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INF557 - From the Internet to the IoT: Fundamentals of Modern Computer Networking (2020-2021)

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Started on	Wednesday, 9 December 2020, 7:11 AM
State	Finished
Completed on	Wednesday, 9 December 2020, 7:26 AM
Time taken	15 mins 37 secs
Marks	1.65/8.00
Grade	**1.03** out of 5.00 (**21%**)

Quiz navigation

Xinyi Dai

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Finish review

Question 1 Partially correct — Mark 0.29 out of 1.00 — Flag question

Fill with the right type of packet in a link-state routing protocol:

- Are never forwarded: None ✗
- Are flooded throughout the network: Hellos ✗
- Are sent to 1-hop link local multicast destinations: Both ✗
- Their exchange is used to determine bidirectional connectivity between neighbors: Hellos ✓
- Can be sent periodically, or triggered by external events: Both ✗
- Information contained in these is used to learn global topology of the network: LSAs ✓
- Each of these contains all network links, known by their originator, at the time at which the it was generated: LSAs ✗

LSAs | Hellos | Both | None

Question 2 Partially correct — Mark 0.20 out of 1.00 — Flag question

The Forwarding Information Base (FIB) ✓ is derived from the router ✗, and contains the actual rules followed when a packet is received at an ingress interface, to select the egress interface for that packet.space.

A Routing Information Base (RIB) ✗ allows each participating host ✗ to determine its routing protocol ✗.

Routing Information Base (RIB)
Forwarding Information Base (FIB)
router
host
routing protocol

Question 3 Partially correct — Mark 0.33 out of 1.00 — Flag question

In a link-state routing protocol, a HELLO message describes information about the neighbours of the originating router.

A Link State Advertisement (LSA) describes links from the originating router and to its neighbours.

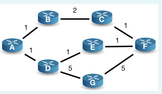
Since both messages describe the local topology of the router that originates them, why are separate message formats needed? Wouldn't it be more efficient to use just a single message format to describe local topology, regardless of to where it is advertised?

Select one or more:

- a. Two separate message formats are not technically needed; they exists simply for historical reasons.
- b. Although they both carry local topology information, their purposes are different. HELLO messages are used to verify bidirectional connectivity with neighbouring routers LSAs are used to announce to bidirectional links to other routers in the network.
- c. Although they both carry local topology information, the forwarding scope of LSAs and HELLOs is different. LSAs are flooded (i.e., are forwarded by routers that receive them), whereas HELLOs are never forwarded.
- d. Although they both carry information about their neighbours, they do not carry exactly the same information. In particular, since HELLOs are used to verify bidirectional connectivity, they need to include not only "symmetric" neighbours, but also those neighbours that are only "heard" -- these "heard" neighbours are not included in LSA messages ✓

Question 4 Incorrect — Mark -0.33 out of 1.00 — Flag question

Assume the topology below, and assume that within it, a link-state routing protocol has converged. In particular, the traffic from A to F is sent through route (A, D, E, F) (shortest-path, with total cost 3).



Now, the link (D, E) breaks. How is the protocol expected to react?

Select one:

- a. D and E detect that the link broke, because they no longer receive LSA updates from each other. D and E will issue new LSAs describing their new local topology (for D: {A, G}; for E: {F}). When these LSAs are received by A, A will recompute accordingly the shortest path to F, install a new routing table to F via B, and send accordingly traffic to F through the path {A, B, C, F}, with total cost 4. ✗
- b. The routing protocol cannot converge after the failure; no traffic can be delivered from A to F until the two routers at each end of the broken link (D and E) reboot and re-run Dijkstra's algorithm.
- c. D detects that the link is broken, because D no longer receives HELLO messages from E. Therefore, it re-runs Dijkstra algorithm to recompute its routing table, by excluding the link (D, E), and sends traffic to F via G. The final path from A to F thus becomes (A, D, G, F), with a total cost 11.
- d. D and E detect that the link broke, because they no longer receive HELLO messages from each other.

  D and E will update the HELLOs that they generate (by removing E and D as a "symmetric" neighbour, respectively).

  D and E will each issue a new LSA, describing their new local topology (for D: {A, G}; for E: {F}).

  When these LSAs are received by A, A will recompute accordingly the shortest path to F, install a new routing table to F via B, and send accordingly traffic to F through the path {A, B, C, F}, with total cost 4. ✓

Question 5 Incorrect — Mark 0.00 out of 1.00 — Flag question

In a link-state routing protocol:

Select one or more:

- a. Routers compute the shortest paths to every possible destination in the network, e.g., by using Dijkstra's algorithm, based on the topology information received trough LSAs. ✓
- b. Routers send their full view of the network topology to any other router in the network, through LSA messages. ✗
- c. Routers send their full view of the network topology with their neighbours, through LSA messages.
- d. Routers report their list of neighbours to their neighbours (1-hop), via HELLO messages.
- e. Routers advertise their costs to reach every possible destination to their neighbours, through LSA messages. ✗
- f. Routers report the symmetric links between themselves and their neighbours to every other router in the network, through LSA messages.

Question 6 Incorrect — Mark 0.00 out of 1.00 — Flag question

Select all statements, which are true for a link-state routing protocol

Select one or more:

- a. Dijkstra's algorithm is run by each router, over the links described in all the LSAs received (and its own local topology information)
- b. The set of all LSAs, valid at a given time t, describes the full view of the network topology, as recorded by network routers, at time t ✓
- c. Dijkstra's algorithm is run by each router, over the links that are described in its own LSAs ✗
- d. An LSA contains all links detected in a network
- e. LSAs need to be unique in the network, and are identified by the ID of the originating router, and a sequence number
- f. Each (bidirectional) link appears in only one LSA at a time.

Question 7 Correct — Mark 1.00 out of 1.00 — Flag question

When an LSA is flooded to a network:

Select one or more:

- a. routers retransmit the LSA every time they receive a copy, until the LSA has reached every router in the network
- b. each router receives a copy of the LSA exactly once
- c. each router retransmits the LSA at least once
- d. each router retransmits the LSA every time it receives a copy
- e. each router retransmits the LSA exactly once (when they first receive it) ✓
- f. each router receives a copy of the LSA at least once ✓
- g. only routers along the shortest paths from the originating router retransmits the LSA

Question 8 Partially correct — Mark 0.17 out of 1.00 — Flag question

A routing protocol...

Select one or more:

- a. forwards packets received on a device interface, towards their intended destination. ✗
- b. is used by hosts.
- c. is used by hosts and routers.
- d. is used by routers. ✓
- e. allows devices running the routing protocol, to build routing tables.

Finish review

◄ 49 - Link-State Routing

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