Software Infrastructure of the Commercializing Internet

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Background of Chapter

- Not finished...
- Mostly journalistic
  - Recounting of basic events from secondary sources
  - Focus on interplay between technology and business models
- Search engines/portals to be separated
  - Software infrastructure chapter
  - Search and portals chapter

Reconstruction of Technology

- What happens when an already "shaped" technology gets
  - New uses
  - New "relevant social groups"
  - New cultural meanings
- Models
  - VHS vs Beta? –
    - which is the net?
  - Ecological?
    - Extinction of the megafauna
    - Native Americans and Smallpox

Construction of Internet Technologies

- Closed, homogenous, small academic population
  - Results: Rely on social mechanisms for security, elimination of troublemakers
- Non-commercial
  - No mechanisms to bill for use of resources
- Support for many machine types
  - Compatibility through standards, not code

Construction of Internet Technologies II

- Practical, working network
  - Rather have it next week than perfect
- Decentralized and international
  - Easy to connect new machines, sub-domains
- Many different communication mechanisms
  - TCP/IP works over many media
- Created for experimentation and research
  - Separation of application protocols from network mechanisms

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Layering of Protocols

FTP Client	Mail client	Web browser	Many others....
FTP (File transfer)	SMTP (Mail transfer)	HTTP (Web)	Video, chat, news, P2P, instant messaging
Socket API			
TCP/IP (also DNS shared by applications)			
Ethernet	SLIP/ PPP	Satellite	Fiber Optic, Etc.

Internet Commercialization

- Rapid and unexpected
  - Though idea of "information superhighway" and universal networking was not
- Driven by virtues
  - Web and email as killer apps
  - High quality, free(ish) multiplatform software
  - Real, useful, pragmatic
- Adopted by existing online services
  - AOL, Compuserver, etc.

Internet Email

- SMTP is Internet Email protocol
  - "Pushes" messages to destination
- Classic example of internet approach
  - Builds on TCP/IP and DNS
  - Initial version very simple, so easy to implement from RFC
    - Tech support for "hacker" culture?
- No frills
  - Plain text only
  - No verification of sender identity
  - No way to charge sender
  - Very simple addressing mechanism
  - Reading, composition, sorting of email left to other tools
- Later standards build on this, eg MIME, add features

Simple Charms

- Frame is email as application
  - Continuities and differences of Internet with earlier services
- In early commercial period, Internet email
  - Is a lingua-franca between closed systems
  - Is cheap and easy to implement
  - Does the job
  - Has easy to remember addresses
- Unlike "official" X.400 standards

Power of Technological Momentum

- Biggest opportunities are in fixing design flaws
  - Perfect environment for spam
  - Internet has no natural defenses against spammers
- Plenty of proposed standards available to make email
  - Secure and authenticated
  - Give proof of receipt
  - Support email directories, etc
- But require simultaneous shift of client, server, user behavior.
  - Will probably never happen...
  - Especially as Microsoft has a proprietary system

Commercial Internet Email

- Traditional packaged application model struggles
  - People expect downloads
  - Free software is available and expected
  - Microsoft kills the market with bundling
- New models emerge
  - Webmail – Hotmail as big success
    - Follows Internet tradition of integrating existing technologies and code

Web: Business History

- Covers the basics
  - Berners-Lee and CERN
  - Gopher, WAIS, etc
  - Mosaic
  - Netscape
  - Browser wars
  - Java
  - Firefox

Focus and Arguments I

- Initial appeal of web as integrator of existing content
  - Obvious development of existing ideas
  - New elements: HTML, HTTP, URL
- Simplicity of web
  - Fundamental problems ignored
  - Follows spirit of internet
- General confusion of web and Internet
  - Unlike email, web needs direct TCP/IP connection

Focus and Arguments II

- Coevolution of browser and server
  - Importance of Apache to keep things open
- Importance of AOL and ISPs
  - As distributors, packages of software
- Work needed to reconstruct browser as commerce platform
  - SSL and credit card protection
  - Creation of logins and sessions – CLUNKY
  - Creation of web development platforms
  - Packaging of internet storefronts, etc.

Influence on Business Models

- No support for payment for content
  - Micropayment hyped but flops
  - Web publishing model shifts fundamentally from AOL era
- Microsoft push to integrate browser creates insecurities
- Layering of protocols allows many new apps
  - VOIP, P2P, streaming video, etc.

Help Me Frame This

- Does the argument seem reasonable?
- What did I miss out?
- Can more of the user experience be squeezed in?