Migrating and Troubleshooting HP Enterprise Networks

Exam description

This exam tests your ability to troubleshoot complex, enterprise level network solutions based on HP A-Series products and open standard technologies. In addition to assessing your general skills in troubleshooting, the exam verifies that you can implement complex Border Gateway Protocol (BGP) solutions and HP's Rapid Ring Protection Protocol (RRPP).

Who should take this exam?

Although anyone can take this exam, most successful candidates have at least five years of real world experience implementing and maintaining complex enterprise networks.
You will also need sufficient experience with Cisco proprietary protocols to understand how those protocols interact with open-standard protocols and to follow best practices to migrate those protocols to their open-standard equivalents.

Exam contents

This exam has 52 questions. Here are types of questions to expect:

- Multiple choice (multiple responses)
- Multiple choice (single response)
- Drag-and-drop

Tips for taking this exam

Rather than emphasize simple memorization, this exam attempts to assess whether you have the knowledge and skills that a networking professional requires on the job. Therefore, some questions feature exhibits or scenarios. You will have an average of about three minutes per question. If allowed by the system, you might want to answer the questions about which you are sure first and then move back to the others.
Except for a few questions that specifically discuss replacing Cisco products with HP E-Series products, this exam focuses on the A-Series products in the HP portfolio. Some questions might not specifically state that a switch or router is an HP A-Series product. Nonetheless, unless otherwise stated, you should answer the question according to the functionality on HP A-Series products. Some questions will require you to interpret ASeries configurations or to recognize the correct commands for configuring a feature or fixing a problem.
Take the time to read the entire question and consider all of the options carefully before you answer. If the question indicates that it features an exhibit, study the exhibit and reread the question. Make sure to select the answer that correctly responds to the question that is asked — not simply an answer that includes some correct information. If the question asks for more than one answer, remember to select each correct answer. You will not receive partial credit for a partially correct answer.

Exam ID	HP0-Y37
Exam type	Proctored exam taken at dedicated testing center
Exam duration	1 hour 45 minutes
Exam length	52 questions
Passing score	67%
Delivery languages	English, Korean
Related certifications	• HP Master ASE - Network Infrastructure [2011] • HP Master ASE - Network Infrastructure [2011] - upgrade from Master ASE - HP ProCurve Campus LANs [2010]/ H3CSE/Cisco - CCIE Routing & Switching/Voice • HP Master ASE - Network Infrastructure [2011] - upgrade from HP Enterprise Networking Products Technical Qualification
Supporting courses	These recommended courses help you prepare for the exam: • 00301927 - Migrating to an Open Standards Network, Rev. 11.21 • 00314301 - Accelerated Migrating & Troubleshooting HP Enterprise Networks, Rev. 11.31 • 00270055 - Troubleshooting HP Enterprise Networks, Rev. 11.11
Additional study materials	• HP A-Series products solution guides and documentation.

Register for this Exam
You will need an HP Learner ID and a Pearson VUE login and password.

During the exam, you can make specific comments about the exam and items. HP welcomes these comments as part of our continuous improvement process.
No online or hard copy reference material will be allowed at the testing site. This exam may contain beta test items for experimental purposes.

Objectives

This exam validates that you can successfully perform the following:

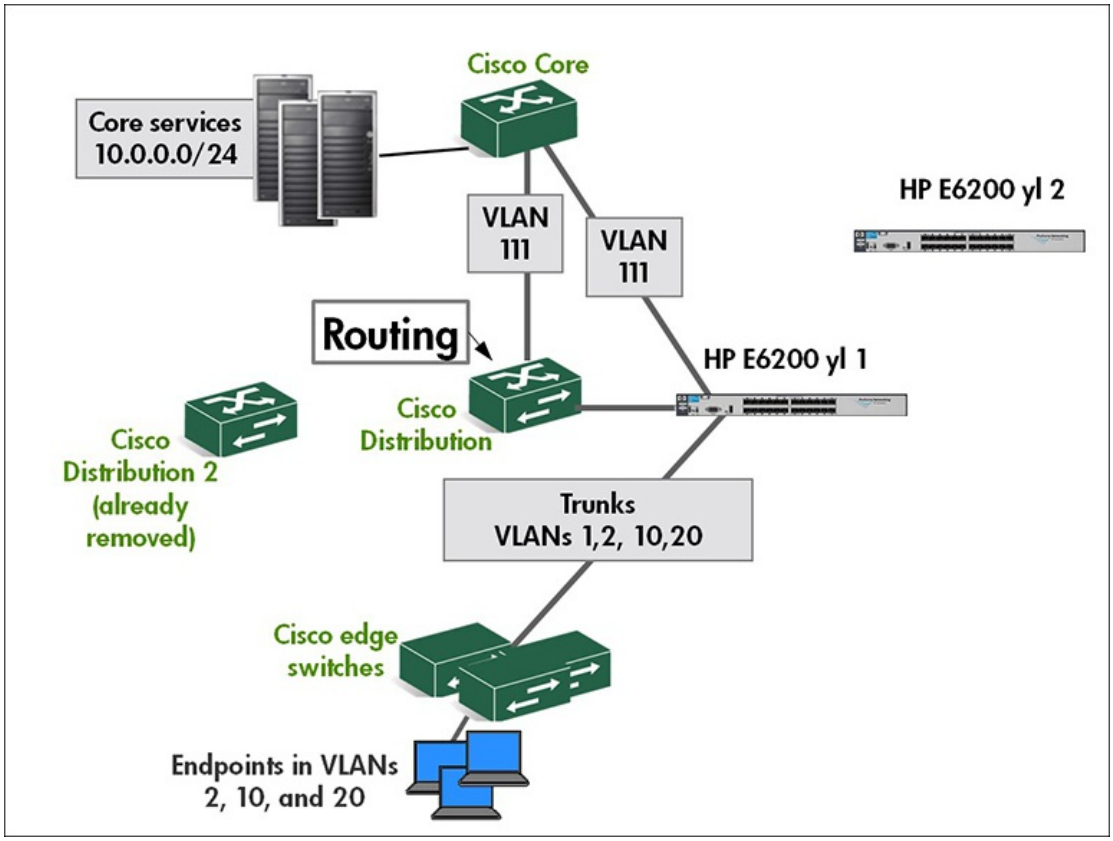
	Sections/Objectives
7%	Intelligent Resilient Framework (IRF) • Use the HP A-Series CLI to evaluate IRF configuration and performance • Troubleshoot IRF split detection using Multi-Active Detection (MAD) over LACP or over BFD
14%	Rapid Ring Protection Protocol (RRPP) • Describe the functioning and appropriate deployment of the Rapid Ring Protection Protocol (RRPP) in the enterprise networking • Design RRPP solutions for enterprise networks, using single-ring and intersecting-ring topologies, MSTP, and RRPP Domains • Configure and monitor RRPP implementations on HP A-Series switches • Analyze and mitigate deficiencies in RRPP implementations using tools available at the CLI of HP A-Series switches

13%	Border Gateway Protocol (BGP) • Design enterprise routing solutions using interior and exterior Border Gateway Protocol (BGP) routing • Troubleshoot BGP solutions on HP A-Series switches • Use technologies such as route redistribution and filtering to ensure BGP interoperability with other routing protocols in the enterprise network
5%	Layer 3 (BGP) Multi-Protocol Label Switching (MPLS) VPNs • Design L3 MPLS VPN solutions for enterprise deployment, ensuring appropriate interaction with provider networks and internal enterprise resources • Analyze and mitigate deficiencies in enterprise L3 MPLS VPNs using BGP as a signaling protocol
4%	MASE networking experience requirements • Troubleshoot advanced enterprise implementations of Layer 2 and Layer 3 QoS technologies • Troubleshoot advanced enterprise implementations of OSPF, RIP, and static routes
18%	Migrating a Cisco Network to Open Standards • Replace the Cisco proprietary protocols CDP, PVST+, VTP, and EIGRP with the following open standards protocols: LLDP, MSTP, GVRP, and OSPF • Devise a strategy to replace proprietary Layer 2 and Layer 3 protocols with their open standards counterpart while minimizing downtime
10%	Migrating Edge Devices • Migrate edge to HP switches and connect uplinks of edge switches to the Cisco distribution switch • Configuring management options for the HP edge switches • Configure edge features
14%	Migrating and Expanding the Distribution Layer with HP E-Series • Replace Cisco switches at the distribution layer with HP E-Series switches • Consider the order in which you migrate various features in order to reduce issues and downtime • Assess the advantages of various strategies in different customer environments
7%	Migrating and Expanding the Distribution Layer with HP A-Series • Replace Cisco switches at the distribution layer with HP A-Series switches • Consider the order in which you migrate various features in order to reduce issues and downtime • Assess the advantages of various strategies in different customer environments
8%	Migrating Border Gateway Protocol • Replace a BGP-configured Cisco router with a BGP-configured HP A-Series router • When replacing a BGP-configured Cisco router with a BGPconfigured HP A-Series router, consider the operation order to reduce downtime

Sample questions

Use the following questions to help assess whether you are ready to take the exam. Answers to these sample questions are provided at the end of this guide.

1. A company originally had a Cisco-only network but wanted to replace the two Cisco switches at the distribution layer with two HP E6200 yl Series switches. You have begun the migration by removing one of the Cisco distribution switches and connecting one of the new HP E-Series switches to the existing network in parallel. The exhibit displays the network topology at this point in the migration.

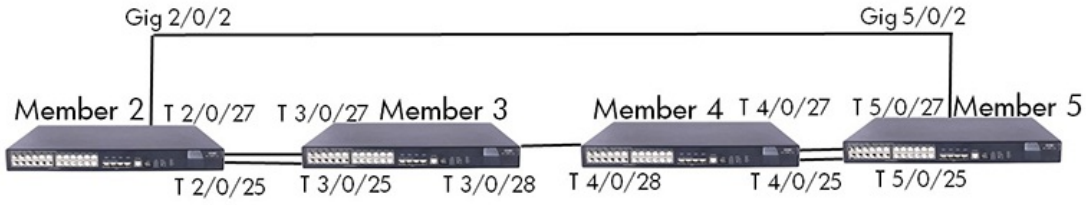


At this point, the Cisco distribution switch runs Extended Internal Gateway Routing Protocol (EIGRP) and Hot Router Standby Protocol (HSRP), the Cisco core switch runs EIGRP and Open Shortest Path First (OSPF), and the HP E6200 yl switch runs OSPF and Virtual Router Redundancy Protocol (VRRP). Edge switches and endpoints in VLANs 1, 2, 10, and 20 use 10.1.X.254 as their default gateway address (X being their VLAN ID). This is the virtual HSRP address configured on the Cisco distribution switch. You have checked that the HP switch and Cisco core switch have achieved OSPF adjacency. The network is not experiencing any connectivity issues at this point.
You now disable VLAN 10 on the Cisco distribution switch and enable VRRP on VLAN 10 on the HP switch. Based on the configurations below, what issue will occur?

a. Endpoints in VLAN 10 can no longer reach the core.
b. Endpoints in VLANs 2 and 20 can no longer reach devices in VLAN 10.
c. The HP E-Series router cannot route traffic from endpoints in VLAN to endpoints in VLANs 2 and 20.
d. Endpoints in all VLANs lose connectivity entirely for about five minutes.

2. Examine the HP A-Series device's BGP routing table, a portion of which is displayed below. Which combination of BGP attributes will be selected as the preferred route for prefix 6.0.0.0/8?
   a. Preference, 0; AS Path, 60 2 23; Origin Type, ?
   b. Preference, 1; AS Path, 60 2 23; Origin Type, i
   c. Preference, 1; AS Path, 50 23; Origin Type, ?
   d. Preference, 0; AS Path, 50 23; Origin Type, i

3. The 10 Gigabit Ethernet link that connects the HP A-Series switches labeled Member 3 and Member 4 in the exhibit fails (T3/0/28 to T4/0/28). After several minutes, the link is reestablished.



Based on the command output displayed below, what happens after the link is reestablished?

a. IRF Member 2 remains Master.
b. IRF Member 3 remains Master
c. IRF Member 4 remains Master.
d. The IRF device has two masters until all switches reboot.

4. Switch B, an HP A-Series switch, is participating in an RRPP domain. View the Rapid RRPP statistics provided below. What explains what you see?

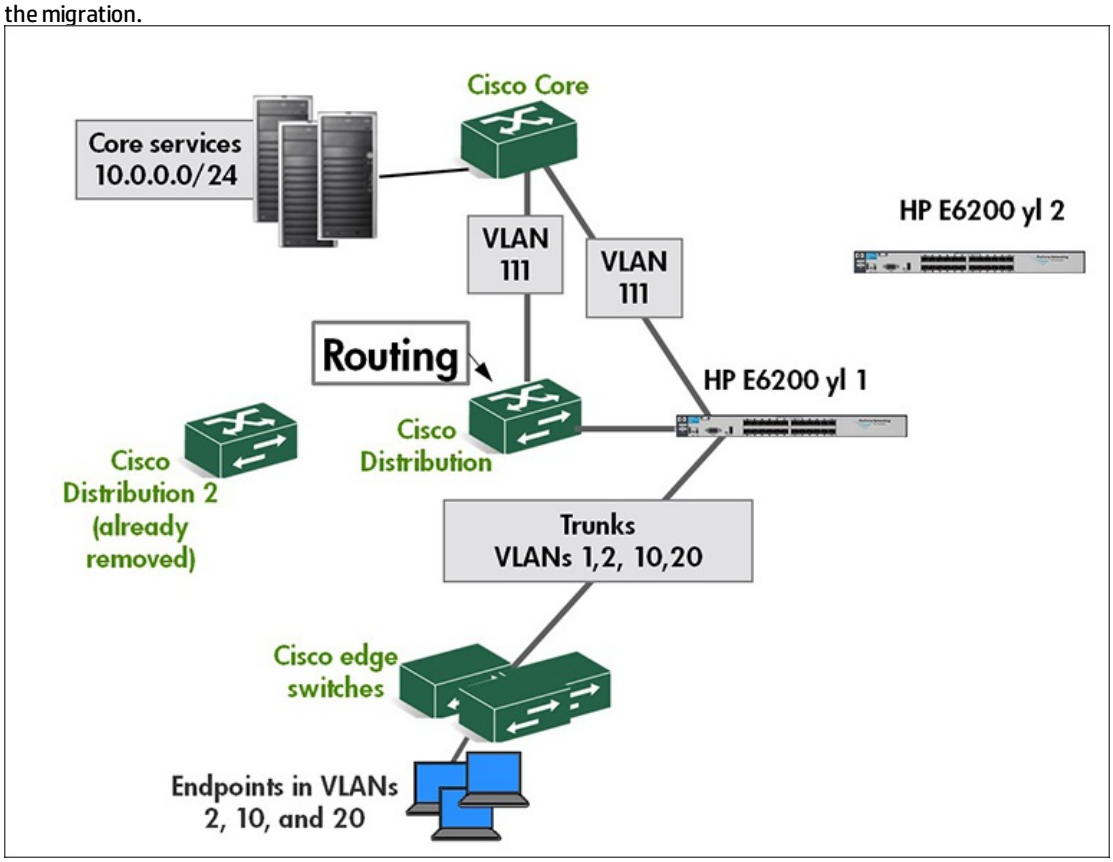
a. The Master has detected the failure of the primary port on this switch using the polling method, as indicated by 0 Link Down packets.
b. The primary port has failed, but the Master has not yet reported the failure, as indicated by 0 Common Flush FDB packets.
c. As is typical of normal behavior, the Transit switch is receiving hellos on the secondary port and sending them on the primary port but not logging the packets.
d. The primary and secondary ports have been reversed and must be fixed before the ring can become complete.

5. A customer has a Cisco-based network running the Cisco proprietary protocol Per-VLAN Spanning Tree Plus (PVST+). The customer now wants to migrate to the open-standard Multiple Spanning Tree Protocol (MSTP). The customer does not have a scheduled outage and wants you to complete the migration in an active network with minimal downtime. Which two statements correctly describe the proper sequence? (Select two.)
   a. You should run PVST+ and MSTP in parallel throughout the migration.
   b. You should migrate the distribution layer switch that will be the CIST root first
   c. You should disable PVST+ on all switches only after you have verified that all switches have activated MSTP and have joined the region
   d. You should configure all MSTP settings on switches before changing to MSTP mode
   e. You should disable Cisco proprietary features such as uplinkfast on edge switches before migrating any switches to MSTP

Answers

This section provides answers to and references for the sample questions.

1. A company originally had a Cisco-only network but wanted to replace the two Cisco switches at the distribution layer with two HP E6200 yl Series switches. You have begun the migration by removing one of the Cisco distribution switches and connecting one of the new HP E-Series switches to the existing network in parallel. The exhibit displays the network topology at this point in the migration.



At this point, the Cisco distribution switch runs Extended Internal Gateway Routing Protocol (EIGRP) and Hot Router Standby Protocol (HSRP), the Cisco core switch runs EIGRP and Open Shortest Path First (OSPF), and the HP E6200 yl switch runs OSPF and Virtual Router Redundancy Protocol (VRRP). Edge switches and endpoints in VLANs 1, 2, 10, and 20 use 10.1.X.254 as their default gateway address (X being their VLAN ID). This is the virtual HSRP address configured on the Cisco distribution switch. You have checked that the HP switch and Cisco core switch have achieved OSPF adjacency. The network is not experiencing any connectivity issues at this point.
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References

Explanation: The issue begins when the E-Series switch begins to route traffic in VLAN 10 while the Cisco distribution switch continues to route traffic in VLANs 1, 2, and 20. Therefore, you can expect that the issue will relate to routing. What happens when you disable VLAN 10 on the Cisco switch and the HP switch begins to route for that VLAN? You should already be thinking of potential problems:

- The HP switch VRRP address might be misconfigured, which would prevent the endpoints in VLAN 10 from reaching their default gateway.
- The Cisco core switch might not be advertising the correct routes in OSPF, so the HP switch cannot route traffic correctly.
- The Cisco switch, which is still routing traffic some traffic, might not have a route to VLAN 10, which is no longer a directly connected network.
  You now check the configuration for each problem. You determine that:
- The HP switch has the correct virtual IP address in VLAN 10.
- The Cisco core switch is running OSPF on all local networks, including those at the core. Because the question indicated that this switch and the HP switch have achieved adjacency, you know that these networks should be advertised.
- The Cisco distribution switch does not have any way route to the VLAN 10 subnet. The HP switch is the only router on that VLAN, and it runs only OSPF while the Cisco distribution switch runs only EIGRP. Therefore, the Cisco distribution switch cannot learn the route from the HP switch. The core distribution switch, which does learn about the VLAN 10 subnet using OSPF, does not redistribute routes between EIGRP and OSPF. Nor does it advertise a default route to the distribution switch. Finally, the Cisco distribution switch itself has no default route to the core.
  You now know that the Cisco distribution switch cannot route to VLAN 10. Because it is routing traffic from endpoints in VLAN 1, 2, and 20, connectivity between these subnets is disrupted. Answer b is correct.
  Because the HP switch can route to the core, and the core can route back to VLAN 10, answer a is incorrect.
  Answer c is incorrect because the HP switch has directly connected routes to VLAN 2 and 20. Although VRRP is not enabled on those interfaces, and endpoints are not using the HP switch as the default gateway in the associated subnets, the VLAN interfaces themselves are enabled. The HP switch can therefore route traffic from VLAN 10 to VLAN 2 or 20. The routing problem occurs when the Cisco distribution switch attempts to route the traffic back to VLAN 10 (as indicated above, you would need to solve the problem by migrating the Cisco switch to OSPF, or giving it a default route, or so forth).
  Answer d is incorrect. As discussed earlier, some traffic, including traffic from each user VLAN to the core, continues uninterrupted.
  Cisco distribution switch routing configuration
  ip subnet-zero
  ip routing
  !
  interface Vlan1
  ip address 10.1.1.1 255.255.255.0
  standby 1 ip 10.1.1.254
  standby 1 priority 255
  standby 1 preempt
  !
  interface Vlan2
  ip address 10.1.2.1 255.255.255.0
  standby 1 ip 10.1.2.254
  standby 1 priority 255
  standby 1 preempt
  !
  interface Vlan10
  ip address 10.1.10.1 255.255.255.0
  ip helper-address 10.1.2.100
  standby 10 ip 10.1.10.254
  standby 10 priority 255
  standby 10 preempt
  !
  interface Vlan20
  ip address 10.1.20.1 255.255.255.0
  ip helper-address 10.1.2.100
  standby 20 ip 10.1.20.254
  standby 20 priority 255
  standby 20 preempt
  !
  interface Vlan111
  ip address 10.0.111.1 255.255.255.0
  !
  !
  router eigrp 1
  network 10.0.0.0
  Cisco core switch routing configuration
  ip subnet-zero
  ip routing
  !
  Interface Vlan111
  ip address 10.0.111.3 255.255.255.0

```
!
interface Vlan121
ip address 10.0.121.3 255.255.255.0
!
router eigrp 1
network 10.0.0.0
distance eigrp 130 170
!
router ospf 1
network 10.0.0.0 0.0.0.255 area 0
network 10.0.111.0 0.0.0.255 area 0
network 10.0.121.0 0.0.0.255 area 0
HP E6200 yl switch 1 routing configuration
ip routing
vlan 1
ip address 10.1.1.5 255.255.255.0
no untagged 4
untagged 1-3,5-24
exit
vlan 2
ip address 10.1.2.5 255.255.255.0
tagged 1-3
exit
vlan 10
ip helper-address 10.1.2.100
ip address 10.1.10.5 255.255.255.0
tagged 1-3
exit
vlan 20
ip helper-address 10.1.2.100
ip address 10.1.20.5 255.255.255.0
tagged 1-3
exit
vlan 111
name "VLAN111"
untagged 4
ip address 10.0.111.5 255.255.255.0
exit
router ospf
area 0.0.0.1 stub 10
area backbone
exit
router vrrp
router vrrp virtual-ip-ping
vlan 1
ip ospf 10.1.1.5 area 0.0.0.1
vrrp vrid 1
backup
virtual-ip-address 10.1.1.254 255.255.255.0
priority 254
exit
exit
vlan 2
ip ospf 10.1.2.5 area 0.0.0.1
vrrp vrid 2
backup
virtual-ip-address 10.1.2.254 255.255.255.0
priority 254
exit
exit
vlan 10
ip ospf 10.1.10.5 area 0.0.0.1
vrrp vrid 10
backup
virtual-ip-address 10.1.10.254 255.255.255.0
priority 254
exit
exit
vlan 20
ip ospf 10.1.20.5 area 0.0.0.1
vrrp vrid 20
backup
```

virtual-ip-address 10.1.20.254 255.255.255.0
exit
exit
exit
vlan 111
ip ospf 10.1.111.5 area backbone
exit

2. Examine the HP A-Series device's BGP routing table, a portion of which is displayed below. Which combination of BGP attributes will be selected as the preferred route for prefix 6.0.0.0/8?

a. Preference, 0; AS Path, 60 2 23; Origin Type, ?

b. Preference, 1; AS Path, 60 2 23; Origin Type, i

c. Preference, 1; AS Path, 50 23; Origin Type, ?

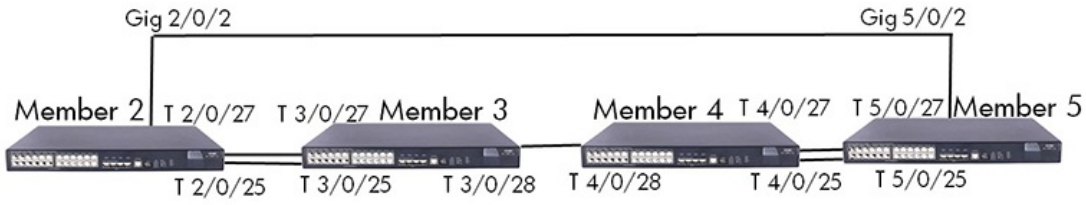
d. Preference, 0; AS Path, 50 23; Origin Type, i

References

Explanation: BGP examines different attributes in turn to select the preferred route:

- If the next hop of this route is unreachable, the route is discarded.
  All of these routes are valid, so this criterion does not help to select between them.
- Select the route with the highest preference value
  The second and third routes listed have a preference value of 1. You can narrow the selection to these two routes, but you must continue examining other criteria to choose between them.
- Select the route with a higher local precedence
  Both routes have the same local preference.
- Select the route originated at the local router.
  Neither route originated at the local router.
- Select the route with shortest AS path.
  The third route listed has a shorter AS path, so this route is selected. The other criteria (origin type; MED value; source of the route whether eBGP, confederation, or iBGP; the hop cost, advertising router ID) do not matter.
  Therefore, answer c is correct.

3. The 10 Gigabit Ethernet link that connects the HP A-Series switches labeled Member 3 and Member 4 in the exhibit fails (T3/0/28 to T4/0/28). After several minutes, the link is reestablished.



Based on the command output displayed below, what happens after the link is reestablished?

a. IRF Member 2 remains Master.

b. IRF Member 3 remains Master

c. IRF Member 4 remains Master.

d. The IRF device has two masters until all switches reboot.

References

Explanation: As shown in the output for the display irf command, Member 4 was originally Master. However, when the link between 3/0/28 and 4/0/28 failed, the IRF divided into two IRF groups. Member 4 remained Master in the group with Member 5. Member 3 was elected as the Master of the other group because Member 3 has the higher priority.
The display mad verbose command output indicates that BFD MAD is active. In other words, MAD detected that the single IRF device had become two separate IRF devices (sometimes called a split brain situation). MAD selected the IRF device that was using Member 3 as the Master to remain active because Member 3 has the lower IP address for MAD. MAD then shut down all ports on Members 4 and 5.
When the link is reestablished, Member 3 remains Master because the current Master always has highest priority in remaining Master. Answer b is correct.
display vlan 4003
VLAN ID: 4003
VLAN Type: static
Route Interface: configured
Description: VLAN 4003
Name: VLAN 4003
Tagged Ports: none

Untagged Ports:
GigabitEthernet2/0/2
GigabitEthernet5/0/2
display mad verbose
Current MAD status: Detect
Excluded ports(configurable):
Excluded ports(can not be configured):
Ten-GigabitEthernet2/0/25
Ten-GigabitEthernet2/0/27
Ten-GigabitEthernet3/0/25
Ten-GigabitEthernet3/0/27
Ten-GigabitEthernet3/0/28
Ten-GigabitEthernet4/0/25
Ten-GigabitEthernet4/0/27
Ten-GigabitEthernet4/0/28
Ten-GigabitEthernet5/0/25
Ten-GigabitEthernet5/0/27
MAD LACP disabled.
MAD BFD enabled interface:
Vlan-interface4003
mad ip address 192.168.1.2 255.255.255.0 member 2
mad ip address 192.168.1.3 255.255.255.0 member 3
mad ip address 192.168.1.4 255.255.255.0 member 4
mad ip address 192.168.1.5 255.255.255.0 member 5

display irf
Switch Role Priority CPU-Mac
2 Slave 13 0023-89d9-b190
3 Slave 20 0023-89d9-c162
*4 Master 22 0023-89d6-7c53
+5 Slave 18 0023-89d9-b793
---
* indicates the device is the master.
+ indicates the device through which the user logs in.
The Bridge MAC of the IRF is: 0023-89d6-7c52
Auto upgrade : yes
Mac persistent : 6 min
Domain ID : 0
display irf topology
Topology Info

IRF-Port1 IRF-Port2
Switch Link neighbor Link neighbor Belong To
2 UP 3 DIS -- 0023-89d6-7c53
5 DIS -- UP 4 0023-89d6-7c53
3 UP 4 UP 2 0023-89d6-7c53
4 UP 5 DIS 3 0023-89d6-7c53
display irf configuration
MemberID NewID IRF-Port1 IRF-Port2
2 2 Ten-GigabitEthernet2/0/25 disable
Ten-GigabitEthernet2/0/27
3 3 Ten-GigabitEthernet3/0/28 Ten-GigabitEthernet3/0/25
Ten-GigabitEthernet3/0/27
4 4 Ten-GigabitEthernet4/0/25 Ten-GigabitEthernet4/0/28
Ten-GigabitEthernet4/0/27
5 5 disable Ten-GigabitEthernet5/0/25
Ten-GigabitEthernet5/0/27

4. Switch B, an HP A-Series switch, is participating in an RRPP domain. View the Rapid RRPP statistics provided below. What explains what you see?

   a. The Master has detected the failure of the primary port on this switch using the polling method, as indicated by 0 Link Down packets.

   b. The primary port has failed, but the Master has not yet reported the failure, as indicated by 0 Common Flush FDB packets.

   c. As is typical of normal behavior, the Transit switch is receiving hellos on the secondary port and sending them on the primary port but not logging the packets.

   d. The primary and secondary ports have been reversed and must be fixed before the ring can become complete.

References

Explanation: As you see in the output for the display rrpp statistics command, this switch operates in Transit mode. During normal operations, Transit switches track receive Hello packets on the secondary port and forward those packets on their

primary port. However, they do not log statistics for these hellos. The table shows exactly this situation. Therefore, answer c is correct.
Answers a and b are incorrect because there is no reason to believe from this display that the primary port has failed. Answer d is incorrect because the switch has received a complete flush FDB packet indicatitng the the ring has been established successfully.

5. A customer has a Cisco-based network running the Cisco proprietary protocol Per-VLAN Spanning Tree Plus (PVST+). The customer now wants to migrate to the open-standard Multiple Spanning Tree Protocol (MSTP). The customer does not have a scheduled outage and wants you to complete the migration in an active network with minimal downtime. Which two statements correctly describe the proper sequence? (Select two.)

   a. You should run PVST+ and MSTP in parallel throughout the migration.

   b. You should migrate the distribution layer switch that will be the CIST root first

   c. You should disable PVST+ on all switches only after you have verified that all switches have activated MSTP and have joined the region

   d. You should configure all MSTP settings on switches before changing to MSTP mode

   e. You should disable Cisco proprietary features such as uplinkfast on edge switches before migrating any switches to MSTP

References

Explanation: Answer d is the first correct answer. You can configure MSTP settings before actually changing any switches to MSTP mode. The configuration does not affect the network but ensures that everything is in place for a quick migration when you do begin to change switches to MSTP mode.
Answer b is also correct. You must migrate the root for the CIST and other spanning trees (which is typically at the distribution layer) to MSTP first. Otherwise, the switch that you migrate to MSTP first will detect PVST+ inconsistencies due to receiving PVST+ BPDUs with a better priority than its own. These errors can cause the switch to close the uplink, disrupting connectivity.
Cisco switches cannot operate in PVST+ and MSTP mode at the same time, so answer a is incorrect. Similarly, answer c is incorrect. Because the switches cannot run PVST+ at the same time as MSTP, you cannot activate MSTP before disabling PVST+.
Answer e is also incorrect. These features are useful as long as PVST+ is running, and there is no reason to disable them until all switches are running MSTP.

For more information

HP ExpertOne: www.hp.com/go/ExpertOne-ContactUs

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