

An Evaluation of Cloud Computing and Its Development Trends: Advantages and Challenges of Adopting Cloud Computing From an Enterprise Perspective

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Abstract— This paper focuses on the utilization of Cloud computer in any business, along with key development trends in this sector. Cloud computing has become the main business tool that can support ongoing technological advancement. From an enterprise perspective cloud computing can have significant advantages such as, reliability and security. There are other advantages such as, the utilization of AI and other tools related to cloud computing that can significantly boost the overall performance of any organization. In order to collect information, require to complete this paper secondary data collection technique has also been used on available quantitative data. Thematic data analysis also helps this paper in order to shed light on the way cloud computing is required in any business.

Keywords – Cloud computing, AI, IT, IoT, ML, Enterprise, benefits of cloud computing, cloud computing is the future, virtualization in cloud computing.

I. INTRODUCTION

Cloud computing has become an increasingly popular technology in recent years, with many enterprises adopting it to improve their operations and lower their costs. This paper aims to provide a comprehensive evaluation of cloud computing, including its current state, its development trends, and its advantages and challenges from an enterprise perspective. The adoption of cloud computing has brought numerous benefits to enterprises, including improved scalability, reliability, and cost-effectiveness. Cloud computing allows companies to easily scale their computing resources up or down as needed, ensuring that they have the necessary resources to meet the demands of their business. It also provides a high level of reliability, as cloud providers typically have redundant systems in place to ensure that their services are always available. Finally, cloud computing can offer cost-savings to enterprises, as they only pay for the resources that they consume and do not have to invest in expensive hardware and maintenance.

However, there are also challenges that enterprises may face when adopting cloud computing. One of the primary concerns is security, as companies must trust their sensitive data to a third-party provider [1]. There is also the risk of vendor lock-in, as companies may become reliant on a particular cloud provider and find it difficult to switch to a different provider if their needs change. Finally, there are regulatory compliance issues to consider, as different industries and countries have their own specific requirements that must be met. This paper examines these advantages and challenges in greater detail and provide recommendations for

enterprises considering adopting cloud computing. This paper also explores the current development trends in cloud computing and how they may impact the future adoption of this technology by enterprises. Through this analysis, this paper can provide a comprehensive overview of the current state of cloud computing and its potential impacts on enterprises.

II. LITERATURE REVIEW

Trends in Cloud Computing

Cloud computing has come a long way since its inception and has become an increasingly popular technology for businesses of all sizes. In recent years, there have been several notable developments in cloud computing that have impacted its adoption and use by companies. One of the major developments in cloud computing has been the proliferation of multi-cloud and hybrid cloud architectures. Many companies are now using a combination of public cloud, private cloud, and on-premises infrastructure, allowing them to choose the best solution for their specific needs and workloads [2]. This approach offers greater flexibility and allows companies to take advantage of the benefits of multiple cloud providers.

Another significant development in cloud computing has been the rise of artificial intelligence (AI) and machine learning (ML) capabilities. Many cloud providers now offer a range of AI and ML services that can be used to improve business operations, such as predictive analytics and natural language processing. These services can help companies make more informed decisions, automate processes, and

improve customer experiences. There has also been a trend towards the edge in cloud computing, with the proliferation of edge computing and the Internet of Things (IoT). Edge computing allows companies to process data closer to the source, reducing latency and improving the efficiency of their operations. The IoT, on the other hand, involves the connectivity of a wide range of devices, including sensors and industrial equipment, which can generate vast amounts of data that must be processed and analyzed. Cloud computing plays a critical role in enabling the edge and the IoT by providing the necessary computing power and storage capacity.



Figure 1: Cloud Computing in IoT
(Source: [3])

In addition to these trends, there have been several other developments in cloud computing, including the rise of containers, serverless computing, and 5G. Containers allow companies to package and deploy applications more efficiently, while serverless computing allows them to pay only for the resources they consume. 5G, on the other hand, is expected to enable a new generation of cloud-based services and applications by providing faster and more reliable connectivity [3]. In conclusion, cloud computing has undergone significant developments in recent years, with the proliferation of multi-cloud and hybrid cloud architectures, the rise of AI and ML capabilities, and the emergence of the edge and the IoT. These trends are expected to continue to shape the future of cloud computing and impact its adoption and use by companies.

Cloud Computer as a Business tool

Cloud computing has become a popular technology for businesses of all sizes, offering a range of benefits that can help companies improve their operations and reduce costs. One of the primary benefits of cloud computing is its ability to provide scalable and reliable computing resources on demand. Instead of investing in expensive hardware and infrastructure, companies can access the computing power they need from a cloud provider, paying only for the resources they consume. Another advantage of cloud computing is its ability to improve collaboration and productivity within an organization. Cloud-based tools such

as Google Workspace and Microsoft 365 allow employees to access and share documents and information from any location, improving communication and collaboration within the company [4]. Cloud computing can also offer cost-savings to businesses. By using cloud-based services, companies can reduce their IT infrastructure and maintenance costs, as the responsibility for these tasks is typically handled by the cloud provider. This can allow businesses to focus on their core competencies and allocate their resources more efficiently.

However, there are also potential challenges that businesses may face when adopting cloud computing. One of the primary concerns is security, as companies must trust their sensitive data to a third-party provider. It is important for businesses to carefully evaluate the security measures and protocols of their chosen cloud provider to ensure that their data is adequately protected. There is also the risk of vendor lock-in, as companies may become reliant on a particular cloud provider and find it difficult to switch to a different provider if their needs change [5]. It is indispensable for businesses to carefully consider their long-term needs and select a cloud provider that can meet their requirements over the long term.

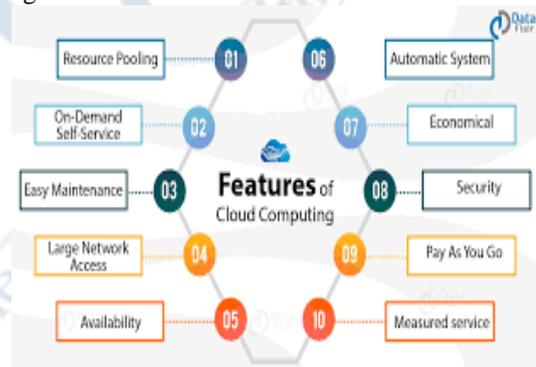


Figure 2: Future in Cloud Computing
(Source: [5])

Finally, there are regulatory compliance issues to consider, as different industries and countries have their own specific requirements that must be met. Businesses must ensure that their cloud provider is compliant with relevant regulations and that their data is stored and processed in a manner that is compliant with these regulations. In summary, cloud computing can offer a range of benefits to businesses, including improved scalability, reliability, and cost-effectiveness [6]. However, it is important for businesses to carefully evaluate their needs and choose a cloud provider that can meet their requirements while also addressing any potential security, vendor lock-in, and regulatory compliance concerns.

III. METHOD

In this paper, secondary methods of collecting qualitative data on the advantages and disadvantages of cloud computing in any business has been utilized. Secondary qualitative data can offer a range of benefits when it comes to evaluating

cloud computing and its development trends, as well as the advantages and challenges of adopting cloud computing from an enterprise perspective. Additionally, by using secondary qualitative data, researchers can save time and resources, as the data has already been collected and is readily available [7]. Combining secondary qualitative data with primary data, researchers can triangulate their findings and increase the validity of their conclusions. Using secondary qualitative data can allow building on the work of others and contribute to the existing body of knowledge on a topic.

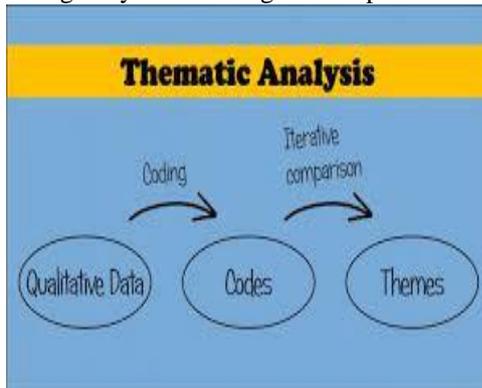


Figure 3: Aspects of Thematic Data Analysis (Source: [8])

In this paper, themes are generated on the gathered secondary qualitative data regarding cloud computer and its overall aspects on businesses. Thematic data analysis is a useful approach for evaluating cloud computing and its development trends, as well as the advantages and challenges of adopting cloud computing from an enterprise perspective. Thematic data analysis allows identifying patterns and trends within the data, which can provide insights into the current state of cloud computing and its development trends. Moreover, by organizing data into themes, researchers can easily compare and contrast different aspects of cloud computing, such as the advantages and challenges of adopting it from an enterprise perspective [8]. Thematic data analysis can also help to make sense of the data and provide a clear and interpretable representation of their findings. Additionally, thematic data analysis is a flexible approach that can be applied to a wide range of data types, including text, audio, and video. This allows to analyze a variety of sources and gain a more comprehensive understanding of the topic at hand.

IV. DISCUSSION AND ANALYSIS

Cloud Computing Provide Advantages to Businesses

Cloud computing can provide a range of advantages to businesses, including improved scalability, reliability, and cost-effectiveness. One of the primary benefits of cloud computing is its ability to provide scalable and reliable computing resources on demand. Instead of investing in expensive hardware and infrastructure, companies can access the computing power they need from a cloud provider,

paying only for the resources they consume. This allows businesses to easily scale their operations up or down as required, ensuring that they have the necessary resources to meet the demands of their business. Another advantage of cloud computing is its ability to improve collaboration and productivity within an organization. Cloud-based tools such as Google Workspace and Microsoft 365 allow employees to access and share documents and information from any location, improving communication and collaboration within the company [9]. This can help businesses to be more agile and responsive to changing business conditions. Cloud computing can also offer cost-savings to businesses. By using cloud-based services, companies can reduce their IT infrastructure and maintenance costs, as the responsibility for these tasks is typically handled by the cloud provider.



Figure 4: Cloud Computing Use Case (Source: [10])

This can allow businesses to focus on their core competencies and allocate their resources more efficiently. In addition to these benefits, cloud computing can also provide companies with greater flexibility and agility [10]. By using cloud-based services, businesses can quickly and easily add or remove computing resources as needed, allowing them to adapt to changing business conditions. This can be especially useful for companies that experience seasonal fluctuations or sudden increases in demand. Overall, cloud computing can provide a range of advantages to businesses, including improved scalability, reliability, cost-effectiveness, and flexibility. By leveraging these benefits, companies can improve their operations and better compete in today's digital landscape.

Barriers Disrupting Cloud Computing Adoption in the Enterprise

There are several barriers that can disrupt the adoption of cloud computing in the enterprise, including security concerns, vendor lock-in, and regulatory compliance issues. One of the primary barriers to cloud computing adoption in the enterprise is security. Companies are often hesitant to trust their sensitive data to a third-party provider, and there are valid concerns about the security of cloud-based systems. While cloud providers have implemented a range of security

measures to protect their systems and data, companies must carefully evaluate these measures to ensure that their data is adequately protected. Another barrier to cloud computing adoption is vendor lock-in [11]. Once a company becomes reliant on a particular cloud provider, it can be difficult to switch to a different provider if their needs change. This can create a sense of “lock-in” that can be difficult to overcome. To avoid vendor lock-in, companies must carefully evaluate their long-term needs and choose a cloud provider that can meet their requirements over the long term.

Finally, there are regulatory compliance issues to consider, as different industries and countries have their own specific requirements that must be met. Companies must ensure that their cloud provider is compliant with relevant regulations and that their data is stored and processed in a manner that is compliant with these regulations [12]. This can be a complex process, and companies must be prepared to devote the necessary resources to ensure compliance. Overall, these barriers can create challenges for companies considering the adoption of cloud computing. While the benefits of cloud computing can be significant, it is important for companies to carefully evaluate their needs and address any potential security, vendor lock-in, and regulatory compliance concerns before making the switch.

Cloud Computer Enhances the Business Economic Value

Cloud computing can enhance the economic value of businesses in several ways. One of the primary ways in which cloud computing enhances economic value is by reducing costs. By using cloud-based services, businesses can reduce their IT infrastructure and maintenance costs, as the responsibility for these tasks is typically handled by the cloud provider. This can allow businesses to allocate their resources more efficiently and focus on their core competencies. Another way in which cloud computing enhances economic value is by improving productivity. Cloud-based tools such as Google Workspace and Microsoft 365 allow employees to access and share documents and information from any location, improving communication and collaboration within the company [13]. This can help businesses to be more agile and responsive to changing business conditions, increasing their efficiency and competitiveness. Cloud computing can also enhance economic value by providing businesses with greater flexibility and agility.

Moreover, by using cloud-based services, businesses can quickly and easily add or remove computing resources as needed, allowing them to adapt to changing business conditions. This can provide businesses with the ability to take advantage of new opportunities as they arise. Finally, cloud computing can enhance economic value by providing businesses with access to a wider range of tools and services. By using cloud-based services, businesses can easily access a range of specialized tools and services that may not be available on-premises, such as artificial intelligence and machine learning capabilities [14]. This can allow businesses to innovate and differentiate themselves in their market.

Overall, cloud computing can enhance the economic value of businesses by reducing costs, improving productivity, increasing flexibility and agility, and providing access to a wider range of tools and services.

V. CONCLUSION

In conclusion, this research paper has evaluated cloud computing and its development trends, as well as the advantages and challenges of adopting cloud computing from an enterprise perspective. Through the analysis of the gathered secondary data, it has been found that cloud computing can offer a range of benefits to businesses, including improved scalability, reliability, and cost-effectiveness. However, it is important for businesses to carefully evaluate their needs and choose a cloud provider that can meet their requirements while also addressing any potential security, vendor lock-in, and regulatory compliance concerns. It has also been found that there are several barriers that can disrupt the adoption of cloud computing in the enterprise, including security concerns, vendor lock-in, and regulatory compliance issues. To overcome these barriers, it is influential for businesses to carefully consider their needs and implement appropriate strategies to address any potential challenges. In summary, cloud computing can provide a range of benefits to businesses, but it is important for companies to carefully evaluate their needs and consider any potential barriers before making the switch.

REFERENCES

- [1] Abdullah, P.Y., Zeebaree, S.R., Shukur, H.M. and Jacksi, K., 2020. HRM system using cloud computing for Small and Medium Enterprises (SMEs). *Technology Reports of Kansai University*, 62(04), p.04.
- [2] Rashid, A. and Chaturvedi, A., 2019. Cloud computing characteristics and services: a brief review. *International Journal of Computer Sciences and Engineering*, 7(2), pp.421-426.
- [3] Sunyaev, A., 2020. Cloud computing. In *Internet computing* (pp. 195-236). Springer, Cham.
- [4] Gill, S.S., Tuli, S., Xu, M., Singh, I., Singh, K.V., Lindsay, D., Tuli, S., Smirnova, D., Singh, M., Jain, U. and Pervaiz, H., 2019. Transformative effects of IoT, Blockchain and Artificial Intelligence on cloud computing: Evolution, vision, trends and open challenges. *Internet of Things*, 8, p.100118.
- [5] Houssein, E.H., Gad, A.G., Wazery, Y.M. and Suganthan, P.N., 2021. Task scheduling in cloud computing based on meta-heuristics: review, taxonomy, open challenges, and future trends. *Swarm and Evolutionary Computation*, 62, p.100841.
- [6] Ujjwal, K.C., Garg, S., Hilton, J., Aryal, J. and Forbes-Smith, N., 2019. Cloud Computing in natural hazard modeling systems: Current research trends and future directions. *International Journal of Disaster Risk Reduction*, 38, p.101188.
- [7] Houssein, E.H., Gad, A.G., Wazery, Y.M. and Suganthan, P.N., 2021. Task scheduling in cloud computing based on meta-heuristics: review, taxonomy, open challenges, and future trends. *Swarm and Evolutionary Computation*, 62,

- p.100841.
- [8] FG Assis, L.F., Ferreira, K.R., Vinhas, L., Maurano, L., Almeida, C., Carvalho, A., Rodrigues, J., Maciel, A. and Camargo, C., 2019. TerraBrasilis: a spatial data analytics infrastructure for large-scale thematic mapping. *ISPRS International Journal of Geo-Information*, 8(11), p.513.
 - [9] Abdalla, P.A. and Varol, A., 2019, June. Advantages to disadvantages of cloud computing for small-sized business. In *2019 7th International Symposium on Digital Forensics and Security (ISDFS)* (pp. 1-6). IEEE.
 - [10] Battina, D.S., 2020. Devops, A New Approach To Cloud Development & Testing. *International Journal of Emerging Technologies and Innovative Research* (www.jetir.org), ISSN, pp.2349-5162.
 - [11] Shetty, J.P. and Panda, R., 2021. An overview of cloud computing in SMEs. *Journal of Global Entrepreneurship Research*, pp.1-14.
 - [12] Vinoth, S., Vemula, H.L., Haralayya, B., Mamgain, P., Hasan, M.F. and Naved, M., 2022. Application of cloud computing in banking and e-commerce and related security threats. *Materials Today: Proceedings*, 51, pp.2172-2175.
 - [13] Akpan, I.J., Udoh, E.A.P. and Adebisi, B., 2022. Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic. *Journal of Small Business & Entrepreneurship*, 34(2), pp.123-140.
 - [14] Wang, Z., Wang, N., Su, X. and Ge, S., 2020. An empirical study on business analytics affordances enhancing the management of cloud computing data security. *International Journal of Information Management*, 50, pp.387-394.

