Brokering Strategy in Network and Resource Performance with Multi Node Proxy Server

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Abstract: ***In Grid environment, monitoring of resources and network performance is needed to maintain high performance distributed data access and computing. The Grid resources are needed to be discovered in order to satisfy the needs of a demanding environment. In this paper, we discuss how the grid services discover the resources and network performance in a wide area distributed grid and how efficiently complete the submitted job within minimum time with various methods. In this scenario, the multimode proxy system is used to specify the more number of jobs can schedule paralleled in order to reduce the time delay to complete the job and waiting time.***

Keywords: Resources Broker, Proxy Server, Grid Resources.

1. Introduction

To analyzes the time delay for the selection of the Grid resource to schedule the job. The computational Grids facilitate the software applications to integrate instruments, displays, and computational resources which are managed by various organizations from extensive locations [1]. To build the monitoring system in the computing resources, there is a need to achieve an effective utilization of the Grid resources. The Network monitoring is very much needed in Grids to avoid the problems which arise due to overloaded servers, failure of network connections, etc.

The network performance monitoring and prediction provides the necessary information for the enrichment of scheduling the best resources such as where to get or put the data and where to execute the job, fault detection and trouble-shooting, identifying the bottleneck, performance analysis and tuning. The existing monitoring strategy will significantly increase the system overhead whenever the size of the computing facility grows [2].

Processing all monitoring tools for different resources involved with an application, collecting such data, filtering them for obtaining useful information may become a major problem [3]. To solve the problem, the multi node proxy server system is used. Here the job can schedule parallel so that more number of jobs can do in minimum time.

2. Problem Statement

The monitoring of resources in the Grid environment is very much needed due to its dynamic behaviors and unpredictable nature also to prevent the resource starvation. Once the job got into CPU then aborts that job and move to another job is difficult [4].The data transfer time will vary due to network performance so the time delay may occur to complete the job [5].To manage devices from a central location, the SNMP protocol is facilitates the transfer of data from the client portion of the equation to the server portion where the data is centralized in logs for centralized viewing and analysis [6]. The SNMP protocol was designed to provide a "simple" method of centralizing the management of TCP/IP-based Networks. To overcome the existing system problem of resource and monitoring performance, the recent research describes about the proxy based task scheduling is used.

3. Terminology

3.1 Proxy Server

A proxy server is a server (a computer system or an application) that acts as an intermediary for requests from clients seeking resources from other servers. A client connects to the proxy server, requesting some service, such as a file, connection, web page, or other resource available from a different server and the proxy server evaluates the request as a way to simplify and control its complexity. A proxy server has a variety of potential purposes, including

- To speed up access to resources (using caching).
- To keep machines behind it anonymous, mainly for security.
- To scan outbound content, e.g., for data loss prevention.

The dataflow proxy already communicates with the level three nodes, so it is capable of performing the monitoring and control functions itself. To implement each node as a separate run control proxy, and express the overall aggregation of the states using abstract SMI objects. This approach was feasible, but we wanted certain features that were awkward to achieve within SMI. In particular, to allow dynamic variability in the number of nodes that actually participated in a given operation. In addition, we wanted timeouts and conflict detection to apply to each aggregate state transition.

4. Proposed Work

The proposed work described about the multi node proxy server which helps to finish the job in multi node system. The proxy server will always helps to speed up the activity and keeps the machines secure to overcome the resource starvation and overload server. The proxy will also help to store the data periodically to the database in order to reduce the data loss.

4.1 Multi Node Proxy Servers

In Meta scheduling process, once the user submitted the job manually then the request handler will start the process and monitor the job submission process. In the proposed system, the resource scheduling and resource selection is done by the resource broker and it will directly update to the global archive.

If n number of clients offers for the resource allocation process means then resource broker will dispatch the jobs to other available resources with the help of global archive Information. So it will take time for completing the job. The waiting time for the job and response time for the next job will get delay. So the success rate for the submitted job strategy may get change.

In order to reduce the time delay for the job scheduling, Multi Node Proxy Server (MNPS) is used. The proxy server is mainly used for decision making. The Multi Node Proxy Server will maintain the proxy server for global archives.

Here n number of clients is requesting for the resource availability, the server will allocate the three nodes for data collection in the Local Grid Resource Broker. The resource allocation will process in the three conditions such as

- If the entire node is idle
- If the entire node is busy or
- Minimum requirement.

The scheduling process will take place only if any one of the condition satisfied. Here the scheduling process takes place through the MNPS. The Proxy Server will schedules the available node and given back the reply to the server.

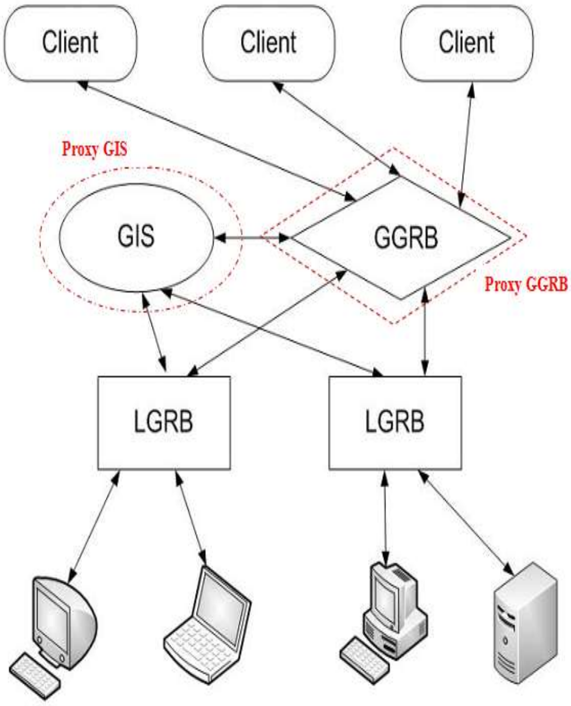

Figure 1: Proxy Based Task Scheduling

The node will dispatch the job for available process and other node will be in idle till it get another resource. Here the monitoring process done by the mobile agents so every data process is stored in the Global Grid Resource Broker (GGRB). Resource selector queries the information repository to select the suitable resource with network aware resource selection strategy and sending that information to the scheduler.

The mobile agent technology can play a vital role because of its capability to cope up with the system's heterogeneity. Mobile agents are autonomous, intelligent programs that travel in a network, searching for the required information and return the results on the user's behalf. The mobile agents reduce the network load because they use less bandwidth by moving logic near data, and their actions are dependent on the state of the host environment. They are capable of working without a dynamic connection between nodes, hence not affected by network failures. So the mobile agents are extensively used in resource discovery and monitoring applications for information retrieval, and also for monitoring the network performance [7].

The agents perform this task for all computing node in the Grid cluster and update the global archive. Depends on the submitted job on resource broker, it decides on the strategy to follow to identify the best resource in the matched list of resources. More number of jobs can be done parallelly in order to reduce the time delay and waiting time.

The varying number of jobs were submitted in the Resource Broker and observed their waiting time and execution time. The execution time is the time taken for a job when it is executing on the resource. The waiting time includes the time in the meta-scheduler queue and the time spent on the local resource manager's queue.

4.2 Experimental Description

4.2.1 Task Allocation

- The task has been allocated to the available node according to the client request. This process will generate a new task and allocate the work to each specified node.
- The resource monitor monitors the resource and sends the monitored information to data collected. The data collector aggregates the collected information and periodically updated to local archives.

4.2.2 Client Request

- Once the task has been allocated to the local archives, then agent will receive the client requested message.
- Agent will play a major role, here the mobile that act as an agent and migrates from the resource broker to all resource sites and starts the sensors to collect the metrics.
- Here the multi node proxy server will get the request directly from the global archives database. It sends a notification to the mobile device according to the client request.
- Once the process start, then it will automatically dispatch the work to all nodes and complete the job.

4.2.3 Resource Scheduling Strategy

- This strategy is helps to identify the job starting time and job completion time.
- The agent performs this task for all computed nodes in the Grid cluster and update in the global archive.
- Depend on the submitted job on resource broker, it decides on the strategy to follow to identify the best resource in the matched list of resources.

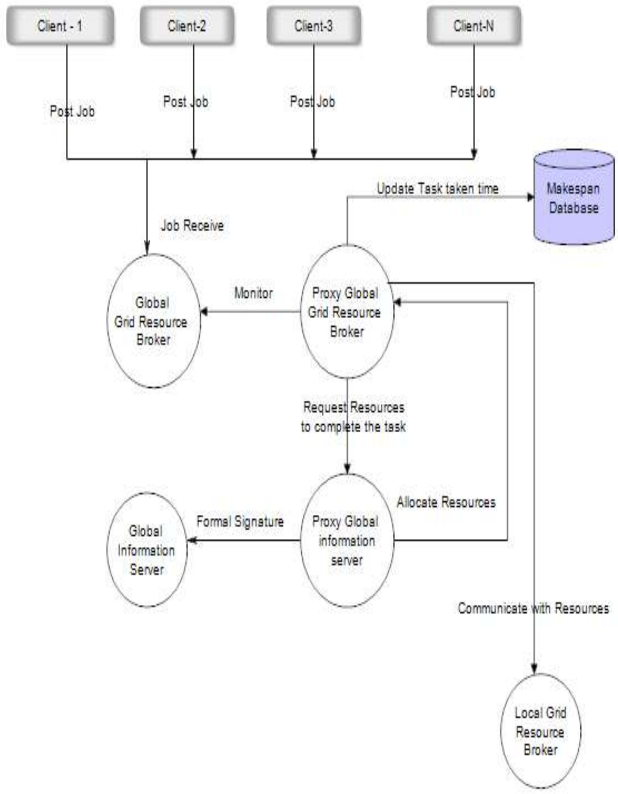

Figure 2: Data Flow Diagram of Proxy Based Task Scheduling

5. Proxy Based Task Scheduling (Pbt) Algorithm

Step 1: Initialize proxy GGRB
Step 2: Initialize proxy GIS
Step 3: Calculate the level of task
Step 4: for all the tasks in the P_GGRB then do
Step5: Levelsize (task) +size (receiveddata) +max (level (child. Task)) end;
Step 6: Allocate task to proxy GIS for all the task then do;
Step 7: do, for all the processor
Step 8: do, assign estimated start time to start time and assign estimated executed time to executed time then calculate, executed time – start time and assign end time to calculated time
Step 9: find the minimized task and allocate them
Step 10: End

In proxy based task scheduling algorithm is described about the two proxy system which are Proxy Global Grid Resource Broker and Grid Information System. These two are need to be initializing first to calculate the task. Whenever the client is submitting the job every process will send to the GGRB which is act as a main server. Here the proxy will start the work to store whatever data that the main server has on it. Then it intimates the GIS for the available resource to start the job. It's always act as an intermediate for the global Grid resource and local resource. The GIS will allocate the available resource to Local Grid resource. Whatever the process may take place in the proxy global grid resource then everything will be stored in the database.

This process will help to identify the size of the task, size of the received data and the maximum level of the child task that is nothing but the multi node process. The proxy GIS will allocate the entire task to be done in minimum time. For all the available processor the task has been allocated so that job can be completed within the minimum time. After assign the task, it start to estimate the start time to start the time and executed time to executed the time then calculate the executed time and start time and it will assign to the end time to calculated time. After all the process to be done then it helps to find out the minimized task and allocate them in the local grid resource brokers.

Level=size(task)+size(receiveddata)+max(level(child. Task)) ;

This process will able to identify best available node to process the job. Each node will get the task whenever the node is idle. Suppose if the node is busy then it will prioritize the task based on its waiting time. One of Grid Resource Broker's tasks is to find the suitable node for the submitted job on it. The network parameters can influence the scheduling decisions and can lead to preeminent outcome to help the resource broker in suitable resource selection [12]. The end-to-end path characteristics between destination and each source have a major impact in the measurement of network performance. In this scenario, the transfer time needed for transferring the input files and also output files is minimized when the resource selection is based on the proposed approach. The network performance monitoring helps the scheduler to select the resource for the data intensive jobs which needs of high data transfer on Grid Sites. The mobile agent also plays a major to indicate the job scheduling process and other task allocation process. It starts the sensor to maintain the task allocation from the local archives. For calculating the received data it will process the notification message to the mobile device with the notification of client request.

6. Conclusion

Grid network monitoring system monitors the network by deploying sensors as different network monitoring tools to collect the network metrics. To determine the source of these problems, detailed end-to-end monitoring data from applications, networks, operating systems, and hardware must be correlated across time and space. The detailed comparison of these data from a variety of monitoring methods, the base paper represent a monitoring system using Mobile device for efficient handle high-volume streams of monitoring data but time delay for job completion will vary from one another. In order to reduce the delay, the multi-node proxy server is used. Here the proxy server will complete the job schedule without delay. Agents provide better automation and fault tolerance to the Grid monitoring. The sensors are the network monitoring tools which are used to retrieve the network metrics between the end to end nodes in all Grid resources.

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Ms. S. Abika received her B.E degree from Karunya University in the year 2011. She is currently pursuing her master's degree in Software Engineering. Her area of interest includes Grid Computing, Resource brokering process, software Agents and Software testing. She is currently working on Resource Brokering strategy in Grid Computing.