A New Virtual Machine Scheduling algorithm for Public Cloud

Raghu N.
Student
Dept. of CSE

Supreeth S.
Asst. Professor
Dept. of CSE

ABSTRACT
Cloud computing is defined for the computing servicing of—storage, servers, networking databases, analytics, software and more—over the inter network ("the cloud"). VM scheduling is a process, which allows each process to use the VM while the execution of another process is in waiting state due to not available of any resource etc., thereby creating full use of VM. The aim of the paper is to advise a new VM scheduling algorithm. This new algorithm focused at cloud computing in order to maximize efficiency. It schedules VM requests by each user according to the users input priority, which is determined by the account level purchased by the each user. In addition, the new algorithm improves the resource utilization by increasing the utilization of CPU. There are many selections in cloud computing which available purchase or free, each having their own varying levels of fees and services. The requesting cloud user who pays yearly (instead of month-to-month), pays a higher fee should be given a higher priority. Currently, this logic is not available in cloud service. At present in current running scheduling algorithm, same priority will be given to those people who pay on a month to month and those who pay on yearly. The new algorithm searches to prioritize the scheduling of the VM according to the selected priority level of users. Current VM service provider that do not consider the account priority. The new algorithm trying to resolve this by taking both time and priority into consider when scheduling VM machine requests from each user.

General Terms
Virtual Machine scheduling algorithm

Keywords
Virtual Machine, Scheduling, Cloud Computing

1. INTRODUCTION
computing is a inter network of servers hosted on remote store, achieve, and process the data, rather than a local server or a personal computer. Every day in our life, using cloud-computing services, even if we do not recognize it. If we use an online services like sending email, editing documents, watching movies or TV, listening to music, playing games or storing pictures and other files, it is possible that cloud computing is creating it all possible behind the scenes. Companies embracing the a CPU value will be 1, 2, or 4 are the inputs of each VM request which ranked based on priority and is queued into its respective queue like low, medium, or high then 1, 2, or 4 CPU. Queue, which have High propriety, will be served first after finishing the serviced request will be added to the end of the queue. Specific time will be set for each request. Once the request time is matched at low priority queue, its priority is raised and is moved to the higher queue to service. After finishing all requests in High queue, next priority is given to medium request and will be processed accordingly. At same time if any request comes with High priority, high priority considered to service and medium priority request is treated as medium and added in medium queue. Responsible for Green computing is to run computers and resources environmentally and eco-friendly. Green computing is the study of manufacturing/engineering, designing, using and arranging of computing devices in a way that reduces their environmental impact.

2. LITERATURE SURVEY
The survey was understating of different way of algorithms to schedule the Virtual Machines and how to improve the CPU utilization. Picking right paper is challenge here. I have followed many papers, which provides suitable meaning, green computing, cloud architecture, efficient resource utilization, artificial natural networks, hybrid heuristic, energy aware green computing.

3. PROPOSED METHOD
The new algorithm is helping for scheduling of Virtual machine service based on priority and time to maintain a utilization rate and efficiency increase and currently this approach is not available at cloud provider. Because of the above new changes of efficiency increase, it solves to reduce time, resource waste or redundant energy, which regularly deal to the slowing of a system. The main logic here in new algorithm to use high priority virtual machine service request will be allocated for computing nodes and it gets service on top and first priority. New scheduler algorithm continuously monitors the free resources and uses the utilization of resources at maximum level. Impact on environment is a helpful with the increase in the efficiency implemented in algorithm. The efficient of the system will be improved while increase in utilization of resources. The minimum use of electricity and power will be used when efficient of the system is improved. Electricity is a non-renewable energy source and it is used in daily life. Our new algorithm based on efficiency and priority logic will benefits the cloud provider to increase system efficiency. More benefits to the service provider who provide the service from our new algorithm that focuses on priority and efficiency. Because the priority based schedule algorithm, the quality of the service will be improved while providing the service to standard for premium accounts, so that each service provider will be able to greater to deliver of services and provide another support of service for the important user who can assurance the good service than non-premium accounts. In case if, his or her premium service if not satisfactory, the end user affected positively as they are the receiver of the service and get directly impacted. The main plan of the project has been classified into 3 parts – homework, execution and testing (Validation and Verification). The scope of this project will include all three parts:

1. Initial

- Gathering and understanding the concepts of all scheduling algorithms of VM
- Make proposal documents for new planned algorithm of scheduling on priority basis for the cloud environment

2. Execution

- Assign space for each request of VM to the queue which indicates its priority – high, medium, low
- Increase the priority of a queue at mentioned specific pre-determined time period
- Need to make sure of computing node is always assigned the VM with the highest priority
- Maximize the utilization of CPU through continual monitoring during development

3. Testing

- Run the system before, after and compare the CPU usage
- Run the system multiple times to ensure constant results
- Boundary testing

Three existing algorithms are examined: Round Robin scheduling, Priority scheduling and First Come First Appeared. Individual algorithms and their fault(s) will be defined in detail in the following topic. To last, a detail section will be defined for the discussion of VM requests with processes. Each process has a priority number in priority scheduling; this priority number will be considered and used to calculate when each VM scheduled (high priority one takes first) either preemptively or non-preemptively. However, if only processes which having high priority are run, then this would result in hunger for all processes which having lower priority– that is, they could fail to run and they never run. Simplest and best scheduling algorithm for a preemptive way of scheduler is Best Round Robin scheduling. FIFO logic is present for Round Robin scheduling to schedule the queue, in between time is set (quantum). Each new coming process will be added into at the end of the queue (ibid). Round Robin scheduling is developed with time-sharing systems, is works like scheduling of First Come First Served with the exception that after a certain period, the running process is interrupted and the next available process in the queue is initiated.

If time is not set properly, there might be incorrect running of processes, which causes CPU efficiency to be lower, or it can cause weak response period for little communicating requests from the each user. There are problems while rim process using Round Robin. As we aware, another non-preemptive scheduling algorithm that is First Come First Serve (FCFS) way of scheduling method, similar to Round Robin scheduling. In this algorithm, CPU will not get release until the requests get terminates or requests I/O. in FCFS scheduling, the waiting time of request is longer as compared to Round Robin scheduling, it effects the low CPU and utilization of I/O resource. Lastly, a detail overview of the processes in requests of VM is a main topic to elaborate on. At the service of initial request, the controller of cluster provides VM images as services of IAAS to prepare as templates from cloud administer. Once the request is received to create virtual machine for the each user, the virtual machine is assigned to the specific node controllers and begins to run on nodes of computer. The user then use the VM for their functions, which needed and stops the machine once it completed; the virtual machine service is then stopped from the cloud system.

Advantages:

- Provides the excellent understanding the problem domain.
- Survey papers provide good ideas with the help existing scheduling algorithm to optimize.

Disadvantage:

- Struggled to get the idea on some topics which specific to current project
- None of the papers considered to have different priorities with virtual machine requests.

The proposed algorithm, however, provides:

Priority based of 3 queue-sets

- High, medium, and low priority rank is created in queue set
- Input provide 3 sets of request with each having CPU assigned for each reqsuest along with arrival time and total period. Here representation of each CPUs will be mentioned with 1(yellow), 2 (green), and 4 (blue).

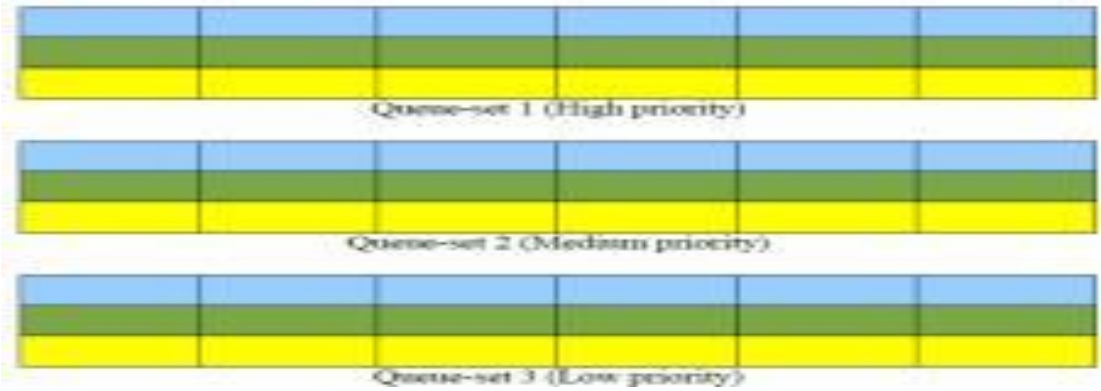


Fig1: Priority Queue

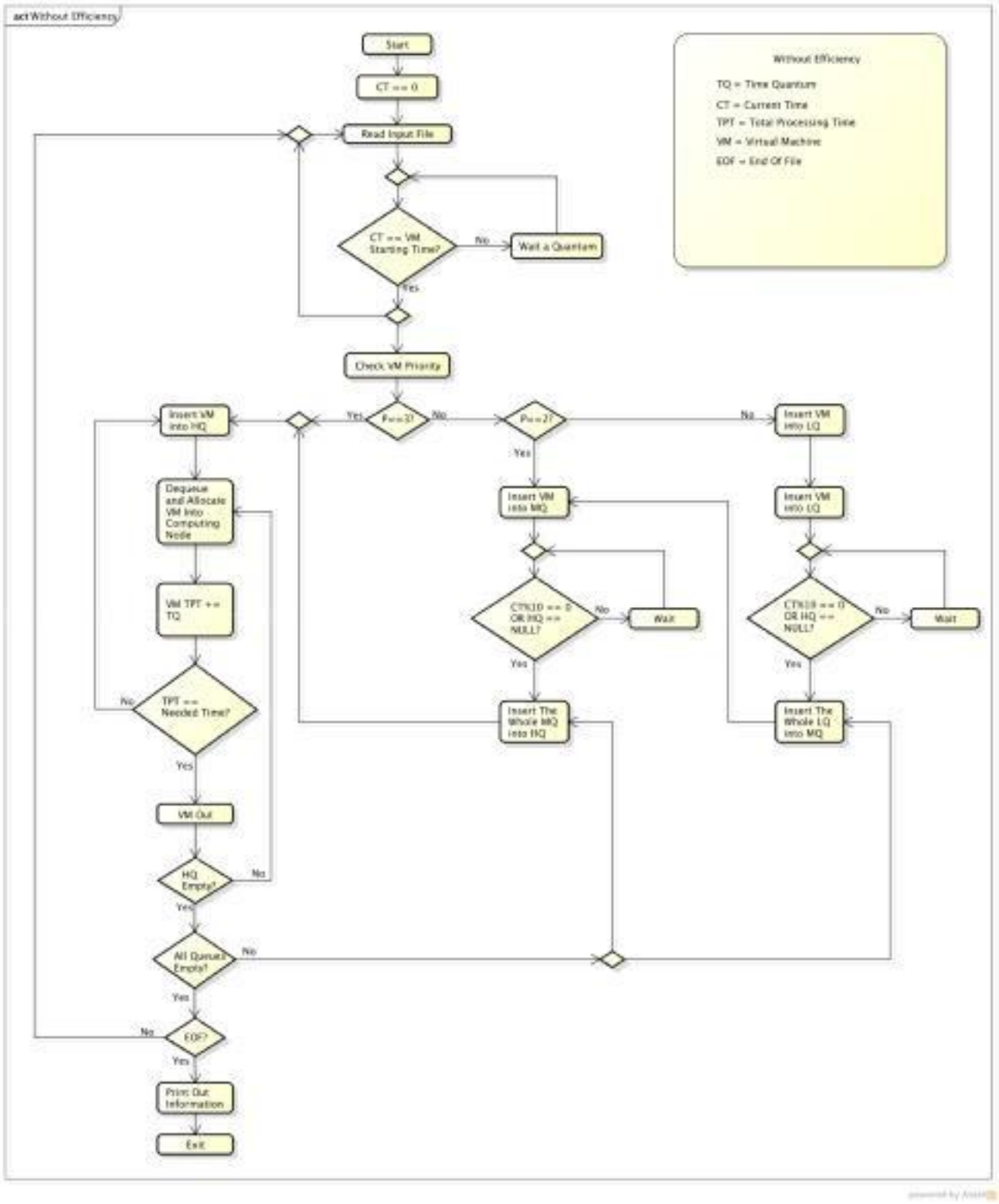
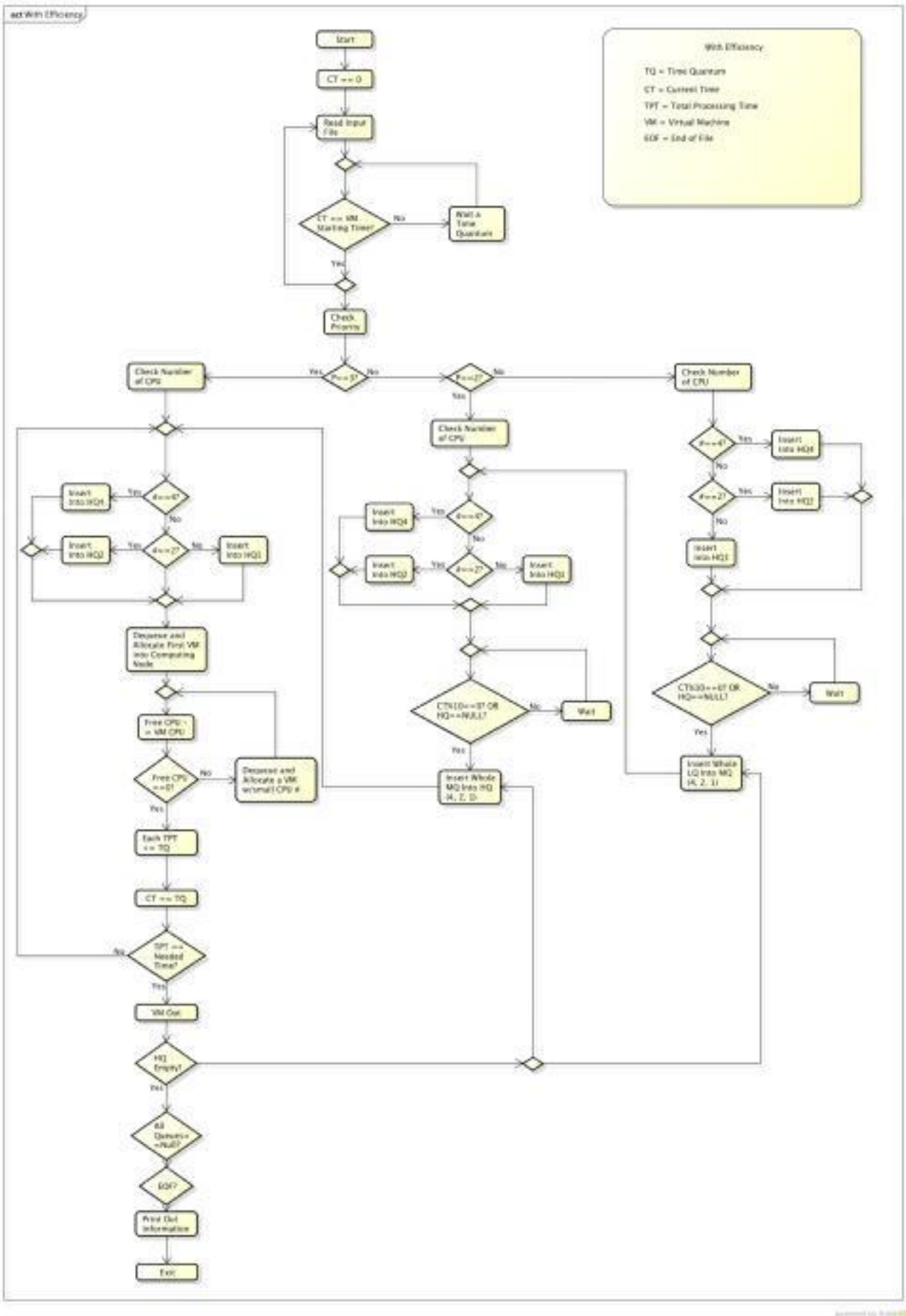


Fig 2: Flow Diagram


ad With Efficiency
Start
CT == 0
Read Input File
CT == VM Starting Time?
No
Wait A Time Quantum
Yes
Check Priority
Check Number of CPU
Yes
No
Check Number of CPU
Yes
No
Check Number of CPU
Insert Into HQ4
Insert Into HQ3
Insert Into HQ2
Insert Into HQ1
Dequeue and Allocate First VM into Computing Node
Free CPU == VM CPU
Free CPU == 0?
No
Dequeue and Allocate a VM w/small CPU #
Yes
Each TPT -= TQ
CT += TQ
TPT == Needed Time?
No
Yes
VM Out
HQ1 Empty?
Yes
All Queues == NULL?
EOF?
Print Out Information
Exit
CT%10==0? OR HQ==NULL?
No
Wait
Yes
Insert Whole LQ Into HQ
With Efficiency
TQ = Time Quantum
CT = Current Time
TPT = Total Processing Time
VM = Virtual Machine
EOF = End of File

Test Data 1

User ID	Priority	Arrival Time	Need Time	CPU
1	3	0	10	2
30	2	5	22	4
2	3	8	5	2
15	1	12	30	1
45	1	14	8	4
36	2	20	18	4
24	3	36	10	1
11	3	40	16	1
9	1	41	8	2
31	2	46	12	4
59	2	50	13	2
42	1	52	16	1
103	2	55	30	4
99	3	58	40	4
33	3	64	7	2

4. EXPERIMENTAL RESULTS

Input 1 with Corresponding Output

ID	Priority	Arrival Time	Need Time	CPU	Priority Scheduling without efficiency	Priority Scheduling with efficiency
1	3	0	10	2	<----Priority Scheduling without efficiency----> Here is the information of finished VM: User 1 arrived at 0 and finished at 11 . User 2 arrived at 8 and finished at 18 . User 45 arrived at 14 and finished at 87 . User 30 arrived at 5 and finished at 124 . User 24 arrived at 36 and finished at 134 . User 36 arrived at 20 and finished at 140 . User 33 arrived at 64 and finished at 146 . User 9 arrived at 41 and finished at 151 . User 31 arrived at 46 and finished at 169 . User 59 arrived at 50 and finished at 176 . User 11 arrived at 40 and finished at 183 . User 42 arrived at 52 and finished at 200 . User 15 arrived at 12 and finished at 223 . User 103 arrived at 55 and finished at 235 . User 99 arrived at 58 and finished at 245 . total system cpu is: 980 total use cpu is: 678 percentage is: 0.691837	<----Priority Scheduling with efficiency----> Here is the information of finished VM: User 1 arrived at 0 and finished at 10 . User 2 arrived at 8 and finished at 24 . User 24 arrived at 36 and finished at 50 . User 11 arrived at 40 and finished at 56 . User 15 arrived at 12 and finished at 60 . User 59 arrived at 50 and finished at 75 . User 33 arrived at 64 and finished at 84 . User 9 arrived at 41 and finished at 85 . User 42 arrived at 52 and finished at 95 . User 30 arrived at 5 and finished at 129 . User 45 arrived at 14 and finished at 130 . User 31 arrived at 46 and finished at 147 . User 36 arrived at 20 and finished at 156 . User 103 arrived at 55 and finished at 188 . User 99 arrived at 58 and finished at 198 . total system cpu is: 792 total use cpu is: 688 percentage is: 0.868687
30	2	5	22	4		
2	3	8	5	2		
15	1	12	30	1		
45	1	14	8	4		
36	2	20	18	4		
24	3	36	10	1		
11	3	40	16	1		
9	1	41	8	2		
31	2	46	12	4		
59	2	50	13	2		
42	1	52	16	1		
103	2	55	30	4		
99	3	58	40	4		
33	3	64	7	2		

5. CONCLUSION AND FUTURE SCOPE

Scheduling method is significant for provision of tasks on virtual machines. Currently there are lot of scheduling algorithms have been implemented. Existing scheduling algorithms give enhanced presentation and utilization of resource. Each algorithm is developed on set of rules to regulate the work order. Good scheduling algorithm means, they must concentrated on energy efficient, minimize the power requirement and cost effective. Same combination would be considered in algorithm, each virtual machine requests is scheduled on High priority basis. To this end, the new proposed algorithm was created. This algorithm is implemented with the help of combination of both Round Robin and FCFS algorithm. The requests of each Virtual machine which comes first will be having more priority as compared to those who come in second (FCFS).

6. ACKNOWLEDGMENTS

I am greatly thankful to my supervisor, Mr. Supreeth S, Assistant Professor, Department of Computer Science & Engineering, Reva Institute of Technology and Management for his constant encouragement, in spite of his busy schedule and pressure of academic work, he always saved time for me, and his guidance, valuable and friendly, always kept me on the right track, in mywork. I always remember his quick examination, caring solution and quick review.

7. REFERENCES

[1] F. Wang and G. Akanmu, "Min-Min Scheduling Algorithm for Heterogeneous Cloud Servers," International Journal of Computer Engineering, vol. 2, no. 4, pp. 15-16, 2012.

[2] M. Gahlawat and P. Sharma, "Analysis and Performance Assessment of CPU Scheduling Algorithm in Cloud Sim," International Journal of Applied Information System (IJAIS), vol. 5, no. 9, July 2013.

[3] A. Jain, M. Mishra and S. Peddoju, "Energy Efficient Computing-Green Cloud Computing," IEEE International Conference on Green Cloud Computing, 2012.

[4] J. Li, J. Peng, Z. Lie and W. Zhang, "An Energy Efficient Scheduling Approach Based on Private Cloud ," Journal of Information and Computational Science, vol. 8 , no. 4 , pp. 716-724, 2011.

[5] A. Delava and Y. Aryan, "HSGA: A Hybrid Heuristic Algorithm for Workflow Scheduling," Springer Conference on Cluster Computing, pp. 1-9, 2013.

[6] L. Wang and S. Khan, "Review of Performance Metrics for Green Data Centers: A Taxonomy Study," The Journal Super Computing, vol. 63, no. 11, pp. 639-656, March 2003.