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RESOURCE SHARING IN
DISTRIBUTED PEER-TO-PEER
INTERNET APPLICATIONS

by

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Abstract

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A dissertation presented on distributed Peer-to-Peer (P2P) Internet applications, focusing on distributed resource sharing as a P2P application. The history of Internet applications is researched to point out the roots of P2P applications as well as the dependency between modern technology and legacy technology. P2P applications are compared with traditional client/server applications. A classification system for categorizing P2P applications according to functionality and computing model is devised. The classification system is used to group applications with similar attributes and behavior. Five main mechanisms utilized by all content sharing P2P applications are identified. These mechanisms are node discovery, content discovery, content retrieval, content publishing and content storage. Napster, Gnutella and Freenet are discussed in detail as examples of distributed P2P resource sharing applications which utilize these mechanisms. These applications are then compared to point out similarities and differences. Other P2P initiatives known to the author are briefly presented. Challenges that need to be overcome if P2P applications are to be widely adopted are identified and discussed. A typical content sharing P2P application is

implemented for constraint mobile devices such as cell phones. The unique characteristics, possibilities and challenges of P2P on mobile devices are explored.

Keywords: Peer-to-peer, P2P, distributed, resource sharing, Internet, Napster, Gnutella, Freenet, mobile, J2ME.

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ACRONYMS

ADSL	Asynchronous Digital Subscriber Line
API	Application Programming Interface
ARPA	Advanced Research Projects Agency
ASP	Active Server Pages
ATM	Asynchronous Transfer Mode
CSD	Circuit Switched Data
CHK	Content Hash Key
CLDC	Connected Limited Device Configuration
CRT	Cathode Ray Tube
DARPA	Defense Advanced Research Projects Agency
DBMS	Database Management System
DHCP	Dynamic Host Configuration Protocol
DMZ	Demilitarized zone
DNS	Domain Name System
DoD	Department of Defense
DSL	Digital Subscriber Line
FTP	File Transfer Protocol
GPRS	General Packet Radio Service
GUI	Graphical User Interface
HTML	Hyper Text Markup Language
HTTP	Hyper Text Transfer Protocol
ICMP	Internet Control Message Protocol
IDE	Integrated Development Environment
IMP	Interface Message Protocol
IP	Internet Protocol
IRC	Internet Relay Chat
J2ME	Java 2 Micro Edition
JAD	Java Application Descriptor
JAR	Java Archive
JSP	Java Server Pages
JVM	Java Virtual Machine
JXME	Juxtapose for J2ME
JXTA	Juxtapose
KSK	Keyword Signed Key
KVM	Kilo Virtual Machine
LCD	Liquid Crystal Display
MIDP	Mobile Information Device Profile
MP3	MPEG 1 Audio Layer 3
MPEG	Moving Pictures Experts Group
MSISDN	Mobile Integrated Services Digital Network (cell phone number)
MSN	Microsoft Network



NAP	Napster audio file
NAT	Network Address Translation
NCP	Network Control Protocol
NNTP	Network News Transfer Protocol
OS	Operating System
OSI	Open Systems Interconnection
P2P	Peer to peer
PDA	Personal Digital Assistant
PPP	Point-to-point Protocol
RF	Radio Frequency
RFC	Request For Comment
RMS	Record Management System
ROM	Read Only Memory
SAT	SIM Application Toolkit
SETI	Search for Extraterrestrial Intelligence
SIM	Subscriber Identity Module
SMTP	Simple Mail Transfer Protocol
SOAP	Simple Object Access Protocol
Sonet	Synchronous Optical Network
SSK	Signed Subspace Key
TCP	Transmission Control Protocol
Telnet	Telecommunication network
TLC	Tender Loving Care
TTL	Time to live
UDP	User Datagram Protocol
URL	Universal Resource Locator
VM	Virtual Machine
WMA	Windows Media Audio
WWW	World Wide Web
XML	Extensible Markup Language



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