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Title: Advantages of Cloud Computing

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1. Abstract:

Internet-based startup companies and small businesses need to have their own servers for operations, which requires maintenance. Maintaining a server can be quite costly for these small companies, as they need both a physical server and a system administrator to manage it. Consequently, they must cover the salary of at least one employee along with the server maintenance costs. For e-commerce companies selling products online, unpredictable daily website traffic adds to the challenge. During holidays, high traffic volumes can even cause server outages. The advent of cloud solutions has proven to be both financially and temporally advantageous, especially for small companies. With cloud services, you only pay for what you use. Moreover, small businesses no longer need to employ someone to manage servers or maintain physical servers, enhancing cost efficiency. Cloud services also offer greater security compared to physical servers, as major technology companies that provide cloud services employ thousands of experts dedicated to ensuring security and reliability. Additionally, there is a significant demand for software engineers with cloud expertise, who tend to earn substantially more than their peers. To address this need, major cloud providers offer free training on their platforms and provide paid certification exams. Additionally, global warming is a pressing issue, and nations are striving to combat it. In this context, cloud solutions offer an environmentally friendly alternative. Large cloud providers share their resources with other companies, allowing multiple businesses to use the same infrastructure, which reduces the overall environmental footprint.

Keywords: Cloud Computing, Cloud Solutions, Physical Servers, Resource Management

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2. Introduction:

Maintaining physical servers can be extremely costly for companies, particularly startups. This is where cloud solutions come up. Customers of cloud services only pay for what they use, which offers numerous benefits to companies. "However, if a company utilizes excessive resources, it may incur significant debt. Therefore, managing resources efficiently is essential. Rawat et al. (2023) stated, “Cloud resource management, which includes resource provisioning, allocation, and monitoring, is a key component of cloud computing” (p. 2). Also, for cloud providers, this model allows them to sell their excess resources, creating a win-win situation. Additionally, sharing resources helps combat climate change, as companies no longer need their own servers, which consume large amounts of electricity. Furthermore, cloud computing has generated new job opportunities, such as cloud engineers and cloud solution architects, contributing positively to the economy.

3. Narratives:

3.1 Reliability and maintainability

Maintaining a server can be time-consuming, and there is always the risk of it going down during peak times like holidays or big sale events due to high traffic volumes. If it takes one or two days to fix, the company could lose millions of dollars and potentially lose customers, which is critical. Using cloud services can mitigate these risks because large technology companies employ hundreds of engineers dedicated to ensuring reliability. This means you can have peace of mind, knowing that your server's stability is in capable hands. Yan et al. (2018) stated, “Cloud computing is critical for the further success of

business and enterprises may need to adopt the technology ahead of their rivals. That it is, security is the key to the success of cloud computing and we should focus more on the security and privacy issues of cloud computing" (p. 119).

3.2 Scalability

When a company relies on physical servers and experiences growth in its user base, it must scale its infrastructure. This often means purchasing additional servers and hiring more system administrators to manage the increased workload. However, not all servers may be fully utilized every day, yet they must be available for high-traffic days like Black Friday, making this a poor investment. In contrast, cloud services offer a pay-as-you-go model and easy scalability. Companies only pay for the resources they use, avoiding the need for extra servers that may remain underutilized. Rangaiyengar (2023) stated, "Traditional applications have a static infrastructure and data and services are scaled manually. Cloud-based applications, being automatic, can scale data independently" (p. 1). This approach not only reduces costs but also simplifies management and ensures the company can handle varying traffic volumes efficiently.

3.3 Security

The security of data is a fundamental priority for businesses, as safeguarding sensitive information is crucial for their operations and reputation. To address these concerns, cloud service providers like Amazon Web Services (AWS), Google Cloud, Microsoft Azure go to great lengths to deliver robust security measures. Phaphoom et al. (2012) stated, "Cloud users have to rely largely on third party or a cloud provider's security provisions. The cloud user, still, appears to perceive the security issues as the main concern prohibiting the adoption of the public clouds" (p. 49). Cloud provider big companies

implement advanced technologies, adhere to strict compliance standards, and provide tools that help companies protect their data from breaches and unauthorized access, ensuring a secure and reliable cloud environment.

3.4 Cost

Maintaining a physical server comes with significant costs. Companies must hire system administrators to manage the servers, which require proper cooling to operate efficiently. This necessitates a dedicated server room equipped with cooling systems, adding to electricity expenses. Furthermore, if the company needs to scale its operations, it must purchase additional servers and upgrade its server room infrastructure, incurring further expenses. Hsu et al. (2014) stated, “After a firm has decided to adopt cloud computing based on its technological, organizational, and environmental benefits, the choice of a pricing mechanism emerges. One of the most distinctive features of cloud computing is its “pay-as-you-go” pricing mechanism. The literature suggests that with this elastic pricing mechanism, compared to a traditional IT/IS pricing mechanism (such as one-time license or monthly plan), a firm will not only eliminate the formidable up-front investment for IT resources but also acquire the ability to quickly scale up and balance an unexpected load surge” (p. 476). In contrast, cloud computing offers a cost-effective alternative with a pay-as-you-go model. Companies are charged based on the actual traffic to their servers and the resources they utilize, allowing for flexible and scalable solutions without the overhead of maintaining physical hardware. Mac an Bhairda and Lynn (2023) stated, “Barriers to entry are relatively low, as start-ups can develop and deliver software applications with minimal financial resources, which has significant financing implications for new firms” (p. 152).

3.5 Economically beneficial and environment friendly

Sharing resources is an environmentally friendly approach, particularly in light of the rapid pace of global climate change over the past decades. Electricity, a key contributor to carbon emissions, is a critical resource that must be used wisely. Companies utilizing cloud services avoid the additional electricity consumption associated with maintaining their own servers. Similarly, cloud providers optimize their infrastructure by sharing resources across multiple users, minimizing waste and reducing unnecessary energy expenses. This shared model promotes sustainability while supporting efficient resource utilization. Nawrocki and Smendowski (2024) stated, “In effect, such optimization has profound financial and business ramifications, and helps achieve the vision of Green Cloud Computing by reducing the consumption of energy” (p. 288).

3.6 Cloud Computing's Impact on the Job Market

Cloud computing generates job opportunities and new economic growth globally, such as roles like cloud solution architect engineer and cloud engineer. Konstantinos et al. (2015) stated, “Consequently, a notable economic advantage of cloud computing is that it promises new development opportunities and job creation, contributing to the boost of economic growth of a state” (p. 211). Additionally, cloud computing knowledge is crucial not only for software engineers but also for technical managers, business managers, and even CEOs. Maresova et al. (2017) stated, “The adoption of cloud computing results in a considerable amount of organizational change that will affect employees” (p. 521). Therefore, acquiring knowledge in cloud computing is crucial for everyone. Earning cloud certifications from cloud providers signifies your expertise and acknowledges the difficulty of achieving such credentials. Ouh and Gan (2023) stated, “Many certification exams

prefer candidates with working experiences on their platform or technology. Applying experiential learning closes this gap" (p. 49). Therefore, Figure 1 illustrates the concept of experiential learning.

4. Conclusion

The cloud solutions are among the best accelerators for companies, especially newly established startups, as they significantly save both time and costs. Additionally, cloud services offer greater reliability and security compared to maintaining an physical server. Furthermore, expertise in cloud technology benefits software engineers by enhancing their earning potential and it benefits climate change as companies share resources efficiently.

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6. Appendix

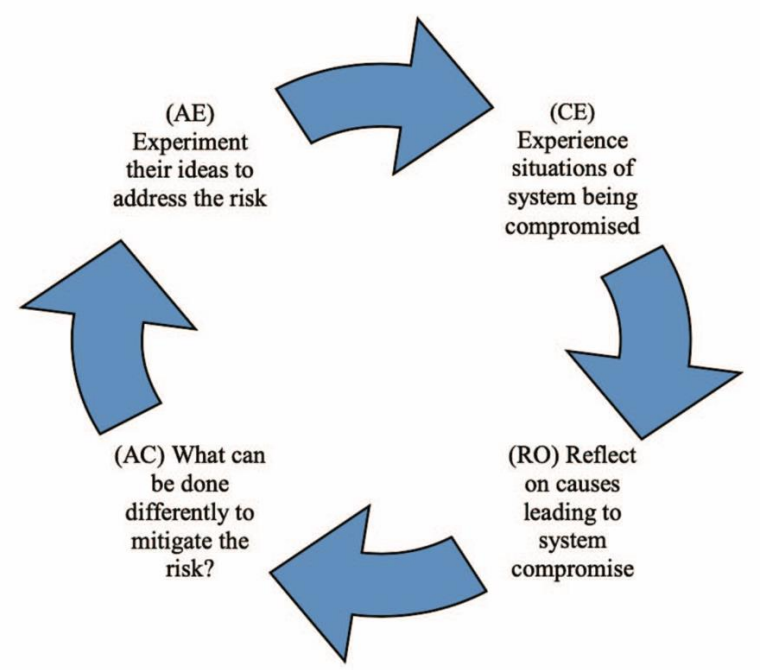

Figure 1- Learning by experiment