From p2p to privacy and anonymity

- Industry will leverage p2p (is already)
  - Movie industry, software industry

- Related: Akamai, CDN (content distribution network)
  - Provides NBA video, CNN, Fedex, 2000+ sites
  - Content mirrored “nearby”, found by “magic”

- Hide p2p usage using conventional technology
  - Encrypt traffic, use alternate routes, undetectable?

Akamai for neophytes

- How do cnn.com and nytimes.com cope?
  - Last night, what was traffic like at 10:00 pm EST?
  - How does web/Internet cope with flash crowds?

- 15,000 servers; 69 countries; 1,000 networks
  - Content: rich media, software, e-commerce, ...
  - 70%? Of CDN market

- Customized DNS, overlay network, patented
  - Server health, load, type-of-content
  - Network conditions, client location

From Akamai to patents to p2p

  
  Claim: distributed hosting framework operative in a computer network in which users of client machines connect to a content provider server, the framework comprising: a routine for modifying at least one embedded object URL of a web page to include a hostname pretended to a domain name and path; a set of content servers, distinct from the content provider server, for hosting at least some of the embedded objects of web pages that are normally hosted by the content provider server; at least one first level name server that provides a first level domain name service (DNS) resolution; ...

Patent aside

- Patent: useful art or invention, not an idea
  - Reference prior art
  - File patent, back-and-forth with examiner, $10K+

- Business methods and software patents
  - In Re Bilski, Oct 08, reject and upheld “merely manipulates an abstract idea and solves a purely mathematical problem”

- How does one deal with patent infringement?
  - Sue, look at claims, appeal to experts?
p2p FUD at Elon

http://www.elon.edu/pendulum/Story.aspx?id=934

word leaked that the Recording Industry Association of America (RIAA) had been investigating file sharing at Elon. While the rumors ranged from company officials physically showing up on campus to being able to backtrack downloaded songs from years ago

The school used to keep logs of complaints for three days, but when the Higher Education Reauthorization Act was passed in August the school became required to keep logs for about two weeks.

Elon FUD continued

While no students have been turned over to the RIAA yet, Fulkerson said tracking the exact IP address to a specific student could definitely happen. In that case, they would also be handed off to Judicial Affairs.

“We aren’t required by law to turn the names over, but we do cooperate with the RIAA,” he said.

“The recording industry is becoming more aggressive at prosecuting and they’re getting better at finding people and they’re getting the government on their side by being very sympathetic about their industry. It’s the law.”

Higher Education Act (2008)

- The institution certifies that the institution:
  - ‘(A) has developed plans to effectively combat the unauthorized distribution of copyrighted material, including through the use of a variety of technology-based deterrents; and
  - ‘(B) will, to the extent practicable, offer alternatives to illegal downloading or peer-to-peer distribution of intellectual property, as determined by the institution in consultation with the chief technology officer or other designated officer of the institution.’

http://www.govtrack.us/congress/billtext.xpd?bill=h110-4137

Costs of dealing with campus p2p

- The Campus Computing Project, Paul Green, 10/08
  - http://tinyurl.com/5mqxyd

- Private universities spend (average, ’07-’08)
  - $105K software, $158K hardware, $144K other direct costs (e.g., personnel)
  - Software for monitoring, shaping p2p
  - Hardware, e.g., Copysense appliance
  - Keeping up with RIAA: IT and student support
Audible Magic: Copysense Appliance

- EFF ‘analysis’ of solutions
  - http://tinyurl.com/6l36p6
- What does this do? Database of copyrighted works with digital fingerprints
  - Compare packet data with database
  - If there’s a match do “something” to squelch use
  - $60-75K/year

Campus tussles in p2p monitoring

- How much of IT budget for p2p monitoring?
  - Vendor lock, support, open-source solutions?
- Academic freedom, student expectations of privacy
  - How is p2p traffic monitored? Wiretapping?
- Discourage infringement, respect laws and students
  - Laws require universities to do something
  - Student expectations and reality

Packet shaping

- From $1,500 to $58,000 (Packeteer, there are others)
  - Look at where packets go, specific port
    - http: 80, limewire: 6346, Edonkey: 4662, ...
  - Look at what type of information packet carries
    - Typically don’t need to do “deep” inspection
- Throughput, latency, throttling
  - Change network behavior

Deep Packet Inspection

- Comcast (2007) DPI to shape/deter p2p traffic
  - Look at packets and then deploy subterfuge
  - Forge RST (reset) packet, similar technique to what’s done with Great Firewall of China
- Machine A “forges” a reset packet from machine B and sends to C. C then cuts off communication to B
  - Really? Is it that simple?
  - Violates end-to-end principle, havoc wreaking