Design and Development of Cloud Computing and Cloud Economics in I.T. Companies

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Abstract

"Cloud computing" is a term that encompasses the evolution of several aspects related to information technologies, telecommunication networks and advances in microprocessors, the most significant being virtualisation or hardware abstraction. Virtualisation software enables running an application concurrently on several remote machines, and the concurrent sharing of system hardware resources (CPU, RAM, network adapters, etc.) by different applications and operating systems. Thus, by making the hardware independent of the software it runs, it provides ubiquitous, on-demand access to a shared set of configurable computing resources. Economics of Cloud Computing is based on the PAY AS YOU GO method. Users/Customers must have to pay only for their way of usage of the cloud services. It definitely beneficial for the users. So that Cloud is economically very convenient for all. Another side is to eliminate some indirect cost which is generated by assets such as license of software and their support. In cloud, users can use software application on subscription basis without any cost because the property of the software providing service remains to the cloud provider.

Keywords: *Development, Cloud Computing, Cloud Economics, I.T. Companies, Telecommunication Networks, Information Technologies, Virtualisation Software, Hardware Resources.*

1. INTRODUCTION

Cloud Computing is a new paradigm for the provision of computing infrastructure, platform or software as a service. In a modern society basic provided such that everyone can have easy access to them. Cloud computing promises reliable services delivered through new virtualized data centers and it achieves a 21st century vision of computer utilities. Today we have high cost of computing and we need highly specialized labor to keep it running well. Cloud Computing address these needs with on-demand access, elasticity, pay-per-use, connectivity, resource pooling and abstracted infrastructure. For consumers, Cloud Computing is primarily a new business paradigm.

The most active research topic in Cloud Computing is its economic aspect. The main question is whether or not your organization should use Cloud Computing. This depends on a number of factors, e.g. cost/benefit ratio, speed of delivery, used capacity, sensitivity of date, organization's corporate and IT structure. The second problem is pricing of Cloud Computing services. we give overview of existing literature on Cloud Computing economics and propose some new research challenges. The Cloud Computing paradigm based on current lit in creature. Review Cloud Computing economics. In the next section we analyze actual and future research challenges and issues in Cloud Computing economics.

Cloud services and technologies are currently receiving increased attention from the industry mostly due to business-driven promises and expectations. Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing. However, is the migration to the Cloud the most profitable option for every business? Enterprise adoption of cloud computing often requires a significant transformation of existing Information Technology (IT) systems and processes. To justify such a change, a viable business case must be made based on the economics of transformation. This chapter presents a study of the basic parameters for estimating the potential infrastructure and software costs

deriving from building and deploying applications on cloud and on-premise assets. Estimated user demand and desired quality attributes related to an application are also addressed in this chapter as they are aspects of the decision problem that also influence the choice between cloud and in-house solutions.

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2. REVIEW OF LITERATURE

Darko Andročec (2011) Cloud Computing is a new paradigm of computing infrastructure provision which promises to achieve a vision of computer utilities. Cloud Computing is its economic aspect. In this article we give overview of existing literature on Cloud Computing economics (pricing of Cloud services, costs, benefits and risk of Clouds, ROI and cost/benefits models) and propose some new research challenges. Some of the most interesting future topics are a complete cost-benefit analysis methodology development, using simulations to identify tangible cost reduction, sustainability of current prices of Cloud services and system administration cost in a Cloud environment.

Bei Liu (2010) Over the years, with the popularity of the Internet and the development of information technology, a lot of data have appeared social information beyond the range that individuals or systems can accept and use effectively, and the phenomenon of failure is more and more, data mining is particularly important, it is also a hot research direction in the information industry. Cluster analysis is a representative core technology of data mining. However, with the further study of clustering algorithm, it is found that the fuzzy classification problem is not suitable for the past classification methods. Based on the FCM fuzzy clustering algorithm, uses six macroscopic methods As the basis of division, the economic index has obtained very good clustering results and has very strong practical reference value.

Zhangqi Zhong (2014) an agent-based computational economic modeling approach into an input–output analytical framework and proposes diffusion of technological innovation behavior into the simulation models. A large number of heterogeneous firms with macro-regional economic frameworks are included to perform policy simulation scenarios to investigate the impact of diffusing technological innovations on the dynamic changes in the regional economic structures of major global. This study reveals that process innovation may be more conducive to promoting the transfer of resource elements between regions for China, the EU, Japan, India, and Russia. However, for the U.S., product innovation may facilitate upgrading its industrial structure. Furthermore, from 2012 to 2030, for these six economies, the output share of the primary industry will likely decline by varying degrees, while the output share of the tertiary industry will show an uptrend.

Cristina Popîrlan (**2010**) this study offers a general view over Cloud computing in Europe and an evaluation of the probable impact cost-wise and its benefits. We also give a model to analyze the cost and gain based on a vast analysis of specialty literature, data sets and available statistics. The main scope is to evaluate the cloud computing market, including micro and macro-economic analysis as well as the impact it has over the European Union's environment. Various economic sectors are inspected in order to establish the average benefits and costs that involve embracing Cloud computing.

V.V.L.N. Sastry (2009) Cloud Computing, a new prototype of computing infrastructure provision, gives an assurance of fulfilling a dream of optimal utilization of computer utilities for an economical and smooth functioning of businesses. In Cloud Computing, the economic aspect along with cloud offerings is a research topic in itself. This research presents an overview of the economic aspects involved. Cloud architecture brings with it an assurance of a low-cost delivery, speedy implementation, enhanced flexibility and thus has been adopted widely in a very short period of time. Statistics show that there is a possibility of the cloud services market reaching a level of 160 billion dollars by the year 2010. Although cloud computing technology is being widely accepted, the research is still in the beginning stage. This research attempts to bring out the viability of adoption of this technology based on suitability index and uses further, parameters like number of servers, geographical coverage, extent of data to be migrated, size of operations of the companies and the various financial parameters like ROI (Return on Investment), Payback period, NPV (Net Present Value).

Rasha Makhlouf (2008) Looking merely from the neoclassical perspective, cloud computing is price effective. However, according to institutional and transaction cost economics, cloud customers should estimate other costs beyond the price. Such costs may not be known to cloud customers, leading to unmet expectations and implementation challenges. Is to study transaction costs of cloud computing from the customer perspective to make the cloud journey less cloudy, i.e. more informed and well planned. Applies transaction cost theory to cloud computing through a 360-degree industry analysis. Expert interviews with vendor, customer and consultancy sides were conducted to understand costs associated with cloud computing. Findings were validated through a case study.

Girish Tolani (2017) the level of awareness that organizations in India have of the concepts, strengths and benefits of sustainability, green IT and cloud computing. Very few research papers have examined the sustainability, green IT awareness and cloud computing issues in India, and it has become necessary to ascertain just where Indian organizations stand when it comes to these concerns. Before determining whether these organisations are progressing towards sustainability, green IT and cloud computing, it is first necessary to determine whether, and to what extent, they are aware of these concepts. This research is to obtain answers, which hopefully will be a first step in a shift towards sustainability and green IT, via an online survey.

Stamatia Bibi (2014) Cloud services and technologies are currently receiving increased attention from the industry mostly due to business-driven promises and expectations. Significant innovations in virtualization and distributed computing, as well as improved access to high-speed Internet and a weak economy, have accelerated interest in cloud computing. However, is the migration to the Cloud the most profitable option for every business? Enterprise adoption of cloud computing often requires a significant transformation of existing Information Technology (IT) systems and processes. To justify such a change, a viable business case must be made based on the economics of transformation. This chapter presents a study of the basic parameters for estimating the potential infrastructure and software costs deriving from building and deploying applications on cloud and on-premise assets.

A. Klabunde (2016) an agent-based model of endogenously evolving migrant networks is developed to find and estimate the size of determinants of migration and return decisions. Individuals are connected by links, the strength of which declines over time and distance. Methodologically speaking, this chapter combines parameterization using data from the Mexican Migration Project with calibration. It is shown that expected earnings, an idiosyncratic home bias, network ties to other migrants, strength of links to the home country, and age have a significant impact on circular migration patterns over time. The model can reproduce spatial patterns of migration as well as the distribution of the number of trips of migrants. It can also be used for computational experiments and policy analysis.

Isaac Odun-Ayo (2012) Cloud computing is an IT paradigm that has progressed successfully in some organizations and enterprises across the world. Cloud users can leverage on the facilities available on the cloud to develop and deploy applications. Cloud providers also have software that can be utilized for routine services by users already deployed on the cloud. The services provided by the cloud are scalable and available at a cost. On the other hand, most organizations have continued to utilize on-premise infrastructure which some consider cheaper than migrating to the cloud. Migration to the cloud is believed to reduce or even eliminate the capital and operational expenses of an enterprise. This paper examines present trends in the area of cloud economics and provides a guide for future research. The study was executed by means of review of some literature available on cloud economics.

3. CLOUD COMPUTING

The impact of cloud computing on industry and end users would be difficult to overstate: many aspects of everyday life have been transformed by the omnipresence of software that runs on cloud networks. By leveraging cloud computing, startups and businesses are able to optimize costs and increase their offerings without purchasing and managing all the hardware and software. Independent developers are empowered to launch globally-available apps and online services. Researchers can share and analyze data at scales once reserved only for highly-funded projects. And internet users can quickly access software and storage to create, share, and store digital media in quantities that extend far beyond the computing capacity of their personal devices.

Despite the growing presence of cloud computing, its details remain obscure to many. What exactly is the cloud, how does one use it, and what are its benefits for businesses, developers, researchers, government, healthcare practitioners, and students? In this conceptual article, we'll provide a general overview of cloud computing, its history, delivery models, offerings, and risks.

By the end of this article, you should have an understanding of how the cloud can help support business, research, education, and community infrastructure and how to get started using the cloud for your own projects.

Cloud Computing provides us means of accessing the applications as utilities over the Internet. It allows us to create, configure, and customize the applications online.

4.   DEVELOPMENT MODELS IN CLOUD COMPUTING

Since cloud technology provides many benefits to users, these benefits should be classified based on the needs of the users. The cloud deployment model represents the exact category of cloud environment based on proprietorship, size, and access and also describes the nature and purpose of the cloud. Most organizations implement cloud infrastructure to minimize capital expenditure & regulate operating costs.

Today, organizations have plenty of exciting opportunities to reimagine, repurpose and reinvent their businesses with the cloud. The last decade has seen even more businesses rely on it for quicker time to market, better efficiency and scalability. It helps them achieve long-term digital goals as part of their digital strategy.

Though the answer to which cloud model is an ideal fit for a business depends on the computing and business needs of your organization. Choosing the right one from the various types of cloud service deployment models is essential. This would ensure your business is equipped with the performance, scalability, privacy, security, compliance & cost-effectiveness it requires. It is important to learn and explore what different deployment types can offer – around what particular set of problems it can solve.

Read on as we cover the various cloud computing deployment and service models to help discover the best choice for your business.

➢   **What Is a Cloud Deployment Model?**

It works as your virtual computing environment with a choice of deployment model depending on how much data you want to store and who has access to the infrastructure.
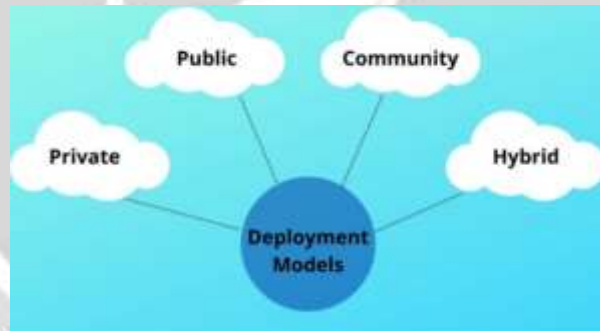

Figure 1- Deployment Model

Deployment Model or the Cloud Deployment Model is a specific reference to the environment where the cloud lies and who controls it. Also, you should decide the type of deployment model prior to engaging the cloud computing system. As mentioned earlier, there are different types of deployment models that serve different requirements. Hence, it is important to justify the model according to your organization.

➢   **Why are there different cloud deployment models?**

You may ask, why do we have all these different cloud deployment models, and which one is good for me? Well, we have these models because cloud computing is very efficient and has become very popular.

At the same time, companies try to use their existing data centers with the same efficiency and features. Some companies can't just move to the public cloud for different reasons. For example, compliance and data protection laws may bar them from using the public cloud. Or they may be reluctant to move to the public cloud simply because they previously spent gobs of money on their own servers, and they want to get use out of them. That's why we have a few cloud deployment models to facilitate all the possible scenarios.

5. MODEL OF CLOUD COMPUTING DEPLOYMENT FOR USE IN IT COMPANIES

The Cloud Computing Business is growing at a remarkable rate as more companies realize the power of the cloud and its unparalleled and terrific potential. The immense growth of Cloud Computing made Businesses shift to the cloud. However, some entrepreneurs remain sceptical of the blooming cloud market is a testament to how quickly cloud has gone mainstream.

Cloud computing are evolving day by day as new startups come up with more innovative and unique use cases. In this fast-paced business world, everyone is trying their best to make a mark. With growing innovation boosted by a breakneck competition in the cloud market, numerous use cases have popped up that help in exploring new horizons making the cloud a much more vast and versatile infrastructure.

Cloud startups continue to attract venture capital funding from the companies and the attention of the top cloud computing platform providers amid a digital transformation march that's expected to push public cloud service revenue from $214.3 billion in 2015 to $331.2 billion by 2017.

However, at a certain point of time, things can go south quickly and quite easily which is why there is immense pressure on these startups to not just come up with extraordinary and unique ideas but to also keep delivering while making smart business decisions. The inevitable future is Cloud Computing and it will be exciting to witness the process of the journey of all these groundbreaking startups.

Cloud computing is a stage in the market that performs administrations like programming, storing data, systems administration, databases, and servers through the web. It has subbed the physical utilization of hard drives and private servers.

Some of the characteristics of cloud computing are Elasticity, Pay per use, Workload resilience, Resource pooling, Flexibility, Disaster recovery, Easy maintenance, On-demand services, Broad network access.
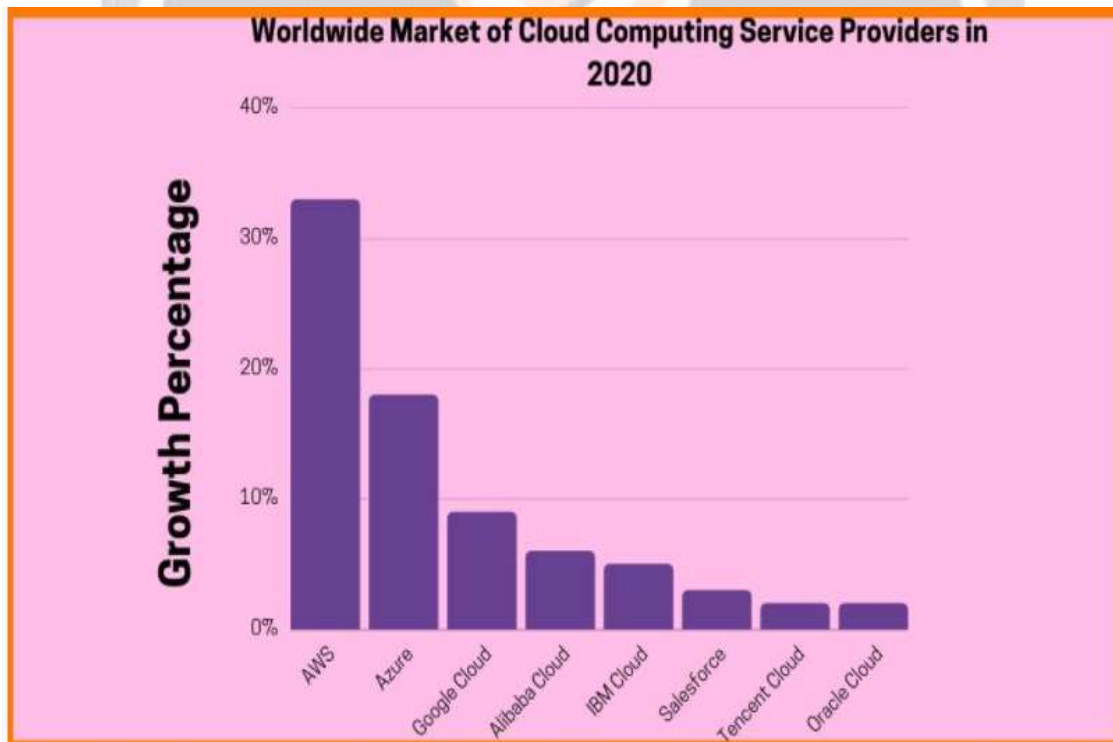
Figure 2 Worldwide Growth of Cloud Computing Service Providers in 2010

There are some of the cloud computing companies and startups in India which are successful including IBM, Amazon, Ctrls, AGC, Microsoft, Cloud Sify.

The global pandemic may have affected many sectors of the economy, but it doesn't seem to have hindered the cloud computing market. According to the latest forecast, the public cloud market will likely grow 6.4% in 2010 to reach $242.7 billion. Software as a service (SaaS) is particularly strong, accounting for $104.7 billion of that total.

In a 2010 Information survey, IT leaders estimated that 42% of their cloud-related budgets are going to SaaS initiatives. According to research, it was found that nearly all enterprises and small businesses are using some form of cloud computing. Around 96% were using public cloud services and 76% use a private cloud.

As cloud computing has become the norm, the trend has given birth to a huge number of startups that rely on the cloud. The cloud-based companies have challenged older, more established firms by finding new ways to do things more efficiently and cost-effectively than ever before. And these exciting new business models have attracted a lot of investment, in many cases in the hundreds of millions of dollars.

❖ **Cloud Computing Startups it companies in India**

In hyper-connected businesses, it is hard to imagine a world immune to cyber-attacks and data breaches. For a modern-day business organization, a robust resourceful IT infrastructure is the need of the hour. To develop the uncompromised infrastructure and maintain it, it involves a huge investment and this is one of the major reasons where businesses lag.

Despite possessing trained and skilled resources. Re-innovating the infrastructure underlying cloud applications has taken immense steps in recent years and is believed to be the next wave of innovation.

In order to meet the growing demands, all organizations need to adapt and scale well. This stage is where the role of a cloud start-up comes into the picture. These start-ups are transforming the business and simplifying enterprise application delivery.

➢ **CSQ Global Solutions**

CSQ Global Solutions, founded in 2013, is a provider of technology-enabled solutions across Cloud such as eLearning, PaaS, SaaS and also offers an array of services in Application Servers, Data Centers, Developing Environments, Analytics, Mobility, Digitalization, Testing also including the Test Environments and SOA based Business Services.

• **Backup Guru**

The Cloud Computing startup called Backupuru provides affordable and secure cloud solutions for businesses and new entrepreneurs.

• **Browser Stack**

BrowserStack is a cloud web and mobile testing platform that enables developers to test their websites and mobile applications across on-demand browsers, operating systems and real-time devices.

- **Inflect**

Infilect is a startup which specializes in deriving intelligence by parsing large-scale visual content using proprietary deep learning and artificial intelligence technology.

- **Right Cloudz**

RightCloudz empowers and enables their cloud customers to make the right vendor choices when buying cloud-based assets and services.

- **CTRLS**

CTRLS, founded in 2007 is a provider of a cost-effective best-in-breed IT Infrastructure Solutions and a host of outsourced business solutions like Private cloud-on-demand, cloud hosting Disaster Recovery on demand and Managed services.

- **Share N Search**

ShareNSearch, founded in 2012, is an interest-based provider on social media platform with categorization that enables users to store contents on cloud and share it with likeminded people while empowering advertisers to reach precise targets.

6. CONCLUSION

The present industry situation is so that companies are reluctant to migrate upon cloud-based services. Several of the causes are: -

- Large scale funding was already created in the IT Services as Servers, Server Rooms, Cooling mechanisms, IT infrastructure (cable connectivity throughout the organization), and Network infrastructure. Thus, the lower management has to persuade the top-level management to do away with such a large-scale investment already completed in the services mentioned previously, and that is very hard.

- A great amount of workforce recognized as Infrastructure assistance or maybe Information Security (IS) staff continues to be used for that purpose. Migration on Cloud would suggest laying off such a large-scale workforce which once again becomes hard to justify.

- Reluctance to adopt modern and new technology in place of the already developed technology.

- Data Consistency problems between old and new methods also present a challenge.

- Data protection becomes an enormous problem as a business hands over critical and sensitive extremely info to a 3rd Party Cloud based service provider. Although there's a service level agreement between the 2 parties, the company is actually apprehensive of vital data being leaked to competitors. Additionally, leaking of secret info as banking particulars can additionally result in great financial losses to the company.

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