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Service Reliability in a hybrid Green cloud

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***Abstract*— GREEN CLOUD COMPUTING also called Green Technology(GCloud), is the environmentally responsible use of computers and related resources which features on Green use, Green disposal, Green design, Green manufacturing. Green Cloud Computing is the next big step in the internet's Era, which can provides everything to people as a Service(EaaS), whenever and wherever they want, for many applications, apparently it is reshaping IT processes and marketplace. Usage of Hybrid Green Clouds enhance the functioning of IT sectors. Hybrid GClouds couple the scalability offered by public Clouds with the greater control supplied by private ones. A hybrid Green Cloud broker acts as an intermediary between users , increasing growth of large data storage and computational demand. Green Cloud Computing is known to be a broad area and hot field for research. To capitalize various IT resources, Green Cloud computing has produced an ultimate and impressing way to virtualize servers and data centers and to make energy efficient. The IT resources consume huge avolumes of power and energy, which in return produces shortage in energy and bring ab. Therefore, there is changes a need of Green cloud computing which can produce solutions that can not only make the IT resources energy efficient but also minimize the operational costs. To solve environment issues in the IT sector, Green IT is named to be an important step for Gogreen scenario. It includes a large number of focus areas to provide proper management of power, server virtualization, data center design, method for recycling, eco-labeling, sustainability environment design and energy efficient resources etc. In this review firstly, a brief note on Hybrid Green cloud computing, Eaas or XaaS or *aaS(Everything as a Service),Resource broker Management(Monitoring as a Service , Communication as a Service , consistency as a Service) and Scheduling in Resource broker management system are made. As proposed this work investigates all of them to achieve a complete picture about cloud service reliability for a Green Hybrid cloud. Automata Theory, Queuing Theory and Graph Theory are mainly used here to model ,evaluate the cloud service reliability.**

***Index Terms*— Resource Broker Management , EaaS, Hybrid Green Cloud, Automata Theory , Queuing Theory ,Graph Theory.**

I. INTRODUCTION

Green cloud computing is a newly developed technology for complex systems with large-scale resource sharing, wide-area communication, multi-institutional collaboration, etc.. The real and specific problem that underlies the Green Cloud concept is coordinated resource sharing and problem solving in dynamic multi-institutional virtual organizations. This is got by a variety of collaborative problem solving and resource-brokering strategies[1]. This sharing is highly controlled by resource management system (RMS), with resource providers and a consumer defining what to be shared, who will be allowed to share, and the conditions under which the sharing occurs. Recently, Hybrid Cloud Services Architecture has enabled the integration of services and resources across distributed heterogeneous dynamic virtual organizations. A cloud serviceEaaS is designed to complete a set of programs under the Hybrid Green cloud circumstances making resource available 24/7 and "pay as you Go" basis. The programs may need distributed remote resources. However, they initially do not know the site information of those remote resources in such a large scale environment, so RMS plays an important role in managing the pool of shared resources, in matchmaking the programs to their requested resources, and in controlling them to access the resources through a wide-area network. The following are the work commitments,they are as follows:

Making the Queue for the LoadBalancing .

Provide MaaS(Monitoring as a Service), CaaS1(Communication as a Service),CaaS2(consistency as a Service) ,thereby making resource easier and quicker for access.

When a client requests for a resource , a Resource Broker of the RMS is invoked , the Resources Brokering is Carried out using SYL's Algorithm* which brings down the Probability of Defects in the Resource Brokering process[2].

Once when all the above mentioned features are enhanced most of the failures of the Cloud unit in each layers is removed, Resource Brokering and FAI-Failure Analysis are all inter-dependent on each other of an Effective CLOUD performance. Although the developmental tools and techniques for the cloud have been widely studied, cloud reliability analysis and evaluation are not easy because of their complexity of combining various failures interacting with one another[3]. As one of the important measures, the cloud service reliability needs to be quantified, assessed, and predicted using new models and tools.

II. PROBLEM DESCRIPTION

The cloud security mechanism in RMS operates to control the resource access using Certification, Authorization, and Authentication, which leads to various logical connections to cause dynamicity in the network topology. The above process can lead to different types of failures that make a cloud service unreliable. When the new requests of the cloud service arrive at the RMS, they cannot enter the request queue if it is full, so the blocking failure occurs. Usually, the cloud service may set

a due time for the matchmaking service of the RMS, so the time-out failure occurs if the waiting time in the queue is longer than the due time of the program. If the RMS matches requests to the wrong resources, the matchmaking failure occurs. Network failure may emerge when the programs are transmitting data through the network with remote resources. The programs themselves are software that may contain software faults causing program failures. The resources are usually heterogeneous, for example, they can be hardware, software, or firmware (such as database, protocol, processor, digital product, etc.) and, therefore, they may include either software or hardware faults that can induce the resource failures.

III. AREA OF SPECIALIZATION

Some of the area of specialization my reaearch is proposed to proceed with are drafted below:

GREEN CLOUD COMPUTING also called Green Technology, is the environmentally responsible use of computers and related resources which features on Green use, Green disposal, Green design, Green manufacturing.

Eaas or XaaS or *aaS the acronym refers to an increasing number of services that are delivered over the Internet rather than provided locally or on-site.

QUEUING THEORY is the mathematical study of waiting lines, or queue models which is constructed so that queue lengths and waiting time can be predicted.

GRAPH THEORY is the study of graphs , which are mathematical structures used to model pair wise relations between objects.

AUTOMATA THEORY is the study of abstract machines as well as the computational problems that can be solved .

A. Evolution Of Cloud Computing

Modern data centers, operating under the Cloud computing model are hosting a variety of applications like serving requests of web applications such as e-commerce and social ., transient workloads networks portals) to those that run for longer periods of time. The need to manage multiple applications creates the challenge of on-demand resource provisioning and allocation in response to time- varying workloads. Generally, data center resources are allocated statically to applications, based on characteristics of peak load, in order to regulate isolation and provide guaranteed performance. Until recently, high performance has been the sole concern in data center deployments and this demand has been many without paying much attention to energy consumption. The figure 1 shows the evolution of green computing.

WWH Question	Cloud of the Past		Cloud of the Present		Cloud of the Future		
	E-Business		IT as a Service		Everything as a Service		
WHY Function	•Internal based supply chain integration and e-commerce		•Consumerised internal services. •Low cost IT		•Pervasive business and consumer services		
WHAT Technology Orientation	•Web based app design. •EAI and Message bus integration internet protocols 3-tier architecture.		•Web 2.0 and SOA app design. •Virtualization •Cloud-Based technology platform.		•Data-Oriented,Context-aware services. •Vertical and horizontal ecosystem.		
HOW IT Organization Design	•Organized around technology domains. •Technology-centric		•Organized around service supply chain. •Service-centric.		•Organized around value networks. •Service-centric		
	1990	1995	2000	2005	2010	2015	2020

Figure 1. Evolution of Green Computing

B. Architecture Of Green – Cloud Computing

People in IT industry are reassessing data center strategies to determine if energy efficiency should be added to the list of critical operating parameters. Issues of concern include:

1. Reducing data center energy consumption, as well as power and cooling costs.
2. Security and data access are critical and must be more easily and efficiently managed.
3. Critical business processes must remain up and running in a time of power drain or surge .

These issues are leading more companies to adopt a Green Computing plan for business operations, energy efficiency and IT budget management. Green Computing is becoming recognized as a prime way to optimize the IT environment for the benefit of the corporate bottom line – as well as the preservation of the planet. It is about efficiency, power consumption and the application of such issues in business decision-making. Simply stated, Green Computing benefits the environment and a company's bottom line. It can be a win/win situation, meeting business demands for cost-efficient , energy-effect, flexible, more secure and stable solution, while demonstrating new levels of environmental responsibility. Below is the figure 2 describing the architecture of the proposal.

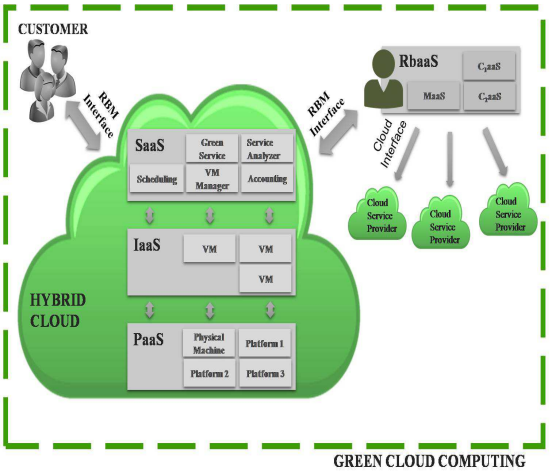

Figure 2. Architecture of the proposed work

C. *Algorithm Emphasising on Resource Constraint*

This is the Resource Brokering Architecture both for the client side as well as the Sever side. Refer Fig 4 for the architecture. In the Client side Tags are issued for every new resources into the queue and for Server side Tag Matching process takes place. Tag Matching is the process of checking for similar tags present in the requested Resource of the client with that of the resources in the Request bucket collection. If matched then the resources are forwarded to the request client as Response. In case of 'mis-match', it intimates the client that the resource is not available immediately they by reducing :1)Time out Failure 2)Blocking Failure3) Mis-Match of resource failure. This Architecture plays a vital role in Syl's Algorithm to improve the Probability of Defects in the Resource Brokering.

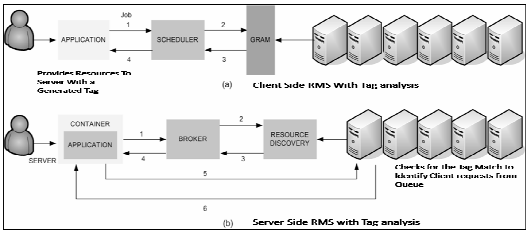

Figure. 3 Resource Broker Architecture

D. *SYL's SCHEDULING ALGORITHM*

SYL's algorithm is built upon the additional optimization of reducing the probability mean thereby producing an ease for cloud computational environment. The main objective of SYL's algorithm to dynamically schedule the process based on pre-emption that best suits among the clients. The ORC scheduling algorithm which repeatedly runs through a list of jobs and giving opportunity to each job for using the processor in succession.

Probability of defects in resource brokering = Waiting time -1

where,

$$\sum_{K=P1}^{K=Pn} R = 1 \qquad (1)$$

which can be expressed as,

$$\sum_{K=P1}^{K=Pn} R = \sum_{K=P1}^{K=Pn} \min \text{ (from ORC algorithm)} \qquad (2)$$

where K is the processor, P_n is the number of processors currently processing and R is the resources left in a dynamic queue for processing.

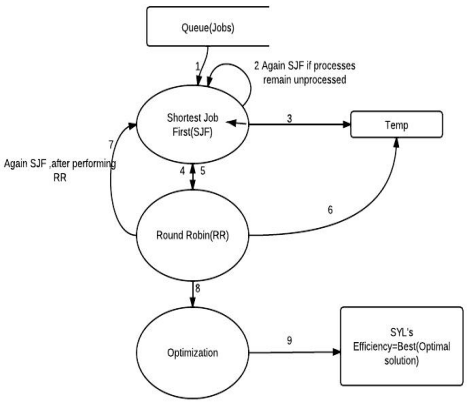

Fig. 4 Scheduling Based Frame Work for SYL's Algorithm

IV. MAJOR ADVANTAGES

Saves Time

By employing a cloud for the search engine the time for locating the required data is considerably shortened. This is possible by better utilizing and distributing existing computer resources.

Lower Computing Costs

On a price-to-performance basis, the Cloud platform gets more work done with less administration and budget than dedicated hardware solutions. Depending on the size of the network, the price-for-performance ratio for computing power can literally improve by an order of magnitude.

Faster Project Results

The extra power generated by the Cloud platform can directly impact an organization's ability to win in the marketplace by shortening product development cycles and accelerating research and development processes.

Better Product Results

The power created by the Cloud platform helps to ensure a higher quality product by allowing higher-resolution testing and results, and permits an organization to test more extensively prior to product release. The security, scalability, and manageability of Cloud technology have been proven.

Load Balancing

Cloud Computing Based Search Engine ensures that each node performs the same amount of work. i.e. the system is load balanced.

V. CONCLUSION AND FUTURE WORK

As the prevalence of Cloud computing booms to rise, there is an increase in the need for power saving mechanisms within the Cloud. This paper presents a Green Cloud framework for improving system efficiency in a data center. To demonstrate

the potential of frameworking, presented new energy efficient schedules. Though in this paper, we have found new ways to save vast amounts of energy while minimally impacting performance. Not only do the components discussed in this paper complement each other, they leave space for future work. In Future opportunities could explore a scheduling system that is both power-aware and thermal-aware to maximise energy savings both from physical servers and the cooling systems used. Such a scheduler would also drive the need for better data center designs. While a number of the Cloud techniques are discussed in this paper, there is a growing need for improvements in Cloud infrastructure, both in the field of academic and commercial space sectors. The usage of the blooming technology-RMI (Remote Method Invocation) for the RBM (Resource Broker Management) will find its way in the field of 'Heterogeneous system. This Green Cloud computing paradigm will enhance faster and more effective Green IT sectors.

VI. ACKNOWLEDGEMENTS

This work is published as a basic survey work for the productiveness of the Green IT where EaaS (Pay-as-Go) evolving eniveronment.

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