Active Learning

Introduction
Application Layer
Transport Layer

Session Plan

- Decide Groups of Size 5-6 (~2 mins)
- Group Discussions on Assigned Questions (~10 mins)
- Group representatives provide answers and discussion debriefing (~5 mins/Question)
  - Any follow up questions from students
- Additional Lecture Q&A (~5min)

- Notes
  - Slides published but answers will not be published
  - Take your own notes for details of the discussions

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Q (1)

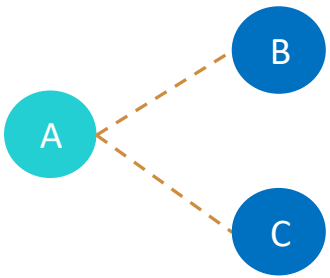
Host A wants to simultaneously send packets to Hosts B and C through a broadcast channel. A is connected to B and C via a broadcast channel (a packet sent by A is carried by the channel to both B and C).

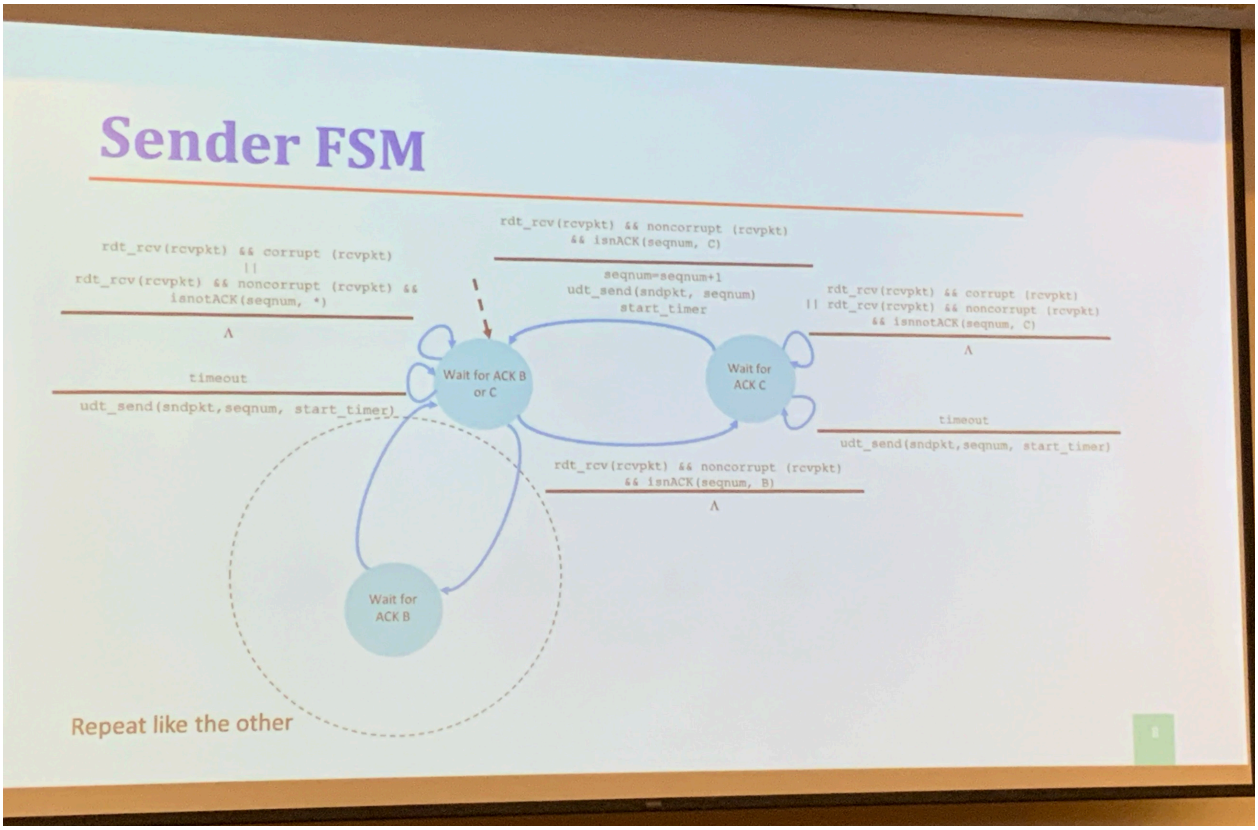
The broadcast channel connecting A, B, and C can independently lose and corrupt packets (e.g., a packet sent from A might be correctly received by B, but not by C).

Design a stop-and-wait-like reliable transfer protocol from A to B and C, such that A will not get new data from the upper layer until it knows that both B and C correctly received the current packet.

Sketch the FSMs of A and C.

Also, provide a description of the packet format(s) used.





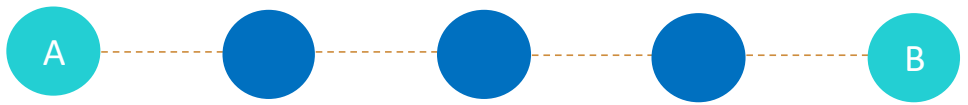
Stop & Wait - 2 Sequence Numbers

↳ Ensure Acknowledgement from Both

↳ ACK from B, wait for C

Q (2)

Five packets of length L arrive at node A and they are to be sent from node A to node B. There are three nodes connected through four links along the path from A to B (as shown in figure). Each link has transmission rate R. What is the total end-to-end delay the **fifth packet** will experience?



$4(L/R)$ queue Delay

+ $4(L/R)$ Transmission Delay

Transmission Delay L/R

- 4 Links to B
- 5 packets

= 1 packet takes $4(L/R)$

Packet 5 waits for the 4 others (one by one)

= $8(L/R)$

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Q (3)

Suppose you start a new startup named ***MyAmazingStartup.com***. You want to register your domain for your **website** and **mail server**. What kind of records needs to be registered and propagated into the DNS system to make this possible? Where these records should be inserted?

Type A websites

Type MX mailserver

Q (4)

Discuss the following:

- Consider you want to provide a DASH service to a user. You have ***N*** videos, each of the videos have ***C*** chunks, and you have to provide the service for ***S*** different screen sizes, each of which can support **R** different streaming rates.
- How many files your server needs to store if
  - You store files for mixed audio/video? $N \cdot C \cdot S \cdot R$
  - You store one separate file for audio for each chunk, and multiple video-only files?

N manifest files → N·C Audio files + N·C·S·R Video files

Acknowledgements

The following materials **(course textbook)** have been used in preparation of these set of questions:

Computer Networking: A Top-Down Approach
James Kurose, Keith Ross
7th and 8th Edition, Pearson
http://gaia.cs.umass.edu/kurose_ross/

Interactive Exercises

http://gaia.cs.umass.edu/kurose_ross/interactive/