Announcements

• HW3 remaining measurements
• P2 status
High Performance Websites

• Scaling to larger number of users
  – Server resources such as databases, memory, CPU
  – Latency

• Lowering the latency
  – Deploy servers closer to the clients
Content Distribution Networks

• Scalable and low-latency infrastructure for delivery of online content
• Many times hosted inside an ISP

• Why do ISP agree to such placement?
• Why do the content providers purchase CDN services?
Some CDNs

• Akamai

• Many other commercial services
  – Cloudfront

• Non-commercial CDNs
  – Coral CDN
An Exercise

• You have 1000 machines
• How would you host www.myunique.com on these machines?
  – Scale to a large number of user requests
  – Minimize latency to each user
• Assumptions
  – Static content
  – Ability to deploy software on these machines
Figure 1: The steps involved in serving a Coralized URL.

[Freedman 10]
Figure 1: Illustration of Akamai DNS translation.

[Su 06]
Akamai CDN and DNS

• Need to use CNAME to point to Akamai server

• Caching by LDNS
  – Use low or high TTL?
Server Diversity

• How many servers does a client typically see

• High diversity implies Akamai redirecting to different servers to optimize access latency
  • More pronounced on clients that are farther away
  • Network dynamics
Figure 2: Server diversity from two characteristic PL nodes.

Figure 3: Server diversity for all measured PL nodes.
Figure 5: Redirection dynamics from three representative nodes.
Quality of Akamai Redirection

Figure 6: Measurement Methodology.
Figure 7: Ranks for three characteristic PL nodes.

\[ R = r1 + r2 - 1 \]
• Akamai returns the hosts that are likely reachable on low latency paths

• How to take advantage of this information to build low latency point-to-point routing between arbitrary hosts in the Internet?
Free-riding on Akamai

• To route from A to B
  – Direct route
  – A - an Akamai host - B

• Goal is to estimate the maximum gains
  – No discussion on mapping Akamai host to a router
(a) Taiwan — UK

(b) UK — Taiwan