Construction and Arena Simulation of Grid M-Commerce Process

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ABSTRACT

With the rapid development and the wide use of mobile technology, m-commerce research has gradually become the focus of scholars. Difficulties exist in m-commerce, such as information sharing, business collaboration, and process reengineering. Grid management, a new managerial concept, has the potential of being a powerful weapon that affects the study on m-commerce process. This study systematically analyzes the traditional m-commerce process and its problems. On that basis, this paper constructs the grid m-commerce process based on the idea of grid management. Through the help of Arena simulation software, the authors prove that all the convenience, function, and safety of the process are improved by grid M-commerce process.

Keywords: Arena, Business Process Reengineering (BPR), Grid Management, M-Commerce Process, Simulation

INTRODUCTION

Since the appearance of mobile e-commerce (M-commerce or MC for short) in 1990s, its characteristics of anytime and anywhere are changing people's way of life. In developed countries, M-commerce has penetrated into every aspect of life, while China is developing it rapidly. In recent years, studies on M-commerce have no longer stay in the cognitive level, and concentrates on service and process.

However, there is no scholar systematically constructed the whole process of M-commerce.

They only did some researches on node flows, such as the payment process (Yang & Zhang, 2009), the logistics process (Liu & Jiao, 2009) and the authentication process (Wang & Zhang, 2009), and the analysis of process is still in qualitative stage. Therefore, setting up, optimizing and quantitative evaluating the M-commerce process from the user's angle to improve the service can be the core of the study, of which targets are to improve the resource utilization of mobile network and the management efficiency of M-commerce.

To resolve these problems, a process reengineering study based on grid management (Chi, 2008) provides a new solution. This thinking

mode derived from the grid technology can help solve the problems in resource sharing and collaboration. Meanwhile, the mobile grid technology (Du, 2010) makes applying grid management into M-commerce process possible, which will be more convenient, powerful and safe. In addition, if analyzing the process with resource utilization and time efficiency, we can quantitatively calculate and evaluate the efficiency of M-commerce, and doing further analysis with the help of simulation technology.

This paper will take B2C M-commerce process as the object of study, constructing current M-commerce process and analyzing its existing problems firstly. On that basis, the grid M-commerce process is constructed with the theories of grid management and process reengineering, and we will adopt modeling simulation technology in both new and current processes to do the contrast analysis.

THEORETICAL FOUNDATIONS

Grid and Grid Management

Grid Technology

"Grid" is a new technique building on the Internet, which blends high speed Internet, high performance computers, large databases, sensors, and remote equipments as a whole, providing more resources, function and interactivity for technicians and ordinary people. Grid technologies form a super computer that integrates all resources from different physical locations in Internet, realizing the widely sharing of information and resources.

Mobile grid is the extending of traditional grid in the wireless circumstance. It supports mobile users and resources seamlessly, transparently, safely and effectively. The mobile grid (Figure 1) integrates mobile devices, consisting of a resources sharing network with mobile notes.
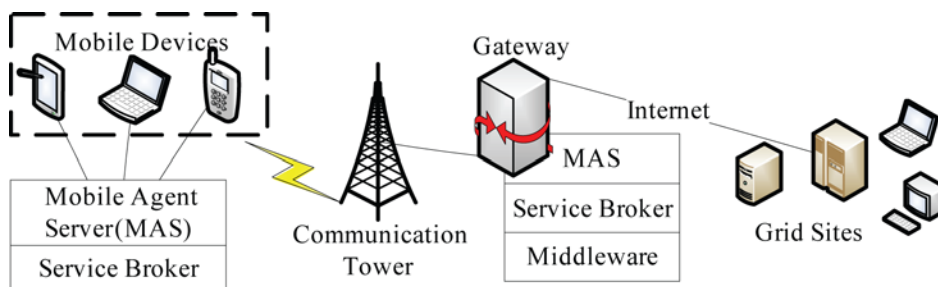
Grid Management

Grid management emerges from grid computing that can realize information integration, synergic operation and information sharing (Shen, 2006). This idea divides objects into grid units according to certain principles, and makes the units communicate with each other effectively, sharing the resources apparently with the help of IT and coordinate mechanism to improve the management efficiency.

Grid management has several features, including: (1) slices combining with pieces; (2) operation process reengineering; (3) supreme customers; (4) resources sharing; and (5) systematic supervision and administration (Zheng, Xu & Wang, 2005).

The process of grid management is abstracted as follows (Yuan, Wang & Ma, 2007):

1. Business Acceptance. Accept all demand applications from clients at the same platform, and verify the demands.
2. Business Dispatch. Recognize and subdivide the type of demands, dispatching

Figure 1. Structure of mobile grid

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