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CCIE Routing and Switching Written Exam

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Topic 1, Network Principles

QUESTION NO: 1

Which two options are causes of out-of-order packets? (Choose two.)

- A. a routing loop
- B. a router in the packet flow path that is intermittently dropping packets
- C. high latency
- D. packets in a flow traversing multiple paths through the network
- E. some packets in a flow being process-switched and others being interrupt-switched on a transit router

Answer: D,E

Explanation:

In traditional packet forwarding systems, using different paths have varying latencies that cause out of order packets, eventually resulting in far lower performance for the network application. Also, if some packets are process switched quickly by the routing engine of the router while others are interrupt switched (which takes more time) then it could result in out of order packets. The other options would cause packet drops or latency, but not out of order packets.

QUESTION NO: 2

A TCP/IP host is able to transmit small amounts of data (typically less than 1500 bytes), but attempts to transmit larger amounts of data hang and then time out. What is the cause of this problem?

- A. A link is flapping between two intermediate devices.
- B. The processor of an intermediate router is averaging 90 percent utilization.
- C. A port on the switch that is connected to the TCP/IP host is duplicating traffic and sending it to a port that has a sniffer attached.
- D. There is a PMTUD failure in the network path.

Answer: D

Explanation:

Sometimes, over some IP paths, a TCP/IP node can send small amounts of data (typically less than 1500 bytes) with no difficulty, but transmission attempts with larger amounts of data hang, then time out. Often this is observed as a unidirectional problem in that large data transfers succeed in one direction but fail in the other direction. This problem is likely caused by the TCP MSS value, PMTUD failure, different LAN media types, or defective links.

Reference. <http://www.cisco.com/c/en/us/support/docs/additional-legacy-protocols/ms-windows-networking/13709-38.html>

QUESTION NO: 3

Refer to the exhibit.

```
Internet Protocol Version 4, Src: 10.149.4.110 (10.149.4.110), Dst: 192.168.3.1 (192.168.3.1)
  Version: 4
  Header length: 20 bytes
  Differentiated Services Field: 0x00 (DSCP 0x00: Default; ECN: 0x00: Not-ECT (Not ECN-Capable Transport))
  Total Length: 60
  Identification: 0x64ac (25772)
  Flags: 0x00
  Fragment offset: 0
  Time to live: 1
  Protocol: ICMP (1)
  Header checksum: 0x8269 [correct]
  Source: 10.149.4.110 (10.149.4.110)
  Destination: 192.168.3.1 (192.168.3.1)
Internet Control Message Protocol
  Type: 8 (Echo (ping) request)
  Code: 0
  Checksum: 0x4d3d [correct]
  Identifier (BE): 1 (0x0001)
  Identifier (LE): 256 (0x0100)
  Sequence number (BE): 30 (0x001e)
  Sequence number (LE): 7680 (0x1e00)
  Data (32 bytes)
0000  61 62 63 64 65 66 67 68 69 6a 6b 6c 6d 6e 6f 70  abcdefghijklmnop
0010  71 72 73 74 75 76 77 61 62 63 64 65 66 67 68 69  qrstuvwabcdefghi
      Data: 6162636465666768696a6b6c6d6e6f707172737475767761...
      [Length: 32]
```

ICMP Echo requests from host A are not reaching the intended destination on host B. What is the problem?

- A. The ICMP payload is malformed.
- B. The ICMP Identifier (BE) is invalid.
- C. The negotiation of the connection failed.
- D. The packet is dropped at the next hop.
- E. The link is congested.

Answer: D

Explanation:

Here we see that the Time to Live (TTL) value of the packet is one, so it will be forwarded to the next hop router, but then dropped because the TTL value will be 0 at the next hop.

QUESTION NO: 4

Refer to the exhibit.

```
R101#show ip cache flow
[...]
SrcIf      SrcIPAddress  DstIf      DstIPAddress  Pr  SrcP  DstP  Pkts
Et0/0     10.0.0.1      Et0/0     15.0.0.2      01 0000 0800 2603
```

Which statement is true?

- A. It is impossible for the destination interface to equal the source interface.
- B. NAT on a stick is performed on interface Et0/0.
- C. There is a potential routing loop.
- D. This output represents a UDP flow or a TCP flow.

Answer: C

Explanation:

In this example we see that the source interface and destination interface are the same (Et0/0). Typically this is seen when there is a routing loop for the destination IP address.

QUESTION NO: 5

Which three conditions can cause excessive unicast flooding? (Choose three.)

- A. Asymmetric routing
- B. Repeated TCNs
- C. The use of HSRP
- D. Frames sent to FFFF.FFFF.FFFF
- E. MAC forwarding table overflow
- F. The use of Unicast Reverse Path Forwarding

Answer: A,B,E

Explanation:

Causes of Flooding

The very cause of flooding is that destination MAC address of the packet is not in the L2 forwarding table of the switch. In this case the packet will be flooded out of all forwarding ports in its VLAN (except the port it was received on). Below case studies display most common reasons for destination MAC address not being known to the switch.

Cause 1: Asymmetric Routing

Large amounts of flooded traffic might saturate low-bandwidth links causing network performance issues or complete connectivity outage to devices connected across such low-bandwidth links.