The Fifth Generation of Computing

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Abstract

This research paper aims to discuss, investigate and provide an overview of the different uses of cloud computing. This paper starts by discussing the different iterations of computing since 1964, then tackles why cloud computing is the architecture of the future. Furthermore, there will be an investigation of cloud-based architecture along with a focus on the types of organization it takes to run the cloud. The three different architectures that cloud computing provides to both its clients and hosts. Additionally, there will also be an overview of the types of cloud computing environments available along with the different services provided by Amazon, Google, and Microsoft.

Keywords: Big Data, Cloud Computing, Architecture Model, IaaS, PaaS, SaaS, Amazon AWS, Google, Microsoft Azure

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The Fifth Generation of Computing

Since the dawn of the first-generation computing model, which was the introduction of the mainframe computer first made popular in 1964 by IBM, there have been numerous, vastly improved iterations involving computing architectures. These upgrades to how people use computers have not only vastly improved quality of life, but these evolutions have also aided businesses of all sizes to help scale, run more extensive programs, and process more data. Cloud computing has also helped in reducing the cost of equipment. These iterations have taken us from using a mainframe to personal computers, to client-server computing, to the web, and now introducing the fifth iteration, cloud computing.

Cloud computing has revolutionized the way in which people can store and access their data across the internet and even around the globe. Cloud computing aims to bridge the gap of in-house computers processing power and limited storage. Cloud computing also helps advance many different information technology sectors like data mining and simulation processing. The cloud is believed to push these sectors to new heights by offering more cost-effective alternatives to processing data and being able to run process-intensive applications straight from the cloud. Cloud computing has been so successful in the last decade because of its robust features and services, pay-as-you-go package, and ability to access, download, or even upload data from anywhere instantly.

Therefore, this paper aims to discuss and investigate the uses of cloud computing. There will be an investigation of cloud-based architecture along with a focus on the types of organization it takes to run the cloud. This paper will also cover the start of the service, the software, and technologies supported through cloud computing, along with the composition of its user base. Lastly, there will be a brief discussion on the financial background, emphasizing stock capitalization, the revenue stream from the services, and subscriptions.

# The Three Cloud Architectures

Cloud computing has risen to its current heights for many reasons. One of which that makes cloud computing most attractive is its ability to create a unique resource pool (see figure 1). This pool consists of processing power, memory in the form of storage, and network connectivity abilities. This all grants the user of this service the ability to have access to dynamic hardware and software based on their needs. This type of dynamic computing is what drives cloud computing and allows the service providers to use a pay-per-use system.

Cloud computing has three main branches of its clouds that it allows its userbase to choose from. These branches come in the form of public computing, private computing, and hybrid cloud computing (Velásquez et al., 2018). Each different cloud environment presents its pros and cons.

The private cloud is a service the user may select which gives access to only a single customer. This environment loads all the software and hardware resources to a single location and provides single-point access control. The private cloud is a popular option for businesses as it allows for ease of use, security, and complete customization of resource delivery. The private cloud environment is also one of the only environments that allow for protecting confidential files and locks intellectual property securely (Velásquez et al., 2018).

The public cloud is a service by which a third party manages the resource pool and cloud infrastructure. The information is shared across different organizations and has different services to choose from infrastructure (IaaS), platform as a service (PaaS), and software as a service (Saas). Selecting from these services can either incur a monthly charge or is usually wrapped within cloud computing’s pay-per-use model. This branch greatly aids businesses in eliminating unnecessary charges by getting rid of the need to host these types of services from their own centers. The public computing model is chosen by most businesses to scale their existing information technology resources at the blink of an eye while also giving them the ability to scale their existing resources up or down. This can be done by the user purchasing a virtual desktop license which allows the desktop to be located anywhere and moved anywhere instantly (Velásquez et al., 2018).

The last architecture of cloud computing is the hybrid cloud. Hybrid cloud computing meshes the public and private cloud together to make a hybrid. The hybrid cloud combines different cloud computing environments, switching between public and private, and the ability to choose and change which cloud computing environment is best for the businesses structure. Hybrid cloud accomplishes this by initially rendering a company’s data into the private cloud, and then porting some of the files over to the public cloud.

# The Types of Cloud Computing Environments Available

There are numerous advantages of businesses using cloud computing, one of those benefits is in terms of cloud computing’s overall cost. Cloud computing’s financial model is a pay-as-you-go model (Rogers & Cliff, 2012). This allows the users of these services to only pay for what they actually use during their billing cycle rather than charging a fixed monthly fee. This dramatically enhances the advantages of information technology sectors porting their data to the cloud. That is why large companies like Twitter, Linkedin, Google, and much more already use the cloud as their primary storage.

Each cloud service provider has a unique package deal for nearly every business need. The three primary cloud service providers are Amazon AWS, Google GCP Cloud Services, and Microsoft Azure. The type of information a company needs to know is how much their expected direct/indirect infrastructure costs can be. How much storage capacity they will be using, along with a projected storage capacity use for the near future (Rogers & Cliff, 2012). Lastly, one of the aspects of switching a business over to cloud computing would be analyzing the cost to migrate all of their files to the cloud.

Amazon AWS also adheres to the clouds pay-as-you-go model. Amazon AWS allows for its users to have as many upgrades as possible to the server that they would like. For this plan, the user will only pay for as much software, space, and memory they used during their billing cycle. Amazon also promises that the price you pay in at will never increase and states that most of their members enjoy saving approximately half of the price Amazons competitors charge for the same quality service

Google GCP Cloud Service (see figure 3) also has different plans to choose from. Googles GCP also operates on the same standard cloud computing model. Google GCP Cloud Service plans allow their users to start the plan with almost no cost. They allow their customers to use precisely what they need and will only charge them extra when their usage crosses that threshold. Their plans also does not come with any activation or termination fees. One of the most considerable advantages of using Google as a cloud computing provider is the amount their clients save by not having to pay for unwanted scripts and other processes that are running in the background.

Microsoft Azure Cloud Services (see figure 4) is Microsoft’s version of a cloud computing platform. Microsoft grants their clients the ability to maintain server connections anywhere around the globe at the lowest prices. This makes Microsoft Azure one of the best cloud computing providers available. However, Microsoft Azure has plans that come with a three-year contracts which locks in the users. Though this may sound like a caveat, the users can choose which price tier they want to fall into, and they can also pay the amount in advance and enjoy that fixed price for the total length of the contract. Microsoft Azure is one of the best packages for those businesses who already know what their storage requirements will be in the years ahead.

# Conclusion

In this paper, we have discussed how far we’ve come in the development of different iterations of computing since the dawn of the mainframe in 1964. The importance and prominence of cloud computing for the future and how it will revolutionize the way the both businesses and people store their data on the internet. There has been an overview of the different architectures, public, private and hybrid computing, that cloud computing offers, along with an overview of each.

There is a number of advantages to encourage companies to move over to cloud computing environments. Doing so will not only decrease the amount of computing resources required to run a business but also drastically reduce the overall cost of information technology maintenance. Cloud computing offers faster, cheaper, and overall more straightforward services to in-house storage systems. The resources are scalable, dependent on the needs of the client, and the protection against lost data. The evidence is clear that cloud computing is the future of our society’s way in which we will interact with both the internet and data.

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Diagram

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Figure 1 Resource Pool

Graphical user interface, website

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Figure 2 Amazon AWS

Graphical user interface, text, application

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Figure Google GCP Cloud Service

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Figure Microsoft Azure Cloud Service