

Cloud Computing Applications and Data Security in Overseas Investment

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Abstract: This paper explores the application of cloud computing technology in overseas investment by enterprises and strategies to ensure data security. By analyzing the elastic scalability, global deployment advantages, and intelligent decision-support tools of cloud computing, the study highlights its critical role in multinational operations. Additionally, it addresses data security challenges through solutions such as full lifecycle data encryption, dynamic verification in zero-trust architectures, and distributed deployment in geopolitically sensitive regions. These measures aim to address cross-border data flows, geopolitical risks, and compliance requirements. The proposed strategies not only enhance enterprises' global competitiveness but also provide robust support for the security and continuity of their operations. Research findings indicate that continued innovation in cloud computing will further drive enterprises' digital transformation and promote sustainable development in global markets.

1. Introduction

In recent years, with the acceleration of globalization, overseas investment has become a crucial strategy for enterprises to gain international market share and enhance competitiveness. However, as multinational operations expand, data processing and security assurance have emerged as significant challenges. Cloud computing technology, with its high elasticity, cost-effectiveness, and ease of global deployment, has become a core enabler of cross-border operations. While helping enterprises optimize resource allocation and improve operational flexibility, cloud computing also faces numerous risks, including data breaches, cross-border compliance, and cybersecurity threats.

This study aims to explore the application scenarios and key issues of data security in cloud computing for overseas investment. By analyzing the technological advantages and potential challenges, the research proposes cloud-based data security solutions to help enterprises achieve a balance between security and efficiency in their global operations. The findings provide valuable insights for technological development and policy formulation in the related fields^[1].

2. Advantages of Cloud Computing Technology in Overseas Investment

2.1 Elastic Resource Optimization

Cloud computing technology demonstrates remarkable elastic scalability, offering efficient

solutions for resource optimization in overseas investments. In multinational business environments, enterprises must respond effectively to the uncertainty and volatility of market demands, which traditional IT infrastructures often fail to address promptly. Cloud computing allows on-demand resource allocation, enabling enterprises to dynamically adjust their use of computing, storage, and network resources according to actual needs, thereby significantly reducing operational costs.

For instance, during short-term promotional campaigns in new markets, cloud computing can swiftly scale up server capacity to support surges in user traffic. After the campaign ends, excess resources can be quickly decommissioned, avoiding unnecessary long-term hardware investments. Moreover, the resource pooling feature of cloud computing enhances resource utilization efficiency. Through virtualization technology, multiple users can share the same physical hardware resources without mutual interference. This shared model not only reduces the burden of self-built data centers for enterprises but also minimizes idle hardware, improving economic efficiency in resource utilization^[2].

Enterprises operating globally can further benefit by leveraging the multi-region data centers of cloud service providers. They can dynamically switch the deployment location of computing resources to meet regional market demands in a cost-effective manner. This flexibility is especially crucial in overseas investments, where market scales, user behaviors, and network infrastructures vary significantly across countries. Cloud computing ensures seamless adaptation to these differences, providing robust technical support for global operations.

2.2 Global Network Advantage

In overseas investments, the global network capabilities of cloud computing significantly enhance operational flexibility and reliability. Traditional cross-border business operations often face challenges such as high network latency and poor connection stability. Cloud service providers, through their distributed data center networks, can deliver stable localized services to enterprises on a global scale.

For example, cloud providers like AWS and Azure have deployed hundreds of availability zones across numerous countries and regions. Enterprises can deploy their applications in data centers closest to their customers, effectively reducing network latency and greatly improving user experience. Additionally, the global network of cloud computing helps enterprises better manage geopolitical and regulatory uncertainties. By flexibly reallocating data storage and computing tasks across data centers in different regions, businesses can mitigate risks of service disruption due to policy changes or network blockages in certain areas^[3].

For instance, in regions with strict regulations on cross-border data transmission, cloud computing enables compliant data storage and processing through local nodes, ensuring uninterrupted business operations. This flexibility also minimizes potential losses caused by international relations or policy changes.

Moreover, the global network of cloud computing provides robust disaster recovery capabilities. Through multi-region synchronization and disaster recovery mechanisms, enterprises can achieve effective remote backup of critical data and services. In case of natural disasters or network outages in one region, the system can quickly switch to data centers in other regions, ensuring business continuity. This high availability is critical for enterprises investing overseas, as it directly impacts brand reputation and customer trust.

2.3 Intelligent Support for Data Collaboration

Cloud computing offers unique advantages in data collaboration and intelligent support, enabling efficient information flow and decision-making capabilities for enterprises expanding overseas.

Multinational operations typically involve close collaboration among multiple departments, regions, and even external partners. Cloud computing facilitates this by building unified data-sharing platforms that eliminate information silos and enable seamless real-time data transmission.

For instance, a multinational retail enterprise can leverage a cloud-based ERP system to integrate inventory, sales, and logistics data from various branch offices worldwide in real-time. This consolidated data provides the headquarters with accurate insights for supply chain decision-making.

On the intelligence front, cloud computing, combined with big data and artificial intelligence technologies, offers robust data analysis and forecasting capabilities. By enabling real-time collection and processing of distributed data, cloud platforms can swiftly identify market trends, changes in user behavior, and potential risks. For example, an overseas financial enterprise can utilize cloud-based intelligent analytics tools to monitor global financial market dynamics, providing solid support for investment decisions.

Such intelligent support not only enhances an enterprise's adaptability but also helps capture market opportunities more efficiently, accelerating business growth.

3. Cloud Computing Applications in Overseas Investment

3.1 Compliance Solutions for Cross-Border Data Storage

Cross-border data storage and transmission are critical challenges that enterprises must address in overseas investments. Regulatory policies on data differ significantly across countries, and with the implementation of the European Union's General Data Protection Regulation (GDPR), compliance pressures have increased substantially. Cloud computing offers efficient and flexible solutions to these challenges.

Cloud service providers typically deploy data centers across multiple global regions, allowing enterprises to leverage localized facilities to store sensitive data in specific jurisdictions, thereby meeting the regulatory requirements of target countries. For example, when processing data from EU users, enterprises can store the data in cloud data centers located within the EU, avoiding legal disputes arising from cross-border data transmission.

In addition, cloud computing provides capabilities for tiered data storage, enabling enterprises to apply different storage strategies based on the importance and sensitivity of the data. With efficient access control and data encryption technologies, enterprises can ensure compliance while managing globally distributed data seamlessly. For instance, non-sensitive business data can be stored in cost-effective regions, while sensitive information can be tiered and stored in high-security nodes compliant with local regulations.

This flexible storage architecture not only reduces compliance costs but also improves the efficiency of data management, offering robust technical support for enterprises in their overseas investments.

3.2 Business Continuity in a Distributed Architecture

The distributed architecture of cloud computing provides robust reliability for enterprises conducting business globally. Traditional IT systems typically rely on single data centers or fixed hardware setups, making centralized architectures highly vulnerable to natural disasters, network outages, or hardware failures, which can lead to complete system paralysis. In contrast, cloud computing deploys data and services across multiple data centers worldwide. This allows enterprises to quickly switch to operational nodes when a failure occurs in any specific node, ensuring uninterrupted business continuity during such transitions.

This distributed design excels not only in data redundancy but also in system availability. For instance, a multinational e-commerce enterprise that hosts its website and order management system on a cloud platform can automatically switch to backup nodes in other regions if a specific data center becomes inaccessible due to a natural disaster. This ensures that user experience remains unaffected. Additionally, the load-balancing features of cloud platforms dynamically allocate traffic based on the real-time performance of various nodes, preventing system crashes caused by overloading a single point.

Beyond disaster recovery, the distributed architecture enhances the ability of enterprises to address geopolitical risks effectively. In politically or economically unstable regions, enterprises can designate redundant data centers as primary operational nodes while backing up critical data in more secure regions. Should local policies or economic conditions change, businesses can swiftly switch operational nodes, minimizing the impact of regional disruptions on overall operations.

This flexible and efficient architectural design grants enterprises greater autonomy in global competition while significantly improving their adaptability to diverse market conditions.

3.3 Decision Support with Intelligent Tools

In overseas investments, enterprises often face complex market environments that require swift and accurate decision-making. Cloud computing provides intelligent data analysis and decision-support tools that offer profound insights. Leveraging the powerful computational capabilities and massive data processing technologies of cloud platforms, these tools analyze real-time data from multiple global markets within a short period, offering reliable decision-making foundations for enterprises.

For example, an enterprise can utilize a cloud platform to integrate its global supply chain data, including production plans, inventory levels, and logistics information. By processing this data with big data analysis tools, the company can monitor dynamic changes in its supply chain in real time, enabling scientifically informed optimizations of logistics routes and reductions in inventory costs.

Moreover, these tools can simulate and predict potential market fluctuations, allowing enterprises to assess their potential impacts and prepare contingency plans in advance. This proactive approach helps reduce decision-making risks, enabling businesses to respond more effectively to the challenges of international markets^[4].

4. Cloud Computing Data Security Strategies in Overseas Investment

4.1 Full Lifecycle Data Encryption

In overseas investments, ensuring the integrity and confidentiality of data throughout its entire lifecycle is central to data security. Encryption technology provides comprehensive protection across storage, transmission, and processing. By encrypting data, enterprises can significantly reduce the risk of data breaches. Even in cases of cyberattacks or physical media loss, attackers cannot decrypt encrypted information, ensuring data security.

Cloud computing platforms offer various encryption solutions to protect both static and dynamic data. For example, static data stored on physical drives can be encrypted using Advanced Encryption Standards (AES), restricting accessibility and ensuring robust protection. For dynamic data during transmission, Transport Layer Security (TLS) protocols can encrypt the data, safeguarding against common threats such as man-in-the-middle attacks.

Moreover, enterprises can leverage Key Management Services (KMS) to ensure the secure generation, distribution, and storage of encryption keys, reducing the risk of encryption failure due to key compromise.

Cloud computing also supports advanced technologies like homomorphic encryption and multi-party computation, allowing encrypted data to be processed and analyzed without being decrypted. These groundbreaking technologies are particularly valuable for sensitive data processing in overseas investments. For instance, in financial or healthcare sectors, enterprises can use homomorphic encryption to conduct cross-border data analysis while preserving data privacy and ensuring compliance, thereby achieving innovation in business operations.

4.2 Dynamic Verification in Zero-Trust Architecture

Traditional network security strategies often rely on a perimeter defense model, assuming internal networks are trustworthy while external networks are not. However, as enterprises deepen their overseas investments, globalization and workforce distribution have rendered this model ineffective. Zero-trust architecture provides a new security paradigm: trust no network or user, and require strict verification for every access request. This dynamic verification mechanism offers strong support for data security in cloud computing environments.

In a zero-trust architecture, each data access request is treated as an independent event. The system performs real-time verification based on multiple factors, including user identity, device security, access time, and geographical location. Cloud platforms integrate Identity Access Management (IAM) and Multi-Factor Authentication (MFA) to enable dynamic evaluation and precise authorization of access requests.

For instance, if an employee logs into the enterprise system from abroad, the zero-trust framework dynamically adjusts access permissions based on the device's security level and the user's location, ensuring sensitive data is not accessed indiscriminately.

Zero-trust architecture also emphasizes granular access control. Enterprises can apply the principle of least privilege by assigning access rights based on user roles, task requirements, and data sensitivity. This ensures users can only access the data necessary for their work, preventing exposure to unauthorized information.

Additionally, cloud platforms provide real-time monitoring of all access logs through advanced analytics. If anomalies such as repeated failed login attempts or unusual access to sensitive data are detected, the system triggers alerts or enforces isolation measures immediately. This dynamic verification strategy in a zero-trust architecture effectively mitigates internal threats and external attacks, establishing a solid foundation for enterprise data security.

4.3 Distributed Deployment in Geopolitically Sensitive Regions

Enterprises expanding overseas often face data security risks stemming from geopolitical changes, such as strict regulations on cross-border data transfers or disruptions in data access due to international sanctions. A distributed deployment strategy offers an effective response by dispersing data and computational tasks across data centers in different regions. This approach allows enterprises to flexibly adjust their business architecture to mitigate the risk of operational interruptions caused by geopolitical factors^[5].

One key advantage of distributed deployment is its adaptability to local compliance requirements. Enterprises can choose to store sensitive data in data centers located within target countries to meet data localization regulations. For example, the multi-region deployment model of certain cloud platforms enables enterprises to establish local nodes in specific countries, storing customer data in the region closest to the customer and avoiding legal issues related to cross-border data transfers. Furthermore, distributed deployment can help optimize data access speeds, enhancing user experience.

More importantly, this strategy provides robust disaster recovery capabilities. If a data center in

one region becomes inoperable due to natural disasters or cyberattacks, the system can swiftly switch to another region's data center, ensuring business continuity. For instance, a multinational enterprise with primary data centers in the United States and backup centers in Europe can immediately shift core operations to the European data center if the U.S. system is compromised or interrupted. This ensures uninterrupted operations in the global market.

By adopting a distributed deployment strategy, enterprises can effectively address geopolitical and natural risks while enhancing their competitiveness in international markets.

5. Conclusion

Cloud computing provides robust technical support and data security for enterprises expanding overseas. Through full lifecycle data encryption, enterprises achieve deep protection of data privacy and security. Zero-trust architecture introduces precise access control, addressing the complexities of a globalized business environment. Distributed deployment strategies effectively mitigate geopolitical and compliance risks, ensuring both business continuity and regulatory adherence.

These strategies not only enhance the competitiveness of enterprises in multinational operations but also lay a solid foundation for their global expansion. Looking ahead, continued innovation in cloud computing technology will further optimize overseas investment models, injecting new vitality and momentum into the digital development of global markets.

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