RFD based on Resource Scheduling Technique in cloud Computing

Nihar Ranjan Nayak, S. Bhubaneswari

Abstract--- Cloud computing is recent emerging trends and server based technology.to provide different platform, computing resources and services to users. Now a days resources scheduling is most challenging issues that is how we providing and allocating resources in efficient manner. In this paper nature inspired based river formation dynamics (RFD) algorithm has proposed to mapping the cloud resources to cloudlet (workload). The experimental result produced reduce execution time and execution cost of all resources.

Keywords— Cloud Computing; Resource Provisioning; Resource Scheduling; RFD Algorithm.

INTRODUCTION

Cloud computing is virtualized provide resources according to the user requirement in cost effective way. Cloud computing is also known as utility computing.it implies greater flexibility, reduce total cost, service oriented architecture, reduce it overhead for the end user, on demand service, and also reduce total cost of ownership[(Science, Che, Zhu, Fairfield, & Khaleel, n.d.)]

The prototype of Cloud computing Model and services are classified into different types, Models are public cloud, private cloud, hybrid cloud and community cloud. And Services are IaaS (Infrastructure as a Service)for example processing power, CPU, Memory etc, PaaS (Platform as a Service) for example it provide platform like software life cycle process, and SaaS (Software as a Service) foe example it provide software to remote access by user.[(Ranjan Nayak & Associate Professor Registrar, 2018)]. Description about models firstly in case of Public cloud: no restriction to access, user can utilize the resources access from any places. And going to second is Private cloud is used in particular company provide security access to user and third is Hybrid (both the private and public cloud) and community cloud basically handled by third party services.

Virtualization is the process of handling lot of servers at a time. It's looking like real but not. Anyway whatever function is working in virtualize environment that is real. Overall it working like multiple operating system operate in single physical machine. It handles thousands of server at a time. In virtualization technique simple multiple operating systems run on a single physical machine.[(Nayak & Bhuvaneswari, n.d.)]

Cyberinfrastructure is an important thing in cloud computing. It also provides quality, reliability and efficiency of sharing of resource and service.[(Vouk, 2008)].

Now a days to managing efficient resource in cloud is more difficult because resources are growing day by day.to overcome this problem we have to search out the solution of scheduling of resources then supplies to user.

Basically resource provision contains of 2 types

1. on-demand
2. Long term reservation.

In on-demand process resources are providing as soon as possible (urgent workload).and one problem with on-demand that is executing too many workload at a time which show the degradation of performance or over provisioning.

In long term reservation, too many resources are not used that is in idle state. So it is called under provisioning. Basically under provisioning and over provisioning of resources are loss of time and cost.[(Singh & Chana, 2015)]

LITERATURE REVIEW:

Sukhpal singh, Indderveer chana: proposed provision of resources in quality of service based computing and implemented in cloudSim tools for reducing execution time and cost but without considering Response time.

Pablo Rabanal, Ismael Rodr´ıguez, and Fernando Rubio proposed solving dynamic TSP and Steiner tree problem.in case of solving tsp by using river formation dynamics it has both static and dynamics graphs and rfd is giving better solution then aco.[(Rabanal, Rodríguez, & Rubio, 2010)]

Raicu I, Zhao Y, Dumitrescu C: proposed provision of dynamics resources and different policies metrics without following time, cost and response time.[(Raicu, Foster, Stevens, & Szalay, 2007)]

Dunren Che, Mengxia Zhu, Jason Fairfield, and Mustafa Khaleel is proposed vendor in- dependence, improved availability (due to reduced Internet dependence), and increased resource utilization. "greener" environment. Without considering Execution time, cost and Response time.[(Alahmadi, Che, Khaleel, & Zhu, 2015)]

Christian et al. proposed deadlined of provision of resources in Aneka hybrid cloud tools and that technique follows makespan reduces without considering response time.[(Vecchiola, Calheiros, Karunamoorthy, & Buyya, 2012)]

RFD ALGORITHM:

It's a nature inspire algorithm and Copying how water forms river eroding the ground. As water transform the environment, altitude of a place dynamically modified (inc/dec) and depositing sediments. decreasing gradient will created and then gradient followed by subsequent water

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drops to create new gradient like this process is going on. So best solution are giving in the form of when altitude is decreasing [(Rabanal, Rodr, & Rubio, 2008)].

At first normal environment/ flat environment is there, each and every node put in same altitude. And final node is fixed. Then drops are released from initial node and it automatically spread to environment and some of the drop reached into final node. And after some time erosion process will start, each and every adjacent node erode and create new slope down. And at last new path will found that is final path. First of all the blockage path and inefficient path is handle by erosion process.

When water is passing, if one node is lower than other node that time the drop will deposit sediments at the same time node of altitude will increases. Then compare/ match process will follows which means node and adjacent node altitude will match which will escape other drop fall to both the nodes.

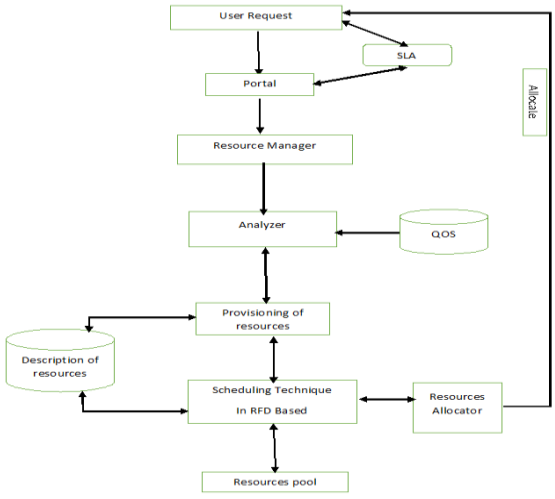
APPLIED TO CLOUD:

So when we start mapping RFD algorithm to Cloud Sim tools, the below scheme follows: drop is "cloudlet" that is number of workload and node referred to the "vm" that is number of resources. So according to decreasing gradient cloudlet is mapping to vm. Here weight of vms is host MIPS that is fixed. When while loop is executing (Move all the Cloudlet around Vm ()) the probability of two vms is calculated as:

$$P^{b}(VM_i, VM_j) = \frac{\Delta De\ (VM_i, VM_j)}{\sum_{VMk=1}^{coVm(i)} (\Delta De\ (VMi, VMj))}$$

Here VM(k) is the set of vm and CoVM(i) is connecting VM, so we will calculate each vm by its altitude and Weight of vm that is MIPS. In this process we calculate all vm and when first vms all resources are executed it destroy and add some sediments (increase the value) and follow the process.

Architecture Diagram:



(Fig 1: Architecture Diagram of Resource Scheduling)

The above fig1 shows the architecture diagram of resource scheduling using River formation dynamics algorithm. The user will send the request to the portal, the resource manager will take the decision. If resources are available through analyzer all process will follow. The analyzer is directly connecting to datacenter access, and available resource provision, each and every resource through RFD scheduling technique it allocates to users. In analyzer lot of QoS parameters added it may be both homogeneous and heterogeneous.

Resource manager contains

1. Managing the SLA
2. Maintain the resources
3. Dynamically updating resource status

Parameters:

Parameters	values
a. Number of resources	(15,30,60,120,180)
b. Number of cloudlet/workloads	(350,400,500,600,700)
c. Bandwidth	(1000-4000)bw
d. Number of PE per machine	1
e. Cost	$ 0.5

Algorithm:

Input:-Number of resource and number of workload
Result:-Mapping between all workload and resources
Start: - Initialized Resources [Number of resource list]
Initialized workloads [Number of job lists]
D= droplet
N=VM
IN=Initialized VM
DN=Destination VM
At=Altitude of VM
DN=0;
While (All the cloudlet not follow the same path ()) and (condition are not Match ())
Move all the drop around Vm ()
Altitude of Vm erode the path ()
Altitude of all Vm deposit sediments ()
Analyzed the path completely ()
End While
End

EXPERIMENTAL RESULT:

From experiment of RFD scheduling algorithm, we used Cloud Sim toolkits with 700 workload and 180 resources. Basically, cloudlet is a file associated with the workload which contains input file size, output file size, memory, cost per workload, multiple instructions (MI) are the parameters of cloudlet properties, and in VM too we have taken MIPS, ram, bandwidth, PES number etc. Below these many parameters and value we have taken to validate our result.

Execution Time and Cost:

The time and cost of each Resources we calculated in three algorithm that is PSO, ACO, RFD. The below diagram shows Execution time is decreasing all the algorithm. Where RFD is giving better performance when comparing to ACO and PSO. We have taken 15 to 180 resources and when Resources are increasing Execution time decreasing. And same to the cost, when Resources are increasing Execution cost decreasing. As compared to ACO and PSO RFD giving better execution time and cost.

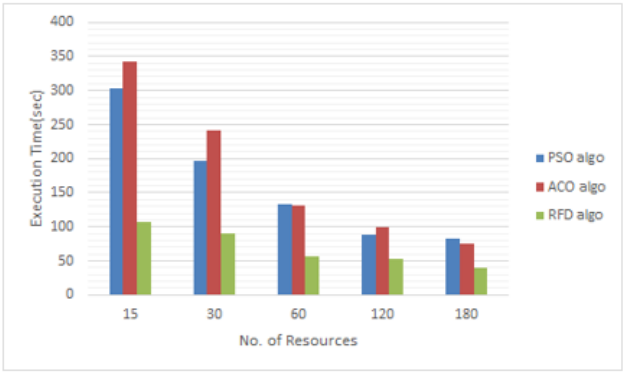


Fig 2: Execution time of PSO,ACO and RFD

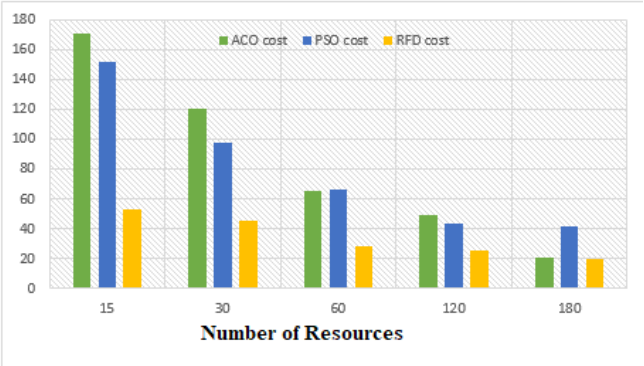


Fig 3: Execution cost of ACO,PSO and RFD

Response time:

In the case of response time, we have taken a number of workload and number of resources for calculating Response time. Fig 3: firstly comparing Response time RFD algorithm also with PSO algorithm. And RFD has given better Response time. And comparing to ACO, it is less.

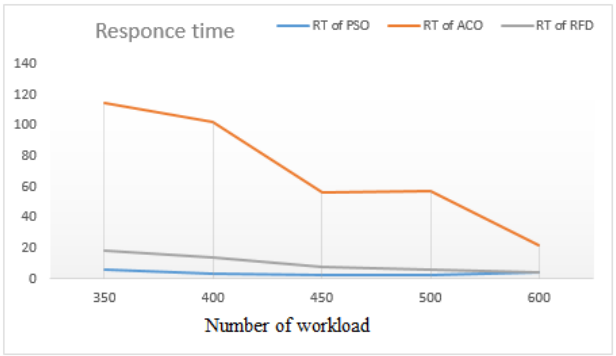


FIg 3: Responce time PSO,ACO and RFD

CONCLUSION:

Cloud computing is recent trends and service-based technology to provide different platform, computing resources to users (qos based, SLA based etc). In this paper, nature-inspired based river formation dynamics (RFD) algorithm has proposed to map ping the cloud resources to cloudlet (workload). I have taken three algorithms RFD, ACO and PSO from experimental result RFD produced better execution time and cost comparing to another algorithm. For comparing Response time RFD giving the better result than PSO. A lot of researchers focused on scheduling technique with the different meta-heuristic algorithm. The proposed work properly discussed allocating the resources efficiently.

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