EECS 489 - FA 21

Discussion 8

Announcements

Assignment 3 is out.

Due date: **11/17 2021, 11:59 PM**

Lateday policy:

You have 3 group latedays in total for assignment 2 - 4.

Please compile your code in the VM and test it carefully.

Agenda

- A3 Hints
- Routing Protocol Questions

A3 Hints

WTP-base

Your sender and receiver should work given:

- Timeouts/Large amounts of latency (think 100s of ms)
- Packet loss
- Packet corruption
- Multiple file transfers for 1 receiver lifespan
- Large binary or text file transfers (A video file, a very long text file, etc.)

Script your tests and don't hand inspect files

- Use things like cmp, sdiff, etc.

A3 Hints

WTP-opt

Your sender and receiver should work given:

- Same conditions as last slide
- ACKs should have precisely the same seq as what was sent
- Packets that have been ACK'd should not be retransmitted

i.e make sure the expected "optimizations" are observable

Do not use TCP sockets, the AG knows when you are doing this!

A3 Hints

Useful tools

- tcpdump: capture packets
- wireshark: a GUI software to inspect the result generated by tcpdump

Routing Protocols

Link-State (LS) Routing

- Open Shortest Path First (OSPF)
- Dijkstra's Algorithm

Distance-Vector (DV) Routing

- Routing Information Protocol (RIP)
- Bellman-Ford Algorithm

Q1 True / False

- Link-State (LS) routing involves broadcasting its local knowledge of the network to everyone.
- True; uses Dijkstra's for computation (OSPF).

- Conversely, Distance-Vector routing involves telling only neighbors about its global view.
- True; uses Bellman-Ford for computation (RIP).

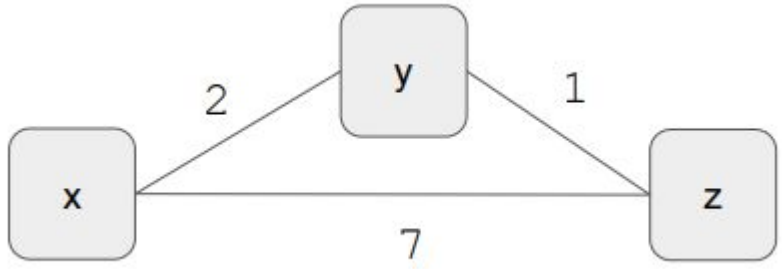
- Both routing methods involve finding least-cost paths to all other nodes
- True; allows easy metric to avoid loops.

Q2 Distance-Vector Properties

Yes / No:

- For DV routing, will the count-to-infinity problem occur if we decrease a link's cost?
- No. Loops aren't caused by decreasing link cost

- What about if we connect two previously unconnected nodes?
- No. Loops potentially result from a removing a link

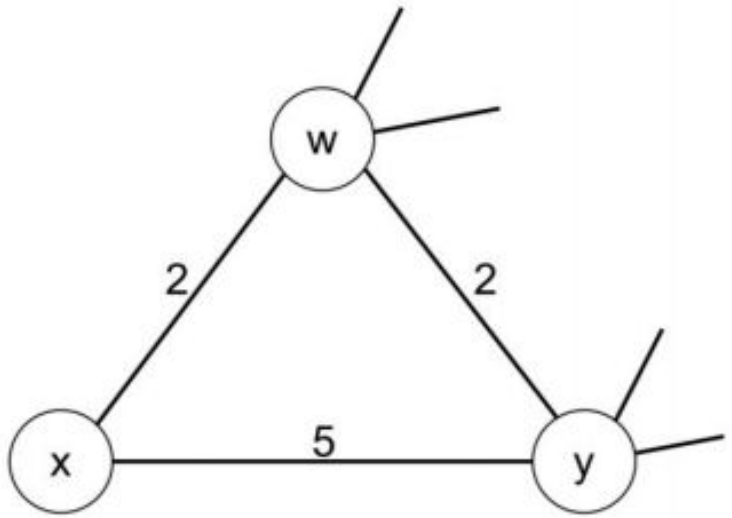


Count-to-infinity problem may occur when the cost of a link increases.

Q3 Distance-Vector Situations

Consider this network fragment:

- **w**'s least-cost path to **u** (not shown) of 5
- **y** has least cost path to **u** of 6
- Complete paths from **w** and **y** to **u** not shown
- All links have strictly positive costs



$$D_w(u) = 5$$
$$D_y(u) = 6$$

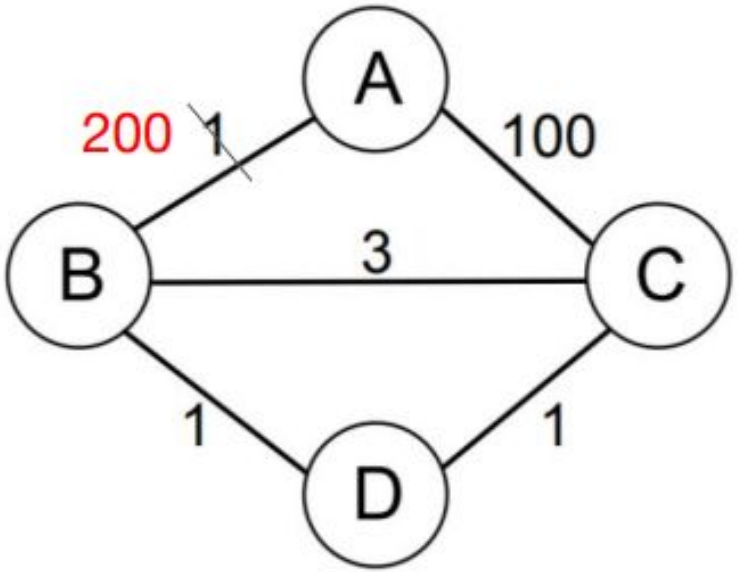
What is x's distance vector for **w**, **y**, and **u**?

```
Dx(w) = 2
Dx(y) = 4    x -> w -> y
Dx(u) = 7    x -> w -> … -> u
```

Q4 Poisoned Reverse

Consider this network fragment Assume the following events:

- DV is used with **poisoned reverse**
- Routing state has stabilized
- c(A, B) goes from 1 to 200 very suddenly



Will count to infinity occur?

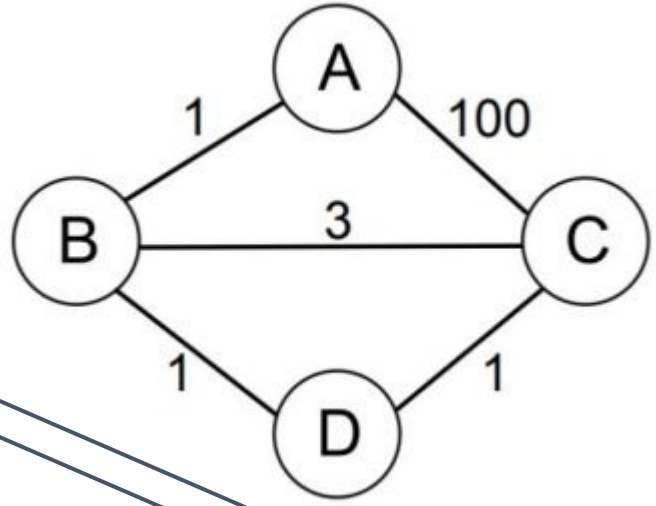
No.

In general, if x goes to z through y, then x will tell y the cost from x to z is infinity.

Poisoned Reverse Explained

	A	B	C	D
A	0	1(B)	inf	inf
B	1(A)	0	**2(D)**	1(D)
C	inf	2(D)	0	1(D)
D	**inf**	1(B)	1(C)	0

Distance Vectors @ B



	A	B	C	D
A	0	1(B)	inf	2(B)
B	1(A)	0	**inf**	1(D)
C	inf	inf	0	1(D)
D	**2(B)**	1(B)	1(C)	0

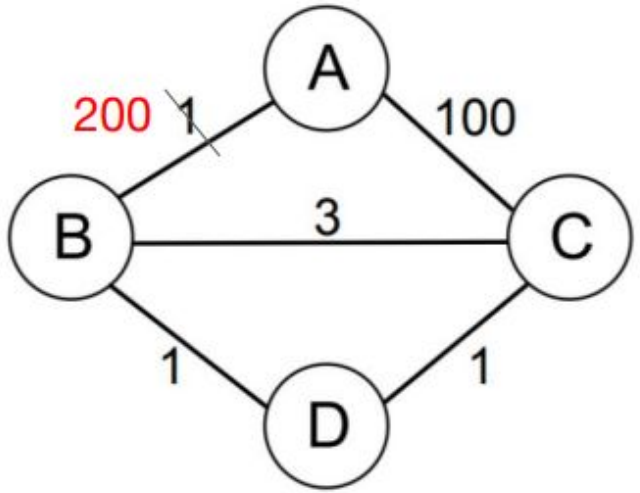
Distance Vectors @ D

Initial steady state

Poisoned Reverse Explained

	A	B	C	D
A	0	1(B)	inf	inf
B	200(A)	0	**2(D)**	1(D)
C	inf	2(D)	0	1(D)
D	inf	1(B)	1(C)	0

Distance Vectors @ B



Some time later

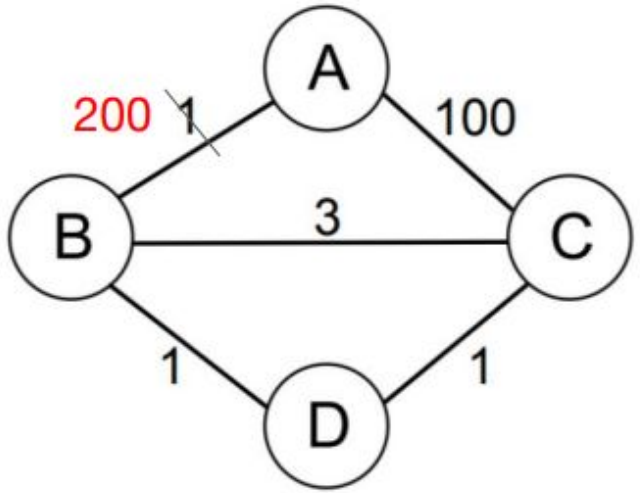
	A	B	C	D
A	0	1(B)	inf	2(B)
B	200(A)	0	**inf**	1(D)
C	100(A)	inf	0	1(D)
D	101(C)	1(B)	1(C)	0

Distance Vectors @ D

Poisoned Reverse Explained

	A	B	C	D
A	0	102(C)	100(C)	101(D)
B	102(D)	0	2(D)	1(D)
C	100(A)	2(D)	0	1(D)
D	101(C)	1(B)	1(C)	0

Distance Vectors @ B



Finally

	A	B	C	D
A	0	inf	100(C)	101(D)
B	inf	0	inf	1(D)
C	100(A)	inf	0	1(D)
D	101(C)	1(B)	1(C)	0

Distance Vectors @ D

Thanks

Have a good one!