Analysis of E-Commerce Management Model in the Context of Cloud Computing

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Abstract: With the rapid development of information technology, cloud computing, as a new generation of information technology, is profoundly changing the operation mode of e-commerce. Based on this, this paper analyzes the definition and characteristics of cloud computing and its positive impact on e-commerce management, revealing how cloud computing provides higher security, flexibility, data processing capacity, and economic benefits for e-commerce. In addition, this paper also discusses the new e-commerce management model based on "supply chain cloud" and "mobile cloud" to provide more theoretical support and practical guidance for the innovative development of enterprises.

Keywords: Cloud computing; E-commerce management; Model analysis

1. Overview of cloud computing

1.1. Definition of cloud computing

Cloud computing is an Internet-based computing method that connects a large number of computing resources through the network to achieve resource sharing and efficient utilization [1]. In the virtual cloud computing system, users can obtain and use computing resources on demand, including servers, storage, databases, networks, etc., thus enjoying powerful computing power, storage space, and various services. Cloud computing not only changes the way information technology (IT) resources are used, but also has a profound impact on the business model of all walks of life. In the e-commerce sector, cloud computing has provided merchants with strong technical support, allowing them to manage their business more flexibly and efficiently, improve user experience, reduce operating costs, and achieve sustainable development [2].

1.2. Features of cloud computing

Cloud computing plays a crucial role in the field of e-commerce, promoting the innovation and development of e-commerce management models, which are mainly characterized by powerful resource pooling, on-demand self-service, extensive network access, fast elastic scalability, and measurable services [3]. Firstly, resource pooling

refs to the abstraction of physical resources into resource pools through virtualization technology to provide users with unified resource management and scheduling. In e-commerce, resource pooling can realize efficient utilization of resources, reduce resource waste, and improve system performance. To further reduce costs, resource pooling can also enable multi-tenant sharing, where different e-commerce platforms can share the same set of infrastructure [4]. Second, on-demand self-service enables users to independently select and configure cloud services according to their own needs, without manual intervention. For e-commerce enterprises, IT resources can be flexibly adjusted according to business needs to quickly respond to business, effectively improving resource utilization and enhancing the competitiveness of enterprises. Third, through the Internet, e-commerce enterprises can provide consistent service experience for global users and expand market coverage. For example, e-commerce platforms can deploy data and applications in multiple data centers around the world through cloud computing technology to achieve low-latency access worldwide and enhance user experience. Fourth, in e-commerce, business demand often shows volatility, especially during promotional activities, when visits may surge. Through elastic scaling technology, e-commerce platforms can automatically adjust resources to respond to different business needs, not only improving the availability of the system but also enhancing the flexibility and adaptability of enterprises. Finally, measurable service means that the cloud service provider can charge according to the amount of resources actually used by the user, so as to realize pay per usage. In this regard, e-commerce enterprises can flexibly select and configure cloud services according to actual needs, carry out cost control and budget management more accurately, and improve the financial transparency and management level of enterprises [5].

2. Positive impacts of cloud computing on e-commerce management mode

2.1. Enhanced security

In the context of cloud computing, by utilizing cloud services, e-commerce enterprises are able to adopt higher levels of data protection measures to ensure the security of customer information and transaction records. Cloud service providers usually provide multi-level security mechanisms, including physical security, network security, data security, and application security, to build a solid defense line and effectively resist various security threats [6].

In terms of physical security, cloud service providers usually choose geographically dispersed data centers to store data, which not only have high standards of physical protection facilities, such as access control systems, video surveillance, etc., but also have perfect disaster recovery plans, which can quickly restore services in extreme situations such as natural disasters to ensure data integrity and availability. At the level of network security, cloud service providers use advanced firewall technology, intrusion detection systems, and encrypted communication protocols to build a tight network protection network, which can effectively prevent unauthorized access and data disclosure [7]. At the same time, cloud service providers also provide DDoS protection services to help enterprises resist large-scale distributed denial of service attacks and ensure business continuity. In terms of data security, cloud service providers use data encryption, access control, data backup, and other means to ensure that data is not illegally obtained or tampered with during transmission and storage. Enterprises can choose appropriate encryption algorithms according to their own needs, such as AES, RSA, etc., to encrypt sensitive information and improve data security. In terms of application security, cloud service providers provide a series of security development tools and frameworks to help enterprises build secure applications. These tools and frameworks not only support functions such as code audit and vulnerability scanning but also help enterprises quickly discover and fix potential security vulnerabilities to improve application security [8].

2.2. Improved flexibility

Cloud computing technology provides dynamic and stretch resource allocation capabilities, based on which e-commerce enterprises can quickly adjust IT resources according to business needs, without complicated hardware procurement and deployment, reducing the initial investment cost of enterprises, improving resource utilization efficiency, and helping e-commerce enterprises to respond more flexibly in the face of market changes [9]. The cloud computing platform supports the pay-as-needed model, and e-commerce enterprises can adjust the amount and type of resources used according to the actual changes in business volume, thus avoiding the waste caused by idle resources in the traditional model. This flexible resource management mode provides e-commerce enterprises with a more efficient and economical operation mode [10]. In addition, through the API interface provided by the cloud platform, e-commerce enterprises can easily integrate these services without developing complex algorithms or maintaining huge data processing systems by themselves, speeding up the online speed of new functions and lowering the technical threshold, so that small and medium-sized enterprises can also enjoy the advantages brought by advanced technologies. In terms of operating across geographies, cloud computing also shows its strong flexibility. E-commerce enterprises can quickly deploy global operations through the cloud platform, and realize global synchronization and access to data. Cloud service providers usually have multiple data centers around the world, and enterprises can select the most suitable geographical location for deployment according to business needs to reduce network latency and improve service quality.

2.3. Superior data processing capabilities

Through distributed computing technology, cloud computing decomposes tasks to multiple computing nodes for parallel processing, which improves the data processing speed. The e-commerce platform can handle a large number of user requests in real time, ensuring the stable operation of websites. For example, when user visits surge during large-scale promotion activities, cloud computing can rapidly expand resources to ensure that the system will not crash due to excessive load, and at the same time, it can quickly respond to users' search, shopping cart addition, payment, and other operations to improve user experience. Additionally, e-commerce companies can store more types of data and choose appropriate storage methods according to actual needs to reduce costs. More importantly, cloud computing platforms usually have automatic backup and recovery functions to ensure the security and reliability of data, and can be quickly restored even in the event of hardware failure or human error, guaranteeing business continuity [11]. In addition, cloud computing integrates advanced data analysis tools and services, such as machine learning and big data analysis, to help e-commerce companies mine valuable information from massive data. By analyzing user behavior data, enterprises can more accurately understand consumers' preferences, make personalized recommendations, and improve conversion rates. By analyzing sales data, it can predict market trends, optimize inventory management, and reduce costs. By analyzing the data of competitors, more effective competitive strategies can be formulated and market competitiveness can be enhanced.

2.4. Better economic benefits

The introduction of cloud computing technology has changed the cost structure of the e-commerce industry. Through cloud computing, enterprises can obtain computing resources on demand. This "pay-as-needed" mode reduces the initial investment cost of enterprises and enables enterprises to flexibly adjust resources according to the changes in business volume, avoiding the waste of resources, and thus achieving remarkable results in

cost control. In addition, cloud computing can also help enterprises reduce operation and maintenance costs. The traditional IT architecture requires enterprises to maintain hardware facilities such as servers by themselves, which not only requires a lot of manpower and material resources but also faces the pressure of technological upgrading. After the adoption of cloud computing, this maintenance work is taken care of by cloud service providers, and enterprises can focus more energy on core business, improving the overall operational efficiency. In terms of improving economic efficiency, cloud computing also provides e-commerce enterprises with powerful data processing capabilities [12]. In the era of big data, data has become an important asset for enterprises. Cloud computing platforms can process massive data, provide decision-making support for enterprises through data analysis and mining, help enterprises grasp market dynamics more accurately, optimize products and services, and improve customer satisfaction, thus enhancing enterprises' market competitiveness.

3. Exploration of e-commerce management mode from the cloud computing perspective

3.1. Whole-process e-commerce model based on "supply chain cloud"

Supply chain cloud refers to connecting all nodes in the supply chain, including suppliers, manufacturers, distributors, retailers, and end consumers, to form a virtual supply chain network through cloud computing technology. In this network, all parties can share information and work together, thereby improving the overall efficiency and response speed of the supply chain and reducing operating costs. This not only realizes the seamless connection of all links of the supply chain but also brings unprecedented flexibility and transparency to supply chain management [13].

The core of the supply chain cloud lies in the sharing and analysis of data. Through the cloud computing platform, enterprises can obtain real-time data of all links of the supply chain, including inventory level, order status, logistics progress, etc. After processing and analysis, it can provide decision support for enterprises, helping them better predict market demand, optimize inventory management, and improve production efficiency. For example, by analyzing historical sales data and market trends, enterprises can accurately predict product demand in the future period of time, so as to adjust production plans in advance and avoid the occurrence of inventory overstocking or out-of-stock. The supply chain cloud can also facilitate collaboration among all participants in the supply chain. Under the traditional model, there is a lag in information transfer in the supply chain, resulting in slow response and low efficiency. However, through the supply chain cloud platform, all parties can achieve instant communication and collaboration and quickly solve problems in the supply chain. For example, when an exception occurs in a certain link, relevant parties can be notified quickly and take measures to deal with it, thereby reducing losses. The whole-process e-commerce model based on the "supply chain cloud" can also bring significant economic benefits to enterprises. By optimizing supply chain management, enterprises can reduce inventory costs, transportation costs, etc., and improve profit margins. Furthermore, the data analysis services provided by the supply chain cloud platform can help enterprises discover new business opportunities and expand the market. For example, by analyzing consumer behavior data, enterprises can understand the changes in consumer demand, so as to develop products or services that are more in line with market demand and enhance market competitiveness.

3.2. Mobile e-commerce model based on "mobile cloud"

By combining the flexibility, scalability, and cost-effectiveness of cloud computing with the convenience,

immediacy, and individuation of the mobile Internet, mobile cloud can provide strong support for mobile e-commerce, optimize the shopping experience of users, and provide enterprises with more efficient management and operation methods [14].

With the support of mobile cloud, users can access the e-commerce platform anytime and anywhere through mobile devices such as smartphones and tablets, and enjoy personalized recommendations, instant messaging, virtual try-ons, and other services. Based on users' browsing history, purchase history, and social network data, the mobile cloud platform can use big data analysis technology to provide users with more accurate product recommendations, which improves users' shopping satisfaction and loyalty. For merchants, through the mobile cloud platform, enterprises can realize in-depth analysis of customer behavior, timely adjustment of market strategies, and improve competitiveness. The flexible computing power of the mobile cloud also enables enterprises to quickly adjust resources according to business needs, reduce operating costs, and improve efficiency [15]. In addition, mobile cloud also supports multi-channel marketing, where companies can interact with consumers through multiple channels such as social media and apps to enhance brand influence. At the technical level, mobile cloud platforms usually adopt a micro-service architecture to ensure high availability and scalability of the system. By breaking up the application into multiple independent services, each of which can be independently deployed, scaled, and managed, the system's flexibility and responsiveness are improved. In terms of security, the mobile cloud platform has taken a variety of measures to safeguard data security and user privacy. For example, encryption technology is used to protect data transmission and strict authentication and access control mechanisms are implemented to prevent unauthorized access. At the same time, the platform conducts regular security audits and vulnerability scans to ensure the security of the system.

4. Conclusion

In a word, cloud computing technology can not only improve the efficiency and security of e-commerce management but also promote the innovation of e-commerce management models and bring greater competitive advantages to enterprises. In the future, with the continuous progress of cloud computing technology and the deepening of applications, the e-commerce management mode will be more intelligent and personalized, bringing more quality service experience to users.

Disclosure statement

The authors declare no conflict of interest.

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