Journal of Advances and Scholarly Researches in Allied Education
Vol. 16, Issue No. 6, May-2019, ISSN 2230-7540

Relevance of Cloud Computing and its Significance

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Abstract – Cloud computing is an emerging paradigm of computing in which computing infrastructure resources are provided as internet services. Cloud computing allows consumers and businesses to use applications without installation and to access their personal files on any computer with internet access. As promising as it is, this paradigm also presents many new challenges to data security and access control when users outsource sensitive data to cloud servers that are not within the same trusted domain as data owners. Cryptographic methods are used to keep sensitive user data confidential against unreliable servers by disclosing data decryption keys to authorized users only. This thesis explores the secure and scalable real-time banking system operating model using cloud computing. Cloud computing has the potential for tremendous benefits, but wide-scale adoption has a number of challenges that need to be addressed. These challenges have been reviewed and how they relate to computing. This thesis is therefore capable of achieving a secure and scalable real-time banking system operating model using cloud computing by developing and applying new generated algorithms.

Keywords: Applications, Banking System, Cloud Computing, Scalable Operating Model

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INTRODUCTION

Cloud computing is an embryonic paradigm with changing definitions, but for this research work, we can define a virtual infrastructure that will provide shared information and communication technology services, via the Internet "cloud," for "multiple external users" through the use of the Internet or "large-scale private networks." An analogy with an electrical grid is to be useful for understanding cloud computing. A power company maintains and owns the infrastructure, a distribution company distributes electricity, and consumers merely use resources without ownership or operational responsibilities.

It is a subscription-based service where networked storage space and computer resources are available. One way to think about cloud computing is to consider our experience with email. Let it be Yahoo, our email clients! , Gmail, Hotmail, and so on, are taken care of housing all the hardware and software needed to support our personal email account. If we want to access our email, we need to open our web browser and go to the email client and log in. The most important part of the equation is internet access. Our physical computer does not contain our email address. It is accessed through an internet connection anywhere by us our email can be checked anywhere, whether it's on a trip or down the street for coffee, as long as we have access to the internet.

CHARACTERISTICS FOLLOWING ARE THE MAIN CHARACTERISTICS OF CLOUD COMPUTING

1. Agility:

Agility is improved with users' ability to re-provision technological infrastructure resources

Application programming interface (API):

Accessibility to software enables machines to interact with cloud software in the same way that the user interface facilitates interaction between humans and computers. Normally, the cloud computing system uses REST-based APIs.

1. Cost:

Costs can be reduced and capital expenditure can be converted into operational expenditure in the public cloud delivery model. It is assumed that the barrier to entry is lower, that a person normally provides infrastructure and does not need to purchase one-time or rarely intensive computing tasks. Utility-based pricing is fine-grained with use-

based options and some IT skills are required for (in-house) implementation. The state-of-the-art repository of the e-FISCAL project contains a number of articles exploring cost aspects in detail, most of which result in cost savings depending on the type of activities supported and the type of infrastructure available in-house.

2. Tool and location autonomy:

It enables users to access systems to use a web browser in the malice of their domains or which device will be used (e.g. PC, mobile phone). Infrastructure and access can be made available to a person via the Internet, users can be connected from anywhere.

3. Virtualization:

The technology can be allowed to store the server and the tool can be shared and the use will be increased. Applications will be easily transferred from one server to another server.

4. Security:

Centralization of data improves security, but concerns about the loss of certain data and the lack of security will remain. Security is always good and better than other conventional systems, partly because providers will be able to provide over-the-counter resources to solve security issues that many cannot afford. On the other hand, the complexity of security will be increased when data is disturbed, unrelated users can use a larger number of devices and multi-location systems, and it will be more difficult for users to access security audit logs. Private cloud installations can be part of a user's desire to control communications and stay away from losing control of order security.

LAYOUT OF CLOUD COMPUTING

The layout of cloud computing can be understood in the diagram below, which shows the basic high level of cloud computing, where the provider would create their solution (software, infrastructure, or platform) on the Internet, and one or more users would be able to consume that service on demand. Next is the mode to make it convenient.

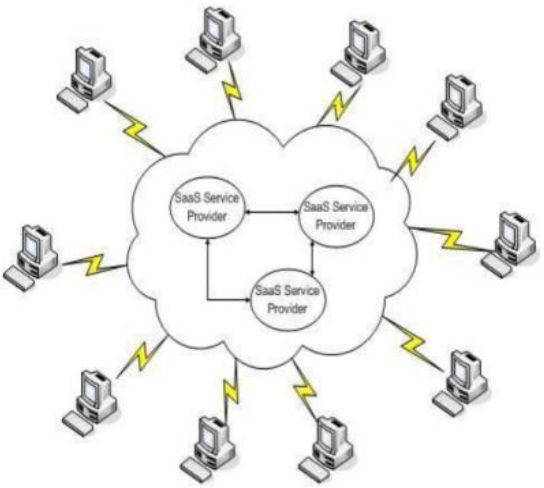

Figure1. Basic High Level layout of Cloud Computing

COMBINATION OF BASIC PLATFORMS

Cloud Computing is a combination of different platforms. The main platforms are as follows:

Software as a Service:

Reference is made to a service delivery model in that the remote component can be used for business services that are accessible through a software interface and are combined to create new business services delivered through flexible networks.

Platform as a Service:

The cloud system can offer an additional level of abstraction: instead of providing a virtualized infrastructure, it provides a software platform where we can run on a system. The size of the hardware resources may be demanded by the execution of the services in a transparent manner. In other words, PaaS is the delivery of a computer platform and a solution stack as a service..

Infrastructure as a Service:

Infrastructure Providers manage a wide range of computing resources, such as storage and processing capacity. Virtualization enables them to divide, assign and dynamically re-size these resources in order to build ad-hoc systems as required by customers. They 're deploying software stacks that run their services.

BENEFITS OF CLOUD COMPUTING:

There are a lot of expectations and possible applications for any new technology, and Cloud promises much more than technological applications. It promises a new paradigm and a new understanding of what IT is all about. In order to be accepted by the market, a list of good drivers

for innovation is needed. All of these drivers represent the sum of characteristics that distinguish cloud computing from other technologies and promote it as a competitive solution in an accelerated business environment. In short, the main benefits of cloud computing are as follows.:

Infrastructure cost reduction:

Owing to the fact that the actual computer resources are supplied by the cloud, the key expense of the technology remains the networking and storage of the network equipment.

Increase speed to market:

Since the infrastructure exists, any investor may start a business far quicker, without thinking about computational requirements.

New business models:

Cloud storage offers innovation and a whole new industry segment, but different business models for both Cloud customers and vendors need to be created.

CLOUD COMPUTING KINDS BASED ON POTENTIAL AND ACCESS:

There are various types of cloud computing based on the potential and ability to access them. In which public cloud is very prominent. There are many types of public cloud computing. Following represent various cloud computing types, which are based on capability and access.

1. Infrastructure as a service (IaaS),
2. Platform as a service (PaaS),
3. Software as a service (SaaS)
4. Storage as a service (STaaS)
5. Security as a service (SECaaS)
6. Data as a service (DaaS)
7. Business process as a service (BPaaS)
8. Test environment as a service (TEaaS)
9. Desktop as a service (DaaS)
10. API as a service (APIaaS)

Software-as-a-Service' (SaaS):

We may label 'Software-as-a-Service' (SaaS) the first form of cloud computing. It focuses on delivering business-specific functionality for consumers. Third-party utilizes the unique features of the organization in the cloud in SaaS. "Google Apps is one example of SaaS providers; web-based office resources such as email, scheduling, and record processing are offered.

- **salesforce.com:** A full customer relationship management application will be provided by it.
- **zoho.com:** Large suite of web-based applications will be provided, mostly for enterprise use.

Infrastructure-as-a-Service (IaaS):

The Infrastructure-as-a-Service (IaaS) would be another form of cloud computing function. The Internet would sustain computing technology. Companies and entrepreneurs would be able on demand to extend their IT technology.

Below are some samples of IaaS providers

- **Amazon Elastic Compute Cloud (EC2):** users with a special effective machine will be provided (AMI) it can organize and run on the EC2 infra-structure
- **Amazon Simple Storage Solution (S3):** users with access to energetically scalable storage resources will be provided
- **GoGrid:** users with access to energetically scalable computing and storage resources will be provided.

TYPE OF CLOUD COMPUTING BASED ON ACCESS RESOURCES

The two types of cloud storage would be focused around who would be allowed to use services which would be classified as public and private. In public clouds a individual may provide a pay-per-use charge for overhauling money, normally over an Internet link. Their use may be measured by the customer and no hardware is needed to access the service. The public cloud offers the messaging and pool services to the consumers. In private clouds, capital is distributed and controlled by the consumer community in a firewall. It is operated by the software and hardware communications group, and the cloud and controls are controlled to its resources. This tools and facilities cannot of course be exchanged outside the association

Implementation of Cloud Computing

Cloud computing is carried out in multiple aspects, with eight cloud infrastructure characteristics as indicators for recognition in cloud computing. Attributes include ease of usage, collaboration,

reliability, reduced transaction rates, accessibility, risk avoidance, scalability, and virtualization..

Cloud Computing and Grid Computing

Cloud computing is often strongly tied to grid computing. As we know, "a grid is a framework that utilizes free, general-protocols to federate distributed infrastructure to offer the best-efficient quality services." Even though there is no obvious distinction with cloud computing, one differentiator is that network computing is directly connected to communications networksabstracts and interfaces are provided by a grid system for connectivity and coordination of common services.

The (ITaaS) is used by in-house IT firms delivering some or more of the above facilities. The customer often leases device tools and libraries utilizing tools as a business. The cloud vendors are responsible for the networks and systems the apps work on. End users access cloud-based apps through a web portal, a lightweight laptop or a smartphone app while company information and user data are held in distant locations on servers.

Proponents say that businesses are enabled to wake up their applications and operate business more easily, with improved efficiency and fewer securities, and encourage Them to change capital more rapidly to satisfy fluctuating and volatile market demand. Online infrastructure depends on services exchange to create coherence and economies of scale close to a power network (such as the grid). The wider idea of converged networks and pooled storage is the cornerstone of cloud computing.

IaaS:

According to online Wikipedia, computing technology (typically a network virtualization environment) is provided as a service as Technology-as-a-Service (IaaS). IaaS leverages massive developments in infrastructure, software and data centers as a commodity to consumers. Like conventional outsourcing, which involves thorough due diligence, agreements and difficult, long contract vehicles, it is based on the distribution model of a business that accounts for a fixed, structured personalized infrastructure. Simplified definitions and à la carte service-level option make it easier to customize a solution to the customer's requirements.

1. IaaS providers handle the installation and deployment of chosen apps on their networks.

2. The client and vendor handles their application(s) for the offloading and storage maintenance of the hosting activities to the IaaS. The implementations held by the vendor usually contain the following components:

3. Hardware for computers (typically built as a grid for huge scalability)

4. Network of computers (including routers, firewalls, load balancing, etc.)

5. Internet connections (often on OC 192 backbones)

6. Virtualization environment for client-specified virtual machines

SaaS:

It's a single program that can be distributed to thousands of consumers for this form of cloud infrastructure from the start to the finish. When we speak of customers, it means that there is no early business in the cloud or software license, with an program maintained, prices are minimal in contrast with routine hosting. Salesforce.com has been the most prominent example of business applications, but SaaS would also be usual for HR and ERP food chains with players such as Workday. And how has the rapid emergence of SaaS "desktop" applications such as Google Apps and Zoho Office predicted?

Utilities computing, which is not recent, but this type of cloud computing would add fresh life to Amazon.com, Sun, IBM and several others by offering now storage and on-demand IT. Early venture adopters will primarily use services in additional storage, but most of the datacenter will be demolished one day. Other vendors will provide applications that will help IT build essential datacenters from commodity servers, such as the 3Tera Software Logic, the Modular Cloud on Demand for Unified Scalable Technology. Liquid Computing Liquid Q provides concurrent features, allowing IT to integrate power, I / O, storage and processing as a virtualized network-based supply chain.

PUBLIC, PRIVATE, COMMUNITY AND HYBRID CLOUD

1. Public Cloud:

Everyone has a shared cloud running over the internet. The cloud company operates and maintains everything from processes and infrastructure to devices. Amazon EC2, Google App Engine and Microsoft Azure are common public clouds. A shared cloud is generated when many organisations have common needs and are trying to share resources and equipment. It may also be socially appealing, as the store of services, workstations which are needed and exchanged in the group are also used.

2. Private Cloud:

A private cloud is available only to trusted users of an organization or group. Everything in a private cloud can be managed either by the organization or the cloud provider. iCylanAPP enables we to remote access the sensitive applications of enterprises by Smartphone's or tablet device anywhere and anytime. The cloud-based resources are delivered to one platform, which providing high performance, security, and user experience. We can access the desktop, run applications, change settings, and access data exactly as we are sitting in front of the local PC, using its keyboard and mouse. iCylanAPP has three versions, such as Standard Edition, Advanced Edition, Enterprise Edition, which providing proven security of different class. It can connect to any Windows applications running aiCylanAPP Client on smartphones or tablets devices. Nowadays, it supports the current systems, such as google, Android, Mac iOS, windows Phone 7 or BlackBerry.

3. Community Cloud:

The participants of a broader network comprising multiple organisations or associations are open to a shared platform and are assisted by affiliate organisations and the service-provider..

4. Hybrid Cloud:

A hybrid cloud is a mixture of both public and private databases, solving the complexities of a single private or public cloud system..

CLOUD COMPUTING IN REAL TIME BANKING SYSTEM

Real-time banking is the concept used in contemporary days. Finance utilizing These software is referred to as real-time finance. In real time , consumer service will be enhanced, back office productivity improvements and technical capability rises as actual expertise is premium. Real-time financial applications are utilized in the real-time finance sector. A real time device is used where the operation of a machine or the movement of a data has been subject to a fixed time constraint. It is most sometimes used in a particular program as a control unit. Sensors carry machine info. The computer has to interpret the data and change the controls to alter the feedback of the sensors. Most banks follow the real-time banking model, which involves call centres, portals, ATMs, and several other interactive fields. A simple illustration of ATMs is the cloud infrastructure definition solely in. An ATM system is used to provide us with transactions details.

ADVANTAGES OF USING CLOUD COMPUTING IN BANKS:

Following are the advantage of using cloud computing in banking system:

1. Cost Savings and Usage-based Billing

Financial institutions may transform high initial capital spending into lower and recurring running expenses by cloud storage. Heavy developments in modern hardware and software are not required. Moreover, the special existence of cloud storage enables financial institutions to select and pay for the resources needed**.**

2. Business Continuity

The company is responsible for the maintenance of the infrastructure of cloud storage. Financial organizations may achieve a higher degree of data security, error detection and rehabilitation from disasters. Cloud storage is therefore rich in reliability and service at a cheaper price than conventional technology systems..

3. Cloud Computing Threats

It relies on supply and demand. In the production side, it allows potential entrants to the sector, which creates lowest cost platforms. On the demand side, consumers may create a direct relationship with banks. For banks, communicating to consumers would not waste time and customers require personal attention. If banks struggle to update their offerings, the consumer may find other service suppliers who can easily grasp and leverage the latest model. Which will inevitably relegate banks to the opposite of these third-party cloud-based front ends in a back office and have almost as small gatekeepers for activities, such as money laundering (AML). Banks incorporate this threats long in contrast to their philosophy, at a period when customer care reductions are required and financial losses will destroy consumer perceptions.

PROBLEM STATEMENT

Deploying apps in a service-oriented environment may be more complicated than conventional device implementation models. This enables SaaS services to be priced depending on the amount of consumers using the service.

REVIEW LITERATURE

Ian Foster (2012) has combined grid computing technology delivery, object-oriented design and network resources. "A Grid is a type of parallel system which allows dynamically, depending on their availability, efficiency , cost and quality-of -service requirements, to share, pick, and aggregate

geographically dispersed autonomous resources" The concept of providing machine services by utilizing the public network was proposed by J.C.R.

Licklider (2013). *Many scholars agree that American computer scientist John McCarthy first proposed the concept of cloud computing. According to him, "computing should be given as a public benefit." There have been several innovations over the last sixty years, as seen in Fig. 2.1 which depicted machine history, from very large computers in the 1970s to smaller PCs in 1999 and then the distributed computing era. In 2010, corporations took the decision to switch from corporate processing to device sharing. cloud computing is a modern software paradigm that provides cost-effective cloud resources for a vast number of consumers. In a speech to commemorate the 100th MIT anniversary****,***

John McCarthy (2015) coined the programming term "If computers with what I have proposed are future machines, computing will one day be regulated as a public service as is the telephone system." In general, device and computing services are known to be metered utility 13 such as heating, power, gas and telecommunications. The consumers will access the utility facilities at any moment, without increasing the original expense of the equipment. The utility concept recently reappeared in modern ways like grid and cloud storage

Tanni Flower, A. S. And van Steen. And van Steen, M. In the 2nd edition (2017) — Distributed Systems: Concepts and Paradigms, the distributed system is a largely heterogeneous set of autonomous Computers that appears as a single device to its users. Cled with the fundamentals of distributed computing, where a variety of individual computing machines operate such that they seem a single unit that just allows certain attempts to maximize the utilization of available resources. The study paper, named "An Execution Tool for Grid Computing," is released by.

Warren Smith and Chaumin Hu (2014) for thorough migration from dispersed to grid computers. The next phase in the distributed system was grid computing, according to this paper, where researchers are focusing on various principles by which the distributed system can be delivered to the consumer as a single device. This concept consists of focusing on the existing services in the underused infrastructure that can be transmitted to the external (remote) customer. It involves work on numerous principles focused on the uses of computing capacity, the usage of and protection of memory (primary and secondary).

Lijun Mei et. al. (2018) have published a qualitative analysis among a variety of cloud infrastructure, ubiquitous computing and utilities in their study — A Tale of Clouds: Model Contrasts and Some Thoughts on research concerns [20]. They ended their study with the cloud infrastructure system positions on the simple device architectural paradigm and three distinct features: data, storage and measurement.

For each of three attributes, the author proposed a distinction which can be summarized as:

(i) Network system input-output function parallels process processing in cloud computing.

(ii) Database system management is more closer to that of general computing than that of cloud computing.

(iii) Both paradigms have the same estimation characteristics. Based on contrasts, the writers address a variety of study topics including a selection of pluggable cloud software computing tools , data access openness, the flexible design of cloud systems, and the automated quantification of cloud service functionality.

Sangwan and Singh (2016) addressed cloud infrastructure and system forms in their publication Services and Protection Issues of cloud computing. The paper also presents non-functional, economic and technical issues to be discussed by clouds. The analysis of cloud computing business model-Service as a Program (SaaS), Business as a Network (PaaS) and Service as Application (IaaS) is carried out in this article. At the end of the day, this document presents a variety of protection concerns.In their Cloud computing technology paper,

Sean Carlin et. al. (2012) outlines several big cloud computing technology features and discusses three main components such as software as a service, application as a service, architecture as a cloud computing framework that establishes the cloud computing technology and model of distribution. In this author the fundamental virtualization technology that makes cloud storage possible has been described and clarified. It analyzed and addressed a variety of issues facing cloud computing technology a day. Based on their study, they have the potential course for cloud infrastructure technology alongside different apps 22, which can take advantage of cloud and developments. It offers a short description of how and how the system will continue in the future.

C. Weinhardt et. al. (2013) address the emergence of cloud computing from grid computing in their publication Cloud computing – description, market models and analysis directions. The writers address the market model paradigm on the basis of their analysis. This paper explores the common approaches used for cloud implementation. It offers

a variety of companies that use different templates for their numerous business applications.

Ang Li et. al. (2015) in CloudCmp: Comparing public cloud suppliers with different public cloud providers build CloudCmp on the basis of their tests, a framework that systematically compares cloud providers' efficiency and expense. Based on its measurements focused on consumer efficiency, CloudCmp tests the different cloud criteria including elastic computing, distributed storage , and network services. Cloud Cmp seeks to ensure that these assessments are reasonable, reflective and consistent when operating under calculating cost limits. Applying CloudCmp to many common cloud companies today, which together make up the majority of cloud users, researchers concluded that their offerings are contingent on efficiency and prices, offering them a forum to choose the right provider on demand. These representative cloud applications as well as the case studies demonstrate that CloudCmp will direct customers to choose the best quality provider for their applications.

Salman A. Baset (2012) has been interested in a range of public cloud service providers, which include 23 Amazon, Rackspace, Microsoft's windows azure and Storm on Request, as well as a variety of public cloud service providers, to review their SLA and infer the SLA effect on resources supplied by these service providers. There are a variety of conditions for this. It ends with the findings that nobody gives any accuracy assurances for service estimates from the cloud providers examined, and asks the customer to spot violations of SLA that indicates that the customer has the duty to lift a doubt of the SLA infringement and show it from the services they use.

Dowd, P.W. Dowd. and McHenry.-And McHenry (2015) a paper entitled Network Protection has been released: it's time to take it seriously. The protection of the data released by them enables the relevant data of a consumer to be converted into raw data that can be exchanged. In case this raw data is compromised and captured by the intruder during delivery, the real and usable data has to be decoded. The usage of authentication key is successful at a certain extent as it is very possible to crack a day with very simple computers as the solid encryption key of the past is redundant in the immediate future.

ArshadHashmi et. al. (2016), in their publication A Study of Cloud Storage System Protection Trends and Problems, note that cloud infrastructure can have 25 several benefits, but security challenges render it more challenging for consumers to utilize it. It is well known to all consumers of the security vulnerabilities in the cloud. Various apps can use multi-tenancy and virtualisation to use the same physical infrastructure. However this adds to risks to the cloud. Relevant compliance concerns exist because of the global nature of cloud infrastructure of customer data and operation. The owner company, as a part of this ownership role, has restricted regulatory authority and access control mechanisms are a technical function of the enterprise. The challenges to defense, virtualization and the data cloud were created and subsequent strategies were introduced as a countermeasure. In the latest research, enriched techniques have clearly illustrated the reach of security service.

S. Subashini et. al. (2013) in the research publication ―A Survey on Security Issues in Service Delivery Models of Cloud Computing‖ [38] elaborate its finding as cloud computing is a way using which the capacity of computing can be increased exponentially or the capabilities can be added dynamically that is too without any investment in infrastructure, or training of existing personnel, or purchasing licenses of any existing software. The implication is that cloud infrastructure will require less effort to expand the current capacities of information technology (IT).

OBJECTIVE OF THE STUDY

1. Identify compliance issues for cloud infrastructure deployment in the banking sector.

2. Comparative research of traditional infrastructure and cloud-based architecture in current protection framework.

CONCLUSION

The cloud framework is a distributed model spread across a wide scale that provides on-demand resources in a competitive manner, the pseudo code for the proposed SMQS (Smarter Multi-Queueue Scheduling) algorithm is introduced and when applied, it was able to manage the problem of work scheduling in a efficient manner in the cloud setting. The smarter MQS algorithm has demonstrated through the tests that it has the potential to maximize efficiency while reducing the energy consumption. Both the methods i.e., the quantitative simulations and numeral effects. Effective MQS and Better MQS algorithms suggest our preferred method i.e. on various sums of consumer employment. Smarter MQS is much more efficient and focused to minimize electricity usage, which inevitably therefore decreases the delivery period for work to some degree. The algorithm suggested would enable improved scheduling of workers in the cloud storage world. Consequently, the SMQS algorithm is capable of reacting to job scheduling problems in cloud networks. Another trend in growing cloud country is the recognition that micro banks are operating their whole company on cloud computing. In such a Greenfield scenario where previous investments in technology have been reduced, it makes a lot of

sense for micro banks to exploit cloud infrastructure as opposed to doing the capital spending on existing datacenters. The thesis provides new light to incorporate Safe and Scalable Operating Model utilizing Cloud Infrastructure in Real Time Banking Sector, thus offering an auxiliary forum for potential researchers.

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