۲

Index

4MB, 9 10/100 Base-T Ethernet, 50 24/7, 387 56Kbps, 123 2002 O'Reilly P2P Conference, 336

A

A-A (application to application) applications, 37–38 A-A (application to application) conversations, 37-38 Abilene, 380 AbovePeer, 212 Absolute freedom of speech, 247–249 Academic goal, 321 Actors, 37–38, 387 Ad hoc communities, 108 Ad hoc groupings, 105 AD hoc sessions, 41 Addressability, 118-119 Advanced network applications, 379 Advanced networks, 379 Advogato, 356 Agency, 38 AIM, 161 content sharing, 81 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 Jabber, 168 JXTA, 303 Mojo Nation, 216 secure authentication, 79

security, 78 Swarmcast, 238 Agile Software Development (Cockburn), 110 AIM (AOL Instant Messaging), 60, 112, 150 accessing user information, 162 agency, 161 AOL users, 162 architecture, 161 browsing, 161 Buddy List, 162 central authorization server, 161 central server relay, 162 channels, 164 command families, 164-165 connecting to services, 161 connection with BOS server, 161 covert client detection, 166 dependency on low-level timing constraints, 165 free users, 162 identity, 161 interoperability problems, 165 "invite a friend" feature, 163 lost data, 165 messaging functionality, 162-163 OSCAR server, 165 out-of-order command, 165 personal profiles, 162 presence, 161 protocol, 161, 163-165 roster, 161 sequence numbers, 164

TCP packets, 164 tracking online status, 161, 165 trial users, 162 Trillian, 180 UCP2P (user-centric p2p) model, 44 user roster, 162 user searches, 162 AIM/Oscar Protocol Specification Web sites, 163 Aimster, 189, 212 Akamai, 344, 354, 378 Alpine (Adaptive Largescale Peer2peer Networking), 133 applications sharing UDP connection, 134 associated content on peers, 138 avoiding congestion, 136 clients continually discovering peers, 135 CORBA (Common Object Request Broker Architecture) interface, 137 FTP, 137 HTTP, 137 peer affinity, 136-137 reliable queries, 138 social discovery analog, 134-135 traditional solutions better than, 137 transparent multiplexing of connections, 133 Alpine Web site, 133

413

Amdahl's Law, 121-122 Amir, Amnon, 150 Analog telephones, 15-16, 387 Anonymity, 84, 96 Anonymous Web Transactions with Crowds (Reiter and Rubin), 96 AOL (America Online), 7, 194 ICQ, 145 interoperability and, 149 noninteroperability problem, 171-172 popularity, 146 AP2P (atomistic p2p) model, 32 architecture, 49 content storage model, 70 formal two-tier variation, 42 Gnutella, 123 Groove, 292 how to join, 41 implementations and contentsharing, 70 nodes, 40-42 non-reliance on nodes, 211 peer-discovery situation, 41 resilient, 42 scalability, 120-129 self-maintaining, 42 up-to-date node lists, 42 Apache Software License, 302 Apple Macintosh, 50–51 AppleTalk, 50-51 Application and process layer, 24-25 Application data type, 177 Application-level p2p networking, 47–48 Applications À-A (application to application), 37-38 advanced network, 379 as autonomous client, 38 capabilities, 116 conversational modes, 35-36 equality, 317 open source, 47 P-A (person to application), 37 - 38P-P (person to person), 37-38 roster, 38 Apt-get, 261 Architecture, 5, 39, 387 AIM, 161 content sharing, 81 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 Jabber, 168 JXTA, 303 Mojo Nation, 216

security, 78 Swarmcast, 238 ARK (address-resolution key), 271ARPANET, 17 AS (Authentication Server), 361 Asheron's Call, 55 Asynchronous conversations, 33 Atomistic p2p networks addressing model, 118 Amdahl's Law, 121-122 bandwidth bottleneck solutions, 124-126 basic bandwidth constraints. 121-122 broadcast-route protocol, 120 clients and arbitrary outbound connections, 209 event horizon constraints, 128-129 fixed addresses, 118 Gnutella, 197 Jabber servers, 169 LAN networks, 120 presence transience, 128-129 saturation point, 124 as search and discovery, 63 Atomistic search arbitrary, source-determined relevancy, 64 file storage model affecting search, 67-68 more innovations needed, 65-67 question and answer, 64 responses and queries, 65 AT&T, 149 Audio Home Recording Act, 330 Authenticated anonymity, 96 Authentication, 356, 387 based on public key digital signatures, 79 content sharing, 80 Groove, 298 IM (instant messaging), 148 Authentication checks, 54-55 Authentication scheme, 56 Authentication-centric server model, 54 Autonomous agents, 341

В

Bandwidth, 6, 9–10, 387 aggressive caching, 353 atomistic p2p network constraints, 121–122 bottleneck solutions, 124–126 category-limiting total user traffic, 352

DTCP (Distributed TCP), 136 Gnutella, 207 growth of, 9 increasing, 10, 124 inefficient consumption of, 10 intelligent routing of messages, 125 management issues, 351-353 manual or automatic traffic monitoring, 352 natural filtering, 353 peers, 137 policy enforcement, 352 rate-limiting or blocking specific ports, 352 rate-limiting total user traffic, 352 refined network services, 352 searches, 138 Bandwidth Barriers to Gnutella Network Scalability, 123 BearShare, 197, 201 BEEP or BXXP (Blocks eXtensible eXchange Protocol), 297 Berners-Lee, Tim, 32, 317, 382 Bidirectional conversations, 35 Bidirectional information flows, 8 **Bio-informatics**, 377 Black Box Law, 10 Block servers, 217, 226 BlueSky Web site, 382 Bluetooth, 302 Bottlenecks at central servers, 107 **BPML** (Business Process Modeling Language), 364 Broadcast push requests, 123 search delay, 126 Broadcast protocols, 41 Broadcast-route protocol, 120 Broadcatch Project Web site, 358 Broker, 387 Broker component, 216 Browsing, 39 AIM, 161 content sharing, 81 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 Jabber, 168 JXTA, 303 Mojo Nation, 216 security, 78 Swarmcast, 238 Buddy List, 162 Business

benefits, 105–106 copyright and patent law, 325 protection of exclusive and proprietary rights, 321 Business-driven innovation, 375

С

Call handling, 187 Call setup, 187 Caservice Project, 306 CBDTPA (Consumer Broadband and Digital **Television Promotion** Act), 94 CD-quality music track, 9 CDs (Compact Discs), 388 Cell phones, 21 Censorship on Internet, 248 Central administration bottlenecks, 105 Central authentication, 55-56 Central server mediation, 43 Central servers bottlenecks, 107 dependence on, 107 improved scalability, 129 index over available resources, 45 load experienced, 129 Cerulean Studios Web site, 181 Channels, 164, 380 Chat, 27–28, 142, 143, 261– 262 Chat data type, 175 Chat relay, 17–18 Chatrooms, 27–28 Checksums, 72, 388 CHK (content hash key), 263– 264 Clarke, Ian, 277, 287 Clary, Mike, 302 Client exposure, 389 Clients, automatic upgrade, 83 Client-server, 388 Client-server models, 31 Client-side model, 32 Clip2 Distributed Search Solutions, 122–123 Clip2 Reflector, 125 Clone clients, 7 Clones, 7, 388 Codats, 304 Collaboration, 341 efforts, 113 Groove, 291-301 JXTA, 302-312 peers, 376 COM objects, 299 comm strategy, 231 Commercial software security risks, 86-87

UPnP (Universal Plug and Play) standard, 87 Common ownership, 320 Communications, 10–11 modality focus, 33 personal identity of user, 77-78 security, 77-80 Community web, 113 Computation-centric model, 31 Computers idle, 106 power of, 9 Concepts, 319 Conceptual models, 32 Conference data type, 177 Connection host, 130 Connection-based protocols, 33 Connections, best-effort attempt to share, 126 Connectivity architecture, 5 scalability, 117 Consent, 320 Consentual sharing, 330 Consumers, 324 Content creation, 113 creator, 323 delivery, 344 distributed, 107, 213 distributed delivery, 113 distributed search, 113 encrypting, 245 encryption helping identification, 72-73 explicit statement of ownership or copyright, 91 free, 369 governance, 69 improving retrieval performance, 71–73 management, 69–73, 354 multiple host sourcing, 72 ownership, 69, 88 p2p (peer-to-peer), 84 persistence, 84-85 piracy, 88 promoting availability, 68 published, 213 publisher/wholesaler, 323 redundancy, 84-85 search, 212 secure storage, 112 shared storage, 112 sharing, 80-81 sharing and distribution, 72 storage and retrieval, 70 transfer resume, 72

unaltered, 73 user-created or owned, 91-92 Content control wars all about money, 322-323 business vs. academia, 324-326 market assimilation, 326-328 ownership rights, 322–323 use of technology, 323–324 Content Management Service, 308 Content servers, 10 Content trackers, 217, 227, 228 Content-publishing systems, 68 Content-sharing systems, 68 Context, 102 Control in p2p (peer-to-peer) networking, 329–330 Convenience feature, 388 Conversational modes, 35-36 Conversations, 10-11, 35-36 A-A (application to application), 37-38, 167 actors, 37-38 asynchronous, 33 dynamic dynamic qualities, 12-14 between equals, 11-12 p2p (peer-to-peer) networks, 37-38 P-A (person to application), 37-38, 167 P-P (person to person), 37-38, 167 properties, 38-40 synchronous, 33 Cooperation without vulnerability, 320 Copy-prevention technology, 331 Copyright, 325, 328 explicit declaration, 90 extended to digital content, 330 protection and enforcement, 88 violation, 95 CORBA (Common Object Request Broker Architecture) interface Alpine, 137 Cost-driven innovation, 375 Covert resistance, 109–110 CPM (Compute Power Market) Project, 308 CPRM/CPPM (Content Protection for Recordable Media and Prerecorded Media), 331, 388 Cramer, Florian, 394

Created or owned content, 91– 92 Critical threshold, 7 Cross-platform software, xxii CS (client-server) relationships, 22

D

DARPA model, 24 Data bidirectional information flows, 8 integrity in Groove, 298 ownership, 46 persistency, 245 potential rights to processed results, 46 unidirectional flow, 8 unindexed, 67 Data types in Jabber, 175, 177 Data-centric model, 31, 131-132 Data-centric P2P, 32 DataChunk messages, 266, 268 DAV (Distributed Authoring and Versioning), 35, 388 DCM (digital content management), 91 DCOM (Distributed Common Object Model), 137 Dcp2p (data-centric p2p), 45 Debian GNU/Linux, 83 Decentralized spaces, 113 DeCSS Web site, 95 De-emphasis on hierarchies, 109 Delta, 388 Delta messages, 293 DEV X Web site, 56 DHCP (Dynamic Host Configuration Protocol), 20. 388 di (Distributed Indexing), 309 Diffie-Hellman key-exchange system, 263 Digital Copyright (Litman), 96 Digital Copyright Web site, 96 Digital items, public perception of ownership, 93 Digital Millennium Copyright Act, 330 Digital ownership, 92-94 Digital signatures, 211 Direct dialing, 16 Directory, 31, 43-44 Directory services, 14, 43, 388 Disclosure of information, 320 Distributed accessibility, 112 Distributed aggregation, 182 Distributed computationcentric implementation,

31

Distributed computing and resources, 341 Distributed content, 107, 213 delivery, 113 Mojo Nation, 215-236 search, 113 storage model, 70 Swarmcast, 237-244 Distributed control of resources, 25–26 Distributed dispatch management, 345 Distributed networks, 89, 329 Distributed ownership of resources, 25 Distributed processing, 46, 377 Distributed search, 68 Distributed services, 107 Distributed storage, 344 Distributed systems and content-sharing, 70 Distribution of storage or functionality, 320 DMCA (Digital Millennium Copyright Act), 94, 95 DND (Do Not Disturb), 148 DNS (domain name service), 18, 262, 360 Domain addressing, 14, 20 Domains, 118 changing IP numbers, 19 Gnutella, 195 DoS (denial-of-service) attacks, 94, 216, 388 Downloading, 71-72 DP (distributed computing) projects, 25 DSL (digital subscriber lines), 27, 388–389 DTCP (Distributed TCP), 133, 135-136 Dumb-terminal mainframe system, 389 Dumb-terminal systems, 31 DVD Copy Control Association, 95 DVD recorders, 331 Dynamic conversations, 12-14, 38 Dynamic IP numbers, 8 Dynamic networks, 111-112 Dynamic p2p (peer-to-peer) technologies, 62

Ε

E2Epi (End-to-End Performance Initiative), 379 E-business ventures firmly based in p2p technologies, 113

E-commerce and secure authentication, 79 Edge services, 108, 341 Edison, Thomas, 15 Edutalla Project, 200 Edutella Project, 308 EGTP (Evil Geniuses Transport Protocol), 230, 231 Electronic Frontier Foundation, 325 Electronic Frontier Foundation Web site, 95 E-mail, 22, 26–27, 141–143 E-mail addresses, 19-20, 142 E-mail clients, 142 Embedded peers, 374-375 Empowering users, 324 Empowerment, 320 Encryption, 211, 248, 389 content, 245 helping identification, 72-73 IM (instant messaging), 148 Psst, 178 trust system, 249 Encryption-protected VPN (virtual private network), 50 End users, 29, 170, 389 Endeavors Technology, Inc., 345, 346 End-to-end connectivity, 11-12 Engineering, 379 Enterprise peer technologies, 339–347 Entropia, 377 EOF (Everything Over Freenet) project, 261 EPocketCash payment protocol, 39 Error data type, 175 Espra, 288 Etree, 335 Event horizon constraints, 128– 129 Genius for a Better Evil Tomorrow, 236 Exchange liability, 88-89 Excite@Home, 149 Exponential backoff algorithm, 135, 389 Exposure, 389

F

Face-to-face conversational mode, 11 Fair use, 92–94 Fairness arbiter block, 128 FastTrack, 347–348 Fat clients, 292, 389 Faybishenko, Yaroslav, 66 FCA (Flow Control Algorithm), 126–128 FCC, 330

FCP (Freenet Client Protocol), 260 FCPproxy, 261 FCPTools, 261 FCRC (Freenet CGI Request Client), 256 FEC (Forward Error Correction), 241–243, 389 File sharing, 341 adaptive bandwidth management, 351 anonymous content repositories, 349-350 built-in drift in topology, 350 complete openness, 211 content piracy, 88 control of, 87 disruptive methods, 211 exchange liability, 88-89 favoring higher-bandwidth connections, 350 freeloader issue, 350 Gnutella, 193-210 Groove, 300 indexing content, 350-351 legal issues, 87-90 Madster, 212 Napster, 191-193 network demands, 351 p2p (peer-to-peer) technology, 189 peer networks, 87-88 reflector principal, 350 reputation, 211 reputation tracking, 350 trust, 211 usage patterns and problems, 349-351 File sharing networks, 9 Files mapping identical on different hosts, 71-72 storage model affecting search, 67-68 storage model restricting innovative functionality, 67 File-sharing applications, 110 Finance and trading, 342–343 Finite stack space, 122 FIPA (Foundation for Intelligent Physical Agents) Web site, 364 Firewalls, 8, 21, 82–83, 389 breaching security, 82 JXTA, 304 p2p (peer-to-peer) networks, 82 SSTP messages, 297 Windows Messenger, 187–188 FNP, 265

FNS (Freenet Naming Service), 262 Forward error correction, 225-2.2.6 FProxy, 256 Fragmenting networks, 8-9, 106Frankel, Justin, 193 Free content, 369 Free digital content, 332 Free Haven, 26 FreeBSD Unix, 83 Freedom of information exchange, 330 Freenet, 26, 53, 60, 128, 133, 137 absolute freedom of speech, 247-249 accessing through normal Web browser, 256 acquiring "seed nodes", 281 agency, 248 anonymity, 249, 250, 252 Apt-get, 261 architecture, 248 ARK (address-resolution key), 271 automatic, intrinsic node behavior, 258 availability of information, 2.49 browsing, 248 browsing and accessing content, 256 business solutions, 287-288 caching, 284 Chat, 261–262 CHK (content hash key), 263-264 client software, 260-262 clients, 285 closed solutions, 274-275 closeness efficiency, 254 clustering, 253 collecting active node IP numbers, 273 content expiration, 257-259 content latency, 260 content veracity, 262-265 continuous connectivity, 279-280 convergence, 278 corruption of file content, 275 defaults and recommendations for node installation, 281 degree of indirection, 279 demand propagation, 252 Diffie-Hellman key-exchange system, 263 direct links, 252

distributed reference files, 273 DNS, 262 document identity key, 250-251 DoS attacks, 275-276 efficiency, 254 encrypting files, 264 enhanced retrieval functionality, 254 false content, 262 fault tolerance, 278-271 fictitious data for retrievals, 275 file management and keys, 264 finite storage allocated by nodes, 257 forcibly removing information, 249 free Web sites, 249 freesite updates, 284 freesites, 260 fulfilled requests ensuring document storage, 258 fully decentralized network, 250 Gaming, 262 human-readable document names, 254 hyperlinks for resources, 283 identity, 248 incompatibility between versions, 280 increased bandwidth, 249 increasing useful connectivity, 252 indirection and updating files, 264-265 InFreenet Key Indices, 255 inserting files or Web sites, 261 Key Index Identifier, 255 key-data pairs, 263 keys, 263 keyspace, 253 KSK (keyword signed key), 263-264 latency for longer messages, 268 lazy replication, 251 leveraged retrieval, 254-257 links to Web, 257 Mail, 261 malicious nodes, 274-277 managing communication at node level, 275 message formats, 266-271 message headers, 271-273 message load low and well balanced, 254 message timeout, 272

message types, 266-271, 269, 270 as message-based protocol, 271 namespace management, 254 namespace structure, 264 nearness to node, 252 network behavior, 253-254 new-node announcements, 274 News, 261 no centralized control or administration, 249 node access, 282-284 node addresses, 271 node discovery, 273–274 node installation, 280-282 nodes as authoritative sources, 253 nodes inherently untrusted, 262 nodes successfully supplying data, 253 not found responses, 270 numeric key, 255 ongoing work, 286–287 operation of, 250–262 practical installation, 279-286 prerouting of encrypted messages, 277 presence, 248 preventing messages indefinitely forwarded, 272 Progressive CHK, 264 protocol, 248 protocol details, 265-273 published content, 255 publishing, 249, 259-260 purging content, 84 random seeding of each node's stack, 253 remote procedure call interface (XML-RPC), 261 removing unpopular data, 258 resistance to DoS or "flooding" attacks, 254 roster, 248 routing choices and performance, 251 safe searching and indexing capabilities, 287 scalability, 277-279 search capability, 255 security, 262 security by obscurity, 276-277 self-installing binary, 281 stability, 277-279 state, 263

steepest-ascent-hill-climbing search with backtracking, 2.51storage, 254 storage model, 253-254 SVK (signature verification key), 263–264 table of data sources, 262 transient nodes, 287 true anonymity, 286 trust, 262-265 trusted nodes, 286 unified search approach, 67 updates to content, 258-259 **URLs**, 260 user's identity and location, 2.50 verifying documents, 249 version incompatibility, 265 vulnerability to dictionary attach, 275 "Freenet: A Distributed Anonymous Information Storage and Retrieval System", 27 Freenet Project Web site, 277 Freenet servers, 260 Freenet Web site, 247 Freenet Wiki, 286 Freesites, 260, 261 Freeware, 181, 389 FreeWeb, 261, 285–286 FreeWeb FAQ, 322 Fritzler, Adam, 163 Frost, 255, 259, 261, 285 FTP (File Transfer Protocol), 133, 137, 389 FTP servers, 83 FurthurNet, 335 Fuzzy-logic searches, 138

G

Gabber for Linux, 173 Gaming, 262 Gaming contexts, 113 Gaming Zone site, 56 Gateways, 21, 167, 389 Generic application-layer control (or signaling) protocol, 186 Geographic locality, 105 GICQ for GTK, 151 Gilder's Law, 9, 124, 367 Gilmore, John, 325, 328 GISP (Global Information Sharing Protocol) Project, 308–309 GMT, 284 gNET (Gnutella Net), 194, 196 Gnewtellium, 197 Gnougat, 311–312 GNU Privacy Guard, 358–360 Gnucleus, 196, 197, 210 GnuGPL, 196 Gnut, 197 Gnutella, 60, 62, 63, 189, 197 agency, 195 arbitrary file types, 195 architecture, 195 atomistic model, 123 atomistic p2p networks, 197 atomistic peer architecture, 194 bad packets, 198 bandwidth, 207 bootstrap list, 197 bottleneck, 122-124 broadcast push requests, 123 broadcast routing strategy, 198-200 browsing, 195 central control lack, 196 as competitor to Napster, 193-194 connecting to others, 196-197 constantly changing topology and discarded descriptors, 206 defining networks, 195 denying access to Web-based clients, 350 descriptors, 201-202 developer freedom, 71 dial-up user, 128 directed probes or attacks, 210 discovering currently active nodes, 204 domains, 195 downloading file segments from alternate hosts simultaneously, 208 effective transfer rate unacceptable, 207-208 egalitarian view of nodes being equal, 123 end-of-line marker, 206 expiring descriptors, 199 FCA (Flow Control Algorithm), 126-128 file sharing, 193-210 framing sequences lack, 203 horizon effect, 198 identity, 195 implementing search, 206-207 improving download performance, 208 increasing bandwidth, 124 infrastructure, 194-196 inherent drift in connection map, 200

inherent (virtual) segmentation, 198 keep-alive nodes, 198-199 message headers, 202-203 messages with TTL (time-tolive) counter, 198-199 minimum supported transfer rate for response, 206 network reach, 200 no-built-in fault tolerance or recovery for descriptors, 202 node address acquisition, 204 nodes continually in and out of reach, 198 open source, 201 optimized query routing, 125 performance constraints, 123 ping-pong messages, 204-205 Pong data, 205 poorly performing nodes, 200 predefined networks, 209 presence, 195 protocol, 195, 201-207 push descriptors, 207 queries, 65, 123-124 random physical location, 197 resuming interrupted transfers, 208 risks, 210 roster, 195 routing policy, 205 scalability, 209-210 security, 210 servent with no firewall, 207 sharing content, 68 shifting network topology, 208 transfer issues, 207-208 transfer statistics in QueryHit message, 201 two-tier system, 125 unreliable transport forwarding, 125 usage patterns and problems, 349-351 Gnutella clients, 196, 197 automatic detection and upgrading to newer versions, 210 connection and discovery, 203-205 filters, 211 mapping other nodes, 204 MP3 file exchange, 196 natural gateway servers, 210 preconfiguring, 210 recent node history, 204 rogue connectivity, 209 subverting closed network, 209

Gnutella Network Snapshot, 195 Gnutella Web site, 194 Gnutella2, 209 gnutella.com domain, 195 gnutellameter.com site, 195 gnutellanews Web site, 194 Goldfinger, Yair, 150 Google, 137, 383–384 Google Web site, 132 Governance, 69 Government and law, 321 Granularity issues, 106 Grokster, 347 Groove, 60, 151 agency, 293 architecture, 292-293 asynchronous architecture, 294 atomistic p2p, 292 authentication, 298 awareness, 295 basic and premium clients, 292 browsing, 293 centralized server-dependency for message passing, 294-295 clients, 299-301 commercial scenarios, 291 connectors, 300 data integrity, 298 delta messages, 293 drag and drop, 299 end-to-end public key encryption, 298 fanout, 295 fat client model, 292 file sharing, 300 Groove-based applications, 292 group membership, 300 hackers and rogue relay services, 296 identity, 293 interactive collaboration efforts, 294 invitation and membership control. 300 kevs. 2.98 LDAP (Lightweight Directory Access Protocol), 295-296 libraries, 301 licensing for relay servers lack, 301 Linux port, 300 native Java support lack, 297 nonrepudiation, 298 PKI layer, 299 presence, 293

privacy, 298 protocol, 293, 297 proxy and tunnel servers, 296 relay services, 294-295 replication, 300 roster, 293 scripting, 299 security issues, 298-299 server bottleneck, 296 shared workspaces, 292, 293-296 SOAP, 297 subscriber notification system, 296 synchronization, 300 thin client, 292 tools, 300 transparency, 295 trusted and approved Web sites, 299 user interface (transceiver), 293 VoIP (Voice over Internet Protocol), 297 "whisper" mode, 300 Windows-only product, 300 Groove Networks Web site, 291 Groove-based applications, 292 Group chat data type, 175

Η

Hagelslag, 197 HailStorm, 54–56, 301 HailStorm/Passport, 169 Handshaking protocols, 11 Harry Fox Agency, 90 Hash, 389 Hash algorithms, 61 Hashed keys, 72–73 Hashed-index system, 137 Headline data type, 177 Health care services, 346-347 Home LANs, 50 Home management, 346 Hong, Theodore W., 277 Hosts mailbox services, 141 mapping identical files on different, 71 sendmail services, 141 HTML (XML-type container), 175 HTTP (HyperText Transfer Protocol), 133, 137, 390 HTTPS (HTTP over SSL), 390 HTTPS servers, 62 Hunt, Mark, 342

Ι

I2-MI (Internet2 Middleware Initiative), 379 IBM LAN Server, 52 IBM Web site, 347 iCAST, 149 ICQ, 60, 112, 145, 330 advanced mode version of interface, 152 agency, 152 alternative addressing models, 119 architecture, 152 browsing, 152 bypassing DNS system of addressing, 151 client status, 154 client-server messages, 156-159 command sets, 156-159 convenience and automation, 152-153 customizing, 154 disabling, 154 documentation for protocol, 151 ease of use, 151 header fields in packets, 155-156 identity, 151, 152 independent profiles, 154 installing, 151-154 intermittent connectivity, 151 packets, 155-156 popularity, 146 presence, 152 protocol, 152, 155-160 protocol-specific addresses, 151 recognized component states, 159 roster, 152 server-client messages, 156-159 Trillian, 180 UCP2P (user-centric p2p) model, 44 usage, 160 versions, 155 ICQ clients, 159-160 ICQ Protocol Web site, 160 ICQ server, 156 ICQ Web site, 150 Identification, 72-73 Identity, 38 AIM, 161 authentication, 79 casual approach, 80-81 content sharing, 80, 81 Freenet, 248 Gnutella, 195

Groove, 293 ICQ, 151, 152 importance of, 39 Jabber, 168 JXTA, 303 Mojo Nation, 216 security, 78 Swarmcast, 238 Idle computers, 106 IETF (Internet Engineering Task Force), 147 Ihse, Magnus, 160 IM (instant messaging), 7, 27-AIM, 150, 160-166 authentication, 148 basic requirements, 148 casual anonymity, 78 client size, 115 common standard, 148-149 concepts, 145-149 conversations, 143 delayed response, 143 encryption, 148 extended conversations, 348 ICQ, 150–160 immediacy, 144 independent presence service, 148individual presence, 146 instant communication, 143-144 instant messaging, 146 interoperability, 148 Jabber, 167-178 lack of interoperability, 349 lack of security, 144 message inbox, 148 messaging technologies, 145-149 P2PQ, 182 permanent network identity, 28 persistency, 143 personal identity of user, 77-78 popularity, 146 presence, 144 presence entity, 148 presence information, 144 proprietary and intentionally incompatible networks, 144 Psst, 178-180 registered identities, 150 relayed messaging, 349 short messages, 348-349 speed and convenience, 143 standardizing concepts, 147 text-based analog to phone conversation, 143

Trillian, 180-182 unique and persistent global identity, 146 usage patterns and problems, 348-349 user control, 148 user presence as greatest asset, 144 Windows Messenger, 183-188 IM clients adequate identification information, 148 casual deployment, 79 configuration and security and integrity issues, 79 degree of exposure by, 79-80 DND (Do Not Disturb), 148 exchanging music, 146 p2p (peer-to-peer) connections, 145-146 PIM (personal information managers), 146-147 push channels, 146 Implementations, 29, 39, 390 IMPP (Instant Messaging and Presence Protocol), 149 IMPP (Instant Messaging and Presence Protocol) Working Group, 147 IMU (IM Unified), 148–149 IMU Web site, 149 Index, 31 Index services, 132, 388 Indifferent users, 109-110 Individual presence, 146 (The) Industry Standard, 67 Infinitely scalable broadcast search network, 126 Informal cooperation, 109 Informal ring protocols, 16 Information authoritativeness of, 384 social rules, 317 InfraSearch, 66 Infrastructure, 14 Ingate Web site, 188 Instant messaging, 146 Instant P2P, 311 Intel and P2PWG (Peer-to-Peer Working Group), 340-342 Intellectual property, 330 Intellectual property rights, 321 Intermediated workflow, 106 Internet A-A (application to application) conversations, 37 addressing resources

paradigm, 20

application and process layer, 24 - 2.5bidirectional information flow, 383 censorship, 248 centralization, 23 chat, 27–28 chat relay, 17-18 connectivity, 20 connectivity and IP numbering model, 118-119 connectivity with packetswitching router technology, 13-14 content-centric infrastructure, 21 credit card payment, 332 cS (client-server) relationships, 22 decentralization, 22 DHCP allocation, 20 divisive effect of unidirectional data flow, 8-9 DNS (Domain Name System), 18 domain namespace, 18-19 dynamic IP numbers, 8 e-mail, 26-27, 169 explicit statement of ownership or copyright, 91 firewalls, 8 functional automatic resource sharing, 17 global payment system, 332 growth of, 7-8 home access, 20 identities, 21 IM (Instant Messaging), 27-28 individuals and, 20-22 infrastructure, 17-25 intranet nodes, 8 IP addressing, 18-20 low pay-per-use model, 334 messages, 17 metering and billing infrastructure for payments lack, 333 NAT (network address translation), 8 network level, 24 packets, 34 payment schemes, 332-334 phases, 60-61 protocol layers, 23-25 search engines, 132 streaming media, 34 subscriptions, 333-334 TCP/IP, 12, 24 transient nodes, 8 transport constraints, 34-35

user-centric infrastructure, 21 Internet Infrastructure & Services (Kwak and Fagin), 104 Internet2, 378-380 Internet-compatible networking, 48 InterPro Global Partners, 346– 347 Intranet nodes, 8 IP (Internet Protocol), 18 IP addresses, well-known, 19 IP addressing, 14, 18–20 IP numbering model, 118-119 IP numbers, 18, 390 Ipeers Project, 309 IPR (intellectual property rights), 369 created or owned content, 91-92 digital ownership, 92-94 fair use, 92-94 legislative problems with, 94-96 public licensing, 90-91 IPv4 and IP numbering limitations, 118-119 IPv6, 20, 22 IPX/ÍSX, 48 iq (info/query) container, 175 IRC (Internet Relay Chat), 27-28, 53 central servers, 145-146 as precursor to user p2p, 143 IRC servers, 143 ISDN (integrated services digital networks), 27, 390 ISPs (Internet Service Providers), 19, 390 I.T. Works Web site, 56

J

Jabber, 44, 53, 60 agency, 168 application exposing internal data to public access, 170 architecture, 168 browsing, 168 business solutions, 173 client-server architecture, 172-175 as conduit between peer applications, 168 data transfer, 168 data types, 175, 177 direct peer connections, 172 distributed network, 169 gateways, 167 identity, 168 infrastructure, 169-175 jabber transports, 170–172

jid (Jabber identity) types, 177 libraries, 167 messages, 175 metadata and structure, 168 modular, extensible architecture, 169 modular open source server, 167 namespace support, 168 namespaces, 175-176 open protocol and codebase, 169 P-A communication, 167 presence, 168, 169 protocol, 168, 175-177 roster, 168 server-side programs, 170 specialized services, 167 transports, 170-172 XML components, 172 XML foundation, 169 XML-based peer architecture, 167 Jabber Central Web site, 173 Jabber clients, 172–175 browser window, 177 implementations, 173 service gateways, 169 simplicity, 172 Jabber FAQ, 171–172 Jabber Protocol Overview document, 177 Jabber servers, 172-175 atomistic p2p network, 169 complexity, 172 gateway services. 171 independence, 169 software and source code, 173-175 user identity, 169-170 Jabber Web site, 149, 167 Jabbernaut for MacOS, 173 JAM (Jabber-as-Middleware) project, 169 Java runtime environment, 115 Java-enabled Web browser, 115 JavaScript, 299 Jnushare Project, 309 JOSL (Jabber Open Source License), 173 Journalizing, 62, 390 Joy, Bill, 302 JRE, 261, 281 JXTA, 60, 66, 302–312, 348 agency, 303 Application layer, 303 application projects, 309-312 architecture, 302-304 browsing, 303 Caservice Project, 306 codats, 304

Content Management Service, 308 Core layer, 303 core projects, 305 core protocols, 303-304 CPM (Compute Power Market) Project, 308 di (Distributed Indexing), 309 Edutella Project, 308 firewalls, 304 GISP (Global Information Sharing Protocol) Project, 308-309 Gnougat, 311-312 identity, 303 Instant P2P, 311 Ipeers Project, 309 Jnushare Project, 309 JXTA Search Project, 309 JXTA Shell, 311 Jxta VFS Project, 309 myJXTA, 311 P2P Web of Trust, 305 P2P-E-mail Project, 309 PAM (Pluggable Authentication Module), 305 Payment Project, 309 peer groups, 304 peers, 304 presence, 303 protocol, 303 roster, 303 security model, 304-305 services, 306-309 Services layer, 303 software projects, 305-312 JXTA Search, 66 JXTA Search Project, 309 JXTA Shell, 311 Jxta VFS Project, 309 JXTA Web site, 302

K

Kadikai, 182 Kan, Gene, 66 KARMA (Key Accessed Redundant Memory Architecture), 287–288, 354 KARMA client, 288 KARMA Drive, 288 Kazaa, 347 Kbps, 123, 390 Kerberos, 54 Keyspace, 253, 390 Keyword data type, 177 Keyword-based searches, 138 KiCQ for KDE, 151 Killer applications average available bandwidth, 9

file-sharing solution for general content, 6 IM (instant messaging), 7 swapping music files, 6, 7 Kimball, Spencer, 66 Knowbots, 300 Kramer, Rob, 287 KSK (keyword signed key), 263–264 Kurtz, Kevin, 181 L LAN computers, 21 LANs (local area networks), 12, 390 atomistic p2p networks, 120 home, 50 vendors and connectivity architecture, 5 Latency, increasing, 121-122 Layer abstraction, 24–25 Lazy replication, 251 LDAP (Lightweight Directory Access Protocol), 295–296 Legal challenges, 328 control and p2p, 329-330 wait-and-see approach, 330-331 Legal issues, 75, 85 anonymity, 96 copies of DVD movies, 89 file sharing, 87-90 IPR (intellectual property rights), 90-96 peer communication, 86-87 Legitimate limited copying, 93, 94 Lessig, Lawrence, 330 Leuf Collaborative Wiki Web site, xxiv Leuf Web site, xxiii Libraries for Jabber, 167 LICQ, 151 LimeWire, 197 Linux, 52, 83 "Local networks", 16

critical threshold, 7

e-mail, 26-27

М

Möller, Erik, 357, 362, 369– 370 Macintosh, 51 Mactella, 197 Madster, 189 Magi Enterprise, 345 Magi Express, 345

Low-bandwidth connectivity, 6

LP2P (leveraged p2p), 45–47 Luby, Michael, 243

Loss of control, 108

Mail, 261 Mailbox services, 141, 390 Mailing lists, 26 Mandragore, 209 Mapping identical files on different hosts, 71 Market meme, 35, 390 Marketplace-driven innovation, 375 Mayland, Bryan, 194 MB (megabyte), 391 McCoy, Jim, 236 McNab, David, 178, 260, 261 Media-embedded copy prevention, 91 Message container, 175 Message inbox, 148 Message-based protocols, 33 Messages, 17, 391 authenticity, 231 digital signature, 231 intelligent routing, 125 Jabber, 175 relative timing, 33 Messaging, 110 Messaging networks, 112–113 Messaging technologies, 145-149 Meta tracker, 217, 226, 227, 228 Metcalfe's Law, 7-9, 219, 318 Micropayment systems DoS attacks, 216 highly automated, 225 Microsoft LAN Manager, 52 Microsoft Office XP security risks, 86–87 Microsoft Zone gaming site, 55 Middleware, 169, 379, 391 Miller, Jeremie, 167 Minimal knowledge agent approach, 244 mIRC, 330 Mission-critical services, 103 Mitzenmacher, Michael, 243 Mnnet, 236 Mobile phones, 16 Mobile telephony, 18 Modems, 12, 391 Modular open source server, 167 Mojo default amount, 217 digitally signed, 224 as distributed load balancer, 216 earning, 217, 218 as incentive to contribute resources, 216 IOU for, 223 payment/credit transactions, 223

relay servers, 217 services used during peak demand, 217 storage costing, 219 tokens, 224 Mojo Nation, 53, 60, 213, 354 accepting initiating queries from other agents, 235 agency, 216 architecture, 216 atomistic peer model, 221 autodetected client running on dynamic dial-up connection, 221 block, search, retrieval and publication with content tracking, 233 block server, 217 Broker, 216, 218, 221–223 browsing, 216 building and maintaining network messages, 231-232 business logic, 223 client-server application, 221 community services, 217 content management messages, 232 content search, 227 content tracker, 217-218 contributing content, 219 conversation layer, 229 cooperative content storage, 218-219 credit rating, 234 distributed load balancing, 216 encryption and authentication layer, 229 faster transactions, 225 fault tolerance, 224-225 file fragmentation, 225-226 file management, 225-228 finding files, 227-228 flexible and secure communications abstraction, 229-230 identity, 216 implementation for node discovery, 232 infrastructure, 215 initiating messages, 232 interface to content search, 218 joining network, 220-221 local price list for services, 232-233 matching messages, 231 message body, 231 message header, 231

message management, 231-2.34 message structure, 230-231 messages, 230-231 meta trackers, 217, 218, 220-221 Mojo, 215–218 Mojo Transaction, 222 Mojo transaction layer, 229 MojoID, 218 more content, 227 multiple agents with information or service, 235 payment messages, 234 peer discovery, 220 polling session with relay server, 221 presence, 216 private publication of content, 227 protocol, 216, 229-234 publication trackers, 217, 218 published blocks, 227 publishing content, 219 Q0S (quality of service) issues, 2.34 recording transactions in session logs, 220 relay messages, 233 relay server, 217 relay services, 235 reputation management, 234-235 responding messages, 232 retrieving files, 228 roster, 216 search-based content, 215 server, 221-223 sharemap of blocks in dinode, 218 speed, 224–225 swarm distribution, 218-219 swarm storage, 225 token server, 223 transaction header, 231 transport layer, 229 unified search approach, 67 uninterrupted service, 225 upload cost, 219 withdrawal of Mojo token, 221 workable micropayments, 223-225 Mojo Transaction, 222 mojohttpd, 222 MojoID, 218 Moore's Law, 9, 367 Morpheus, 347 MP3 files, 6 mp3.com, 89

MPL (Mozilla Public License), 173 MS bCentral portal service, 56 MSN Messenger, 44 MSN network, 149, 183 Musicnet, 146 myAddress, 55 myBuddies, 55 myCalendar, 55 myJNbox, 55 myJXTA, 311 myProfile, 55 myWallet, 55

Ν

Namespaces and Jabber, 168, 175–176 .nap file extension, 191 Napigator, 193 Napster, xv, 5–6, 60, 151, 189 clones, 44 as commercial music download service, 191 compromises, 130–131 connection host, 130 content management, 191 data-centric implementation, 192 directory services, 89, 130 disregard for commercial values of ownership, 26 exclusive focus on MP3encoded music files, 193 file sharing, 44, 191-193 filters, 191 high visibility, 7 liability issue, 88-89 list of available users and shared files, 130 metaserver, 192 MP3 files, 6 MP3 spoofing, 193 nonmusic files, 193 proprietary digital format, 191 rapid response times, 130 reappearance of, 191 scalability, 130 search query, 130-131 server-mediated architecture, 192 server-mediated p2p model, 131 smaller size of CD-quality music track, 9 UCP2P, 191 user convenience, 130 NAT (network address translation), 8, 391 National Music Publishers' Association, 90 Native networking

Linux networking, 52 OS/2 peer networks, 51-52 peer networking in Apple Macintosh, 50-51 peer networking in Microsoft Windows, 48-50 QNX networking, 53 Unix to Unix, 48 .NET Passport service, 149 private key management, 361 .NET initiative, 54 NetBEUI, 48-50 NetMeeting, 119, 151, 187 NetPeerGroup Protocol, 303 Network level, 24 Network Neighborhood, 39 Networks actors, 37–38 advanced, 379 dynamic, 111-112 edge services, 108 evolution of, 10 fragmenting, 8-9, 106 future of, 367-386 identities, 14-15 implementation overview, 59-62 infrastructure, 14 issues, 116 local caching, 106 messaging, 112-113 multitier hierarchy, 125 nodes, 8 persistent connections, 12 personal use, 17 published content, 213 reliable transport links, 126 searching, 63-68 security, 61 social value, 318 state-aware, 33 stateless, 33 static, 111-112 usage patterns, 367 value created by, 105 value of, 7 viable content presuming trust infrastructure, 355 virtual, 47 News, 261 Newsgroups, 22, 26 NGI (Next Generation Internet), 380 NIC (network interface card), 18, 391 Node trust systems, 61 Nodes, 8, 391 AP2P (atomistic model), 40– 42

constraints, 121 disrupting connectivity, 121-122 dropping or delaying requests, 122 dynamic lists of active, 42 equality of, 121 increasing latency, 121-122 intelligent flow control, 126 persistent logical links, 43 preferred, 125 responding to pings, 123 Nomadic data, 381 Nonrepudiation, 298 Novell NetWare, 48, 52 Nullsoft, 194

0

OASIS (Organization for the Advancement of Structured Information Standards), 364 OceanStore Project, 381-382 Odigo, 149 OLGA (OnLine Guitar Archive Sites), 90 One-to-one connectivity, 11 OoB (out-of-band), 391 Open access, 56 Open PGP Alliance Web site, 358 Open protocol, 391 Open source, 331, 391 Open source applications, 47 Open Source Gnutella project, 194 OpenCola, 237 OpenNap, 193 OpenPrivacy initiative, 357-358 Opera (Web browser), 281 Operating system, update mechanism integrated with, 83 O'Reilly, Tim, 342 OS X, 51 OS/2, 51–52 OS/2 Peer, 51, 52 OS/2 Warp, 51 OSI (Open Systems Interconnect) reference model, 24, 391 Otella, 197 Outgoing flow control block, 127 Out-of-band, 143 Overt resistance, 109-110 Ownership, 69 Ownership rights, 322–323 Ozzie, Ray, 291

P2P (peer-to-peer), 5 architectural models, 40–47 client-server models, 31 components and properties, 38-40 conceptual models, 31-32 content, 84 control, 329-330 conversations between equals, 11-12 as cutting edge, 343 dumb-terminal systems, 31 dynamic conversations, 12-14 end-to-end connectivity, 11-12 file-sharing solution for general content, 6 focus areas for implementation, 36 future of, 368-369 IM (instant messaging), 7 intermittent variable connectivity, 22 killer applications, 6-9 legal issues, 85-96 loosely coupled business process, 103 low-bandwidth connectivity, 6 natural, bidirectional conversational modes, 35 as outsider and rogue technology, 343 as person-to-person communication, 10-15 as reaction to server-centric structure, 23 relay server, 295 social criteria, 320 transient connectivity, 12-13 used in sensitive situations, 343 vision, 371-374 P2P (peer-to-peer) applications conflict with centralized control, authentication, and traditional security measures, 86 digital signatures, 211 early, 9 encryption, 211 Macintosh, 51 trust or reputation management, 211 P2P (peer-to-peer) clients automatic upgrade, 83 dynamic indeterminism, 112 rogue programs, 83 security, 77 P2P (peer-to-peer) deployments benefits, 105–108 business benefits, 105-106

business considerations, 104 cost of use, 103 cost savings, 104 costs, 106 decentralized collaboration tools, 103 de-emphasis on hierarchies, 109 ease of use, 103 inappropriateness of, 109 indifferent users, 109-110 informal cooperation, 109 loss of control, 108 necessity of use, 103 reasons for, 101-103 security, 108-109 selecting best software for, 110-111 social benefits, 108 technical benefits, 107 usage, 89 utility of use, 103 P2P (peer-to-peer) implementations application capabilities, 116 deficient or incomplete search functionality, 132 network issues, 116 performance, 115 platform dependencies, 115 platform extensibility, 116 practical considerations, 101-111 scalability barriers, 117-138 selecting, 115-116 P2P (peer-to-peer) networks, xv agency, 38 architecture, 39 atomistic search, 63-68 autonomous behavior, 102 bandwidth management issues, 351-353 bogus clients capable of automatic DoS (denial-ofservice) attacks, 94 broadcast protocols, 41 browsing, 39 common ownership, 320 consent, 320 conversations, 37-38 cooperation without vulnerability, 320 DCP2P (data-centric p2p), 45 disclosure of information, 320 distance, 252 distributed search, 68 distribution of storage or functionality, 320 dynamic, 111-112 empowerment, 320

event horizon constraints, 128 - 129extension of service provider concept, 42 firewalls, 82 future of, 367-386 identity, 38 ignoring user identity, 80-81 imperfection in search, 65 inadvertently becoming public, 87 instant communication, 143-144 LP2P (leveraged p2p), 45-47 presence, 38 presence transience, 128-129 protocols, 39 purpose of, 36-40 request to join designated group, 41-42 roster, 38 searching, 63-68 static, 111-112 strong encryption, 62 UCP2P (user-centric p2p), 43-44 user's real network address, 119 P2P (peer-to-peer) resources books, 395-397 implementation, 399-400 Internet history, 397-398 Internet interoperability, 398 organizations, 398-399 recent laws, 399 Web resources, 397 P2P (peer-to-peer) technologies, application software, 59-61 bandwidth, 9-10 collaborative efforts, 113 community web, 113 computation-centric model, 31 content, 61 content creation, 113 content delivery, 344 data-centric model, 31 decentralized spaces, 113 defining, 5-10 distributed accessibility, 112 distributed computationcentric implementation, 31 distributed content delivery, 113 distributed content search, 113 distributed control of resources, 25-26 distributed ownership of resources, 25 distributed storage, 10, 344

dynamic, 62 dynamic networks, 111–112 e-business ventures firmly based in, 113 file sharing, 189 file sharing networks, 9 focus, 59-62 gaming contexts, 113 guiding vision, 101-102 identity, 61 identity resolution, 21 individual or content identity, 21 infrastructure, 59-61 messaging networks, 112-113 outside clients, 80 peer servers, 53 persistent, 62 persistent storage of content, 26 purpose and scope, 112-114 question and answer, 64 replication of frequently requested information, 10 resources, 61 secure content storage, 112 security, 61-62 selecting and deploying, 111-116 selection decisions, 114 shared content storage, 112 software development and support functionality, 113 static IP identities, 22 static networks, 111-112 suing developers, 329 understanding of specific requirements, 101 unlawful file exchanges, 89 P2P-E-mail Project, 309 P2Pj (peer-to-peer journalism), 355-362 authentication, 356 content generated locally by peers, 355 disseminating content, 355 peers automatically hosting and resharing content, 355 practical trust systems, 356-360 reputation, 356 P2PQ, 182 P2PQ Web site, 182 P2PWG (Peer-to-Peer Working Group), 340–342 P-A (person to application) applications, 37–38 P-A (person to application)

communication, 167

P-A (person to application) conversations, 37-38 Packet switching, 17 Packet transport, 34 Packets, 24, 34, 391 ICQ, 155–156 reliable transfer, 135 sequence numbers, 156 session ID, 155-156 unreliable transfer, 135 Packet-switching router technology, 13–14 PAM (Pluggable Authentication Module), 305 Parabon, 377 Partnerships and alliances, 379 Passport, 55–56 Passport server, 54-55 Patent, 325 Payment Project, 309 Paypal, 334 PDC (Primary Domain Controller), 50 Peck, Martin, 133 Peer clients, 86 Peer community, 317-318 content control wars, 321-328 groupings between people, 318 legal challenge, 328-331 legal for-free alternatives, 335 micropayment solution, 332-334 technology acceptance, 319 Peer computers, 102 Peer Discovery Protocol, 303 Peer groups, 105, 108, 304, 318 Peer Information and Management Protocol, 303 Peer integration, 363–364 Peer networks, 47 Apple Macintosh, 50-51 file sharing, 87-88 innovative services to simple queries, 66 Microsoft Windows, 48-50 OS/2, 51-52 Peer servers, 53 Peer technology endpoint messaging, 102 enterprise, 339-347 practical implementation, xviii shared resources, 102 uses for, 326 Peer to Peer Working Group Web site, 317 PeerGroup Discovery Protocol, 303 PeerGroup Membership Protocol, 304

PeerGroup Resolver Protocol, 304 PeerGroup Sharing Protocol, 304 Peer-readiness, 375 Peers, 304 architectures, 29, 102-103 bandwidth, 137 being able to contact peers, 9 collaboration, 376 communication, 86-87 distributed replication, 106 embedded, 374-375 example of future, 372-374 recommendation, 382-386 Peer-to-peer politics, 362 Pepper, Tom, 193, 194 Performance, 115, 121 Persistence content, 84-85 IM (instant messaging), 143 offline-stored information, 85 security, 84-85 Persistency, 143, 391 Persistent p2p (peer-to-peer) e denotem p2p (peer-to-peer technologies, 62 Persistent storage, 26, 354 PGP certificates, 359 Phay 197 Phex, 197 Philips, 91 Phone.com, 149 Physical items, public perception of ownership, 93 PIM (personal information managers), 146–147 Ping descriptor, 202 Platforms, xxii, 391-392 dependencies, 115 DVD movies playable on, 95 extensibility, 116 PnP support, 188 Pong descriptor, 202 Portarius, 346 P-P (person to person) applications, 37-38 P-P (person to person) conversations, 37-38 PPTP (point-to-point tunneling protocol), 50 Preferred nodes, 125 Presence, 38 AIM, 161 content sharing, 81 as crucial issue, 40 extensive information on, 144 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 IM (instant messaging), 144 Jabber, 168, 169

JXTA, 303 Mojo Nation, 216 security, 78 Swarmcast, 238 undervaluing, 40 Presence container, 175 Presence entity, 148 Presence transience, 128–129 Presentity, 148 Pressplay, 146 Prior restraint, 95 Privacy and Groove, 298 Process-oriented systems, 103 Prodigy, 149 Profiles, 44 Proof of ownership, 92 Proprietary protocols, 155 Protocol, 29, 392 AIM, 161 bidirectional conversations, 35 connection-based, 33 content sharing, 81 conversational modes, 35-36 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 Jabber, 168 JXTA, 303 layers, 23-25 message-based, 33 modality focus of communications, 33 Mojo Nation, 216 p2p (peer-to-peer) networks, 39 proprietary, 155 relative timing of messages, 33 security, 78 state, 33 Swarmcast, 238 types, 33–36 Proxies, 66, 389, 392 Proxy subversion, 82 Psst, 178–180 Psst Web site, 178 PtPTL (Peer-to-Peer Trusted Library), 340 Public domain, 90 Public key encryption, 359 Public key signatures, 61 Public licensing, 90–91 Publication tracker, 217, 226 Published content, 213 Publishing and retrieval usage patterns and problems, 353–354 Publishing information openly, 321 Push, 392 Push channels, 146

Push descriptor, 202 Puskas, Tidvadar, 15

Q

Q-algorithm block, 127 QNX networking, 53 QRP (Query Routing Protocol), 66 Queries DTCP (Distributed TCP), 136 Gnutella, 123–124 Query client transfer session, 206 Query descriptor, 202 Query messages, 206 QueryHit descriptor, 202 QueryHit descriptor, 202 QueryHit descriptor, 202 QueryHit-identified servent, 206 Question and answer, 64

R

RCE (Reputation Capital Exchange), 358 Real-time communication, 142 Recommendation peers, 382-386 Redesign, 103 Redundancy, 84–85, 392 Reed's Law, 318 Relay server, 217 Reliable packet transfer, 135 Reliable packet transport, 392 Reliable transport, 34 Remote procedure call interface (XML-RPC), 261 Render data type, 177 Replicated content storage model, 70 Replication, 106 Representational, 392 Representational addressing, 14 Reptile, 358 Reputation, 356 file sharing, 211 Request propagation, 120 RequestData messages, 269 Resources bottlenecks, 106 distributed control, 25-26 distributed nature, 107 distributed ownership, 25 granting access to large and powerful unused, 351 leveraging existing, 85 policy-based applications of, 380 remote maintenance, 107 sharing distributed, 31 Restarted message, 268

Retrieval, 71–73 RFC 2779 "Instant Messaging/ Presence Protocol Requirements", 147 RFEC (Redundant FEC), 241 RIAA (Recording Industry Association of America), 212 RMF (Reputation Management Framework), 358 RootNode, 335 Roster, 38 AIM, 161 content sharing, 81 Freenet, 248 Gnutella, 195 Groove, 293 ICQ, 152 Jabber, 168 JXTA, 303 Mojo Nation, 216 security, 78 Swarmcast, 238 RPC (remote procedure call), 137, 392

S

Sandberg, Oskar, 277 SANS Institute Web site, 187 Scalability adaptive large scale solution, 133-138 addressability, 118-119 atomistic model, 120-129 barriers, 117-138 connectivity, 117 data-centric model, 131-132 Freenet, 277-279 Gnutella, 209-210 Napster, 130 user-centric model, 129-131 SCDS (Syndicated Content Directory Server), 358 Scott, Tracy, 66 Scour, 6, 189 SDMI (Secure Digital Music Initiative), 331, 392 Search engines, 64, 66, 132, 137-138 Searches bandwidth, 138 file storage model affecting, 67-68 nontraditional responses, 66 traditional solutions, 137-138 Searching networks, 63-68 Secure authentication, 79 Secure content storage, 112 Secure personal anonymity, 96 Security, 36, 75, 393 agency, 78

architecture, 78 authentication of identity, 79 browsing, 78 communication, 77-80 convenience lapses, 83 DCP2P (data-centric p2p), 45 dimensions, 77-82 firewalls, 82-83 Freenet, 262 future of, 360-361 Gnutella, 210 Groove, 298–299 hash algorithms, 61 identity, 78 issues, 77–85 lack of IM (instant messaging), 144 malicious intrusion, 298 media display and storage technologies, 94 networks, 61 node trust systems, 61 p2p (peer-to-peer) clients, 77 p2p (peer-to-peer) deployments, 108-109 p2p (peer-to-peer) technologies, 61-62 persistence, 84-85 presence, 78 protocols, 78 public key signatures, 61 redundancy, 84-85 roster, 78 sharing content, 80-81 Single Sign-in Service on Passport, 360 strong encryption, 61 tunnels, 82-83 Semantic Web, 383 Sendmail services, 141, 393 Servent, 201, 204–207 Server model, 54 Server-based functionality, decentralized, 339 Server-bound networking, 106 Server-mediated p2p networks, 119 Servers backward compatibility, 126 downtime, 105 mediation, 129-131 tolerant connectivity, 126 Server-side model, 32 Server-side programs, 170 Service data type, 177 Service migration to peer architecture, 102–103 Service-oriented architectures, 102 Services distributed, 107

mission-critical, 103 roster, 38 user control over, 107 SETI@home Project, 46, 151, 377 Shared content storage, 112 Shared workspaces, 292, 393 Sharing content and security, 80-81 Sharing distributed resources, 31 Sierra, 358 Single Sign-in Service on Passport, 360 SIP (Session Initiation Protocol), 186–187 Slashdot Friends and Foes, 356 SMS (Small Message Service), 28 SOAP (Simple Object Access Protocol), 54, 137, 297 Social acceptance, 319 Social benefits, 108 Social rules, 317 Sockets, 34 Software as culture, 320 development and support functionality, 113 optimum, 110-111 SOHO (Small Office Home Office), 187 Sony, 146 Sourceforge Web site, 237, 247, 260, 261 SPKI without names certificates, 359 SPKI/SDSI certificates, 359 5 pyware, 80, 393 SSSCA (Security Systems Standards and Certification Act), 94 SSTP (Simple Symmetric Transfer Protocol), 297 State, 33 State-aware networks, 33 Stateless networks, 33 Static IPs, 20 Static networks, 111-112 Steepest-ascent-hill-climbing search with backtracking, 251 Stein, Gertrude, xvi Storage, leveraging existing, 85 Streaming media, 15, 34 Strong encryption, 61, 62, 323– 324 Subject container, 175 Subscriptions, 333–334 Subversive p2p, 84 Success message, 269 Successful technology, 319

Sugarmegs, 335 Suing developers, 329 Superdistribution, 378-382 SVK (signature verification key), 263–264 Swarm distribution, 218–219, 393 Swarm storage, 225, 393 Swarmcast, 60, 133, 213, 249, 353 agency, 238 architecture, 238 browsing, 238 central content server, 244 central server. 239 content distribution system for large files, 237 content providers, 237 content server, 241 dynamic meshing, 240-241 fast and reliable data transfer, 239 FEC (Forward Error Correction) encoding, 241-243 identity, 238 IFEC (irregular FEC), 243 leveraged bandwidth, 239-240 load adaptation, 240-241 minimal knowledge agent approach, 244 open-access version, 237 operation of, 238-244 as plug-in p2p technology, 241 presence, 238 protocol, 238 redundancy encoding, 241-243 reliability, 243 roster, 238 Swarmcast Client, 237 Swarmcast Gateway, 237 transient networks (meshes) based on demand, 239 Swarmcast Client, 237 Swarmcast Gateway, 237 SwReg.org, 332 Synchronous conversations, 33 System performance, 121

Т

"Talking newspaper" service, 15 Talon, 358 TCP data-buffering option, 122 TCP/IP (Transmission Control Protocol/Internet Protocol), 12, 24, 48, 50, 51, 52, 393

packet protocol layer, 39 packet routing, 34-35 as reliable transport, 34 TCP/IP connectivity model, 33 TCP/IP model, 24 Technical benefits, 107 Technology common use of, 326 potential capability, 326 selection of appropriate, 102 social context, 319 successful, 319 use of, 15-16, 323-324 Telephones, 15, 18–19 Telephony, 15–16, 143 growth, 16 mobile, 18 P-A (person to application), 37 TGT (ticket granting ticket), 361 Thalassocracy Web site, 255 Thin clients, 292, 389 Thread container, 175 TLD (top-level domain) extensions, 360 Token server, 223 Tomlinson, Ray, 141 Transactions, well-defined, 376 Transient nodes, 8 Transient Web, 209 Transparent delivery, 380 Transporder status, 43 Transport layer, 24 Tribal Voice, 149 Trillian, 180–182, 183 Trillian Web site, 180 Trust authentication, 356 certificates, 359 files sharing, 211 Freenet, 262-265 GNU Privacy Guard, 358-360 OpenPrivacy initiative, 357-358 practical systems, 356-360 recommendation peers, 382-386 reputation, 356 viable content presuming, 355 Trust system, 249 Tunnels, 82–83

U

UCP2P (user-centric p2p), 32, 43–44, 191 UCP2P (user-centric p2p) networks, 44 UDDI (Universal Description, Discovery and Integration), 364 UDP (User Datagram Protocol), 34, 125, 155, 393 UDP/IP, 39 Uniform protocol, 393 Unindexed data, 67 Unique and persistent global identity, 146 United Devices, 377 Universal interoperability principle, 317 Unix to Unix native networking, 48 Unreliable packet transfer, 135 Unreliable packet transport, 392 Unreliable transport forwarding, 125 Unused storage, 106 UPnP (Universal Plug and Play), 87, 188 UPnP (Universal Plug and Play) Forum, 188 Uprizer, 287 URI (Uniform Resource Identifier), 393 URLs (Uniform Resource Locators), 260, 393 Usage cases, 347-355 patterns and problems, 348-354 Usenet, 48, 394 User data type, 177 User-centric model, 129-131 User-centric Web services, 54 Users, 29 availability, 186 capabilities, 186 covert resistance, 109-110 empowering, 324, 371 enhanced functionality, 170 indifferent to p2p technology, 109-110 location, 186 overt resistance, 109-110 personal identity, 77-78 reliable and persistent identification of, 22 transponder status, 43 UTC (Coordinated Universal Time), 284 UUCP (Unix to Unix Copy Protocol), 48

V

Vardi, Arik, 150 VB Script, 299 vBNS, 380 Vigiser, Sefi, 150 Virtual networks, 47 Virtual p2p networks, 26-27 Virtual-pair switching exchanges, 16 Vivendi Universal, 146 VoIP (Voice over Internet Protocol), 297 VPN (virtual private network), 50 Vulnerability, 75 W WAP (Wireless Application Protocol) phone, 345 Web, 394 content servers, 10 conversations, 35-36 data-centric p2p, 32 inefficient consumption of bandwidth, 10 information popularity, 10 integration with new, 364 static and server-centric content, 32 Web browsers, 57, 142 Web Mk2, 47 Web of trust, 359 Web services, user-centric, 54 WebDAV, 388 Webmail service, 142, 394 Werndorfer, Scott, 163, 181 What's Wrong With Copy Protection, 325 Whispercast, 288 (The) Wiki Way. Collaboration on the Web, 286 Wiley, Brandon, 277 WinÁmp, 193 Windows generic networking components, 48 NetBEUI, 48-49 network model, 25 peer networking, 48-50 proprietary clients, 115 resource and file sharing, 49 scalable-server-centric model, 50 TCP/IP, 50 Windows for Workgroups, 52 Windows XP, 188 WinJab for Windows, 173 WIPO World Copyright Treaty, 95

INDEX 429

WM (Windows Messenger), 55 automation, 183 banner advertising, 184 built-in remote control feature, 185 content in different languages, 185 features implemented one-toone (unicast), 184 finding registered MSN user, 186 firewalls, 187-188 inconvenience of automated convenience features, 185 locale, 185-186 .NET Passport server authentication, 79 open interoperability, 183 plug and wait, 187-188 PnP support, 188 protocol, 186-187 registered identity, 183 screen updates, 185 security risks, 87 SIP (Session Initiation Protocol), 186-187 unique user identifier. 183 UPnP (Universal Plug and Play), 188 usability issues, 185 video rates, 185 voice quality, 184–185 Workgroup networking in Windows, 49 Wrapster, 193 WSDL (Web Services Description Language),

Х

364

X.509 certificates, 359 XML (eXtensible Markup Language), 36, 54, 167, 297 XML-RPC, 137 XML-type container, 175 XMLRPC Web site, 261

Y

Yahoo!, 66, 149 YASO (yet another shake-out), 66

Ζ

Zimmermann, Philip, 358