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Star: Sla-Aware Autonomic Management of Cloud Resources

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Abstract: Cloud computing has recently emerged as an important service to manage applications efficiently over the Internet. Various cloud providers offer pay per use cloud services that requires Quality of Service (QoS) management to efficiently monitor and measure the delivered services through Internet of Things (IoT) and thus needs to follow Service Level Agreements (SLAs). In this paper, we present SLA-aware autonomic resource management technique called STAR which mainly focuses on reducing SLA violation rate for the efficient delivery of cloud services. The performance of the proposed technique has been evaluated through cloud environment. The experimental results demonstrate that STAR is efficient in reducing SLA violation rate and in optimizing other QoS parameters which effect efficient cloud service delivery.

I. INTRODUCTION

QoS-aware aspect involves the capacity of a service to be aware of its behavior to ensure the elasticity, high availability, reliability of service, cost, time etc. as mentioned in SLA. Autonomic implies the fact that the service is able to self-manage itself as per its environment needs. Thus, maximizing cost-effectiveness and resource utilization for applications while ensuring performance and other QoS guarantees, requires leveraging important and extremely challenging tradeoffs.

SLA-aware autonomic cloud resource management technique called SLA-aware autonomic Technique for Allocation of Resources (STAR) for effective scheduling of resources which considers SLA violation rate along with other QoS parameters like execution time, cost, latency, reliability and availability. The objectives of this research work are: i) to propose an autonomic resource management technique for execution of heterogeneous workloads by considering generic property of self-management, ii) to optimize the above mentioned QoS parameters, iii) to reduce SLA violation rate and improve user satisfaction by fulfilling their QoS requirements and iv) to implement and perform evaluation in cloud environment.

II. LITERATURE SURVEY

Hierarchical SLA-driven resource management for peak power-aware and energy-efficient operation of a cloud data centre: In this There are a number of different resource managers in the datacenter. A VM manager (VMM) performs VM assignment and migration. A power manager (PM) manages the e power and performance state of servers whereas a cooling manager (CM) manages the cooling and air conditioning units. In order to achieve the minimum operational cost, coordination between these managers is necessary. The disadvantages complicated problem or propose methods to minimize the power consumption or energy cost by focusing on one or two of the mentioned aspects in this problem. Works are focused on minimizing the average power consumption in datacenter. A hierarchical resource allocation solution to minimize the server energy consumption and maximize SLA utility function is presented. SLA-based resource provisioning for hosted software-as-a-service applications in cloud computing environments: in this

Minimizing the cost by minimizing the penalty cost through resource provisioning based on the customer's credit level BFResv Resource Minimizing the cost by rescheduling the existing requests, Three high level considerations:

A. Impact of reservation strategies
B. Impact of QoS parameters
C. Performance Analysis under Uncertainty Future Interest Value

The disadvantage is that it can increase the cost in some cases due to delay penalties. For example, when a new customer requests to add more accounts on the VM which has been fullyoccupied by other requests, initiating a new VM may be more expensive than the delay penalty.

Decreasing impact of SLA violations: A proactive resource allocation approach for cloud computing environments: User's satisfaction level as an important factor in profitability for cloud service providers. We tried to investigate influence of two characteristics in user satisfaction level. Since these characteristics, called willingness to pay for service and willingness to pay for certainty, are unknown for service provider s, so new methods for estimation of them are provided. Also a new approach presented to reduce impact of SLA violations on users' satisfaction level. We investigate the mentioned approach in a resource allocation scenario. The conducted experiments demonstrate that in critical situations, the estimated characteristics can help the service provider to decide about which users should be served and which ones can be discarded. This can raise user satisfaction level as much as possible and leads to more loyalty of users and higher profit for service provider.

Many attempts have been done in looking for approaches and policies for resource allocations on dynamic resources such as clouds. Most the works in literature employ SLA and QoS constraints for resource allocation and ignore considering user's characteristics. Profitability as objective function plays an important role in decision making while us er satisfaction as a measure, with indirect effect on profitability, has not received enough attention

Optimization of Resource Provisioning Cost in Cloud Computing: Solving cost - sensitive prediction Resolve over and under provisioning problems Improves the service quality of the cloud Reduce the time and cost of the customers and meets the increasing demand of service providers

OCRP algorithm to make an optimal decision based on which Virtual machines can be allocated to the consumers.the solution of the OCRP algorithm are considered including deterministic equivalent formulation, a method called sample- average approximation, and a decompositions called B enders decomposition. Extensive numerical studies are performed in which the results clearly show that with the OCRP algorithm, consumers can minimize the total cost of resource provisioning in cloud computing environments.

III. EXISTING SYSTEM AND PROPOSED SYSTEM

A. *Existing System*

In existing system, interact with the system using available user interface. Our existing research work considers only few QoS parameters of self-optimizing without considering SLA violation rate.The execution time in existing resource management techniques but it i necessary to consider latency separately to test the capability of individual resources using in real time applications. The cloud provider should evolve its ecosystem in order to meet QoS requirements of each cloud component. To realize this, there is a need to consider two important aspects which reflect the complexity introduced by the cloud management should be considered: first 46 QoS-aware and second autonomic management of cloud.

1) Disadvantages

a) Identify threats by correlating real-time alerts with global security intelligence.
b) Proactively protect information.
c) Prevent data exfiltration
d) Integrate prevention and response strategies into security operations

B. *Proposed System*

In proposed system, resource scheduling framework (QRSF) has been proposed, in which provisioned resources have been scheduled by using differentresource scheduling policies (cost, time, cost-time and bar gaining based). In QRSF, manual resource scheduling is considered which further needs lot of human work every time to schedule resources to execute workloads by fulfilling their QoS requirements.To propose an autonomic resource management technique for execution of heterogeneous workloads by considering generic property of self-management. To optimize the above mentioned QoS parameters. To reduce SLA violation rate and improve user satisfaction by fulfilling their QoS requirements. To implement and perform evaluation in cloud environment. The performance of STAR has been evaluated in real cloud environment and the experimental results show that the proposed technique per- forms better in terms of SLA violation rate as compared to existing resource management techniques.

1) Advantages

a) To propose an autonomic resource management technique for execution of heterogeneous workloads by considering generic property of self-management,
b) To optimize the above mentioned QoS parameters,
c) To reduce SLA violation rate and improve user satisfaction by fulfilling their QoS requirements and
d) To implement and perform evaluation in cloud environment.

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IV. FLOW DIAGRAM

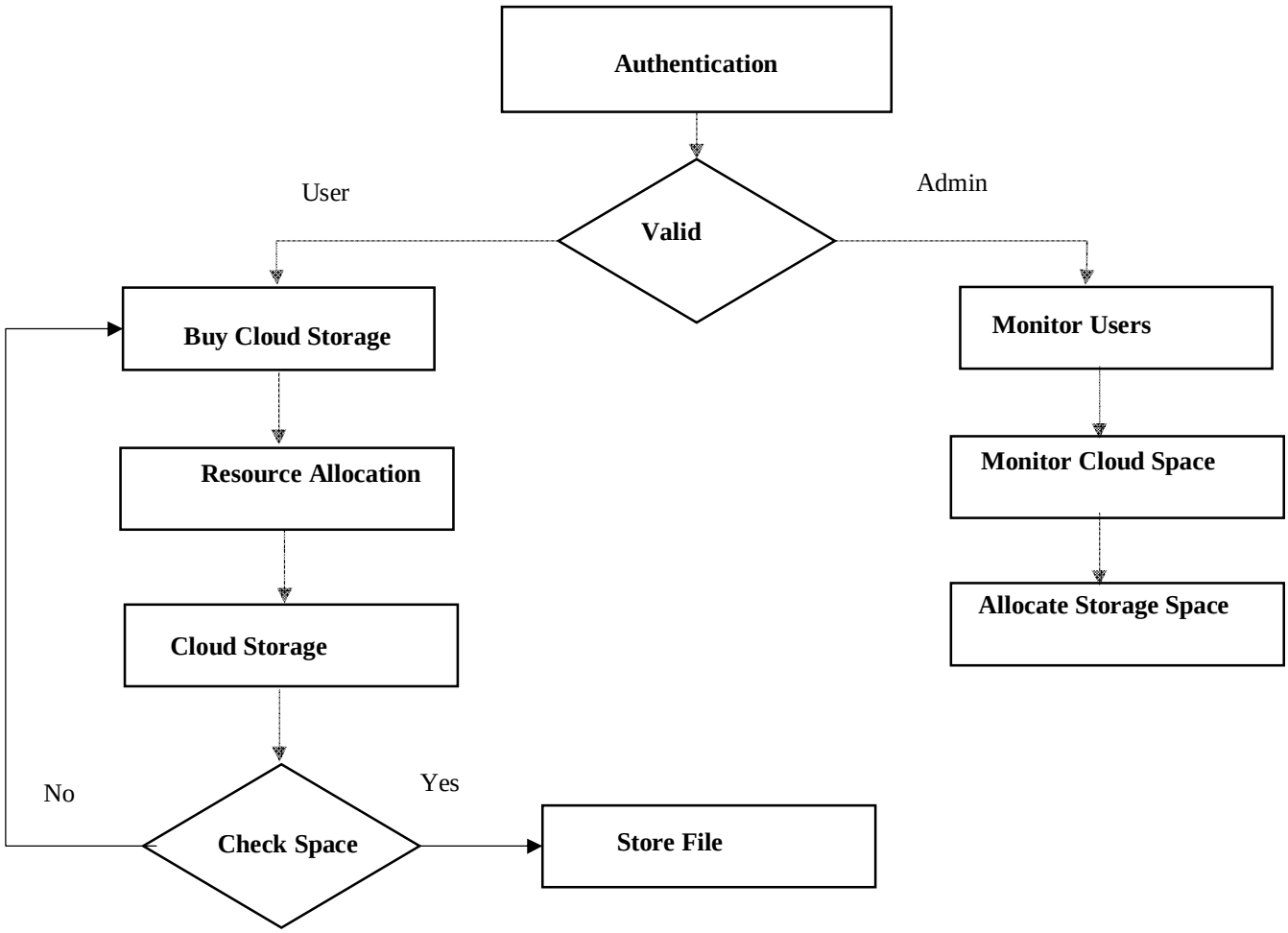

Figure 1: Design Flow Diagram

V. DESIGN METHODOLOGY

A. Design Modules are

1) User

a) Authentication
b) Buy Cloud Storage
c) Resource Allocation
d) File Storage

2) CSP

a) Cost Analysis
b) STAR Monitor

B. Module Description

1) Authentication: In this process the main concept is to aware autonomic management of cloud resources. The main process is authentication. For authentication we want to register our details to the CSP.Every user want to register their details in this process, at the time of registration they can give their all details also.After the registration process is completed only they can store their files in their cloud storage. Before that we want to buy the cloud resources from the CSP through the specified cost.

2) *Buy Cloud Storage*: Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the internet, or "cloud." It is maintained, operated and managed by a cloud storage service provider on a storage servers that are built on virtualization techniques. After user register their details they can login into this system. First they want to buy their cloud storage spaces available regarding their cost benefits. Each cloud server has different types of available Sizes and cost. Regarding their storage size the cost of the each cloud storage cost will be differ. After buying the cloud storage only they can upload their files in their cloud.
3) *Resource Allocation:* This framework for modeling and simulation of cloud computing infrastructures and services. Originally built primarily at the Cloud Computing and Distributed Systems It provides essential classes for describing data centers, computational resources, virtual machines, applications, users, and policies for the management of various parts of the system such as scheduling and provisioning. Cloud Sim provides a generalized and extensible simulation framework that enables seamless modelling and simulation of app performance. By using Cloud Sim, developers can focus on specific systems design issues that they want to investigate, without getting concerned about details related.
4) *File Storage:* After registration only the user can login into this system using the name and password. User can upload their files into the cloud and they can also view the files from the cloud. Before uploading the files into the cloud they want to check their file size with their cloud storage size. If their file size is too long than the cloud size, the files will not be store. At that time we want to again buy the cloud storage.Computer data storage, often called storage or memory, is a technology consisting of computer components and recording media used to retain digital data. It is a core function and fundamental component of computers. The central processing unit (CPU) of a computer is what manipulates data by performing computations.
5) *Cost Analysis:* Cost benefit analysis (CBA), sometimes called benefit cost analysis (BCA), is a systematic approach to estimating the strengths and weaknesses of alternatives. The CBA is also defined as a systematic process for calculating and comparing benefits and costs of a decision, policy (with particular regard to government policy) or (in general) project. Cloud Service Provider view the user details through the cost basis.Cost-Benefit Analysis (CBA) estimates and totals up the equivalent money value of the benefits and costs to the community of projects to establish whether they are worthwhile. These projects may be dams and highways or can be training programs and health care systems.
6) *STAR Monitor:* Sensors get information about the performance of current state of nodes using in the STAR. For analyzing SLA Status, the analyzing unit starts analyzing the behavior of QoS parameters of a particular node after alert is generated by QoS agent. That particular node is declared as 'DOWN' and restarts the failed node and starts it again and measures the status of that node. If the node status changes to 'ACTIVE', then continue its execution, otherwise add new resources in these consecutive steps: [i) current node is declared as dead node, ii) remove dead node, iii) add new resource(s) and iv) reallocate resources and start execution].

VI. RESULT AND ANALYSIS

Figure 2:User Home Page

Figure 3: Buy Cloud

Figure 4: Storage

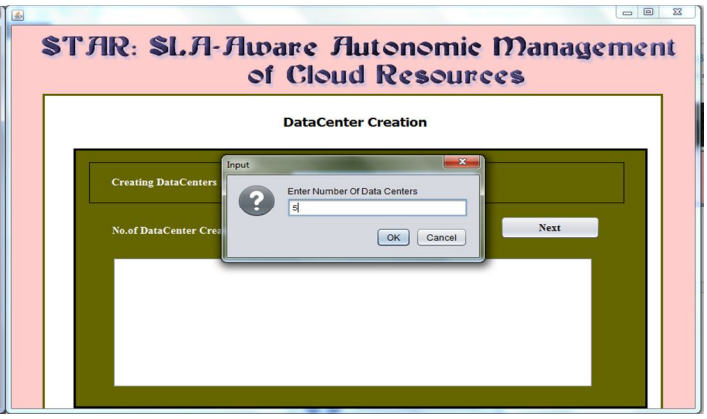

Figure 5: Datacenter Creation

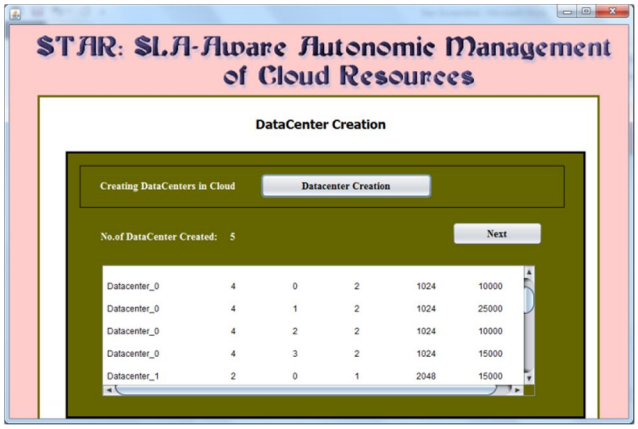

Figure 6: Cloudlet Creation

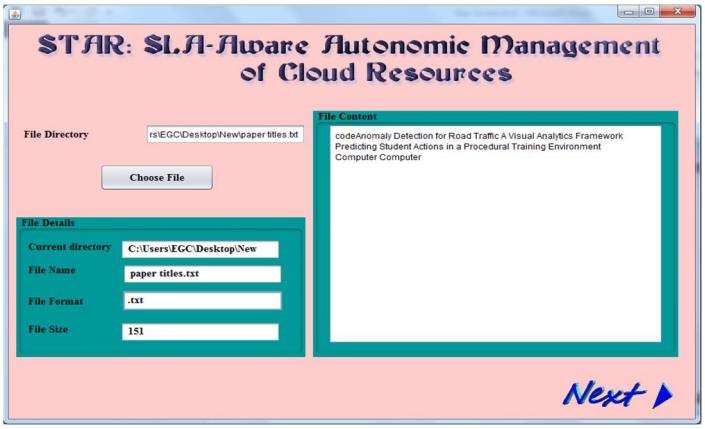

Figure 7: Storing Data into Could

VII. CONCLUSION

Cloud based SLA-aware autonomic resource management technique (STAR) has been proposed for execution of heterogeneous workloads by considering generic property of self-management. The main aim of STAR is to reduce SLA violation rate and improve user satisfaction by fulfilling their QoS requirements. Further, STAR considered different QoS parameters such as execution time, cost, latency, reliability and availability to analyze the impact of QoS parameters on SLA violation rate. The performance of STAR has been evaluated in real cloud environment and the experimental results show that the proposed technique per- forms better in terms of SLA violation rate as compared to existing resource management techniques.

VIII. FUTURE ENHANCEMENT

In Future, STAR can be extended further to add sensitivity of assumptions in weight calculations of both homogenous and heterogeneous cloud workloads. Cloud providers can use these results to quickly assess possible reductions in execution time and cost, hence having the potential to save energy. STAR can also be extended by identifying relation- ship between workload (patterns) and the resource demands (demands for compute, storage, and network resources) in the cloud which will further improve the performance. STAR currently considers cost, execution time, SLA violation, availability, reliability and latency QoS parameters. Further, STAR can be enhanced to work with some other parameters also energy efficiency, attack detection rate, resource utilization and resource contention, scalability etc.

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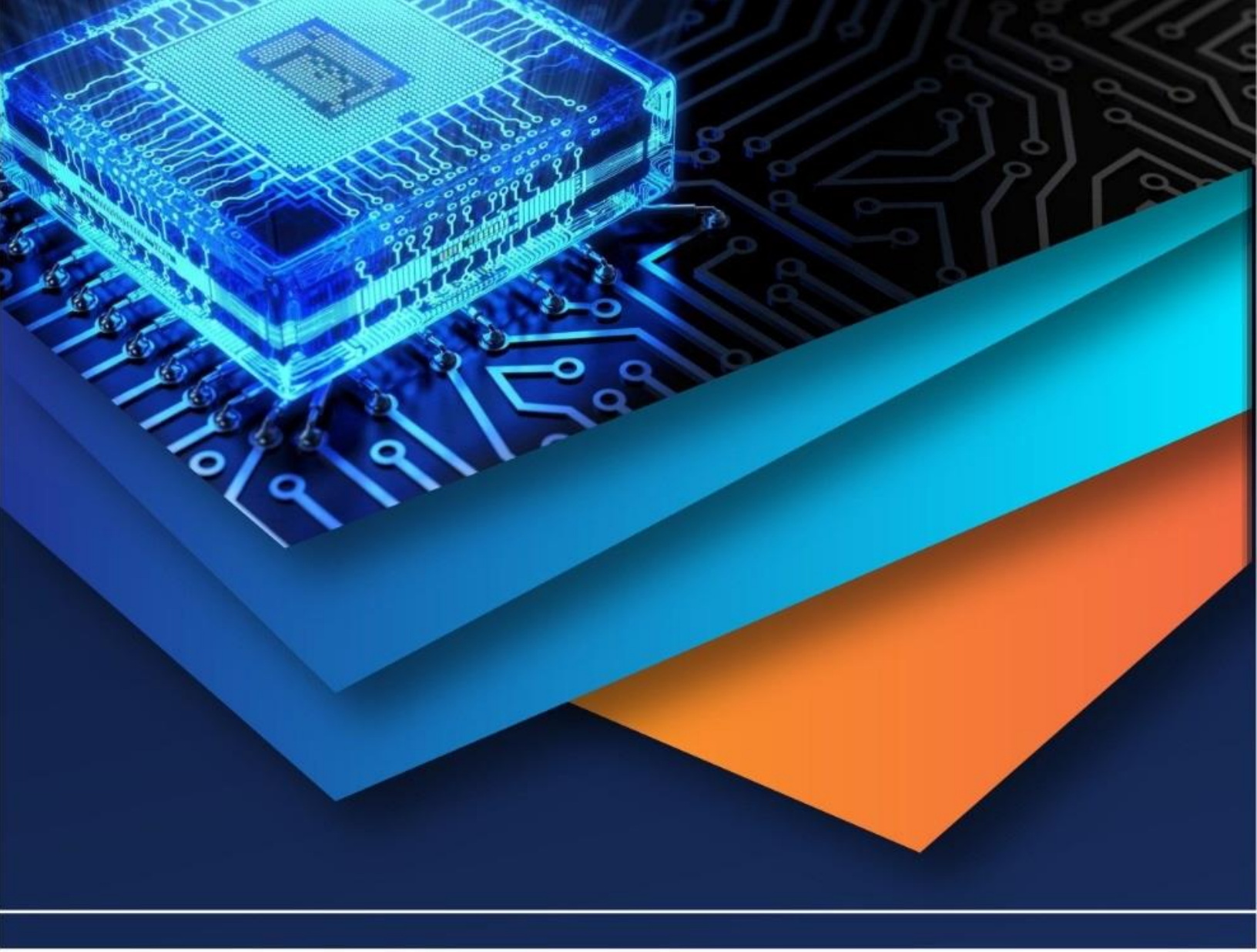

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