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Hybrid Approach of SJF & EDF

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Abstract: The development of the internet have given birth too many technologies. Latest trend in large scale data processing is a grid computing. it provides resource sharing. it give support to the distributed and parallel processing. Providing an efficient response time is major challenging issue in the distributed system. Time is major factor in areal time operating system. Different scheduling algorithm are used to schedule task. Distributed system is a model in which component located on a network computer communicated and coordinate their action by passing a message. The component interacts with each other to achieve a common goal. Distributed computing in most general is on working of multiple computer on single problem. In this single problem is dived into several parts and each part is solved by the different computers.

Keywords: SJF –Shortest Job First, EDF–Earliest Deadline First, OS–Operating System, VM–Virtual Machine

I. INTRODUCTION

The internet is vast area of information required in many format and stored in many computers. The popularity of internet and availability of powerful and high speed computing resources and network technology with the optimal and low cost changes the way of computing. Whenever an information is needed all computers are connected to the network. Grid computing is an ability of using various computing resources through the internet including application and storage service. The idea of grid computing was first establish in 1990 by Carl Kesselman, Lan Foster and Steve Tuecke. According to national institute of standard and technology grid computing is define as grid computing is computing network in which each computer resource is share with every other computer in the system. Processing power memory and date storage are all community resources. “These services requires minimal effort”. The main attribute of grid computing is the elasticity, means it’s a tendency to grow and reduce the computation as per the requirement. The other attribute is scalable. Grid computing is made up of application used for computational problem that are connected into parallel networking.

II. GRID COMPUTING CONCEPT

Grid computing provide the secure access to the application but high level security is a challenge for the cloud developer. Grid computing is an demand service in which infrastructure, platform and software are provided on demand according to client requirement at specific time. Thus all the above mentioned service are access by users as a client to the cloud. Now as the basic idea of grid computing is to provide resource such as VM as a service on demand. Allocating efficient VM on demand is being carried out with the help of load balancing algorithm plays an important role while on deciding which VM is to be allocated on demand of users.

While providing service it is possible to have number of request at a time and due to that some requester need to remain in queue through they have a possibility to send a request to other service provider. Thus with the help of load balancing algorithm user will able to decide whether they need to remain in queue or get service from other service provider. Typically grid works on various task within a network but it is also capable of working on specialized application.

The grid computing concept is not new. It’s a special kind of distributed computing. in an ideal grid computing system every resource is share. Though the concept is not new also not yet perfect. Computer scientist, engineers are still working on creating, establishing and implementing standards and protocols. Grid computing works on the principle of pooled resources



Fig No 1. Grid Computing

III.GRID CHARACTERISTICS

Scalability, heterogeneity, adaptability and multiple administrative domain are the primary characteristics of domain.

- A. Scalability-it handle a large amount of job in smooth and control manner.
- B. Transparent access-it might be single virtual computing node
- C. Reliability-grid system must be reliable if a node fails
- D. Heterogeneity- software and hardware resource in grid system are heterogeneous in nature

IV.LOAD BALANCING ALGORITHMS

Load Balancing is a key component to get highly available infrastructure most commonly used to improve the performance and reliability.

A web server has a dispatcher to balance the incoming request to the servers. The main of dispatcher in load balancing is to transfer the request to server that is available at that time. The front end is responsible to balance the request by making decisions regarding the transfer so that the load is transferred efficiently to the server which can process the request at that moment. Web servers load information is used in making the decisions by the front end.

The load balancing algorithms that is used to determine which of healthy servers on the backend will be selected. Following are the algorithms are used.

A. Shortest Job First

In this shortest executable job is selected first. The approach follows to perform the complete execution of short job to utilize the resources in completion of heavy jobs.it has one advantage that the waiting time for the process is less this makes it more powerful approach.

1) Advantages

- a) It has minimum average waiting time
- b) Its throughput is high

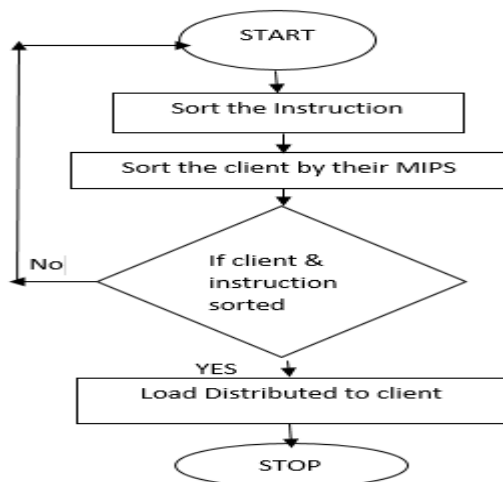


Fig No. 2: Flow-Chart of SJF

2) Example

process	Arrival Time	Execution Time	Service Time
P0	0	4	2
P1	1	2	1
P2	2	7	16
P3	3	3	7

P0	P1	P2	P3
0	2	6	11
			18

Waiting Time= Service Time - Arrival time

Process	Waiting time
P0	2-0=2
P1	1-1=0
P2	16-2=14
P3	7-3=4

Average Waiting time=(2+0+14+4)/4=5

B. Earliest Deadline first

in Earliest Deadline first or least time to go is an dynamic scheduling algorithm .it is used in real time OS to place processes in a priority queue. Whenever a process it to be schedule the queue will be searched for the process which is closest to its deadline. The same process will be continue until next execution. It is also knows as optimal scheduling algorithm. The EDF schedule all the process and completes in given deadlines.

1) Advantages

- It gives minimum average waiting time for a given set of processes.
 - By moving a short process before a long one, the waiting time of short process decreases.
 - It increase waiting time of the long process, so average waiting time is decreases.
- 2) *Example* : Consider the three processes scheduled on preemptive uniprocessor.required execution time and period are provided.

Process	Execution time	Period
P1	1	7
P2	2	6
P3	4	10

Here,processes are scheduled in the time slices.deadlines are that each process complete within its period

P2	P1	P3
0	6	13
		23

First process is schedule by EDF is p2 as its deadline is 2.

When p2 is completed then p1 will be scheduled followed by p3

Utilization is $(1/7+2/6+4/10)=(37/40)=0.925$

As least common multiple of period is 40 then each process is scheduled after every 40 seconds.

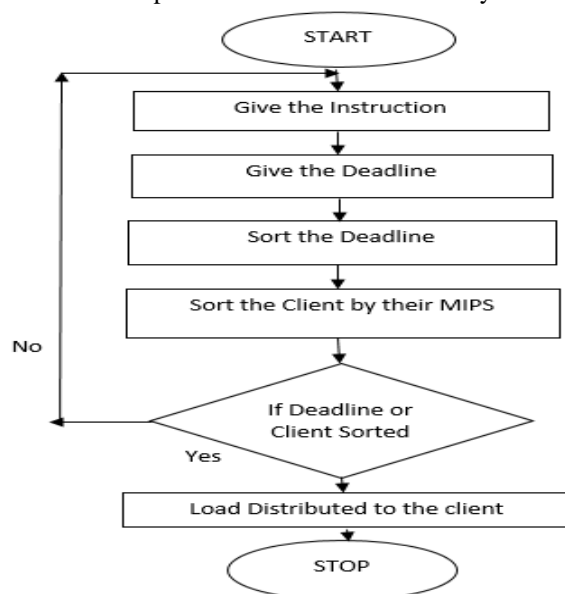


Fig No. 3:Flow-chart of EDF

C. Hybrid approach of SJF & EDF

This is the combination of SJF and EDF algorithm. This will overcome all the issues in both algorithms. It will find the average waiting time of process along with average waiting time of deadline i.e. time given to complete the process.

Here we work in respect to both the algorithms and add them into single one.

1) Advantage

- This will overcome all the issues in sjf and edf.
- it requires minimum waiting time as compared to both algorithms

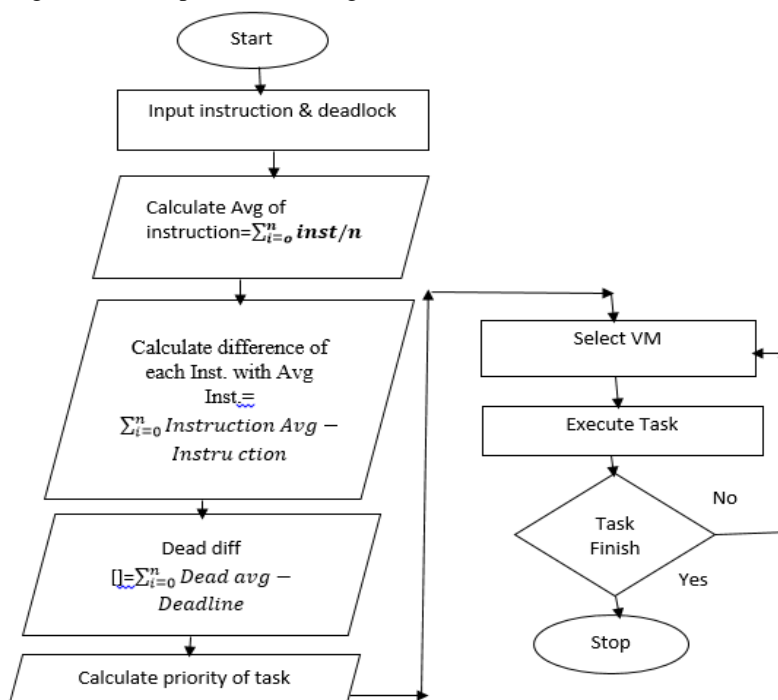


Fig No. 4: Flow-chart of Hybrid approach to SJF & EDF

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