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Cloud Computing: Obstacles and Opportunities

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Abstract: Cloud computing is next generation technology based on internet which change the method of providing services by organizations to clients through various applications. It provides easy, convenient method for providing services to clients by various service providers. But there are some hurdles in adoption of this technology by organizations. This paper outlines various obstacles and opportunities in adoption of cloud computing. Obstacles are categorized into three categories such adoption, growth, policy and business. Opportunities are paired with each obstacle.

Keywords: Cloud Computing, Data Access, Security,

I. INTRODUCTION

Cloud Computing has the potential to revolutionize a large part of IT industry by making software more attractive and shaping the way IT hardware is designed. Basically it is a combination of both applications delivered as services over internet and hardware and software in data centres provide those services.[1] the term cloud means collectively data centre, hardware and software. It has three deployment models such as (i) Infrastructure as a Service (ii) Platform as a service (iii)software as a service. When cloud computing is made available in Pay as you Go manner to general public it is called public cloud and service being sold. In cloud computing, the available service models are[2,3]

Infrastructure as a Service (IaaS):- Provides the consumer with the capability to provision processing, storage, networks, and other fundamental computing resources, and allow the consumer to deploy and run arbitrary software, which can include operating systems and applications. The consumer has control over operating systems, storage, deployed applications, and possibly limited control of select networking components.

Platform as a Service (PaaS). Provides the consumer with the capability to deploy onto the cloud infrastructure, consumer created or acquired applications, produced using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

Software as a Service (SaaS). Provides the consumer with the capability to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client

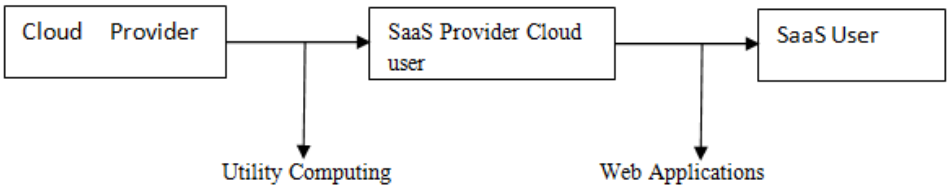

Figure 1: Diagram of cloud computing

Cloud Computing is a model for applications which need model of storage, model of communication, model of computation. Virtualization helps to achieve elasticity, appearance of infinite capacity available on demand requires automatic allocation and management.

II. CATEGORIES OF OBSTACLES

In the following section obstacles of cloud computing can be divided into three categories. First three related to adoption, second category five related to growth, third category related to policy or business obstacles.[1,4]

A) Business continuity & Service Availablility:- In most organizations have worry about adequate availability of utility computing services provided by cloud providers. Most organizations companies have multiple data centres in different geographic regions using network providers using common software infrastructure, accounting system or company. Large customers will be relunctant to migrate to cloud computing.

B) Data lock-In :- Clients cannot easily extract their data and programs from one platform to another. This become one of biggest hurdle in cloud computing adoption. Clients want data and programs to be transferable from one site to another.

C) Data confidentiality/Auditability :- Security is one of the main concern in cloud computing. Cloud users face security concerns. In cloud computing security responsibility is divided among many users including cloud user, cloud vendor. Application level security is responsibility of cloud user. Physical Security & external firewall policies is responsibility of cloud provider. Both user and operator is responsible for security of intermediate layers of software stack. But again one problem with virtualization is that software has not even bug free or break worse to some extent. Even incorrect virtualization may lead to access network or sensitive portions of provider infrastructure.

D) Data Transfer Bottlenecks :- A huge amount of cost is incurred by clients or users during the placement and transfer of data. This present an reluctant view to the clients to shift from traditional to cloud computing.

E) Performance Unpredictability :- Virtualization in cloud computing helps to share resources such as CPU and main memory but still clients will face a problem in network and disk sharing. It means virtual machine suffer from I/O interference. One more unpredictability hurdle is to scheduling of virtual machines for some different categories of batch processing specifically for high performance computing.

F) Bugs in Large Scale Distributed Environment:- Removing errors/bugs in large scale distributed system has became one of prominent challenge. But these bugs cannot be recreated in smaller scales or configurations .So debugging must occur at scale in production data centres.

G) Data Security:- Data leakage or loss is also considered as one of greatest obstacle in growth of cloud computing. It can have severe impact on business, brand and trust of an organization. This challenge would consists of security ,integrity, locality, access confidentiality, breaches, data segregation and storage features related to data.

H) Scaling quickly :- "Pay as you Go" certainly arises only on storage and network bandwidth which count bytes used . It does not apply to computation because computation depends on virtualization level.

I) Reputation Fate Sharing:- One customers bad behavior towards cloud behavior can affect others by strictness made by laws of company.

J) Software Licensing:- Current software licenses commonly require huge amount of investment and maintenance fees. So most cloud computing providers require relied on open source software .

III. OPPORTUNITIES IN CLOUD COMPUTING

A) Use multiple Cloud Providers: - to overcome the hurdle of business continuity and service availability. Cloud computing providers must use multiple cloud providers. If one data centre may be low then our task can be done by another data center.

B) Standardize APIs :- It is SaaS developer could deploy services and data across multiple cloud computing providers. So that failure of one organization would not take all copies with them.

C) Deploy encryption , VLANS, Firewalls:- Different methods of security such as encryption , VLANS , Firewalls should be employed so that protection of data from inside or outside threat . Such as denial of service attack is minimize.

D) FedExing Disks, high Bw:- High cost of placement and transfer of disks is minimized by ship disks .

E) Improved Architectures and Operating Systems efficiently virtualize interrupts and even use of flash memory will decrease I/O interference.

F) Invent Debugger/or Distribution:- to solve the problem of bugs in large scale distributed systems is to reliance on virtual machines helps to catch valuable information which is not possible without VM.

G) Encryption:- Encryption is considered as one of better solution to secure information . It is beneficial to encrypt data before placing it on cloud. It solves severalissues related to data security issue.

H) Snapshot of Conservation:-Opportunity is to automatically scale quickly up and down in response to load which helps ion saving money without violating service level agreements it helps in conserve money as well as resources.

I) Pay for Use license:- commercial software companies change their licensing structure to fill cloud computing.

IV. CONCULSION

Nowdays, Cloud Computing has becoming a promising paradigm for various I.T services as utility computing. This paper outlines various obstacles that are becoming hurdle in adoption of cloud computing by different organizations. Categories of obstacles are also classified such obstacle related to growth, policy and adoption. Opportunities are also described in pair of each obstacle. Opportunities such as multiple cloud providers standardize APIs, encryption, pay for use license, improved architectures and operating systems.

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