NBA 600
IPxx and Digital Convergence
Class 11, Mon 11/19

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Administrative

- Graded quizzes at end of class
- No class this Weds, Thanksgiving break
- Third quiz next Monday (11/26)
- In-class presentations next Wednesday (last class)

Quiz 2

- Economics of information goods and illicit copies
  - Nearly entire cost in producing first copy, needs to be recovered from sales of additional copies
- Versioning for information goods
  - Market segmentation, experience the product
- Hit items and long tail
  - Drive demand to non-hits via recommendations
- Retail categories best positioned for long tail
  - Information goods, near zero inventory cost

Digital Convergence

- "Big idea" in mid-1990's that dedicated networks would disappear and be replaced by universal Internet (IP network)
  - Single network for any service
- Instead Internet replaced only data networks, both local and wide area
  - But telephone, cable, cellular networks remained dedicated to specific services
  - IP as an added service on those networks rather than universal delivery network for all services

Steps Towards Universal Networks

- But these add-on IP services do provide universal access unless blocked
  - Voice over IP (VOIP) became substantial application
    - Skype and other computer-to-computer voice, and later video
    - VOIP as service medium for cable companies to compete with telephone service providers
  - Television over IP (IPTV) followed, but primarily in Asia where home IP networks are faster
  - Recently devices such as Slingbox for personal remote viewing

Service Providers

- Having provided universal access as an add-on service, some providers trying to limit use
  - Blocking certain types of sites or applications
  - Limiting bandwidth
- Need to balance usage levels with revenue
- Focus on certain high bandwidth sites like Google/Youtube and Yahoo/Flickr
  - Many customers seem to expect universal access, get Internet precisely for these sites

Players in Digital Convergence

- Service providers
  - Telephone, cable, broadcast tv, broadband
- Content providers
  - Movie and tv studios, record labels, publishers, web sites, P2P services
- Content creators
  - Artists, authors, amateurs
- Customers – companies and consumers
  - Seek convenient, ready access to broad array of content and services

VOIP

- Voice over Internet Protocol
  - Digitized voice sent in Internet data packets
- What qualifies as VOIP?
  - Voice in IM/chat?
- Lack of standardization
  - Unlike Web or email which are standardized
  - Competing standardization efforts from telephony (ITU) and Internet (IETF) sectors
  - Lack of direct interoperability
    - Except via standard telephone networks

VoIP: User Perspective

- Various applications
  - Dedicated application such as Skype
  - Telephone over broadband, such as cable companies, Vonage, traditional Telcos
  - Voice as part of chat and messaging applications, Yahoo, AIM
  - Replacements for corporate in-house phone systems (PBX)
- Issues
  - Ability to call traditional telephone numbers
  - Interoperability, familiarity, quality, reliability

Factors Driving VoIP Deployment

- Cost reduction
  - Consumer services often priced lower or bundled
  - PBX costs (E.g., Cisco estimates 15%)
- Feature set
  - Practicality of new applications such as call centers
    - Integration of voice calls with data, online chat
    - Distributed (virtual) centers
    - Widely cited successes
      - JetBlue, Office Depot virtual call centers

VOIP Sectors

- Computer-to-computer
  - No phone numbers: Skype, chat, etc.
- Phone-based – users often unaware VOIP
  - Vonage, cable companies
  - Subscriber base
    - Approx. 10M in US&Canada
    - Cable share about 7.5M
      - About 50M households with cable
    - Vonage, Time Warner, Comcast leaders
    - Bundling: internet, phone, tv
    - Projected double digit growth rates

Affected Industries

- Wire-line services
  - Consumer (home) telephone
  - Business telephone
  - Cable-based services, largely consumer
- Wireless voice services
  - Cellular (including broadband)
- Telephone and network equipment
  - PBX, handset/deskset
- Call centers – virtualization (home workers)

Industry Competitive Landscape

- Wire-line voice services
  - New substitutes, software only solutions
  - New entrants, cable companies
    - Change from local monopolies
- Wireless voice services
  - Already considerable competition
- Call centers (internal and outsourced)
  - Virtual centers provide competitive advantage for higher quality services with lower costs?

Pressure on Telco's

- Local phone companies (RBOC's) losing wire-line subscribers
  - Current rate about 150K lines/mo in US&Canada
- Approx. 100K new VOIP subscribers per month
- Other losses attributed to moving to cell-only households and dropping second lines
- Gearing up for same bundled offerings as cable
  - Using IPTV technology

Uses of VoIP Beyond "POTS"

- Virtualization
  - Call centers common example
    - Largely centralized due to current technology, what makes most sense
      - Service quality, retention, load fluctuations
  - Office-on-the-road
    - Full access to office voice services when out of the office
    - Invisible to callers, as if in the office
  - Flexible disaster recovery
    - Trading floor or other central location not needed

Possibly Strategic Uses of VoIP

- Intelligence and customization
  - Routing of calls based on criteria easily set by the user
    - Web based configuration applications
  - Voice contact as situations arise
    - Not just delayed flights but conference calls due to unanticipated disruptions or problems
- Integration
  - Email, voicemail, SMS, chat need not be separate things to check and respond to

IPTV

- Delivery of cable-like subscription TV over Internet, usually by Telcos using DSL
  - Generally special box that connects to TV set, like cable box
  - Microsoft a software supplier
- Global subscriber base estimated at about 6M at end of '06
  - Largely concentrated in Hong Kong, France and Italy
    - E.g., PCCW in Hong Kong about 700K IPTV subscribers

Predictions of IPTV Growth

- Gartner August 2006 study predicts 48.8M global subscribers by end of 2010
- Notes particular challenge in North America where Telcos playing catch-up with cable offerings
  - Need for differentiating offerings, or compete on price to retain/regain customers
- Notes success in Hong Kong depends largely on high concentration of people
  - 85% of PCCW potential customers had pre-existing access to fast enough broadband

Competitive Landscape

- Who has more to gain and to lose in cable-telco battle for triple-play voice-data-tv services?
- Customer power
- Supplier power – who are suppliers?
- Industry rivalry and sustainable competitive advantage
- Role of other substitutes for these services
  - Delivery of Internet versus delivery of services of Internet

IPTV vs. Internet Television

- IPTV offerings are closed systems
  - Analogous to cable, a single provider is choosing channels and bundles and providing the overall service
- Internet television is televised material presented over the "open Internet"
  - E.g., web-based offerings like those on YouTube, Google Video, etc.
    - Both professional and amateur
  - News sites
  - Sites for specific shows or networks

Role of Universal or Open Networks

- So-called network neutrality advocated by consumer groups and tech companies
  - No limits on access to or bandwidth for particular sites or services
  - Recall current charging schemes based on end-user bandwidth and perhaps overall usage (latter generally for commercial customers)
    - Then ISP's pay up-stream networks for access to national and international backbone
      - Tier 1 and tier 2 providers
  - As opposed to fees from content provider to end-user's network as proposed by ATT, others

Internet Competitive Landscape

- Currently difficult for content providers to exist without network service providers and vice versa
  - Network service providers in or wanting to be in content business
  - Content providers investigating investments in network service business
- Content providers and most consumers want universal access
  - Google mobile phone platform – Android
  - Wireless spectrum auction, interoperability

Digital Convergence?

- Telephone and cable companies in direct competition
- Open delivery over Internet
- Role of content and application providers
  - A network connected to what?
- Revenue models?

Next Time

- Open Source (and Open Content)
  - Read Goldman report "Fear the Penguin"