Chapter IV

Peer-to-Peer Corporate Resource Sharing and Distribution with Mesh

Ramesh Subramanian, Quinnipiac University, USA
Brian Goodman, IBM – Advanced Internet Technology, USA

Abstract

Peer-to-peer (or “P2P”) computing has aggressively moved to the center-stage of the computing field in recent years. “P2P computing” emphasizes the shift away from centralized and client/server models of computing to a fully decentralized, distributed model of computing and content distribution. In the P2P mode of thinking, a “peer” system can be almost any computing device connected to a network – whether it is a computer, a printer, a facsimile machine, a video camera or an e-mail server. This idea has great ramifications in the way people work, learn, collaborate and share resources in organizations. In this chapter we present the design and architecture of Mesh, which is a centrally enhanced...
peer-to-peer resource sharing grid. Mesh is a prototype hybrid resource sharing system. It encompasses and advances the currently available solutions in the areas of “pure” P2P computing. The chapter describes a complete implementation of Mesh with directions for future work.

Introduction

The importance of P2P computing in organizations has been made apparent in several recent research reports. According to a Gartner Consulting Report (Gartner Consulting Report, 2001) published in 2001, there exists a very high probability that “half of the current server-based content management vendors will add Data Centered P2P functionality to their product offerings by 2005. Smith, Clippinger and Konsynski (Smith et al., 2003) state that P2P computing represents a major technology shift and corporations should seriously start focusing on P2P computing, “whether they like it or not”.

Organizations are beginning to take advantage of the benefits offered by P2P computing such as opportunities for e-collaboration, creating virtual organizations, massive decentralization, cost-effectiveness and timeliness, to name a few. P2P computing is increasingly being used in core IS management areas such as data management (including distribution and e-collaboration), data-processing and service-processing.

Data Management

Currently, much of the corporate data and content within “global” organizations are distributed by replicating and distributing such data and content using centralized content repositories. That is, the data are globally distributed, but made available within a location or geographical area by using a “central” server that is responsible for serving the content to clients located within the area.

However, this emphasis is shifting — from storing data in, and serving data from, centralized servers to storing and serving (at least some of) the data/content from the client-side. The content provider thus manages his/her content in a local client, and shares them with anyone who is authorized to access them. The responsibility for content creation, storage and security dwells on the client side. There are several advantages to this approach. By shifting the responsi-
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