

Comparison Of Cloud Storage in The Field of Personal Data and Big Data

Jiahao Zhou *

School of Electrical Engineering and Automation, Tianjin University of Technology, Tianjin, China

* Corresponding Author Email: 20204157@stu.hebmu.edu.cn

Abstract. Background: With the development of information technology and the popularization of the Internet, a large amount of data has been generated and collected. These data typically have the characteristics of massive, diverse, and high-speed growth, and traditional data storage devices and technologies are no longer able to meet the storage and analysis needs of data. And people need more and more storage space to store personal files, photos, videos, and other data. Traditional personal computer hard drives have limited capacity and cannot meet the growing data demand. The emergence of cloud storage provides more flexible and efficient solutions for big data storage and analysis, as well as larger capacity and more convenient access methods, solving the challenges of personal storage and sharing. Method: Based on comparative analysis, explore the advantages and disadvantages of cloud storage in the fields of personal data storage and sharing, as well as big data storage and analysis. Result: Cloud storage has certain advantages and limitations in the fields of personal storage and sharing, as well as big data storage and analysis. Users need to consider these factors comprehensively based on their own needs and actual situation.

Keywords: Cloud storage; Personal storage and sharing; Big data storage and analysis.

1. Introduction

With the arrival of the digital era and the acceleration of global digital transformation, enterprises and individuals have generated a large amount of electronic data, requiring more storage space to store digital content, such as files, photos, videos, etc [1]. Cloud storage can provide flexible storage solutions to meet growing storage needs. Under traditional data storage methods, data is prone to loss or damage, and storage space is limited. In addition, cloud storage, as a new type of data storage method, can provide high reliability and infinitely expandable storage space, gradually becoming the preferred solution for individuals and enterprises. Conducting research on cloud storage can help further explore better data storage and management solutions, improve the efficiency and security of data usage. At the same time, research on cloud storage can also promote the development of cloud computing and big data technology and promote the process of digital transformation. Studying the advantages and disadvantages of cloud storage in the personal and big data fields can better help individuals and organizations choose storage methods that are suitable for their own needs, and effectively manage and protect data. At the same time, in-depth understanding of the advantages and disadvantages of cloud storage can promote the development and improvement of cloud storage technology.

This article analyzes and compares the advantages and disadvantages of the two in terms of scale and capacity requirements, security and privacy requirements, cost and payment models, data processing and analysis functions through comparative analysis methods, in order to better understand users' needs and make choices.

2. Principle

2.1. Principle of Cloud Storage

Cloud storage is an emerging network-based storage method that extends and develops from the concept of cloud computing. Through software, it can enable multiple storage systems to work together and provide storage services. Cloud storage plays an important role in cloud computing

systems, as the core of cloud computing is the processing and management of a large amount of data [2] It can be said that cloud storage is a cloud computing system that focuses on data processing and management. Using cloud storage, we are no longer limited by the storage space of personal devices. We can store information anytime, anywhere, and view it on any terminal.

Cloud storage utilizes technological principles such as virtualization, distributed storage, data backup and redundancy, data encryption and security, and network transmission optimization to provide reliable, secure, and efficient data storage services [3] This storage method can not only access user data anytime and anywhere, but also reduce maintenance and management costs, improve data availability and scalability.

2.2. Personal Data Storage and Sharing

The application principles of cloud storage in the field of personal data storage and sharing mainly include data decentralized storage, data synchronization and backup, data encryption and permission control, as well as data access and sharing. These principles can improve the reliability, security, and convenience of data, meeting users' needs for personal data storage and sharing. Distributed data storage improves the reliability and access speed of data, while preventing data loss. Data synchronization and backup ensure data security and reliability and provide data recovery and failover capabilities. Data encryption and permission control protect the security and privacy of user data. The data access and sharing function facilitates users to access and share data anytime, anywhere, and supports multi-person collaboration.

Many people use cloud storage services to store and share their photos. For example, users can upload their photos to platforms such as Google Photos, Apple iCloud, or Flickr. These services allow users to access their photos anytime, anywhere from any device and share albums or specific photos with family, friends, or colleagues. iCloud is a cloud storage service provided by Apple. Users can store personal data (such as photos, music, and documents) on iCloud and access and synchronize this data from multiple devices [4] Users can also share photos and files with others. In addition, Box is a company that provides cloud storage and file sharing services. Users can store personal data on Box's servers and share files and folders with others. These are some large cloud storages and sharing service providers, but there are also many other small companies that provide similar services. These cloud storage services provide convenient, secure, and reliable data storage and sharing solutions for both individual and enterprise users.

2.3. Big Data Storage and Analysis

The application principles of cloud storage in the field of big data storage and analysis mainly rely on distributed storage, high-speed network transmission, data security, and powerful analytical computing capabilities to provide efficient, reliable, and secure data storage and analysis services. Cloud storage provides large-scale storage space and highly available storage services, which disperse user data on multiple servers through distributed storage systems, achieving reliable storage and backup of data [5]. Cloud storage can transfer data from local to cloud through the network or download data from cloud to local. Cloud storage typically utilizes high-speed network transmission and data compression algorithms to provide fast and stable data transmission services. Cloud storage is usually used in conjunction with big data processing platforms or analysis tools, providing functions such as data mining and machine learning to help users discover patterns and trends in data.

Financial institutions need to process a large amount of financial data, such as transaction records, market data, customer data, etc. These data can be stored and analyzed through cloud storage and analysis platforms for risk management, transaction decision-making, anti-fraud, and other aspects of analysis. Cloud storage and analysis provide high reliability, scalability, and resilience to meet the growing data needs of the financial sector. In addition, educational institutions can use cloud storage services to store student data, such as exam scores, attendance records, assignments, etc. Then, by combining these data with educational analysis tools such as Tableau, the application of cloud storage services in the field of big data storage and analysis can be demonstrated through case studies on

student performance, learning trends, and course effectiveness. By leveraging the flexibility, scalability, and high performance of cloud storage platforms, organizations and enterprises can better manage and analyze their big data and gain valuable insights and competitive advantages from it. Conduct in-depth analysis in various aspects. This cloud-based storage provides flexibility and scalability in educational data analysis.

3. Comparison

3.1. Comparison Item 1: Scale and Capacity Requirements

Personal data storage and sharing typically involve a relatively small amount of data, requiring relatively small storage capacity and server size. At the same time, individual users can choose appropriate storage space according to their own needs and adjust storage capacity at any time. Secondly, individual users can access and share their data anytime through the network, without the need to carry storage devices. However, the storage space of individual users may be limited by cloud storage service providers, and exceeding the storage quota may require additional fees or data deletion. Relatively speaking, big data storage and analysis typically involve the storage and processing of massive amounts of data, requiring sufficient storage capacity and processing capabilities. And big data platforms can integrate data from multiple sources, obtain more comprehensive information, and support more accurate analysis and decision-making. At the same time, big data storage and analysis can integrate data from multiple sources to obtain more comprehensive information and support more accurate analysis and decision-making. In addition, big data platforms usually adopt distributed computing and parallel processing technologies to support large-scale data processing and analysis and improve computational efficiency. However, the storage and analysis of big data require the use of specific big data processing technologies and algorithms, which require high technical requirements for the platform and require relevant professional knowledge and experience.

3.2. Comparison Item 2: Security and Privacy Requirements

The data stored and shared for personal data is relatively private, and individual users can choose their own data access permissions to protect personal privacy. Secondly, cloud storage service providers typically backup data to ensure its reliability and recoverability. In addition, cloud storage service providers typically use encryption technology to protect user data and provide a certain level of security during transmission and storage. However, the security of personal data in cloud storage is of great concern, and users cannot fully control the security measures of the data, which poses certain privacy risks [6]. For example, individual users storing data on the servers of cloud storage service providers may lose direct control and visibility of the data, increasing the risk of data abuse or leakage [7]. In addition, cloud storage service providers may have security vulnerabilities that can lead to unauthorized access or attacks on user data. In contrast, big data platforms typically have stricter data security and privacy protection measures, which can protect the security of sensitive data [8] Big data platforms usually adopt strict security measures, including data encryption, access control, identity verification, etc., to protect the security and privacy of big data. In addition, big data platforms can use privacy protection technology to desensitize and anonymize sensitive data to protect personal privacy. Big data platforms need to comply with relevant regulations and compliance requirements to ensure the legitimate use and protection of user data. However, in the process of big data processing, personal information and sensitive data may be involved, and special attention needs to be paid to privacy protection issues to avoid data leakage and abuse [9]. In addition, in the process of big data processing and analysis, data from different sources may be integrated together, which may lead to the risk of exposing certain privacy data. And big data platforms may need to share data with specific partners or third parties, leading to risks to data security and privacy.

3.3. Comparison Item 3: Cost and Payment Models

In the field of personal data storage and sharing, individual users have a more flexible payment model and can choose a suitable payment model to pay based on usage [10]. Compared to big data storage and analysis, the cost of personal data storage and sharing is lower because the volume of personal data is relatively small. However, the storage space of individual users may be limited by cloud storage service providers. If the storage quota is exceeded, additional fees may need to be paid or some data may need to be deleted. Additionally, individual users may need to pay additional fees to obtain higher levels of service, capacity, or functionality. In the field of big data storage and analysis, big data platforms typically provide complete solutions, including hardware, software, and technical support, reducing the cost pressure for users to build and maintain their own big data infrastructure. Big data platforms typically adopt elastic computing and storage models, where users can flexibly expand or reduce storage and computing resources based on actual needs, with only on-demand payments [11]. But big data storage and analysis require large-scale data storage, high-performance computing resources, and professional technical support, resulting in higher costs. At the same time, big data projects may require a longer investment time and a large amount of funds, and the benefits that can be obtained at the beginning are often limited, requiring a longer period of time to recover the investment [12]

3.4. Comparison Item 4: Data Processing and Analysis Function

Personal data storage and sharing mainly focus on data storage and sharing, which is more convenient for general file operations and simple data processing functions. Individual users can access and share data through simple operations, which is convenient and convenient. However, the functions of personal data storage and sharing are mainly limited to basic access and sharing, and support for complex data processing and analysis functions is limited. Relatively speaking, big data platforms provide powerful data processing and analysis capabilities, which can process and analyze large-scale and complex data, mining the value and insights in the data. In addition, big data platforms typically provide various advanced functions and algorithm support, such as machine learning, data mining, natural language processing, etc., to help users conduct in-depth data analysis and insights. However, the storage and analysis of big data involve complex technologies and algorithms, which require high technical capabilities and professional knowledge from users [13] The deployment and maintenance of big data platforms are relatively complex and require professional personnel for management and operation.

Table 1. Comparison between personal data and big data

	Personal data	Big data
Scale and capacity requirements	More emphasis on convenient access and sharing	More emphasis on scalability and high performance, requiring large-scale storage capacity and processing power
Security and privacy requirements	Privacy requirements may be more flexible	Higher security and compliance requirements
Cost and payment models	The payment model is usually based on the selection of storage capacity and functionality, and users can choose the appropriate storage plan according to their own needs and budget	Allowing enterprises to flexibly expand according to demand and avoiding the cost of large-scale investment in hardware equipment
Data processing and analysis function	The data processing and analysis functions are usually relatively simple, mainly focused on data storage and sharing.	Usually integrated with other big data processing and analysis platforms, providing convenient data processing and analysis functions

Table 1 shows that cloud storage has certain advantages and limitations in the fields of personal storage and sharing, as well as big data storage and analysis. Users need to consider these factors comprehensively based on their own needs and actual situation.

4. Conclusion

Through research, this article found that in terms of personal storage and sharing, cloud storage has advantages such as high capacity, convenient sharing, and the ability to backup and restore, but there are privacy and security risks; In terms of big data storage and analysis, cloud storage has advantages such as scalability, high-speed processing, and multi-location backup, but it needs to consider cost, data transmission latency, privacy, and compliance issues. In terms of personal storage and sharing, cloud storage provides a large amount of storage space, which can meet the growing data storage needs of individual users; Cloud storage enables individual users to easily share files and data with others without the need for traditional physical transmission media; Cloud storage provides data backup and recovery functions to protect personal data from hardware failures, loss, or damage; However, individual users' data stored on third-party cloud storage service providers' servers may face privacy and security risks. In terms of big data storage and analysis, cloud storage provides the ability to flexibly expand and quickly increase storage capacity to adapt to large amounts of data; Cloud storage combines cloud computing technology to achieve efficient data processing and analysis, accelerating the processing speed of big data; Cloud storage typically provides the ability to back up from multiple locations, ensuring data reliability and disaster tolerance; However, large-scale data storage and analysis require a large amount of storage and computing resources, which may lead to high usage costs, and there may be transmission delays when transferring data from local to cloud storage servers, affecting real-time performance; Big data may involve sensitive information and privacy issues, and it is necessary to consider the security and compliance of the data.

In the future, cloud storage may have more personalized services and stronger data privacy protection capabilities in the personal domain. With the development of artificial intelligence and the Internet of Things, cloud storage will be integrated with technologies such as smart devices and smart homes, providing a more intelligent and convenient personal data management experience. Cloud storage in the field of big data may place greater emphasis on data security and privacy protection. With the increase in data compliance requirements, cloud storage service providers will strengthen data encryption, permission management, and privacy protection measures to meet users' needs for data security. In addition, new technologies and methods may emerge in the future cloud storage field, such as edge computing, blockchain, etc., to further improve the performance and security of cloud storage. The development of cloud storage in the personal and big data fields will continue to drive progress and innovation in the digital era.

References

- [1] Yu Encheng. Application of computer software technology in the era of big data. *Electronic Testing*, 2020 (15): 139-140. DOI: 10.16520/j.cnki.1000-8519.2020.15.057
- [2] Anoop K S, Atul K S. Quantify the behaviour intention of individuals to control SC performance by exploring cloud storage services: An Extended UTAUT2 Approach. *International Journal of Technology and Human Interaction (IJTHI)*, 2022, 18(7).
- [3] Xia Hao. Analysis of data storage technology in cloud computing environment. *Information Systems Engineering*, 2015, (06): 110-112.
- [4] Apple has launched iCloud cloud storage service and announced the price. *Mobile Communications*, 2011, 35(15): 76.
- [5] Deng Wenwen, Sun Chengming, Qin Peiliang. Research on collection methods for cloud storage of massive data. *Modern Electronic Technology*, 2018, 41(14): 10-13. DOI: 10.16652/j.issn.1004-373x.2018.14.003.

-
- [6] Li Yizhi. Research on cloud storage encrypted data retrieval technology. *Information and Computers (Theoretical Edition)*, 2021, 33 (10): 185-187.
- [7] Wang Tao. Research on identity-based cloud storage data integrity audit and privacy protection technology. Guizhou Normal University, 2023. DOI: 10.27048/d.cnki.ggzsu.2023-000558.
- [8] Qiu Xinhong. Exploration of research on cloud computing and cloud storage technology. *Electronic Technology and Software Engineering*, 2015, 31.
- [9] Cao Jie. Research on big data storage security technology in the context of cloud computing. *Information Systems Engineering*, 2020, 51-52.
- [10] Chen Yuxin. Research on the development status and trends of personal cloud storage services. *Fujian Computer*, 2017, 33 (08): 46-47. DOI: 10.16707/j.cnki.fjpc.2017.08.019.
- [11] Liu Yongjun, Wang Sanfeng. Cloud storage technology and application analysis in big data scenarios. *Computer Products and Circulation*, 2018, 10.
- [12] Naidu P Y, Rajalakshmi D, Muthusundari S, et al. Cost efficient tool for cloud storage services. *Materials Today: Proceedings*, 2021.
- [13] Zhang Tianrui. Key technologies of cloud computing and their applications in enterprises. *Technology and Market*, 2016, 23 (07): 188.