Recitation 5

COS 461

Assuming standard BGP routing policies (Gao-Rexford model), will packets take the drawn path? True or False

Why?
Assuming standard BGP routing policies (Gao-Rexford model), will packets take the drawn path? True or False

Why?
AS X would have to pay AS U whereas it could go through AS Y for free.

Assuming standard BGP routing policies (Gao-Rexford model), will packets take the drawn path? True or False

Why?
Going through AS Y is a free route. AS W would not want to carry the traffic.
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Why?
AS Z would not advertise a route to its provider, AS W, to its peer, AS V, and vice versa.

Assuming standard BGP routing policies (Gao-Rexford model), will packets take the drawn path? True or False

Why?
AS X would not advertise a peer link to its provider, AS U (it would pay for being a middle man).

Routing Loops

If the link (c – e) fails, and the nodes run a link-state routing protocol, can a temporary forwarding loop occur? If so, which node pairs may see their traffic loop?

Nodes a, c, d, and e could potentially see their outgoing packets loop.

a → e

1

b

2

d

2

c

1

e

1

Nodes a, c, d, and e could potentially see their outgoing packets loop.

a → e
c <-> e
d → c
Suppose network operator Olivia decides to bring down the link c–e for maintenance. Olivia figures she can issue a series of link weight changes in the network to shift traffic away from c–e such that no temporary forwarding loops occur. She’s right; what series of changes to c–e’s weight would achieve this?

Change c–e weight to 4.
- a to e moves to a–b.
- c to e remains on c–e.
- d to c moves to d–b.
- e to c remains on c–e.

No traffic left on c–e. Olivia can bring down the link.

1. Which of the following paths to d are valid?
(a) b→a→d
(b) h→e→d
(c) f→e→d
(d) c→b→e→d

2. Which path does e take to reach i?
(a) e→h→i
(b) e→f→i
(c) e→b→c→f→i
(d) e→d→g→b→i
2. Which path does e take to reach i?

(a) e→h→i
(b) e→f→i
(c) e→b→c→f→i
(d) e→d→g→h→i

3. If the link e-f is removed then which path does e take to reach i?

(a) e→h→i
(b) e→f→i
(c) e→b→c→f→i
(d) e→d→g→h→i

4. Suppose AS b provides a dump of all BGP routes they learn for every destination and we use them to reconstruct the AS-level topology, which of the following business relations will be missing?

(a) e→h
(b) e→f
(c) f→i
(d) d→g
(e) c→f

5. What is the minimum set of ASes that must provide “dumps” of every AS path they learn for every edge in the graph to be visible in at least one dump?

(a) a and h
(b) a and c
(c) a, b and h
(d) a, b and c
(e) h
5. What is the minimum set of ASes that must provide “dumps” of every AS path they learn for every edge in the graph to be visible in at least one dump?

(a) a and h 
(b) a and c 
(c) a, b and h 
(d) a, b and c 
(e) h 

6. BGP supports flexible routing policies. Internet Service Providers (ISPs) often have a “prefer customer” policy where they prefer to route through a customer, even if a shorter route exists through a peer or provider. Why? How is this policy realized in BGP?

Directing traffic through a customer generates revenue, whereas sending through a peer or provider is (at best) revenue neutral and may, in fact, cost money. The policy is realized in BGP by having an import policy that assigns a higher local-preference value to routes learned from customer ASes.