



Chapter II

Peer-to-Peer Networks for Content Sharing

Choon Hoong Ding

The University of Melbourne, Australia

Sarana Nutanong

The University of Melbourne, Australia

Rajkumar Buyya

The University of Melbourne, Australia

Abstract

Peer-to-peer (P2P) systems are popularly used as “file swapping” networks to support distributed content sharing. A number of P2P networks for file sharing have been developed and deployed. Napster, Gnutella, and Fasttrack are three popular P2P systems. This chapter presents a broad overview of P2P computing and focuses on content sharing networks and technologies. It also emphasizes on the analysis of network topologies used in popular P2P systems. In addition, this chapter also identifies and describes architecture models and compares various characteristics of four P2P systems—Napster, Gnutella, Fasttrack, and OpenFT.

Introduction

Peer-to-peer (P2P) content sharing technologies such as Napster, Gnutella, and Kazaa are applications that have been astonishingly successful on the Internet. P2P has gained tremendous public attention through Napster, which is a system supporting music sharing on the Web. It is an emerging and interesting research technology with a promising product base.

Intel P2P working group gave the definition of P2P as “The sharing of computer resources and services by direct exchange between systems” (Kan, 2001). This thus gives P2P systems two main key characteristics:

- **Scalability:** There is no algorithmic or technical limitation to the size of the system, for example, the complexity of the system should be somewhat constant regardless of the number of nodes in the system.
- **Reliability:** The malfunction on any given node will not affect the whole system (or maybe even any other nodes).

File sharing networks such as Gnutella are good examples of scalability and reliability. In Gnutella, peers are first connected to a flat overlay network in which every peer is equal. Peers are connected directly without the need of a master server’s arrangement and the malfunction of any node does not cause any other nodes in the system to malfunction as well.

P2P can be categorized into two groups by the type of model: pure P2P and hybrid P2P. The pure P2P model, such as Gnutella and Freenet, does not have a central server. The hybrid P2P model, such as Napster, Groove, and Magi, employs a central server to obtain meta-information such as the identity of the peer on which the information is stored or to verify security credentials. In a hybrid model, peers always contact a central server before they directly contact other peers.

P2P Networks Topologies

According to Peter, Tim, Bart, and Piet (2002), all P2P topologies, no matter how different they may be, have one common feature. All file transfers made between peers are always done directly through a data connection that is made between the peer sharing the file and the peer requesting it. The control process prior to the file transfer, however, can be implemented in many ways. As stated

36 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/peer-peer-networks-content-sharing/28041

Related Content

An Evaluation of New Work Practices After the Pandemic: Crowdfunding
Asl Sezginand Esengül plik (2022). *Handbook of Research on Global Networking Post COVID-19* (pp. 247-262).

www.irma-international.org/chapter/an-evaluation-of-new-work-practices-after-the-pandemic/309610

Context Aware Data Perception in Cognitive Internet of Things - Cognitive Agent Approach

Lokesh B. Bhajantriand Prashant M. Baluragi (2020). *International Journal of Hyperconnectivity and the Internet of Things* (pp. 1-24).

www.irma-international.org/article/context-aware-data-perception-in-cognitive-internet-of-things--cognitive-agent-approach/258101

The Nexus Between Forensic Tax and Accounting Knowledge After Pandemic COVID-19 in Indonesia

I Made Laut Mertha Jayaand I. Made Narsa (2022). *Handbook of Research on Global Networking Post COVID-19* (pp. 480-494).

www.irma-international.org/chapter/the-nexus-between-forensic-tax-and-accounting-knowledge-after-pandemic-covid-19-in-indonesia/309623

Big Data Analysis and Implementation in Different Areas Using IoT

Aqeel ur Rehman, Muhammad Fahad, Rafi Ullahand Faisal Abdullah (2017). *International Journal of Hyperconnectivity and the Internet of Things* (pp. 12-25).

www.irma-international.org/article/big-data-analysis-and-implementation-in-different-areas-using-iot/201094

Internet of Things: Privacy and Security Implications

Mohamed A. Eltayeb (2017). *International Journal of Hyperconnectivity and the Internet of Things* (pp. 1-18).

www.irma-international.org/article/internet-of-things/179894