ISSN No. 0976-5697

Volume 8, No. 4, May 2017 (Special Issue)

International Journal of Advanced Research in Computer Science

REVIEW ARTICLE

Available Online at www.ijarcs.info

A Survey on Trends & Applications of Cloud Computing

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***Abstract*:- Cloud computing has been the developing technology in the recent years and this technology has shifted it base to the clouds taking the world to cloud computing. This paper is a survey of some of the recent technologies used in the cloud computing and methodologies used and the advantages and disadvantages of the various methods.**

***Keywords*: cloud, computing, API**

I. INTRODUCTION

Several trends are opening in the era of computing today. Computing services are used like commodities and delivered in a manner similar to traditional utilities such as water, electricity, gas, and telephony. Users can do his work according to his requirements and he has no information how the work is doing by the cloud system. Several utilities are provided to the user based on the internet. Many computing paradigms have promised to deliver this utility and these include Grid computing, cluster computing and recently Cloud computing. It is common to access content across the Internet independently without reference to the underlying hosting infrastructure. This infrastructure consists of data centers that are maintained around the clock by contents that are provided by the hosting providers. Cloud computing is an extension of this paradigm that is the capabilities of business applications which are exposed as sophisticated services. These services can be accessed over the network.

Cloud computing include the resources hardware and software, which delivered as a service through a computer network. Cloud computing helps to collection of data over the internet through environment of virtualization with the of resources and forms individual units. It can run just not a application but full server on the cloud and it reduces the cost of the hardware also.

Cloud computing has the following key characteristics:

Agility can be improved with the help of the users' ability of re-provisioning technological infrastructure resources

Application programming interface (API) is an interface between cloud software and machine just as user interface works between user and computer.

Cost is reduced and low, and in a public cloud delivery model, capital expenditure is changed to operational expenditure as infrastructure is usually provided by a third-party and does not need to be purchased for one-time or infrequent computing tasks.

Device and location independence enables users to access systems with the help of using the internet from anywhere. User can access from any device that is capable of accessing internet.

Multi-tenancy It is very cost effective by providing the sharing of the resources within the number of users

Utilization and efficiency improve the utilization of systems.

Reliability When a well designed cloud system is used it helps to improve reliability and recovery from any disaster.

Performance is monitored, is consistent and the loosely coupled architectures are constructed using web services as the system interface.

Security could be improved because of centralization of data and increased security-focused resources. But due to central storage concerns can persist about loss of control over certain sensitive data. Security is often better than other traditional systems, because providers are able to solve security issues that many customers cannot afford themselves. The security complexity is increased because data is distributed over a number of systems and in multi-tenant systems that are being shared by many unrelated users. Moreover, users cant not access security audit logs or it is impossible for the user. Private cloud installations

are partially motivated by users' desire to retain control over the infrastructure and to avoid losing control of information security.

Virtualization technology allows servers and storage devices to be shared and utilization to be increased. The applications can be easily migrated from one physical server to any other physical server.

Maintenance of applications in cloud computing is easier, because each application is not installed on user's computer and it can be accessed from different places.

Cloud service providers provide cloud services under following basic models:

Infrastructure as a service (IaaS),

Platform as a service (PaaS),

Software as a service (SaaS)

Storage as a service (STaaS)

Security as a service (SECaaS)

Data as a service (DaaS)

Business process as a service (BPaaS)

Test environment as a service (TEaaS).

Desktop as a service (DaaS)

API as a service (APIaaS)

Out of the above mentioned, three are the basic services discussed below:

Platform as a Service (PaaS)

Cloud computing include platforms for building and running custom web-based applications, known as Platform-as-a-Service. PaaS is an outgrowth of the SaaS application delivery model. The PaaS model makes all facilities required to support the complete life cycle of building and delivering web applications and services entirely available from the Internet, all without any software downloads or installation for developers, IT managers, or end users. Unlike the IaaS model, where developers may create a specific operating system instance with homegrown applications running, PaaS developers are concerned only with web based development and generally do not care what operating system is used. PaaS services allow users to focus on innovation rather than complex infrastructure. Organizations can redirect a significant portion of their budgets to creating applications that provide real business value instead of worrying about all the infrastructure issues in a roll-your-own delivery model. The PaaS model is thus driving a new era of mass innovation. Now, developers around the world can access unlimited computing power. Anyone through Internet can build powerful applications and easily deploy them to users globally. PaaS offers a faster, more cost-effective model for application development and delivery. PaaS provides with the entire infrastructure needed to run applications over the Internet. Such is the case with companies such as Amazon.com, eBay, Google, iTunes, and YouTube. The new cloud model has made it possible to deliver such new capabilities to new markets via the web browsers. PaaS is based on a metering or subscription model, so users pay only for what they use. PaaS offerings include workflow facilities for design and development, testing, deployment, and hosting of applications, as well as application services like team collaboration, database integration, scalability, security, storage, persistence, virtual offices, etc.

Characteristics of PaaS

1. The services to develop, test, deploy, host, and manage applications to support the application development life cycle. Web-based user interface creation tools typically provide some level of support to simplify the creation of user interfaces, based either on common standards such as HTML and JavaScript or on other, proprietary technologies. Supporting a multitenant architecture helps to remove developer concerns regarding the use of the application by many concurrent users.
2. PaaS providers often include services for concurrency management, scalability, fail-over and security.
3. The integration with web services and databases. Support for Simple Object Access Protocol (SOAP) and other interfaces allows PaaS offerings to create combinations of web services (called mashups) as well as having the ability to access databases and reuse services maintained inside private networks. The ability of forming and sharing code with ad-hoc, predefined, or distributed teams greatly enhance the productivity of PaaS offerings. Integrated PaaS offerings provide an opportunity for developers to have much greater insight into the inner workings of their applications and the behavior of their users by implementing dashboard like tools to view the inner workings based on measurements such as performance, number of concurrent accesses, etc. Some PaaS offerings leverage this instrumentation to enable pay-per-use billing models.

Software as a Service (SaaS)

Software as a service is the most popular form of cloud computing and easy to use. Saas uses web to deliver applications that are managed by third party vendor and whose interface is accessed on client side. The traditional model of software distribution, where software is purchased for and installed on personal computers, is occasionally referred to as Software-as-a-Product. Software-as-a-Service is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, generally the Internet. SaaS is an increasingly prevalent delivery model as underlying technologies that support web services and service-oriented architecture (SOA) have matured and new developmental approaches became popular. SaaS is also a pay-as-you-go

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subscription licensing model. Meanwhile, broadband services have become increasingly available to support user access for larger cover around the world. The huge strides made by Internet Service Providers (ISPs) to increase bandwidth, and the constant introduction of ever more powerful microprocessors coupled with inexpensive data storage devices, is providing a huge platform for designing, deploying, and using software across all areas of business and personal computing. SaaS applications must be able to interact with other data and other applications in an equally wide variety of environments and platforms. SaaS is closely related to other service delivery models we have described. IDC identifies two slightly different delivery models for SaaS. The hosted application management model is similar to an Application Service Provider (ASP) model. Here, an ASP hosts commercially available software for customers and delivers it over the Internet. The other model is a software on demand model where the provider gives customers network-based access to a single copy of an application created specifically for SaaS distribution. SaaS is most often implemented to provide business software functionality to enterprise customers at a low cost while allowing those customers to obtain the same benefits of software that is commercially licensed, internally operated without the associated complexity of installation, licensing, support, management and high initial cost. Most customers have little interest in the how or why of software implementation, deployment, etc., but all have a need to use software in their work. Many types of software are well suited to the SaaS model (e.g., accounting, customer relationship management, email software, human resources, IT security, IT service management, video conferencing, web analytics, web content management). The distinction between SaaS and earlier applications delivered over the Internet is that SaaS solutions were developed specifically to work within a web browser. The architecture of SaaS-based applications is specifically designed to support many concurrent users (multitenancy) at once. This is a big difference from the traditional client/server or application service provider (ASP) based solutions that cater to a contained audience. SaaS providers, on the other hand, leverage enormous economies of scale in the deployment, support, management and maintenance of their offerings.

Characteristics of SaaS

Deploying applications in a service-oriented architecture is a more complex problem than is usually encountered in traditional models of software deployment. As a result, SaaS applications are generally priced based on the number of users that can have access to the service. There are often additional fees for the use of help desk services, extra bandwidth, and storage. SaaS revenue streams to the vendor are usually lower initially than traditional software license fees. However, the trade-off for lower license fees is a monthly recurring revenue stream, which is viewed by most corporate CFOs as a more predictable gauge of how the business is faring quarter to quarter. These monthly recurring charges are viewed much like maintenance fees for licensed software. The key characteristics of SaaS software are the following:

1. Network based management and accessing commercially available software from central locations rather than at each customeŕs site, enabling customers to access applications remotely via the Internet.
2. Delivery of application from a one-to-many model (single-instance, multitenant architecture), as opposed to a traditional one-to-one model.
3. Centralized enhancement and patch updating that obviates any need for downloading and installing by a user. SaaS is often used in conjunction with a larger network of communications and collaboration software, sometimes as a plug-in to a PaaS architecture.

Infrastructure-as-a-Service (IaaS)

*I*aaS is the delivery of computer infrastructure (typically a platform virtualization environment) as a service. IaaS leverages significant technology, data center and services investments to deliver IT as a service to customers. Unlike traditional outsourcing, that requires extensive due diligence, negotiations ad infinitum, and complex, lengthy contract vehicles, IaaS is centered around a model of service delivery that provisions a predefined as well as standardized infrastructure specifically optimized for the customer applications. Rather than purchasing data center space, network equipment, servers, software, etc., IaaS customers rent those resources as a fully outsourced service. Usually, the service is billed on a monthly basis, just like a utility company bills customers. The customer needs to pay only for resources consumed. The chief benefits of using this type of outsourced service include:

1. Use of the latest technology for infrastructure equipment
2. Secured, “sand-boxed” (protected and insulated) computing platforms that are usually security monitored for breaches.
3. Reduced risk by having off-site resources maintained by third parties
4. Ability to manage service-demand peaks and valleys Lower costs that allow expensing service costs instead of making capital investments

Cloud storage with high storage and low cost content

Many „Cloud Storage‟ providers have launched in the last two years, providing data storage which can be accessed through internet and delivered in several continents that is backed by rigorous Service Level Agreements (SLAs), guaranteeing performance and uptime targets. The facilities that these providers offer are leveraged by developers via provider-specific Web Service APIs. For content-creators, these providers are a genuine alternative to dedicated Content Delivery Networks (CDNs) for global file storage and delivery, as they are much cheaper, have considerable performance and no ongoing contract obligations. As a result, the idea of utilizing Storage Clouds as a „poor mans‟ CDN is very enticing. However, many of these „Cloud Storage‟ providers provide just the basic storage services, and offer not the capabilities of a fully-featured CDN such

as intelligent replication, load redirection, failover and load balancing. Moreover, they may be difficult to use for non-developers, as each service is best utilized via unique web services or programmer APIs. This paper describes the design, architecture, implementation and user-experience of Meta Content Delivery Networks, a system that integrates these „Cloud Storage providers into a unified Content Delivery Network service that provides high performance, low cost, content storage which is geographically distributed and delivery for content creators, and is also managed by an easy-to-use web portal.

Advantages:

- Intelligent deployment of content
- Viewing, modifying or deleting existing content deployment.
- Maximized coverage and performance
- Cost and QoS optimized deployment

Disadvantages:

- No user customization
- It does not enhance the user's experience of the internet.

Cloud multimedia platform

Social networking web applications such as Facebook and Flickr present new challenges for storing and processing user generated content, i.e. multimedia. Handling massive amounts of data requires special systems that need upfront investment, which may hinder the realization of new innovative ideas. Instead, cloud computing as a new emerging operations model promises to deliver elastic on-demand unlimited computing resources as a utility. This paper proposes architecture for a Cloud Multimedia Platform that does the heavy-lifting for massive amounts of multimedia storage and processing in the spirit of the cloud computing paradigm.

Challenges:

- Scalability
- Elasticity
- Abstraction
- Simplicity
- Interoperability
- Distributed data management
- Responsive services
- Service orchestration

APPLICATIONS

1. Private cloud and hybrid cloud: Among the many incentives for using cloud, there are two situations where organizations are looking into ways to assess some of the applications they intend to deploy into their environment through the use of a cloud (specifically a public cloud). While in the case of test and development it may be limited in time, adopting a hybrid cloud approach allows for testing application workloads, therefore providing the comfort of an environment without the initial investment that might have been rendered useless should the workload testing fail.
2. Another use of hybrid cloud is also the ability to expand during periods of limited peak usage, which is often preferable to hosting a large infrastructure that might seldom be of use. An organization would seek to have the additional capacity and availability of an environment when needed on a pay-as you-go basis.
3. Test and development probably the best scenario for the use of a cloud is a test and development environment. This entails securing a budget, setting up your environment through physical assets, significant manpower and time. Then comes the installation and configuration of your platform. All this can often extend the time it takes for a project to be completed and stretch your milestones. With cloud computing, there are now readily available environments tailored for your needs at your fingertips. This often combines, but is not limited to, automated provisioning of physical and virtualized resources.
4. Big data analytics: One of the aspects offered by leveraging cloud computing is the ability to tap into vast quantities of both structured and unstructured data to harness the benefit of extracting business value. Retailers and suppliers are now extracting information derived from consumers' buying patterns to target their advertising and marketing campaigns to a particular segment of the population. Social networking platforms are now providing the basis for analytics on behavioral patterns that organizations are using to derive meaningful information.
5. File storage Cloud can offer you the possibility of storing your files and accessing, storing and retrieving them from any web-enabled interface. The web services interfaces are usually simple. At any time and place you have high availability, speed, scalability and security for your environment. In this scenario, organizations are only paying for the amount of storage they are actually consuming, and do so without the worries of overseeing the daily maintenance of the storage infrastructure.
6. Disaster recovery**:** This is yet another benefit derived from using cloud based on the cost effectiveness of a disaster recovery (DR) solution that provides for a faster recovery from a mesh of different physical locations at a much lower cost that the traditional DR site with fixed assets, rigid procedures and a much higher cost.
7. Backup up data has always been a complex and time-consuming operation. This included maintaining a set of tapes or drives, manually collecting them and dispatching them to a backup facility with all the

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inherent problems that might happen in between the originating and the backup site. This way of ensuring a backup is performed is not immune to problems such as running out of backup media , and there is also time to load the backup devices for a restore operation, which takes time and is prone to malfunctions and human errors. Cloud-based backup, while not being the panacea, is certainly a far cry from what it used to be. You can now automatically dispatch data to any location across the wire with the assurance that neither security, availability nor capacity are issues

OBJECTIVES

This paper explores how the user's experience of the Internet is enhanced, by moving desktop functionality into the network, in the Void environment. It explores how this model allows us to expand the range of benefits of using the Internet Cloud model, especially when media processing and user customization are concerned. Void, an Edge Cloud-based framework supports user-controlled coordination of Cloud-based applications and its use in media processing. Void's purpose is to support the Cloud-based virtualization of user applications typically running on the desktop, which require exchange of information and high data throughput. Unlike typical SaaS applications, Void supports desktop-like interactions between applications, and allows the user to create or manipulate composite applications.

CONCLUSION

The usual dichotomy is client-based integration or server-based integration. The void has the added benefit of involving the support of the local ISP, which facilitates the integration of key functionalities such as security, mobility and QoS. This new dichotomy between the user and cloud based services, expands the range of applications that can be migrated away from the user's computer, while avoiding inconveniences of loss of control or data replication over the currently prevailing SaaS model.

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