

The Business of P2P



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What is P2P anyway?



- P2P is different things to different people
 - It is sharing files or stealing music
 - It is sharing CPU and storage resources
 - It is distributed search and indexing
 - It is instant messaging
 - It is serverless collaborative work (and play)
 - It is Web Services
 - It is “pervasive” devices talking with one another
- What it isn't ...
 - It isn't a specific architecture or technology
 - It isn't a business model

Examples



- CPU sharing
 - Applied Metacomputing, Centrata, Datasynapse, Distributed.net, Distributed Science, Entropia, Mithral, Parabon, PlatformComputing, Porivo, ProcessTree Network, United Devices
- File sharing (Internet and Intranet)
 - Aimster, Clip2, CuteMX, Docster, FileNavigator, Free Haven, Freenet, Gnutella, Hotline Communications, Interfriendly, KaZaA, Mojo Nation, Napster, Ohaha, Opennap, Publius, Spin Friendly
 - Gigabeat, Hook R, Interfriendly, Jungle Monkey, Mango, myCIO, NextPage, Omnishift, Pointerra
- File search
 - InfraSearch (now Sun), OpenCOLA, Plebio, Thinkstream
- Collaboration
 - 24Link, Enginia, eZ, Groove, Interbind

Examples (continued)



- Instant messaging
 - AIM, ICQ, Jabber, DoCoMo, Nokia, ...
- Marketplaces
 - EPIT, LiquidNet, WorldStreet, Lightshare (a P2P eBay)
- Servers, devices and agents as peers
 - Bluetooth, Endeavors Technology, Jini, .NET, UDDI
- Messaging frameworks, application platforms & tools
 - Aimster, Biz2Peer, Elepar, Centerspan, Ikimbo, Jabber, 100x, Xdegrees
- Multitplayer gaming
 - CenterSpan, 2am, Xbox

So, how do you define P2P?



- A network of collaborating machines with at least one of the following characteristics:
 - The network relies on the active collaboration of edge-of-the-net devices (PCs, cell-phones, PDAs, game boxes, etc.). Peers benefit directly from the participation of other peers rather than just from the server.
 - Participating machines in the network act in some sense as both clients and servers.
 - Users of a P2P application are aware of each other. That is, the P2P network creates a sense of a crowd.

How is the P2P Web different?

| | Client-server | P2P |
|------------------------------|--|---|
| Network traffic | asymmetric, e.g., cable modem, ADSL | symmetric (threatens cable & ADSL) |
| Intellectual property | under the control of the server | under the control of each and every peer (threatens copyright) |
| Intranet control | firewalls protect servers, port 80 used by Web clients | firewalls restrict peer behavior, port 80 subverted |
| Addressing | primarily static DNS, Network Address Translation (NAT) for clients is transparent | uses dynamic real-time registries in place of DNS, NAT can be restrictive |

P2P in the Enterprise: Who's in Control?



- IT Managers want and need to keep some control
 - Many legitimate reasons -- security, protecting intellectual property, bandwidth optimization, infrastructure costs
 - ...that lead to a cultural preference for tight control
- But can they?
 - Viral marketing may bring P2P in "under the radar"
 - Firewalls -- can they cope?

Analyst Predictions for P2P



- IDC - 23.6% of large corporations will install an instant messaging system in the next year.
- Gartner - By 2002, >50% of global Internet users will regularly sign on to at least 2 P2P Internet applications
- Forrester - By 2002, 3 million households will use P2P applications to make their digital photos available to family and friends.
- Forrester - By 2004, 33% of the online population will use P2P services for storing and retrieving personal data.
- Forrester - By 2005, P2P services will come bundled in premium broadband fees and personal information-sharing applications from Adobe, Palm, and AOL.

Winners and Losers: The Power of Positive Feedback



- P2P models benefit from network effects -- each new peer makes a network of peers more valuable
- The winners will be decided by positive feedback effects
- Network effects generate a winner-take-all dynamic
- Factors that confer competitive advantage:
 - Software distribution channels
 - Real-time "presence" registries
 - Payment models

The Importance of Distribution Channels



- Voluntary download works in some cases
 - Napster found the lure of free music
 - SETI@home found the lure of a cool project
 - Instant messaging found the lure of communication
 - OpenCOLA may find many volunteers among eBay users
 - How many others will succeed by voluntary download?
- “Push” distribution will dominate in most cases
 - AOL, and other ISPs can include P2P software with their access software
 - Microsoft, Linux, and Apple can include it with the OS (or with any other ubiquitous software such as a browser)
 - Device manufacturers can include it in the device (Compaq iPAQ, cell phones, PDAs, game boxes, printers, digital cameras, mp3 players)

The Importance of the Registry

- The key issue is knowing which machines are on line and how to send messages to them (their current IP address)
- “Pure” P2P networks use fully distributed mechanisms
- Hybrid networks use a registry -- peers actively notify a registry when they join the network
- The biggest registry is the most valuable registry
 - AOL Instant Messenger has 80 - 130 million
 - Napster has nearly 60 million
 - No one else is even close
- Push distribution can “hardwire” the registry
 - Cellphones, PDAs, etc. easy to hardwire
 - Microsoft’s Windows, .NET, and/or “Hailstorm” can do likewise for PCs

The Importance of the Payment Model



- Eyeballs aren't generating as much revenue
 - Web advertising is faltering
 - P2P applications don't necessarily have a UI anyway
- Per click micropayments?
 - Micropayment systems aren't mature
 - Users haven't accepted the idea
- Monthly fees
 - Phone companies, cable companies, and ISPs already have them -- it's easy for them to add a P2P charge
 - Everyone else has to gain acceptance of another monthly bill -- a difficult task

Conclusions



- P2P is a sociological/economic phenomenon, not a new technology
- Peer-to-peer is the successor to the client-server Web
 - but...don't panic, the client-server Web isn't going away for a long time, if ever
- Peer-to-peer will continue to grow
 - there are more than 120 start up companies already
 - Next 12-18 months growth will be primarily in IM, file sharing, and collaboration
 - Will CPU sharing, search and Web services grow as rapidly?
- The winners will ride network effects. They'll probably be the ones with good distribution, viable payment models, and the biggest registries
- Today it is a PC phenomenon ... tomorrow it is a billion pervasive devices