

## *Retraction*

# **Retracted: Implementation of Distributed Operation and Maintenance of Cross-Border e-Commerce Platform Based on Cloud Native Architecture**

## **Security and Communication Networks**

Received 25 July 2023; Accepted 25 July 2023; Published 26 July 2023

Copyright © 2023 Security and Communication Networks. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

## **References**

- [1] Y. Dong and Y. Zhang, "Implementation of Distributed Operation and Maintenance of Cross-Border e-Commerce Platform Based on Cloud Native Architecture," *Security and Communication Networks*, vol. 2021, Article ID 4254791, 11 pages, 2021.

*Research Article*

# Implementation of Distributed Operation and Maintenance of Cross-Border e-Commerce Platform Based on Cloud Native Architecture

**YanJiao Dong<sup>1,2</sup> and Yang Zhang<sup>1</sup>**

<sup>1</sup>School of Business, Guilin Tourism University, Guilin 541006, Guangxi, China

<sup>2</sup>Faculty of Data Science, City University of Macau, Macao 999078, China

Correspondence should be addressed to Yang Zhang; [dong@gltu.edu.cn](mailto:dong@gltu.edu.cn)

Received 26 October 2021; Revised 15 November 2021; Accepted 4 December 2021; Published 15 December 2021

Academic Editor: Jian Su

Copyright © 2021 YanJiao Dong and Yang Zhang. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The traditional architecture of e-commerce data management needs to adapt to the new and more complex environment, which needs to provide massive data management, compatibility of different types of data, and better user experience. Cloud computing technology is a synthesis of parallel, distributed, and grid computing and is one of the future directions of information technology development. In this paper, we use cloud computing data management technology to study the data management of e-commerce. It is hoped that the current e-commerce data management can be improved with the help of cloud computing technology. This paper starts from analyzing the current e-commerce representatives Taobao.com and Jingdong Mall to find out the data characteristics of these two enterprises, analyze the existing data problems, and find the aspects that can be improved. Using this open-source cloud computing implementation solution, we solve the storage problem of large files and unstructured small files in the e-commerce system.

## 1. Introduction

Information technology has developed exceptionally rapidly in the first decade of the new century, and it has not only penetrated into various fields but has also deeply influenced traditional social production and life [1].

In the twenty-first century, the popular application of the Internet is another revolution for modern business, which has brought a new way of trade, e-commerce [2–4]. For individuals, e-commerce also reduces the transaction cost of individuals, expands the choice, and saves time. The usage rates of online shopping, online payment, and online banking were 33.8%, 30.5%, and 29.1%, respectively, and the user scale reached 142 million, 128 million, and 122 million, respectively, with a half-year increase of 31.4%, 36.2%, and 29.9%, respectively, ranking the top three among all kinds of online applications in terms of growth rate [5].

E-commerce can be roughly divided into three kinds: B2B, B2C, and C2C.

Alibaba occupies the absolute advantage within the industry, covering millions of Chinese SME merchants. From 2008 onwards, B2B e-commerce followers represented by Dunhuang.com and Jinyindao show a rapid development trend [6]. These e-commerce platforms not only complete the function of displaying enterprise information flow but also realize the unification of the three with logistics and cash flow. B2B e-commerce enterprise followers emphasize profitability and potential value, as well as the integrated application of e-commerce [7]. Take Dunhuang.com, for example, which is the core of online trade, to the transaction commission as the main income of the operating model in the development.

The first camp is the market leader, represented by Dangdang.com and Excel.com [8, 9]. Excellence and Dangdang were the first to be established in the early days

when there was no market for e-commerce in China. With the advantages of good technology, logistics, payment, and popularity, they are expected to become strong market challengers. The second camp contains Jingdong Mall, Beidou Mobile, New Egg, McCallum.com, InteractivePublishing.com, Qicai Valley, etc., as well as some product direct sales enterprises, such as DELL, PPG, etc. These websites are the leading websites in each product segment and are in a stable growth state; the third camp is other market players and long-tail websites, such as a large number of individual or workshop B2C websites or some local B2C websites [9]. These sites are numerous, but their impact on the current market share of B2C e-commerce in China is limited.

For the C2C market, Taobao is the dominant player, with 85% of the market share. Tuscany's Paipai is in second place, and Baidu Youya is in third place.

From the above analysis, it can be seen that e-commerce is developing rapidly and will eventually develop into a way for us to shop. We can also see that e-commerce websites are facing a fast-growing user base, and their own integrated functions are becoming more and more complex; for example, Taobao.com began to venture into the B2C field, becoming a comprehensive website for the entire e-commerce personal consumption field. These all mean that the e-commerce website background data management is facing huge pressure.

In the first decade of the 21st century, especially since 2007, a new business model has emerged, which is "cloud computing." It is a concept proposed by a Google-based vendor and can be seen as a development of distributed computing, parallel computing, and grid computing, or as a commercial implementation of these computer science concepts [10]. It is not simply an upgrade of grid technology [11], but cloud computing, a new Internet architecture model that distributes computing tasks over a pool of resources consisting of a large number of computers, enables various applications to access computing power, storage space, and various software services as needed. In the future, through cloud computing, only a laptop or a cell phone will be needed to achieve everything we need through network services, even tasks such as supercomputing. For small- and medium-sized enterprises, they can use information technology services for themselves as easily as electricity, on demand, which will greatly facilitate the development of enterprises [12].

This will be a disruptive concept; with the support of the huge "cloud" in the background, any device that can access the Internet is equivalent to a supercomputer. It is the next driver of Internet development and will also become the driving force of enterprise information technology [13, 14].

At present, Google, Yahoo, Microsoft, SUN, and many other companies are actively involved in this field. Google strives to provide APIs to realize a platform for development, the so-called Paas, and also provides some online text editing applications. Microsoft provides a unified service platform for users. In the SAAS space, Salsesforce's CRM system has achieved a market value of more than \$1 billion. In the IaaS domain, Amazon offers S3 services for data management,

and Yahoo and Microsoft offer similar data management services, respectively [15]. In addition to these well-known companies, many large number of applications are being generated.

Cloud computing is an innovation on top of existing technologies and is a medium transformation technology and application that will have a profound impact on all areas of the Internet. In such a context, this paper attempts to solve the massive data management problem that e-commerce websites need to face through cloud computing technology.

## 2. Related Work

**2.1. Cloud Computing.** Implementation of cloud computing relies on hardware and software platforms that enable virtualization, automatic load balancing, and on-demand performance. Providers in this area are primarily the traditionally leading hardware and software manufacturers, such as EMC's VMware, Red Hat, Oracle, IBM, HP, Intel, and others. The main features of these companies' products are flexible and stable clustering solutions and standardized, inexpensive hardware products.

EMC [16] partnered with Intel in 2009 to develop a power-efficient version of the Atmos cloud storage system, on which AT&T's Synaptic service is built, and proposed building a unified cloud architecture. Red Hat [17] offers a pure software cloud computing solution (supporting any industry standard hardware); a 4-tier cloud computing solution; consolidation, sharing, and allocation of resources through virtualization; on-demand online scaling and on-demand payment for resource usage; and Red Hat has provided a cloud computing platform for Amazon and is working with Verizon Business to deploy a cloud computing service solution.

Google was the first company to provide an open-source cloud storage API interface, defined a large-scale database management system, BigTable [18], and provided the MapReduce [19] distributed programming environment, which is used not only for Google's own developed cloud services but also for cloud storage application developers to develop their own cloud storage services and cloud application services. Google developed GFS [20] (Google File System, a clustered file system based on SAN architecture), which has a good performance, scalability, availability, and reliability.

IBM's Blue Cloud [21] combines a GFS clustered file system with a SAN, a block device-based storage area network, with the SAN providing the block device interfaces, and a GFS distributed file system selected over those block device interfaces. In order to be able to orchestrate other file systems that modify the system at the same time, Blue Cloud uses GFS, which can be orchestrated for Linux file systems around the world.

**2.2. Cloud Management.** Google File System, which is now a key technology in cloud computing data management, is the developers of GFS. Doung Cutting, another pioneer in the field of cloud computing research, is the creator of Hadoop

and is currently working in cloud computing development at yahoo. Other scholars such as Chaudhary and Suri [5] worked on comparative study of grid and cloud computing; Wang et al. and Li et al. [21, 22] focused on the marketability of cloud computing and studying evaluation methods; Liu et al. [23] are working on evaluation survey study of cloud computing; Dong [24] studied data processing issues and architecture in cloud computing; and Hirt and Willmott [25] focused on security issues of cloud computing. Liu et al. [26], on the other hand, proposed a study on the modification of HDFS based on the characteristics of some existing systems with many small files.

Bing et al. and Gani and Faroque [27, 28] are also experts in parallel processing and distributed computing systems, and they have conducted a serious analysis and comparative study of existing cloud computing systems at home and abroad and are also engaged in the design of cloud computing data management systems. Pei et al. [29] are also relatively early researchers in cloud computing in China, and they proposed the concept of grid computing pools early and are now very active in promoting cloud computing. There are also numerous scholars in China such as Francois and Keane and Yu [30, 31], who are introducing various technologies of cloud computing and are studying the combination and impact of these technologies with different disciplines. There are also some scholars who are using existing open-source architecture for the development of systems. In the field of library intelligence, scholars are studying cloud computing technologies, which are currently more in the application of cloud computing and libraries, such as using cloud computing technologies to build library infrastructure and improve the quality of services.

In terms of cloud data management, in addition to the Blue Whale distributed cluster file system developed by domestic scholars in the early days, as well as some research on the Blue Whale system, such as physical resource management, network fault tolerance, load balancing issues in distributed file systems, and metadata and isolation techniques, Brechtel and Altmann [6] dissect the current cloud data management technologies and propose future research directions. There are also some scholars who are engaged in the research of cloud data management [7, 8].

### 3. Introduction to Cloud Computing

The most important features of cloud computing are high reliability, high scalability, and low cost. Current cloud computing implementation technologies are based on making full use of existing resources and can run on inexpensive PCs, which make the previously high cost of data processing lower. Moreover, reliability and scalability of cloud computing systems are very high due to the adoption of extensive virtualization and the initial consideration of untrustworthy nodes.

Currently, there are three publicly recognized service models of cloud computing: IaaS, PaaS, and SaaS, e-commerce Platform Framework.

We first analyze the structure of Taobao.com [7]: the composition of Taobao.com can be roughly divided into

product module, shopping assistant, user management module, community, information module, service module, payment module, order module, etc., as shown in Figure 1.

Among them, and then divided in depth, the product module includes the commodity display part and the commodity management part; the commodity display part is divided in Taobao in great detail, including ordinary sellers' commodity display, Taobao Mall, Taobao Electric City, lottery, Taobao travel, and insurance, as shown in Figure 2. Here, ordinary buyer merchandise display part is the form of C2C, completely personal sellers, to personal buyers transactions.

Shopping assistant is a convenient tool for users to shop, including a search module, shopping cart, fitting room, and look at the picture purchase, as shown in Figure 3.

The user management module includes account management, My Taobao, and My Taobao under Favorites, Member Club, etc., as shown in Figure 4.

The main component of the community module is Tao Jianghu, which can be considered as Taobao's SNS, you can see everyone's shopping products through "Tao Share," group purchase through "Jou Shuang," and exchange through "Qian Zhuang." You can see everyone's shopping products through "Amoy Share," make group purchases through "Juchang" and exchange them through "Qianzhuang." You can also make friends here and join themed groups—"Gangs," as shown in Figure 5.

The information module mainly refers to the information-based introduction of different products, as well as shopping guide information. It also includes the new function of the portal, which is more similar to a large portal.

The service module refers to the various services provided to buyers and sellers for the normal transaction of products, including Amoy and Amoy University, and customer service including refund management, complaint reporting, and rights management (Figure 6).

Order module and order data can be considered the core data of Taobao website, but Taobao does not have its own logistics distribution; it will provide these order data to third-party logistics providers through the interface. The order module is distinguished from buyers and buyers, for buyers: bought goods, order query, and evaluation, and correspondingly for sellers: sold goods, order information query, logistics settings, and evaluation, as shown in Figure 7.

The payment module, Taobao, relies on the Alipay website to complete the entire payment process. By binding a Taobao account of an Alipay account, it seamlessly connects the two websites together to complete the entire transaction. Taobao.com transmits the user's order information to Alipay through an interface to complete the order. Alipay is an independent online payment site with its own various components, which we will not discuss too much here.

Above these are the approximate overall structure of Taobao, and some parts are not involved, such as the product promotion module, and then one above these modules is crossed with each other and not independent.

In the following, we analyze the structure of Jingdong Mall [8].

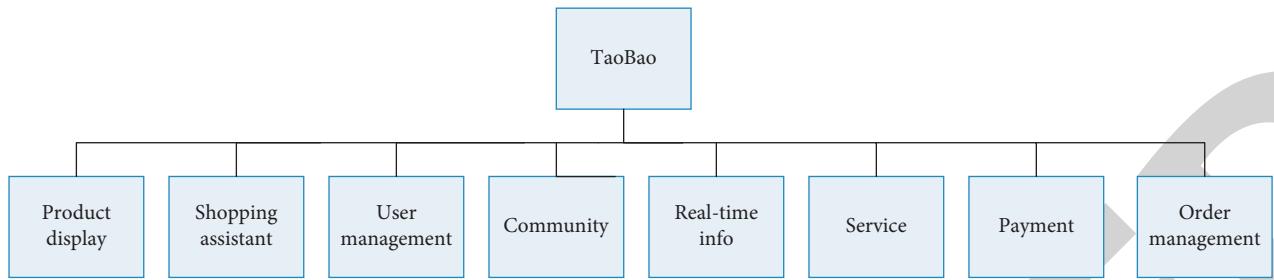


FIGURE 1: Taobao components.

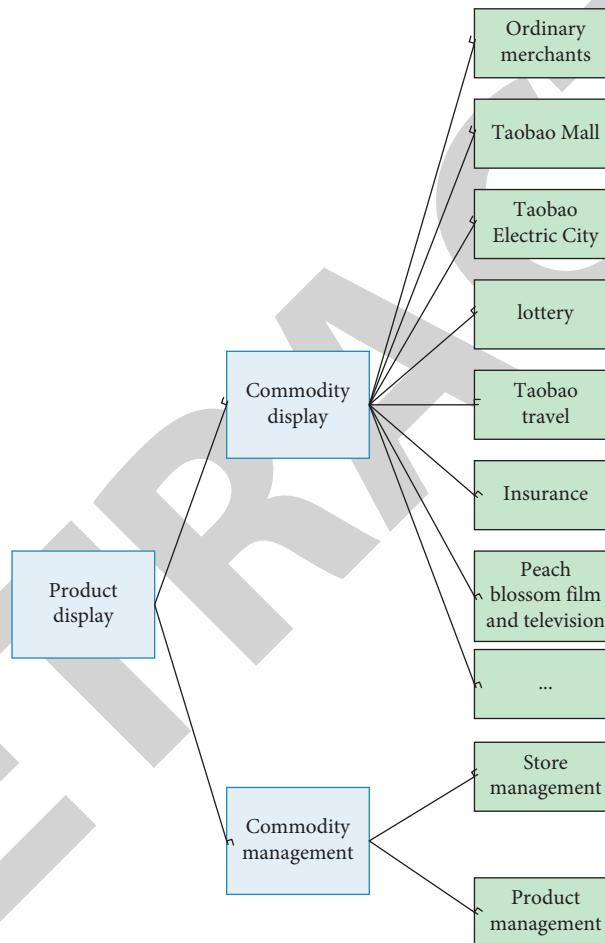


FIGURE 2: Taobao product module.

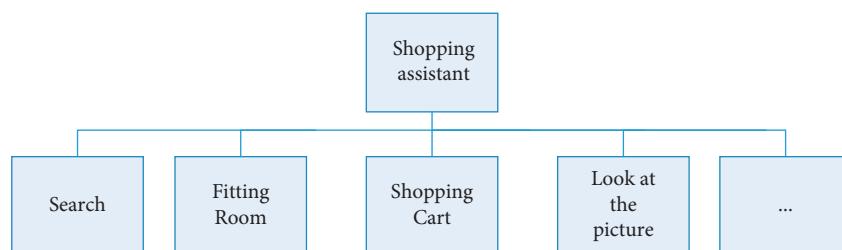


FIGURE 3: Taobao shopping assistant module.

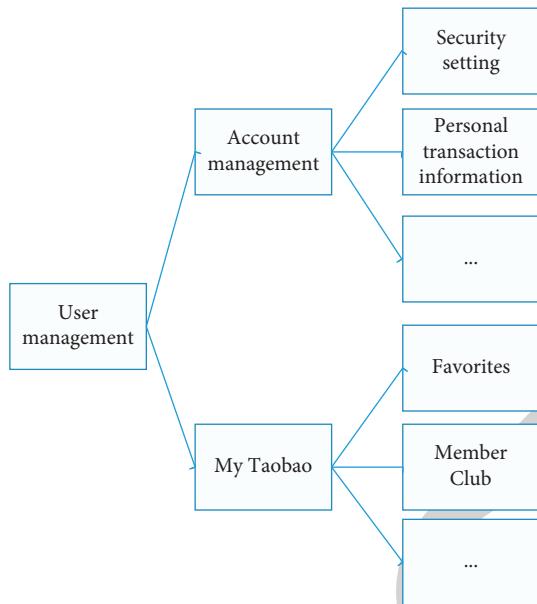


FIGURE 4: Taobao user management module.

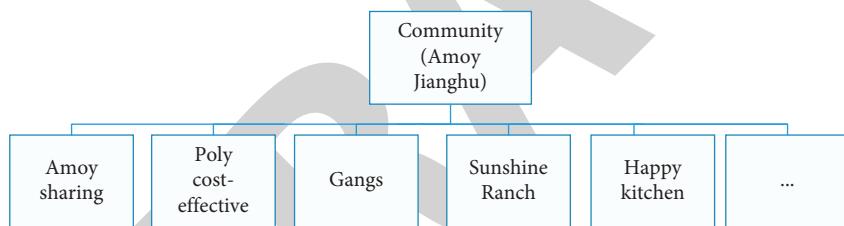


FIGURE 5: Taobao community module.

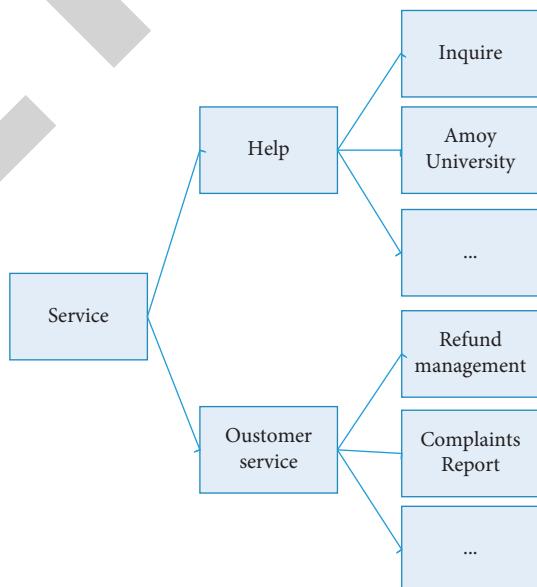


FIGURE 6: Taobao service module.

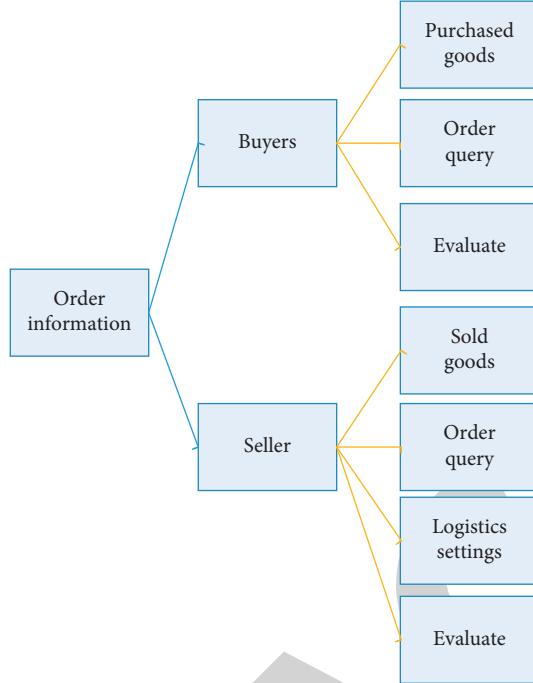


FIGURE 7: Taobao order module.

Jingdong Mall is a representative of B2C websites, which means that Jingdong Mall is acting as a seller and all users are buyers. Its structure is simple compared to Taobao, providing the basic modules to achieve online shopping, including product display, user management, community, services, order management, and payment, as shown in Figure 8.

The product display part is similar to Taobao Mall of Taobao.com and Jingdong Mall unified management, and the catalog classification method is also similar.

The user management module is similar to Taobao's, realizing basic personal information management: password modification, personal data, points, coupons, etc.; personal application management: messages, favorites, and address management; transaction management: order center, transaction records, evaluation, etc.; and service center: consultation, refund requests, complaints, etc. This is the connection implementation of the service module in the user management.

The community module here is mainly a forum of various topics, classified according to goods, allowing buyers to post and exchange.

The payment of Jingdong Mall is realized with the help of Alipay, CUP's platform, post office remittance, and also provides cash on delivery service.

For the management of orders, since Jingdong Mall adopts self-built logistics for goods delivery, the order information realized users to inquire, modify, and evaluate the goods.

Through the analysis of these two websites, we can see that as different forms of e-commerce websites have some common structures, and both include product display module, user management, order processing, payment

module, and user exchange community module. In the next section, we will analyze the data composition from these modules, respectively.

#### 4. Detailed Design of e-Commerce Data Management Model

In this section, we will present a detailed data management model in terms of technical implementation.

**4.1. Model Framework Description.** The model proposed in this section uses a multilevel structure, using front-end page cache Squid, multiple web servers, page fragment cache, hardtop storage system, data interface layer (DAL), Memcached distributed cache, and a split-bank strategy; to achieve this framework, we divide it roughly into four layers, as shown in Figure 9.

This e-commerce data management model solves several problems proposed in Section 3, corresponding to the following: first, for an e-commerce website, the pv value will be as high as millions, with Jingdong Mall and Taobao.com exceeding six million, and we also need to build a front-end proxy server through Squid and ESI cache some fragments to achieve a high responsiveness of user access, where ESI can store the duplicate parts of different pages of the same module proposed in the problem analysis.

For large number of users and other structured data, we first need a master-slave distributed database to store these structured data.

When users access these data, in order to get better user experience and efficient system response, the distributed cache Memcached is used on top of the database system to improve the system response.

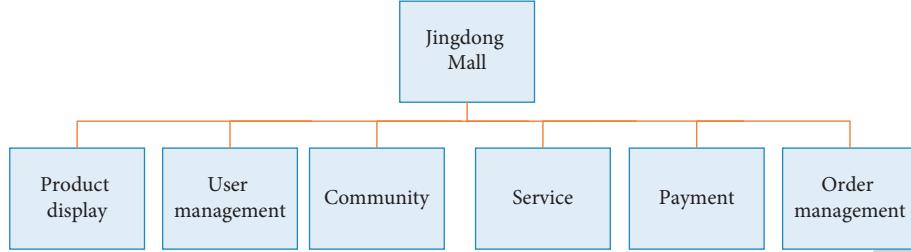


FIGURE 8: Taobao order module.

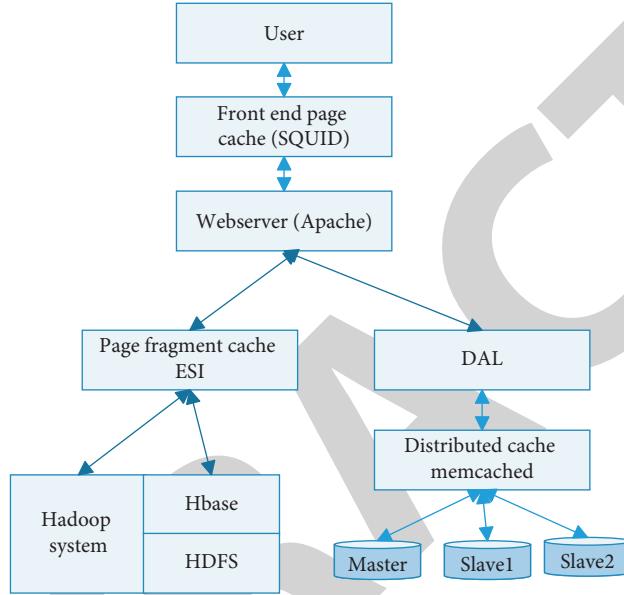


FIGURE 9: e-Commerce data management model.

The model stores differently structured data such as user data, order data, and comments; in this database, so a functional division of the database is required, so we need a unified data interface layer DAL.

Then, for the problem of massive unstructured data such as web data and images, we have to use the current cloud computing implementation technology Hadoop system to solve the problem, which includes a distributed database and distributed file system in this part. Since the Hadoop system itself is an open-source implementation of Google's own application system, it is very effective for large files such as massive data and indexes. For efficient processing of small files such as images, a modification to the Hadoop system is required.

Finally, since our whole system can be seen as a distributed system, different numbers of servers can be set up accordingly depending on the locality of users, and one of the characteristics of cloud computing technology is good scalability, which can also be well satisfied.

**4.2. Front-End Page Caching.** Our e-commerce data management model must satisfy the need to handle large amounts of data and fast response, which dictates that we must use various caching technologies, and user requests,

the first to arrive is the front-end page cache. In this model framework, we use Squid technology to implement.

Many large portals such as Sina now use Squid reverse proxy technology to speed up access to their websites, which distributes different URL requests to different WEB servers in the background, while Internet users can only see the address of the reverse proxy server, enhancing the security of access to the website.

A reverse proxy server, also known as a web acceleration server, is located in the front-end of the web server and acts as a content cache for the web server. The reverse proxy server is set up for the WEB server, and the back-end WEB server is transparent to the Internet users, who can only see the address of the reverse proxy server and are not aware of how the back-end WEB server is organized [13].

Also considering the load balancing of the website, we use DNS polling technology with the implementation of the structure, as shown in Figure 10.

**4.3. Distributed Caching.** Although we have built a page caching system using Squid and ESI, for a large e-commerce website, a good distributed caching system is essential for the efficient operation of the back-end database. We choose the open-source Memcached as our distributed caching system here.

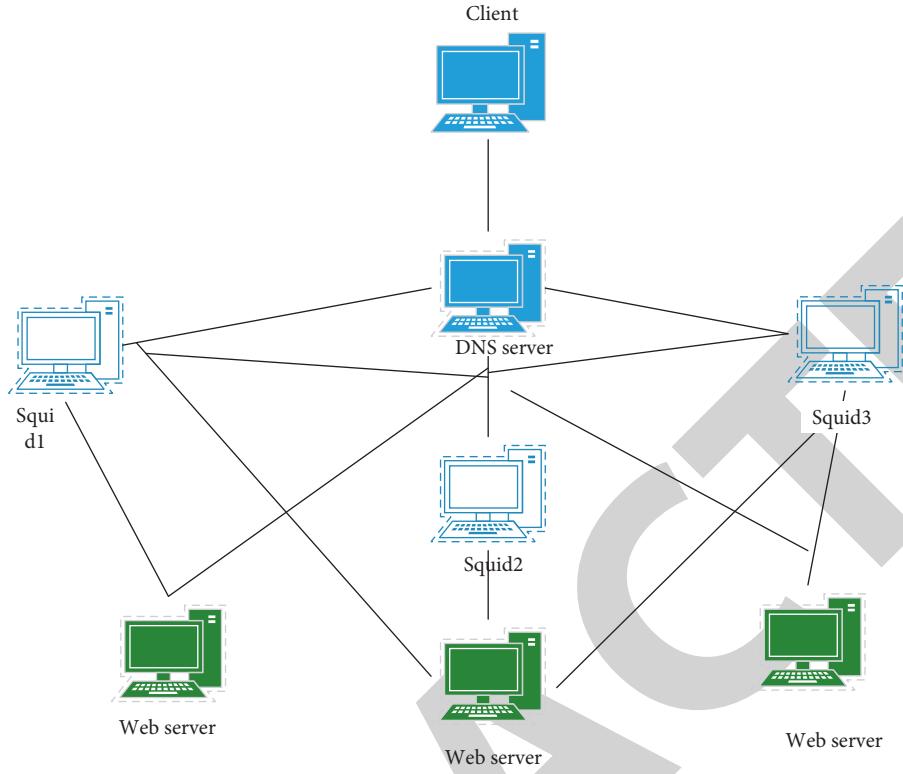


FIGURE 10: Load balancing.

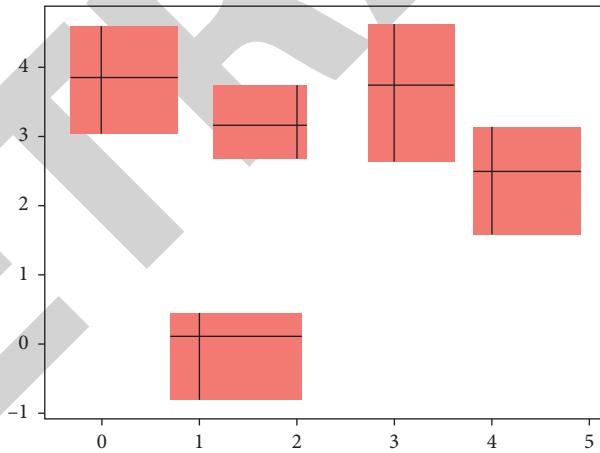


FIGURE 11: User key value for database partitioning.

We have introduced Memcached, a high-performance in-memory distributed caching system that uses key/value values and does hash map algorithms to determine storage locations. Many large companies in the industry are currently using it to build their own systems. It has proven to be very reliable and easy to use. Memcached distributed cache is an auxiliary device for databases.

According to the result of the algorithm, it comes up with the server node where it should be stored and then looks up on that server to get the data.

Memcached is divided into server side and client side, and in our model, the client side is the Apache server side.

On the server side, run

```
# ./memcached -d -m 2048 -l 10.0.0.40 -p 11211
```

This will start a process that takes up 2G of memory and opens port 11211 for receiving requests. Since 32-bit systems can only handle 4G memory addressing, a 32-bit server with more than 4G memory using PAE can run 2-3 processes and listen on different port.

**4.3.1. Memcached-Client Side.** After including a class for describing the client on the application server side, it is very simple to use it directly.

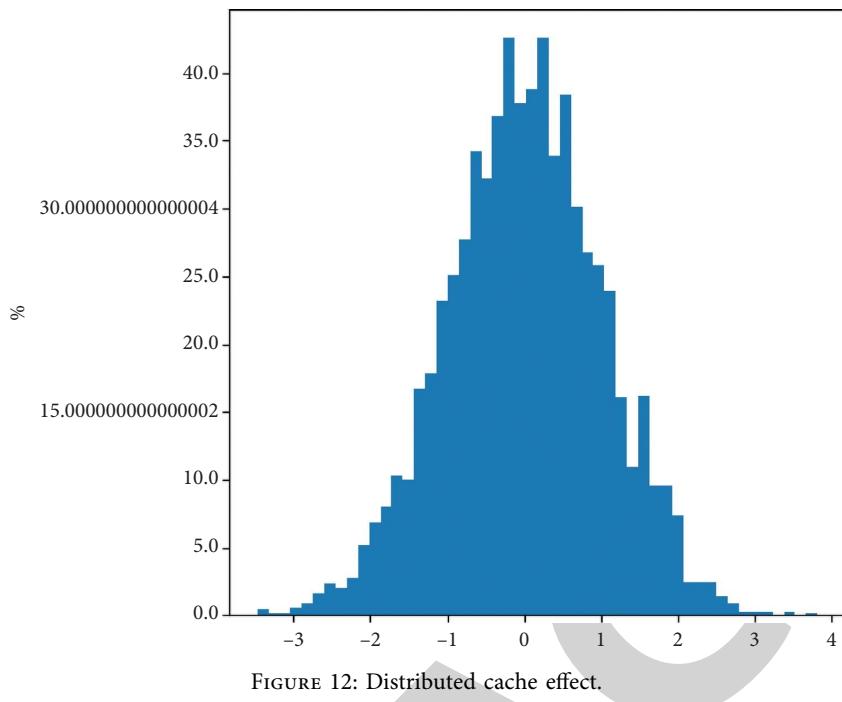


FIGURE 12: Distributed cache effect.

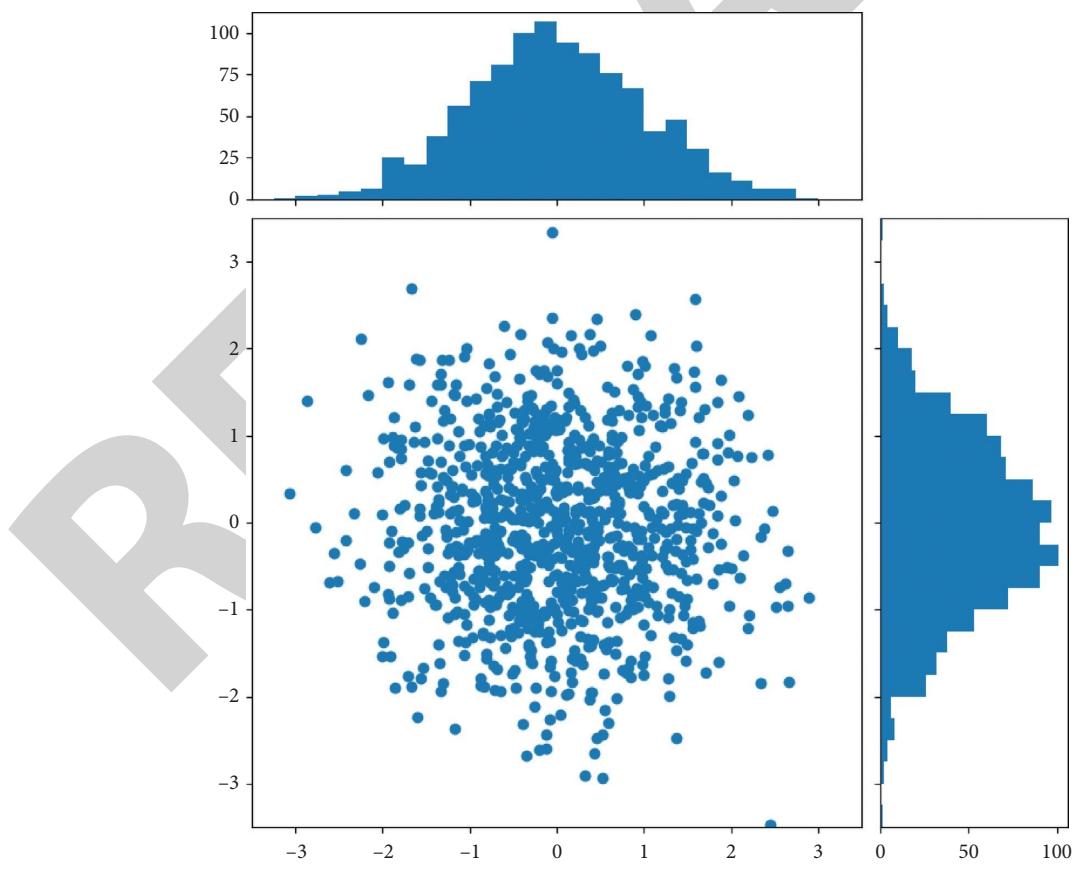


FIGURE 13: e-Commerce website data distribution.

## 5. Experiment

*5.1. DAL and Sub-Banking Strategy.* In our modeling framework, the e-commerce website structured data stored in a database are set. Structured data include user information, order data, and information generated in the community such as short messages posted by users and comments on other users.

It is not practical to store all these different information in the same database. Jingdong Mall has 10 million users, let alone Taobao. In order to provide an efficient database implementation, it is necessary to adopt a split-database strategy to achieve. That is, the database should be divided according to different applications and user key values and then use database server clusters to achieve this, as shown in Figure 11. In Figure 11, the *X* and *Y* axes, respectively, represent the distance (in meters), so each Red Square in Figure 11 represents the coordinates of Taobao's sales module.

As shown in Figure 12, the *x*-axis is the distance and the *y*-axis is the length of the position. *s* are a high-performance KV databases and offer APIs in multiple languages. Redis also have obvious drawbacks, with weak handling of transactions and the inability to do too complex models in relational databases.

Redis supports storing a relatively larger number of Value types, typically String, List of chained tables, Set of sets, Zset of ordered sets (sorted set), and Hash of hash types, all of which support push and pop, add and remove, as well as more complex operations such as taking intersection, concatenation, and difference sets. Since these operations are all atomic, on top of that Redis supports various different ways of sorting.

As shown in Figure 13, since we have to consider different geographical distributions of users in the e-commerce website, we adopt a strategy for splitting the database according to the user ID and the application coordination. The *x* and *y* axes in Figure 13 represent the physical spatial distance. After adopting these strategies, we have to face a problem that different databases, with different application interfaces, exist. Therefore, we adopt the data access layer (DAL) to encapsulate all the operations of adding, deleting, and reading to the database and provide a unified interface to the upper web server. Therefore, the emergence of Redis largely makes up for the shortcomings of KV storage like Memcached and can be a good complement to relational databases in some cases.

## 6. Conclusions

Description of the e-business data management model is presented. Network information is organized into three layers, according to which the different types of data in e-commerce are classified, constituting a logical model of e-commerce, and this model is also a description of the hierarchy of categorization of structured, sized documents. In this paper, we start from analyzing the current e-commerce representatives Taobao.com and Jingdong Mall to find out the data characteristics of these two enterprises, analyze the data problems, and find the aspects that can be

improved. Using this open-source cloud computing implementation solution, the storage problem of large files and unstructured small files in the e-commerce system is solved. We share the burden of the main server of the original Hadoop system by adding a real master server and modify the file format to improve the efficiency of reading small files.

## Data Availability

The dataset used in this paper is available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest regarding this work.

## References

- [1] M. R. Samal, A. K. Pandey, D. K. Ojha, and N. Panwar, "Star formation and young population of the HII complex sh2-294," *Physics*, vol. 755, no. 1, pp. 516–525, 2012.
- [2] L. Y. Zhu, "Design and implementation of unified interface platform for electronic operation & maintenance system based on SOA," *Computer and Modernization*, vol. 1, no. 6, pp. 165–173, 2011.
- [3] T. Xie, C. Zhang, Z. Zhang, and K. Yang, "Utilizing active sensor nodes in smart environments for optimal communication coverage," *IEEE Access*, vol. 7, Article ID 11338, 2018.
- [4] F. Aulkemeier, M.-E. Iacob, and J. van Hillegersberg, "Platform-based collaboration in digital ecosystems," *Electronic Markets*, vol. 29, no. 4, pp. 597–608, 2019.
- [5] S. Chaudhary and P. K. Suri, "Ranking the factors influencing e-trading usage in agricultural marketing," *Global Journal of Flexible Systems Management*, vol. 22, no. 3, pp. 233–249, 2021.
- [6] M. Brechtel and S. Altmann, "Digital platforms for inter-firm collaborations-identifying current challenges," in *Proceedings of the ISPIM Conference Proceedings. The International Society for Professional Innovation Management (ISPIM)*, pp. 1–9, Manchester, UK, June, 2021.
- [7] A. Tiwana, B. Konsynski, and A. A. Bush, "Research commentary-platform evolution: coevolution of platform architecture, governance, and environmental dynamics," *Information Systems Research*, vol. 21, no. 4, pp. 675–687, 2010.
- [8] Z. Zhang, C. Zhang, M. Li, and T. Xie, "Target positioning based on particle centroid drift in large-scale WSNs," *IEEE Access*, vol. 8, Article ID 127709, 2020.
- [9] D. H. McKnight, V. Choudhury, and C. Kacmar, "Developing and validating trust measures for e-commerce: an integrative typology," *Information Systems Research*, vol. 13, no. 3, pp. 334–359, 2002.
- [10] C.-M. Chiu, M.-H. Hsu, and E. T. G. Wang, "Understanding knowledge sharing in virtual communities: an integration of social capital and social cognitive theories," *Decision Support Systems*, vol. 42, no. 3, pp. 1872–1888, 2006.
- [11] D. Gefen and D. W. Straub, "Consumer trust in B2C e-Commerce and the importance of social presence: experiments in e-Products and e-Services," *Omega*, vol. 32, no. 6, pp. 407–424, 2004.

- [12] H.-H. Lin and Y.-S. Wang, "An examination of the determinants of customer loyalty in mobile commerce contexts," *Information & Management*, vol. 43, no. 3, pp. 271–282, 2006.
- [13] C. Zhang, T. Xie, K. Yang et al., "Positioning optimisation based on particle quality prediction in wireless sensor networks," *IET Networks*, vol. 8, no. 2, pp. 107–113, 2019.
- [14] C. H. Cao, Y. N. Tang, D. Y. Huang, W. M. Gan, and C. Zhang, "IIBE: an improved identity-based encryption algorithm for WSN security," *Security and Communication Networks*, vol. 2021, Article ID 8527068, 8 pages, 2021.
- [15] H.-F. Lin, "Determinants of successful virtual communities: contributions from system characteristics and social factors," *Information & Management*, vol. 45, no. 8, pp. 522–527, 2008.
- [16] L. P. Robert, A. R. Denis, and Y. T. C. Hung, "Individual swift trust and knowledge-based trust in face-to-face and virtual team members," *Journal of Management Information Systems*, vol. 26, no. 2, pp. 241–279, 2009.
- [17] F. Hawlitschek, B. Notheisen, and T. Teubner, "The limits of trust-free systems: a literature review on blockchain technology and trust in the sharing economy," *Electronic Commerce Research and Applications*, vol. 29, pp. 50–63, 2018.
- [18] S. X. Komiak and I. Benbasat, "Understanding customer trust in agent-mediated electronic commerce, web-mediated electronic commerce, and traditional commerce," *Information Technology and Management*, vol. 5, no. 1, pp. 181–207, 2004.
- [19] M. Nasir, K. Muhammad, L. Lloret, A. K. Sangaiah, and M. Sajjad, "Fog computing enabled cost-effective distributed summarization of surveillance videos for smart cities," *Journal of Parallel and Distributed Computing*, vol. 126, pp. 161–170, 2019.
- [20] D. Wu, C. Zhang, L. Ji, R. Ran, H. Wu, and Y. Xu, "Forest fire recognition based on feature extraction from multi-view images," *Traitement du Signal*, vol. 38, no. 3, pp. 775–783, 2021.
- [21] L. Wang, C. Zhang, Q. Chen et al., "A communication strategy of proactive nodes based on loop theorem in wireless sensor networks," in *Proceedings of the 2018 Ninth International Conference on Intelligent Control and Information Processing (ICICIP)*, pp. 160–167, IEEE, Wanzhou, China, November, 2018.
- [22] H. Li, D. Zeng, L. Chen, Q. Chen, M. Wang, and C. Zhang, "Immune multipath reliable transmission with fault tolerance in wireless sensor networks," in *Proceedings of the International Conference on Bio-Inspired Computing: Theories and Applications*, pp. 513–517, Springer, NewYork, NY, USA, October 2016.
- [23] Y. Liu, S. Chen, and B. Guan, "Layout optimization of oil-gas gathering and transportation system in constrained three-dimensional space," *Chinese Science Bulletin*, vol. 65, no. 9, pp. 834–846, 2020.
- [24] M. Dong, "International comparisons on business model of agriculture e-commerce between India and China," in *Proceedings of the 2016 International Conference on Industrial Economics System and Industrial Security Engineering (IEIS)*, pp. 1–5, IEEE, July, 2016.
- [25] C. Hirt and P. Willmott, "Digital terrain models," *Encyclopedia of Geodesy*, vol. 5, no. 1, pp. 1–6, 2014.
- [26] Y. Liu, S. Chen, B. Guan, and P. Xu, "Layout optimization of large-scale oil-gas gathering system based on combined optimization strategy," *Neurocomputing*, vol. 332, no. 7, pp. 159–183, 2019.
- [27] B. Guan, S. Chen, Y. Liu, and X. Wang, "Wave patterns of (2+1)-dimensional nonlinear Heisenberg ferromagnetic spin chains in the semiclassical limit," *Results in Physics*, vol. 16, Article ID 102834, 2019.
- [28] J. R. Saura, "Using data sciences in digital marketing: framework, methods, and performance metrics," *Journal of Innovation & Knowledge*, vol. 6, no. 2, pp. 92–102, 2021.
- [29] J. Xu, C. Gui, and Q. Han, "Recognition of rust grade and rust ratio of steel structures based on ensembled convolutional neural network," *Computer-Aided Civil and Infrastructure Engineering*, vol. 35, no. 10, pp. 1160–1174, 2020.
- [30] P. Francois, "SaaS and big data solutions in the area of logistics related services," in *Disrupting Logistics*, pp. 137–148, Springer, NewYork, NY, USA, 2021.
- [31] M. Keane and H. Yu, "A digital empire in the making: China's outbound digital platforms," *International Journal of Communication*, vol. 13, pp. 4624–4641, 2019.