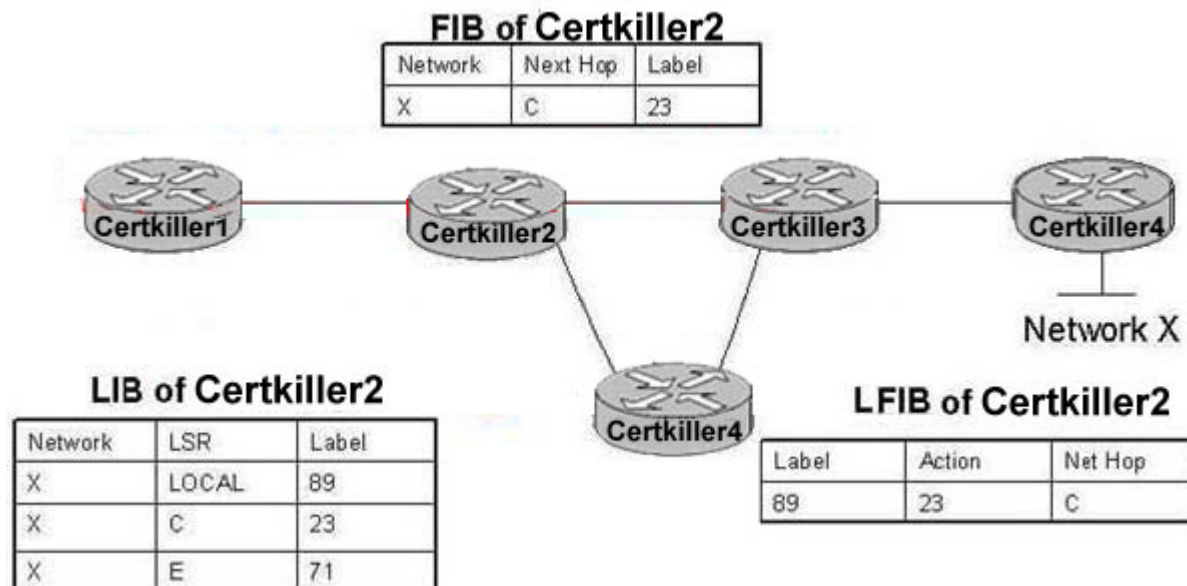
Explanation:

Traffic Engineering Components

A router capable of supporting MPLS is known as Label Switching Router (LSR). The LSR, found just before the last LSR in the MPLS clouds, is known as the penultimate hop. The end-to-end MPLS path is known as Label Switched Path (LSP). LSP is originated at the head-end router and terminates at the tail-end router.

Reference:

[http://www.cisco.com/en/US/tech/CK436/CK428/technologies\\_white\\_paper09186a00800a4472.shtml](http://www.cisco.com/en/US/tech/CK436/CK428/technologies_white_paper09186a00800a4472.shtml)

**QUESTION 113:**

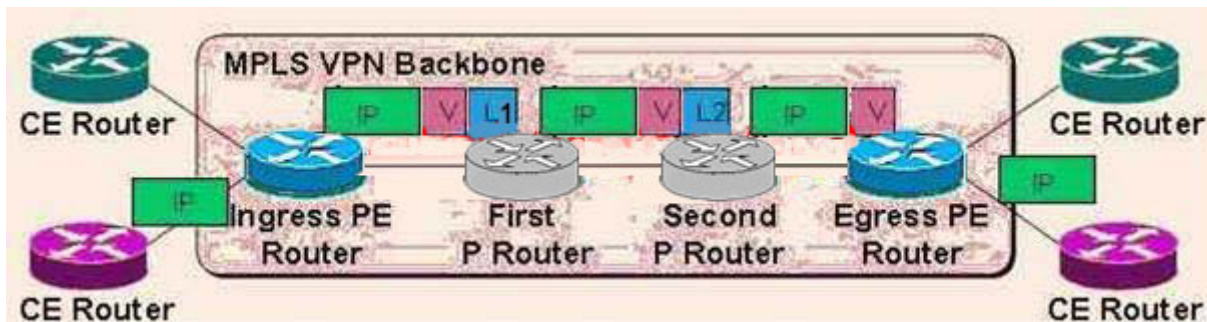
The relevant entries in the FIB, LIB, and LFIB tables for a frame-mode MPLS network is shown. If the link between Routers B and C was lost, what would be the relevant entries in the LFIB table for label, action, and next hop?



- A. 89, 71, Certkiller 5
- B. 71, 89, Certkiller 5
- C. 89,23, Certkiller 4
- D. 71,23, Certkiller 4

Answer: A

#### QUESTION 114:



Refer to the diagram.

Which statement is true about packet forwarding across an MPLS VPN backbone?

- A. Penultimate hop popping (PHP) on the LDP label is performed by the egress PE router.
- B. Penultimate hop popping (PHP) on the VPN label is performed by the second P router.
- C. Penultimate hop popping (PHP) on the VPN label is performed to egress PE router.
- D. Penultimate hop popping (PHP) on the LDP label is performed by the second P router.

Answer: D

Explanation:

Penultimate hop popping, or PHP (the removal of the top label in the stack on the hop prior to the egress router), can be performed in frame-based MPLS networks. In these networks, the last P router in the label switched path (LSP) tunnel pops the LDKP label (as previously requested by the egress PE router through LDP), and the PE router receives a labeled packet that contains only the VPN label. In most cases, a single label lookup performed on that packet in the egress PE router is enough to forward the packet toward the CE router. The full IP lookup through the Forwarding information Base (FIB) is performed only once, in the ingress PE router, even without PHP.

Reference: Cisco Press - "Implementing Cisco MPLS study guide" p.4-99

#### QUESTION 115:

In MPLS VPN implementations, how are the second (VPN) labels in the label stack propagated from the egress PE router to the ingress PE router?

- A. The core IGP.
- B. MP-IBGP VPNv4 routing updates.



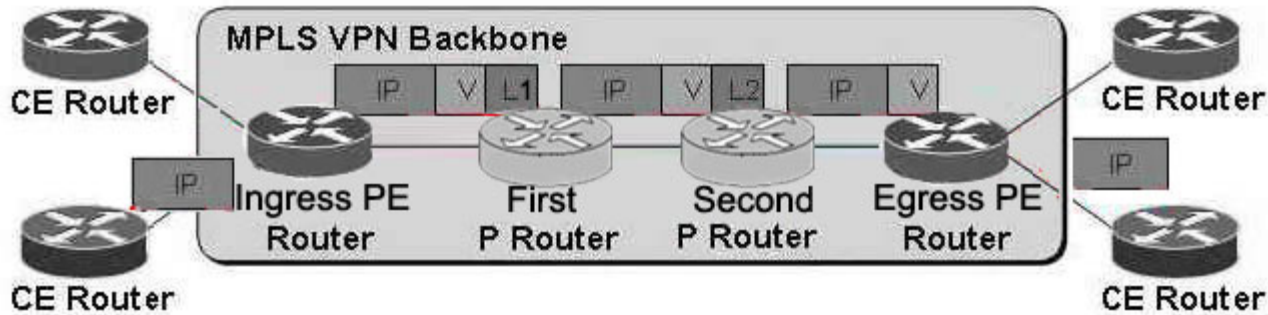
- C. MP-IBGP IPv4 routing updates.
- D. EBGP IPv4 routing updates
- E. LDP
- F. TDP

Answer: B

---

**QUESTION 116:**

Exhibit:



Which statement is true about packet forwarding across an MPLS VPN backbone?

- A. Penultimate hop popping (PHP) on the LDP label is performed by the egress PE router.
- B. Penultimate hop popping (PHP) on the VPN label is performed by the second P router.
- C. Penultimate hop popping (PHP) on the VPN label is performed by the egress PE router.
- D. Penultimate hop popping (PHP) on the LDP label is performed by the second P router.

Answer: D

---

**QUESTION 117:**

Which two are VRF route-limiting options supported by IOS? (Choose two.)

- A. The maximum hop command limits the total number of hops that can be contained in a VRF.
- B. The maximum AS-in command limits the total number of ASes that can be contained in a VRF.
- C. The neighbor maximum-prefix command limits the number of routes that an individual BGP peer can send.
- D. The maximum routes command limits the total number of routes in a VRF, regardless of whether they are received from CE-routers or from other PE-router via MP-IBGP.

Answer: C, D

---

**QUESTION 118:**

Which three statements about MPLS VRFs are true? (Choose three)

- A. Only one interface can be assigned to a single VRF.
- B. Only one VRF can be assigned to a single interface.
- C. A VRF is a routing and forwarding instance for a VPN.
- D. VPN sites share a VRF if they are in an overlapping VPN.
- E. A single VPN site or many VPN sites can share the same VRF as long as these sites share exactly the same connectivity requirements.

Answer: B, C, E

Explanation:

B: You can have multiple interfaces associated with a VRF. But only one VRF associated with a particular interface (meaning an interface cannot be associated with multiple VRFs).

E (not D): According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 7-64

Impact of complex VPN topologies on Virtual Routing Tables:

- A virtual routing table in a PE router can be used only for sites with identical connectivity requirements.

---

**QUESTION 119:**

Which two commands specify an Rd for VRF my\_vpn? (Choose two.)

- A. router (config-vrf) # rd 65000:010
- B. router (config-vrf) # rd 192.168.2.1:010
- C. router (config-int) # rd 192.168.2.1:010
- D. router (config) # ip vrf my\_vpn rd 65000:010
- E. router (config) # ip vrf my\_vpn rd 192.168.2.1:010

Answer: A, B

---

**QUESTION 120:**

How many route targets can you configure on a single VRF?

- A. Two (one import and one export).
- B. The maximum is only limited by the router's memory.
- C. One export and as many imports as the router's memory allows.
- D. One import and as many exports as the router's memory allows.

Answer: B

---

**QUESTION 121:**

What is the proper command to associate interface s0/0 with a VRF named my\_vpn?

- A. Router (config-vrf)# int s0/0
- B. Router (config-if)# vrf my\_vpn
- C. Router (config)# if vrf my\_vpn int s0/0
- D. Router (config-if)# ip vrf forwarding my\_vpn

Answer: D

Explanation:

After you define all relevant VRFs on the PE router, you must tell the PE router which interfaces belong to which VRF and, therefore, should populate the VRF with routes from connected sites. More than one interface can belong to the same VRF. You can do this by using the ip vrf forwarding interface-mode command, which associates the interface with the name VRF. Both main and sub-interfaces can be defined within a VRF. Reference: MPLS and VPN Architectures (Cisco Press) page 204

---

**QUESTION 122:**

You need VRF route to limit the effect of \_\_\_\_\_. (Choose two)

- A. Route loops on the MPLS VPN backbone.
- B. Malicious behavior on the MPLS VPN backbone.
- C. Excessive hop count on the customer's network.
- D. Configuration errors on the MPLS VPN backbone.

Answer: A, C

---

**QUESTION 123:**

Which command configures the redistribution of static VRF routes between PE-routers?

- A. router (config)# redistribute static
- B. router (config-if)# redistribute static
- C. router (config-router)# redistribute static
- D. router (config-router-af)# redistribute static

Answer: C

Explanation:

Router(config-router)#redistribute static  
Redistributes VRF static routes into the VRF BGP table.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products\\_feature\\_guide09186a00800e977b.html](http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products_feature_guide09186a00800e977b.html)

---

**QUESTION 124:**

Which command specifies an RT for VRF my\_vpn?

- A. Router (config-vrf)# route-target both 12703:15
- B. Router (config-router-af)# route-target import 12703:15
- C. Router (config)# ip vrf my\_vpn route-target import 12703:15
- D. Router (config-if)# ip vrf my\_vpn route-target import 12703:15

Answer: A

Explanation:

route-target

To create a route-target extended community for a VRF, use the route-target VRF submode command. To disable the configuration of a route-target community option, use the noform of this command.

route-target{import | export | both}route-target-ext-community

noroute-target {import | export | both}route-target-ext-community

Syntax Description

import Imports routing information from the target VPN extended community.

export Exports routing information to the target VPN extended community.

both Imports both import and export routing information to the target VPN extended community.

route-target-ext-community Adds the route-target extended community attributes to the VRF's list of import, export, or both (import and export) route-target extended communities.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products\\_feature\\_guide09186a00800e977b.html#111](http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products_feature_guide09186a00800e977b.html#111)

---

**QUESTION 125:**

Which three statements about MPLS VRFs are true? (Choose three)

- A. Only one interface can be assigned to a single VRF.
- B. Only one VRF can be assigned to a single interface.
- C. A VRF is a routing and forwarding instance for a VPN.
- D. VPN sites share a VRF if they are in an overlapping VPN.
- E. A single VPN site or many VPN sites can share the same VRF as long as these sites share exactly the same connectivity requirements.

Answer: B D E

Explanation:

B: You can have multiple interfaces associated with a VRF. But only one VRF associated with a particular interface (meaning an interface cannot be associated with multiple VRFs).

E (not D): According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 7-64

Impact of complex VPN topologies on Virtual Routing Tables:

- A virtual routing table in a PE router can be used only for sites with identical connectivity requirements.

---

**QUESTION 126:**

Which three pieces of information are configured within the VRF configuration mode - Router(config-vrf#)? (Choose three)

- A. RD
- B. Import RT
- C. Export RT
- D. Routing protocol address-family
- E. Multiprotocol BGP (MPBGP) neighbor

Answer: A, B, C

---

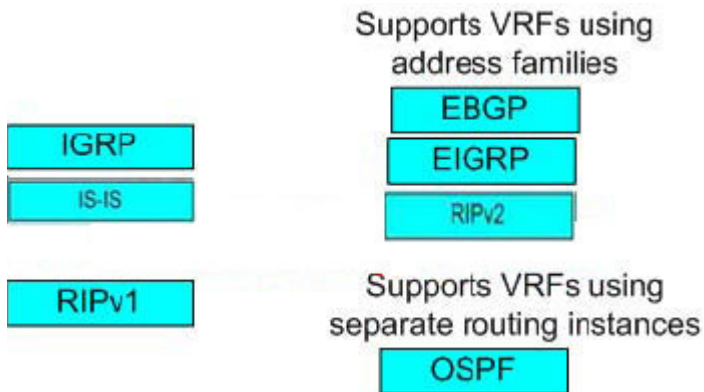
**QUESTION 127:**

DRAG DROP

Identify the routing protocols on the left that are VRF aware by dragging and dropping them into the proper VRF category on the right.

<div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">EBGP</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">EIGRP</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">IGRP</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">IS-IS</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">OSPF</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px; margin-bottom: 5px;">RIPv1</div> <div style="border: 1px solid black; background-color: #00FFFF; padding: 5px;">RIPv2</div>	<div>Supports VRFs using address families</div> <div style="border: 1px solid black; background-color: #FFFF00; padding: 5px; margin-bottom: 5px; text-align: center;">Place here</div> <div style="border: 1px solid black; background-color: #FFFF00; padding: 5px; margin-bottom: 5px; text-align: center;">Place here</div> <div style="border: 1px solid black; background-color: #FFFF00; padding: 5px; margin-bottom: 5px; text-align: center;">Place here</div> <div>Supports VRFs using separate routing instances</div> <div style="border: 1px solid black; background-color: #FFFF00; padding: 5px; margin-bottom: 5px; text-align: center;">Place here</div>
---	---

Answer:



---

**QUESTION 128:**

Which condition must be met for the receiving PE router to install VPNv4 routes into a VRF?

- A. If at least one RD attached to the VPNv4 route matches at least one important RD configured in the VRF.
- B. If at least one RT attached to the VPNv4 route matches at least one important RT configured in the VRF.
- C. If at least one RD attached to the VPNv4 route matches at least one export RD configured in the VRF.
- D. If at least one RT attached to the VPNv4 route matches at least one export RT configured in the VRF.

Answer: B

---

**QUESTION 129:**

Exhibit

```
hostname Certkiller1
!
ip cef
!
ip vrf Customer_Certkiller
  rd 115:300
  route target both 115:300
!
access-list 10 permit 192.168/3.0.0.0.0.255
!
route-map CertkillerMAP permit 10
  match ip address 10
  set extcommunity rt 115:301
!
!output omitted
```

Study the configuration shown in the exhibit. Router Certkiller 1 is supposed to selectively attach an additional RT of 115:301 to all export routes matched by access-list 10. The configuration is currently not working as intended.

Which two items are wrong in the configuration? Select two.

- A. The route-map is missing the route-map Certkiller MAP permit 20 statement.
- B. The vrf configuration is missing the export map RTMAP command.
- C. The vrf configuration is missing the route-target export 115:301 command.
- D. The rd 115:300 command is not correct.
- E. The set extcommunity rt 115:301 command is not correct.
- F. The route-target both 115:300 command is not correct.

Answer: B, E

---

**QUESTION 130:**

What condition must be met for the receiving PE router to install VPNv4 routes into a VRF?

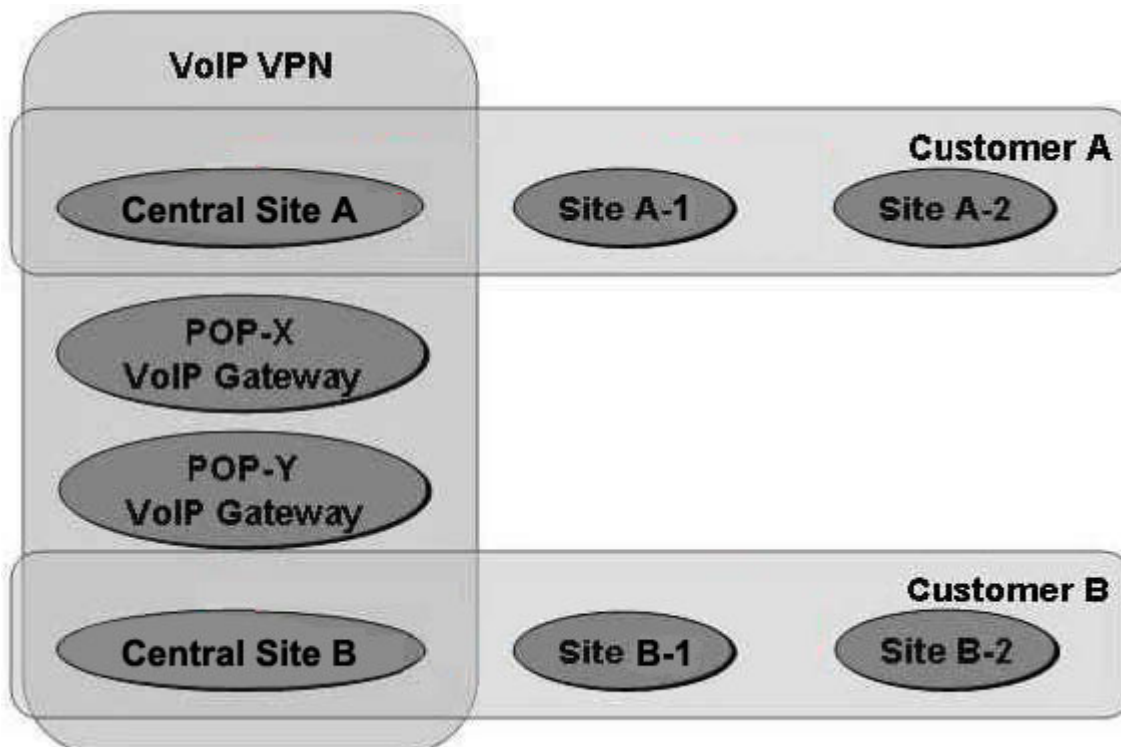
- A. If at least one RD attached to the VPNv4 route matches at least one import RD configured in the VRF
- B. If at least one RT attached to the VPNv4 route matches at least one import RT configured in the VRF
- C. If at least one RD attached to the VPNv4 route matches at least one export RD configured in the VRF
- D. If at least one RT attached to the VPNv4 route matches at least one export RT configured in the VRF

Answer: B

---

**QUESTION 131:**

Network topology Exhibit



## Exhibit #2, Requirements

All sites of Customer A (except from the central site) can share the same routing information.  
 All sites of Customer B (except from the central site) can share the same routing information.  
 The two POP VoIP gateway sites can share the same routing information.  
 Central A site can connect to all of Customer A sites and the VoIP sites.  
 Central B site can connect to all of Customer B sites and the VoIP sites.  
 Sites A-1 and A-2 can not connect to Sites B-1 and B-2.  
 Central B site can not connect to Sites A-1 and A-2.  
 Central A site can not connect to Sites B-1 and B-2.  
 Sites B-1 and B-2 can not connect to Sites A-1 and A-2

How many VRF tables are needed to support three VPNs (Customer A, Customer B, and a VoIP VPN) with the requirements?

- A. 1 VRF
- B. 3 VRFs
- C. 4 VRFs
- D. 5 VRFs
- E. 7 VRFs

Answer: D

---

**QUESTION 132:**

DRAG DROP



You work as network administrator at CertKiller.com. Your CertKiller boss asks you to identify the routing protocols that VRF aware by putting them into the proper VRF category.

**Select from these**

EBGP	EIGRP	IGRP	IS-IS
OSPF	RIPv1	RIPv2	CHAP

**Place here**

Supports VRFs using address families		
Place here	Place here	Place here
Supports VRFs using separate routing instances		
Place here		

Answer:

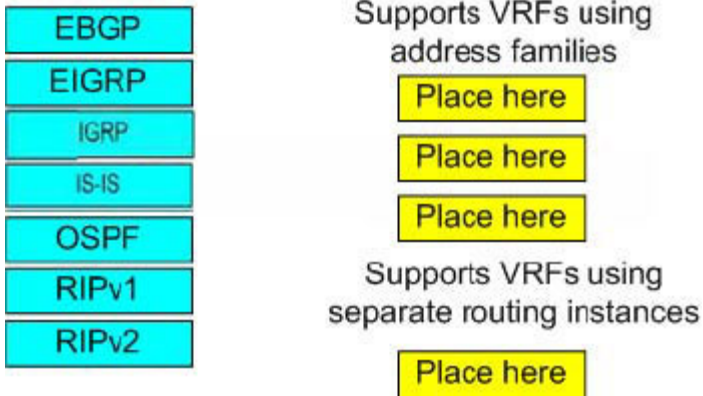
Supports VRFs using address families		
EBGP	EIGRP	RIPv2
Supports VRFs using separate routing instances		
OSPF		

---

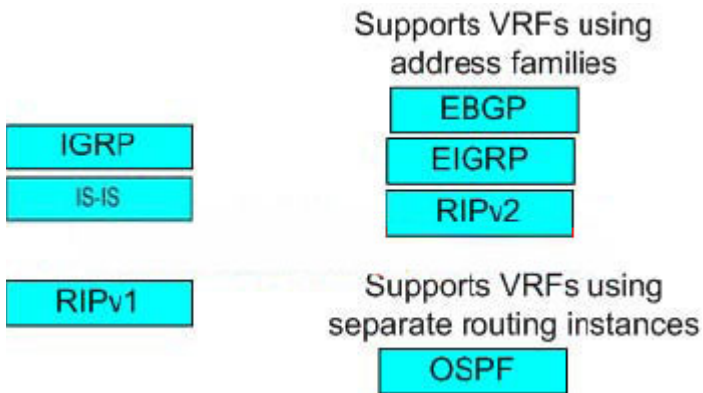
**QUESTION 133:**

**DRAG DROP**

Identify the routing protocols on the left that are VRF aware by dragging and dropping them into the proper VRF category on the right.



Answer:



---

**QUESTION 134:**

For what purpose can the `ip vrf sitemap route-map-name` command be used?

- A. applies a route map for setting the SOO
- B. applies a route map for setting the Down Bit
- C. applies a route map for setting the Routing Bit
- D. applies a route map for setting the RD
- E. applies a route map for setting the RT
- F. applies a route map for setting the VRF name

Answer: A

---

**QUESTION 135:**

Which VRF parameters must be specified for a VRF to become operational?

- A. RD
- B. Interface
- C. Import RT.
- D. Export RT.

Answer: A

---

**QUESTION 136:**

How are route targets used to build virtual routing tables in the PE-routers?

- A. Route targets are prepended to each entry in the VRF to identify which VPN owns the route.
- B. Route targets are prepended to the customer's IP address to create unique address spacing for each VPN.
- C. Every customer route exported from a VRF is tagged with appropriate export route targets. VPN routes received by a PE-router are matched against import route targets configured in a CRF.
- D. Every customer route received from the CE is matched against import route targets. If there is match, the route is added to the VRF. Every route received from the neighbor PE-router is entered in the VRF. It is then matched against export route targets.

Answer: C

Explanation: Route distinguisher is prepended to IP address to create VPN address, not Route target.

---

**QUESTION 137:**

When should you disable redistribution of IPv4 routing updates between MP-BGP neighbors?

- A. When the network only supports MPLS VPNs.
- B. When the network is using OSPF or ISIS instead of I-BGP as the network IGP.
- C. When you want to reduce the number of labels that the P-router needs to store.
- D. When you want to reduce the number of routes that the P-routers must store in their global BGP routing table.

Answer: B

---

**QUESTION 138:**

With MPLS VPNs, which four elements will be included in an MP-BGP update exchange between the PE routers? (Choose two)

- A. VPNv4 Address
- B. Route tag
- C. Label used for VPN packet forwarding
- D. Mandatory BGP attributed like As-Path and Next-Hop
- E. Route target

F. Implicit null label used for PHP operation

Answer: A, C, D, E

---

**QUESTION 139:**

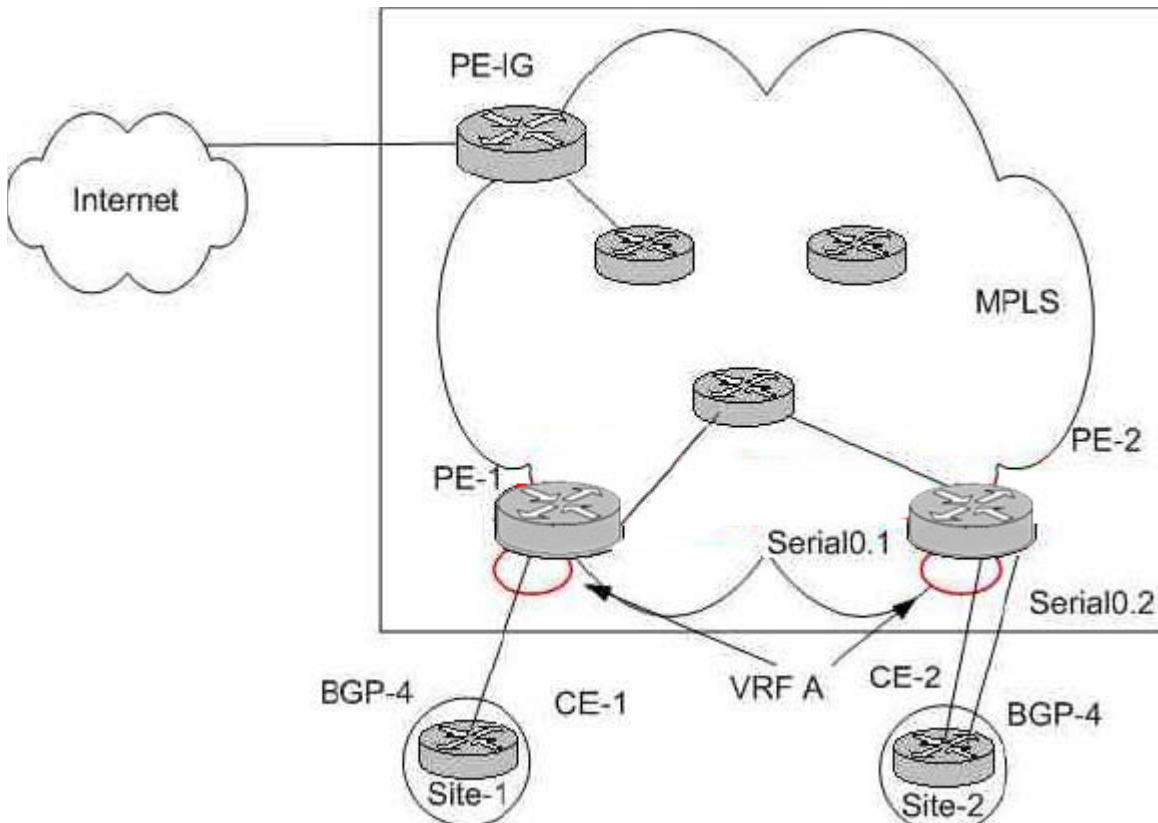
The VPN named my\_vpn is operating on interface s0/0 a PE-router. The CE-PE routing protocol is RIP. The MPLS backbone IGP is OSPF. However, when you review the configuration for the PE-router, you find that BGP has been configured. What explains this configuration?

- A. VPN routes are always imported and exported using MP-BGP.
- B. This router is configured improperly. BGP is not needed in this configuration.
- C. This router is configured improperly. E-BGP is the required routing protocol between PE and CE-routers.
- D. BGP should be configured on all routers supporting MPLS to ensure backward-compatibility reasons for earlier versions of IOS.

Answer: A

---

**QUESTION 140:**



Refer to the graphic. CE-2 is using a dedicated sub-interface implementation for Internet access. In this case, PE-2 will need to establish VPNv4 BGP neighbor

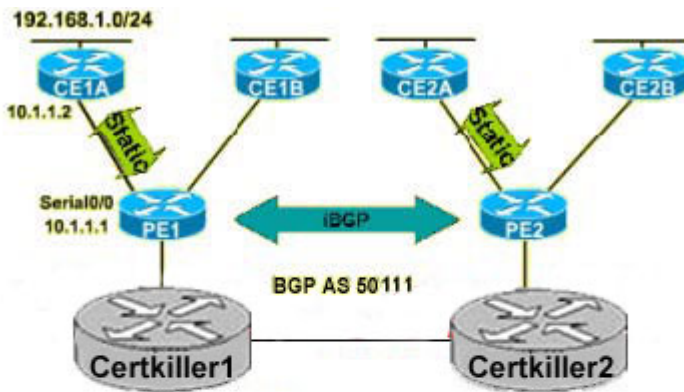
relationship with which other router(s)?

- A. PE-1 only
- B. PE-IG only
- C. PE-1 and PE-IG
- D. PE-1 and CE-2

Answer: A

### QUESTION 141:

Exhibit



Select first command here

Select second command here

Select third command here

Select fourth command here

CE1A and CE2A belong to the Certkiller \_A VPN. Select the correct commands for the PE1 router to establish static routing from PE1 to the CE1A 192.168.1.0/24 network by selecting them below. Some of the commands must be entered in the correct order. Also enable propagation of the static route into MP-iBGP. Assume the MP-iBGP session between PE1 and PE2 have been configured already.

Answer:

Explanation:

```
ip route vrf Certkiller A_VPN 192.168.1.0 255.255.255.0 10.1.1.2 [permanent]
router bgp 50111
address-family ipv4 vrf Certkiller A_VPN
redistribute static
```

**QUESTION 142:**

With MPLS VPNs, which four elements will be included in an MP-BGP update exchange between the PE routers? (Choose four.)

- A. VNPv4 Address
- B. Route tag
- C. Label used for VPN packet forwarding
- D. Mandatory BGP attributes like As-Path and Next-Hop
- E. Route target
- F. Implicit null label used for PHP operation

Answer: A, C, D, E

---

**QUESTION 143:**

When redistributing routes from MP-BGP to OSPF, which three are loop prevention mechanisms? (Choose three)

- A. Tag field.
- B. Down bit.
- C. Time To Live field
- D. Site of Origin field

Answer: B, C, D

Explanation:

According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, pages 9-17 to 9-26

OSPF-BGP routing loops:

-OSPF down bit:

An additional bit ( down bit) has been introduced in the options field of the OSPF LSA header. Pe routers set the down bit when redistributing routes from MP-BGP into OSPF. PE routers never redistribute routes with the down bit set into MP-BGP.

-OSPF Tag field: The tag field in external OSPF routes is used to detect cross-domain routing loops. PE routers set the tag field to the BGP As-number when redistributing non-OSPF routes from MP-BGP into OSPF. The tag field is propagated between OSPF domains when the external OSPF routes are redistributing between OSPF domains. PE routers never redistribute OSPF routes with the tag field equal to their BGP AS-number into MP-BGP.

And you know that Site of Origin is used in BGP to prevent loops to occur.

---

**QUESTION 144:**

Which command configures the propagation of a static VRF route between PE-routers?

- A. router(config-if)# ip route vrf my\_vpn 10.0.0.0 255.0.0.0 10.250.0.2
- B. router(config-router-af)# ip route 10.0.0.0 255.0.0.0 10.250.0.2 s0/0.
- C. router(config-router)# ip route vrf 10.0.0.0 255.0.0.0 10.250.0.2 s0/0.
- D. router(config)# ip route vrf my\_vpn 10.0.0.0 255.0.0.0 10.250.0.2 s0/0.

Answer: D

Explanation:

According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 8-58

Configuring Per-VRF static routes:

```
router (config)#
```

```
ip route vrf name static route parameters
```

- This command configures per-VRF static routes.

- The route is entered in the VRF table.

- You must always specify the outgoing interface, even if you specify the next hop.

Sample router configuration:

```
ip route vrf Customer_ABC 10.0.0.0 255.0.0.0 10.250.0.2 serial 0/0
```

```
!
```

```
router bgp 12703
```

```
address-family ipv4 vrf Customer_ABC
```

```
redistribute static
```

According to the above example, answer D is the right one.

---

### QUESTION 145:

In the set extcommunity rt 123:750 additive command, what does the parameter additive do?

- A. Replaces the existing set of route targets with a new set.
- B. Adds the new route target to the existing route target list but does not replace any existing route targets.
- C. Adds the new route target to the existing route target list and replaces the most current route target.
- D. Adds the new route target to the existing route target list and replaces the least current route target.

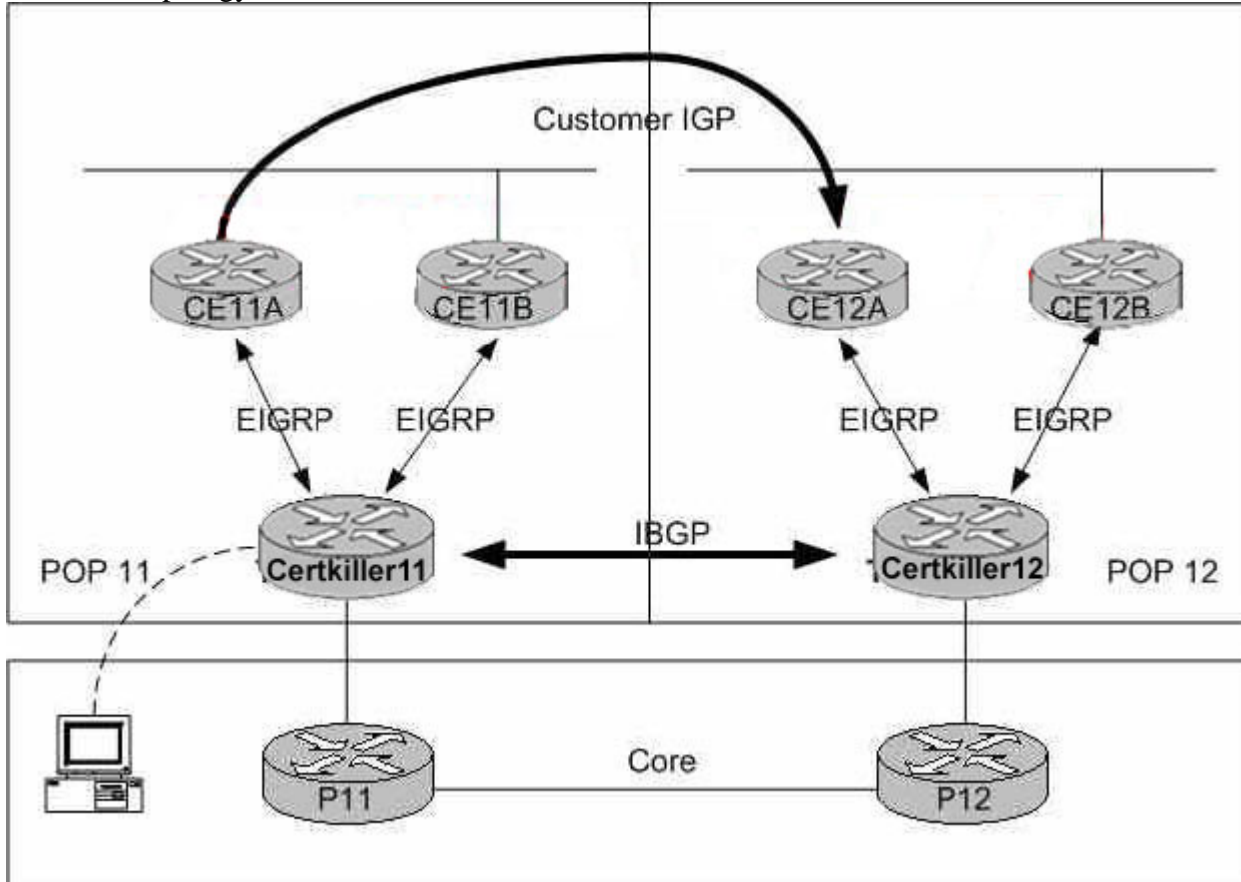
Answer: B

---

### QUESTION 146:

## SIMULATION

## Network Topology Exhibit



You are a CCNA, CCNP and CCSP certified network technician at Certkiller .com. Indigo IT company is a client of Certkiller .com. Indigo IT company is a stock broker service that is using EIGRP AS 1 as the IGP in its network. Furthermore Indigo IT company has decided to establish connectivity between the two sites. For this Implementation Certkiller .com is using a MPLS VPN solution. Certkiller .com has already established MPLS connectivity between all of its PE routers. MPBGP connectivity has also been established on all Certkiller routers. Indigo IT company has successfully completed all necessary tasks on the CE routers, and Certkiller .com has successfully completed all necessary MPLS VPN configuration tasks on Certkiller 12. Your task is to successfully complete the implementation of the VPN connection by configuring the MPLS VPN on Certkiller 11 using the following information:

Privileged mode password: Certkiller

EIGRP is to be used the Certkiller -CE protocol for the VPN.

MPBGP is being used to propagate VPN routing information between the Certkiller routers.

The interface supporting the Indigo Company is Serial0/0 and will have an IP address of 150.1.244.18 255.255.255.240.

The following has been assigned to Indigo's VPN:

The VRF name is Customer\_6



The RD is 6:10

The route target for import is 14:10.

The route target for export is 14:10.

Configure EIGRP between CE11A and Certkiller 11 using AS number 10.

Redistribute from BGP to EIGRP AS 10 using metric string of 10000 100 255 1 1500.

Redistribute from EIGRP AS 10 to BGP using a metric of 1.

VPN is operational when you can see routes for both the local (10.1.11.10) and the remote (10.1.12.0) sites in the VRF routing table.

Start the simulator by clicking on the host computer.

Answer:

ip cef

ip vrf Customer\_6

rd 6:10

route-target import 14:10 !! these lines can be replaced by route-target both 14:10

route-target export 14:10

Interface s0/0

ip vrf forwarding Customer\_6

ip address 150.1.244.18 255.255.255.240

router bgp xx

address-family vpnv4

address-family ipv4 vrf Customer\_6

neighbor x.x.x.x remote-as xx activate

redistribute eigrp metric 1

router eigrp 10

address-family ipv4 vrf Customer\_6

network 10.1.11.0

network 10.1.12.0

redistribute BGP XX ! not enough info in lab sim

default-metric 10000 100 255 1 1500

---

### **QUESTION 147:**

Which prefix-list will permit the 172.16.1.32 255.255.255.240 prefix?

- A. ip prefix-list test permit 172.16.1.0/28
- B. ip prefix-list test permit 172.16.1.0/8 le 30
- C. ip prefix-list test permit 172.16.1.0/16 eq 28
- D. ip prefix-list test permit 172.16.1.0/8 ge 29

Answer: B

---

### **QUESTION 148:**

A PE router is running EIGRP with its MPLS VPN customer. What is wrong with the following EIGRP configuration on the PE router?

```
router eigrp 100
address-family ipv4 vrf Certkiller vpn
network 10.0.0.0
redistribute bgp 65100 metric 10000 100 255 1 1500
! output omitted
```

- A. The autonomous-system as-number command is missing under the address-family
- B. The network 10.0.0.0 command should be configured under the router eigrp configuration mode and not under the address-family.
- C. The redistribute bgp 65200 metric 10000 100 255 1 1500 command should be configured under the router eigrp configuration mode and not under the address-family.
- D. The address-family ipv4 vrf Certkiller vpn command should be changed to address-family vpnv4 vrf Certkiller vpn.
- E. The EIGRP AS number (100) does not match the BGP AS number (65100).

Answer: A

---

#### **QUESTION 149:**

Which two commands are needed to define an MPLS VPN routing context in RIP for VPN my\_vpn? (Choose two.)

- A. router (config) # router rip
- B. router (config-router) # Network 10.0.0.0
- C. router (config-router) # address-family ipv4
- D. router (config-router) # address-family ipv4 vrf my\_vpn
- E. router (config-router) # redistribute bgp 65001 metric transparent

Answer: A,D

---

#### **QUESTION 150:**

The VPN named my\_vpn is operating on interface s0/0 of a PE-router. The RD is 65000:101. The CE-PE routing protocol is RIP. The MPLS backbone IGP is OSPF. Which command should be used to display all labels associated with this VPN?

- A. show mpls vrf my\_vpn fib.
- B. Show ip bgp rd 65000:101 labels
- C. Show vrf my\_vpn labels summary
- D. Show tag-switching forwarding vrf my\_vpn

Answer: D

---

**QUESTION 151:**

Which IOS command should you use to list routers in an LSR's adjacency table?

- A. show tag tdp nei
- B. show tag tdp adj
- C. show tag tdp sum
- D. show tag tdp detail

Answer: A

Explanation:

The TDP neighbors and the status of individual TDP sessions also can be monitored with the show tag tdp neighbor command. The command displays the TDP identifiers of the local and remote routers, the IP addresses and the TCP port numbers between the TDP connection is established, the connection uptime and the interfaces through which the TDP neighbor was discovered, as well as all the interface IP addresses used by the TDP neighbor.

Reference: MPLS and VPN Architectures (Ciscopress) page 33

---

**QUESTION 152:**

The VPN called my\_vpn is operating on interface s0/0 of a PE-router. The CE-PE routing protocol is RIP. The MPLS backbone IGP is OSPF.

How could you verify that the routes received from the remote CE-router are being redistributed into RIP?

- A. Verify the routing table in the local CE-router.
- B. Use the show ip cef vrf command on the local PE-router and verify the adjacency table in the CEF cache.
- C. Use the debug ip routing command in the local PE-router and verify which routes are advertised to the local CE-router.
- D. Use the show ip routing advertised command on the local PE-router and verify that the routes are being advertised to the CE-router.

Answer: B

Explanation:

To display the Cisco Express Forwarding (CEF) forwarding table associated with a Virtual Private Network (VPN) routing/forwarding instance (VRF), use the show ip cef vrf command in privileged EXEC mode.

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps5187/products\\_command\\_reference\\_chapter09186a008017](http://www.cisco.com/en/US/products/sw/iosswrel/ps5187/products_command_reference_chapter09186a008017)

---

**QUESTION 153:**

Which IOS show command can be used to examine all the routes that have been redistributed into MP-BGP?

- A. show ip bgp vpnv4 all
- B. show ip bgp
- C. show ip route vrf name
- D. show ip protocol vrf name
- E. show ip route bgp
- F. show ip bgp sum

Answer: A

---

**QUESTION 154:**

The VPN named my\_vpn is operating on interface s0/0 of a PE-router. The CE-PE routing protocol is BGP. The MPLS backbone IGP is OSPF.

How should you verify routing information is being exchanged between the PE-routers that support this VPN?

- A. On the local PE-router, you use the show ip cef vrf command and verify that there is a label for the remote PE-router's next-hop.
- B. On the local PE-router, you use the show ip bgp summary command and verify that the BGP session to the remoter PE-route is up.
- C. On the local PE-router, you use the show ip bgp vpnv4 command and verify that routes from the remote PE-router have been received.
- D. From the CE-router, you use the ping vrf command to ping the remote CE-router. If the CE-routers cannot ping each other, then the PE-routers are not exchanging routing information.

Answer: C

Explanation:

To display VPN address information from the BGP table, use the show ip bgp vpnv4 command in EXEC mode.

---

**QUESTION 155:**

What is the purpose of the Down bit in an OSPF LSA header?

- A. The Down bit is used to prevent redistribution loops between MP-BGP and OSPF.
- B. The Down bit is used to indicate the route that is being advertised has become

unavailable.

C. The Down bit is used to indicate an interface has been shut down or become unavailable.

D. The Down bit is used to indicate the route that is being advertised is coming from an area that is lower in the hierarchical model.

Answer: A

---

### QUESTION 156:

Exhibit:

\*\*\*MISSING\*\*\*

What is the interaction between the routers in Area 2 and the super-backbone?

A. The OSPF super-backbone is completely transparent to OSPF Area 2.

B. The super-backbone appears as a BGP domain to the routers in OSPF Area 2.

C. The super-backbone appears as another OSPF area to the routers in OSPF Area 2.

D. The super-backbone appears as another OSPF domain to the routers in OSPF Area 2.

Answer:

Explanation: Pending, due to missing exhibit.

---

### QUESTION 157:

How are routing protocol context implemented in OSPF?

A. Each routing context is implemented by redistributing into MBGP.

B. Each routing context is implemented by assigning it to an interface.

C. Each routing context is implemented as a separate routing process.

D. Each routing context is implemented as a separate isolated instance of the same routing protocol.

Answer: C

Explanation:

According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 8-6.

-Routing context=routing protocol run in one vrf

-Routing contexts were introduced in Cisco IOS software to support the need for separate isolated copies of VPN routing protocols. They can be implemented as separate routing processes (OSPF), similar to traditional Cisco IOS software implementation, or as separate isolated instances of the same routing protocol (EBGP, RIPv2).

This is the same issue as the question 201.

**QUESTION 158:**

The VPN named my\_vpn is operating on interface s0/0 of a PE-router. The CE-PE routing protocol is OSPF.

The MPLS backbone IGP is OSPF.

Which statement is true about the interaction between the customer's OSPF routes and the backbone's OSPF routes?

A. On the PE-router, two instances of OSPF are run: one for the VPN and one for the backbone IGP.

B. On the PE-router, three instances of OSPF are run: one for the VPN, one for the backbone IGP, and one to carry the PE-PE routes.

C. This configuration is acceptable for MPLS implementations.

However, when MPLS VPNs are implemented, OSPF cannot be used as the CE-PE routing protocol and the backbone IGP.

D. On the PE-router, a single instance of OSPF is run.

However, the customer's routes are kept separate for the backbone route because the RD is prepared to the customer's routes.

Answer: C

Explanation:

It is important to note that the MPLS/VPN backbone is not a real OSPF area 0 backbone.

No adjacencies are formed between PE routers - only between PE and CE routers.

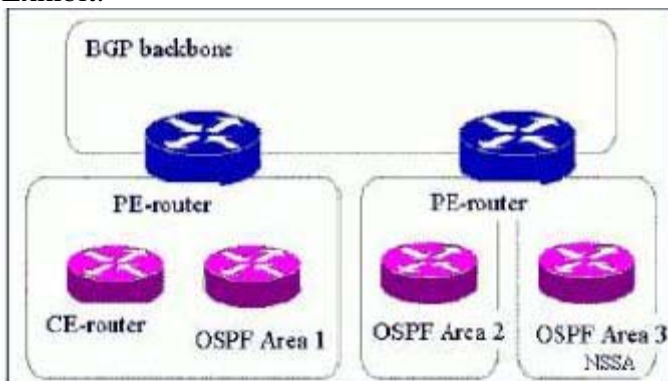
MP-iBGP is used between PE routers, and all OSPF routes are translated into VPN-IPv4 routes. This means that the redistribution of routes into BGP does not cause these routes to become external OSPF routes when advertised to other member sites of the same VPN.

Reference: MPLS and VPN Architectures (Cisco Press) page 235

---

**QUESTION 159:**

Exhibit:



Which statement is true about route summarization for routes announced to the backbone by Area 1?

A. By default, routes will not be summarized.

- B. By default, routes will be summarized on the network boundaries.
- C. By default, routes will be summarized to Area 3 (NSSA) but not to Area 2.
- D. By default, routes will be summarized based upon the summarization schedule configured in the CE-router.

Answer: B

Explanation:

Summarizing is the consolidation of multiple routes into one single advertisement. This is normally done at the boundaries of Area Border Routers (ABRs). Although summarization could be configured between any two areas, it is better to summarize in the direction of the backbone. This way the backbone receives all the aggregate addresses and in turn will injects them, already summarized, into other areas. There are two types of summarization:

1. Inter-area route summarization
1. External route summarization

Reference: <http://www.cisco.com/warp/public/104/3.html#12.0>

---

### **QUESTION 160:**

What is the influence of the Down bit on the OSPF route section process?

- A. OSPF routes with the Down bit set are never entered in the M-BGP routing table.
- B. OSPF routes with the Down bit set are never entered in the backbone's IGP routing table.
- C. OSPF routes with the Down bit set are passed up the hierarchical model. They are blocked from being passed down the hierarchical model.
- D. OSPF routes with the Down bit set are marked as unavailable. After the third consecutive update with the Down bit set, they are removed from the routing table.

Answer: B

Explanation:

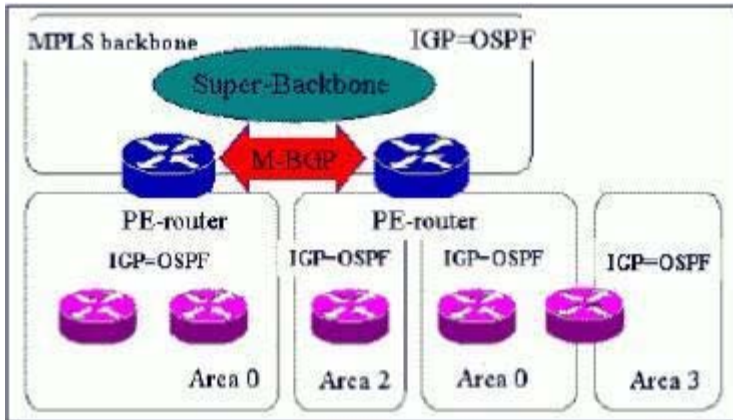
Because inter-site routes may be advertised into a site from various locations, it is necessary to provide a mechanism that allows a PE router to understand whether the route has actually originated from within the attached site, or whether it was injected by another PE router. This mechanism is provided through use of the down-bit, which is an extension to the OSPF protocol and is part of the Options field of the generic LSA header. Any summary LSAs that are generated by the PE routers will have the down-bit set within the LSA.

Reference: MPLS and VPN Architectures (Ciscopress) page 240

---

### **QUESTION 161:**

Exhibit:



What is the interaction between a super-backbone and Area 3?

- A. The super-backbone appears as a NSSA to the non-backbone OSPF routers of Area 3.
- B. The super-backbone appears as BGP domain to the non-backbone OSPF routers of Area 3.
- C. The super-backbone appears as another OSPF area to the non-backbone OSPF routers of Area 3.
- D. The super-backbone appears as Area 0 (backbone area) to the non-backbone OSPF routers of Area 3.

Answer: D

Explanation:

Traditionally, an elaborate OSPF network consists of a backbone area (area 0) and a number of areas connected to this backbone via an area border router (ABR).

By using an MPLS backbone for VPN with OSPF on the customer's site, you can introduce a third level in the hierarchy of the OSPF model. This third level is called the MPLS VPN super backbone.

In simple cases, the MPLS VPN super backbone is combined with the traditional area 0 backbone. This means that there is no area 0 backbone on the customer network, since the MPLS VPN super backbone plays the same role as the area 0 backbone. This is shown in the diagram below:

Reference: [http://www.cisco.com/warp/public/121/mps\\_ospf2.html](http://www.cisco.com/warp/public/121/mps_ospf2.html)

### QUESTION 162:

How are OSPF route attributes propagated across the MPLS VPN backbone? (Choose two)

- A. OSPF priority is propagated in the Experimental Bits.
- B. OSPF cost or external metric is propagated in the BGP MED attribute.
- C. Metrics for external OSPF router is propagated in the Hop Count field.
- D. OSPF area, route type, and metric type are propagated in an extended BGP community.



Answer: B, D

Explanation:

MP-BGP attaches two new extended community attributes to the routes redistributed from OSPF:

- \* OSPF domain identifier extended community attribute
- \* OSPF route type extended community attribute

MP-BGP uses these attributes and the MED to preserve OSPF routing information across the BGP/MPLS VPN backbone.

Reference: MPLS and VPN Architectures (Cisco Press) page 235

---

#### **QUESTION 163:**

Which of the following best describes the function of the OSPF tag field?

- A. prevents cross-domain routing loops for external LSAs.
- B. prevents cross-domain routing loops for internal LSAs.
- C. prevents intra-domain routing loops for external LSAs.
- D. prevents intra-domain routing loops for internal LSAs.

Answer: A

---

#### **QUESTION 164:**

Using OSPF as the CE-PE routing protocol, when and which router will set the down bit?

- A. The PE router will set the down bit when redistributing routes from MP-BGP into OSPF.
- B. The PE router will set the down bit when redistributing routes from OSPF into MP-BGP.
- C. The CE router will set the down bit when propagating the OSPF route to the PE router.
- D. The PE router will set the down bit when propagating the OSPF route to the CE router.
- E. The P router will set the down bit when propagating the route to another P router.
- F. The PE router will set the down bit when propagating the route to another PE router over MP-BGP.

Answer: A

---

#### **QUESTION 165:**

An OSPF LSA type 5 route is redistributed into MP-BGP. That same route is then redistributed back from MP-BGP into OSPF on another PE router. In this case, that OSPF route will appear as what LSA type on the destination CE router?

- A. LSA type 1
- B. LSA type 2
- C. LSA type 3
- D. LSA type 4
- E. LSA type 5
- F. LSA type 7

Answer: E

---

**QUESTION 166:**

The VPN named my\_vpn is operating on interface s0/0 of a PE-router. The CE-PE routing protocol is OSPF.

Why is the OSPF super-backbone needed in MPLS VPN environments?

- A. To ensure that the customer's OSPF traffic has priority over the backbone OSPF routing updates.
- B. To ensure that the backbone internal OSPF routes are not inserted as external OSPF routes into the customer's VPN.
- C. To ensure that the customer's internal OSPF routes on one site are not inserted as external OSPF routes into other sites on the same VPN.
- D. To ensure that the customer's internal OSPF routes are not inserted as external OSPF routes into the provider backbone as internal OSPF routes.

Answer: C

---

**QUESTION 167:**

In Cisco IOS release 12.1, how many VPN OSPF process can run simultaneously in an MPLS VPN PE-router?

- A. 1.
- B. 28
- C. 255
- D. The number of active processes is controlled by the memory available.

Answer: B

---

**QUESTION 168:**

Which three statements about the traditional OSPF routing model are true?  
(Choose three)

- A. Networks running OSPF can be divided into areas.
- B. OSPF was designed to support hierarchical networks.

- C. A single area is a physical site or logical division of that site.
- D. All areas must be physically connected to the backbone area (Area 0)
- E. OSPF implementations consisting of multiple areas must be interconnected by a backbone area.

Answer: A,B,E

Explanation:

Not C: The area in traditional OSPF is a logical union of routers

Not D: It is highly recommended that all areas are connected to the backbone area, but it is not obligatory. Using virtual link the area can be just logically be connected to the area 0.

---

**QUESTION 169:**

BGP address families are used to configure which three route exchange mechanisms? (Choose three)

- A. Propagating Internet routes.
- B. VPNv4 routes that are propagated across an MPLS/VPN backbone.
- C. P-router to P-router routes that are propagated across an MPLS/VPN backbone.
- D. PE-CE routing protocol to exchange VPN routes between provider edge routers and customer edge routers.

Answer: A, B, D

Explanation:

According to the "Implementing Cisco MPLS" Student Guide (Text Part Number: 97-1154-01) Volume 2, version 1.0, page 8-31.

BGP address families: The BGP process in a MPLS VPN-enabled router performs 3 separate tasks:

- Global BGP routes(internet routing) are exchanged as in traditional BGP setup.
- VPNv4 prefixes are exchanged through MP-BGP.
- VPN routes are exchanged with CE routers through per-VRF EBGp sessions.

Address families (routing contexts) are used to configure these three tasks in the same BGP process(because only one BGP process can be configured per router), and the routing contexts (called address families from the router configuration perspective) are used to configure all three independent route exchange mechanisms.

---

**QUESTION 170:**

The VPN named my\_vpn is operating on interface s0/0 of a PE-router. The CE-PE routing protocol is RIP. The MPLS backbone IGP is OSPF. However, when you review the configuration for the PE-router, you find that BGP has been configured. What explains this configuration?

- A. VPN routes are always imported and exported using MP-BGP.

- B. This router is configured improperly.  
BGP is not needed in this configuration.
- C. This router is configured improperly.  
E-BGP is the required routing protocol between PE and CE-routers.
- D. BGP should be configured on all routers supporting MPLS to ensure backward-compatibility reasons for earlier version of IOS.

Answer: C

Explanation:

BGP distributes reachability information for VPN-IPv4 prefixes for each VPN. BGP communication takes place at two levels: within IP domains, known as an autonomous systems (interior BGP or IBGP) and between autonomous systems (external BGP or EBGP). PE-PE or PE-RR (route reflector) sessions are IBGP sessions, and PE-CE sessions are EBGP sessions

Reference:

[http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products\\_feature\\_guide09186a00800e977b.html#111](http://www.cisco.com/en/US/products/sw/iosswrel/ps1830/products_feature_guide09186a00800e977b.html#111)

---

#### **QUESTION 171:**

Which two attributes in BGP are used to help with implementation of the OSPF super-backbone? (Choose two)

- A. MED
- B. weight
- C. AS path
- D. site of origin
- E. extended community

Answer: A E

Explanation:

A: According to the MPLS Student guide Version 2.1 Page 5-94, the OSPF cost is carried in the MED attribute.

Not D: Although Site of Origin is used to prevent loop in BGP, in this question, it is asked which two BGP attributes help the OSPF Super Backbone implementation.

---

#### **QUESTION 172:**

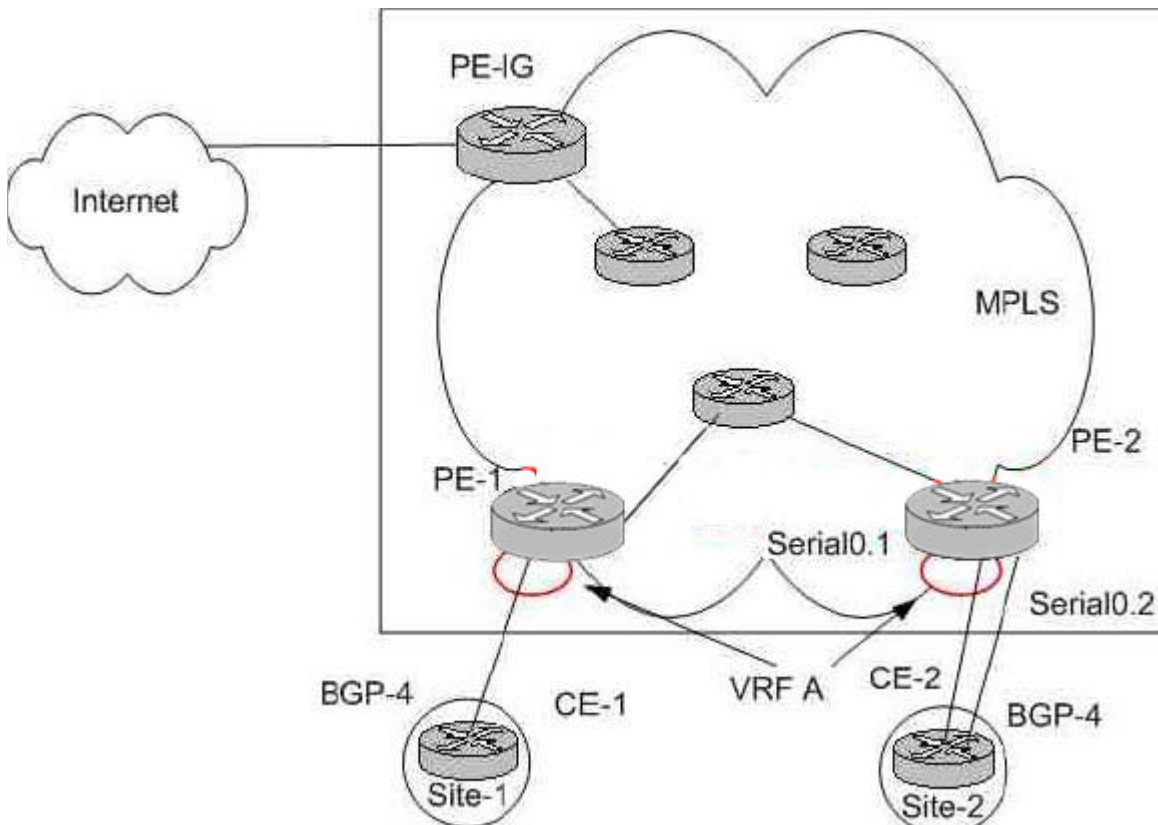
Which statement is true about the use of EBGP as the CE-PE routing protocol in MPLS VPN implementations?

- A. The CE router must be the BGP next hop.
- B. The egress P router must be the BGP next hop.
- C. ebgp-multihop must be configured on the MP-BGP sessions between the PE routers.

- D. next-hop-self must be configured on the MP-IGBP sessions between the PE routers.
- E. The BGP next hops announced using the core IGP can be summarized to reduce the size of the core routing table.

Answer: D

### QUESTION 173:



In the diagram, Internet access is through a dedicated subinterface implementation. What indicates that all of the routes to PE-2 must establish a global BGP neighbor relationship?

- A. CE-1
- B. PE-1
- C. PE-IG
- D. CE-2 and PE-IG
- E. CE-1 and PE-2
- F. PE-1 and PE-2

Answer: A

### QUESTION 174:

Between which types of routers are VPNv4 BGP routes propagated?

- A. CE and PE
- B. PE and P
- C. CE and P
- D. P and P
- E. PE and PE
- F. CE and CE

Answer: E

---

**QUESTION 175:**

How is route target (RT) information attached to a VPNv4 route?

- A. Using the MPLS Label field.
- B. Using the MPLS EXP bits.
- C. Using route tags.
- D. Using Extended BGP communities.
- E. Using the Route Distinguisher (RD) field.

Answer: D

---

**QUESTION 176:**

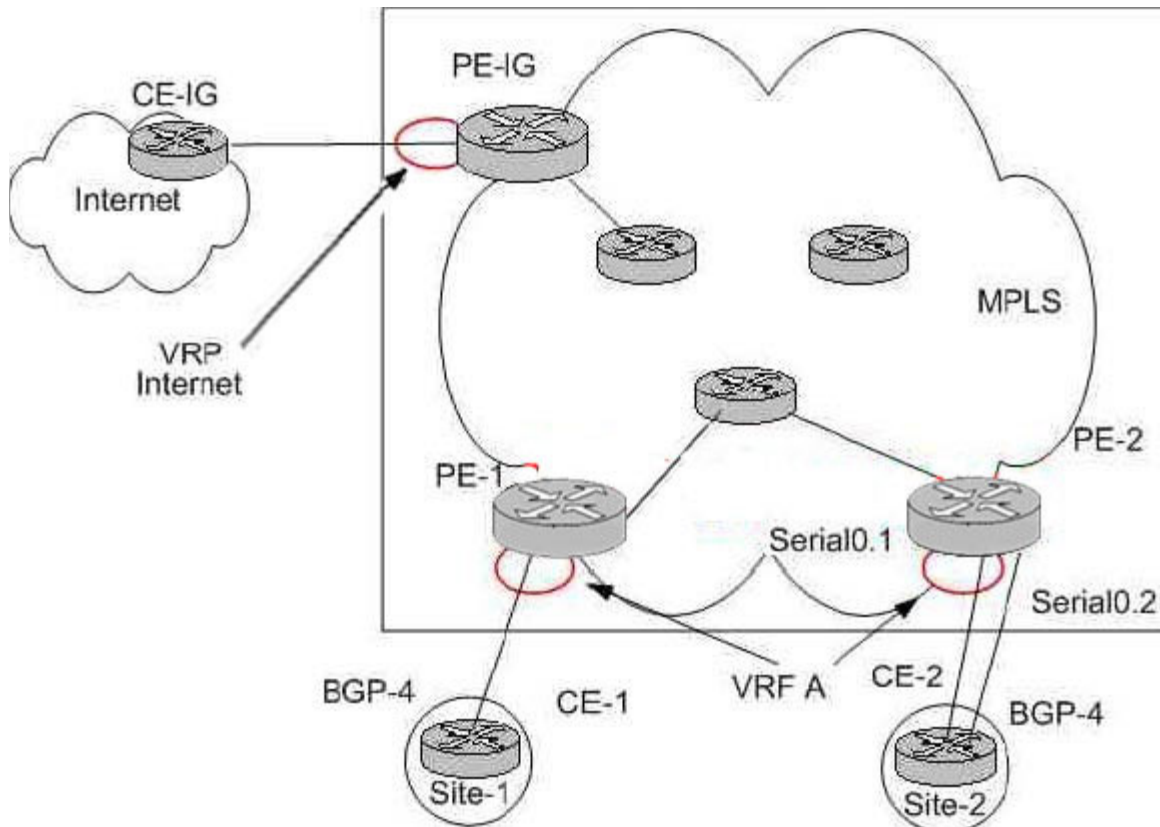
How can you configure a router that carries both Internet and VPNv4 routes so that it will only propagate the VPNv4 routes and not the Internet routes to the 10.1.1.1 BGP neighbor?

- A. router bgp 65010  
nobgp default ipv4-unicast  
neighbor10.1.1.1 remote-as 65010  
address-familyvpnv4  
neighbor10.1.1.1 activate  
! output omitted
- B. router bgp 65010  
nobgp default ipv4-unicast  
neighbor10.1.1.1 remote-as 65010  
neighbor10.1.1.1 activate  
address-familyvpnv4  
neighbor10.1.1.1 activate  
! output omitted
- C. router bgp 65010  
neighbor10.1.1.1 remote-as 65010  
address-familyvpnv4  
neighbor10.1.1.1 activate  
! output omitted

D. router bgp 65010  
 address-family vpv4  
 neighbor 10.1.1.1 activate  
 ! output omitted

Answer: A

### QUESTION 177:



In the diagram, the Internet is accessed through a dedicated Internet VPN. With which router or routers must PE-2 establish an address-family IPv4 BGP neighbor relationship?

- A. CE-2
- B. PE-1
- C. PE-IG
- D. PE-1 and PE-IG
- E. CE-1, PE-1 and PE-IG
- F. CE-1, CE-2, PE-1 and PE-IG

Answer: A

### QUESTION 178:

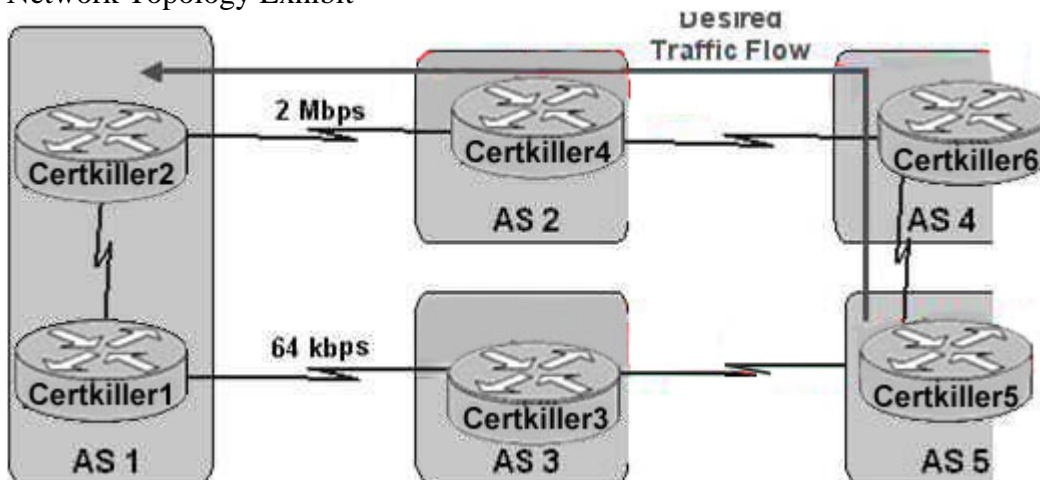
Which three statements are true about route reflectors? (Choose three.)

- A. If the route is learned from an EBGW peer by the route reflector, it is reflected to all IBGP and EBGW peers.
- B. If the route is learned from a non-client IBGP peer by the route reflector, it is reflected to all EBGW peers only.
- C. If the route is learned from a non-client IBGP peer by the route reflector, it is reflected to EBGW peers and clients only.
- D. If the route is learned from a client IBGP peer by the route reflector, it is reflected to all clients only, except the originating client.
- E. If the route is learned from a client IBGP peer by the route reflector, it is reflected to all EBGW peers, non-clients, and clients (except the originating client).

Answer: A, C, E

### QUESTION 179:

Network Topology Exhibit



AS-Path prepending is used AS1 in order to influence the return traffic path from AS 5 to AS 1 through the higher speed via AS 2. \_\_\_\_\_ needs to be configured for AS-Path prepending and a minimum of \_\_\_\_\_ of the AS number should be prepended.

- A. Certkiller1; one copy
- B. Certkiller2; one copy
- C. Certkiller1; two copies
- D. Certkiller2; two copies
- E. Certkiller2; three copies

Answer: C

### QUESTION 180:

In a multihomed environment with two ISP connections, which two statements are



true? (Choose two.)

- A. The customer should not be configured to act as a transit AS between the two ISPs.
- B. It is recommend that the multi-homed customer use a registered (public) AS number.
- C. AS-Path prepending can be configured on the customer's edge router to influence the BGP path selection process for the outbound traffic (traffic from the customer to the ISPs).
- D. The customer can use Local Preference on the customer's edge routers to influence the BGP path selection process for the inbound traffic (traffic from the ISPs to the customer).
- E. The advertisement of the customer's IP address space be conditioned by the customer's edge routers by using a static route to the null0 interface and by using the proper network statement under router bgp.

Answer: A, B

---

**QUESTION 181:**

What is the range of values from which an ISP can assign a private AS number?

- A. 32768 to 65535
- B. 64512 to 65535
- C. 65101 to 65535
- D. 65001 to 65535

Answer: B

---

**QUESTION 182:**

In a Transit AS, how do the internal routers within the Transit AS forward packets destined for the external networks using a scalable solution?

- A. Using the default route.
- B. Using the IGP routes where the external networks are redistributed into the IGP by the edge routers.
- C. Using the EBGP routes where the external networks are redistributed into the IBGP by the edge routers.
- D. Using the IBGP routes, then using recursive lookup based on IGP information to resolve the BGP next-hop.

Answer: D

---

**QUESTION 183:**

What is the main reason for a multihomed customer to apply an outbound route filter to filter the BGP updates from the customer router to the service provider router?

- A. To ensure that the return traffic into the customer network will be load balanced between the different service providers.
- B. To ensure that the outbound traffic from the customer network will be load balanced between the different service providers.
- C. To prevent the customer network from becoming a transit AS.
- D. To allow the customer network to become a transit AS.
- E. To reduce the size of the BGP table on the customer network internal (core) routers.
- F. To reduce the size of the BGP table on the service provider internal (core) routers.

Answer: C

---

**QUESTION 184:**

Which two statements regarding route reflectors are true? (Choose two)

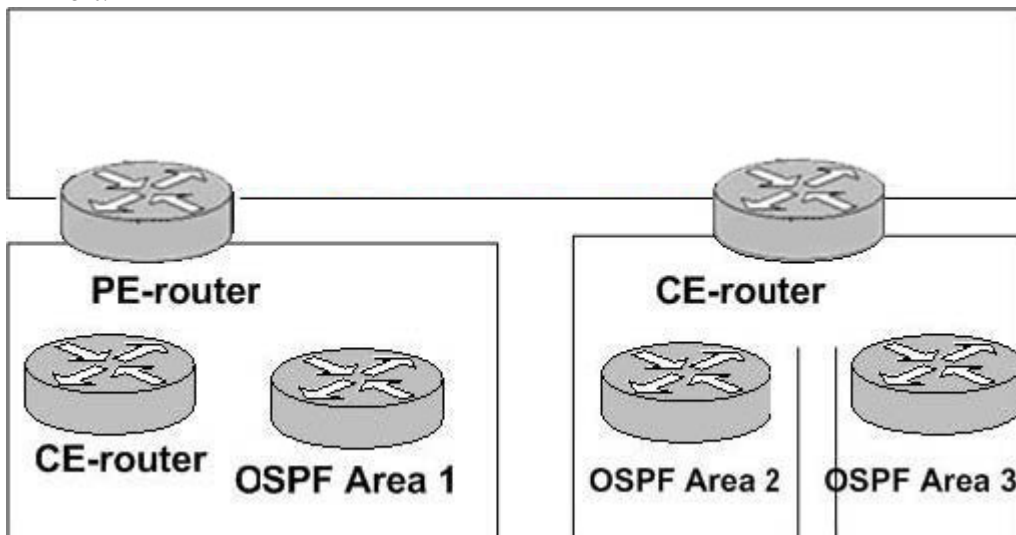
- A. A non-route reflector capable router cannot be a client.
- B. A hierarchical route reflector design is where a route reflector client is not directly connected to the route reflector.
- C. If a client has IBGP sessions to other clients in the same cluster, those clients will receive unnecessary duplicated BGP updates.
- D. If a client in one cluster has an IBGP session to a route reflector that belongs to different clusters, the clients in the other cluster will receive unnecessary duplicated BGP updates.

Answer: C, D

---

**QUESTION 185:**

Exhibit:



Given the information shown in the exhibit, which two statements are true? (Choose two)

- A. BGP is used to propagate routes between sites.
- B. OSPF is used to propagate routes between sites.
- C. Isolated copies of the customer's IGP run at every site.
- D. Redistribution between customer IGP and the backbone OSPF is performed at every PE-router.

Answer: A,D

---

**QUESTION 186:**

Which command enables extended community propagation for VPNv4 MP-BGP sessions?

- A. router (config-router) # ip vpnv4 send-commuinity both
- B. router (config-router-af) # ip vpnv4 send-community both
- C. router (config-router-af) # neighbor 172.16.1.2 send-community both
- D. router (config-router) # vpnv4 neighbor 172.16.1.2 send-community both

Answer: C

---

**QUESTION 187:**

Which command series can be used to troubleshoot TDP session establishment?

- A The debug tag-switching tdp session.
- B. The debug tag-switching tcp session.
- C. The debug tag-switching q931 session.
- D. The debug tag-switching neighbor session.

Answer: A

---

**QUESTION 188:**

How do you test end-to-end data flow between PE-routers?

- A. Use the ping vrf command from the local PE-router to ping the remote PE router's loopback address.
- B. Use the telnet command from the local PE-router to access the remoter PE-router's loopback address.
- C. Use the traceroute command from the local PE-router to the remoter PE-router's loopback address.
- D. Because PE-PE traffic is done via label switching over an LSP, end-to-end data flow cannot be tested. You must test from CE to CE-router.

Answer: C

Explanation:

Not A: You cannot issue "ping vrf" to a loopback, when other end's loopback is not part of VPN.

---

**QUESTION 189:**

What is the difference between a managed CE router VPN and a central services VPN?

- A. In a managed CE router VPN, only customer loopback addresses are marked to be imported into the network management VPN.
- B. In a managed CE router VPN, only default customer routes are marked to be imported into the network management VPN.
- C. In a managed CE router VPN, all customer routes are marked to be imported into the network management VPN.
- D. In a managed CE router VPN, only customer loopback addresses and default customer routes are marked to be imported into the network management VPN.

Answer: A

---

**QUESTION 190:**

Which one of the following is used to prevent routing loops in MPLS VNP networks with multihomed sites?

- A. RT
- B. SOO
- C. RD
- D. AS-Path
- E. MPLS Label
- F. MED

Answer: B

---

**QUESTION 191:**

Exhibit

**Certkiller7 # show mpls ldp bindings**

```

tib entry: 150.1.0.0/16, rev 18
  local binding: tag: 20
  remote binding: tsr: 192.168.1.17:0, tag: 21
  remote binding: tsr: 192.168.1.97:0, tag: 20
tib entry: 150.1.11.32/28, rev 19
  local binding: tag: 21
  remote binding: tsr: 192.168.1.17:0, tag: imp-null
  remote binding: tsr: 192.168.1.97:0, tag: 21
tib entry: 192.168.1.17/32, rev 17
  local binding: tag: 19
  remote binding: tsr: 192.168.1.17:0, tag: imp-null
  remote binding: tsr: 192.168.1.97:0, tag: 19

```

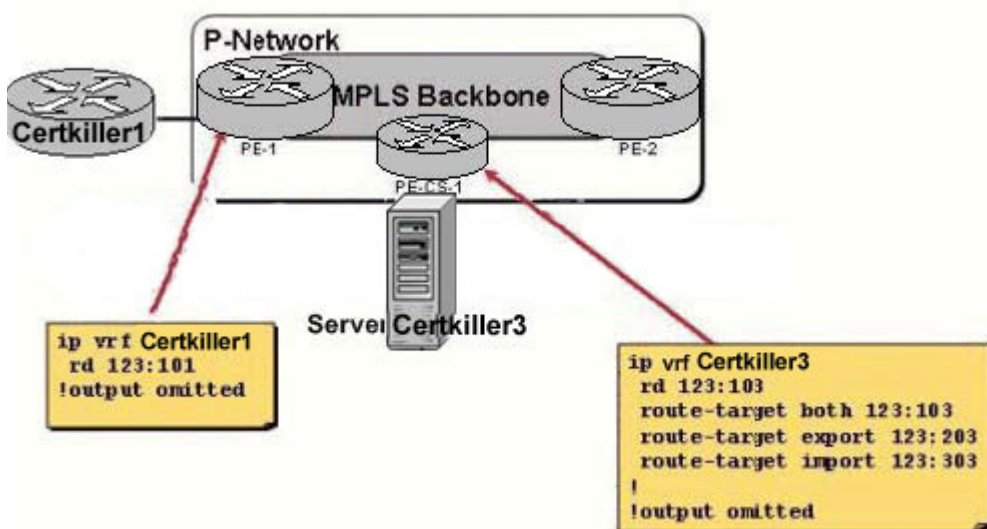
Study the exhibit. Based on the show command output, which four statements are correct? Select four.

- A. Certkiller 7 will announce a label of 20 to its LDP neighbors for prefix 150.1.0.0/16.
- B. To reach prefix 150.1.11.32/28 via 192.168.1.17, Certkiller 7 will pop the label.
- C. To reach prefix 192.168.1.17/32 via 192.168.1.97, Certkiller 7 will use a label of 19.
- D. To reach prefix 150.1.0.0/16 via 192.168.1.97, Certkiller 7 will use a label of 20.
- E. Certkiller 7 will announce an implicit null label to its LDP neighbors for prefix 192.168.1.17/32.
- F. To reach prefix 192.168.1.17/32 via 192.168.1.17, Certkiller 7 will use a label of 19.

Answer: A, B, C, D

**QUESTION 192:**

Exhibit



Study the exhibit. Certkiller 1 is supposed to participate in a central service MPLS VPN. What import and export RTs are required in the Certkiller 1 VRF?

- A. route-target both 123:101  
route-target export 123:303  
route-target import 123:203
- B. route-target both 123:101  
route-target export 123:203  
route-target import 123:303
- C. route-target both 123:101  
route-target both 123:103
- D. route-target both 123:203  
route-target both 123:303
- E. route-target both 123:103  
route-target export 123:303  
route-target import 123:203
- F. route-target both 123:103  
route-target export 123:203  
route-target import 123:303

Answer: A

---

**QUESTION 193:**

You need selective VRF export so only a subset of the routes \_\_\_\_\_.

- A. From a neighbor PE-router is exported to the CE-router.
- B. From a neighbor PE-router is exported to the VRF on the local PE.
- C. Exported from a neighbor CE-router is entered into the VRF on the local PE.
- D. Exported from a VRF in one PE-router is imported into a VRF in another PE-router.

Answer: D

---

**QUESTION 194:**

How does the export route map affect the VRF export process?

- A. A route map can be specified for each VRF to filter routes exported from a CE-router to a PE-router.
- B. A route map can be specified for each VRF to filter routes exported from one PE-router to another PE-router.
- C. A route map can be specified for each VRF to attach additional route targets to routes exported from a PE-router to a CE-router.
- D. A route map can be specified for each VRF to attach additional route targets to routes exported from one PE-router to another PE-router.

Answer: D

**QUESTION 195:**

How does the import route map affect the VRF import process?

- A. The import route map overrides the route target import filter.
- B. A route must pass either the route target import filter or the import route map to be imported.
- C. The import route map overrides the route target import filter and controls the import of routes.
- D. A route has to pass the route target import filter first and then the import route map to be imported.

Answer: D

Explanation:

A route has to pass the route target import filter first and then....

Due to MPLS Student Guide Version 2.1 Page 6-5

---

**QUESTION 196:**

What is the correct configuration to limit the route export to only the loopback address of 10.1.1.1?

- A. ip vft VPN\_A  
!output omitted  
export map NMS  
!  
route-map NMS  
match ip address 1  
set extcommunity rt 123:100 additive  
!  
access-list 1 permit 10.1.1.1 0.0.0
- B. ip vft VPN\_A  
!output omitted  
export map NMS  
!  
route-map NMS  
match ip address 1  
set extcommunity rt 123:100 no-export  
!  
access-list 1 permit 10.1.1.1 0.0.0  
access-list 1 permit any
- C. ip vft VPN\_A  
!output omitted  
export map NMS  
!

```
route-map NMS
match ip address 1
set community rt 123:100 additive
!
access-list 1 permit 10.1.1.1 0.0.0
D. ip vft VPN_A
!output omitted
export map NMS
!
route-map NMS
match ip address 1
set community rt 123:100 no-export
!
access-list 1 permit 10.1.1.1 0.0.0
access-list 1 permit any
```

Answer: A

---

#### **QUESTION 197:**

Which statement about an overlapping VPN is true?

- A. A site participates in more than one VPN.
- B. A site has a link to both the intranet and the Internet.
- C. The VPN contains both private and public address spaces.
- D. The VPN contains two or more overlapping address spaces.

Answer: A

Explanation:

To support connectivity requirements, the MPLS/VPN architecture supports the concepts of sites, where a VPN is made up of one or multiple sites. A VPN is essentially a collection of sites sharing common routing information, which means that a site may belong to more than one VPN if it holds routes from separate VPNs.

Reference: MPLS and VPN Architectures (Cisco Press) page 169

---

#### **QUESTION 198:**

How would you implement an overlapping VPN when the sites contained in the overlapping portion of the two simple VPNs contain an overlapping address space?

- A. Combine the overlapping VPN with a central service VPN.
- B. Implement a NAT service to provide unidirectional address translation.
- C. Implement a dual NAT service with a registered address to be implemented and exported between the two central sites.
- D. Disable routing updates between the overlapping spaces and use a DNS



implementation.

E. Disable routing updates between the overlapping spaces and use static routing.

Answer: C

---

**QUESTION 199:**

What is the most typical use of an overlapping VPN?

- A. Service providers supporting managed CE services.
- B. Service providers supporting carrier-over-carrier MPLS implementations.
- C. Simple intranet VPN implementations.
- D. Companies that use MPLS VPNs to implement both intranet and extranet services.

Answer: D

Explanation:

There are two typical uses for overlapping VPNs:

- 1) Companies that use MPLS VPNs to implement both intranet and extranet services might use overlapping VPNs. In this scenario, each company participating in the extranet VPN would probably deploy a security mechanism on its customer edge (CE) routers to prevent other companies participating in the VPN from gaining access to other sites in other customer VPN
- 2) A security-conscious company might decide to limit visibility between different departments in the organization. Overlapping VPNs might be used as a solution in this case

Reference: Cisco Press - Implementing Cisco MPLS study guide p.6-20

---

**QUESTION 200:**

Which statement is true about overlapping VPNs?

- A. Sites that participate in more than one VPN import routes with RTs from any VPN in which they participate and export routes with RTs for all VPNs in which they participate.
- B. Sites that participate in more than one VPN import routes with RTs for all VPNs in which they participate and export routes with RTs for none of the VPNs in which they participate.
- C. Sites that participate in more than one VPN only import routes with RTs for all VPNs in which they participate.
- D. None of the above statements are correct regarding overlapping VPNs.

Answer: A

Explanation:

Sites that participate in more than one VPN import routes with RTs from any VPN in

which they participate in more than one VPN import routes with RTs from any VPN in which they participate and export routes with RTs from all VPNs in which they participate.

---

**QUESTION 201:**

How would you implement an overlapping VPN when the sites contained in the overlapping portion of two simple VPNs contain an overlapping address space?

- A. Combine the overlapping VPN with a central service VPN.
- B. Implement a NAT service to provide unidirectional address translation.
- C. Implement a dual NAT service with a registered address to be imported and exported between the two central sites.
- D. Disable routing updates between the overlapping spaces and use a DNS implementation.
- E. Disable routing updates between the overlapping spaces and use static routing

Answer: C

---

**QUESTION 202:**

What is the most typical use of an overlapping VPN?

- A. Service providers supporting managed CE Services
- B. Service providers supporting carrier-over-carrier MPLS implementations
- C. Simple intranet VPN implementations
- D. Companies that use MPLS VPNs to implement both intranet and extranet services

Answer: D

Explanation:

There are two typical uses for overlapping VPNs:

3) Companies that use MPLS VPNs to implement both intranet and extranet services might use overlapping VPNs. In this scenario, each company participating in the extranet VPN would probably deploy a security mechanism on its customer edge (CE) routers to prevent other companies participating in the VPN from gaining access to other sites in other customer VPN

4) A security-conscious company might decide to limit visibility between different departments in the organization. Overlapping VPNs might be used as a solution in this case

Reference: Cisco Press - Implementing Cisco MPLS study guide p.6-20

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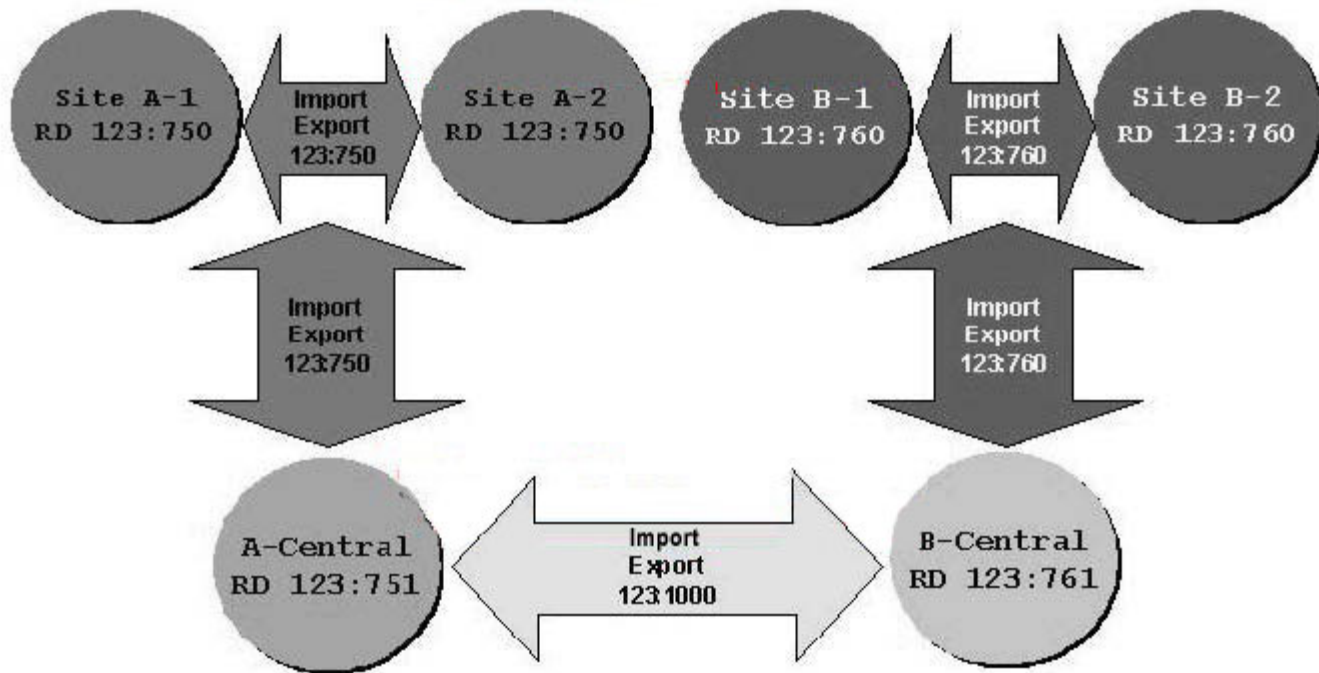
**QUESTION 203:**

Which MPLS VPN implementation allows selected sites in one simple VPN to communicate with selected sites of a second VPN?

- A. central services VPN
- B. managed CE router services VPN
- C. overlapping VPN
- D. managed PE router services VPN

Answer: C

#### QUESTION 204:



In reference to the diagram depicting the flow of routing updates in an overlapping VPN, which statement is true?

- A. Sites A1 and A2 will import all networks with RTs 123:750 and 123:1000.
- B. Sites B1 and B2 will export all networks with RTs 123:760 and 123:1000.
- C. Sites A1 and A2 communicate with Sites B1 and B2 via A-Central and B-Central.
- D. Site A-Central exports RTs 123:750 and 123:1000.
- E. Site B-Central is exporting and importing RT 123:1000 so it can communicate with sites A1 and A2.

Answer: D

#### QUESTION 205:

What is the impact of complex VPN topologies such as Central Services VPN on the VRF tables in the PE-routers?

- A. Complex VPN topologies might require more than one VRF per VPN.

- B. Complex VPN topologies might require more than one VRF per interface.
- C. Complex VPN topologies might require the use of multiple routing protocols to separate VPN address spaces.
- D. Complex VPN topologies might require the use of the public address space to ensure there is no overlap in the address spaces.

Answer: A

Explanation:

Not D: D is incorrect. In the same VPN, no matter complex or not, there should not be overlapping address. Does public address solve this problem? Probably, but you need to plan in advance (buy these addresses then use them), the same can be achieved with private addresses if you DO plan in advance.

---

**QUESTION 206:**

What is the difference between a managed CE router VPN and a central services VPN?

- A. In a managed CE router VPN, only customer loopback addresses are marked to be imported into the network management VPN.
- B. In a managed CE router VPN, only default customer routes are marked to be imported into the network management VPN.
- C. In a managed CE router, VPN, all customer routes are marked to be imported into the network management VPN.
- D. In a managed CE router, only customer loopback address and default customer routes are marked to be imported into the network management VPN.

Answer: A

---

**QUESTION 207:**

In a central services topology, which routes do client VRFs contain?

- A. Routes from the client site, but not from the server site.
- B. Routes from the server site, but not from the client site.
- C. Routes from both the client site and the server site.
- D. Only EBGp routes from either the client site or the server site.

Answer: B

Explanation:

Reference: Implementing Cisco MPLS Student Guide Volume 2 Version 2.1 Page 6-27

---

**QUESTION 208:**

In a managed CE router VPN implementation, which three of the following are RT configuration tasks or tasks that would need to be completed? (Choose three)

- A. Configure NMS import / export route target in NMS VRF.
- B. Configure NMS import / export route target in customer VRF.
- C. Import routes with NMS RT into customer VRF.
- D. Export routes with NMS RT into customer VRF.
- E. Export loopback addresses from customer VRF with RT NMS\_Client.
- F. Import loopback addresses from customer VRF with RT NMS\_Client.

Answer: A,C,E

Explanation:

A not B: Reference: Implementing Cisco MPLS Student Guide Volume 2 Version 2.1  
Page 6-42

Configuring Route Targets:

- 1) Configure per-customer import-export route target in all customer VRFs
- 2) Configure NMS import-export route target in NMS VRF
- 3) Import routes with NMS RT into customer VRF
- 4) Export loopback addresses from customer VRF with RT NMS\_Client
- 5) Import routes with RT NMS\_Client into NMS VRF

---

**QUESTION 209:**

What is the difference in implementation between a managed CE services MPLS VPN and a central services MPLS VPN?

- A. RD assignment
- B. Selective routes export
- C. Selective routes import
- D. MP-BGP route redistribution filtering
- E. CE-PE routing process
- F. None

Answer: B

---

**QUESTION 210:**

In a managed CE router VPN implementation, what information does the service provider need access to on the customer's CE router?

- A. Access to all customer routes.
- B. Access to the customer's simple VPN VRF.
- C. Access to the customer's CE router loopback addresses.
- D. Access to the static routes of the customer's CE router.

Answer: C

---

**QUESTION 211:**

In a managed CE router VPN implementation, what information does the service provider need access to on the customer's CE router?

- A. Access to all customer routes
- B. Access to all the customer's simple VPN VRF
- C. Access to the customer's CE router loopback addresses
- D. Access to the static routes of the customer's CE router

Answer: C

---

**QUESTION 212:**

Which description is NOT a topology where a central services VPN would be used?

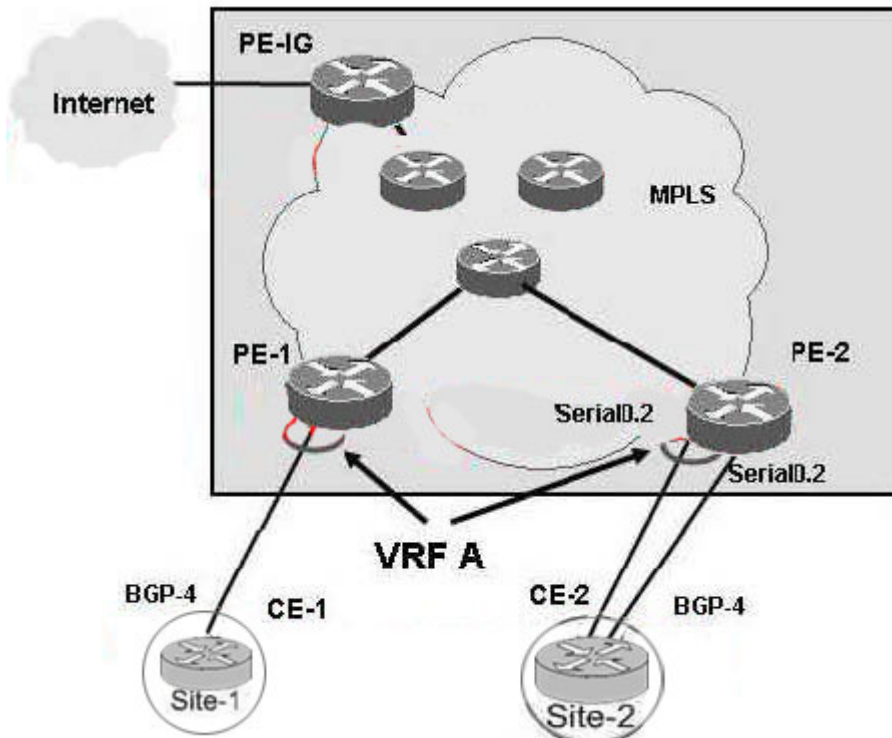
- A. A service provider offers services to all customers by allowing them access to a common VPN.
- B. Two or more companies want to exchange information by sharing a common set of servers.
- C. A security-conscious company separates its departments and allows them to access only to common servers.
- D. Several interconnected subsidiaries of a company require optimal communication between many sites.

Answer: D

---

**QUESTION 213:**

Network topology exhibit; Internet Access through a Dedicated Subinterface



Internet access is through a dedicated subinterface implementation. Which of its routing tables will PE-2 use to forward packets from Site2 to Site 1?

- A. the global routing table
- B. the VPNv4 routing table
- C. the VRF A routing table
- D. the VRF A FIB
- E. the PE-IG routing table

Answer: C

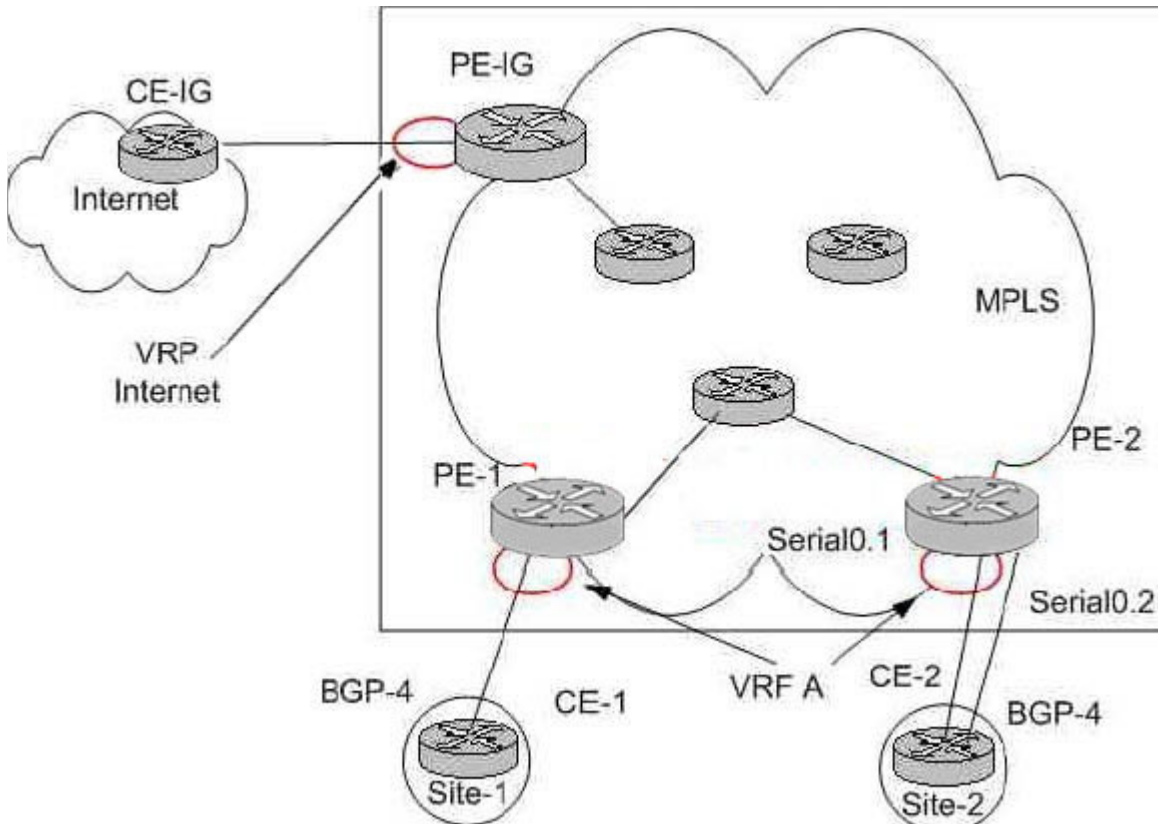
#### QUESTION 214:

When a VPN solution is being implemented in which each customer site has its own independent Internet access, which three statements are true? Select three.

- A. Each customer site has to be individually secured against unauthorized Internet access.
- B. Each customer site has optimal traffic flow to and from the Internet sites.
- C. Each customer site requires at least some public IP addresses.
- D. Each customer edge (CE) router will forward the VPN and Internet traffic toward the Internet.
- E. A central firewall service will be required.
- F. The MPLS VPN service provider backbone will be over utilized, because the same traffic can cross the backbone of the service provider twice, first as VPN traffic and then as Internet traffic (or vice versa).

Answer: A, B, C

### QUESTION 215:



In the diagram, Internet access is through a dedicated subinterface implementation. Which of its routing tables will PE-2 use to forward packets from Site-2 to Site-1?

- A. The global routing table.
- B. The VPNv4 routing table.
- C. The VRF A routing table.
- D. The VRF A FIB.
- E. The PE-IG routing table.

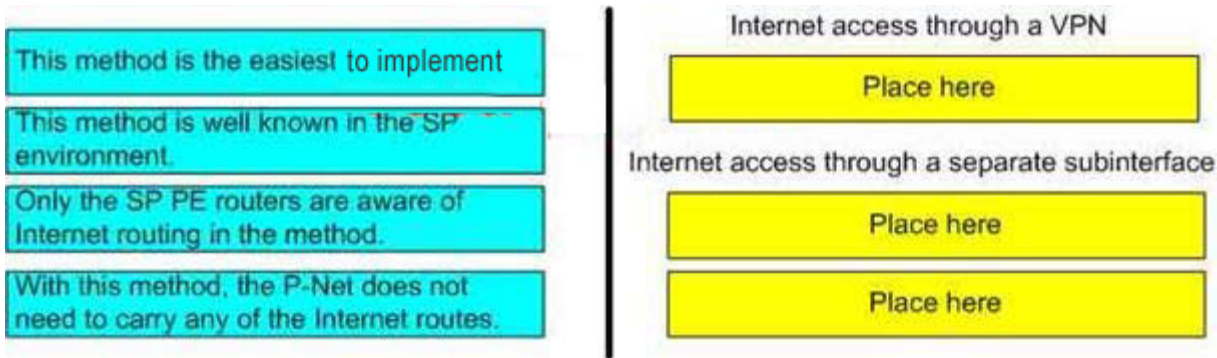
Answer: C

### QUESTION 216:

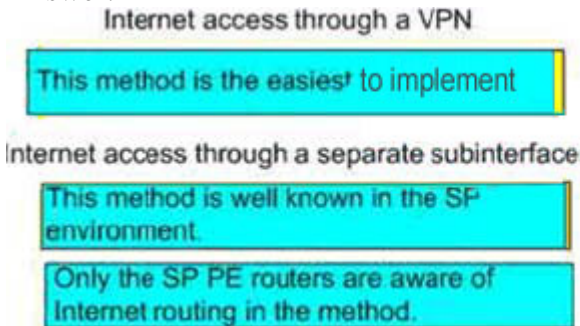
#### DRAG DROP

Match the benefits on the left to the appropriate Internet access method on the right by dragging and dropping each benefit to the proper access method. Benefits that are not appropriate to either method should remain in the left column.





Answer:



---

**QUESTION 217:**

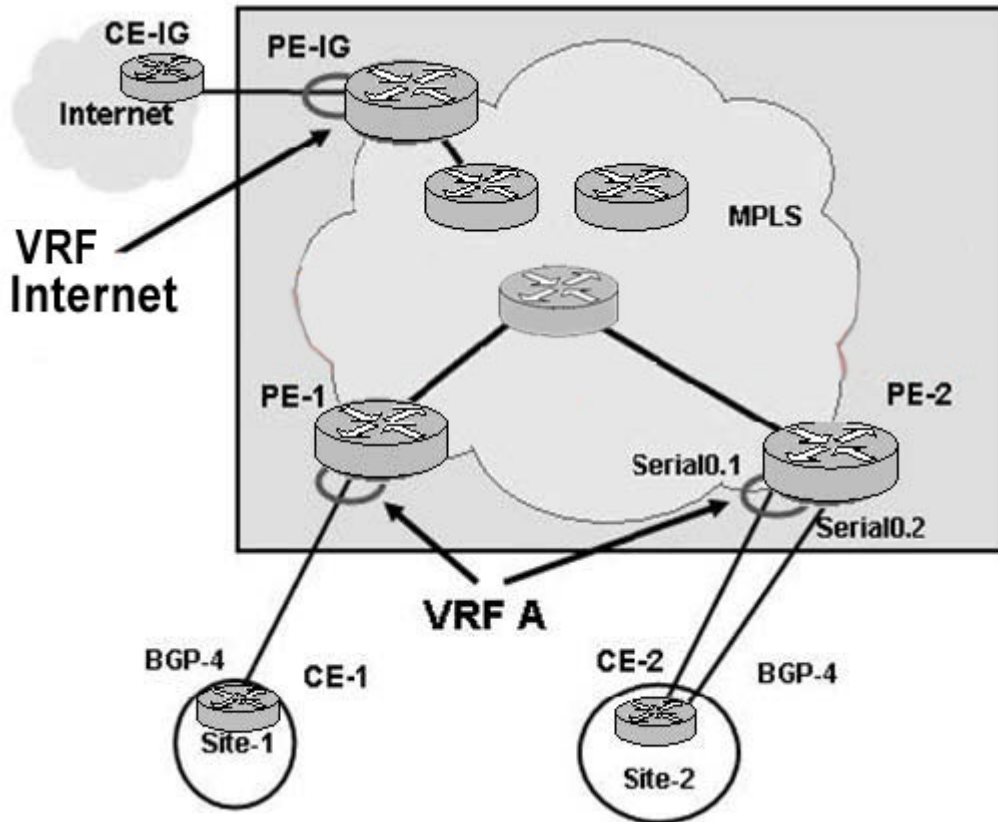
What best describes wholesale Internet access service?

- A. an ISP that uses the IP transport infrastructure of another service provider to reach the customers.
- B. an ISP that provides broadband access (like DSL or cable) directly to the customers.
- C. an ISP that provides both MPLS VPN and Internet access simultaneously to the customers
- D. an ISP that provides a managed firewall service to the customers
- E. and ISP that provides managed CE services to customers

Answer: A

---

**QUESTION 218:**



In the diagram, the Internet is accessed through a dedicated Internet VPN implementation. Which routing table will PE-IG use to forward packets from the Internet to Site-2?

- A. Global routing table
- B. VPNv4 routing table
- C. VRF A routing table
- D. VRF Internet routing table

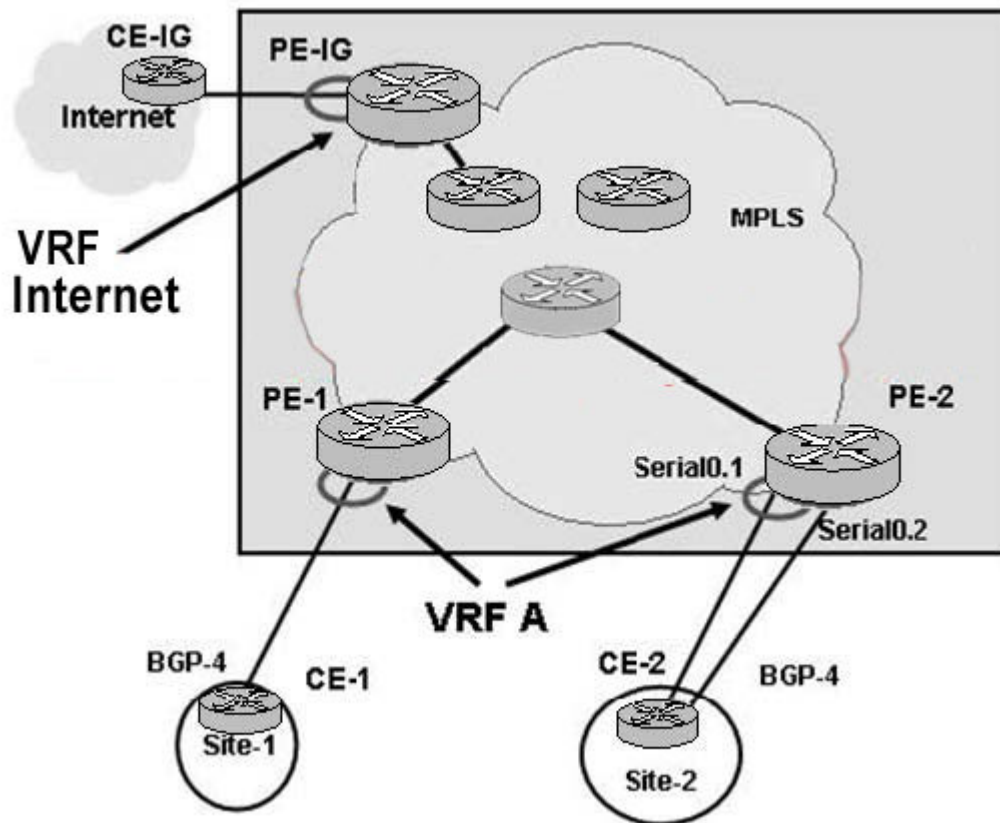
Answer: D

#### QUESTION 219:

With MPLS VPNs, what is prepended to an IPv4 address to make it globally unique?

- A. route target (RT)
- B. route distinguisher (RD)
- C. VPNv4 header
- D. Site of origin (SOO) prefix
- E. Route tag

Answer: B

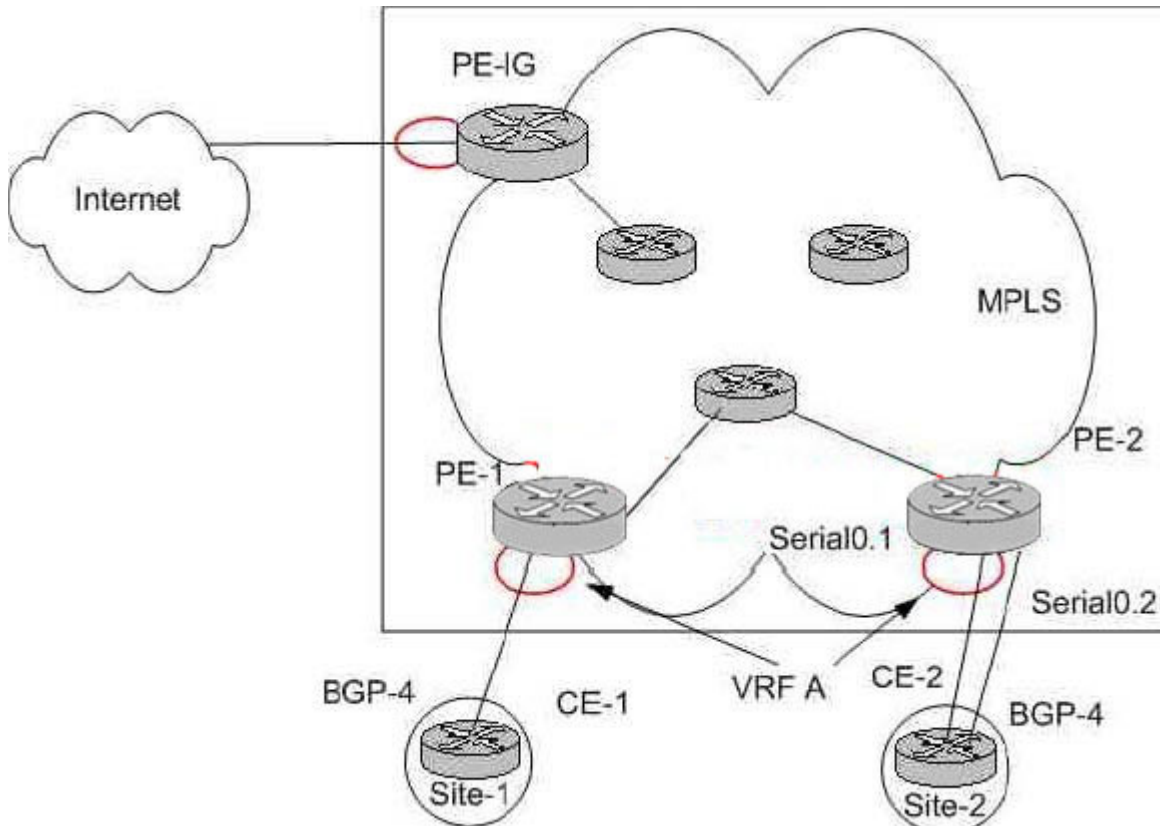
**QUESTION 220:**

In the case of Internet access through a dedicated sub-interface implementation, which routing table will PE-2 use to forward packets from Site-2 to the Internet?

- A. Global routing table
- B. VPNv4 routing table
- C. VRF A routing table
- D. CE-2 routing table
- E. PE-IG routing table

Answer: A

**QUESTION 221:**



In the diagram, the Internet is accessed through a dedicated Internet VPN.  
Which routing table will PE-2 use to forward packets from Site-2 to Site-1?

- A. Global routing table
- B. VRF A routing table
- C. The VPNv4 routing table
- D. VRP Internet routing table

Answer: D

### QUESTION 222:

What are two drawbacks when the Internet is accessed through a dedicated subinterface implementation? (Choose two)

- A. The VRP will leak routes into the global routing table.
- B. The P router must run both an IGP and BGP.
- C. The PE routers must perform Internet routing.
- D. A limited set of Internet services will be implemented.
- E. A separate physical link or specific WAN encapsulation is required.

Answer: C, E

**QUESTION 223:**

What is the main implementation option when using the global IP routing table to provide Internet access?

- A. Use a separate logical interface for Internet access that is not placed in a VRF.
- B. Use the same logical interface for Internet and VPN access and disable packet filtering.
- C. Import the Internet routes from the global IP routing table into the VRF.
- D. Export the Internet routes from the global IP routing table into the VRF.
- E. Use packet filtering between the VRF and the VPNv4 MPBGP RIB (routing information base).

Answer: A

---

**QUESTION 224:**

In situations where cost prohibits having separate physical links for VPN and Internet traffic, what are the two recommended methods for creating two logical links over a single physical link? (Choose two)

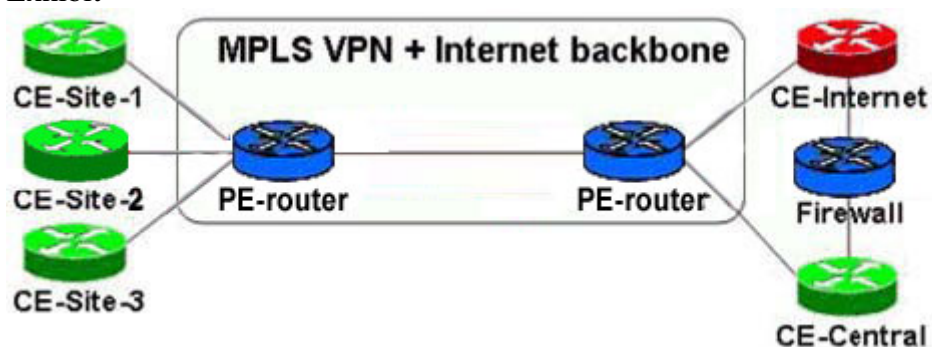
- A. The use of Frame Relay subinterfaces.
- B. The use of 802.1q trunking on LAN interfaces.
- C. The use of GRE tunnel interfaces.
- D. The use of PPP multilink interfaces.
- E. The assignment of two VRFs on the same physical interface.

Answer: A, B

---

**QUESTION 225:**

Exhibit



The exhibit shows a topology where the customer, Certkiller .com, is using Internet access through a central firewall at their central site. If Certkiller .com's MPLS VPN and the Internet access traffic share the same service provider backbone, which of the following statements are true? Select two.

- A. Customer Internet traffic can cross the service provider backbone twice, first as VPN traffic and then as Internet traffic.
- B. Each customer site CE router must perform NAT if the customer is using private IP addresses.
- C. Suboptimal routing of the customer's VPN traffic will occur.
- D. The PE routers will need to exchange both VPNv4 and IPv4 BGP routing updates.
- E. BGP must be used as the routing protocol between the CE and PE routers.

Answer: A, D

---

**QUESTION 226:**

Which are functions required in the control plane when using Unicast IP routing over MPLS?

- A. A packet forwarding protocol.
- B. A cell switching protocol.
- C. An IP routing protocol.
- D. A label distribution protocol.

Answer: C, D

---

**QUESTION 227:**

What is the default state of VC-merge on an MPLS enabled switch?

- A. disabled
- B. enabled

Answer: B

---

**QUESTION 228:**

An interface running MPLS can run both TDP and LDP. True or false?

- A. True
- B. False

Answer: A

---

**QUESTION 229:**

It is possible to restrict the labels that are announced to neighbors using access-lists with the "tag-switching advertise-tags" command.  
What is true about this function?

- A. It can apply to both frame and cell mode MPLS.
- B. It only applies to cell mode MPLS.
- C. It only applies to frame mode MPLS.

Answer: C

---

**QUESTION 230:**

The hop-count TLV can be used to assist with loop preventions in MPLS networks.  
What is NOT true about the hop-count TLV?

- A. The TTL field in the IP or label header is decreased by the hop count at the egress LSR.
- B. The packet is dropped if the TTL field is zero or less.
- C. It counts the number of hops in a label switch path.
- D. It allows the specification of a maximum number of hops for LDP.

Answer: A

---

**QUESTION 231:**

What are advantages of using MPLS as a transit network for BGP?

- A. The transit network does not have to hold the whole Internet routing table.
- B. Core routers only learn BGP next hop addresses.
- C. Only the core routers have to run BGP.
- D. Simplified topology.

Answer: A, B, D

---

**QUESTION 232:**

When would you have to configure a label pool?

- A. Only when using one of the IOS releases for which it is mandatory to do so.
- B. Only if using them.
- C. Always
- D. Never

Answer: A

---

**QUESTION 233:**

What mechanisms are used by LDP in frame mode to prevent loops?

- A. The TTL field in the label header.

- B. The EGP's loop detection mechanism.
- C. The IGP's loop detection mechanism.
- D. The TTL field in the IP header.

Answer: A, C

---

**QUESTION 234:**

An MPLS label header includes a three bit experimental field, what is that used for?

- A. It was used during development and has no application.
- B. It is reserved and not used.
- C. It is used to carry the 3 bit Class of Service values.
- D. It indicates the bottom of the label stack.

Answer: C

---

**QUESTION 235:**

Which ATM virtual circuit is used to establish adjacency between ATM LSR's?

- A. 0/30
- B. 1/30
- C. 0/32
- D. 1/32

Answer: C

---

**QUESTION 236:**

MPLS or tag switching is an alternative to Cisco Express Forwarding which does not require CEF to be functioning. True or false?

- A. False
- B. True

Answer: A

---

**QUESTION 237:**

LSP tunnels are normally determined by IP routing protocols. What can be used to create an LSP tunnel via a specific path that is not the one that would be chosen by the IP routing protocol?

- A. MPLS-VPN
- B. MPLS-Multicast routing



- C. MPLS-TE
- D. MPLS-QOS

Answer: C

---

**QUESTION 238:**

What is true about an LDP Hello packet?

- A. It uses multicast for adjacent peers.
- B. It uses TCP.
- C. It will trigger an attempt to establish a session with any neighbors.
- D. They are sent periodically.

Answer: A, C, D

---

**QUESTION 239:**

The LDP identifier is used to identify a router during LDP session establishment.  
What size is the LDP identifier?

- A. 8 bytes
- B. 6 bytes
- C. 2 bytes
- D. 4 bytes

Answer: D

Explanation:

From page 33 of reference "The LDP identifier is determined in the same way as the OSPF or BGP identifier (unless controlled by the tag tdp router-id command) -- the highest IP address of all loopback interfaces is used. That means the identifier is a 32-bit ip address which should be  $32/8 = 4$  bytes long.

Reference: MPLS and VPN Architectures (CCIP edition)

---

**QUESTION 240:**

What is true about frame mode MPLS?

- A. It uses Conservative label retention.
- B. It uses per-platform label allocation.
- C. It uses ordered label control.
- D. It used per-interface label allocation.

Answer: B

---

**QUESTION 241:**

What is a possible use of make-before-break recovery using frame mode MPLS traffic engineering?

- A. It overcomes issues of convergence during both link failure and recovery.
- B. It overcomes issues of convergence during link recovery.
- C. It overcomes issues of convergence during link failure.

Answer: B

---

**QUESTION 242:**

Which of the following modes of operation would be used for cell mode MPLS?

- A. Unsolicited label distribution.
- B. Per-interface label allocation.
- C. Ordered control.
- D. Conservative label retention.

Answer: B, C, D

---

**QUESTION 243:**

What are functions of the MPLS control plane?

- A. Exchanging label and routing information.
- B. Forwarding data packets.
- C. Routing lookups.
- D. Building and maintaining the label forwarding information base (LFIB).

Answer: A, D

---

**QUESTION 244:**

Which of the following are used by the MPLS data plane?

- A. Routing table
- B. LIB
- C. LFIB
- D. FIC

Answer: C, D

---

**QUESTION 245:**

What does FEC stand for in respect to MPLS?

- A. Following entry cache.
- B. Final entry count.
- C. Forward to exit control.
- D. Forwarding equivalence class.

Answer: D

---

**QUESTION 246:**

In MPLS quality of service what entity is assigned a unique FEC?

- A. A destination multicast address.
- B. An IGP prefix.
- C. An IGP prefix in conjunction with a class of service.
- D. An egress router.

Answer: C

---

**QUESTION 247:**

What is true about a hub and spoke VPN topology?

- A. All traffic takes the most direct path.
- B. It makes security more difficult.
- C. Two hub routers handle the incoming and outgoing route announcements separately.
- D. It allows easy traffic logging/accounting.

Answer: C, D

---

**QUESTION 248:**

Which of the following types of static routes can be combined to implement packet leaking in an VPN combined with Internet scenario?

- A. A VRF static route pointing to a global next hop.
- B. A global static route pointing to a global next hop.
- C. A VRF static route pointing to an interface that is part of a VRF.
- D. A global static route pointing to an interface that is part of a VRF.

Answer: A, D

---

**QUESTION 249:**

Which of the following routes types has to perform a label pop function when forwarding

a packet over an MPLS network if PHP is active?

- A. P router
- B. Penultimate P router
- C. Egress PE router
- D. IngressPE router

Answer: B

---

**QUESTION 250:**

Which two are valid design rules for simple VPN of two PE's each supporting two CE's on the same VPN?

- A. Configure different RD's for all VRF's.
- B. Configure one import/export RT.
- C. Configure the same RD on all VRF's.
- D. Configure one VRF per PE router.
- E. Configure one VRF for each site.

Answer: B, C, D

---

**QUESTION 251:**

Which of the following is the simplest approach to take when configuring EBGp between PE and CE routers?

- A. Use different private AS numbers for each site in a VPN.
- B. Use the same private AS number for all site in a VPN.
- C. Use the same registered AS number for all sites in a VPN.
- D. Use different registered AS numbers for each site in a VPN.

Answer: A

---

**QUESTION 252:**

MPLS VPN providers can be vulnerable to denial of service attacks by customers generating too many routes and depleting resources in the PE router.

Which are valid methods of combating this possibility?

- A. Limit the number of prefixes from a BGP neighbor using the neighbor maximum prefix command.
- B. Limit the number of routes that can be imported into a VRF using the maximum route command.
- C. Limit the size of the VRF routing table using the VRF maximum size command.
- D. Limit the number of BGP neighbors in the configuration.

Answer: A, B

---

**QUESTION 253:**

Standard OSPF-BGP redistribution results in OSPF routes that are passing through an MPLS VPN are inserted into the receiving sites route tables as external routes. This makes stub areas and route summarization hard to implement. How does an MPLS VPN overcome this problem?

- A. It uses well known RD's for the different route types.
- B. Route types are allocated to each route in the router ospf configuration.
- C. It used BGP extended communities to propagate the OSPF route type.
- D. It used the BGP MED to propagate OSPF route type.

Answer: C

---

**QUESTION 254:**

What is true about the following configuration?

```
Router bgp 1234
no bgp default ipv4 unicast
neighbor 10.3.2.1 remote-as 1234
neighbor 10.3.3.1 remote-as 1234
neighbor 10.3.2.1 active
address-family vpnv4
neighbor 10.3.2.1 active
neighbor 10.3.3.1 active
```

- A. Neighbor 10.3.3.1 receives both IPv4 and VPNv4 routes.
- B. Neighbor 10.3.2.1 receives both IPv4 and VPNv4 routes.
- C. Neighbor 10.3.2.1 receives only VPNv4 routes.
- D. Neighbor 10.3.3.1 receives only VPNv4 routes.

Answer: B, D

---

**QUESTION 255:**

When redistributing from RIP to MG-BGP and back again it is important to consider the RIP metric as it passed through the MPLS VPN. What is true about this function?

- A. The RIP metric is automatically carried from BGP to RIP.
- B. The RIP metric is automatically carried from RIP to BGP.
- C. The RIP metric is automatically passed across the VPN.
- D. The BGP multi-exit discriminator is used to carry the RIP metric across the VPN.

Answer: B, D

---

**QUESTION 256:**

Which command would you use to display all VRF's including all relevant route targets and route maps associated with each VRF?

- A. sh ip vrf interfaces
- B. sh ip vrf
- C. sh ip vrf detail
- D. sh vrf detail

Answer: C

---

**QUESTION 257:**

Which is a valid combination of configuration statements to set up a simple MPLS VPN on a PE?

- A. ip vrf yellow  
rd 122:23  
route-target both 122:23  
ip vrf forwarding interface serial 0/0  
interface s0/0  
ip address 10.3.0.1 255.255.255.252
- B. ip vrf yellow  
route-target both 122:23  
interface s0/0  
ip vrf forwarding yellow  
ip address 10.3.0.1 255.255.255.252
- C. ip vrf yellow  
route-target both 122:23  
interface s0/0  
rd 122:23  
ip vrf forwarding yellow  
ip address 10.3.0.1 255.255.255.252
- D. ip vrf yellow  
rd 122:23  
interface s0/0  
route-target both 122:23  
ip vrf forwarding yellow  
ip address 10.3.0.1 255.255.255.252

Answer: B

Explanation:

Note: the correct option B lacks route distinguisher configuration (rd 122:23).

---

**QUESTION 258:**

Which two ethertype values are used to indicate that the packet contains a label?

- A. 8848
- B. 8847
- C. 8281
- D. 8888

Answer: A, B

---

**QUESTION 259:**

When using the SOO extended community attribute in MP-BGP, what does SOO stand for?

- A. Start of operation
- B. Site overlay object
- C. Source of origin
- D. Sites of origin

Answer: D

---

**QUESTION 260:**

What is true about a VRF?

- A. You can assign only one interface to a VRF.
- B. VPN interfaces assigned to a VRF can be physical, logical or sub-interfaces.
- C. There is one routing table for all VRF's in a PE.
- D. You can assign an interface to only one VRF.

Answer: B, D

---

**QUESTION 261:**

Which of the following is a valid configuration statement for a route distinguisher?

- A. (config-vrf)#route-distinguisher 110:22
- B. (config-vrf)#rd 110.22
- C. (config-vrf)#rd 110:22
- D. (config-if)#rd 110.22

Answer: C

Explanation:

Note the colon (:) between 110 and 22.

---

**QUESTION 262:**

What is true about a P router?

- A. It runs provider backbone IGP.
- B. It exchanges VPNv4 routes with other routers.
- C. It has to run BGP.
- D. It has no direct customer connectivity.
- E. It participates in customer routing protocols.

Answer: A, D

---

**QUESTION 263:**

What is contained in a MP-BGP update?

- A. Extended communities
- B. VPNv4 address
- C. Label
- D. IPv4 address

Answer: A, B, C

---

**QUESTION 264:**

What is the name given to an extended form of BGP that can multiple address families?

- A. MP-BGP
- B. EXT-BGP
- C. EBGp
- D. BGP-4

Answer: A

---

**QUESTION 265:**

Which BGP facility is used to carry the route target attribute throughout the P network?

- A. Confederations
- B. Extended BGP communities



- C. Route reflectors
- D. VPNv4 address

Answer: B

---

**QUESTION 266:**

What type of route target function is used when it is appended to a customer route as it is being converted to a VPNv4 route?  
Export RT

- A. Implied RT
- B. Import RT
- C. Extended RT

Answer: A

---

**QUESTION 267:**

How many bits are there in total in an MPLS header?

- A. 64
- B. 24
- C. 16
- D. 32

Answer: D

---

**QUESTION 268:**

Which protocol is used to carry customer routes between PE routers in an MPLS VPN?  
OSPF

- A. BGP
- B. RIP V2
- C. EIGRP

Answer: B

---

**QUESTION 269:**

Which command would you use to display the capabilities of LC-ATM peer LSR's?

- A. show tag-switching lc-atm detail
- B. show tag-switching atm-tdp detail

- C. show tag-switching lc-atm capabilities
- D. show tag-switching atm-tdp capabilities

Answer: D

---

**QUESTION 270:**

What is true about overlay VPN's?

- A. They do not add overheads due to encapsulation headers.
- B. The provider routers have full knowledge of customers routes.
- C. They are easy to implement.
- D. Optimal routing requires a full mesh of VC's.

Answer: C, D

---

**QUESTION 271:**

Which of the following describes a VPN in which every site can communicate with every other site?

- A. Overlapping VPN
- B. Central services VPN
- C. Simple VPN
- D. Remote access VPN

Answer: C

---

**QUESTION 272:**

Which command of the following commands would you use to display the MTU size on an MPLS interface?

- A. show mpls mtu detail
- B. show tag-switching parameters interface E0 detail
- C. show tag-switching interface E0 detail
- D. show mpls detail

Answer: C

---

**QUESTION 273:**

An extended ping running varying packet size fails for packets with a payload of 1497 bytes and above. What could be the problem?

- A. The LAN MTU has been automatically decreased to cater for the addition of a label.

- B. The WAN MTU has been automatically increased by the length of the label.
- C. The packet is being fragmented by the LSR.
- D. The MTU has been increased by a label and there are old or low end switches in the network.

Answer: D

---

**QUESTION 274:**

After entering the "mpls ip" command for an interface which label distribution protocol will be started?

- A. TDP
- B. LDP
- C. Both

Answer: A

---

**QUESTION 275:**

MPLS can be run over ATM PVC's, perhaps as a first step in migration to an MPLS infrastructure.

What is NOT true about this function?

- A. There can be one LSP per ATM PVC.
- B. The ATM network does not have to run MPLS.
- C. The ATM PVC is considered as a frame mode MPLS interface.
- D. LDP runs between adjacent routers either side of the PVC.

Answer: C

Explanation:

ATM is considered to be cell-mode

---

**QUESTION 276:**

What is true about the "path vector" TLV which is sometimes used to prevent loops in the MPLS domain?

- A. It is supported by LDP and TDP.
- B. It operates in a similar fashion to BGP's AS-Patch facility.
- C. The TLV holds the ID's of all ATM LSR's in the MPLS path.
- D. If an LSR receives an LDP update which contains its own ID the update is dropped.

Answer: B, C, D

---

**QUESTION 277:**

Which IOS table is built when CEF is enabled?

- A. FIB
- B. LFIB
- C. LIB
- D. TIB

Answer: A

---

**QUESTION 278:**

What form of label distribution is used by RSVP-TE?

- A. Unsolicited downstream
- B. Upstream-on-demand
- C. Unsolicited upstream
- D. Downstream-on-demand

Answer: D

---

**QUESTION 279:**

Cell mode MPLS utilizes the TTL field in the label to assist loop preventions. True or false?

- A. False
- B. True

Answer: A

---

**QUESTION 280:**

The implicit null label is advertised by an MPLS egress router to indicate that PHP should be used.

What LDP label value is used for the implicit null?

- A. 2
- B. 3
- C. 1
- D. 0

Answer: B

---

**QUESTION 281:**

What is true about IP aggregation on an LSP tunnel?

- A. It should not be used in MPLS VPN's.
- B. It breaks the tunnel into two segments.
- C. It is transparent to the label switch path tunnel.
- D. It can be used in frame and cell MPLS networks.

Answer: A, B

---

**QUESTION 282:**

Which destination IP address is used by LDP hello messages sent to adjacent peers?

- A. 224.0.0.6
- B. 224.0.0.9
- C. 224.0.0.2
- D. 224.0.0.5

Answer: C

---

**QUESTION 283:**

Which of the following is a valid LDP identifier for a router using per-platform operation?

- A. 192.168.1.2:2
- B. 134.6.43.1:4
- C. 10.0.1.1:1
- D. 172.16.1.1:0

Answer: D

---

**QUESTION 284:**

Which are valid modes of MPLS operation?

- A. Frame mode
- B. Byte mode
- C. Cell mode
- D. Bit mode

Answer: A, C

---

**QUESTION 285:**

Which protocols can be used to create MPLS TE tunnels and propagate labels?

- A. CR-LDP
- B. PIM V2
- C. RSVP
- D. MP-BGP

Answer: A, C

---

**QUESTION 286:**

What is true about TDP and LDP?

- A. They can coexist in an MPLS network providing peers use the same type.
- B. They are compatible between peers of differing type.
- C. They are functionally equivalent but incompatible.
- D. An MPLS network must use only one type throughout.

Answer: A, C

---

**QUESTION 287:**

How many bits are there in the label field of an MPLS label?

- A. 24
- B. 30
- C. 16
- D. 20

Answer: D

---

**QUESTION 288:**

In multicast IP routing what entity is assigned a unique FEC?

- A. An IGP prefix in conjunction with a class of service.
- B. An egress router.
- C. An IGP prefix.
- D. A destination multicast address.

Answer: D

---

**QUESTION 289:**

When using a hub and spoke VPN topology and EBGP as the PE to CE protocol it is necessary to implement allow-as-in on the PE router that connects to the customer hub site. True or false?

- A. True
- B. False

Answer: A

---

**QUESTION 290:**

How many interfaces can be associated to a VRF?

- A. 1
- B. 2
- C. 0
- D. Many

Answer: D

---

**QUESTION 291:**

Which of the following correctly configures simple per-VRF OSPF?

- A. router ospf 11 vrf purple  
redistribute bgp 1  
network 172.16.0.0.0.0.255.255 area 0
- B. router ospf 11  
address-family ipv4 purple  
redistribute bgp 1 subnets  
network 172.16.0.0.0.0.255.255 area 0
- C. router ospf 11 vrf purple  
redistribute bgp 1 subnets  
network 172.16.0.0.0.0.255.255 area 0
- D. router ospf 11  
ip vrf purple  
redistribute bgp 1 subnets  
network 171.16.0.0.0.0.255.255 area 0

Answer: C

---

**QUESTION 292:**

What is true about using EBGP between the PE and CE routers?

- A. Redistribution to MP-BGP is still required.

- B. Customer BGP attributes are not maintained across the VPN.
- C. All customer BGP attributes are maintained across the VPN.
- D. Redistribution to MP-BGP is not required.

Answer: C, D

---

**QUESTION 293:**

If several MPLS VPN customer sites run BGP and want to use the same AS number throughout there would normally be a problem since standard BGP operation is to reject incoming external routes that contain the local AS number in their AS-path. What is a BGP facility that provides a workaround to this problem?

- A. AS-cutthrough
- B. AS-override
- C. AS-passthrough
- D. AS-transparent

Answer: B

---

**QUESTION 294:**

How many labels are required as a minimum for an MPLS VPN?

- A. 4
- B. 1
- C. 3
- D. 2

Answer: D

---

**QUESTION 295:**

What is true about the use of RIP between the PE and CE routers?

- A. A separate routing context is configured for each VRF running RIP.
- B. RIP parameters for each VRF can be configured globally.
- C. It supports RIPv1 and RIPv2.
- D. Routes have to be redistributed to and from BGP.

Answer: A, C

Explanation:

RIPv1 CAN be used but NOT supported officially by Cisco.

---



**QUESTION 296:**

How would you display the routing table for a VRF named "yellow"?

- A. sh ip vrf-route yellow
- B. sh ip route vrf yellow
- C. sh ip route yellow
- D. sh ip route mp-bgp

Answer: B

---

**QUESTION 297:**

Which is NOT a possible function of BGP in an MPLS VPN environment?

- A. The exchange of traditional global IPV4 routes.
- B. The distribution of labels throughout the P network.
- C. The exchange of VPN routes with a customer using either EBGP or redistribution to another protocol.
- D. The exchange of VPNv4 routes.

Answer: B

---

**QUESTION 298:**

When must the BGP next-hop-self option be set in an MP-IBGP session between PE's?

- A. When BGP between the PE's is also carrying standard communities.
- B. When All routers run in the same AS.
- C. When EBGP is running between the PE and CE routers.
- D. When EBGP is not running between the PE and CE routers.

Answer: C

---

**QUESTION 299:**

Which of the following label operations can be performed by an edge LSR?

- A. Pop
- B. Push
- C. Swap
- D. Purge

Answer: A, B

---

**QUESTION 300:**

What is true about a CE router?

- A. It exchanges VPNv4 routes with other routers.
- B. It participates in customer routing protocols.
- C. It runs provider backbone IGP.
- D. It has to run BGP.
- E. It has no direct customer connectivity.

Answer: B

---

**QUESTION 301:**

In a PE the VRF tables are populated by?

- A. Routing information from the associated CE router.
- B. MP-BGP information from other PE's.
- C. The core IGP.
- D. BGP-4 information from P routers.

Answer: A, B

---

**QUESTION 302:**

VPNv4 addresses are exchanged between \_\_\_\_\_?

- A. PE and P routers
- B. PE routers
- C. PE and CE routers
- D. CE routers

Answer: B

---

**QUESTION 303:**

Within a PE router one VRF should be assigned per \_\_\_\_\_ ?

- A. PE router
- B. Site
- C. VPN
- D. Group of sites with the same VPN connectivity

Answer: D

---

**QUESTION 304:**

Given the configuration below which type of MPLS connectivity would this normally support?

```
int atm 0/0
atm pvp 37
int atm 0/0.37 point-to-point
mpls ip
```

- A. ATM switch to ATM enabled router over an ATM VP.
- B. ATM switch to ATM switch over an ATM VP.
- C. ATM enabled router to ATM enabled router over an ATM VP.

Answer: A, B

---

**QUESTION 305:**

How does MPLS VPN architecture allow for overlapping address space between customers?

- A. The addresses are kept unique by prefixing them with a route distinguisher.
- B. The addresses do not class because a separate routing process is used for each customer within the MPLS network.
- C. A separate PE router is provided for each customer.
- D. Customers have to use registered addresses, they cannot overlap.

Answer: A

---

**QUESTION 306:**

What type of VPN could be described as one in which a provider offers virtual point to point links between customer sites?

- A. Peer to peer VPN
- B. Remote access VPN
- C. Overlay VPN

Answer: C

---

**QUESTION 307:**

Which of the following are valid business categorizations for VPN's?

- A. Intranet VPN
- B. Internet VPN
- C. Extranet VPN

D. Access VPN

Answer: A, C, D

---

**QUESTION 308:**

Which command would you use to display information about the TDP session and the addresses and ports being used?

- A. show mpls tdp-sessions detail
- B. show tag-switching tdp neighbors
- C. show tag-switching neighbors
- D. show mpls tdp-sessions

Answer: B

---

**QUESTION 309:**

The default control VC an LC-ATM is 0/32 how would you change this to 2/32?

- A. (config-if)#tag-switching atm vpi 2 32
- B. (config-if)#tag-switching atm control-vc 2 32
- C. (config-if)#tag-switching atm control-vc 2/32
- D. (config)#tag-switching atm control-vc 2 32

Answer: B

---

**QUESTION 310:**

Which command would you use to disable TTL propagation?

- A. (config)#no mpls ttl-propagate
- B. (config-if)#no mpls ip propagate-ttl
- C. (config)#no mpls ip propagate-ttl
- D. (config)#no ip mpls ttl-propagate

Answer: C

---

**QUESTION 311:**

What is the effect of the use of the hop-count TLV in cell mode MPLS to the traceroute command?

- A. Traceroute still accurately indicates the number of hops in the MPLS path.
- B. Traceroute will indicate the ingress router to an MPLS domain once for each hop through the MPLS path and not the core MPLS LSR's.

- C. Traceroute will accurately indicate each router in the MPLS path.
- D. Traceroute will not indicate any of the MPLS domain routers including the ingress and egress routers.

Answer: B

Explanation:

Mode MPLS. Page 91 of the reference states "...Although the previous description provides all the necessary functionality for traceroute to work in a Farme-mode MPLS environment, you also need to consider the effects of traceroute across an MPLS network that is constructed with ATM-LSRs in the topology.

Chapter 1, "Multiprotocol Lable Switching (MPLS) Architecture Overview," defines an ATM-SLR as an LSR with a number of LC-ATM interfaces that forward cells between these interfaces using labels carried in the VPI/VCI field.

The consequence of this is that TTL is not available in the header of an ATM cell and, therefore CANNOT BE MANIPULATED AT EACH HOP in the network.

For this reason, when ATM-SLRs are within the path, the ATM portion of the network is TREATED AS ONE IP HOP."

Reference: MPLS and VPN Architectures (CCIP edition)

---

### **QUESTION 312:**

Which of the following are names of valid fields in the MPLS header?

- A. Label
- B. B bit
- C. TTL
- D. TOS

Answer: A, C

---

### **QUESTION 313:**

What is true about disabling TTL propagation into an MPLS domain? (Select all that apply.)

- A. It has to be disabled on all LSR's in the MPLS path.
- B. The TTL field in the label is set to 0.
- C. The TTL field in the label is not copied into the IP header on egress.
- D. The TTL field in the label is not copied from the TTL field in the IP header on ingress.

Answer: C, D

Explanation:

Not A: Option A is incorrect as it only needs to be turned off at ingress router.

---

**QUESTION 314:**

What is true about penultimate hop popping?

- A. It works on cell and frame mode MPLS networks.
- B. It allows double lookup on the egress router which is more efficient.
- C. It prevents the need for double lookup on an egress router.
- D. It causes the label to be popped one hop earlier.

Answer: C, D

---

**QUESTION 315:**

Which MPLS mode of label retention allows all received labels to be stored not just the ones from a next hop neighbor?

- A. Independent
- B. Ordered
- C. Liberal
- D. Conservative

Answer: C

---

**QUESTION 316:**

What is the order of significance for determining the IP address portion of a TDP identifier?

- A. The highest interface IP address.
  - B. The value of the "tag tdp router-id" statement.
  - C. The highest loopback IP address
- B, A, C

- A. C, A, B
- B. B, C, A
- C. A, C, B

Answer: C

---

**QUESTION 317:**

Which of the following modes of operation would be used for packet (or frame) mode MPLS?

- A. per-interface label allocation
- B. unsolicited label distribution
- C. liberal label retention
- D. ordered control

Answer: B, C

---

**QUESTION 318:**

What is true about OSPF running between PE and CE routers?

- A. Extra configuration is required to pass the OSPF route attributes from OSPF to MP-BGP.
- B. OSPF route attributes are carried as extended BGP attributes into MP-BGP.
- C. Extra configuration is required to pass the OSPF route attributes from MP-BGP to OSPF.
- D. Routes redistributed from MP-BGP to OSPF automatically maintain OSPF route attributes.

Answer: B, D

---

**QUESTION 319:**

Which of the following are MPLS applications?

- A. Traffic screening/filtering
- B. Traffic engineering
- C. QOS
- D. Web caching

Answer: B, C

---

**QUESTION 320:**

Which are valid MP-BGP extended community formats?

- A. <type>:<ASnumber>:<Value>
- B. <type>:<Prefix>:<Value>
- C. <type>:<Arenumber>:<Value>
- D. <type>:<IP address>:<Value>

Answer: A, D

---

**QUESTION 321:**

When providing Internet access to VPN customers through global routing two options exist at the PE.

What are these two options?

- A. VPN leaking
- B. Packet popping
- C. Use a separate (sub) interface for Internet and VPN traffic.
- D. Packet leaking

Answer: C, D

---

**QUESTION 322:**

In cases where VPN customers use OSPF and have cross domain links to other sites which also connected into the provider network what is true about this situation?

- A. The OSPF tag field can be set to prevent cross domain routing loops.
- B. This configuration is not supported by MPLS VPN's.
- C. The down bit can be used to prevent cross domain routing loops.
- D. The down bit will be reset as routes pass between OSPF domain and may cause routing loops.

Answer: A, D

---

**QUESTION 323:**

Which of the following can be performed by an ATM LSR?

- A. Pop
- B. Swap
- C. Push

Answer: B

---

**QUESTION 324:**

What is true about the SOO extended community?

- A. SOO is only needed for multihomed customer sites.
- B. SOO can be used as a loop prevention mechanism.
- C. SOO is most useful for stub sites.
- D. SOO has the effect of creating possible loops.

Answer: A, B

---



**QUESTION 325:**

What is true about the following configuration in a PE router?

```
Router bgp 21
address-family ipv4 vrf yellow
neighbor 10.3.2.1 remote-as 44
neighbor 10.3.2.1 active
```

- A. It configures an MP-BGP neighborhood to another PE.
- B. It configures an EBGP neighborhood to a CE.
- C. It configures an IBGP neighborhood with a CE.
- D. It configures an IBGP neighborhood to another PE.

Answer: B

---

**QUESTION 326:**

Which is a valid route configuration statement?

- A. (config-vrf)#route-target 1234:13 import
- B. (config-vrf)#rt import 1234:13
- C. (config-vrf)#rt 1234:13 export
- D. (config-vrf)#route-target both 1234:13

Answer: D

---

**QUESTION 327:**

Which BGP address family configuration statement in a PE router correctly specifies an MP-BGP session to another PE router?

- A. (config-router)#ip address-family vpnv4
- B. (config-router)#address-family vpnv4
- C. (config-router)#address-family ipv4 vrf <vrf name>

Answer: B

---

**QUESTION 328:**

What is true about a routing context?

- A. It uses global router variables for all routing instances.
- B. It allows a routing protocol run in one VRF.
- C. It allows different customers on the same PE to run the same routing protocol.
- D. It allows multiple routing instances in a VRF.

Answer: B, C

---

**QUESTION 329:**

What is true about a PE router?

- A. It participates in customer routing protocols.
- B. It runs provider backbone IGP.
- C. It exchanges VPNv4 routes with other routers.
- D. It has no direct customer connectivity.
- E. It has to run BGP.

Answer: A, B, C, E

---

**QUESTION 330:**

Which are function(s) required in the control plane when using multicast IP routing over MPLS?

- A. PIM version 2 with MPLS extensions.
- B. A label distribution protocol.
- C. A packet forwarding protocol.
- D. An IP routing protocol.

Answer: A

---

**QUESTION 331:**

Only one route target can be associated with each route.  
True or false?

- A. True
- B. False

Answer: B

---

**QUESTION 332:**

Which of the following describes a VPN in which every site can communicate with a server but not with each other?

- A. Central services VPN
- B. Overlapping VPN
- C. Managed network VPN
- D. Simple VPN

Answer: A

---

**QUESTION 333:**

What is the name given to an IP address that is extended with an RD?

- A. An IPv4 address
- B. A VPNv4 address
- C. A VPNv2 address
- D. A RDv4 address

Answer: B

---

**QUESTION 334:**

Which of the following is NOT a valid topology?

- A. Hub and spoke
- B. Partial mesh
- C. Circular
- D. Multilevel

Answer: C

---

**QUESTION 335:**

Which command would you use to display the contents of the LFIB table?

- A. show tag-switching lfiv
- B. show mpls label-forwarding-table detail
- C. show mpls forwarding-table detail
- D. show mpls lfib detail

Answer: C

---

**QUESTION 336:**

What is true about the MTU on an interface when running MPLS?

- A. The MTU is automatically decreased on WAN interfaces.
- B. Some switches do not support jumbo frames.
- C. If the MTU is increased on a LAN interface it can result in jumbo frames.
- D. The IP MTU is automatically decreased on LAN interfaces.

Answer: B, C, D

---

**QUESTION 337:**

BGP derived prefixes are assigned the label that is used for the \_\_\_\_\_?

- A. IBGP peer
- B. AS-Path
- C. IGP prefix in the routing table
- D. Next hop address

Answer: D

---

**QUESTION 338:**

What does LDP use to find non adjacent neighbors?

- A. Broadcast hello packets
- B. Multicast hello packets
- C. Specific hello packets
- D. Directed hello packets

Answer: D

---

**QUESTION 339:**

Following an exchange of LDP hellos, which router will attempt to establish the LDP session?

- A. The router with the highest IP address in the LDP identifier.
- B. The router which is the first to receive a hello.
- C. They will both try.
- D. The router with the lowest IP address in the LDP identifier.

Answer: A

---

**QUESTION 340:**

Which mode of label distribution advertises labels to all neighbor LSR's?

- A. Independent
- B. Liberal
- C. Unsolicited
- D. On demand

Answer: C

---

**QUESTION 341:**

What is true about per-platform label allocation over per-interface label allocation?

- A. It conserves table space.
- B. It conserves VPI/VCI's in an ATM MPLS network.
- C. It is more efficient.
- D. It is more secure.

Answer: A, B, C

---

**QUESTION 342:**

Which customer routing protocols will support MPLS VPN's?

- A. RIP V2
- B. RIP V1
- C. EIGRP
- D. OSPF
- E. EBGp

Answer: A, B, D, E

Explanation:

B: RIPv1 CAN be used but NOT supported officially by Cisco.

---

**QUESTION 343:**

Which are the two major components of MPLS?

- A. Administrative plane
- B. Data plane
- C. Routing plane
- D. Control plane

Answer: B, D

---

**QUESTION 344:**

What is true about the following configuration?

```
ip vrf green
rd 100:10
route-target both 100:10
ip vrf blue
rd 100:11
```

```
route-target both 100:11
ip vrf orange
rd 100:12
route target both 100:10
route-target both 100:14
```

- A. Site orange can talk to another site using an RT of 100:14.
- B. Site blue cannot talk to site orange.
- C. Site orange can talk to site green
- D. Site green can talk to site blue.

Answer: A, B, C

---

**QUESTION 345:**

In cases where VPN customers run OSPF and have areas that are multihomed into a provider network it is possible for loops to form.  
What provision is made to prevent this?

- A. Use the OSPF "tag bit" on egress to the multihomed area from the PE.
- B. Set the OSPF "down bit" on egress to the multihomed area from the PE.
- C. Set the OSPF "down bit" on ingress from the multihomed area to the PE.
- D. Use the OSPF "tag bit" on ingress from the multihomed area to the PE.

Answer: B

---

**QUESTION 346:**

What is true about the following configuration?

```
ip vrf blue
rd 21:222
import map map
route-target both 21:222
route-map map permit 10
match ip address 10
access-list 10 permit 172.18.2.0.0.0.0.255
```

- A. Routes will be entered into the vrf table if they satisfy the access list.
- B. Routes will be entered into the vrf table if they have RT 21.222 appended to them.
- C. Routes will be entered into the vrf table if they satisfy the access list and have only RT 21.222 appended to them.
- D. Routes will be entered into the vrf table if they satisfy the access list and have at least RT 21.222 appended to them.

Answer: D

---

**QUESTION 347:**

What is the name given to the MPLS VPN in terms of the OSPF hierarchy?

- A. OSPF virtual link
- B. OSPF superbackbone
- C. OSPF ABR
- D. Area 0

Answer: B

---

**QUESTION 348:**

Instead of using a routing protocol between the PE and CE routers it is possible to use static routes in some cases.

What is true about static routes in MPLS VPN's?

- A. The static routes are on a per VRF basis.
- B. You must always specify the outgoing interface.
- C. The static routes are not entered into the VRF routing table.
- D. The static routes are configured under the bgp address family prompt.

Answer: A, B

---

**QUESTION 349:**

Which are valid formats for a route distinguisher?

- A. 10.34.231.4:21
- B. 10:34:231:4.21
- C. 14567.32
- D. 121.32

Answer: A

Explanation:

Not D: option D should not be correct as it is a dot between 121 and 32 not a colon.

---

**QUESTION 350:**

If a customer who is part of an MPLS VPN is running OSPF, routes are automatically imported from the OSPF instance in the VRF to BGP for advertisement to other PE's.

True or false?

- A. True

B. False

Answer: B

---

**QUESTION 351:**

Which of the following devices performs the MPLS function at the interface to a cell mode MPLS domain?

- A. Edge LSR
- B. ATM LSR
- C. LSR
- D. ATM edge LSR

Answer: D

---

**QUESTION 352:**

What does cell mode MPLS use as a forwarding label?

- A. The AAL5 header
- B. The ATM header
- C. The label
- D. The IP header

Answer: B

---

**QUESTION 353:**

Which of the following describes a VPN in which some sites are part of more than one VPN?

- A. Simple VPN
- B. Overlapping VPN
- C. Central services VPN
- D. Managed network VPN

Answer: B

---

**QUESTION 354:**

What is true about peer to peer VPN's? (Select all that apply.)

- A. The customer is isolated from the provider network.
- B. The provider routers carry all the customers routes.
- C. They are easy to implement.



D. They can provide optimum routing between sites.

Answer: B, C, D

Explanation:

Option D is also correct as page 139 states "Routing between the customer sites is always optimal, as the provider routers know the customers's network topology and can thus establish optimum inter-site routing."

Reference: MPLS and VPN Architectures (CCIP edition)

---

**QUESTION 355:**

Which of the following label operations can be performed by a P router that is not a penultimate router in the MPLS VPN path?

- A. Pop
- B. Purge
- C. Push
- D. Swap

Answer: D

---

**QUESTION 356:**

If labels are being distributed in an MPLS network but no labels are being allocated for local routes, what could be the problem?

- A. There is an error with the conditional label distribution configuration.
- B. CEF is disabled on the LSR.
- C. There are no LDP neighborships established to the LSR.
- D. CEF is not enabled on an input interface.

Answer: B

---

**QUESTION 357:**

If you use the configuration statement "mpls mtu 1512" how many labels in a label stack are being allowed for?

- A. 3
- B. 2
- C. 4
- D. 1

Answer: A

---

**QUESTION 358:**

In an MPLS domain that carries BGP traffic it is best to use host routes without summarization for BGP next hop addresses. True or false?

- A. False
- B. True

Answer: B

---

**QUESTION 359:**

How is the TTL field in the label header generated?

- A. It is set to a number equal to the number of hops in the MPLS path plus 1.
- B. It is copied from the TTL field in the IP header on ingress.
- C. It is copied from the TTL field in the IP header on egress.
- D. It is set to 255 when enabled.

Answer: B

---

**QUESTION 360:**

What does PHP stand for?

- A. Packet Hierarchical Priority.
- B. Previous Hop Pushing.
- C. Packet Header Priorities.
- D. Penultimate Hop Popping.

Answer: D

---

**QUESTION 361:**

What is true about a VPNv4 address?

- A. It contains an RD and an IPV4 address.
- B. It is 96 bits long.
- C. They are unique within the local PE.
- D. They are propagated using the core IGP.

Answer: A, B

---

**QUESTION 362:**

What is the correct order following initialization for the following frame mode

MPLS label functions:

- A. Every LSR completes its LIB, LFIB and FIX data structures
- B. Each LSR assigns a label to every FEC.
- C. IP routing protocols build their routing tables.
- D. LSR's announce their labels to their peer LSR's.

A. B, D, A, C

B. B, C, D, A

C. C, A, B, D

D. C, B, D, A

Answer: D

---

**QUESTION 363:**

What is NOT true about VC-merge in ATM MPLS networks?

- A. It can cause jitter or delay across the network.
- B. It increases buffer requirements.
- C. It buffers cells for a whole frame before forwarding them.
- D. It allows you to use per-interface label allocation.

Answer: D

---

**QUESTION 364:**

TDP is the default labeling protocol but LDP has to be used when peering to non-Cisco devices. True or false?

- A. True
- B. False

Answer: A

---

**QUESTION 365:**

Which IGP IP routing protocols support MPLS traffic engineering?

- A. RIP v2
- B. IS-IS
- C. EIGRP
- D. OSPF

Answer: B, D

---

**QUESTION 366:**

Which of the following router types has to perform an IP routing table lookup when forwarding a packet over an MPLS network if PHP is active?

- A. Egress PE router
- B. P router
- C. Penultimate P router
- D. CE router

Answer: A

Explanation:

It is certain that option A (Egress PE router) needs to perform an IP lookup, but CE router, being the receiver does not apply (not D).

---

**QUESTION 367:**

PE to CE routing protocols supported are, RIPv2, OSPF and EBGp.  
Which of the following situations would best suit the use of EBGp?

- A. Stub sites which are not concerned with convergence.
- B. For very large customer networks that presently use OSPF.
- C. Where many routes may be originated by the customer.
- D. For complex multihomed scenarios.

Answer: C, D

---

**QUESTION 368:**

If a customer using BGP as a PE to CE routing protocol is connected to two VPN's there is a problem because the customer router will not be able to route between the two VPN's due to the provider AS number being the same for both, which is rejected in standard BGP.

What is a BGP facility that can provide a workaround to this problem?

- A. AS-transparent
- B. AS-passthrough
- C. No-ascheck
- D. Allowas-in

Answer: D

---

**QUESTION 369:**

In MPLS VPN's which protocol propagates VPN labels?

- A. RSVP
- B. MP-BGP
- C. CR-LDP
- D. PIM V2

Answer: B

---

**QUESTION 370:**

How many route targets can be attached to an advertised route?

- A. 0
- B. Many
- C. 2
- D. 1

Answer: B

---

**QUESTION 371:**

Which of the following routing protocols can support multiple processes?

- A. RIPv2
- B. EBGp
- C. OSPF

Answer: C

---

**QUESTION 372:**

What does VRF stand for?

- A. VPN routing and forwarding instance.
- B. VPN route filter.
- C. VPN routing formatter.
- D. VPN routing function.

Answer: A

---

**QUESTION 373:**

What is the name of the entity that indicates VPN membership within an MPLS VPN?

- A. PE
- B. Route target
- C. VPNv4 address
- D. Route distinguisher

Answer: D

---

**QUESTION 374:**

What is the function of the "S bit" in the MPLS header?

- A. It is a service bit which when set indicates this label is active.
- B. It is a bottom of stack bit which when set indicates that this is not the last label in the stack.
- C. It is a bottom of stack bit which when set it indicates that this is the last label in the stack.
- D. It is a service bit which when set indicates this label is not active.

Answer: C

---

**QUESTION 375:**

In VPN terms what is the name given to an MPLS device that interfaces with a customer site router?

- A. CE
- B. PE
- C. CPE
- D. P

Answer: B

---

**QUESTION 376:**

Which command would you include in a configuration for a basic LC-ATM interface on a Catalyst ATM switch?

- A. (config)#int atm 0/0  
(config-if)#mpls ip
- B. (config)#int atm 0/0 point-to-multipoint  
(config-if)#mpls ip
- C. (config)#int atm 0/0 point-to-point  
(config-if)#mpls ip
- D. (config)#int atm 0/0 tag-switching  
(config-if)#mpls ip

Answer: A

---

**QUESTION 377:**

The TTL field in the MPLS header is used to prevent loops forming.  
How many bits are allocated to that field?

- A. 16
- B. 4
- C. 8
- D. 6

Answer: C

---

**QUESTION 378:**

In MPLS frame mode where in the packet is the label inserted?

- A. Between layers 3 and 4.
- B. Between layers 4 and 5.
- C. Between layers 2 and 3.
- D. Between layers 1 and 2.

Answer: C

---

**QUESTION 379:**

A Label Switch Path (LSP) tunnel is \_\_\_\_\_?

- A. Bidirectional
- B. Multidirectional
- C. Unidirectional

Answer: C

---

**QUESTION 380:**

Which of the following is true about convergence in a frame mode environment?

- A. Convergence after link failure is possible as soon as the IP routing protocol has converged.
- B. Frame mode MPLS does not maintain alternative paths in the LIB.
- C. Convergence after link recover is possible as soon as the IP routing protocol has converged.
- D. Frame mode MPLS maintains alternative paths in the LIB.

Answer: A, D

---

**QUESTION 381:**

What is true about LDP?

- A. It uses TCP port 646.
- B. It uses TCP port 711.
- C. It uses UDP port 646.
- D. It uses UDP port 711.

Answer: A, C

---

**QUESTION 382:**

Which are benefits when providing Internet access via a separate VPN rather than through global routing in the PE router?

- A. Internet routes are not carries an VPN routes.
- B. The provider backbone is isolated from the Internet.
- C. It is easily scalable.
- D. It has greater security.

Answer: B, D

---

**QUESTION 383:**

PE to CE routing protocols supported are, RIPv2, OSPF and EBGp.  
Which of the following situations would best suit the use if RIPv2?

- A. Stub sites which are not concerned with convergence.
- B. For complex multihomed scenarios.
- C. For very large customer networks.
- D. Where many routes may be originated by the customer.

Answer: A

---

**QUESTION 384:**

Per VRF routing means that there could be several instances of RIP and BGP alongside several OSPF processes.  
What is the maximum total number of routing processes allowed in one router?

- A. 16
- B. 32



- C. 64
- D. 8

Answer: B

---

**QUESTION 385:**

Which is the default state for the "config-router-af)#neighbor 10.3.2.1 send-community" configuration statement?

- A. Extended
- B. Standard
- C. Both

Answer: A

---

**QUESTION 386:**

Be aware when configuring a route target that there are implementation issues with some IOS levels that require \_\_\_\_\_?

- A. All export RT's must have a matching import RT for the same VRF.
- B. There must be at least one import RT.
- C. At least one export RT must also be an import route target for the same VRF.
- D. There must be at least one RT.

Answer: C

---

**QUESTION 387:**

What size is the route target attribute?

- A. 48bits
- B. 16 bits
- C. 64 bits
- D. 32 bits

Answer: C

---

**QUESTION 388:**

What size is a route distinguisher (RD)?

- A. 16 bits
- B. 32 bits
- C. 64 bits

D. 48 bits

Answer: C

---

**QUESTION 389:**

Which command would you use to enable frame mode MPLS on an interface?

- A. (config-if)#mpls ip
- B. (config)#tag-switching ip
- C. (config)#mpls ip
- D. (config-if)#ip mpls

Answer: A

---

**QUESTION 390:**

Which command would you use to enable Cisco Express Forwarding on all VIP interfaces?

- A. (config)#ip cef
- B. (config-if)#ip cef
- C. (config)#ip cef distributed
- D. (config-if)#ip cef distributed

Answer: C

---

**QUESTION 391:**

Which methods can be used in cell mode MPLS to prevent loops?

- A. The IGP's loop prevention mechanisms.
- B. The loop count TLV.
- C. The hop count TLV.
- D. The path vector TLV.

Answer: A, C, D

---

**QUESTION 392:**

What is an effect of disabling TTL propagation into the MPLS domain?

- A. It stops traceroute from operating.
- B. It assists with loop preventions.
- C. It hides the core routers in the MPLS domain from the non MPLS domain.
- D. It allows the setting up of explicit LSP's that are suboptimal.

Answer: C

---

**QUESTION 393:**

Cell interleave is an issue with ATM MPLS networks. Which of the following could result in this problem?

- A. Per-platform label allocation is being used.
- B. Liberal label retention is being used.
- C. VC-merge is being used.
- D. Per-interface label allocation is being used.

Answer: A

---

**QUESTION 394:**

LDP neighbors are discovered but no LDP session is established. What could be the cause?

- A. There is no TCP connectivity between the neighbor loopback addresses.
- B. There is an LDP/TDP protocol mismatch.
- C. There is no TCP connectivity between neighbor's adjacent interfaces.
- D. MPLS is not enabled on neighbor router.

Answer: A

---

**QUESTION 395:**

Which of the following statements will configure a VRF static route to a global next hop for access to the Internet?

- A. (config)#ip route vrf red 0.0.0.0 0.0.0.0 172.16.32.1  
global
- B. (config)#ip global-route vrf red 0.0.0.0 0.0.0.0  
172.16.32.1
- C. (config)#ip route 0.0.0.0 0.0.0.0 vrf red 172.16.32.1  
global
- D. (config)#ip route vrf red 0.0.0.0 0.0.0.0 global  
172.16.32.1

Answer: A

---

**QUESTION 396:**

It is possible to add extra RT's to selected outgoing routes to signify a specific

purpose.

Which route map set command would you use to append an extra RT of 110:32 to an exported VRF route?

- A. set export-rt 100:32 additive
- B. set extcommunity rt 110:32 additive
- C. set export-rt 110:32
- D. set extcommunity rt 110:32

Answer: B

---

**QUESTION 397:**

If an MPLS router receives a packet with a stack of labels which label will it act upon?

- A. The bottom label.
- B. The label point to by a pointer.
- C. The top label.
- D. All the labels.

Answer: C

---

**QUESTION 398:**

MPLS VPN's use a label stack to forward packets to the correct remote VPN. Which router assigns the VPN label which is the second label in the stack?

- A. The ingress PE router.
- B. The egress PE router.
- C. The ingress CE router.
- D. The penultimate P router.

Answer: B

---

**QUESTION 399:**

Which is NOT a BGP community attribute which is used in MPLS applications?

- A. The route target.
- B. The local preference.
- C. The site of origin.
- D. The OSPF route type

Answer: B

---

**QUESTION 400:**

What type of route target function selects routes to be inserted into the VRF routing table?

- A. Implied RT
- B. Import RT
- C. Extended RT
- D. Export RT

Answer: B

---

**QUESTION 401:**

Which are types of traditional peer to peer VPN implementations?

- A. Dedicated P router
- B. Shared PE router
- C. Dedicated PE router
- D. Shared CE router

Answer: B, C

---

**QUESTION 402:**

Which command would you use to display TDP hello timers?

- A. show tag-switching interface
- B. show tag-switching tdp parameters
- C. show tag-switching timers
- D. show mpls timers

Answer: B

---

**QUESTION 403:**

What is NOT true about an explicit LSP tunnel?

- A. They can be set up using RSVP or CR-LDP.
- B. They can be configured manually.
- C. Uses include the ability to implement load balancing over unequal paths.
- D. The tunnels cannot be included in the IGP shortest path calculation.

Answer: D

---

**QUESTION 404:**

What are another name given to the MPLS label inserted into a packet header?

- A. Patch
- B. Plug
- C. Pad
- D. Shlm

Answer: D

---

**QUESTION 405:**

Which of the following are required fields in an LDP hello packet?

- A. UDP header
- B. Transport address TLV
- C. IP header
- D. LDP identifier TLV

Answer: A, C, D

---

**QUESTION 406:**

Which of the following are Cisco proprietary functions?

- A. MPLS
- B. LDP
- C. TDP
- D. Tag switching

Answer: C, D

---

**QUESTION 407:**

In MPLS unicast IP routing what entity is assigned a unique FEC?

- A. An IGP prefix.
- B. An IGP prefix in conjunction with a class of service.
- C. A destination multicast address.
- D. An egress router.

Answer: A

---

**QUESTION 408:**

What is true about using static routes from the PE to the CE router?

- A. Can be used where there is only one connection from the customer to the provider network.
- B. They do not need to be redistributed into MP-BGP.
- C. The CE router can use a default route to the PE.
- D. They simplify the management of VPN's by the service provider.

Answer: A, C

---

**QUESTION 409:**

In an MPLS VPN where the customer uses OSPF how is the OSPF route cost propagated between sites?

- A. A BGP extended community is used to pass the OSPF cost.
- B. The cost is passed transparently through area 0.
- C. The cost is configured using the default metric parameter.
- D. The BGP MED is used to pass the OSPF cost.

Answer: D

---

**QUESTION 410:**

What should be remembered when configuring VRF forwarding on an interface?

- A. The VRF will be applied to all subinterfaces on that physical interface, they may need reconfiguring.
- B. CEF will be disabled on the interface, it will need to be re-enabled.
- C. The interface will be shutdown, it will need restarting.
- D. The IP address of the interface will be removed, it will need re-entering.

Answer: D

---

**QUESTION 411:**

When you configure a VRF what is true?

- A. It is configured using (config)#vrf <vrf name>
- B. VRF names only have local significance.
- C. VRF names are not case sensitive.
- D. The VRF is not operational until you configure an RD.

Answer: B, D

---

**QUESTION 412:**

What is true about the MP-BGP extended community attribute?

- A. If it is an AS number form attribute the AS number has to be a registered number.
- B. If it is an AS number form attribute the AS number can be a private AS.
- C. If it is an IP address form of attribute it can be a private address.
- D. If it is an IP address form of attribute it has to use a registered IP address.

Answer: A, D

---

**QUESTION 413:**

Which is NOT true about MPLS VPN's?

- A. Customers cannot use overlapping addresses.
- B. Optimum routing can be provided between customer sites.
- C. Customers routing tables are kept separate within the PE.
- D. Only PE routers participate in customer routing.

Answer: A

---

**QUESTION 414:**

What are the connectivity requirements of a Central Services VPN?

- A. Both client and server sites have unlimited connectivity within a Central Service VPN.
- B. Client and server connectivity within the Central Service VPN is defined by the router descriptor within the VRF.
- C. Client sites can only talk to the server sites, server sites have unlimited connectivity within a Central Services VPN.
- D. Client sites have unlimited connectivity within a Central Services VPN, server sites have connectivity only to the clients.

Answer: C

---

**QUESTION 415:**

What is used to provide virtual intra-area OSPF connectivity across MPLS VPN backbone so the customer's traffic will prefer the MPLS VPN backbone over a backdoor OSPF link between the customer's sites?

- A. OSPF virtual-link
- B. OSPF sham-link
- C. OSPF nssa-link
- D. OSPF stub-link



- E. OSPF demand-circuit
- F. OSPF LSA1-link

Answer: B

---

**QUESTION 416:**

What are three drawbacks of a peer-to-peer VPN using a shared provider edge (PE) router? (Choose three)

- A. A full mesh of virtual circuits is required between the customer sites.
- B. All the customers have to share a common IP address space.
- C. Optimal routing between customer sites cannot be guaranteed.
- D. The shared PE router has to know all routes for all customers.
- E. Packet filters are required on the PE routers.

Answer: B, D, E

---

**QUESTION 417:**

What are the two major design models for offering Internet access and MPLS VPN services using the same MPLS backbone? (Choose two)

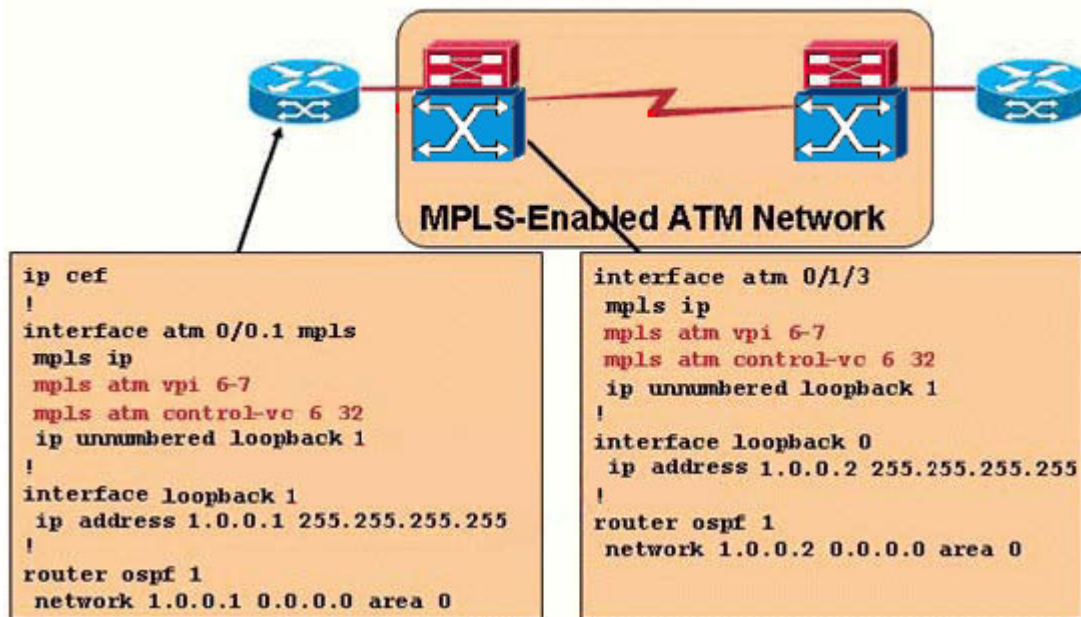
- A. Implementing Internet access as another VPN.
- B. Implementing Internet access through the global IP routing table on the PE routers.
- C. Implementing Internet access through the global VRF routing table on the PE routers.
- D. Implementing Internet access using Wholesale Internet Access Service.
- E. Implementing Internet access using packet filtering between the VRF and the global IP routing table on the CE routers.

Answer: A, B

---

**QUESTION 418:**

Exhibit



Refer to the exhibit. Which two of the following statements about the MPLS configurations are true? (Choose two)

- A. The VPI range being configured is the default VPI range.
- B. The router is missing the mpls label protocol ldp configuration command on its ATM 0/0.1 subinterface to make it an LC-ARM enabled subinterface.
- C. There is a problem with the configuration because the control VC should be set to 0 32 instead.
- D. The ATM switch is using VC merge since VC merge is enabled by default.
- E. For MPLS label allocations, both VPI 6 and 7 can be used.

Answer: D, E

#### QUESTION 419:

Which show command is used to verify the proper redistribution of the MPLS VPN EIGRP customer routes into a per-VRF instance if MP-BGP?

- A. show ip bgp vpnv4 vrf vrf-name
- B. show ip bgp
- C. show ip route bgp
- D. show ip route eigrp
- E. show ip vrf vrf-name
- F. show ip vrf detail vrf-name

Answer: A

**QUESTION 420:**

DRAG DROP

Drag the number of bit(s) on the left to the field of the MPLS header that uses them on the right.

1	Time To Live Field
2	Field length in bits
3	Stack Field
4	Field length in bits
8	Experimental Field
12	Field length in bits
16	Label Field
20	Field length in bits
24	

Answer:

2	Time To Live Field
	8
4	Stack Field
	1
12	Experimental Field
16	3
24	Label Field
	20

**QUESTION 421:**

What are the three default frame-mode MPLS label allocation and distribution modes? (Choose three)

- A. per-platform label space
- B. per-interface label space
- C. unsolicited label distribution

- D. downstream-on-demand label distribution
- E. liberal label retention
- F. conservative label retention

Answer: A, C, E

---

**QUESTION 422:**

What are the two tunneling technologies used to implement Layer 3 overlay VPNs over an IP backbone? (Choose two)

- A. IPSec
- B. GRE
- C. L2TP
- D. PPTP
- E. AToM
- F. MPLS TE

Answer: A, B

---

**QUESTION 423:**

Which IOS command can be used to examine the MPLS VPN label stack for a prefix?

- A. show ip route vrf [vrf-name] [ip-prefix]
- B. show ip cef [ip-prefix]
- C. show ip cef vrf [vrf-name] [ip-prefix]
- D. show ip vrf detail
- E. show ip bgp vpnv4 all
- F. show mpls interfaces

Answer: C

---

**QUESTION 424:**

DRAG DROP

Match the drawbacks on the left to the appropriate MPLS Internet access methods on the right by dragging and dropping the drawbacks to the proper access method. Drawbacks that are not appropriate to either method should be placed in the trash.

<p>This method introduces significant delay processing delays</p> <p>It is not practical to implement full Internet routing using this method.</p> <p>This method requires multiple physical or logical interfaces on the CE router.</p> <p>Customer use of private IP addressing is not supported when using this method.</p>	<p>Internet access through a VPN</p> <p></p>
	<p>Internet Access through a separate subinterface</p> <p></p>
	<p>Trash</p> <p></p> <p></p>

Answer:

<p>Internet access through a VPN</p> <p>It is not practical to implement full Internet routing using this method.</p>
<p>Internet Access through a separate subinterface</p> <p>This method requires multiple physical or logical interfaces on the CE router.</p>
<p>Trash</p> <p>This method introduces significant delay processing delays</p> <p>Customer use of private IP addressing is not supported when using this method.</p>

---

**QUESTION 425:**

Which one of the following is a problem solved by VC merge?

- A. Slow MPLS converges issue when using cell-mode MPLS.
- B. Limited number of VCs supported by the router and MPLS-enabled ATM switch hardware.
- C. Security concern when the same local label value is reused on different interfaces.
- D. Loop detection since the ATM header does not contain a TTL field.

Answer: B

---

**QUESTION 426:**

A pair of MPLS routers, operating in the default frame-mode, are connected over two parallel links. Which of the following describes what will happen when they try to establish LDP sessions?

- A. Only one LDP session will be established.
- B. Multiple LDP sessions, one for each link, will be established and the TCP traffic will be load balanced between the links.
- C. Multiple LDP sessions, one for each link, will be established, but only the one with the highest IP address will be active.
- D. Multiple LDP sessions, one for each link, will be established, but only the one with the best metric will be active.

Answer: A

---

**QUESTION 427:**

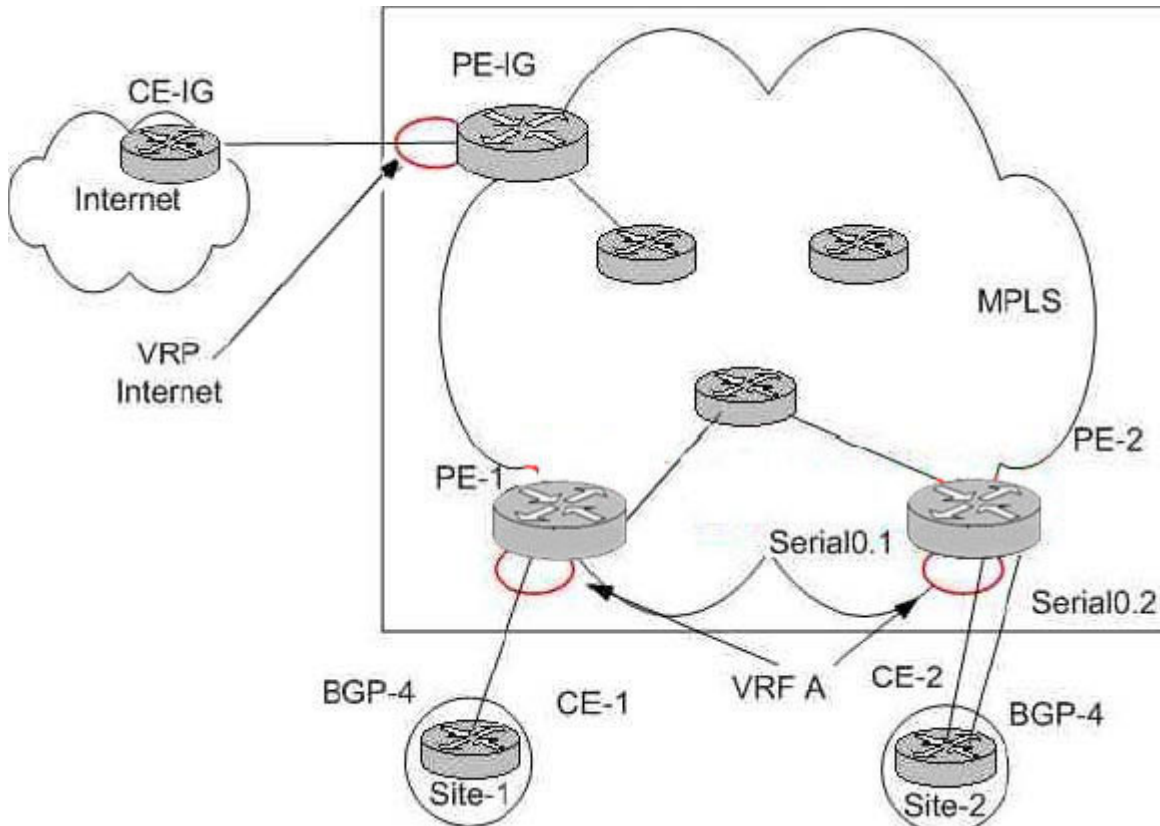
What does the Cisco ODAP for MPLS VPN feature enable?

- A. VRF aware NAT services
- B. VRF aware on-demand IP address pool
- C. VRF aware Hot Standby Router Protocol
- D. VRF aware OSPF domain area protocol
- E. VRF aware OSPF database access procedures
- F. VRF aware DHCP relay services

Answer: B

---

**QUESTION 428:**



In the diagram, the Internet is accessed through a dedicated Internet VPN implementation. With which two routers must PE-2 establish a VPNv4 BGP neighbor relationship? (Choose two)

- A. CE-1
- B. CE-2
- C. PE-1
- D. CE-IG
- E. PE-IG

Answer: C, E

#### QUESTION 429:

To troubleshoot an MPLS VPN, the show ip route [vrf-name] command should be entered on which router(s)?

- A. P
- B. CE
- C. PE
- D. CE or PE
- E. P or PE
- F. P or PE or CE



Answer: C

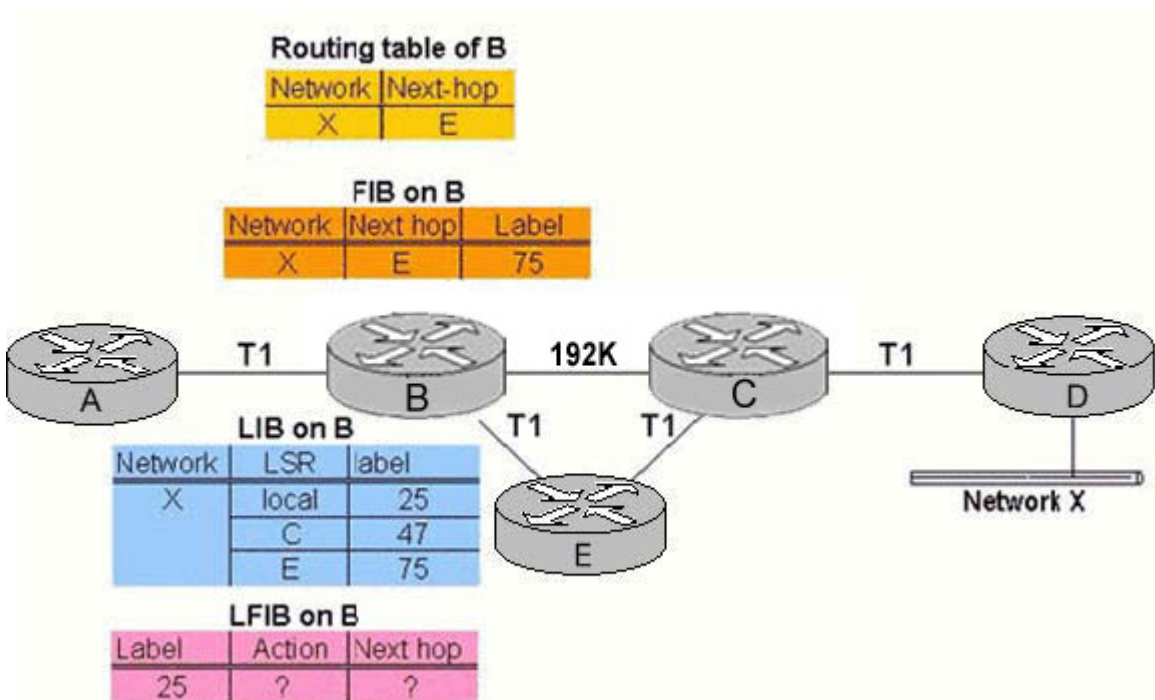
### QUESTION 430:

Which two statements are true about a service provider managed central firewall service? (Choose two)

- A. Traffic between the customer sites and the Internet are typically restricted only by the security functions of the service provider managed central firewall.
- B. Traffic between sites of an individual customer must flow inside the customer's VPN.
- C. Traffic between the different customers (Inter-customer VPN traffic) should be allowed.
- D. Customers that still want to retain their own private IP addresses inside their network must use NAT on the service provider managed central firewall.
- E. Service providers typically use public IP addresses as the address space between the service provider managed central firewall and the customers.

Answer: A, B

### QUESTION 431:



Refer to the graphic. At router B, complete the LFIB for a label of 25.

- A. Action: label of 47 and Next hop: router C
- B. Action: label of 75 and Next hop: router E
- C. Action: label of 25 and Next hop: router C
- D. Action: label of 25 and Next hop: router E

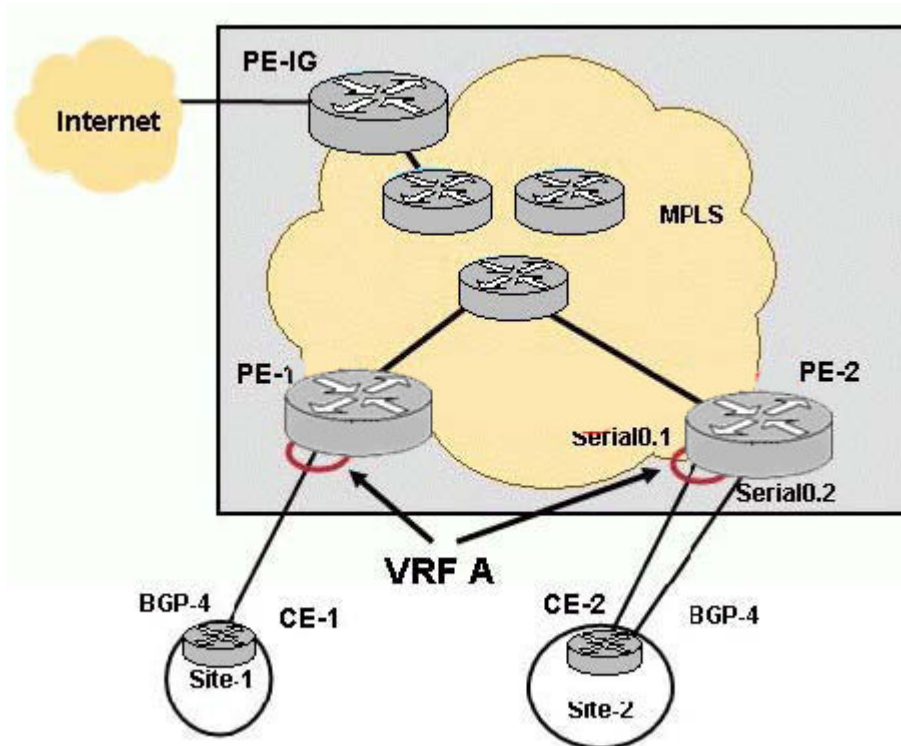


E. Action: 47 and 75 and Next hop: router C and router E

Answer: B

---

**QUESTION 432:**



On a dedicated subinterface implementation, PE-2 must establish an address-family vrf IPv4 BGP neighbor relationship with which router?

- A. CE-1
- B. CE-2
- C. PE-1
- D. PE-IG
- E. CE-1 and CE-2
- F. PE-1 and PE-IG

Answer: B

---

**QUESTION 433:**

What is wrong with the following BGP router configuration?

```
router bgp 65001
no bgp default ipv4-unicast
!
address-family vpnv4
neighbor 192.168.1.1 remote-as 65001
```

```
neighbor 192.168.1.1 update-source loopback 0
neighbor 192.168.1.1 activate
neighbor 192.168.1.1 next-hop-self
neighbor 192.168.1.1 send-community both
```

- A. The neighbor 192.168.1.1 remote-as 65001 and the neighbor 192.168.1.1 update-source loopback 0 commands should be moved under the bgp router configuration mode.
- B. The neighbor 192.168.1.1 activate command should be moved under the bgp router configuration mode.
- C. The no bgp default ipv4-unicast command needs to be removed.
- D. The neighbor 192.168.1.1 remote-as 65001, the neighbor 192.168.1.1 update-source loopback 0, and the neighbor 192.168.1.1 activate commands should be moved under the bgp router configuration mode.
- E. Nothing is wrong. The router will be able to propagate VPNv4 routes to the 192.168.1.1 MP-BGP neighbor.

Answer: A

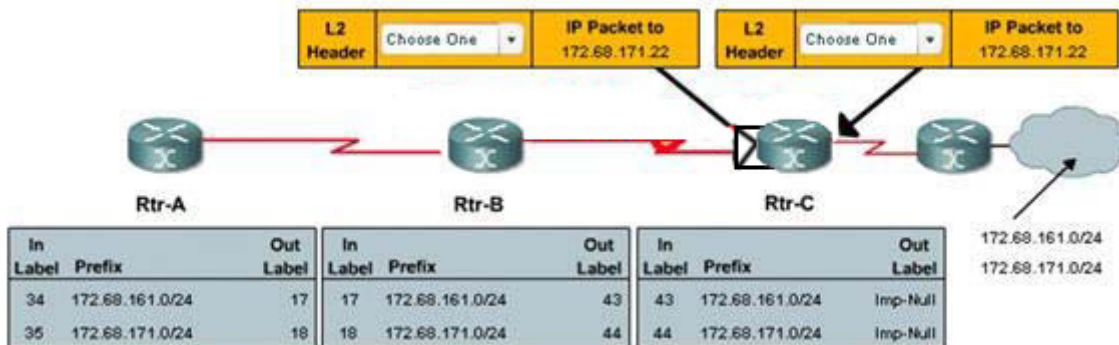
#### QUESTION 434:

##### DRAG DROP

For the packet destined to 172.68.171.22 from Rtr-B:

1. What label will be used at the ingress to Rtr-C?
2. What label will be used at the egress from Rtr-C?

Use the drop down box and choose the correct label for each packet.



Answer:

Explanation:

Label used @ the ingress to router C = 44

Label used @ the egress from router C = Imp-Null

#### QUESTION 435:

What best describes the following configuration example of allowas-in?

```
router bgp 100
address-family ipv4 vrf CustomerA
neighbor 195.12.4.5 remote-as 123
neighbor 195.12.4.5 activate
neighbor 195.12.4.5 allowas-in 2
```

- A. Permits incoming BGP updates defined by access-list 2.
- B. Permits incoming BGP updates defined by class-map 2.
- C. Permit incoming BGP updates defined by route-map 2.
- D. Permits incoming BGP updates with no more than two occurrences of AS 100 in the AS path.
- E. Permits incoming BGP updates with no more than two occurrences of AS 123 in the AS path.

Answer: D

---

**QUESTION 436:**

Which routing protocol is not VRF aware and uses a separate routing process for each VRF?

- A. EIGRP
- B. RIP
- C. OSPF
- D. BGP

Answer: C

---

**QUESTION 437:**

Exhibit:

```
Certkiller 3(config-router)#neighbor 10.1.1.1 maximum-prefix 100 80 warning-only
```

What does the command displayed in the exhibit accomplish?

- A. It prevents the 10.1.1.1 neighbor from exhausting the memory of the Certkiller 3 router.
- B. It limits the number of BGP Update messages the Certkiller 3 router will send to the 10.1.1.1 BGP peer.
- C. It logs a warning message on the Certkiller 3 router if the Certkiller 3 router BGP contains more than 100 prefixes.
- D. It logs a warning message on the Certkiller 3 router if the Certkiller 3 router BGP table is 80% full.
- E. It resets the BGP session to the 10.1.1.1 BGP peer of the Certkiller 3 router BGP table contains more than 100 prefixes.
- F. It resets the BGP session to the 10.1.1.1 BGP peer of the Certkiller 3 router BGP table is 80% full.

Answer: A

---

**QUESTION 438:**

Exhibit, Output

```
Certkiller12 #sh ip route bgp
B 192.168.24.0/24 [20/0] via 172.31.1.1, 02:34:00
B 192.168.21.0/24 [20/0] via 172.31.1.2, 02:34:00
B 192.168.20.0/24 [20/0] via 172.31.1.2, 01:20:33
B 10.0.0.0/8 [20/0] via 172.31.1.1, 02:34:29
B 192.168.23.0/24 [20/0] via 172.31.1.1, 02:34:00
B 192.168.22.0/24 [20/0] via 172.31.1.2, 02:34:00
B 192.168.12.0/22 [20/0] via 172.31.1.1, 01:40:07
B 192.168.20.0/24 [20/0] via 172.31.1.1, 01:36:12
```

Which prefix-list can be used to permit only the 192.168.12.0/22 and the 192.168.20.0/22 prefixes?

- A. ip prefix-list test permit 192.168.0.0/19 le 22
- B. ip prefix-list test permit 192.168.0.0/16
- C. ip prefix-list test permit 192.168.0.0/22
- D. ip prefix-list test permit 192.0.0.0/8 ge 22
- E. ip prefix-list test permit 192.168.0.0/20 le 22

Answer: A

---

**QUESTION 439:**

Exhibit

```
route-map test permit 10
match ip address prefix-list def
match as-path 1
set weight 111

route-map test permit 20
match ip address prefix-list def
set weight 110
|
route-map test permit 30
set weight 109
|
ip as-path access-list 1 permit _65111$
|
ip prefix-list def seq 10 permit 0.0.0.0/0
```

What does the route map in the exhibit accomplish? Select three.

- A. The weight of a default route that originates in AS65111 will be set to 111.
- B. The weight of a default route that originates in AS65111 will be set to 110.
- C. The weight of all routes that originates in AS65111 will be set to 111.

- D. The weight of all routes that originates in any AS will be set to 109.
- E. The weight of all routes that originates in any AS will be set to 110.
- F. The weight of all routes other than a default that originates in any AS will be set to 109.

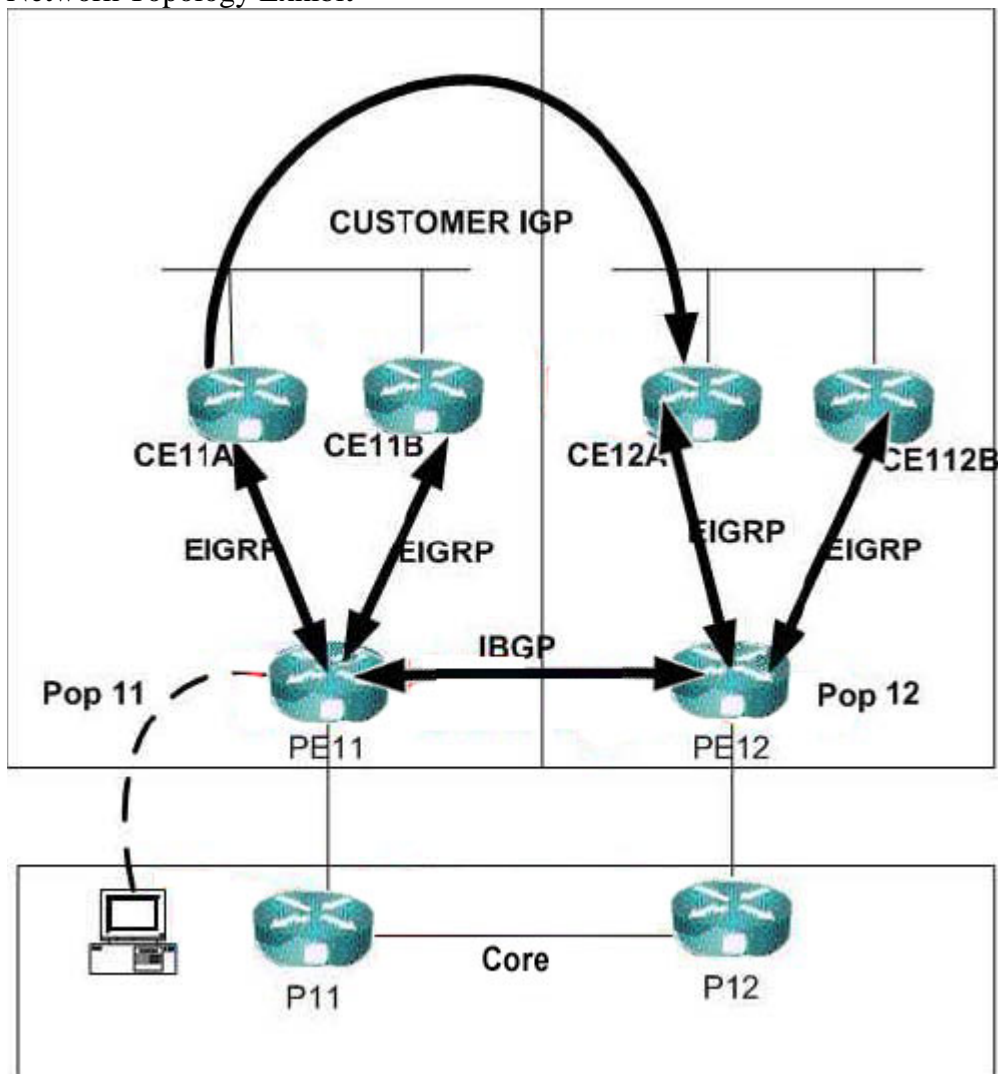
Answer: A, B, F

---

**QUESTION 440:**

**SIMULATION**

**Network Topology Exhibit**



Certkiller .com is a stock broker service that is using EIGRP AS 1 as the IGP in its network. Certkiller .com has decided to establish connectivity between the New York site and the Los Angeles site. NiceNet, a service provider, has been selected by Certkiller .com to provide the connectivity between the two sites. For this implementation NiceNet is using a MPLS VPN solution. NiceNet has already established MPLS connectivity between all of its PE routers. MPBGP

connectivity has also been established on all PE routers.  
Certkiller .com has successfully completed all necessary tasks on the CE routers, and NiceNet has successfully completed all necessary MPLS VPN configuration tasks on PE12. Your task is to successfully complete the implementation of the VPN connection by configuring the MPLS VPN on PE11 using the following information:  
Privileged mode password: Certkiller  
EIGRP is to be used as the PE - CE protocol for the VPN  
MPBGP is being used to propagate VPN routing information between PE routers.  
The interface supporting the Certkiller .com is Serial 0/0.101 and will have an IP address of 150.1.119.18 255.255.255.240  
The following has been assigned to Certkiller .com's VPN:  
The VRF\_name is Certkiller \_22  
The RD is 22:10.  
The route target for import is 21:10.  
The route target for export is 21:10.  
Configure EIGRP between CE11A and PE11 using AS number 10.  
Redistribute from BGP to EIGRP AS 10 using a metric string of 10000 100 255 1 1500.  
Redistribute from EIGRP AS 10 to BGP using metric string of 1.  
VPN is operational when you see the routes for both the local (10.1.11.0) and the remote (10.1.12.0) sites in the VRF routing table.  
Click on the host computer to start the simulation.

Answer:

```
ip cef
ip vrf Certkiller _22
rd 22:10
route-target import 21:10
route-target export 21:10
OR
route-target both 21:10
interface serial0/0.101
ip vrf forwarding Certkiller _22
ip address 150.1.119.18 255.255.255.240
Router bgp 'as number'
Address-family vpnv4
Address-family ipv4 vrf Certkiller _22
Neighbour x.x.x.x remote-as 'as number' activate
Redistribute eigrp metric 1
router eigrp 10
address-family ipv4 vrf Certkiller _22
Network 10.1.11.0
Network 10.1.12.0
redistribute bgp 'as number'
default-metric 10000 100 255 1 1500
autonomous-system 'as number'
```

**QUESTION 441:**

When nonadjacent LDP neighbors are used for implementing an MPLS traffic engineering solution, how are the nonadjacent LDP neighbors discovered?

- A. using multicast CR-LSP (constraint-based LSP)
- B. using unicast CR-LSP (constraint-based LSP)
- C. using multicast LDP hello messages
- D. using unicast LDP hello messages
- E. using multihop MP-IBGP
- F. using multihop MP-EBGP

Answer: D

**QUESTION 442:**

Drag and drop the correct commands in the proper order to redistribute the RED VPN routes from the BGP VRF into the EIGRP VRF.

router eigrp 1	Command 1 (place here)
router bgp 65001	
no auto-summary	Command 2 (place here)
redistribute eigrp 1	
address-family ipv4 vrf RED	Command 3 (place here)
address-family vpnv4 vrf RED	
redistribute eigrp 1 metric transparent	
redistribute bgp 65001 metric transparent	
redistribute bgp 65001 metric 1000 100 255 1 1500	



Answer:

Command 1
router eigrp 1

Command 2
address-family ipv4 vrf RED

Command 3
redistribute bgp 65001 metric transparent

---

**QUESTION 443:**

Refer to the exhibit. Based on the show outputs, which condition could be preventing the P1 router from establishing TDP adjacency with its neighbor over the s0/0.211 and s0/0.212 subinterfaces?

- A. The s0/0.211 and s0/0.212 subinterfaces line protocol are in the down state.
- B. The P1 router cannot establish a TCP session with its neighbors.
- C. The P1 router is missing the mpls label protocol LDP command.
- D. The show mpls tdp neighbor command needs to be used to view the TDP neighbor status.

Answer: B

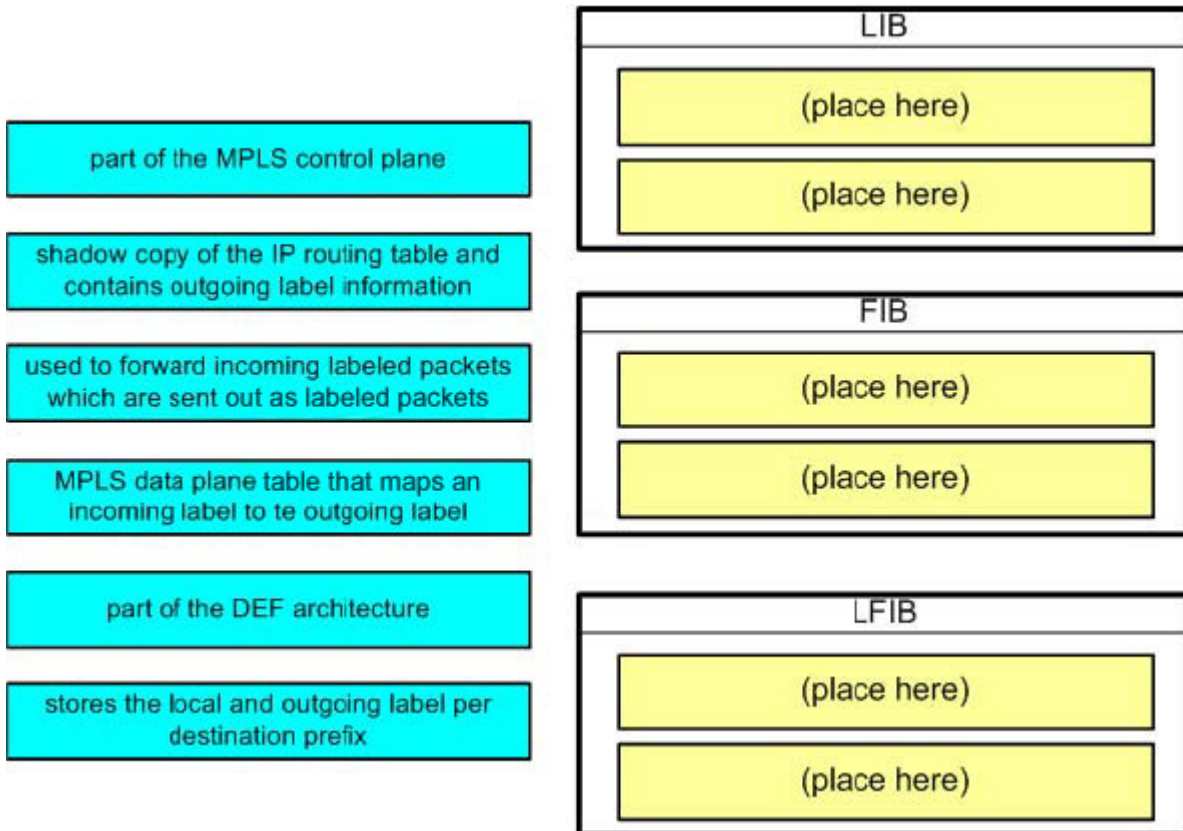
---

**QUESTION 444:**

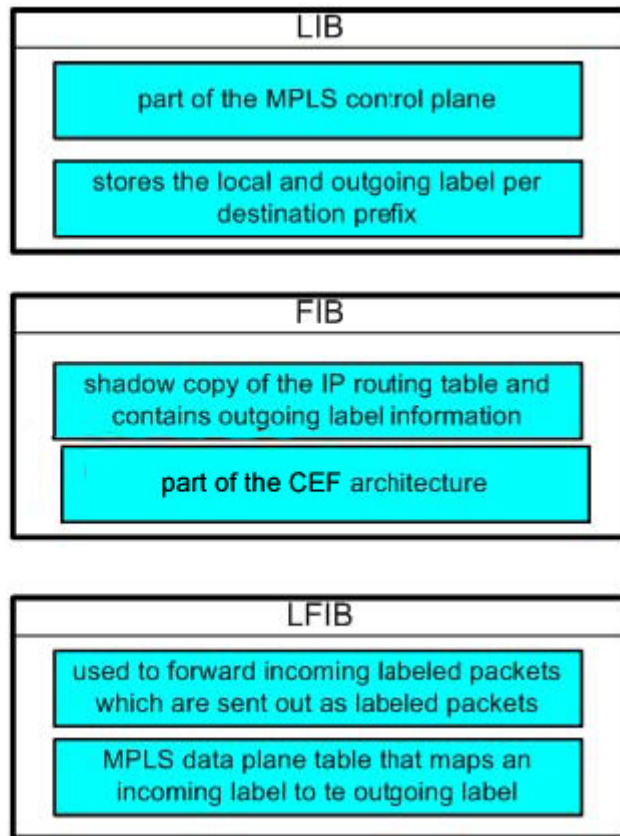
DRAG DROP

Drag the item on the left to the correct table it pertains to on the right.





Answer:



---

**QUESTION 445:**

With MPLS VPNs, if the CE-PE routing protocol is BGP, which statement below is true?

- A. The different customer sites must use different autonomous system numbers.
- B. Manual route redistribution between EBGp and MP-BGP is required.
- C. The SOO extended BGP community can be used to prevent routing loops.
- D. A BGP virtual sham-link is required between the customer site's CE routers to ensure optimal routing between the customer sites.
- E. The customer's autonomous system number must match the MPLS VPN service provider's autonomous system number.

Answer: C

---

**QUESTION 446:**

BGP is used as the CE-PE routing protocol in an MPLS VPN. The customer routes are successfully propagated from the CE router to the ingress PE router, but they are not showing up on the egress PE router. What is the most likely cause of the problem?

- A. There is a BGP-to-MPBGp redistribution error on the ingress PE router.
- B. There is a MPBGp-to-BGP redistribution error on the egress PE router.
- C. One of the P routers is performing route summarization, breaking the path between the ingress and the egress PE routers into two LSPs.
- D. RTs attached to the CE routes exported by the ingress router are not matched by at least one of the import RTs on the egress PE router.
- E. A route reflector is used to propagate the routes from the ingress PE router to the egress PE router, thus breaking the LSP.

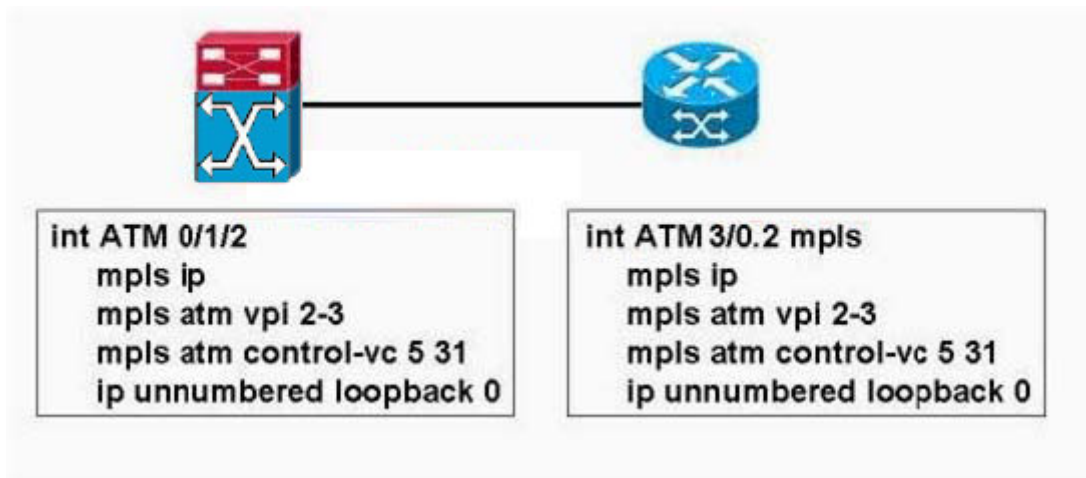
Answer: D

---

**QUESTION 447:**

Refer to the exhibit. A diagram of a router connected to an MPLS-enabled ATM switch via an LC-ATM MPLS interface, and a partial configuration for the MPLS-enabled ATM switch and router are shown. Which statement describes what is incorrect about the configuration shown?

Exhibit:



- A. CEF has not been enabled on the router.
- B. The VPI range of 2-3 is invalid.
- C. The control VPI/VCI has not been set to 0/32 on the router.
- D. VC-merge has not been enabled on the ATM switch interface.
- E. The router has not been configured to specifically use LDP.

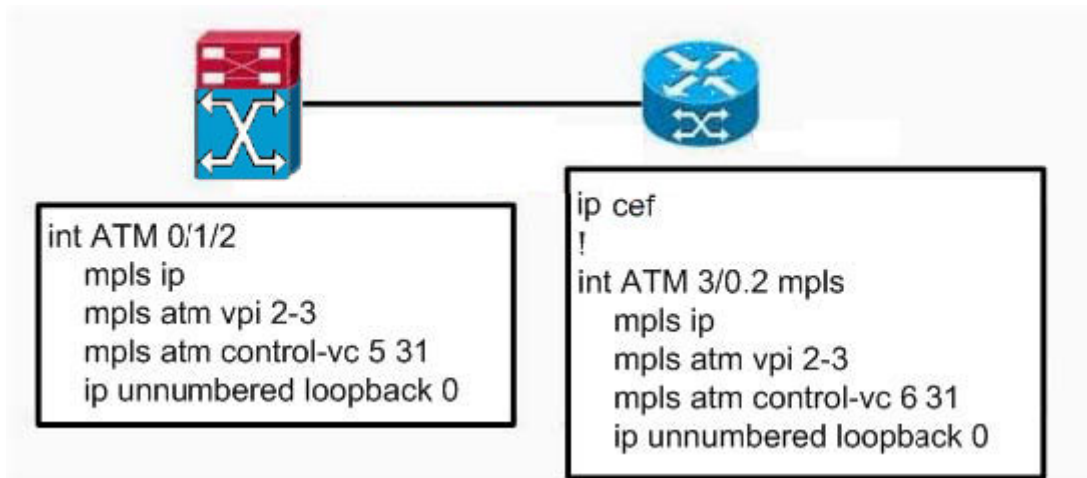
Answer: A

---

**QUESTION 448:**

Refer to the exhibit. A diagram of a router connected to an MPLS-enabled ATM switch via an LC-ATM MPLS interface, and the partial configuration for the MPLS-enabled ATM switch and router are shown. Which statement describes what is incorrect about the configuration?

Exhibit:



- A. The control VPI/VCI numbers do not match.
- B. The ATM VPI range of 2-3 is invalid.
- C. CEF has not been enabled on the router ATM 3/0.2 subinterface.
- D. VC-merge has not been enabled on the switch ATM 0/1/2 interface.
- E. The router has not been configured to specifically use LDP.

Answer: A

#### QUESTION 449:

What are three characteristics of overlay VPNs? (Choose three.)

- A. Service provider infrastructure appears as point-to-point links to the customer routers.
- B. Routing protocols run directly between the customer routers.
- C. Implementing optimum routing between customer sites requires a partial mesh of virtual circuits.
- D. Service provider PE routers use route filtering to isolate between different customers.
- E. Service provider does not participate in customer routing.

Answer: A, B, E

#### QUESTION 450:

DRAG DROP

Drag and drop the correct commands in the proper order to redistribute the RED VPN routes from the EIGRP vrf into the BGP vrf.

router eigrp 1

router bgp 65001

no auto-summary

redistribute eigrp 101

autonomous-system 101

address-family ipv4 vrf RED

address-family vpnv4 vrf RED

redistribute eigrp 101 metric  
1000 100 255 1 100

redistribute bgp 65001 metric  
1000 100 255 1 100

Command 1

(place here)

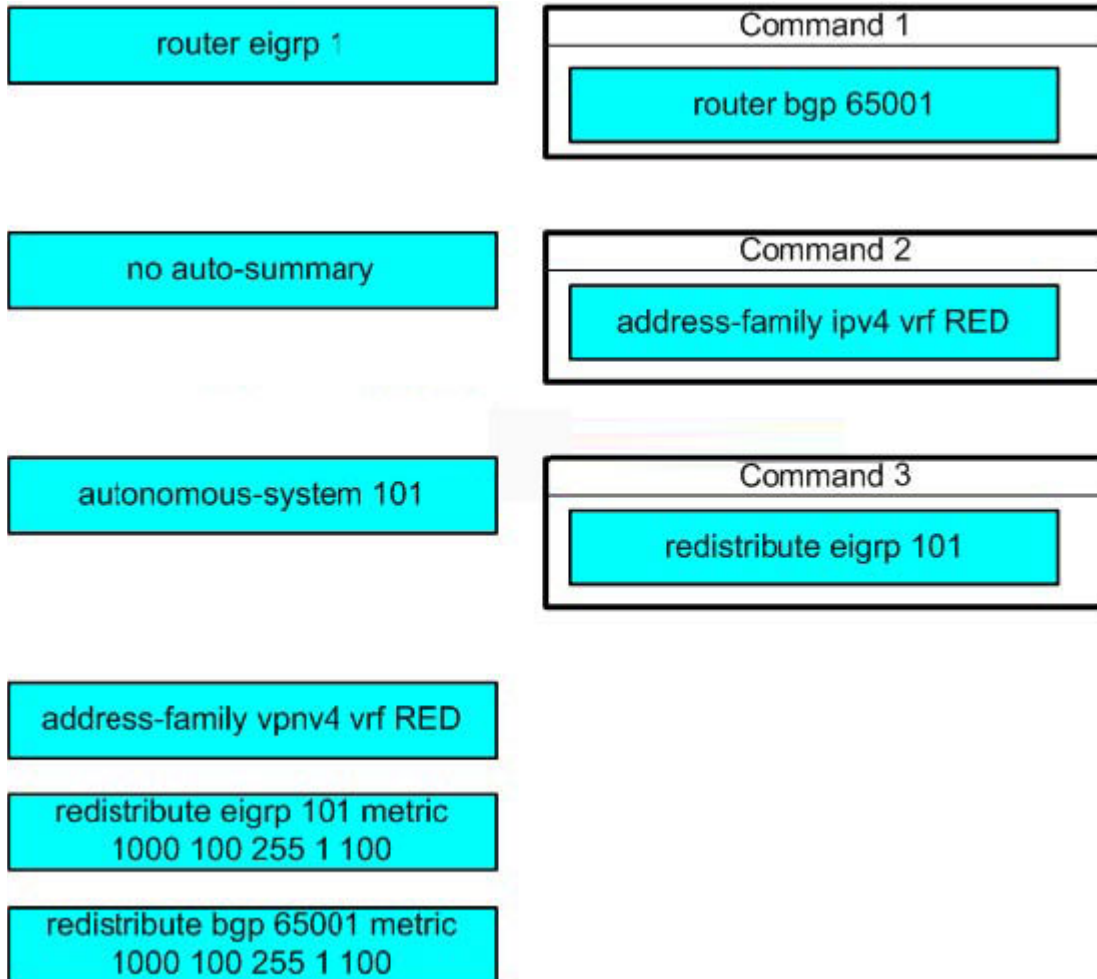
Command 2

(place here)

Command 3

(place here)

Answer:

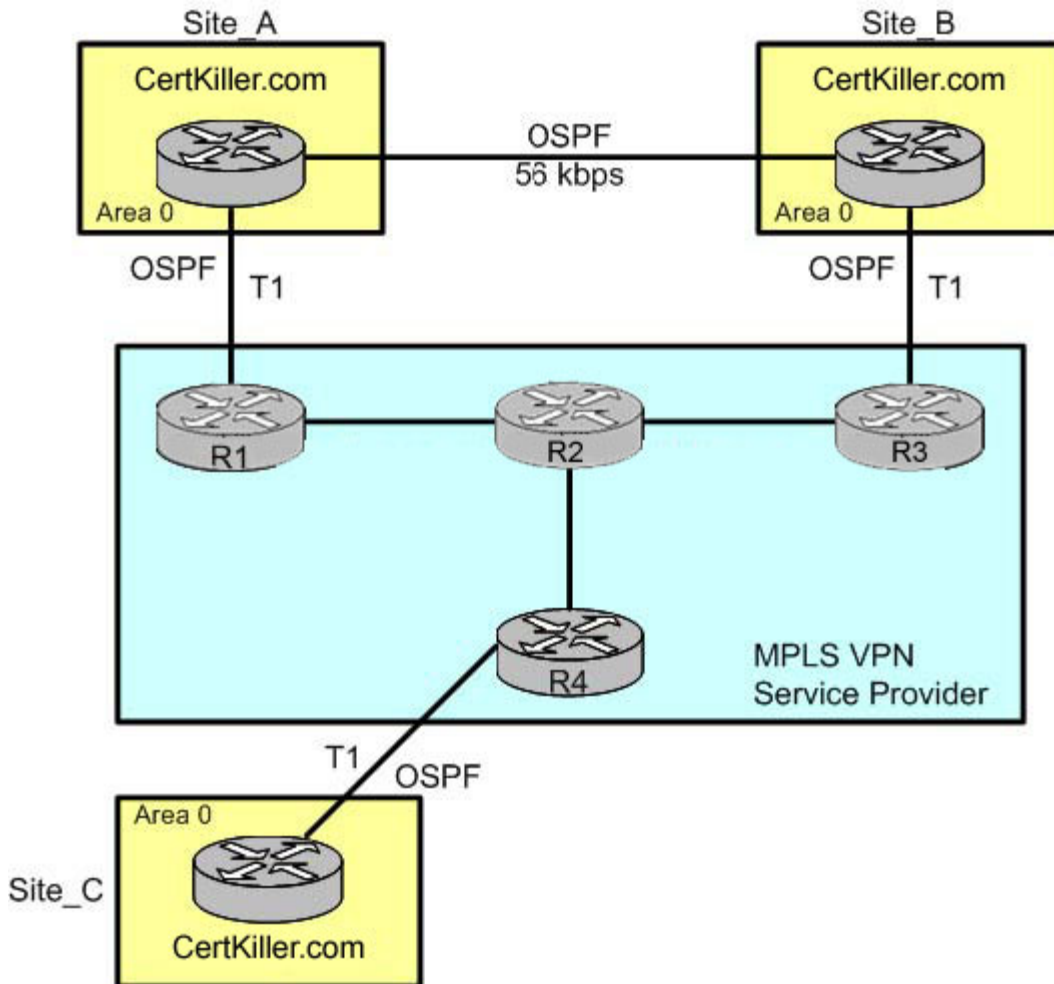


---

**QUESTION 451:**

Refer to the exhibit. Customer XYZ is using an MPLS VPN to connect its locations of Site\_A, Site\_B, and Site\_C. Each site uses OSPF as the CE-PE routing protocol. After a new direct 56 kbps link was added between Site\_A and Site\_B, all applications degraded in response time only between Site\_A and Site\_B. What is the most probable cause and its solution?

Exhibit:



- A. A routing loop needs to be corrected by an OSPF down bit.
- B. A routing loop needs to be corrected by the OSPF tag field.
- C. Suboptimal routing needs to be corrected by a virtual link.
- D. Suboptimal routing needs to be corrected by a sham link.

Answer: D

### QUESTION 452:

When configuring Internet access using a separate MPLS VPN, which three statements are correct? (Choose three.)

- A. The Internet backbone is separate from the MPLS VPN backbone.
- B. Two dedicated physical or logical links between the PE and the CE routers are required.
- C. An Internet gateway is connected as a CE router to the MPLS VPN backbone.
- D. An Internet gateway shall insert full Internet routing into the Internet VPN to achieve optimal routing.
- E. The customer's Internet access is enabled by combining the Internet VPN with the

Customer VPN using overlapping VPN topology.

Answer: A, C, E

---

**QUESTION 453:**

When configuring Internet access from a MPLS VPN using a separate subinterface, which two configurations are required on the PE router? (Choose two.)

- A. Use the ip vrf forwarding command on the subinterface that is used for MPLS VPN access.
- B. Use the ip vrf forwarding command on the subinterface that is used for Internet access.
- C. The CE router is configured as a BGP neighbor in both the global BGP process and inside the VPN in the VRF.
- D. The PE-to-CE VPN and Internet routing are configured using two separate address-family ipv4 vrf commands, one for VPN routing and one for Internet routing.

Answer: A, C

---

**QUESTION 454:**

What is the purpose of the global configuration command, ip dhcp relay information option vpn?

- A. enables the DHCP relay agent to insert the VPN suboptions to the BOOTP request
- B. enables the DHCP relay agent to convert the broadcast DHCP request to a unicast DHCP request to a shared DHCP server
- C. enables the DHCP relay agent to perform VRF-aware NAT before forwarding the DHCP request to a shared DHCP server
- D. enables ODAP (On-Demand Address Pool) on the DHCP relay agent

Answer: A

---

**QUESTION 455:**

Using MPLS unicast IP forwarding, what will happen if an LSR receives an unlabeled incoming packet?

- A. It will process switch the packet by doing a routing table lookup.
- B. It will forward the packet using the LFIB.
- C. It will forward the packet using the LIB.
- D. It will forward the packet using the FIB.
- E. It will drop the packet immediately.

Answer: D

---



**QUESTION 456:**

When routes between MP-BGP and RIP are being redistributed, what does the option metric transparent do?

- A. copies the BGP MED into the RIP hop count
- B. copies the BGP local preference into the RIP hop count
- C. copies the RIP hop count into the BGP local preference
- D. copies the RIP hop count into the BGP MED
- E. uses the default seed metric when redistributing from MP-BGP into RIP
- F. uses the default seed metric when redistributing from RIP into MP-BGP

Answer: A

---

**QUESTION 457:**

For which purpose is the command mpls ldp maxhops used?

- A. In large ATM-MPLS networks, the LFIB can become too large and it may be necessary to limit the maximum diameter of the MPLS LSPs.
- B. Because downstream-on-demand label allocation uses hop count to control loop detection, it maybe necessary to limit the maximum diameter of the MPLS network.
- C. Because end-to-end delay can cause problems with some voice applications, it may be necessary to limit the maximum diameter of the MPLS network.
- D. When interconnecting large frame mode MPLS and cell mode networks it may be necessary to limit the maximum network diameter to prevent forwarding loops.

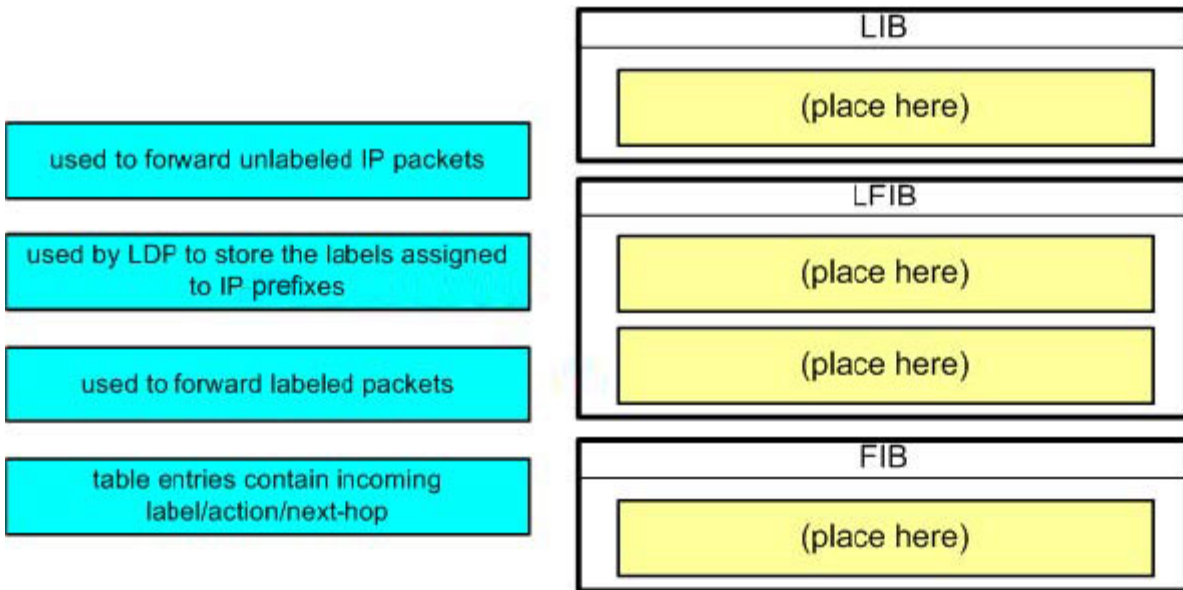
Answer: B

---

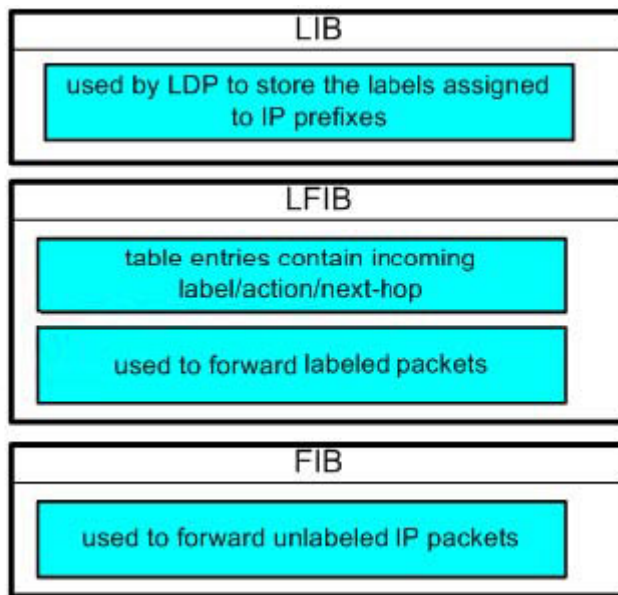
**QUESTION 458:**

DRAG DROP

Drag the description on the left to the name of the table on the right to which it best corresponds.



Answer:



#### QUESTION 459:

What is wrong with the following MP-BGP to EIGRP route redistribution configuration?

```
router eigrp 100
address-family ipv4 vrf XYZ
autonomous-system 200
redistribute bgp 51001
```

A. The redistribute command should be under the router eigrp 100 process and not under the address-family.

- B. The redistribute command is missing the metric option.
- C. The redistribute command is missing the subnet option.
- D. The redistribute command is missing the metric transparent option.
- E. The redistribute command is missing the vrf option option.

Answer: B

---

**QUESTION 460:**

Which statement correctly describes managed CE routers service?

- A. The export map {route-map-name} command is used within the customer's VRF so only the loopback interface on the CE routers are exported to the central server VPN.
- B. The managed CE routers service allows the service provider to have access to the CE router and to all of the networks behind the CE router.
- C. The managed CE routers service uses the same VRF and RD design as overlapping MPLS VPN.
- D. The managed CE routers service uses the same VRF and RD design as central services MPLS VPN combined with simple MPLS VPN, except for the CE router Route Target marking process during route import.

Answer: A

---

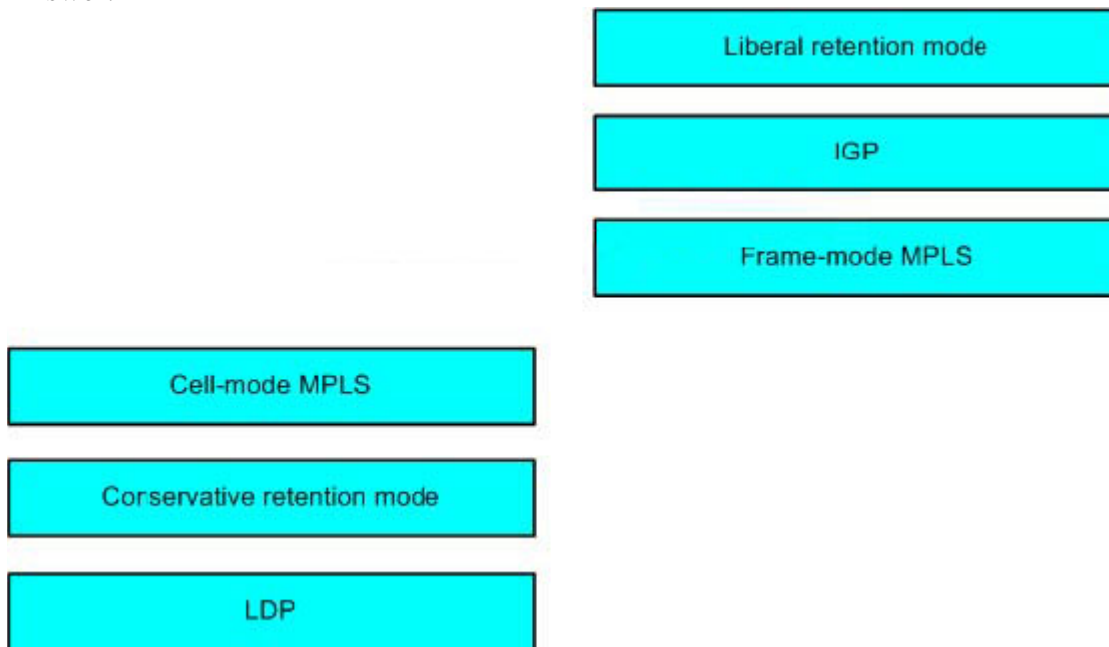
**QUESTION 461:**

DRAG DROP

Drag the term on the left to its description on the right. Not all the terms on the left are used.

Frame-mode MPLS	Enables routers to store all received labels even if they are not being used.
Liberal retention mode	Determines the network convergence time.
IGP	Uses liberal retention mode.
Cell-mode MPLS	
Conservative retention mode	
LDP	

Answer:



---

**QUESTION 462:**

Which statement represents the overall impact of convergence in a frame-mode MPLS network when there is a failure on a link that an LSP is using?

- A. Overall convergence is not affected because, by default, frame-mode MPLS uses liberal retention mode.
- B. The LSPs must be rebuilt by the LDP, which minimally impacts convergence regardless of the number of LSPs.
- C. The LSPs must be rebuilt by the LDP, and the impact of convergence depends upon the number of LSPs using the failed link.
- D. The LSPs must be rebuilt along with the LFIB and LIB on each LSR on the path, which can dramatically impact convergence.

Answer: A

---

**QUESTION 463:**

Which three statements correctly describe how labels are used in cell-mode MPLS? (Choose three.)

- A. The ATM header VPI/VCI field is used for forwarding decisions.
- B. The 32-bit MPLS label is preserved in the frame but is not used in the ATM network.
- C. The original MPLS label is present only in the first cell of a packet.
- D. The 32-bit MPLS label is inserted between the ATM header and the ATM AAL5 header.
- E. Labels in cell-mode MPLS are not a scarce resource like in frame-mode MPLS.

F. The TTL field in the MPLS label is copied into the ATM header TTL field by the ingress edge LSR.

Answer: A, B, C

---

**QUESTION 464:**

When using MPLS unicast IP forwarding, what will happen if an LSR receives an incoming labeled packet but the LSR can't find that incoming label in its LFIB?

- A. The packet will be forwarded using the FIB.
- B. The packet will be forwarded using the LIB.
- C. The packet will be process switched by performing a route lookup in the routing table.
- D. The packet will be forwarded using the LFIB with an imp-null outgoing label.
- E. The packet will be dropped even if the IP destination exists in the FIB.

Answer: E

---

**QUESTION 465:**

What is the purpose of the area {area-id} sham-link {source-address} {destination-address} cost {number} command?

- A. to create an OSPF virtual link between two CE routers
- B. to allow the customer sites to use the same OSPF area ID
- C. to enable optimized routing over the MPLS backbone when there is a direct backdoor link between two CE routers
- D. to allow the MPLS backbone to act as an OSPF Superbackbone
- E. to prevent routing loops when using OSPF as the CE-PE routing protocol
- F. to allow the customer sites to use area 0 as the OSPF area ID

Answer: C

---

**QUESTION 466:**

Which two of the following describe the actions that the OSPF routing process on a PE router will take based on the down bit being set? (Choose two.)

- A. The routing bit will be set so the OSPF routes with the down bit set will be preferred over the MP-BGP learned routes.
- B. The routing bit will be cleared so the OSPF routes with the down bit set never enter the IP routing table.
- C. OSPF routes with the down bit set will not be redistributed from OSPF into MP-BGP.
- D. OSPF routes with the down bit set will be redistributed from OSPF into the MPLS VPN OSPF super-backbone as intra-area routes.
- E. OSPF routes with the down bit set will be redistributed from OSPF into the MPLS

VPN OSPF super-backbone as type 5 LSAs.

Answer: B, C

---

**QUESTION 467:**

The following partial output is a PE router configuration related to the OSPF process. During troubleshooting, you notice that the OSPF routes from the remote sites are not showing up in the local CE router. What is a problem that can cause this issue?  
router ospf 1 vrf ABC network 0.0.0.0 255.255.255.255 area 0 redistribute bgp 55111

- A. The output is missing the metric option in the redistribute command.
- B. The output is missing the metric-type option in the redistribute command.
- C. The output is missing the subnet option in the redistribute command.
- D. The output is missing the vrf option in the redistribute command.
- E. The OSPF network statement is not correct.
- F. The OSPF routing process is missing the address-family ipv4 vrf ABC configuration.

Answer: C

---

**QUESTION 468:**

An OSPF route is redistributed into MP-BGP with the following extended community: Extended Community: RT:1:10 OSPF RT:0:1:0 Which parameter(s) will the OSPF RT:0:1:0 indicate?

- A. OSPF cost value
- B. OSPF metric type
- C. OSPF down bit
- D. OSPF routing bit
- E. OSPF area ID and LSA type
- F. OSPF domain ID and OSPF version

Answer: E

---

**QUESTION 469:**

DRAG DROP

Drag the proper commands in the proper order to configure EBGp as the CE to PE routing protocol for VPN RED on a PE router.

router bgp 65001

no bgp default ipv4 unicast

address-family ipv4 vrf RED

address-family vpnv4 vrf RED

neighbor 10.10.10.1 active

neighbor 10.10.10.1 remote as  
65001

neighbor 10.10.10.1 remote as  
65002

neighbor 10.10.10.1  
update-source loopback 0

Command 1

(place here)

Command 2

(place here)

Command 3

(place here)

Answer:

no bgp default ipv4 unicast

Command 1

router bgp 65001

address-family vpnv4 vrf RED

Command 2

address-family ipv4 vrf RED

neighbor 10.10.10.1 active

neighbor 10.10.10.1 remote as  
65001

Command 3

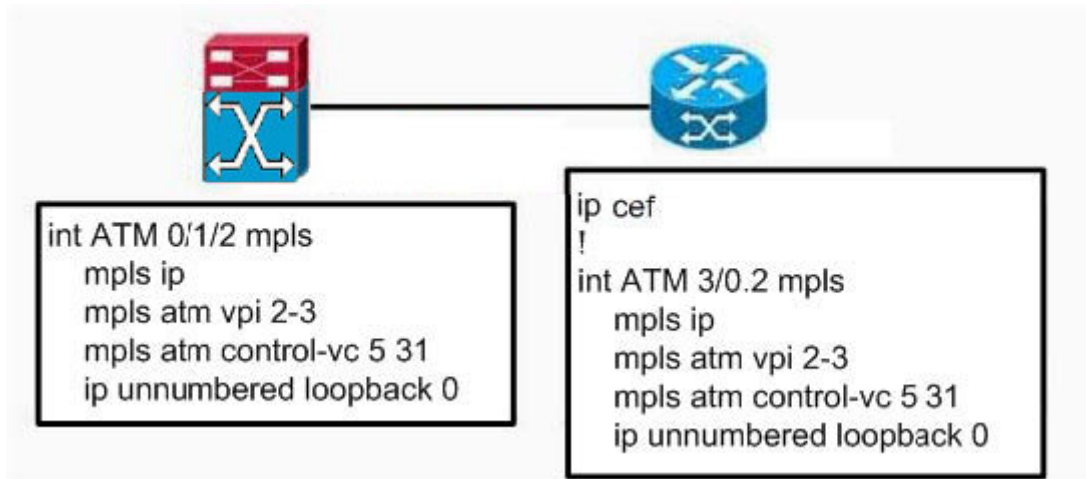
neighbor 10.10.10.1 remote as  
65002

neighbor 10.10.10.1  
update-source loopback 0

**QUESTION 470:**

Refer to the exhibit. A router connected to an MPLS-enabled ATM switch via an LC-ATM MPLS interface, and a partial configuration for the MPLS-enabled ATM switch and the router are shown. Which statement describes what is incorrect about the configurations shown?

Exhibit:



- A. The router subinterface is not specified as an MPLS cell-mode subinterface.
- B. CEF has not been enabled on the ATM interface of the MPLS-enabled ATM switch.
- C. The control VPI/VCI has not been set to 0/32.
- D. VC-merge has not been enabled on the ATM interface of the MPLS-enabled ATM switch.
- E. The router has not been configured to specifically use LDP.
- F. The ATM interface of the MPLS-enabled ATM switch has not been configured for cell-mode MPLS operations.

Answer: A

**QUESTION 471:**

An OSPF LSA type 1 route is redistributed into MP-BGP. That same route is then redistributed back from MP-BGP into OSPF on another PE router. In this case, which LSA type on the destination CE router will the OSPF route appear as?

- A. LSA type 1
- B. LSA type 2
- C. LSA type 3
- D. LSA type 4
- E. LSA type 5
- F. LSA type 7



Answer: C

---

**QUESTION 472:**

When using the redistribute ospf {process-id} command, which types of OSPF routes will be redistributed into BGP?

- A. all internal (interarea and intra-area) OSPF routes
- B. all external OSPF routes
- C. all external OSPF routes except type 7 LSAs
- D. both internal and external OSPF routes
- E. only classful OSPF routes without the subnet option
- F. only external OSPF routes without the match option

Answer: A

---

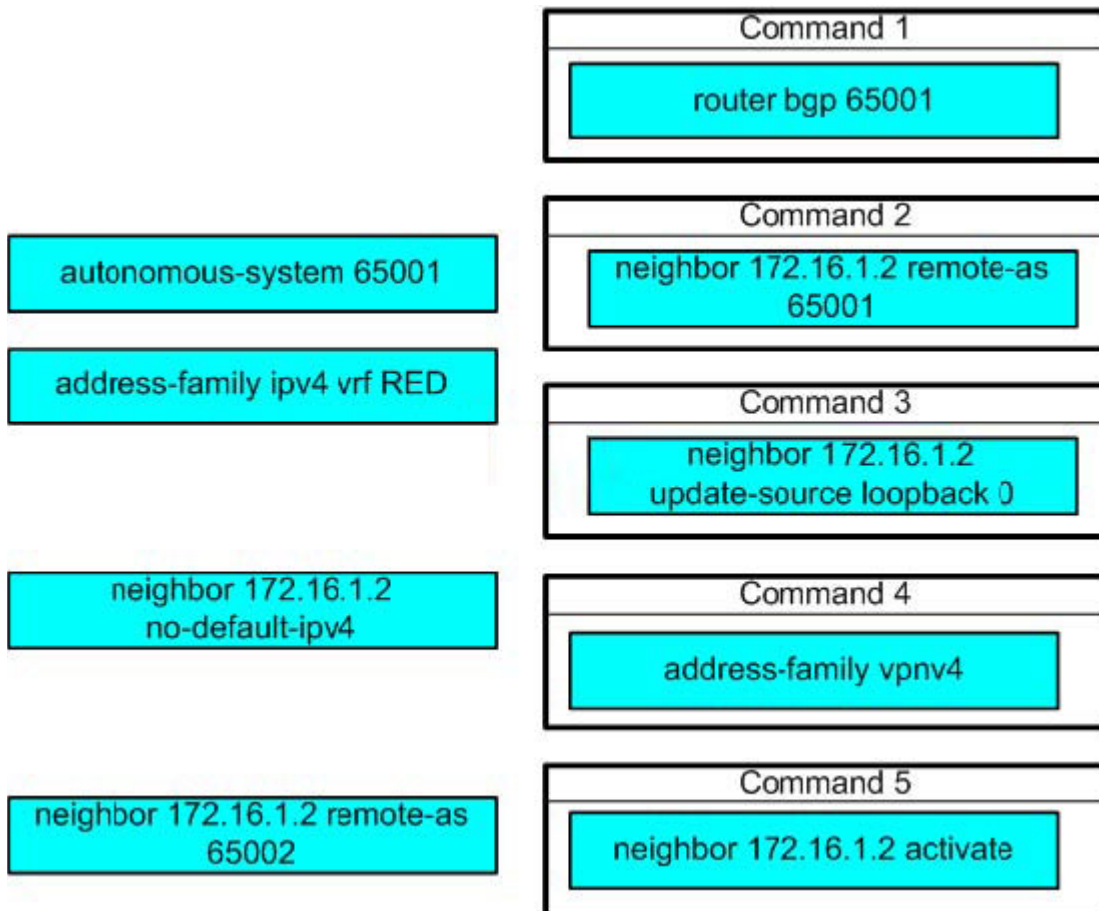
**QUESTION 473:**

DRAG DROP

Drag and drop the proper commands in the proper order to create a MP-BGP session between two PE routers that will be used to support the RED VPN.

router bgp 65001	Command 1 (place here)
address-family vpnv4	Command 2 (place here)
autonomous-system 65001	Command 3 (place here)
address-family ipv4 vrf RED	Command 4 (place here)
neighbor 172.16.1.2 activate	Command 5 (place here)
neighbor 172.16.1.2 no-default-ipv4	
neighbor 172.16.1.2 remote-as 65001	
neighbor 172.16.1.2 remote-as 65002	
neighbor 172.16.1.2 update-source loopback 0	

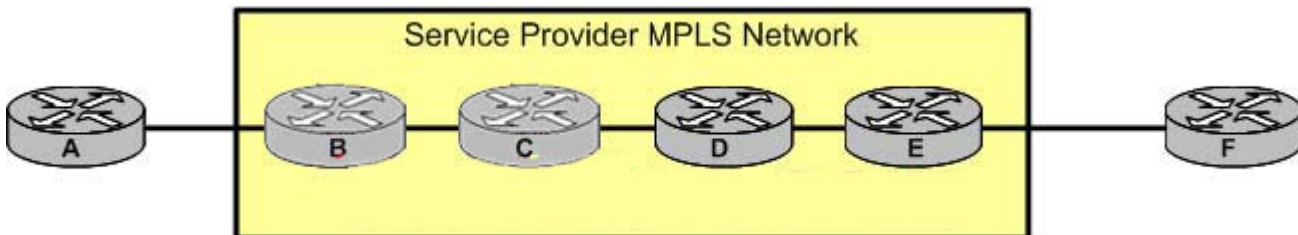
Answer:



#### QUESTION 474:

Refer to the exhibit. It shows an MPLS network with four routers as well as two customer routers. Router E is advertising the network 192.168.12.0/24. Rather than propagating the 192.168.12.0/24 network, Router D aggregates the 192.168.12.0/24 route into 192.16.0.0/16. Which route or routes will Router B receive?

Exhibit:



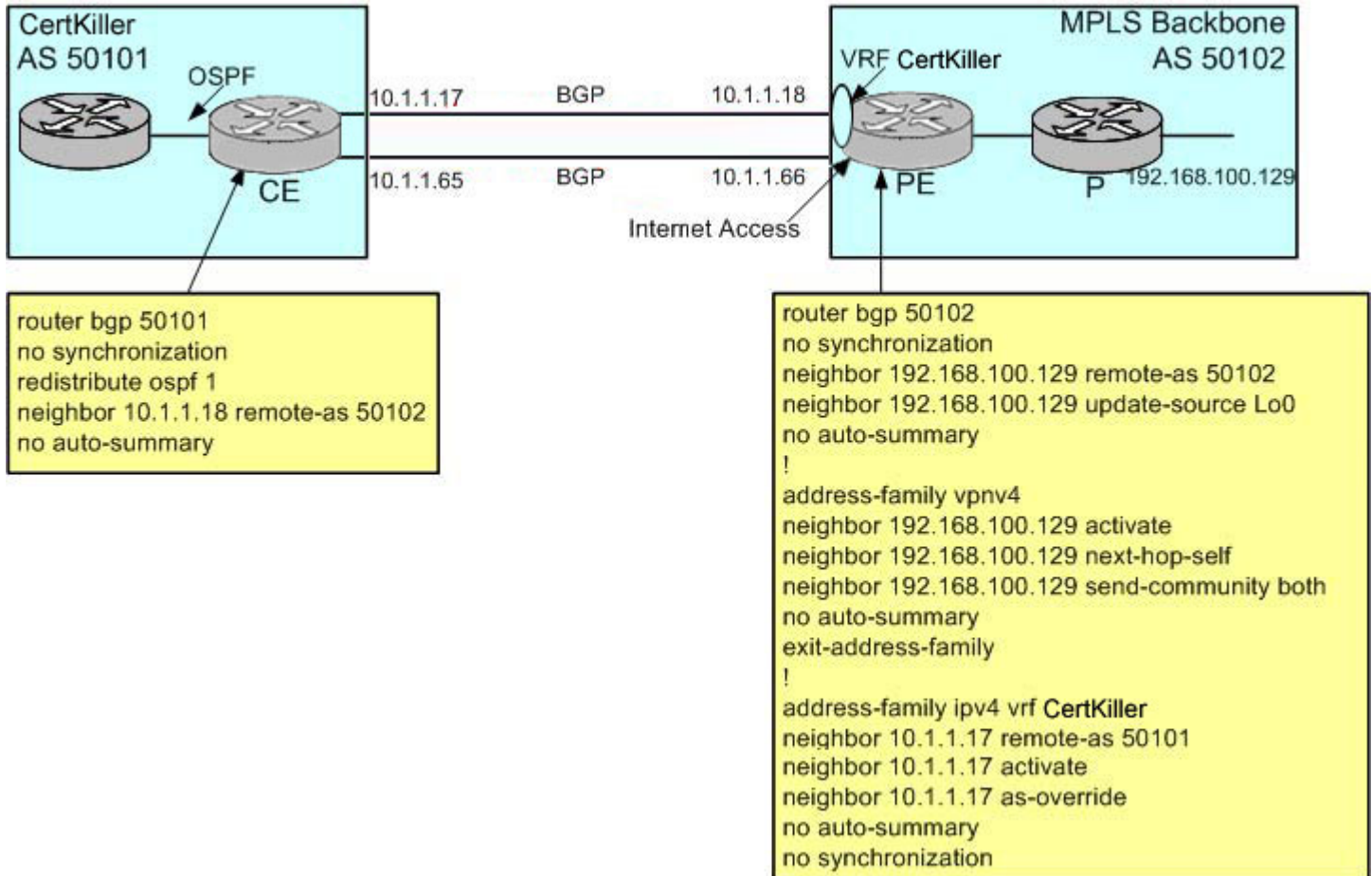
- A. only 192.168.0.0/16
- B. only 192.160.12.0/24
- C. both 192.168.0.0/16 and 192.160.12.0/24
- D. neither of the routes-the LSP is broken

Answer: A

### QUESTION 475:

Refer to the exhibit. The MPLS VPN Customer A is using a separate interface for Internet access. However, with the current configurations shown, the CE router is not receiving any Internet routes from the PE router. Which two additional configuration commands can resolve the Internet connectivity issue? (Choose two.)

Exhibit:



- A. At the CE router, under router bgp 50101, add the neighbor 10.1.1.66 remote-as 50102 command.
- B. At the CE router, under router bgp 50101, add the network 0.0.0.0 command.
- C. At the CE router, under router bgp 50101, add the ip route 0.0.0.0 0.0.0.0 10.1.1.66 command.
- D. At the PE router, under address-family ipv4 vrf Certkiller , add the neighbor 10.1.1.65 remote-as 50101 command.
- E. At the PE router, under address-family ipv4 vrf Certkiller , add the neighbor 10.1.1.17 default-originate command.
- F. At the PE router, under router bgp 50102, add the neighbor 10.1.1.65 remote-as 50101

command.

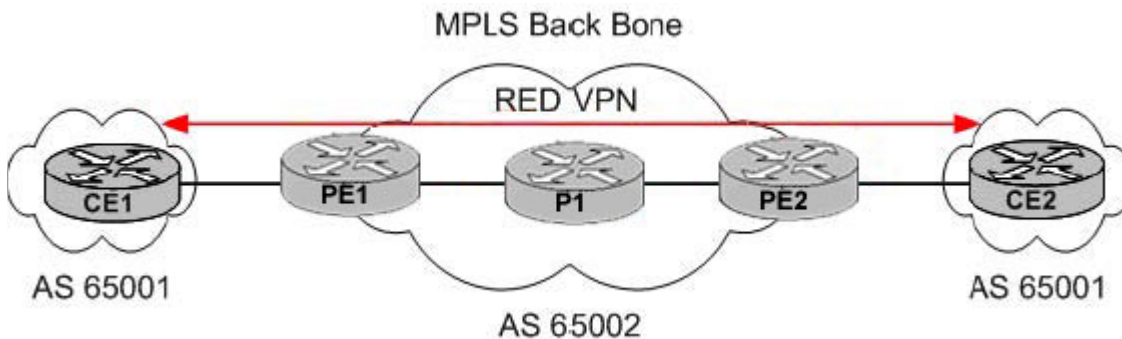
Answer: A, F

---

**QUESTION 476:**

Refer to the exhibit. The customer is experiencing routing problems because both sites are using an AS number of 65001. As the ISP, which neighbor command would you use to address this issue and on which two routers would you configure that command? (Choose three.)

Exhibit:



- A. CE1
- B. CE2
- C. PE1
- D. PE2
- E. allowas-in
- F. as-override

Answer: C, D, F

---

**QUESTION 477:**

A CE router running EBGP with the MPLS VPN service provider's PE router is not able to receive any BGP updates from the PE router, and the debug ip bgp updates on the CE router shows the following debug message. BGP(0): 150.1.11.18 rcv UPDATE about 150.1.12.16/28 -- DENIED due to: AS-PATH contains our own AS  
What can be configured on the PE router to solve this problem?

- A. Configure the PE router as a route reflector with the CE router as one of its clients.
- B. Configure AS-Path Prepending on the PE router.
- C. Configure AS-Override on the PE router.
- D. Configure AllowAS-In on the PE router.
- E. Configure AllowAS-Out on the PE router.

Answer: C

**QUESTION 478:**

Which two of the following statements correctly describe the difference between Edge LSRs and LSRs? (Choose two.)

- A. LSRs have all their interfaces enabled for MPLS.
- B. LSRs can only perform label switching and not IP routing.
- C. Edge LSRs remove labels and forward IP packets out of the MPLS domain.
- D. Edge LSRs only forward labeled packets and perform label swapping.
- E. Edge LSRs have all their interfaces enabled for MPLS.

Answer: A, C

---

**QUESTION 479:**

With MPLS VPN-aware NAT, what additional information is tracked inside the NAT translation table?

- A. RD information
- B. RT information
- C. VRF information
- D. Multi-protocol BGP prefixes
- E. MPLS Labels

Answer: C

---

**QUESTION 480:**

Which three fields must be included in MPBGP updates between PE routers in an MPLS network? (Choose three.)

- A. VPNv4 address
- B. label used for VPN packet forwarding
- C. AS path
- D. Site of Origin
- E. TE path designator

Answer: A, B, C

---

**QUESTION 481:**

Which three statements correctly describe a route target (RT)? (Choose three.)

- A. An RT is an extended BGP community.
- B. An RT is a 64-bit prefix prepended to a IPv4 address enabling different customers to share the same IP address pool.

- C. An RT is attached to IPv4 routing updates for indication of MPLS VPN membership.
- D. Multiple RTs can be attached to a single VPNv4 BGP routing update.
- E. Each VRF on a PE router can have multiple import RTs configured.
- F. Export RTs are manually configured on the CE routers.

Answer: A, D, E

---

**QUESTION 482:**

Within the VRF configuration mode, the import map and the export map commands are used for which purpose?

- A. to reference the import and export route-maps that are used to limit the maximum number of routes in a VRF
- B. to reference the import and export route-maps that are used to selectively specify additional criteria for route-targets import and export
- C. to reference the import and export route-maps that are used to filter the routes that are redistributed into MPBGP
- D. to reference the import and export route-maps that are used to set loop avoidance parameters such as SOO
- E. mandatory VRF commands to specify the import and export route-targets

Answer: B

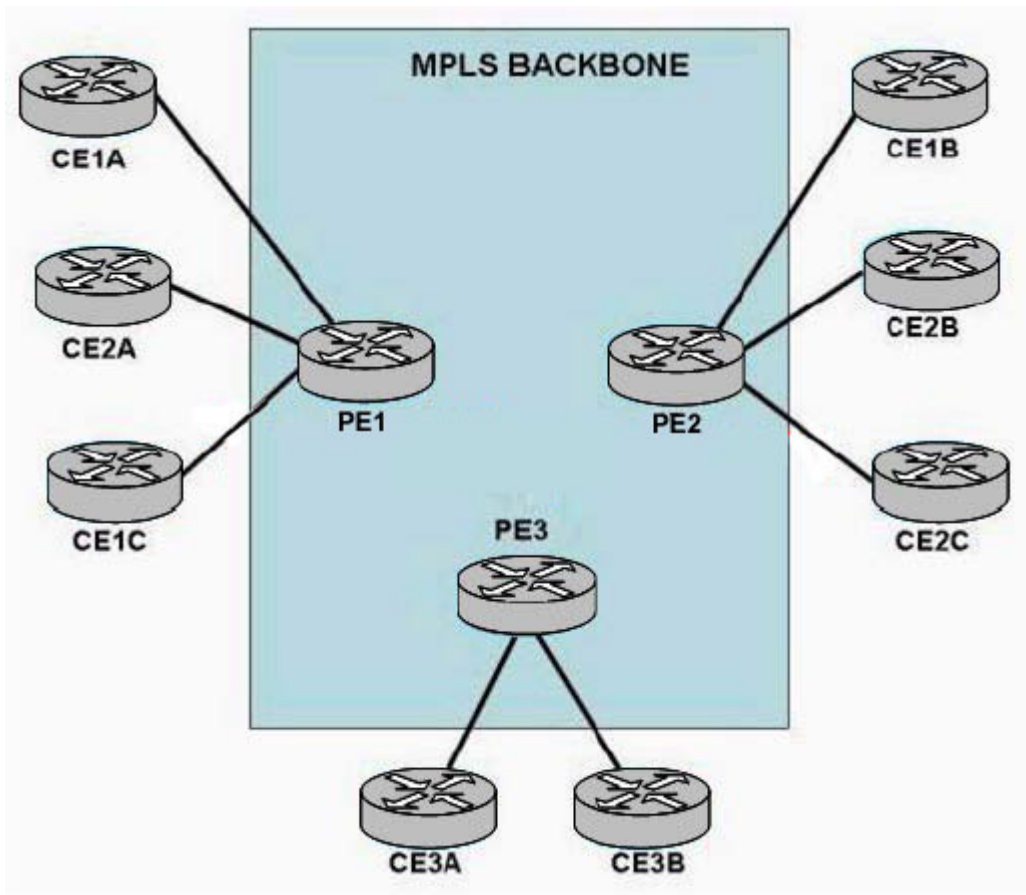
---

**QUESTION 483:**

Refer to the exhibit and the following connectivity requirements. Which type of MPLS VPN is being implemented? Sites CE1A and CE1B require connectivity to each other. Sites CE2A and CE2B require connectivity to each other. Site CE1C requires connectivity to sites CE1A, CE1B, CE3A, and CE3B. Site CE2C requires connectivity to sites CE2A, CE2B, CE3A, and CE3B. Sites CE3A and CE3B require connectivity to each other and to CE1C and CE2C.

Exhibit:





- A. central services MPLS VPN
- B. overlapping MPLS VPN
- C. simple VPN
- D. combinations of overlapping and central services MPLS VPN
- E. combinations of simple and central services MPLS VPN

Answer: D

#### QUESTION 484:

Which four of the following questions need to be answered during the MPLS VPN troubleshooting process? (Choose four.)

- A. Are the VPNv4 routes propagated to the other PE routers?
- B. Are the CE routes received by the PE and inserted into the PE VRF?
- C. Are the CE routes received by the PE router redistributed into the PE global BGP table?
- D. Are the VPNv4 routes redistributed from MPBGP into the PE-CE routing protocol?
- E. Are the VPNv4 routes inserted into the VRF on the other PE routers?
- F. Are the PE routers enabled for propagating IPv4 routing updates between them?

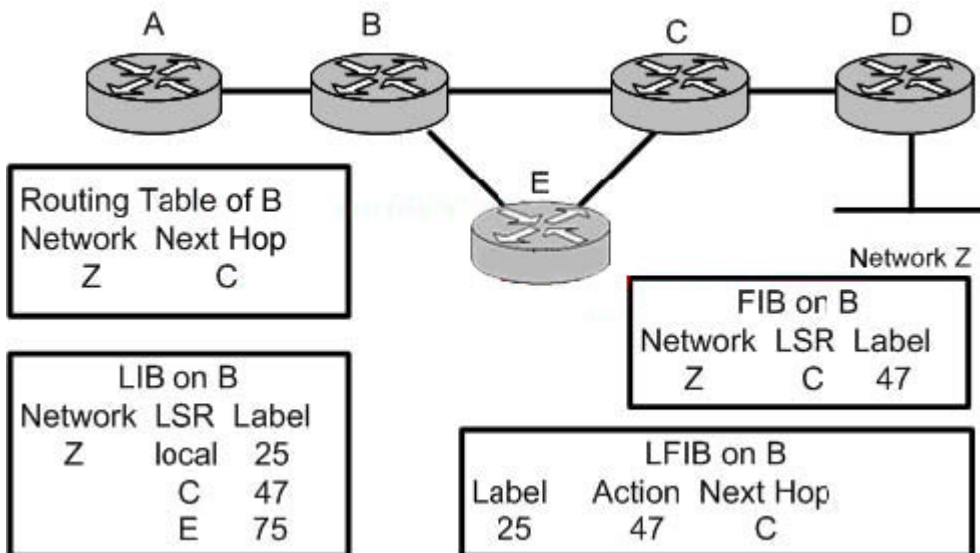


Answer: A, B, D, E

### QUESTION 485:

Refer to the exhibit. Routers A and D are the edge LSRs. If the link between Routers B and C has failed, what best represents the state of the LFIB table on Router B after convergence?

Exhibit:



- A. Label 25, Action 75, Next Hop E
- B. Label 47, Action pop, Next Hop E
- C. Label 75, Action 25, Next Hop E
- D. Label 47, Action pop, Next Hop C

Answer: A

### QUESTION 486:

The MPLS VPN provider is using a separate Internet VPN to provide Internet access to its MPLS VPN customers. Currently, all of its customers are not able to access the Internet. The partial provider's CE-Internet router configuration is shown below. Based on the configuration, what could be the cause of the problem?

```
ip route 0.0.0.0 0.0.0.0 10.1.1.1
```

```
!
```

```
router bgp 51001
```

```
network 0.0.0.0
```

```
neighbor 10.2.2.2 remote-as 51002
```

```
!
```

```
PE neighbor router
```

```
neighbor 10.2.2.2 prefix-list test1 out
```

```
neighbor 10.3.3.3 remote-as 51001
!  
Another Internet router  
neighbor 10.3.3.3 prefix-list test2 out  
!  
ip prefix-list test2 permit 0.0.0.0/0  
ip prefix-list test1 permit 0.0.0.0/0  
ge 1
```

- A. The test2 prefix-list should be applied to the 10.2.2.2 neighbor and the test1 prefix-list should be applied to the 10.3.3.3 neighbor.
- B. Both prefix-lists should be applied in the "in" direction instead of the "out" direction.
- C. The network command is missing the mask 0.0.0.0 option.
- D. The network command is missing the mask 255.255.255.255 option.
- E. The neighbor 10.2.2.2 activate and the neighbor 10.3.3.3 activate commands are missing.

Answer: A

---

**QUESTION 487:**

What benefit does AToM provide to the service provider's customers?

- A. By supporting Layer 2 VPNs, customers maintain control of their site-to-site routings over the WAN.
- B. By supporting Layer 3 VPNs, a full mesh of virtual circuits will not be required between the different customer sites to enable optimal routing.
- C. By supporting secured Layer 3 VPNs, customers do not have to deal with the complexity of configuring IPsec.
- D. By supporting MPLS traffic engineering over ATM, customers can better utilize their WAN link.
- E. By supporting Diff-Serv QoS, AToM allows customers to deploy voice/video applications across the WAN.

Answer: A

---

**QUESTION 488:**

Which of the following could be called a VPN identifier in the MPLS/VPN architecture?

- A. route target
- B. route distinguisher
- C. VRF
- D. VPN IPv4 address
- E. BGP site-of-origin (SOO) extended community attribute

Answer: A

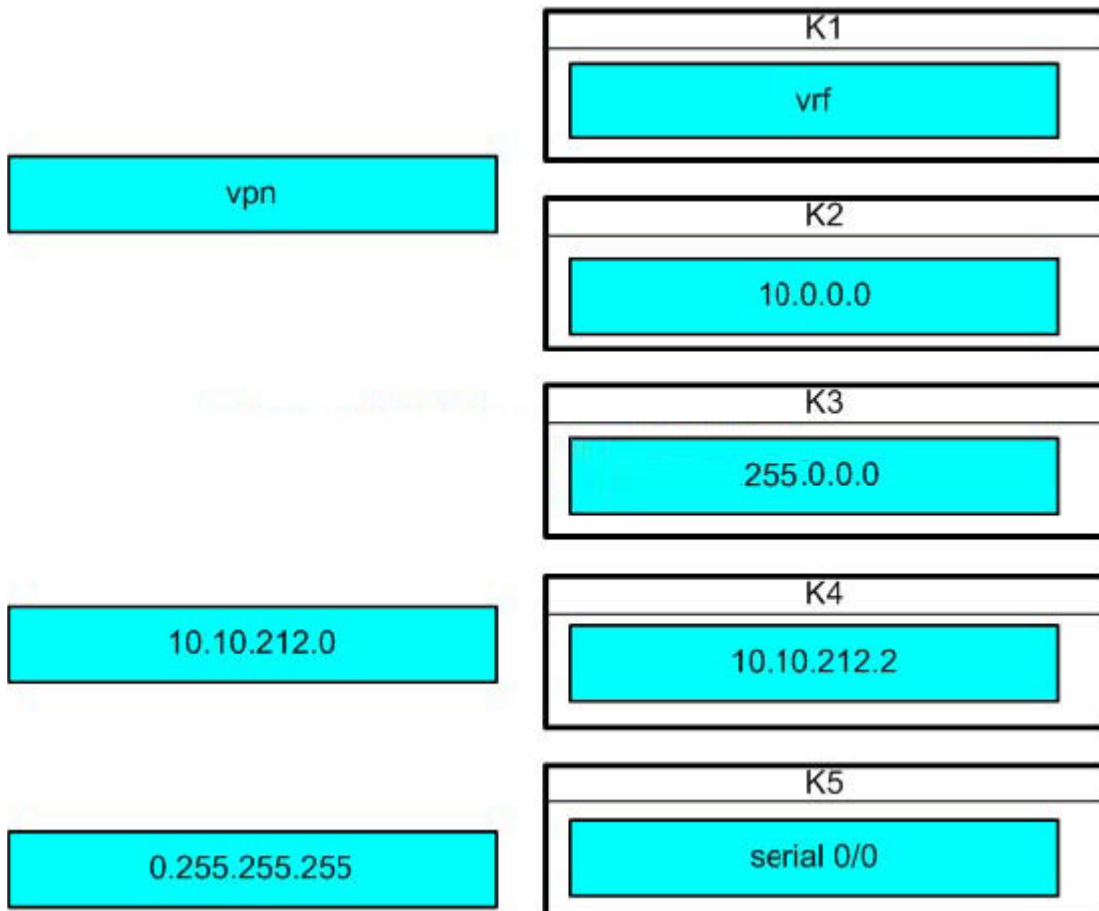
**QUESTION 489:**

**DRAG DROP**

Drag and drop the proper keywords to complete the command that will create a static route based upon the following. Destination network = 10.0.0.0/8, Next hop = 10.10.212.2, Output interface = serial 0/0, VPN = RED ip route [k1] RED [k2] [k3] [K4] [K5]

vrf	K1 (place here)
vpn	K2 (place here)
10.0.0.0	K3 (place here)
255.0.0.0	K4 (place here)
serial 0/0	K5 (place here)
10.10.212.0	
10.10.212.2	
0.255.255.255	

Answer:



---

**QUESTION 490:**

What are two concerns when implementing CEF switching? (Choose two.)

- A. increased CPU utilization from maintaining the FIB table
- B. increased memory requirement
- C. the requirement to disable other IOS features such as NBAR and MQC
- D. increased memory requirement on the VIP when implementing DCEF
- E. configuration complexity
- F. troubleshooting complexity because of the many tables that CEF maintains

Answer: B, D

---

**QUESTION 491:**

Within an MPLS domain, which of the following has the most impact on network convergence time?

- A. the LDP convergence time
- B. the IGP convergence time

- C. the IGP to MPLS redistribution process
- D. the time required to rebuild the LIB table
- E. the time required to cache the routing table entries into the FIB table

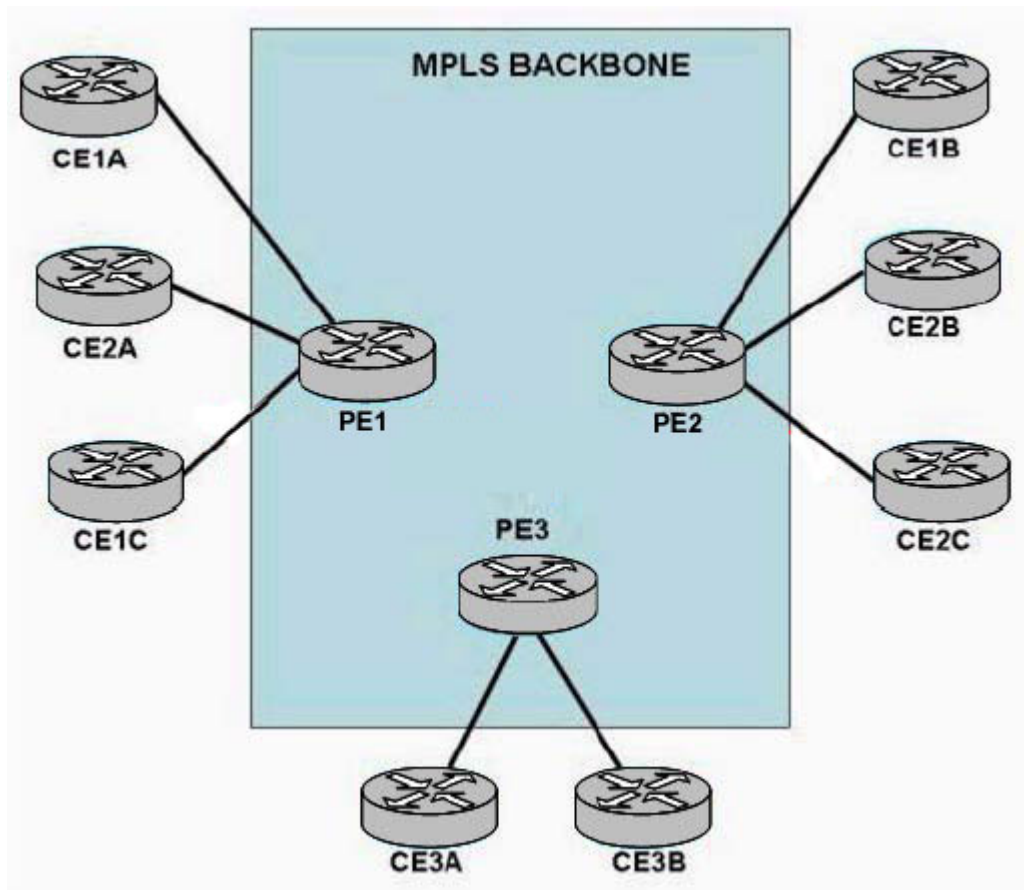
Answer: B

---

**QUESTION 492:**

Refer to the exhibit. How many different VRFs are required to support the given connectivity requirements? Sites CE1A and CE1B require connectivity to each other. Sites CE2A and CE2B require connectivity to each other. Site CE1C requires connectivity to sites CE1A, CE1B, CE3A, and CE3B. Site CE2C requires connectivity to sites CE2A, CE2B, CE3A, and CE3B. Sites CE3A and CE3B require connectivity to each other and to CE1C and CE2C.

Exhibit:

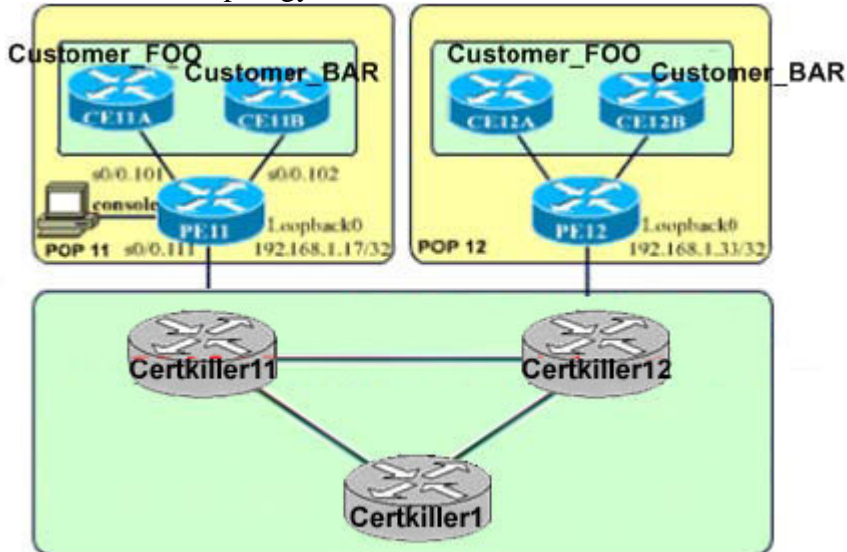


- A. 3 VRFs
- B. 4 VRFs
- C. 5 VRFs
- D. 6 VRFs
- E. 8 VRFs

Answer: C

## Topic 1, Case Study Certkiller .com, Scenario

Exhibit, Network Topology



Certkiller .com is providing MPLS VPN service to Customer\_FOO and Customer\_BAR. Customer\_FOO sites CE11A and CE12A belong in a simple VPN. Customer\_BAR sites CE11B and CE12B belong in \*\* missing\*\*

### Case Study Certkiller .com (6 Questions)

#### QUESTION 493:

Note: Please refer to the Case Study Certkiller .com

At the PE11 router, how many BGP routes are in the Customer\_FOO VRF routing table?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

Answer: C

#### QUESTION 494:

Note: Please refer to the Case Study Certkiller .com

The PE11 router has how many BGP neighbors?

- A. 1
- B. 2

- C. 3
- D. 4
- E. 5

Answer: A

---

**QUESTION 495:**

Note: Please refer to the Case Study Certkiller .com

What is the BGP next-hop and MED for the 10.2.12.15/28 prefix in the Customer\_BAR VRF? Select two.

- A. Next-hop = 192.168.1.33
- B. Next-hop = 150.1.11.33
- C. Next-hop = 192.168.1.17
- D. MED = 0
- E. MED = 1
- F. MED = 100

Answer: A, E

---

**QUESTION 496:**

Note: Please refer to the Case Study Certkiller .com

What routing protocol is used between the PE11 and CE11A routes?

- A. EIGRP
- B. EBGp
- C. RIPv2
- D. Static Routing

Answer: C

---

**QUESTION 497:**

Note: Please refer to the Case Study Certkiller .com

In the PE11 router global routing table, the EIGRP routes are used for what purpose?

- A. VPNv4 routing
- B. IGP routing within Certkiller .com network
- C. PE-CE routing
- D. To carry the customer routes across Certkiller .com network.
- E. Internet routing using a separate Internet VPN.

Answer: B

**QUESTION 498:**

Note: Please refer to the Case Study Certkiller .com

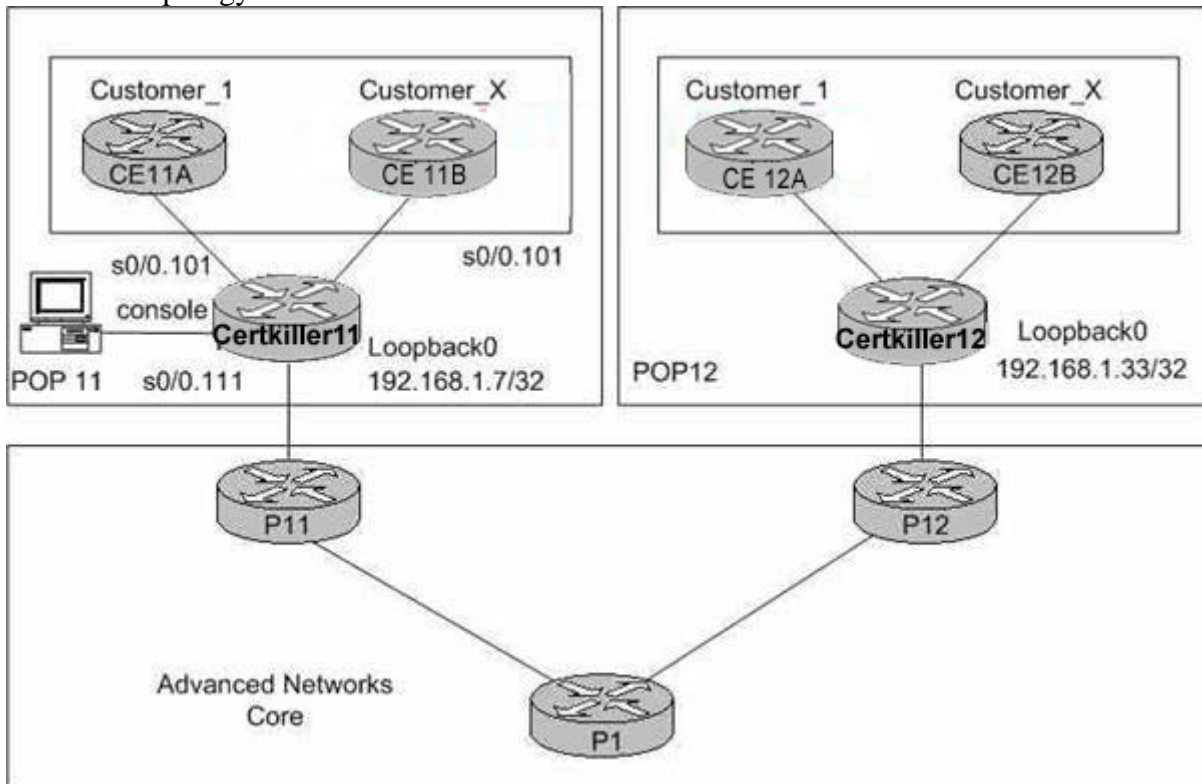
How many BGP routes are in PE11's global IP routing table?

- A. 0
- B. 1
- C. 2
- D. 6
- E. 12

Answer: A

## Topic 2, Case Study Certkiller .com Japan, Scenario

Network Topology Exhibit.



You work as network administrator at the Nagasaki office of the Japanese branch of Certkiller .com. Certkiller .com is providing MPLS VPN Service to a customer.

Customers sites CE11A and CE12A belong in a simple VPN.

CE11B and CE12B are not used by the simulator.

**Case Study Certkiller .com Japan (5 Questions)**

**QUESTION 499:**

Note: Please refer to the Case Study Certkiller .com Japan.



For Certkiller 11 to reach IP address 192.168.1.33 ( Certkiller 12 loopback), what outgoing label will be imposed (used)?

- A. 16
- B. 17
- C. 18
- D. 19
- E. 20
- F. Implicit Null

Answer: C

---

**QUESTION 500:**

Note: Please refer to the Case Study Certkiller .com Japan.

What local label will Certkiller 11 announce to its LDP peer for reaching the 192.168.1.17/32 prefix ( Certkiller 11 own loopback)?

- A. 16
- B. 17
- C. 18
- D. 19
- E. 20
- F. Implicit Null

Answer: F

---

**QUESTION 501:**

Note: Please refer to the Case Study Certkiller .com Japan.

What routing protocol is used between CE11A and Certkiller 11?

- A. EBGp
- B. IBGP
- C. Multi-Protocol BGP
- D. EIGRP AS 65010
- E. EIGRP AS 65020

Answer: E

---

**QUESTION 502:**

Note: Please refer to the Case Study Certkiller .com Japan.

On Certkiller 11, how many prefixes are learned from Certkiller 12 (192.168.1.33) over the MPBGP session?

- A. 0
- B. 1
- C. 4
- D. 7

Answer: C

---

**QUESTION 503:**

Note: Please refer to the Case Study Certkiller .com Japan.

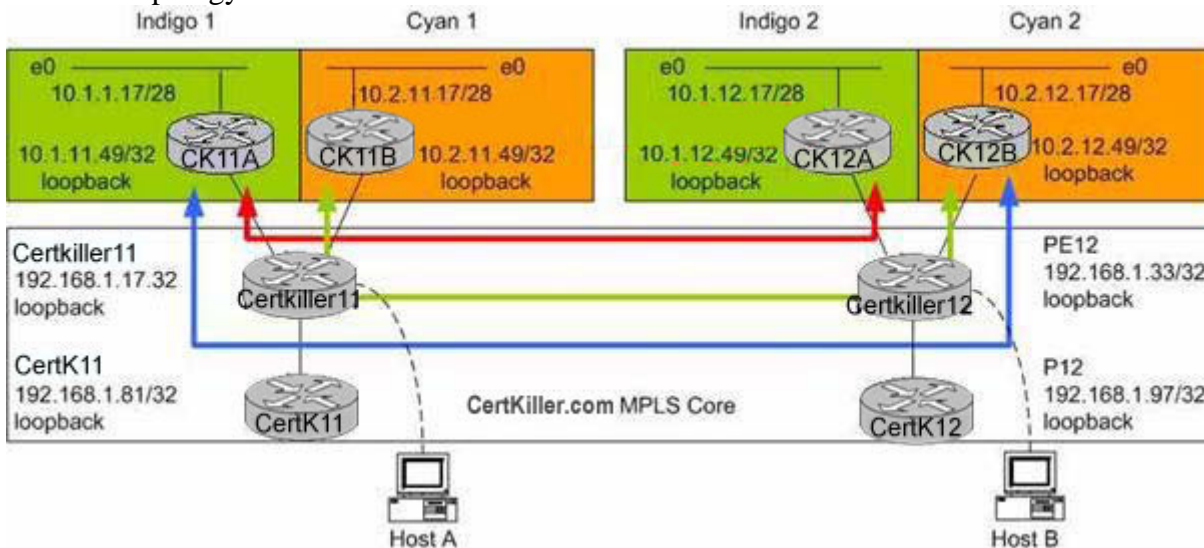
What label or labels will be imposed by What label or labels will be imposed by Certkiller 11 to reach network 10.1.12.64/28 in the Customer\_1 VRP?

- A. 18 23
- B. 20 18
- C. 18 only
- D. 20 only
- E. 23 only
- F. implicit Null

Answer: A

### Topic 3, Case Study Certkiller .com Tallinn, Scenario

Network topology exhibit



You are a CCNP certified technician working at the Tallinn branch of Certkiller .com.

The colored lines represent VPNs membership. Certkiller .com is a service provider that is providing advanced VPN solutions using MPLS VPNs.

Currently Certkiller.com is activating three VPNs. The RED VPN is a sample VPN

that connects the site Indigo 1 with Indigo 2.

**Case Study Certkiller.com Tallin (4 Questions)**

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**QUESTION 504:**

Note: Please refer to the Case Study Certkiller .com Tallin

Indigo Company has indicated that they cannot establish connectivity between Indigo 1 and Indigo2.

Testing has validated that there is MPLS connectivity between the Certkiller routers. Based upon the output of the show commands, what configuration changes must be made to correct the Indigo connectivity issue?

- A. On Certkiller 11, configure a BGP VPN4 neighbor session between Certkiller 11 and Certkiller 12.
- B. On Certkiller 12, configure a BGP VPN4 neighbor session between Certkiller 12 and Certkiller 11.
- C. On Certkiller 11, configure a rd of 1:10 in the Indigo\_Cyan VRF.
- D. On Certkiller 12, configure a rd of 1:20 in the Cyan\_Indigo VRF.
- E. On Certkiller 11, configure a rd of 1:20 in the Cyan\_1 VRF.
- F. On Certkiller 12, configure a rd of 1:20 in the Indigo\_2 VRF.

Answer: A

---

**QUESTION 505:**

Note: Please refer to the Case Study Certkiller .com Tallin

What import and export route target would you add to the Cyan\_Indigo vrf on Certkiller 12 to enable the overlapping VPN?

- A. 1:10
- B. 1:20
- C. 4:11
- D. 4:20
- E. 4:21
- F. 1:1001

Answer: F

---

**QUESTION 506:**

Note: Please refer to the Case Study Certkiller .com Tallin

Based upon the information that you can obtain from Certkiller 11 and Certkiller 12, what is the routing protocol used between Certkiller 11 and the Indigo 1 site?

- A. BGP
- B. OSPF

- C. EIGRP
- D. RIPv2
- E. ISIS

Answer: A

---

### QUESTION 507:

Note: Please refer to the Case Study Certkiller .com Tallin

Based upon the information that you can obtain from Certkiller 12, what type of BGP routing updates will Certkiller 12 send to Certkiller 11?

- A. Certkiller 11 and Certkiller 12 will only exchange IPv4 routing updates.
- B. Certkiller 11 and Certkiller 12 will only exchange VPNv4 routing updates.
- C. Certkiller 11 and Certkiller 12 will only exchange IPv4 and VPNv4 routing updates.

Answer: B

## Practice Questions

---

### QUESTION 508:

#### SIMULATION

Network topology exhibit:



You work as a network technician at Certkiller .com. You have been asked to troubleshooting the network displayed in the exhibit.

MPLS is configured in the Certkiller network, however no labels are exchanged. You need to make the proper reconfiguration on the Certkiller 1 and Certkiller 2 routers.

Your task is completed when labels are exchanged.

Answer:

Explanation:

Networks of serial interfaces and loopback interfaces where not configured under router rip!

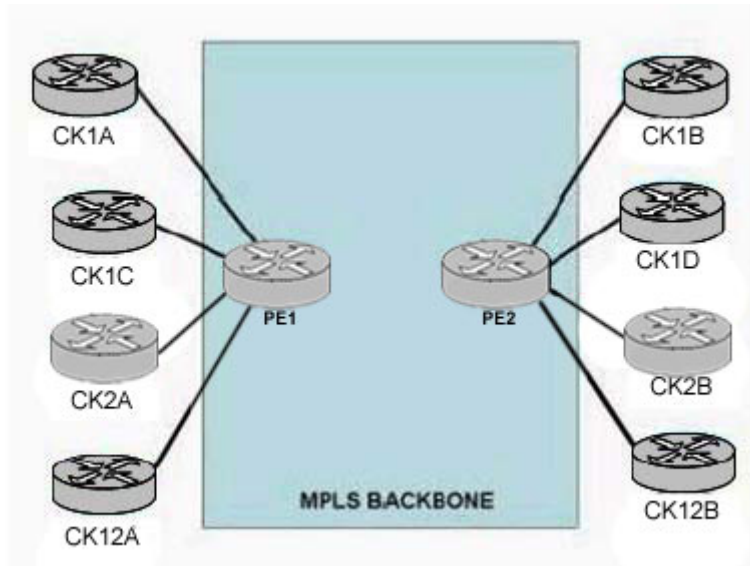
```
Certkiller 1# conf t
router rip
network 10.0.0.0
```

```
network 10.0.0.0
Certkiller 2# conf t
router rip
network 10.0.0.0
network 1.0.0.0
```

---

**QUESTION 509:**

Refer to the exhibit and the following connectivity requirements. How many different VRFs are required? Sites CK1 A, CK1 B, CK1 C, and CK1 D require connectivity among them. Sites CK2 A and CK2 B require connectivity between them. Site CK1 2A requires connectivity to sites CK1 A, CK1 B, CK1 C, CK1 D, and CK1 2B. Site CK1 2B requires connectivity to sites CK2 A, CK2 B, and CK1 2A.



- A. 2 VRFs
- B. 3 VRFs
- C. 4 VRFs
- D. 6 VRFs
- E. 8 VRFs
- F. 10 VRFs

Answer: C

---

**QUESTION 510:**

What best describes the following configuration example of allowas-in?

```
router bgp 100
address-family ipv4 vrf CustomerA
```

neighbor 195.12.4.5 remote-as 123  
neighbor 195.12.4.5 activate  
neighbor 195.12.4.5 allowas-in 2

- A. permits incoming BGP updates defined by access-list 2
- B. permits incoming BGP updates defined by class-map 2
- C. permits incoming BGP updates defined by route-map 2
- D. permits incoming BGP updates with no more than two occurrences of AS 100 in the AS path
- E. permits incoming BGP updates with no more than two occurrences of AS 123 in the AS path

Answer: D