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A STUDY ON COMPLEX SERVICE ANALYSIS FOR CLOUD COMPUTING

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ABSTRACT

The concept of Service Oriented Architecture (SOA), as related to cloud computing is simple. It is necessary to understand that when we are dealing with clouds, we're dealing with services and when we're dealing with services we should we dealing with SOA.

In SOA world we talk of services and only services, where services are in form of software, live components and objects (technical things) but when it comes to realization in the real world it is outcome based. It is generally found people saying 'we are doing SOA so we are ready for the cloud', but the difference between SOA services and the cloud context is huge. Typically Cloud is focused only towards the outcome, not the technology. "In cloud the service terminology you are focusing on is a relationship between service provider and consumer not technology provider and consumer".

KEYWORDS: *SOA, Architecture, Computing*

INTRODUCTION

Low utilization of server is the biggest factor in a datacenter with low power. For example, the regular utilization of server in a Google datacenter was reported to be 30% energy efficiency. This fact has motivated the design of energy-proportional servers to minimize the overall power consumption. State-of-the-art commercial servers are,

however, not proportional to energy utilization. It is thus prudent from an energy efficiency viewpoint to have as few servers as possible turned being highly utilized with each active server. Hence, there is a strong justification for server consolidation in current datacenters.

Operational cost and admission control policy in the cloud computing system are affected by its power control and VM management policies. Power management techniques control the average and/or peak power dissipation in datacenters in a distributed or centralized manner. VM management techniques control the VM placement in physical servers as well as VM migration from a server to another one. The proposed study focused on SLA-based VM management to minimize the operational cost in a cloud computing system.

The IT infrastructure provided by the datacenter owners/operators must meet various SLAs established with the clients. The SLAs may be resource related e.g., amount of computing power, space, memory/storage network bandwidth, performance related e.g., service time or throughput), or even quality of service related e.g., 24-7 availability, data security, percentage of dropped requests. Infrastructure providers often end up over provisioning their resources in order to meet the SLAs client's. Such over provisioning may increase the operational cost of the datacenters in terms of their monthly carbon emission and electrical energy bill. Therefore, in order to minimize the impact of datacenters on the environment and optimal provisioning of the resources to reduce the crucial cost incurred on the datacenter is prioritized.

The research proposal probes various aspects of modeling the power consumption in datacenters. The proposed system attempts to investigate a complex service analysis for cloud computing which is structured as virtual machine for various resource brokers. The research also finds various power-aware policies of virtual machines for Cloud services. Simulation environment is created in java platform which shows that datacenters can predominantly reduce energy consumption and increase their profit using proposed DVFS schemes which shows maximized profit with minimized power consumption irrespective of system load. To reduce the number of processor instructions of dynamic

frequency scaling can issue in given time while reducing performance.

Dynamic frequency scaling has been rarely advisable as a way to conserve the power switching itself. The most power requires dynamic voltage scaling in saving, because of the fact that modern CPU and V2 components are strongly optimized for low idle states of power. It is more efficient to run in most constant voltage cases to briefly at peak speed and stay longer in a deep idle state, then it is reduced at a reduced clock rate for long time and only stay briefly in a idle state. Thus, reducing the voltage along with clock rate can change the tradeoffs.

The proposed study was evaluated in highly controlled research environment as performing sophisticated experiments on real time giant datacenters is almost near to impossible. However, the effect of the traffic, protocols used, considerations of downtime formulation, service level agreement, as well as provisioning schema was entirely simulated using available cloud simulators. But, simulating the considered research variable (energy) in cloud simulator and extracting the throughput from it doesn't give the actual visualization of what exactly happens in real time traffic in cloud environment. However, the reliability of the mathematical evaluation considering the effectiveness of DVFS system is well assured and promising, but it is not experimented over wide real time test cases of dynamic internet environment considering cloud services. Currently, the proposed study is only limited to Software as a service consideration, whereas Infrastructure as a service and Platform as a Service are yet to be evaluated, which may be the scope of future direction. The stress was less on service domain as the proposed study is purely concentrated on the energy preservation schema.

ICT solutions can play a strategic role towards the improvement of IT companies competitiveness. However IT companies are reluctant to invest in ICT solutions due to lack of ICT skills, high cost of ICT solutions, performance issues, downtime and disaster recovery and so forth. Of those IT companies which have ICT in their internal environment, they are faced with several challenges such as lack of sufficient ICT and problem solving skills to provide satisfactory ICT support, and lack of sufficient capital to procure bespoke ICT solutions. The consequence of these issues negatively affect business operation as in

most cases they have no alternative option or failover at the time of ICT failures.

Of the recent ICT evolutions, cloud computing happens to be an alternative ICT solutions compared to traditional (on-premise) ICTs. The traditional cost model of on-premise ICT is characterised by software licensing cost, support and maintenance cost as well as upfront capital investment.

RESEARCH WORK

Cloud computing comprises of different deployment models nevertheless each service comes with its own security issues. Thus, to guarantee the security of corporate data in the cloud is difficult, if not impossible. In Infrastructure as a Service (IaaS) model, for example, the security responsibility of the underlying infrastructure and abstraction layers belong to the cloud service provider, while the remainder of the stack is the consumer's responsibility. Organisations, before moving applications outside their corporate firewalls, should be aware of the data intrusion risks associated with such an environment.

IaaS cloud models are prone to attacks like XML Signature Element Wrapping – this is a well-known attack on protocols using XML Signature such as SOAP (that stands for Simple Object Access Protocol) messages.

These protocols are used to provide authentication for messaging through the web. With Platform as a Service (PaaS) model, the security of the platform used for development is the service provider's responsibility, but the security of the applications developed is the responsibility of the consumers. Concerns about cloud service integrity and binding issues with PaaS' cloud models should be given further consideration. PaaS models are prone to cloud malware injection attacks and metadata spoofing attack as described by Jensen.

In Software-as-a-Service (SaaS) model, the service provider is responsible for, not only providing physical and environmental security capabilities, but also addresses the security control on the infrastructure, applications and data. According to a Forrester research, security concerns are the most commonly cited reason why enterprises are not interested in SaaS. A major concern of SaaS is unauthorised access due to data being transferred to a

remote server thought the internet. This might allow adversaries to obtain passwords, inspect data, and modify or damage the data. This would be more harmful in case of unauthorised access to sensitive information such as payments details and information on human resources. Denial of service attacks and network failure present the availability concern of SaaS.

The lack of standards in cloud computing also rise interoperability and manageability issues inside and between cloud providers, with possible economic impacts. Interoperability is concerned with the migration and integration of applications and data between different

vendor's clouds. Whereas standardization, strives to support applications by different service vendors to interoperate with one another, exchange traffic and cooperatively interact with data as well as protocols for joint coordination and control.

In the absence of standardization, IT companies willing to outsource and combine the range of services from different cloud providers to achieve maximum efficiency, will experience difficulty when trying to get their in-house (legacy) systems to interact with the cloud providers system. Likewise, the lack of standardization may also bring disadvantages, when migration, integration, or exchanges of resources are required. The main negative aspect is the necessity of factoring applications to comply with other cloud Application Programming Interfaces (APIs), which can possibly lead to higher costs, delays and risks, thus opposing agility, efficiency, and low costs. In the aforementioned, reconfiguration of systems and applications to achieve interoperability are time consuming and thus, require a considerable amount of expertise, which could be challenging for IT companies. Further, interoperability and portability will give rise to standard reusability, which in turn will lead to faster cloud deployment.

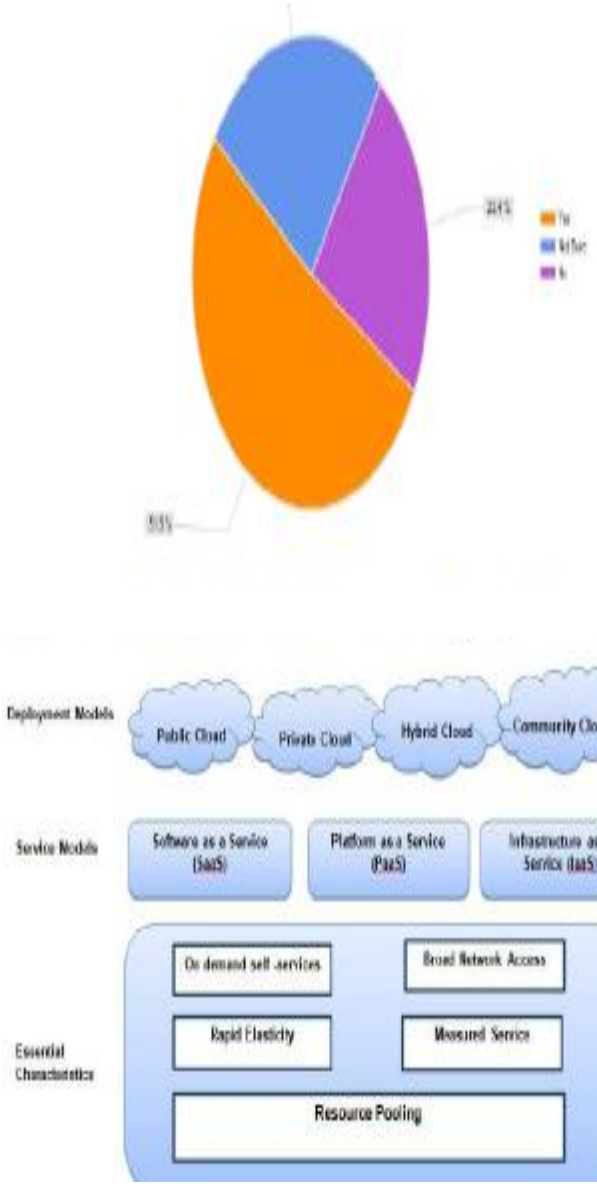
Therefore, IT companies considering cloud-based services should be aware of the associated risks and vulnerabilities before adopting them for critical applications or sensitive information. IT companies might be interested in migrating gradually by starting from some of the non-core business/mission-critical applications to the cloud environment. But a common challenge associated with many cloud migration projects is on how effectively the migration risks are identified.

Cloud providers should implement regulatory compliances that cover operational and security areas that users may have concerns about. Theses compliances would improve the security by having cloud vendors and customers to be securely certified. It would also reduce the concerns of interoperability and portability. Cloud vendors should provide details of their security police to include risk management, access control, network security, physical security, and backup and system recovery. They should also provide details of how customers' systems would be segregated from others in a multi-tenant environment. However, often cloud providers tend not to reveal more details about their systems and data centres, claiming doing so would compromise their security.

Cloud Computing plays an important role to contribute IT companies to decrease their expense and time on IT field. It enables IT companies to develop application-driven their needs with less price in the long-term. Although this technology has positive advantage, Cloud Computing-related risks should be considered. Most governments are not sure about the future of this scientific achievement and are worried about security and private data. In this research we identified what are the significant risks that may each IT companies deciding to move towards Cloud comes across. Two categories are described, Outsourcing opportunism risks and Technology development risks, and in the future work we will work on ways to solve the problem by reducing these risks, and suggesting the best approach.

DISCUSSION

A recent study conducted by Craig shows that there is an increase of 14% of IT companies in understanding cloud computing. The increase of cloud computing understanding is expected to accelerate the cloud adoption by IT companies. Industry research giants including Gartner, Forrester and other industry research analysts predicted that a substantial number of the world's top enterprises would have migrated their IT needs to the cloud offerings by 2011 Furthermore, IBM predicted that cloud computing migration will be more than double by 2014.

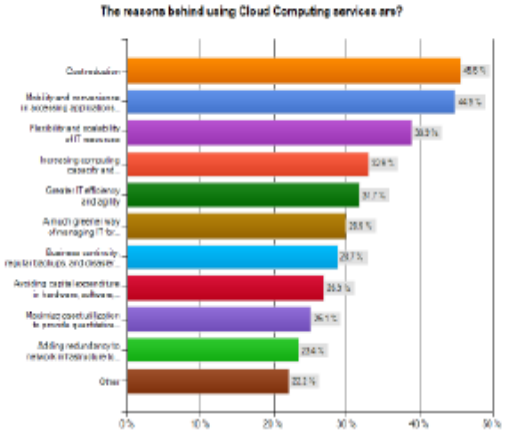


The cloud offers several deployment models - management, cost, and security of these clouds depend on the choice of the organization in either opting to buy and operate its own cloud or to obtain cloud services from a third-party. Due to the clouds' elastic and usage-based pricing model, hosted cloud-based applications from a third-party i.e. public clouds probably offer the most attractive solutions to IT companies. Public cloud service offerings will allow new and smaller organizations to benefit from enterprise level services, security and products, at a reduced cost.

Green IT, reliable access, backup, disaster recovery, maximising asset utilisation, and adding redundancy to network infrastructure were also reasons of adopting the cloud but they appear to be less important motivations to use the cloud from IT companies point of view.

The cloud concept offer many options to startups and IT companies to decide how to utilise cloud computing services. Start-ups may decide to launch all their applications on the cloud, while more established firms might decide on moving existing software assets gradually to the cloud environment. Moreover some cloud-based services do interoperate with on-premise software so instead of spending more on renting and/or buying new software licenses, rather benefits can be reaped from applications that interoperate with vendor platforms. To explore IT companies plans for utilising cloud computing services, this study raised the question" what do you intended to use cloud computing services for".

Figure shows the analysis of IT companies plans



Cloud computing is Gartner's number one strategic technology area for 2010. Indeed the company predicts that one fifth of all businesses will own absolutely no IT assets by 2012. This forecast signals a massive shift in attitude to technology acquisition and ownership, and underpins the importance of cloud and cloud-enabled services.

Unfortunately, as this research undertaken on behalf of GFI Software reveals, the IT market may be significantly overestimating the level of understanding of the new

technology model. The issue is not just confusion about the pros and cons of the cloud, but a fundamental lack of familiarity with key terms.

CONCLUSION

According to the research, half (50%) of senior business decision-makers have never heard of cloud computing. A further 13% have heard of cloud computing but don't know what it is: that is, 63% of key decision-makers in IT companies have no understanding at all about cloud computing In contrast, only 15% and 11% have not heard of managed services and hosted services respectively.

Given the reliance within IT companies on non-IT professionals to make strategic technology decisions this is an important finding. But the research also discovered that as many as 12% of IT professionals in IT companies still have never heard of cloud computing and further 10% (so almost a quarter in total) don't know what cloud computing is about – a fact which may take some IT vendors by surprise The survey also reveals further confusion about the key reasons for adopting or not adopting this model. Security – widely perceived by the IT industry as the main barrier to adoption – is indeed the second highest perceived disadvantage of cloud computing Market research organizations, pundits and IT vendors of every persuasion are committed to cloud computing.

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