available online at: https://alkadhum-col.edu.iq/ijst/index.php/JACEAS

2023, p.p 51-59



Journal of Imam Al Kadhum College for Engineering

and Applied Sciences (JKCEAS)



ADOPTION OF CLOUD COMPUTING AS A BUSINESS SOLUTION FOR SME's

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Received: 25/10/2022

Accepted: 11/12/2022

Abstract

Cloud Computing has evolved over the years in providing platforms for SME's to thrive while accessing technology on a different level and capacity. More businesses are moving into the cloud based on criteria such as insights on big data, sustainability, flexibility and scalability, efficient collaboration, business continuity, disaster recovery, and cost-effectiveness. The structure and logistics behind how the cloud works have been explained in detail. Cloud deployment models include public, private, community, and hybrid cloud. Typical cloud services include Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). Cloud characteristics and features cut across different criteria which eventually combine to form the benefits and challenges. The focus of this paper is on evaluating why cloud computing has become one of the best solutions for SME's worldwide and the need for businesses to begin to consider moving to the cloud. The pandemic has also proven the essence of cloud computing as a business solution for SME's.

Keywords: Cloud Computing, Hardware, Software, Data Security ;

1. Introduction

In recent times, a lot of organizations and firms have been critically considering cutting operational costs, while maximizing profit. To be able to achieve this, SME's need to invest in cutting-edge technologies that give them the leverage and advantage to be able to offer services with the highest level of quality. Security becomes important in consideration of cutting-edge technology to invest in, but in recent times, cutting-edge technologies have become expensive to invest in. To solve the problem of companies, not being able to access cutting-edge technology because of cost, some companies have decided to offer a wide range of services that cutting-edge technology provides. One such is Cloud Computing. By definition as explained by [1], Cloud Computing is a general term that is used to describe anything that is involved in delivering hosted services over the internet. The services can be categorized into three streams: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). It becomes important to understand cloud computing for SME's to fully adopt

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it. In addition, consideration for choosing the cloud, how it works, deployment models and services, its characteristics and features as well as benefits and challenges will all be taken into consideration.

2. WHY CHOOSE THE CLOUD

It becomes important to understand why it stands out for it to be chosen



Cloud Computing 'as a Service' Revenue (\$bn)

At this point, considering reasons why the cloud is a better option becomes necessary. As explained and described by [5], there are six main reasons why SME's are beginning to choose the cloud over the traditional business solution. These includes

2.1 More Insights on Big Data

As we all know that SME's generate huge volumes of both structured and unstructured data daily from their business operations. This is known as big data and past research conducted by Accenture has shown that SME's that are not cloud oriented has a high chance of losing their competitive advantage as compared to those who have fully adopted the cloud as a business solution, [5].

2.2 Sustainability

Deriving valuable insights, especially from big data is important for SME's but requires cost-effective ways of data processing. This is very difficult for most organizations to achieve because of the large amount of space needed to continue to store huge volumes of data. Doing this the traditional ways becomes very expensive, but moving to the cloud, helps organization gains very valuable insights and make data-driven decisions, [12]

2.3 Flexibility and Scalability

This is also considered one of the major benefits of moving to the cloud is its flexibility and scalability. Many organization has been able to manage their bandwidth, most especially by leveraging the cloud in their growth phase. Organizations can easily scale up and down based on their user requirement. It saves SME's from investing

Fig.1 showing Predictions for cloud computing revenues, Source: [8]

heavily in infrastructure that cost a lot. The flexibility of cloud services is demonstrated in the fact that it does not tie an organization down to one physical location. Services can be accessed from anywhere and this was demonstrated especially during the Covid when businesses that were already on the cloud were able to quickly adapt to the new norm much faster and more efficiently as compared to those who were not on the cloud, [5]

2.4 Efficient Collaboration

Cloud services can facilitate efficient work processes due to the fact that the cloud enables collaboration on a very large scale, especially among employees. It allows and enables employees from different departments to access required information simultaneously. It helps organizations to also overcome the issue of geographical location, especially for those organizations that have more than one physical branch. It also allows companies to combine both cloud technology with managed services to be able to efficiently share information, [12]

2.5 Business Continuity and Disaster Recovery

The way the cloud works has changed how organizations store and retrieve data. Because data is stored in the cloud and not in a domestic facility when there is any form of natural disaster, it does not in any way affect business operations in the case where it does, it only takes a shorter time for the business operations to be back to normal. In addition, ransomware has become a huge threat to a business of recent, which is capable of causing severe physical damage. Cloud services backup helps businesses recover quicker. During the pandemic, the cloud has helped a lot of organizations stay operational while they continue their business from any location, [5]

2.6 Simple and Cost Effective

Expanding on-premises infrastructure by SME's can be very expensive because it requires heavy investment in hardware, network, software as well as license. This combined with the cost associated with installation and maintenance becomes overwhelming. Moving to the cloud eliminates that investment, though the cloud also involves initial costs associated with setup, it is nowhere near what would have been required if it were to be on-premises infrastructure. This further helps organizations to achieve economies of scale at a faster rate, [12]

Having been able to understand why choosing the cloud is a better option, it becomes important to understand how the cloud work. This becomes important to be able to utilize the resources it provides to maximize performance.

3. How does cloud computing work

Cloud computing derived its name from how it works, because the information that will be accessed from it, is done remotely in the cloud or what is known as virtual space, [4]. Cloud service providers create an environment that allows users to store files and applications on remote servers and then each time the information is needed, it can be accessed through the internet. This also means the user can be in any location but must be connected to the internet to gain access. Cloud computing takes all data processing away from one's device and moves everything to cyberspace in this case, the internet becomes the cloud, and data, work as well as applications are available from any device.

Now that it becomes clearer how the cloud works, it becomes necessary to evaluate both deployment models and services.

4. Cloud deployment models and services

Previous research has shown consistently that there are four and three deployment models and services respectively. These are explained in depth

4.1 Deployment Models

As explained by [9] and [10]the four deployment models are:

4.1.1 Public Cloud

When it comes to a public cloud, it means it is accessible by the public and can be used by SME's with lowsecurity concerns, this deployment is easy and quick to get done. The provider does networking services, coupled with virtualization and storage. It requires minimal setup and there is no hardware or infrastructure setup and management.



Fig.2. showing public cloud, Source: [9]

4.1.2 Private Cloud

In the case of the private cloud, it is more suitable, especially for organizations that look for cost efficiency as well as more control over data and resources. In a private cloud, it becomes integrated with an organization's data center and managed by the IT team. It can also be hosted externally but in terms of customization, it offers a wide range of opportunities that are able to meet the organization's specific requirements and needs. it also provides a high level of security as compared to a public cloud.



Fig.3 showing private cloud, Source: [9]

4.1.3 Community Cloud

This is similar to the public cloud with one difference, while the public cloud is accessible to everyone, the community cloud is only accessible by a specific set of users that share common objectives as well as cases. This is usually hosted and managed internally or by a third party. It requires investment and comes with a lot of setup benefits



Fig.4 showing community cloud, Source: [9]

4.1.4 Hybrid Cloud

The name literarily suggests how it is deployed, it is a combination of 2 or more cloud architectures that function differently. Both internal and external providers have the ability to offer resources. It is cost-effective, highly secured, and very flexible.

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Fig.5 showing hybrid cloud, Source: [9]

4.2 Cloud Services

The three most common cloud services are IaaS (Infrastructure-as-a-Service), PaaS (Platform-as-a-Service), and SaaS (Software-as-a-Service)

4.2.1 Software as a Service (SaaS)

This is also referred to as cloud-based application or software because both the application or software are hosted on the cloud and users can gain access using their browser, a desktop client, or even an API. Users pay either monthly or annually in form of a subscription. In addition, it offers automatic upgrades as well as data loss protection



Fig.6 showing Software as a Service architecture, source: [2]

4.2.2 Platform as a Service (PaaS)

In the case of PaaS, it provides software developers on-demand platform which integrates hardware, a complete software stack, development tools, and general infrastructure that helps in the development, running, and management of applications. It saves the cost. Cloud provider hosts everything ranging from servers, networks, operating systems, storage, software, and even databases.



Fig.7 showing Platform as a Service architecture, source: [7]

4.2.3 Infrastructure as a Service (IaaS)

This simply provides on-demand access to computing resources such as virtual and physical servers, networking, and storage over the internet. It can also be based on pay as you use it. One of its advantages is that it allows users to shrink and also scale based on their needs which reduces the need for very high upfront capital



Fig.8 showing Infrastructure as a Service architecture, source: [6]

5. Characteristics and features

The characteristics and features of cloud computing cannot be overemphasized. Some of its characteristics include a self-service provision, elasticity, scalable based on payment as one uses, a high level of flexibility in the migration, broad network access, multi-tenancy as well as resource pooling, [1]. Its features are demonstrated in the following areas: Automation and Orchestration, Cost Management, Performance Monitoring, Governance, and Compliance as well as Security. The combination of the characteristics and features makes up the basis for the benefits and challenges

6. Cloud benefits and challenges

There are so many benefits of moving to the cloud that SME's can leverage and take advantage of. These includes

- High speed leading to quick deployment
- Automatic software updates
- Efficiency and cost reduction
- High level of data security
- Scalability
- Collaboration across all levels
- Unlimited storage capacity
- Data backup and restoration
- Disaster recovery
- Mobility
- Prevention of data loss
- Resource control
- Competitive advantage and leverage

In as much as there are so many benefits of moving to the cloud, there are also some challenges that may be encountered in the process of migrating to the web. As explained by [11] and [4. Some of the challenges include

- Security issues
- Management cost and Containment
- Lack of expertise and resources
- Government control and regulations
- Compliance standards
- Multiple cloud management
- Performance
- Migration and Integration

7. Conclusion

In conclusion, cloud technology has been able to provide an alternative to SME's in the way to utilize and access technology. Cloud technology has so many benefits as well as challenges, it has been able to leverage its benefits to create a more flexible environment in which businesses can run businesses smoothly while it limits the effect of its challenges. Cloud technology has become handy, especially in recent times with the effect and impact of Covid. Though the technology keeps improving with more research and development, it has been able to stand the test of time and has become a worldwide solution.

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