

Practice Exam questions for: Nokia Virtual Private Routed Networks (exam number: 4A0-106)

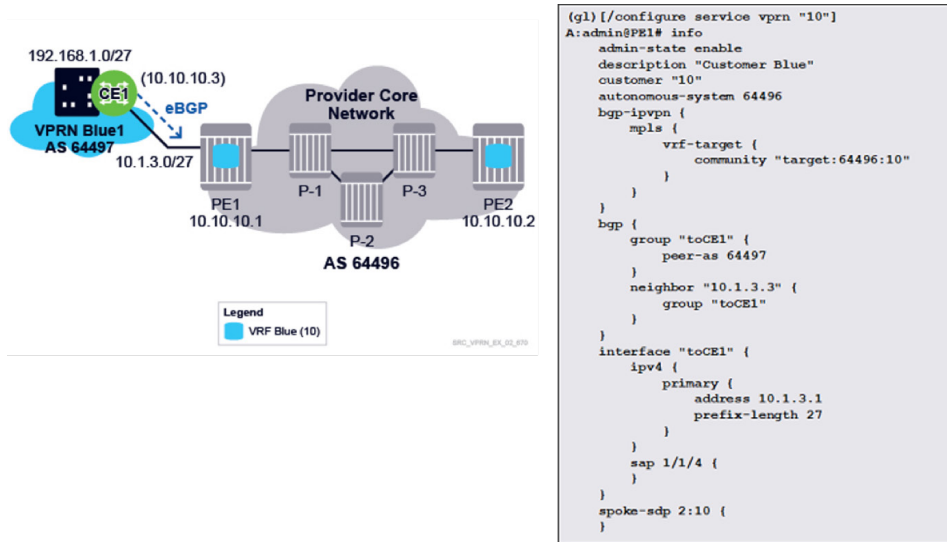
The following questions will test your knowledge and prepare you for the Nokia Virtual Private Routed Networks exam. Compare your responses with the Answer Key at the end of the document.

1. Which of the following statements about a VPRN service is FALSE?
 - a. Layer 2 information is removed from the customer data before it is forwarded across the VPRN.
 - b. Each P router maintains a separate IP forwarding table for each VPRN service.
 - c. Each customer's VPRN is invisible to other customers' VPRNs.
 - d. Customer data transported across the provider network is encapsulated with two MPLS labels.
2. In a VPRN that uses MPLS transport tunnels, which of the following statements about CE devices is TRUE?
 - a. VPRN routes are stored on the CE device in a VRF.
 - b. The CE device peers with the P router.
 - c. Multiple VPRNs can be configured on one CE device.
 - d. The CE device is unaware of the existence of the MPLS protocol.
3. Which of the following statements about a VPN-IPv4 prefix is FALSE?
 - a. It consists of an 8-byte route distinguisher and an IPv4 prefix.
 - b. It appears in IP data packets exchanged between PE routers.
 - c. It is carried by MP-BGP.
 - d. It is a unique prefix among different VPRNs.
4. Which protocol is used for VPRN label signaling when LDP-based LSP tunnel is used?
 - a. LDP
 - b. GRE
 - c. iBGP
 - d. MP-BGP

5. Consider the exhibit. A VPRN service is configured across Nokia 7750 SRs. BGP is used between the PE router and the CE device. How should the policy shown in the exhibit be applied on the PE router?

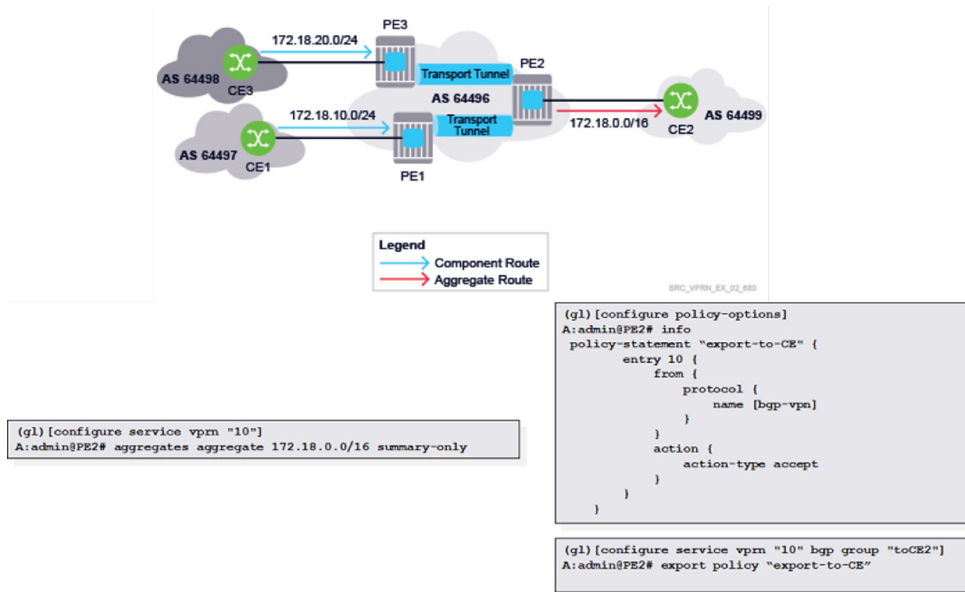
```
(gl) [/configure policy-options]
  policy-statement "policy1" {
    entry 10 {
      from {
        protocol {
          name [bgp-vpn]
        }
      }
      action {
        action-type accept
      }
    }
  }
}
```

- As an import policy in the base router BGP context
 - As an import policy in the VPRN BGP context
 - As an export policy in the base router BGP context
 - As an export policy in the VPRN BGP context
6. Consider the exhibit. What is wrong with the VPRN configuration applied on PE1?



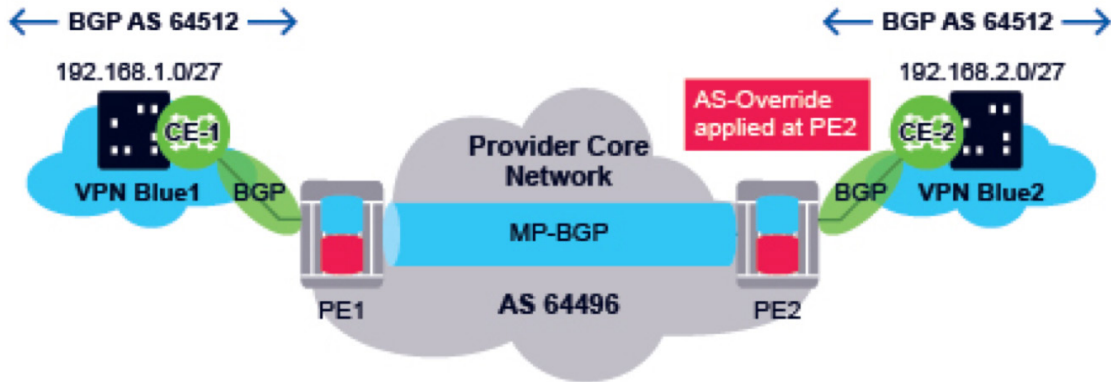
- The router-id must be configured.
- The "neighbor" must be set to the system interface of CE1.
- The "vrf-target" must be set to "64496:10".
- The route-distinguisher must be configured.

7. Consider the exhibit. PE2 must advertise an aggregate route 172.18.0.0/16 to CE2. Which of the following statements about the displayed PE2 configuration is TRUE?



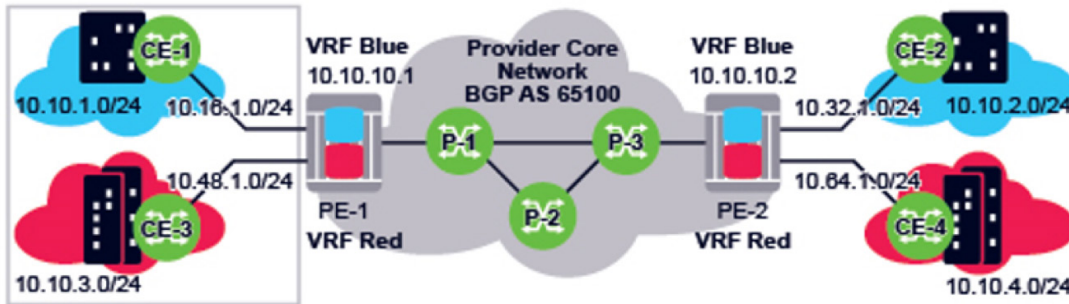
- The "aggregate" configuration must be configured on both PE1 and PE3.
 - The "aggregate" configuration should be implemented on CE2.
 - The policy "export-to-CE" is missing an entry needed to accept the aggregate protocol.
 - The "as-set" aggregate option must be used to allow advertisement of the aggregate route.
8. A service provider core consists of 4 PE routers and 3 P routers. Assuming route reflection is not used, what is the TOTAL number of iBGP sessions required in the service provider network for the correct operation of VPRN services on the 4 PE routers?
- 3
 - 4
 - 6
 - 12

9. Consider the exhibit. AS-override is configured on PE2 for the Blue VPRN. What is the expected AS-Path in the route 192.168.1.0/27 received by CE2?



- a. 64496
 - b. 64496 64512
 - c. 64512 64512
 - d. 64496 64496
10. Which of the following statements is FALSE about the AS-Path remove-private method on a Nokia 7750 SR?
- a. It is configured on a PE router to update VPN routes advertised to peer PEs.
 - b. It is only valid when private AS numbers are used at customer sites.
 - c. It is functionally similar to the AS-Path nullification method.
 - d. It is useful when the same customer has separate sites using the same BGP AS number.
11. Which of the following BGP loop prevention methods is best to avoid route loops in multi-homed sites?
- a. Site of origin
 - b. AS-Path nullification
 - c. AS-Override
 - d. AS-Path remove-private
12. How many different route targets are required to configure a PE hub and spoke VPRN with one hub and 3 spokes?
- a. 1
 - b. 2
 - c. 3
 - d. 4

13. Consider the exhibit. The main sites of the Blue(CE-1) and Red(CE-3) VPRNs share routes through an Extranet VPRN configured on PE-1. On PE-2, which route target(s) should be imported under the Blue VPRN?



```
community "Blue-Only" {
    member "target:65100:1" ( )
}
community "Blue-Red" {
    member "target:65100:3" ( )
}
community "Red-Only" {
    member "target:65100:2" ( )
}
```

SRG_VPRN_EX_02_710

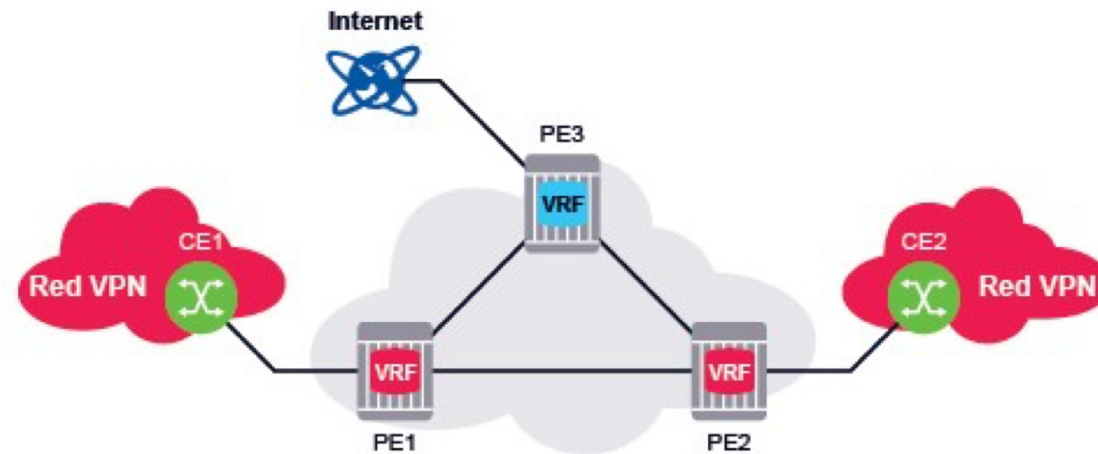
- a. 65100:1 and 65100:3
 - b. 65100:1 and 65100:2
 - c. 65100:3
 - d. 65100:1
14. Which of the following statements is FALSE about route reflector implementation in VPRNs?
- a. Route reflectors optimize the forwarding of user traffic.
 - b. Route reflectors modify the iBGP split horizon rule.
 - c. When a new PE is added, it only requires that a BGP session with route reflectors is configured.
 - d. Route reflectors reduce the number of MP-iBGP sessions within an autonomous system.
15. Which of the following statements is FALSE about Route Distinguisher (RD) assignment in VPRNs?
- a. Assigning one RD per VRF per site allows quick identification of the site of origin.
 - b. Assigning one RD per VRF adds resiliency in a single VPN.
 - c. Assigning one RD per VRF increases memory consumption on the PEs.
 - d. Assigning one RD per VPN allows load balancing.

16. Consider the exhibit. Which of the following statements about the VPRN configuration on PE1 is TRUE?

```
(gl)[/configure policy-options]
A:admin@CSC-PE1# info
community "Extranet-VPN-Blue" {
  member "target:65100:1" { }
  member "target:65100:3" { }
}
community "Red-Only" {
  member "target:65100:2" { }
}
policy-statement "Blue-Sitel-Export" {
  entry 10 {
    action {
      action-type accept
      community {
        add ["Extranet-VPN-Blue"]
      }
    }
  }
}
```

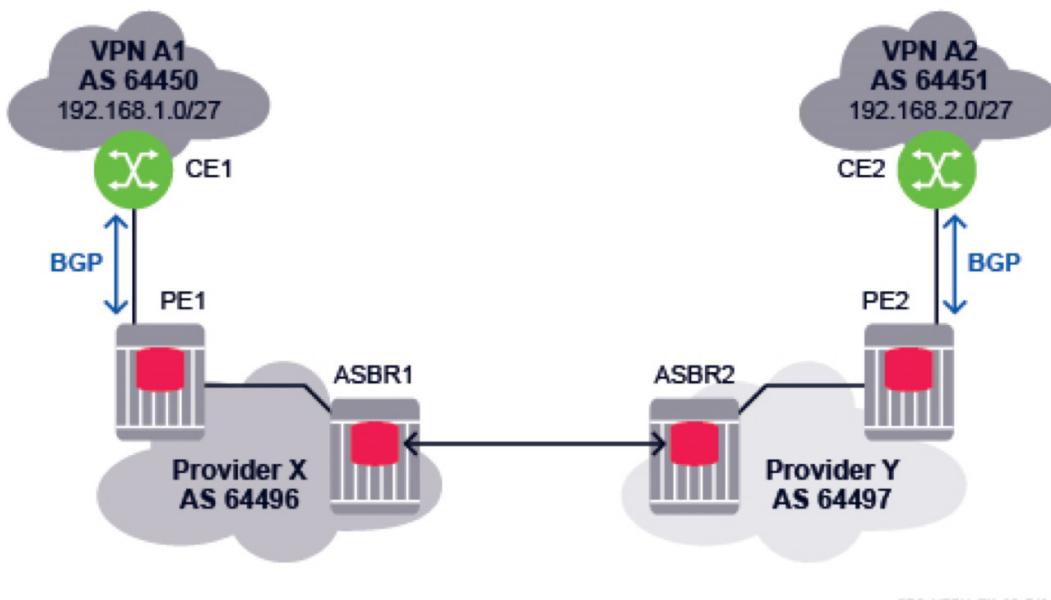
```
*(gl)[/configure service vprn "10"]
A:admin@CSC-PE1# info
:
  bgp-ipvpn {
    mpls {
      :
        vrf-target {
          community "target:65100:2"
        }
        vrf-export {
          policy ["Blue-Sitel-Export"]
        }
      }
    }
  }
```

- PE1 imports "Red-Only" routes and only adds "Red-Only" to exported routes.
 - PE1 imports "Red-Only" routes and only adds "Red-Only" and "Extranet-VPN-Blue" to exported routes.
 - PE1 imports "Red-Only" routes and only adds "Extranet-VPN-Blue" to exported routes.
 - PE1 does not import any routes and only adds "Extranet-VPN-Blue" to exported routes.
17. Consider the exhibit. The network has an Internet VRF dedicated to Internet access. CE1 is connected to the Red VPN and requires the full Internet table. Which of the following statements do not fulfill this requirement?



- The Internet VRF on PE3 imports the red VPN routes advertised by PE1.
- PE3 learns the Internet routes via its VRF interface to the Internet peering router.
- PE1 advertises only the red VPN routes and a default route to CE1.
- The red VRF on PE1 imports the red VPN routes advertised by PE2.

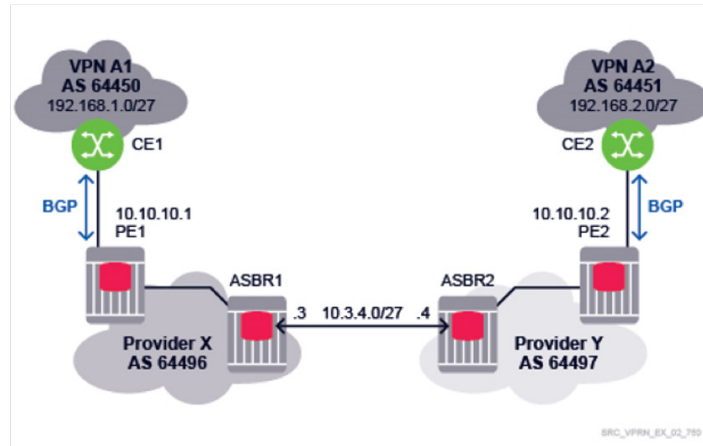
18. A VPLS with a service-mtu of 1514 is terminated by spoke-sdp on a VPRN service. What ip-mtu value should be configured on the VPRN interface for the spoke-sdp to be operational?
- 1496
 - 1500
 - 1514
 - 1522
19. Consider the exhibit. An inter-AS model A VPRN is used to provide connectivity between CEs. CE2 sends an IP packet destined to CE1. Which of the following statements is FALSE?



- CE2 forwards an unlabeled packet to PE2 via the VPRN interface.
- PE2 pushes two labels on the IP packet and label switches it to ASBR2.
- ASBR2 forwards an unlabeled packet to ASBR1.
- ASBR1 pushes one label on the packet and label switches it to PE1.

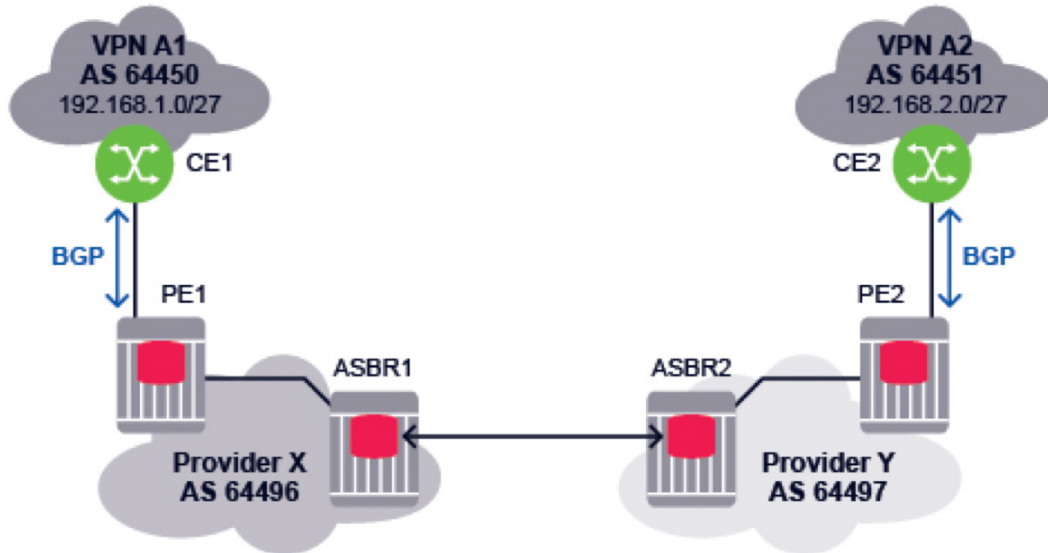
20. Consider the exhibit. Which of the following statements about the inter-AS model A VPN configuration on ASBR1 is TRUE?

```
(gl)[/configure service vpn "10"]
A:admin@ASBR1# info
admin-state enable
customer "10"
autonomous-system 64496
router-id 10.10.10.3
bgp-ipvpn {
  mpls {
    route-distinguisher "64496:1"
    vrf-target {
      community "target:64496:10"
    }
    auto-bind-tunnel {
      resolution-filter
      resolution-filter {
        ldp true
      }
    }
  }
}
bgp {
  group "bgp" {
    peer-as 64496
    export {
      policy ["mpbgp-bgp"]
    }
  }
  neighbor "10.10.10.1" {
    group "bgp"
  }
}
interface "toASBR2" {
  ipv4 {
    primary {
      address 10.3.4.3
      prefix-length 27
    }
  }
  sap 1/1/2 {
  }
}
```



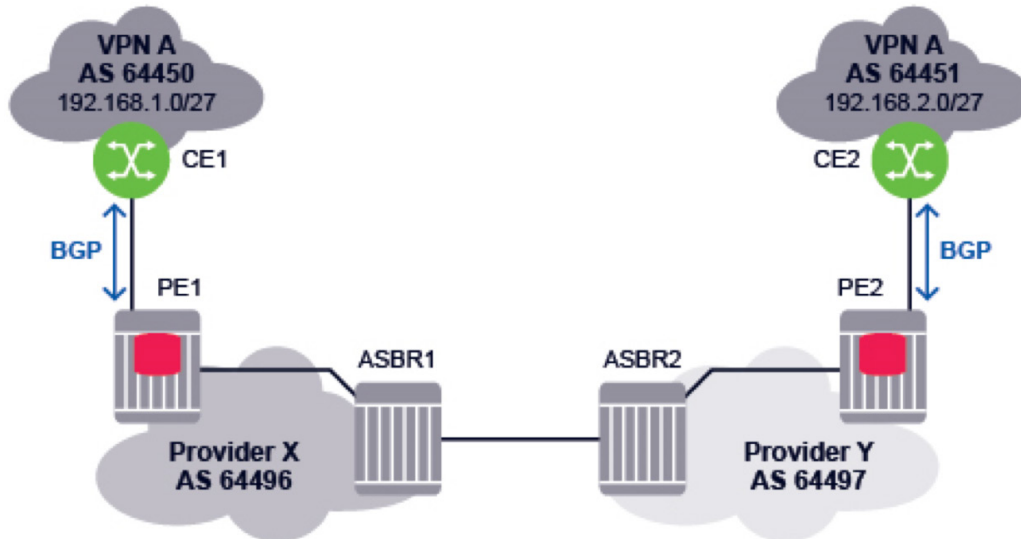
- The BGP neighbor should be 10.3.4.4 and the peer-as should be 64497.
- BGP configuration within the VPN service is not required.
- An export policy is not required in the BGP configuration.
- The route-distinguisher should be 64496:10.

21. Consider the exhibit. An inter-AS model A VPRN is used to provide connectivity between CEs. Which of the following statements about the control plane operation is FALSE?



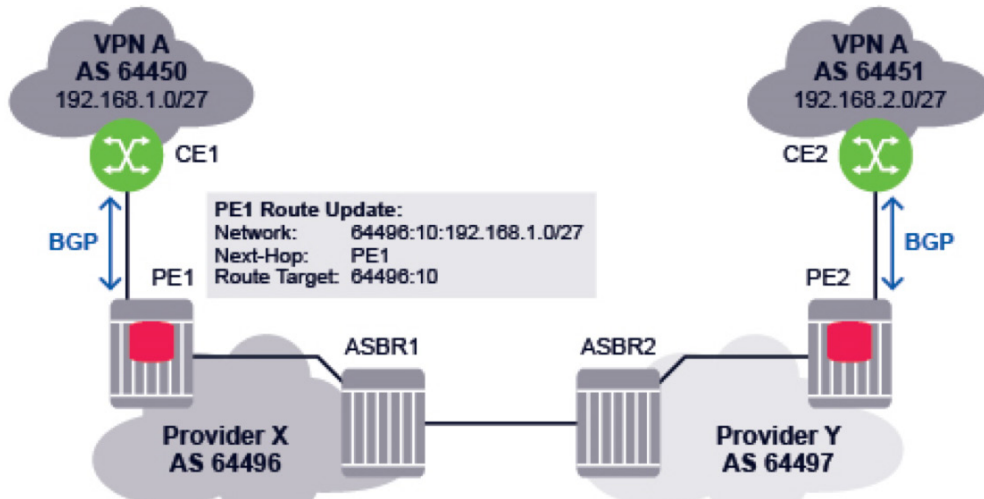
- CE1 sends route 192.168.1.0/27 as an IPv4 route to PE1.
- PE1 installs the route in the VRF and advertises it as a VPN-IPv4 route to ASBR1.
- ASBR1 advertises the received route as a VPN-IPv4 route to ASBR2.
- ASBR2 advertises the received route as a VPN-IPv4 route to PE2.

22. Consider the exhibit. Which of the following statements about Inter-AS model B VPRN is TRUE?



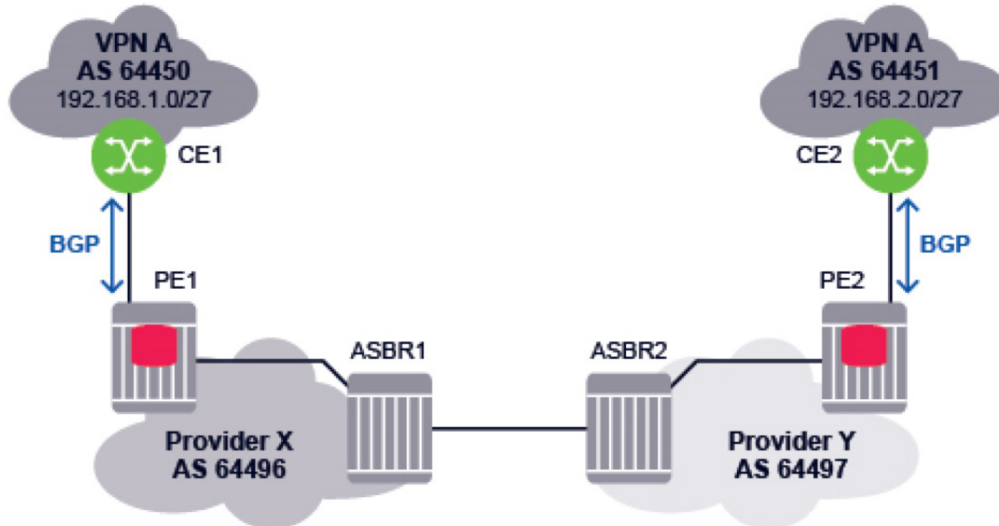
- a. MP-eBGP is used between ASBR1 and ASBR2 to exchange VPN-IPv4 routes.
- b. MP-eBGP is used between PE1 and ASBR1 to exchange VPN-IPv4 routes.
- c. iBGP is used between PE1 and ASBR1 to exchange IPv4 routes.
- d. eBGP is used between ASBR1 and ASBR2 to exchange IPv4 routes.

23. Consider the exhibit. Inter-AS model B is configured for VPRN A. PE1 sends a route update for VPRN A prefix 192.168.1.0/27 to ASBR1. Which of the following route updates is sent from ASBR2 to PE2?



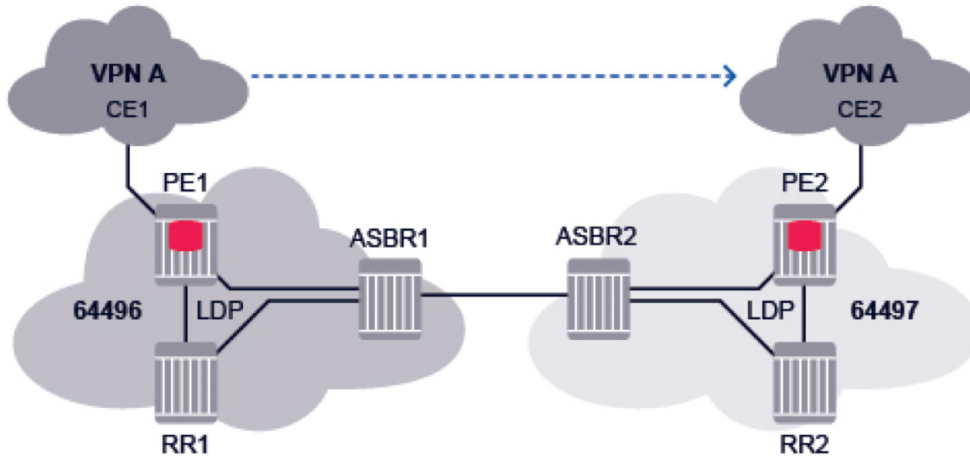
- a. Network: 64497:10:192.168.1.0/27
Next-Hop: ASBR2
Route Target: 64497:10
- b. Network: 64497:10:192.168.1.0/27
Next-Hop: ASBR2
Route Target: 64496:10
- c. Network: 64496:10:192.168.1.0/27
Next-Hop: ASBR1
Route Target: 64496:10
- d. Network: 64496:10:192.168.1.0/27
Next-Hop: ASBR2
Route Target: 64496:10

24. Consider the exhibit. For the Inter-AS model B VPRN, which of the following statements is TRUE when CE2 sends an IP packet to 192.168.1.1?

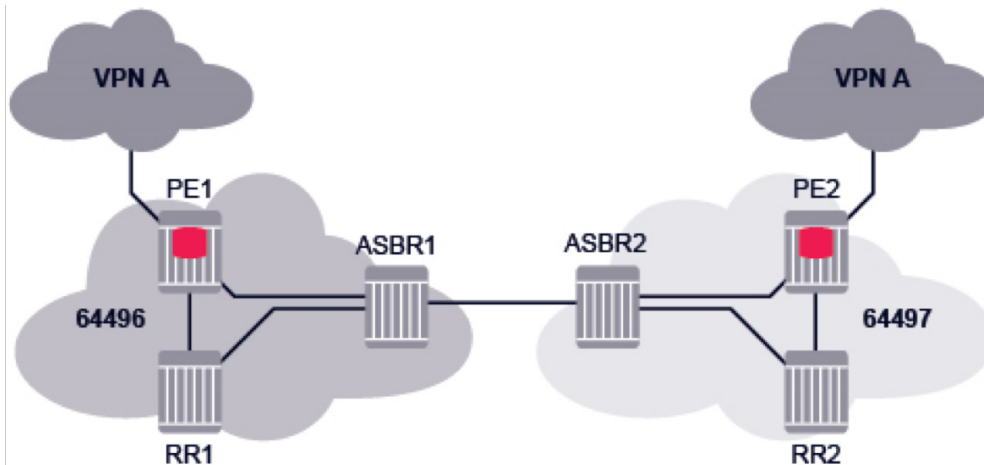


- a. PE2 pushes 2 labels on the packet and forwards it to ASBR2.
 - b. ASBR2 pushes 2 labels on the packet and forwards it to ASBR1.
 - c. ASBR1 pushes 1 label on the packet and forwards it to PE1.
 - d. PE1 pushes 1 label on the packet and forwards it to CE1.
25. Which of the following statements about the Inter-AS model B VPRN is FALSE?
- a. It improves the scalability of the Inter-AS model A solution.
 - b. It is also known as MP-eBGP for VPN-IPv4 exchange.
 - c. It requires the configuration of VPRN instances on the ASBRs.
 - d. In this model, the route target advertised in one AS is maintained and used in the remote AS.
26. Which of the following is NOT a characteristic of Inter-AS model C VPRN?
- a. Each ASBR advertises remote PE routes within its local AS.
 - b. PE routers in different ASes exchange IPv4 routes directly using eBGP.
 - c. VPN routes are neither held, nor re-advertised by the ASBR.
 - d. ASBRs exchange labels for the system addresses of PE routers.

27. Consider the exhibit. Routers RR1 and RR2 are configured as route reflectors. For the Inter-AS model C VPRN, which of the following statements is FALSE if a CE attached to PE1 sends an IP packet to a CE attached to PE2?

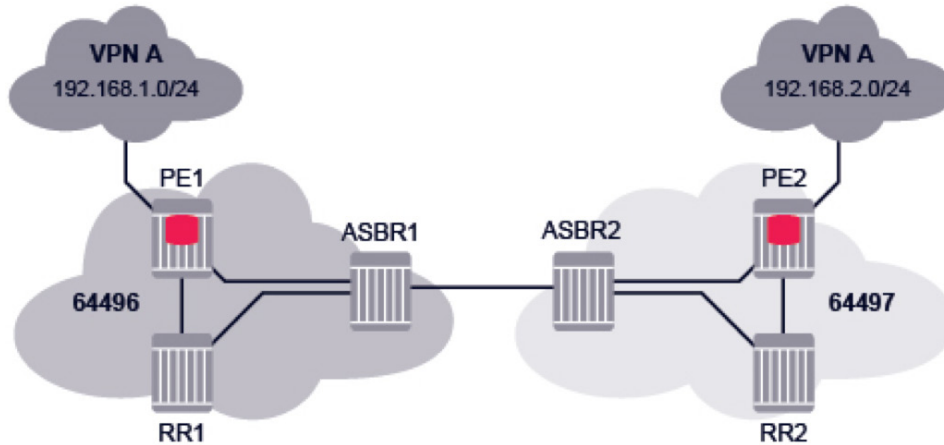


- PE1 pushes 3 labels on the IP packet.
 - ASBR1 pops the LDP label and swaps the BGP label.
 - ASBR2 pops the BGP label and swaps the VPN label.
 - PE2 pops all labels and forwards the unlabeled IP packet to the CE.
28. Consider the exhibit. Routers RR1 and RR2 are configured as route reflectors for all BGP routes. For the inter-AS model C VPRN, which of the following statements is TRUE about the BGP sessions established between the routers?



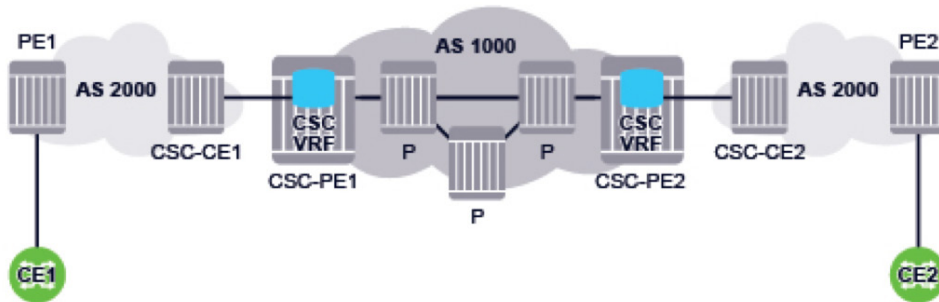
- ASBR1 has a total of 2 BGP sessions established: one with RR1 and one with ASBR2.
- RR1 has a total of 2 BGP sessions established: one with PE1 and one with ASBR1.
- PE1 has a total of 2 BGP sessions established: one with RR1 and one with PE2.
- RR2 has a total of 3 BGP sessions established: one with PE2, one with ASBR2 and one with ASBR1.

29. Consider the exhibit. Routers RR1 and RR2 are configured as route reflectors for all BGP routes. For the Inter-AS model C VPRN, which of the following statements is FALSE about VPN-IPv4 route advertisement?

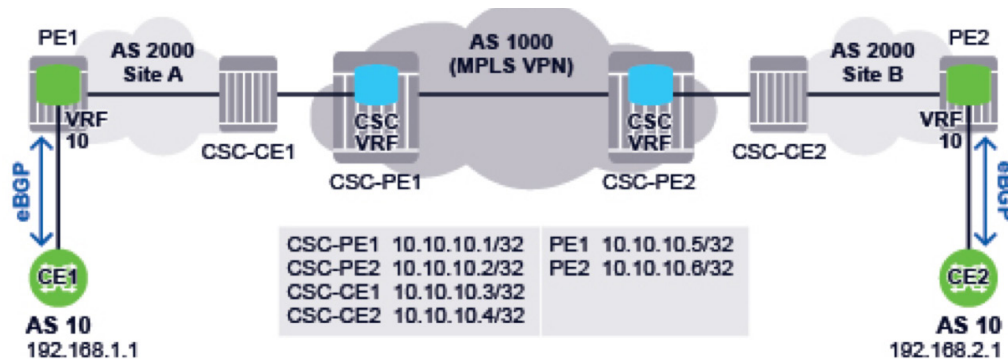


- a. PE1 advertises the VPN-IPv4 route for prefix 192.168.1.0/24 to RR1.
 - b. RR1 advertises the VPN-IPv4 route for prefix 192.168.1.0/24 to RR2.
 - c. PE2 advertises the VPN-IPv4 route for prefix 192.168.1.0/24 to RR2.
 - d. RR1 advertises the VPN-IPv4 route for prefix 192.168.2.0/24 to PE1.
30. A Carrier Supporting Carrier (CSC) VPRN is configured for an ISP customer carrier that provides Internet connectivity to its end-customers. Which type of BGP session is configured between the customer carrier PE routers residing in different sites?
- a. iBGP for IPv4
 - b. MP-iBGP for VPN-IPv4
 - c. eBGP for IPv4
 - d. MP-eBGP for VPN-IPv4
31. A Carrier Supporting Carrier (CSC) VPRN is configured for a customer carrier that provides VPRN services to its end-customers. Which type of BGP session is configured between the customer carrier PE routers residing in different sites?
- a. MP-iBGP for VPN-IPv4
 - b. iBGP for IPv4
 - c. MP-eBGP for VPN-IPv4
 - d. eBGP for IPv4

32. Consider the exhibit. For the Carrier Supporting Carrier (CSC) VPRN, which of the following statements is FALSE about the transport tunnel creation process between PE1 and PE2?

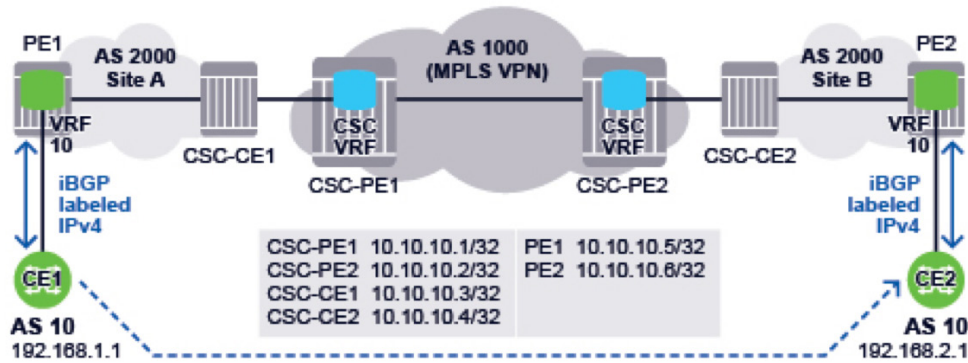


- PE2 advertises to CSC-CE2 a route and a label for its system IP address.
 - CSC-CE2 advertises the system IP address of PE2 to CSC-PE2 as a labeled IPv4 route.
 - CSC-PE2 installs the system IP address of PE2 in its CSC VRF.
 - CSC-PE1 advertises the system IP address of PE2 as an unlabeled BGP route to CSC-CE1.
33. Which of the following statements about the control plane in a Carrier Supporting Carrier (CSC) VPRN is FALSE?
- The end-customer routes are populated in the CSC VRF.
 - Routes exchanged between CSC-CE and CSC-PE are labeled.
 - The customer carrier does not learn any network provider routes.
 - The network provider learns the customer carrier PE system addresses.
34. Consider the exhibit. A Carrier Supporting Carrier (CSC) VPRN is configured for a customer carrier who provides VPN services. Which of the following routes is NOT present in PE2's global route table?



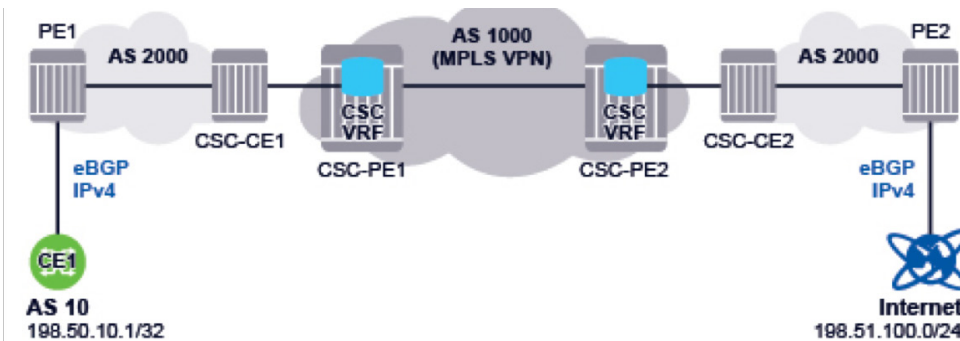
- 10.10.10.2
- 10.10.10.4
- 10.10.10.5
- 10.10.10.6

35. Consider the exhibit. A Carrier Supporting Carrier (CSC) VPRN is configured for a customer carrier offering VPN services. Which of the following statements is FALSE when CE1 sends an IP packet to 192.168.2.1?



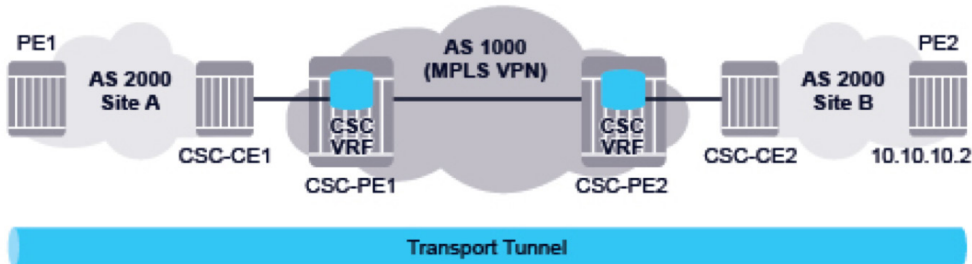
- PE1 pushes three labels on the IP packet: VPN label, BGP label and LDP transport label. PE1 forwards the packet to CSC-CE1.
- CSC-CE1 pops the LDP label, swaps the BGP label and sends the packet to CSC-PE1.
- CSC-PE1 pops the BGP label, pushes a VPN label, pushes an LDP label and forwards the packet to CSC-PE2.
- CSC-PE2 pops the LDP label and the VPN label and forwards the packet with one label to CSC-CE2.

36. Consider the exhibit. A Carrier Supporting Carrier (CSC) VPRN is configured for a customer carrier who is an Internet Service Provider (ISP). Which of the following statements is FALSE?



- CSC-CE2 advertises PE2's system address to CSC-PE2 over a labeled eBGP session.
- CSC-PE2 advertises the Internet route 198.51.100.0/24 to CSC-PE1 over an MP-iBGP session.
- PE2 advertises its system address into IGP and LDP within the local customer carrier site.
- PE1 advertises the Internet route 198.51.100.0/24 to CE1 over an eBGP session.

37. Consider the exhibit. A Carrier Supporting Carrier (CSC) VPRN is configured for a customer carrier who is an Internet Service Provider (ISP). Which of the following statements about the transport tunnel creation from PE1 to PE2 is FALSE?



- a. PE2 advertises route 10.10.10.2 to CSC-CE2 via IGP and a label via LDP.
 - b. CSC-CE2 advertises route 10.10.10.2 to CSC-PE2 as a labeled IPv4 route.
 - c. CSC-PE2 installs route 10.10.10.2 in its global route table and advertises it to CSC-PE1.
 - d. CSC-PE1 advertises route 10.10.10.2 to CSC-CE1 over the CSC VRF interface as a labeled IPv4 route.
38. A company has a national headquarters with three regional offices, and requires traffic to traverse its headquarters site. Which of the following VPRN topologies is best suited for this?
- a. Extranet VPRN
 - b. PE hub and spoke VPRN
 - c. Full mesh VPRN
 - d. CE hub and spoke VPRN
39. Which of the following is NOT a viable option when implementing Inter-AS VPRN?
- a. An eBGP session between ASBRs to exchange labeled IPv4 routes.
 - b. An eBGP session between PEs in different ASes to exchange IPv4 routes.
 - c. An MP-eBGP session between ASBRs to exchange VPN-IPv4 routes
 - d. An MP-iBGP session between PEs in the same AS to exchange VPN-IPv4 routes
40. Which of the following statements about Carrier Supporting Carrier (CSC) VPRN architecture is TRUE?
- a. CSC allows the customer carrier to offer VPN and/or Internet services to its end-customers.
 - b. A CSC VPRN is configured on the customer carrier PE routers.
 - c. The network provider is aware of the services offered by the customer carrier.
 - d. The customer carrier learns the network provider's internal addresses.



Answer Key

- | | | |
|-------|-------|-------|
| 1. B | 16. C | 31. A |
| 2. D | 17. C | 32. D |
| 3. B | 18. B | 33. A |
| 4. D | 19. D | 34. A |
| 5. D | 20. A | 35. D |
| 6. D | 21. C | 36. B |
| 7. C | 22. A | 37. C |
| 8. C | 23. D | 38. D |
| 9. D | 24. A | 39. B |
| 10. A | 25. C | 40. A |
| 11. A | 26. B | |
| 12. B | 27. C | |
| 13. D | 28. A | |
| 14. A | 29. C | |
| 15. D | 30. A | |

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