

Project 3

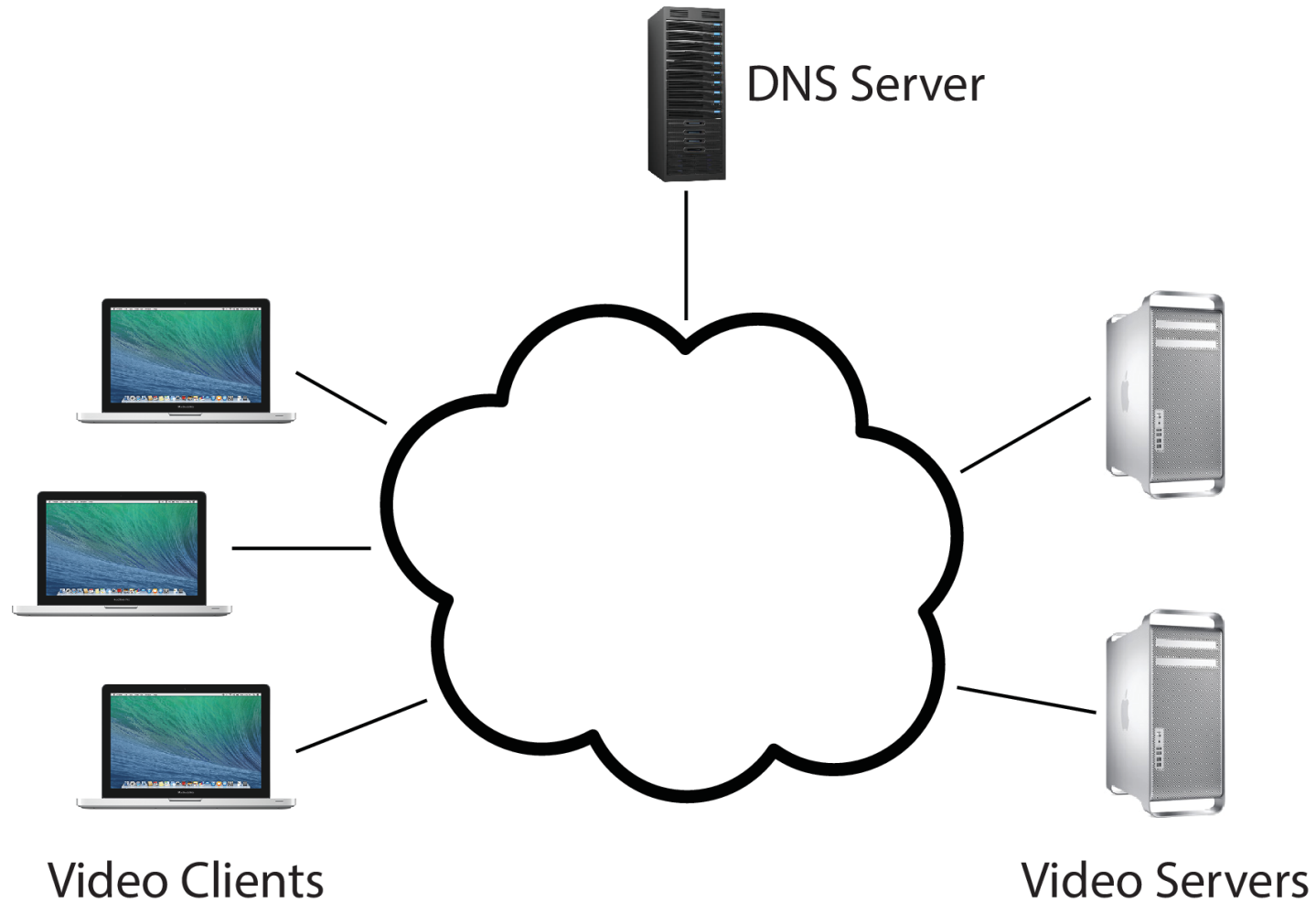
Video Streaming

15-441: Computer Networks

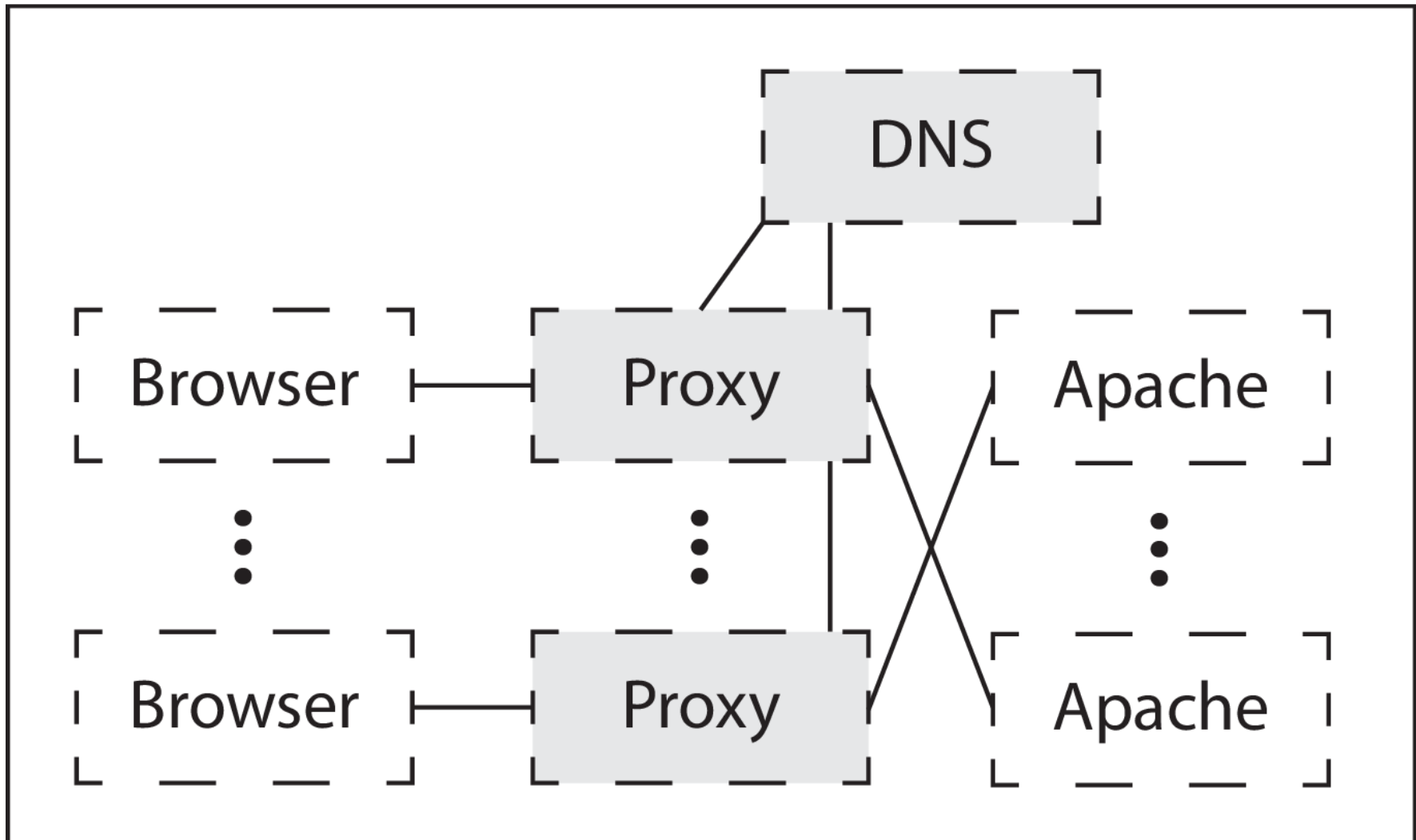
Priyaranjan Jha

Thanks to past TA's...

Video CDN: The Real World



Video CDN: Your System



Your Job: 2 Parts

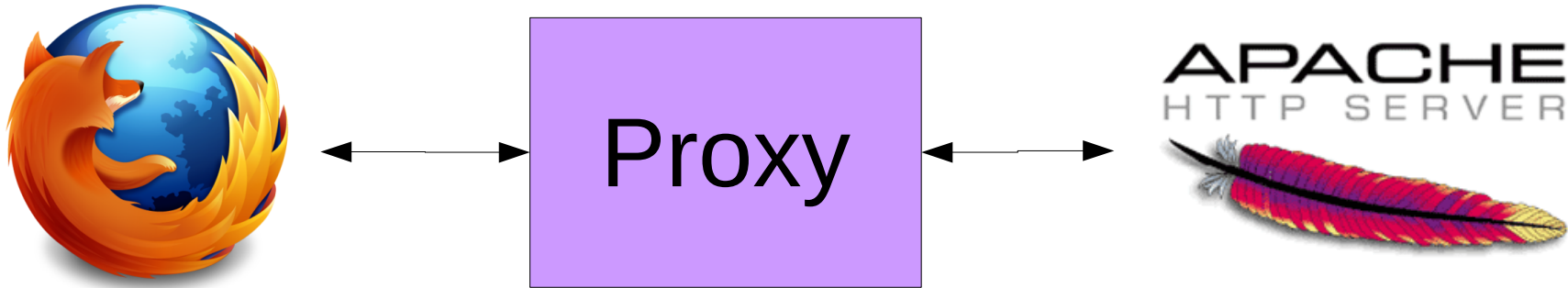
HTTP Proxy

Adaptive bitrate selection

DNS Server

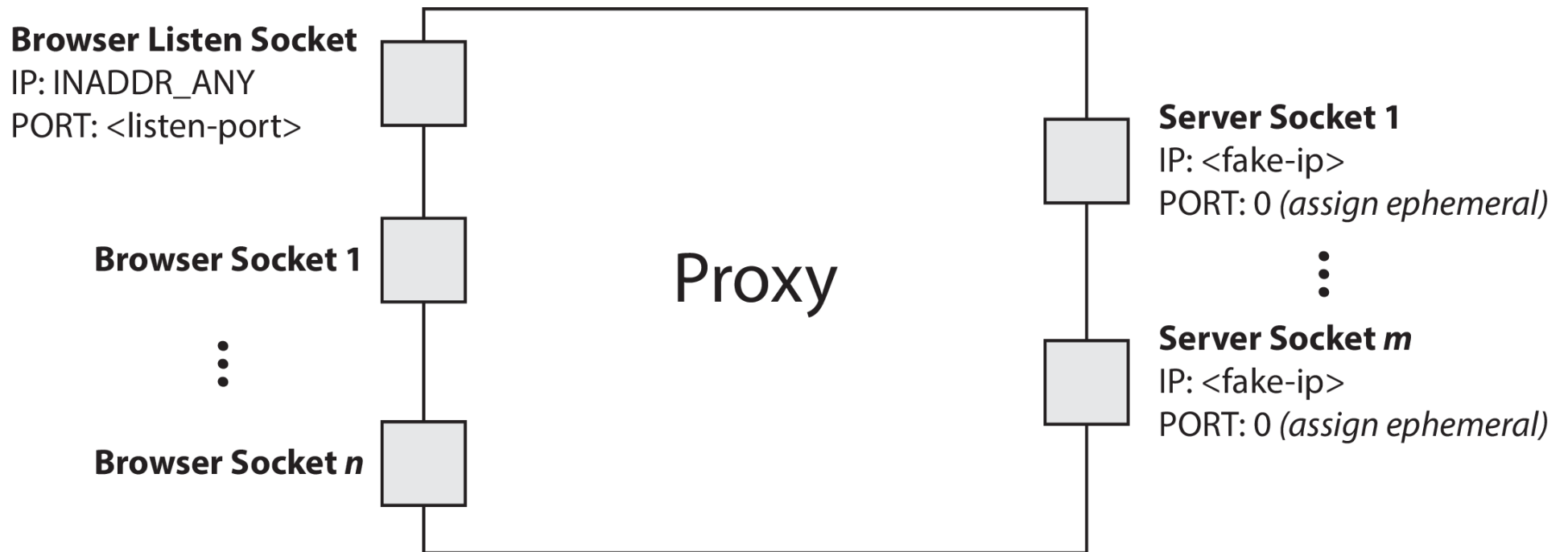
Load balancing

HTTP Proxy



- Browser requests video chunks
- Proxy forwards request to server, returns data to browser
- Proxy estimates throughput, selects appropriate bitrate for each chunk
- Re-using project 1 code is fine

HTTP Proxy



HTTP Proxy

Throughput Estimation

- Per chunk

$$T = \frac{B}{t_f - t_s}$$

size of chunk

time chunk transfer from server completed

time request received

- Average:

$$T_{current} = \alpha T_{new} + (1 - \alpha) T_{current}$$

Exponentially-Weighted Moving Average (EWMA)

HTTP Proxy

Bitrate Selection

- Modify Request-URI

500 Kbps

`/path/to/video/big_buck_bunny_500Seq2-Frag3`

1 Mbps

`/path/to/video/big_buck_bunny_1000Seq2-Frag3`

DNS Server

Load Balancing

- Round robin
- Geographic proximity
 - Real world: **IP prefix → location** mapping
 - This project: **Link State Advertisements**

!!! This is not realistic, but it's easy and teaches you about LSA !!!

Network Simulator

- We provide a network simulator!
- More details in PDF

Logistics

- Starter Code
 - Virtual machine
 - Download VirtualBox
- Submission
 - **CP1 and Final**
 - See the submission guidelines in the handout