Equitable Resource Allocation and Fair Share Management in Multi Cloud Computing

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Abstract—Many people's now a day's migrating their load on the Cloud service providers premises. To increase utilization of resources and maximize revenue provider try to provide services not only to local customer but also make their free slot available to global customer. As the all service provider provide their free slot or a full machine to satisfied global users request create a multi Cloud environment. At one side this fundamental increase the resource utilization of every providers other side it suffer from issue of equitable allotment of user request between providers and share revenues as per the usage of slot of various providers. If proper care not taken in both this fundamental then it might be possible some providers get heavy load but the share is not according to number of slot it provided. So the main purpose must be to develop a system which make an efficient scheduling which allocate the resource equally on various providers machines as well effectively manage the share which distributed among them.

Keywords —Cloud Computing, Resource allocation,Scheduling,Workflow

I.INTRODUCTION

History

Cloud Computing is a type of computing and it is considered as a new era of computing. For rapidly emerging new paradigm for delivering computing as a utility cloud is considered. In cloud computing variety of services are demanded by various cloud consumers as per cloud's dynamically changing needs. All the demanded services to the cloud consumers are fulfilled by cloud computing and it is the job of cloud computing. Difficult task for cloud providers to provide all the demanded services because of the availability of finite resources. Cloud resources must be allocated in a fair manner as per the point of view of the cloud providers. So, it's a essential point to light on cloud consumers' QoS requirements and satisfaction.

Cloud Computing[11,12]

"Cloud Computing is build on the web-based computing, it provides users or devices as share pool of resources, information or software on demand as pay per-use basis". It allows end user and small companies to make use of various computational resources like storage, software and processing capabilities provided by other companies such as Amazon or Microsoft. Cloud is a type for enabling convenient, ubiquitous, on-demand network access to a communicated pool of adjustable calculating resources that can be fast released and provisioned with minimal organization effort or facility provider communication. Cloud model is composed of four deployment models , three service models and five characteristics.

Cloud Service Model : [13,14]

Cloud service models explain the key of service that the facility provider is presenting. The most important models are:

(1) Software as a Service (SaaS) : It is a fully operating background with management ,the user interface and applications,. In this model, the application is given to the customer through a thin customer's responsibility, and the customer interface ends and begins with managing its data ,user interaction and entering .All from the application infrastructure is the seller's responsibility.[7,8,10]

(2) Platform as a Service (PaaS) : The customer can use its applications on this infrastructure that were programmed using tools and languages that are supported by this facility provider. The facility provider handles the enabling software the cloud infrastructure and the operating systems. The customer is responsible for managing and installing the application that it is using. This service provides operating systems ,virtual machines, development frameworks , applications, services, control structures development and transactions.[9]

(3) Infrastructure as a Service (IaaS) : This service provider handle all the communication, while the customer is responsible for all other features of the organization. IaaS can comprise the user interactions with the system, applications and operating system. This provides virtual storage , virtual machines, other hardware assets and virtual infrastructure as sources that customer can stipulation.[7]

Resource Allocation[15]

Available resources of the cloud applications in the internet are assigned by resource allotment in cloud computing. If the allotment is unmanaged then resources allocation suffer services . The service providers are allowed for managing the resources for each individual modules by resources provisioning to solves that problem.

Resource Allocation Strategy :

Resource Allocation Strategy (RAS) is indicating the mean value of cloud provider activities to the limit of cloud environment for exploit and assigning sparse resources so that light for the requirement of the cloud application. Each application's necessary is required the type and quantity of resources by RAS in order to complete a user job. Optimal RAS have an inputs are the order and time of allocation of resources . An optimal RAS should circumvent the backing basis as follows:

(a) Resource contention the same resource at the same time are accessed by two different applications at that time the situation arises is called resource contention.
(b) Resource Scarcity emerge when resource have problem of limitation.
(c) fragmentation of Resource case emerge in the isolated resource. Resource will not be too much but for the needed application there is not able to allocation.
(d) Resource Over-provisioning resources emerge in the application of oversupply resources than demanding.
(e) Resource Under-provisioning for resources emerge in the application is allocated of hardly any numbers of resources as compare to the demand.

Users of resource (users of cloud) evaluate for resource request for complete the job before the evaluate time should guide to the resource of over-provisioning. Providers of resources allotment for resources should guide the resource of under-provisioning. For succeed in dealing with the mentioned in above inconsistency, cloud providers and users have the necessity of input. For the cloud user's view, the major inputs to RAS are the requirement of application and Service Level Agreement (SLA). RSA managing and allocating resources on host applications, Inputs are required from the other side are the offer the resource, status of resource and able to the resource[16] of resources. Throughput, latency and response time are the parameters that must be satisfied by the any optimal RAS outcome. Despite a fact that cloud provides trustworthy for resources, it have create the critical problems in assigning dynamically the resource and managing to the applications too.

II.RELATED WORKS

For the demand fatten for provisioning resources and computation in cloud systems resource management is the prime issue. Resource provisioning, job scheduling, load balancing, scalability, pricing, energy management and availability etc are the issues and challenges.

2.1:"Cloud Workflow Scheduling with deadlines and time slot availability"[1]

"In this paper[1] author proposed a workflow scheduling that cloud service providers provide available time slots to new user's requests based on available capacities. For solution two greedy and Fair based improvement strategies and a perturbation strategy are proposed .User have time slot availability and it decrease the cost."

2.2: "Preference-Based Economic Scheduling in Grid Virtual Organizations"[2]

"In this paper [2] preference-based approach is proposed for grid computing with regard to preferences given by various groups of virtual organization stakeholders to improve overall quality of service and resource load efficiency. A specific cyclic job batch scheduling scheme is examined in paper which enables to distribute and share resources considering all the stakeholder's preferences and find a balance between VO global preferences and those of its users."

2.3:"Cloud Flat Rates Enabled Via Fair Multi-Resource Consumption" [3]

"In this paper [3] Flat rates for services that telecommunications sector has shown that customers prefer flat rates. And that defines the utilization thresholds, to cap the usage of heavy customer and thereby limit their impact on the flat rate price and the cloud performance. It defines customer's fair "cloud share" and according utilization thresholds complex due to customer consume multiple heterogeneous resources in clouds."

2.4"An Effective Task Scheduling Approach For Cloud Computing Environment" [4]

"Author proposed [4] efficient task scheduling algorithm for multi cloud environment. Perform extensive simulation of the proposed algorithm on benchmark data and compare the result with the existing algorithms. Algorithm performs better in terms of make span and resource utilization. Introduce the turnaround time."

2.5 "GA-Bases Customer-Conscious Resource Allocation and Task Scheduling in Multi-Cloud Computing" [5]

"Author [5] propose algorithm to bridge the gap between frequently changing customer requirement and available infrastructure for the services, Algorithm divided into two phases one is generic algorithm based resource allocation and second is shortest task first scheduling. The objective is to map the tasks to VMs of the multi cloud federation in order to have minimum make-span time and maximum customer satisfaction."

2.6 "Credibility-based cloud media resource allocation algorithm" [6]

"Author[6]propose a credibility-based cloud media resource allocation(CCMRA) algorithm is proposed in this paper. According to the continuous ,the resource applicants and resource owners submit their request to the allocation agents. Based on the total credibility, the allocation agents allocate the media resources to get the optimal allocation sequence for higher allocation efficiency and Quality of Service(QoS)."

III.COMPARISON OF VARIOUS RESEARCH SCHEMES

Table indicate that given data are the comparison of the various schemes proposed by researchers. The table gives the description of the basic technique used with the benefits that researcher gets as well as the limitations found in schemes.

Criteria Group →	Parameters							
Individual Criteria → Providers ↓	Multi Cloud Computing	Time Slot Based	Preference Based	Work Load	Fair Sharing	Credibility based	Scheduling Strategy	Single or Multi Resource
[1]	✓	✓	X	X	X	X	X	Multi
[2]	X	X	✓	✓	X	X	X	Single

[3]	✓	X	X	X	✓	X	X	Multi
[4]	X	X	X	✓	X	X	✓	Single
[5]	X	✓	X	✓	X	X	X	Single
[6]	✓	X	X	X	✓	✓	✓	Multi

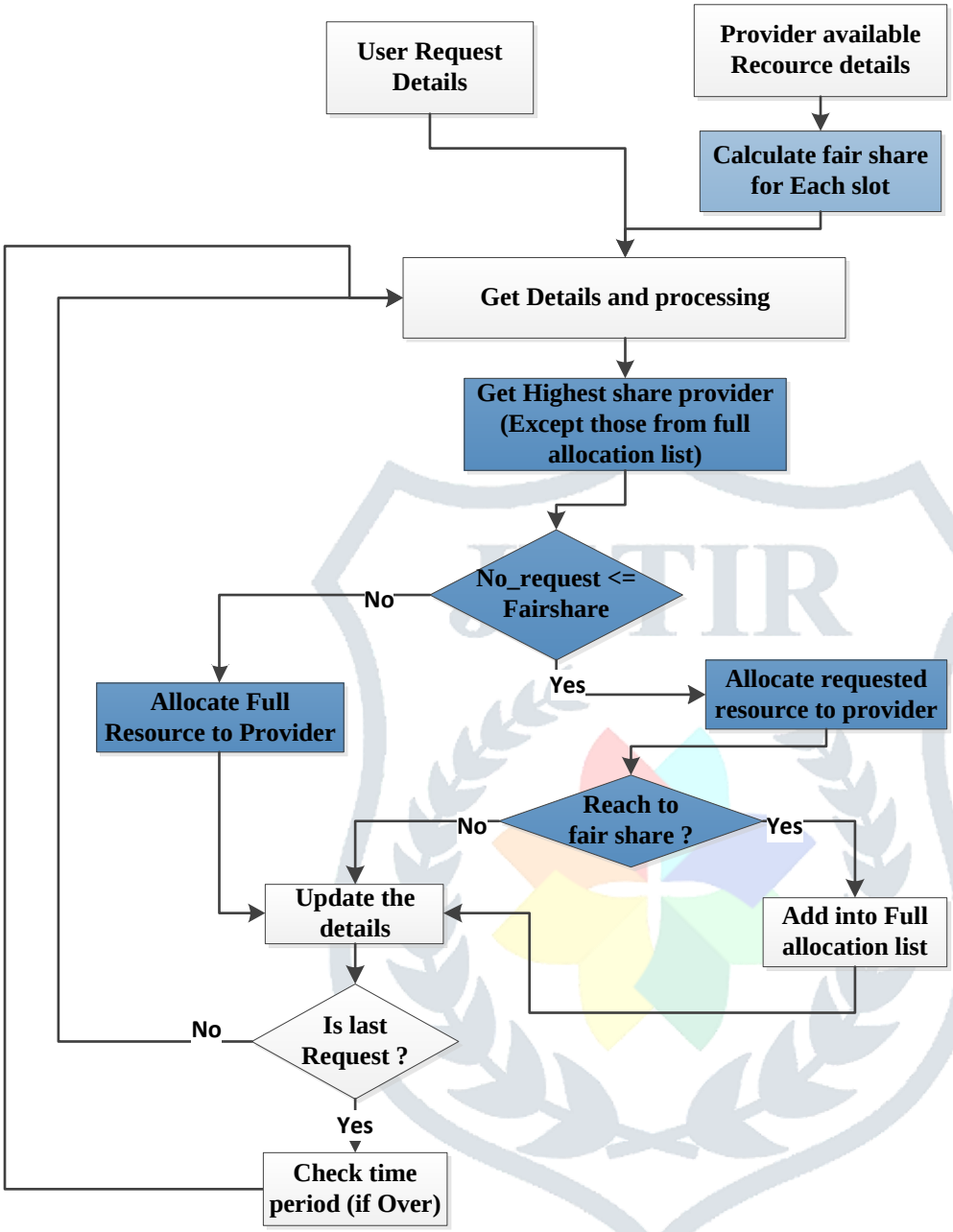
Table 3.1 Comparison study

IV.Proposed Methodology

The system will work on Fair Resource allocation. User send request to the system. Provider send available resources details to system. System calculate fair share for each provider. Provider have more fair share then it will have more profit. If number of request > fair share then allocate full resource to that particular provider. After that system update details. If it is last request to that provider then it's stop otherwise it continue with the beginning flow.

For request allocation system get highest share provider(except those from full list) and system will allocate requested resource to that provider. System check if provider reach to fair share then add that provider into full allocation list if not then update the detail of provider. System check if request is last to provider then stop the system else continue the system with beginning flow. In allover system work on Fair share management of resources and resources are allocating equitably. And increase allover satisfaction level of cloud user.

Flow Chart



Algorithm Steps:

Step 1: Start.

Step 2: Provider put details of available resource

Step 3: Get details and calculate fair share for each slot

Step 4: User put request and preference details.

Step 5: Get details and processing.

Step 6: Get highest share provider (except those from full allocation list)

Step 7: Check Number of request<= Fair share then continue else go to step 11

Step 8: Allocate resource to provider

Step 9: Update share details

Step 10: If last request then go to step 14 else go to Step 5

Step 11: Allocate resource to provider

Step 12: If provider not reach to fair share then go to step 9 else continue

Step 13: Add provider to full allocation list and go to step 10

Step 14: Check time period if that over then go to Step 5

(1) This Table 4.1 represent the no. of request V/S request allotment. when request arrive then in existing allotment, requests are allocated as per the maximum resources are shared by providers so in that all provides have not given chance to serve. While in proposed allotment, requests are allocated as the share of resources with system by providers. So that in proposed allotment each provider have chance to serve as per their resource share. Provider have more share then it will have more resource allotment and will have more profit and this approach is not used in existing.

Table 4.1 : Comparison of different request allotment

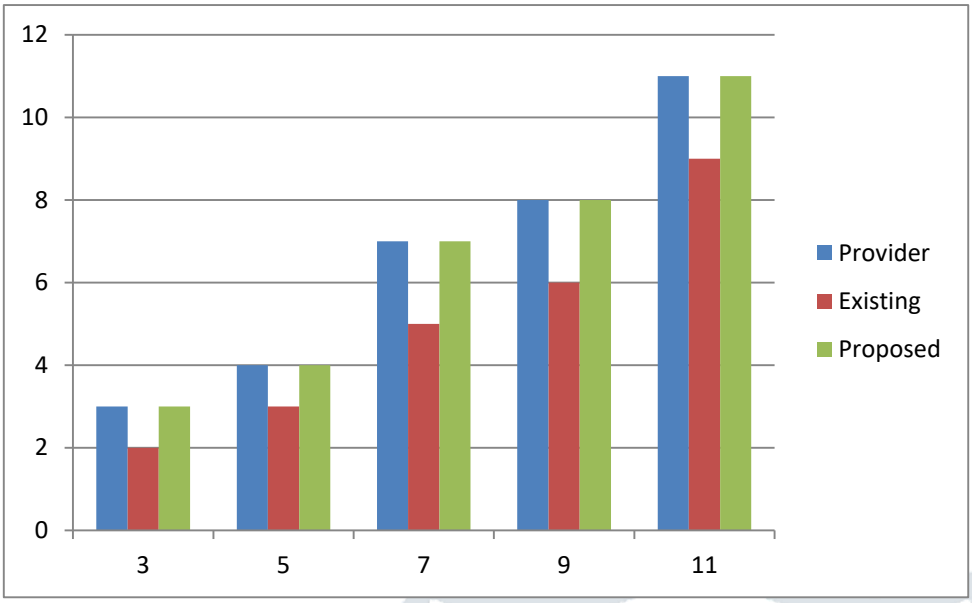
	Providers Resource			Allotment Existing			Allotment Proposed		
R	U1	U2	U3	U1	U2	U3	U1	U2	U3
10	8	7	4	8	2	0	4	4	2
15	3	7	10	0	5	10	2	5	8
20	6	11	10	0	11	9	4	8	7
25	13	6	8	13	4	8	12	6	7
30	9	15	11	4	15	11	8	13	9

(2) This Table 4.2 shows the no. of provider have chance to serve for requests.

Table 4.2 : Request allotment to provider

R	Provider	Existing	Proposed
3	3	2	3
5	4	3	4
7	7	5	7
9	8	6	8
11	11	9	11

The below chart shows the allotment of total requests.



V.CONCLUSION

From all the above analysis we can conclude that...

In cloud computing user have different type of request for various resources which not satisfied by single provider. It's need to different type of services in multi-cloud environment from multiple service providers. Our proposed scheme taking care of equal amount distribution of user request among the providers. Our system have equitable resource allocation to all the providers. And have fair share management system .If provider have more fair share then it will get more user request.

Our system maximize the resource utilization and maximize the profit of resource providers. And increase overall satisfaction level of cloud user.

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