PRE-EMPTABLE SHORTEST JOB NEXT SCHEDULING IN PRIVATE CLOUD COMPUTING

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***ABSTRACT*:** *Cloud computing is a term for different technologies that provide computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. In current scenario cloud computing is most widely increasing platform for task execution. In this paper, we propose an efficient algorithm to have an effective and fast execution of task assigned by the user. We proposed an effective communication framework between broker and virtual machine for assigning the task and fetching the results in optimum time and cost using Broker Virtual Machine Communication Framework (BVCF).We implement it over Cloudreports under VM scheduling policies by modification based on Virtual Machine Policy. Scheduling over Virtual Machine as well as over Cloudlets and Retransmission of Cloudlets are the basic building blocks of the proposed work on which the whole architecture is dependent. Execution of cloudlets is being analysed over Round Robin and algorithm is proposed for Pre-emptive Shortest Job Next (PSJN) is being done.*

Keywords—Cloud Computing, Round Robin, Scheduling, Pre-emptive Shortest Job Next.

1. INTRODUCTION

Cloud computing is a disruptive model for enabling on-demand, convenient, flexible access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be quickly provisioned and released with minimal management effort or service provider interaction [1].

Cloud Computing is technological term that provides computation, software, storage and data access services that don't require end-user knowledge of the physical location and configuration of the systems that deliver the services. This may take form of Web based applications or tools that clients can access through web-browsers. This may provide the delivery of applications via Internet. These applications resources are unified at remote data centre location and data are stored at remote location. The computing and storage resources are unified at remote data centre location. So it is a wide concept of converged infrastructure and shared services. So, clients get their required applications up and running faster with less management and maintenance [2].

Cloud computing is service-focused to provide high quality and low-cost information services by pay-per-use model in which guarantees are offered by the cloud service providers through customized SLA [3].

Cloud Computing helps user applications dynamically provision as many compute resources at specified locations. Workflow scheduling plays a vital role in the workflow management to enhance performance.

Cloud computing involving distributed technologies to satisfy a variety of applications and user needs. Shared resources, software, information via internet are the main functions of cloud computing to reduced cost, better performance and satisfy needs. To improve the response time of the job, distribute the total load of the collective system [4]. By this removing a condition in which some of

nodes are overloaded while some other are under loaded. Scheduling algorithms does not take the previous state or behaviour of the system, it depends upon the present behaviour of the system because it is dynamic in nature Round robin algorithm process on circular order by handling the process without priority but Pre-empetive Shortest Job Next handle the process with priorities [5].

DIFFERENT TYPES OF CLOUD SERVICES

Cloud computing can be thought as different layers or models which provide different services. Cloud contains three types of services as follows [3].

1. Software-as-a-Service (SaaS):

It provides the use of applications running on the Cloud Provider's infrastructure. These services can be accessible from any heterogeneous systems or any interfaces. These services may be defined with exception of limited user specific usage.

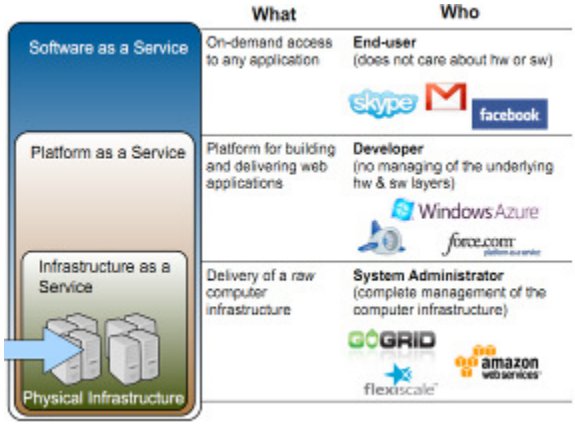

Fig1. Cloud Services [2]

2. Product-as-a-Service (PaaS):

Cloud Platform as a Service (PaaS) facilitates deployment of applications without the cost and complexity of buying and managing the underlying hardware and software layers. PaaS provider provides core cloud competences those are required to develop applications onto the Cloud.

3. Infrastructure-as-a-Service (IaaS):

Cloud Infrastructure as a Service (IaaS) consists of shared data-centers, virtual hardware and appearing as a single point of access for consumer's computing needs. IaaS can deliver software, data centre space, virtualization platforms and network instruments with advantages like flexibility, scalability and cost effectiveness.

TYPES OF CLOUD

Cloud Computing technology and services can be implemented in different ways according to their purpose and characteristics. These different types of deployment of Cloud are categorized in four ways as follows [3].

1. Private Cloud:

In this Cloud, Infrastructure is deployed and operated by an Organization where all the resources can be owned, maintained and controlled by it only. It can be managed internally or by Third-party. It is also hosted internally or externally.

2. Community Cloud:

In this Cloud, Infrastructure of Cloud is deployed and operated by several organizations in sharing that supports a specific community with common approaches.

3. Public Cloud:

In this Cloud, Infrastructure of Cloud is available to the general public or large group of different kinds of organization. Client can access services without any control and at specific rent. Client's services and data can be co-located with other users.

4. Hybrid Cloud:

In this Cloud, Infrastructure of Cloud can be combination of Private, Community and Public Cloud Infrastructure. This combination of two or more clouds is with unique characteristics, entities and benefits to the users. Multiple kinds of Cloud are connected in such a way that programs and data can be transferred from one system to another deployment Cloud system.

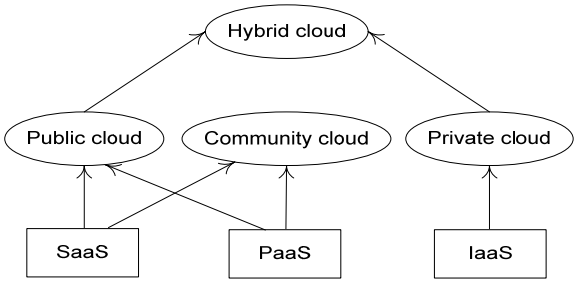

Fig2. Types of Cloud [4]

2. CURRENT SYSTEM

In Current Scenario, with a prior disquisition of the subject, the task is divided and disseminated into same size cloudlets. These Cloudlets as well as Virtual Machines are scheduled according to the Round Robin Scheduling [6].

In general Cloud Computing scenario user submits the task to be performed / executed. Cloud Coordinator (CC) divides the task into equal sized cloudlets and passes it to DataCenter (DC).Due to default policy, it takes a lot of time because the

cloudlets are processed and emanates one at a time in FCFS manner as and when they reach to VM. In addition to the time consuming factor, the cost factor also acts negatively for this scheduling policy. VM executes the cloudlets present in the queue as they reach the VM's. In a gist, this default policy is extremely Time-Consuming, Cost insensitive and inefficient [6].

Round Robin (RR) Algorithm

The RR algorithm is designed especially for time-sharing systems and is similar to the FCFS algorithm. Here, a small unit of time (called time quantum or time slice) is defined. A time quantum is generally from 10-100 milliseconds. So, the RR algorithm will allow the first process in the queue to run until it expires its quantum (i.e. runs for as long as the time quantum), then run the next process in the queue for the duration of the same time quantum. The RR keeps the ready processes as a FIFO queue. So, new processes are added to the tail of the queue. Depending on the time quantum and the CPU burst requirement of each process, a process may need less than or more than a time quantum to execute on the CPU. In a situation where the process need more than a time quantum, the process runs for the full length of the time quantum and then it is pre-empted. The pre-empted process is then added to the tail of the queue again but with its CPU burst now a time quantum less than its previous CPU burst. This continues until the execution of the process is completed. The RR algorithm is naturally pre-emptive. RR algorithm is one of the best scheduling algorithms that developed by many researchers [6].

Cloudlet Scheduling Algorithm

Step-1: Execute Round Robin Scheduling

Step-2: Executed cloudlets are returned to Cloud Coordinator.
CC [cloudlet_list] ← VMM [executed_cloudlet_list]

Step-3: Cloud Coordinator combines all the cloudlets to form task.
Combine [cloudlets]

Step-4: Executed Task returned back to User by Cloud Coordinator.
User [executed task] ← combine [cloudlets]

3. PROPOSED SYSTEM

The proposed work is to schedule the jobs according to execution priorities defined with pre-emption combining Round Robin Scheduling with Shortest Job Next. It will work on following for cloud computing:-

- Cost Benefit Analysis.
- Time Management analysis.
  -improves response and execution time.

The SJF algorithm associates the lengths of the next CPU burst with each process such that that the process that have the smallest next CPU burst is allocated to the CPU. The SJF uses the FCFS to break tie (a situation where two processes have the same length next CPU burst). The SJF algorithm may be implemented as either a pre-emptive or non-pre-emptive algorithms. When the execution of a process that is currently running is interrupted in order to give the CPU to a new process with a shorter next CPU burst, it is called a pre-emptive SJF. On the other hand, the non-pre-emptive SJF will allow the currently running process to finish its CPU burst before a new process is allocated to the CPU [6].

Combine pre-emption of round robin (RR) with shortest process next (SPN). PSPN pre-empts the current process when another process is available with a total service requirement less than the remaining service time required by the current process. The following is proposed architecture shown.

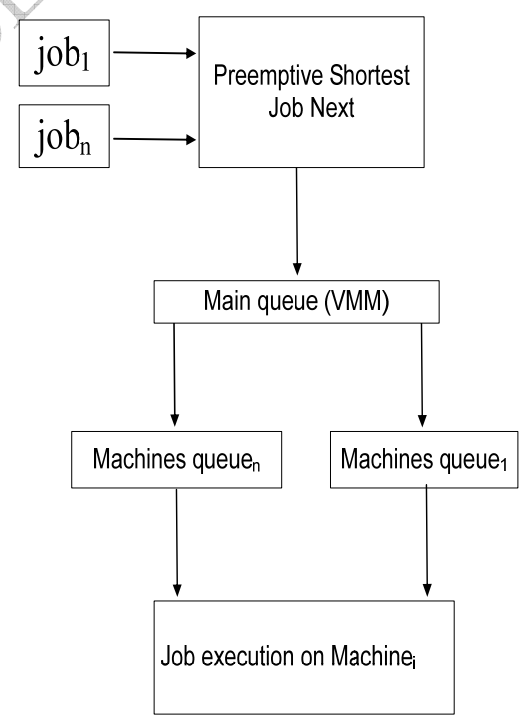

Fig3. Proposed architecture.

Pseudo Code of Proposed System

Step-1: Execute PSJN
[Initialize] time quantum as tq = 10
Execute [actual_cloudlet] with assigned tq

Executed_list[cloudlets]←Execution[Actual_cloudlet]
actual_cloudlet ← cloudlet_list [next_cloudlet]
Now define the priority to each remaining Execute [actual_cloudlet]
Repeat Steps till(actual_cloudlet_list).Length== NULL
{Execute [actual_cloudlet] till tq

Executed_list[cloudlets]←Execution[Actual_cloudlet]
actual_cloudlet ← cloudlet_list [next_cloudlet]
}
VMM[executed_cloudlet_list]←Executed_list [cloudlets]

Step-2: Executed cloudlets are returned to Cloud Coordinator.
CC[cloudlet_list] ← VMM [executed_cloudlet_list]

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4. CONCLUSION

The real test bed limits the experimentation and makes reproduction of results a tough task. The novel VM allocation best packed policy is implemented at host level to enhance resource utilization. The proposed scheduling algorithm considers the processing requirement of the Job execution and time limit of the resource while taking scheduling decisions. Overall total execution time is considerably reduced making the cost also go down considerably. CPU utilization has improved efficiently by making use of proposed algorithm.

With achievement of proper scheduling in cloud computing environment through the better resource allocation and optimization, better performance and efficiency can be achieved.

5. REFERENCES

[1] "Cloud computing resources". http://www.cloud9s.net/cloudcomputingresources.html
[2] "Cloud computing services". http://www.india.amazon.com/
[3] http://en.wikipedia.org/wiki/Cloud_computing
[4] N.S.Sanghani, R.J.Khimani, K.K.Sutaria (2012). "A Survey on Different Workflow Scheduling Algorithm in Cloud Computing". International Journal of Scientific Computing (IJSC), ISSN: 0973-578X, Vol. 6(2), pp 139-143.
[5]Ms.Nitika, Ms.Shaveta and Mr. Gaurav Raj, "Comparative Analysis of Load Balancing Algorithms in Cloud Computing". International Journal of Advanced Research in Computer Engineering & Technology (IJARCET). ISSN: 2278 – 1323, Vol.1, Issue No. 3, May 2012.Distributed Systems Laboratory, 2009.
[6] GauravRaj and Sonika Setia, "Effective Cost Mechanism for Cloudlet Retransmission and Prioritized VM Scheduling Mechanism over Broker Virtual Machine Communication Framework ". International Journal on Cloud Computing: Services and Architecture (IJCCSA), Vol.2, Issue No.3, June 2012.