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Design of Port E-Business Marketing Management Information System Based on Cloud Computing

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ABSTRACT

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Today's society is an information era. In the information age, the most notable feature is the rapid transmission of information, which leads to increasingly fierce competition. If we want to get a firm foothold in the fierce competition, we must grasp the information. To survive in competition, enterprises are constantly forging ahead and innovating in the information age to keep pace with the progress of the times. Therefore, information management systems have very important roles in enterprises. This article uses the data management technology of cloud computing to study the data management of electronic commerce. We hope to improve the level of current e-commerce data management with the help of cloud computing technology. This article starts with an analysis of the current e-commerce marketing, analyzes the data problems based on the characteristics of the data, finds some aspects that can be improved, and establishes an e-commerce marketing-management system based on cloud computing. By using network information organization, we classify different types of data and put forward different solutions according to different divisions. Finally, we present an entire e-commerce data-management model.

ADDITIONAL INDEX WORDS: *E-commerce, database, information management.*

INTRODUCTION

Tropical cyclones are mostly associated with warm and moist air; therefore, they originate only over warm ocean waters near the equator. The favorable conditions required for the formation of cyclones are (1) warm sea-surface temperatures; (2) large, convective instability; (3) low-level, positive vorticity; (4) weak, vertical wind shear of horizontal winds; and (5) adequate Coriolis force. The development of cyclonic storms is a frequent phenomenon in the Bay of Bengal, and they account for about 7% of the global annual total number of cyclones. The genesis of a cyclone is a regular feature in the premonsoon (May) and postmonsoon (October to November) seasons over the Bay of Bengal. Timely prediction of these storms can reduce the loss of human life and damage to infrastructure. The wave heights during cyclones Baaz, Fanoos, and 7B have been estimated in the Bay of Bengal, and Patra, Mohanty, and Mishra (2015) developed a wave model to estimate and validate offshore wave characteristics of cyclones that occurred in the Bay of Bengal from 2008 to 2009. The spatial characteristics of the nearshore waves of Paradeep, India, have also been estimated during monsoons and extreme events.

In recent years, more Internet users have begun to use online banking, which is both convenient and quick, to trade on the Internet. At the same time, this manner of shopping entertains people. Most of contemporary Internet users have experienced online shopping. This system is an e-commerce marketing platform for small and medium product production and marketing enterprises. With the rapid development and popularization of Internet, e-commerce and online shopping have become another fashion shopping mode. Meanwhile, this shopping mode is gradually being accepted by more people (Nguyen, Nguyen, and Cao, 2014). For small and medium enterprises (SMEs), network marketing will increase in the future. The realization of e-commerce, so that people can easily, anywhere in the world, at any time, shop, trade, or acquire a service; can deeply understand or fully share of goods and services; select from a wide group of goods and services and comparison shop; and reduce transaction costs, speed up a purchase or transaction cycle, optimization a supply chain is more conducive to opening up a vast global market and economies of scale but is also conducive to the improvement of the management level of the enterprise or business. The purpose of the construction of this system is to provide the SMEs with the living environment and business space of port e-business online, which is in line with the national conditions of China. The platform can help SMEs or even individuals start their own businesses independently. They can independently market an Internet business city to achieve a goal of rapid profit. The enterprise opens up unique sales channels through an e-commerce platform, provides a virtual space that can fully display products and services with a number of varieties for the company or enterprise, and enhance their visibility and business reputation to participate in international competition (Yu and Yang, 2014). Small and medium-sized enterprises can also use the electronic commerce system to carry out modern trade and equalize competition with big business opportunities, win larger development space, reduce operating costs, improve

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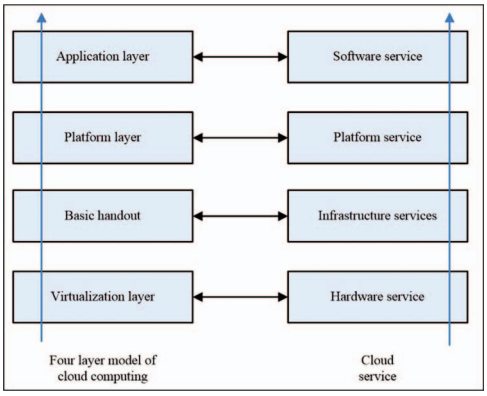

Figure 1. Cloud computing service architecture.

management efficiency, save a large amount of investment, and enable SMEs to focus on core business-enterprise funds. The system is based on the normal function of electronic commerce platforms and uses cloud computing technology to develop the e-commerce platform. Because of the computing technology of the e-commerce system under electronic commerce, the system has very high advancement and innovation and provides virtual computing resources—that is, a self-management function and maintenance of a large server cluster. Through the large service cluster, internal computing resources of e-commerce enterprises can be supplemented or with an e-commerce platform of cloud computing capability (Lin *et al.,* 2017). Software as a service (SaaS), which provides the software as a service to the customer, is offered through cloud computing. Clients will find the services provided by cloud computing more convenient and effective.

Cloud Computing

At the end of 2006, Google's staff started a project called "Google 101" at the University of Washington. In the project, a cluster of dozens of ordinary computers were joined by software, and then, MapReduce was used to break down each task into a number of small tasks. These small tasks were completed in the cluster, and then the information processed by MapReduce was returned and arranged into a complete processing result. This is the earliest embryonic form of cloud computing (Kar and Rakshit, 2015). Cloud computing was first used by large Internet service providers, such as Google, Amazon, and other expansion-infrastructure companies. Basically, cloud computing is just a way to provide information technology (IT) resources as services, including almost all IT resources, such as applications, computing power, storage capacity, programming tools, and so on, through cloud services. Cloud computing is not a completely new concept, but it will be a subversive technology (Alavi, Alavi, and Mohan, 2013). The main reasons for the emergence and development of cloud computing are as follows (Figure 1):

(1) High-speed changes in hardware and software,
(2) High-speed data increase, and
(3) The inevitable result of network and bandwidth development.

AN OVERVIEW OF PORT E-BUSINESS MARKETING MANAGEMENT¶

The Principle of Electronic Commerce Management

The principles of e-commerce management mainly discuss the management mechanism, organization structure, operation mode, and operation process of the e-commerce organization from the research object, function, composition, and definition of e-commerce management and recognizing the connotation and standard requirements of e-commerce organization management. The principle of e-commerce management should include the following principles (Mansuri, Verma, and Laxkar, 2014).

The Object and Function of E-Commerce Management. This principle mainly includes the composition of e-commerce management, the organization of e-commerce activities, a description of the e-commerce activities, the scope and tasks of the e-commerce activities, the object of the e-commerce management, the functions of the e-commerce management, and so on.

The Management System of the E-Business Organization. Based on electronic commerce management organization, this article analyzes the connection and difference between the e-commerce organization management systems and traditional enterprise management systems, establishes the management mechanism for an e-commerce organization, and provides a management system that is unified with the management mechanism. The e-business system of organization management mainly includes the electronic commerce organization and management system, the relationship between the electronic commerce organization and the management system, the significance of the e-commerce organization, and optimization of the management system standard as well as providing trend changes, organization structures for e-commerce design, e-commerce structures of organization, organization development, and a marketing management system (Park and Lee, 2013).

An Operation Mode of the E-Commerce. The operation mode for a port e-business is the organizational rule for the e-commerce activities. The organizational elements of the business's activities and the principles of their organizational design must be studied.

The Operation Process of the E-Commerce. The operational process of the e-commerce enterprise is the procedural norm of the activities for electronic commerce. From all aspects of e-commerce activities, we discuss the operating platform and operational skills of each link and realize the scientific and standard requirements of the operation and its management (Mohaupt and Hilbert, 2013).

Content of Port E-Business Management

Electronic commerce management is the core content in the management of electronic commerce. It mainly includes the related electronic commerce activities engaged in the organi-

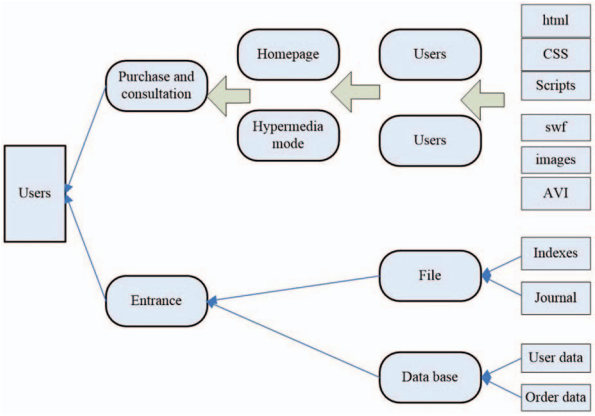

Figure 2. The logic model of e-commerce data management.

zation of human, financial, and material resources; time; information; technology; environment; and other elements of the customer system composing its information flow, capital flow, and logistics resources management, *etc*. The content of the port e-business management mainly includes the following contents (Rodmunkong and Wannapiroon, 2013).

The Strategy of a Port E-Business Operation. The e-commerce business strategy is the macro level of managing port e-business activity. The strategic objectives, strategic plans, and strategic actions of the e-business must be understood to ensure management strategy quality.

The Management of E-Commerce Resources. E-business activities can not be separated from their resources, and the optimal allocation and management of those resources are the main content of the enterprise's e-commerce management. Therefore, the characteristics of all resources and the ways and means of their organization and management from their composition, and the use of resources such as manpower, material resources, financial resources, and intangible assets must be understood (Mei and Qiu, 2016).

Management of the Information Flow in Port E-Business Marketing. Information flow is the blood of e-commerce activities, and it is the core of electronic commerce management. The way information is collected, processed, stored, retrieved, and used should be discussed during the formation of information sources.

Port E-Business Marketing Logistics Management. E-commerce logistics is the basis for the movement of e-commerce activities and the physical flow process of material entities from suppliers to demand.

DESIGN OF THE INFORMATION SYSTEM MODEL

Data Logic Model of E-Commerce

We call the organization mode of network information a microscopic-organization mode. It reveals and describes a specific knowledge unit of a specific bit of information and determines how that unstructured information is managed, similar to the way of file free text also refers to a way of

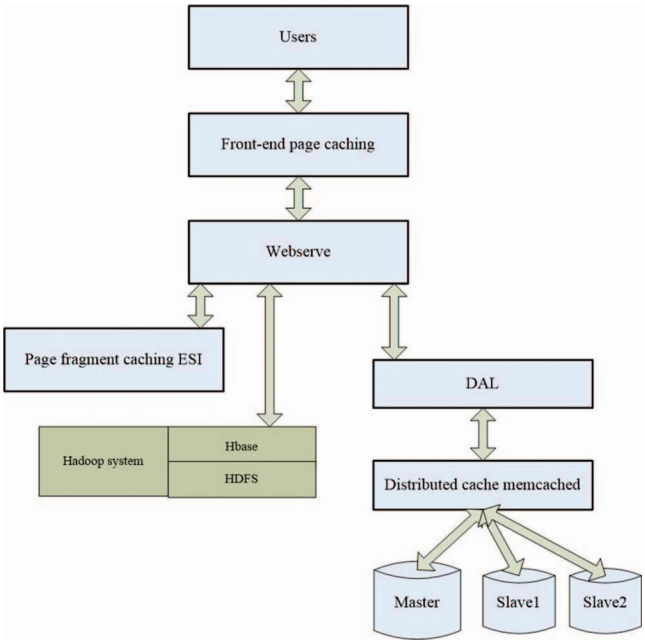

Figure 3. Data association model for e-commerce.

organizing and managing unstructured text information. The difference is that we need to use natural language to reveal the knowledge units in literature, which mainly applies to full-text databases. Hypermedia refers to combining hypertext and multimedia technology to organize and use network information resources. It organizes multimedia information, such as text, form, voice, graph, image, video, and so on, in a hypertext way (Mastorakis *et al.,* 2014). The macro mode organization of network-information resources refers to the overall organizational management and the control of network-information resources by using various specific microcosmic and information organization methods and models. Therefore, for information organization, we can sum up a logical model for an e-commerce website's informational organization, as shown in Figure 2. In this model, the information is roughly divided into four layers, which correspond to the three-layer classification of the network information organization mentioned above, the highest one is the user of the information. Website support data that are not visible to users, such as indices, logs, and so on, are not completely divided into three layers, and we divide them into two layers.

Model Framework Description

The model presented in this section is based on a multistage structure, using the front-page cache squid, multiple web-servers, page cache, the Hadoop storage system, a data access layer (DAL) data interface, a Memcached distributed cache, and a branch strategy to implement this framework, which can be divided into four layers, as shown in Figure 3. After the user's access request is submitted, it first reaches the front-page cache. If the cached data can't meet the user's request, then the Squid server will submit the user request information to the web server. The web server we used here is Apache,

Table 1. *Master Hbase.*

Shop	Describe	Server ID	File
1234	Clothing	1	1

Table 2. *Slave Hbase.*

Name	Type	Size	Attribute	Describe	File Block ID	Intrablock Migration
Shop 1234	html	120 K	Main	Clothing	1	2
Black	css	140 K	Shop12		1	102
Shop	script	200 K	Shop12		1	243
Image 1	gif	4 K	Shop12	Lcon	1	245
Image 2	gif	10 K	Shop12	Trousers	1	255

which is widely used as an open-source server. The web server then visits the page fragment-caching Edge Side Includes (ESI) to see whether there is a user's request, and if not, what type of the user's request was resolved. If you read a webpage or other unstructured data request, you send the request to the Hadoop system; if the user logs in, you need to view the structured data request, such as user information, then send the request to the database. Then, the two parts come up with a result and return it to the user.

Server Description

The main server is divided into two parts: the main server, and the query master server. The main server is responsible for data updates, creations, deletions, and other logical management and is also responsible for communicating with all secondary servers and monitoring the status of each server. To do that solves the above-mentioned electronic business website data problem, that is, the query function of the data, to use the most-common problem. Using this model, the separate processing of a query function reduces the pressure on the main server and improves the processing capability of the entire system. Because we want to have only one main server, query master servers can be set up according to the increases in data. The main server needs to be synchronized with the querying master server at any time to ensure that, after modifying the data, querying the main server will also provide the corresponding mapping data-modification information. The main server can ensure synchronization by sending the modified information actively. The secondary server is connected by many separate servers throughout the network. This server can be distributed in different places, which is the biggest feature of the distributed system. The secondary server actually implements the data storage function, and various unstructured files in various e-commerce environments, such as text, picture information, webpage data, *etc*., are stored on every server. Each subserver is allocated by the master server to decide the data tables and files stored by the customers. After the corresponding customers receive data-location information from the main server, they receive data from the corresponding secondary servers. This part uses the existing implementation of the Hadoop storage system, through the Hregion components of the Hbase and the Hadoop distributed file system (HDFS) slave component. The secondary server also includes a cache component, which, together with the cache part of the query master server, forms the distributed cache system of the entire system. Examples of a clothing store on the master Hbase and the corresponding slave Hbase are shown in Tables 1 and 2.

CONCLUSIONS

With the development and progress of the economy and culture, a new consumption pattern has gradually been accepted by people. However, because the application of IT in China's traditional enterprise foundation is weak, the supporting service system is not perfect; the amount of data generated in e-commerce transactions is particularly large, the data structure is very complicated, and with sudden and strong concurrency, the need for massive information management and the provision of an e-commerce platform are required for sustained and stable efficient service. Therefore, enterprises performing e-commerce activities are required to invest in greater construction and maintenance costs. With the rapid development of cloud computing technology, the low cost and high efficiency of cloud computing services brings an opportunity for enterprises to develop e-commerce activities.

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