Week 10 Discussion

FAQ

- Q: When and where is the final exam?
- A: 8 am, 11/12 on Wednesday. Center Hall 113.

- Q: Are we allowed to bring cheat sheets?
- A: Yes, one 8.5x11 doubled sided cheat sheet is allowed.

- Q: What will be covered in the final exam?
- A: Everything in lecture slides and assigned readings.

FAQ

- Q: Will there be a final review session?
- A: Yes, during the last lecture on Friday.

- Q: Will there be any TA office hours in the final week?
- A: Yes, we will update the schedule on piazza soon.

- Q: Do we have practice finals?
- A: Yes, we will post practice finals later this week.

Aloha Protocol

Goal: distributed access control over a shared broadcast channel

Fact: only one transmission at a time is allowed in shared broadcast channel

Algorithm:
If a node has data to send:
    try to send the data
    while failed:
        delay for some random time interval
        resend the data

Aloha Protocol

Suppose there are two nodes A and B in a channel. All frames transmitted by A and B have identical length L, and take the same amount of time T to transmit from one node to the other.

a. If node A starts to transmit a frame F1 at time t1 = 0, and node B starts to transmit a frame F2 at time t2 = 0.5T. Which transmission(s) will be successful?

b. If node A wants to successfully transmit a frame F1 starting from t1 = T, give a time range that node B cannot start to transmit any frames.

Slotted Aloha

(1) Time is divided into equal size slots

(2) Time slots should be synchronized across all nodes in the channel

(3) Each node can transmit only at the beginning of a time slot.

(4) Retransmissions occur at the nearest next slot

Slotted Aloha

- Suppose there are n nodes in a channel, and each node has a transmission probability p.

- The probability that node n1 successfully transmits data in its first try is: S(n1 success) = p (1-p)^(n-1)

- The probability that there exists one node (among n nodes) that successfully transmits data in the first try is:

S(any one node in n success) = np(1-p)^(n-1)

Slotted Aloha Example

Suppose two stations A and B use the slotted Aloha protocol to send frames in the same channel. For each time slot of T ms, station A and B have transmission probability Pa and Pb, respectively. Assume station A and B have infinite number of frames to transmit, and at t = 0, station A sends a frame Fa and simultaneously station B sends a frame Fb; both Fa and Fb have size less than maximum transmission unit (MTU).

a. What is the probability that station A successfully transmits Fa at t = 0?

b. What is the probability that station A successfully transmits Fa at t = T?

c. What is the probability that station A successfully transmits Fa at t = 2T?

Slotted Aloha Example

Suppose two stations A and B use the slotted Aloha protocol to send frames in the same channel. For each time slot of T ms, station A and B have transmission probability Pa and Pb, respectively. Assume station A and B have infinite number of frames to transmit, and at t = 0, station A sends a frame Fa and simultaneously station B sends a frame Fb; both Fa and Fb have size less than maximum transmission unit (MTU).

Now suppose Pa = 2Pb, and at t = T, the probability of either Fa or Fb is successfully transmitted is 0.56. What is the value of Pa?

Border Gateway Protocol (BGP)

True or False

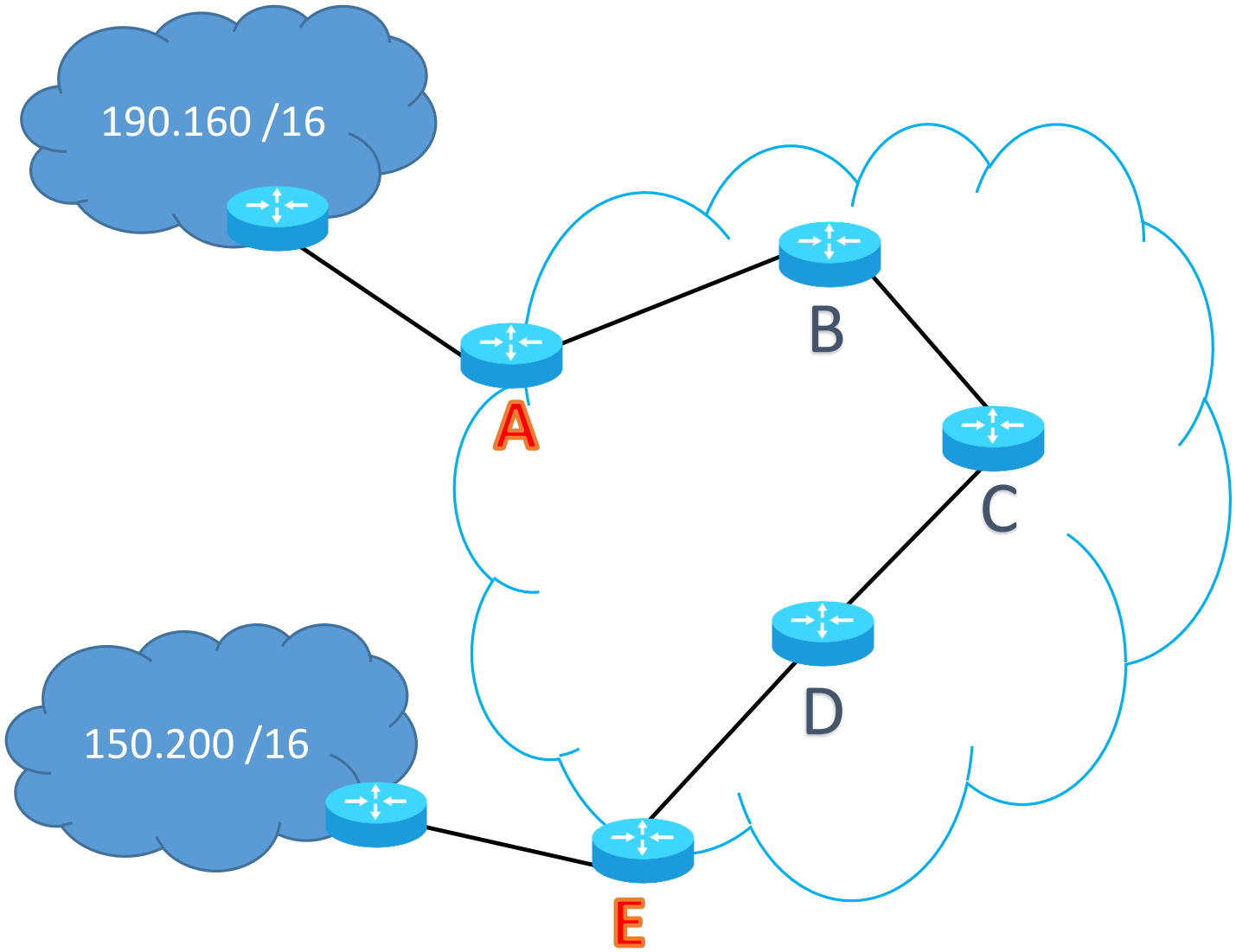
a. One vulnerability of BGP is that packets might be lost during transmission.

b. BPG routing decisions are made based on shortest AS path (number of hops).

c. Routers running BPG should frequently exchange keepalive messages with each other.

d. Internal BGP (iBGP) is established between routers that are adjacent, but within the same Autonomous System.

Interior Border Gateway Protocol (iBGP)



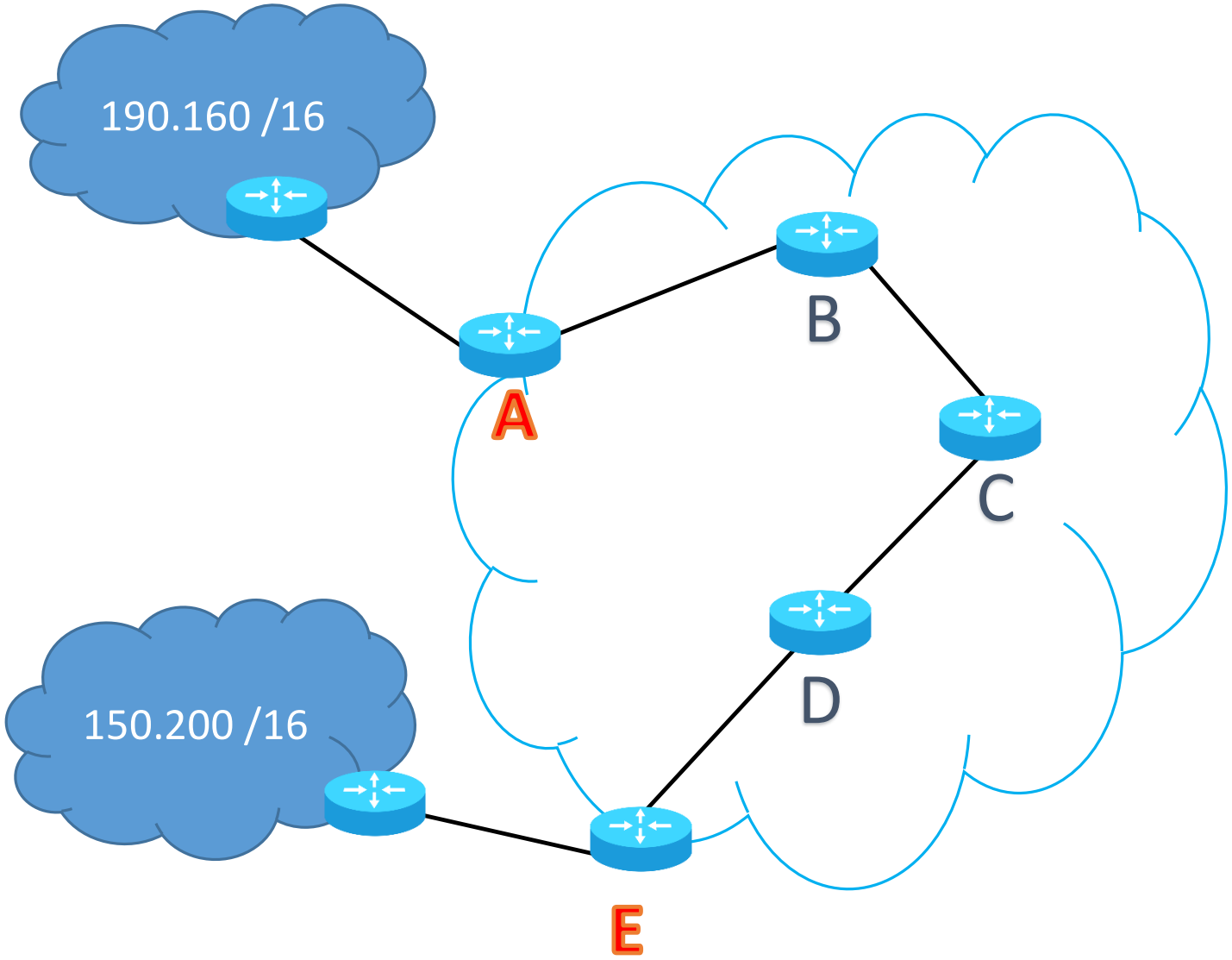
BGP table for the AS

Prefix	BGP Next Hop
190.160 /16	A
150.200 /16	E

IPG table for router C

Router	IGP Path
A	B
B	B
D	D
E	D

Interior Border Gateway Protocol (iBGP)



Combined table for router C

Prefix	IGP Path
190.160 /16	B
150.200 /16	D

Questions?