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Appling Grid Computing for Video on Demand Performance Enhancement

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Abstract: Video on demand (VOD) service is widely used nowadays to watch online videos. Video on demand has evolved as a major Problem implementation for network. This research aims to design a suitable grid computing system to enhance performance of video on demand. The goal of using Grid computing system is to create the simple but large and powerful virtual computer with large collection of heterogeneous systems sharing resources. User can submit request for video to grid server without necessary knowing where it will be execute. It is the responsibility of the grid server to distribute request among several servers (clusters). The results we get optimize resource usage, load balance, and time delay for delivering video file. The MATLAB simulation program is designed to compare old server performance with Grid server performance focusing on time delay and system throughput, which decreases Video delay 60 % - 70%.

Keywords: Video, Network, Grid computing system.

I. INTRODUCTION

In this project we propose the use of Video on Demand (VoD) system where in multiple users served simultaneously a single video stream transmit by the server. The video streaming involves decoding and huge data and re-encoding the same based on certain parameters in very less times, so distributing the computing efficiently across the various nodes capable of performing computation at average power leads to a scalable and better solution [1]. Grid computing is considered to a high scalable solution where compute intensive processes are split up into multiple low cost system so that the overall load is minimize and cost reduce. Grid works very efficiently in data parallel, where data Grid system architecture ensures high availability and reliability through redundancy mechanisms which don't require expensive hardware for deployment. In this project we are applying grid computing on our network to enhance performance for video on demand. When the client request for video media, this request forwarding from local Grid proxy server, the Grid proxy server distributed the video stream content to the Clusters, each cluster compose video packets and send back to the Grid proxy server as parallel and at same time, the Grid proxy server send it through network with available bandwidth to the client as in Figure (1). In this situation the video stream are delivering to the client fast and may be near to real time video. As a result we achieve that the video on demand will be enhancement the performance by Appling grid computing system. The other main point of these projects is if we increase the number of cluster in grid computing system what is the effects will happen in video on demand enhance performance and what the relationship between them (The Number of Cluster in grid computing system and Enhancement the performance of video on demand).

II. METHODOLOGY

In this research we simulate grid computing system by using MATLAB simulation to determine time delay, and System throughput for finish execute single or multiple video request from clients. We compare normal situation for requesting video with normal server, and server Appling grid computing system. In the mathematical Model the main focus of this part to determine the parameter calculation which consider in the proposed algorithm used some function in Matlab simulation tools.

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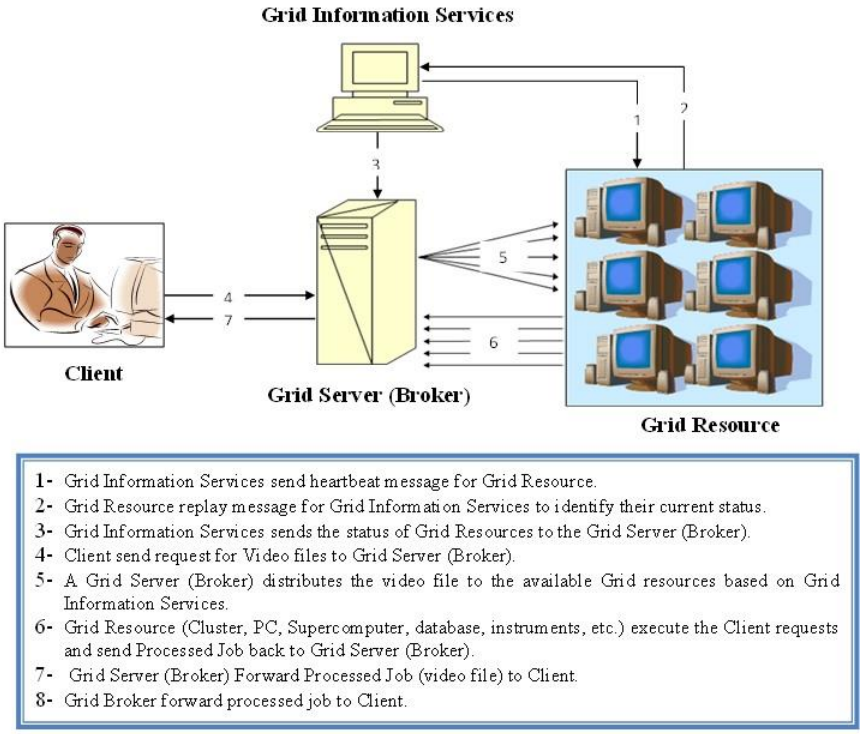

Figure 1: Video on Demand Grid Computing System.

III. SIMULATION SCENARIO

This simulation has two codes for two algorithms. In the first algorithm, which is currently used, the number of nodes request (client) n. The inter-arrival time is the amount of time between the arrival of one connection and the arrival of the next connection.it calculated for each connection by passion distribution. After that identify the traffic class amount the multimedia in network such as (text image ….). then check of arrival connection bandwidth is start in a particular time and class type of multimedia if yes bandwidth value is greater than bandwidth of request (BW: total bandwidth > BW_n: bandwidth of multimedia) so assign the bandwidth by different from total bandwidth and put the status is one it means is busy otherwise if no the status is two it means is block. The status is zero it mean is idle (the connection is empty). The status is four the connection using the buffering. The proposed algorithm code different from that in condition if no compute the extract bandwidth using buffering and prioritization.

1. Simulation Parameters default Values:

In this section we generate 100 video sessions with length of 200MB, For 10 clients, every video arrives in a random arrival time which simulated using Poisson distribution function. The figure below views the relation between the clients and the video arrival time

the simulation time is starts at 0 second and ends in 300 second , also the video arrival time which shows that there is a video arrives at the below seconds: [75.3333 66.3333 70.0000 68.0000 67.3333 62.6667 63.6667 68.6667 64.0000 65.0000] which generated randomly to simulate the real traffic generation.

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2. System Flow chart:

The client send request for video file to grid server, grid server distribute video file to available grid resources, Grid information services send message to grid resources to identify their availability, grid resources replay message to grid information services their current status, then grid information services send to grid server the available grid resources to handle the new video request from client, available grid resources composed packets by using compression algorithms and send it back to grid server at same time.

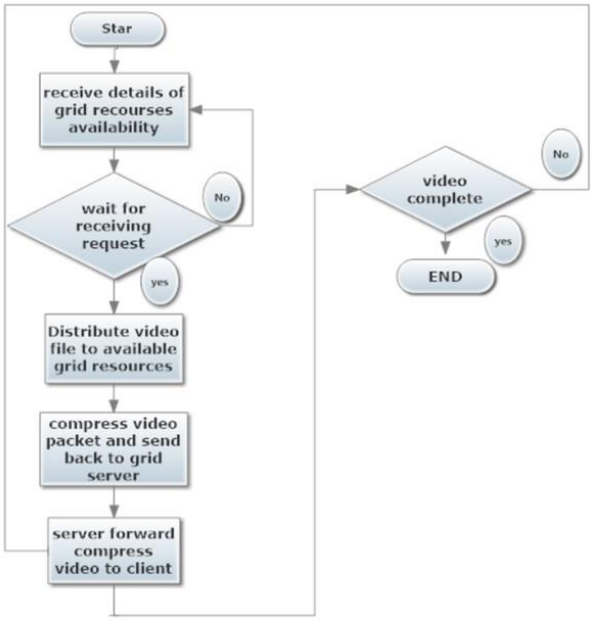

Figure 2: System Flow chart

IV. RESULTS AND DISCUSSION

Result: The result of these research shows that when we use grid system the delay is decreased to an optimum level by distributing video files to multiple clusters which execute the video frames processes starting from video compression and ending with video transmission to the client which make the client served by multiple clusters, to ensure that bottleneck problems will not cause the video frames by any delay time because of system load balance.

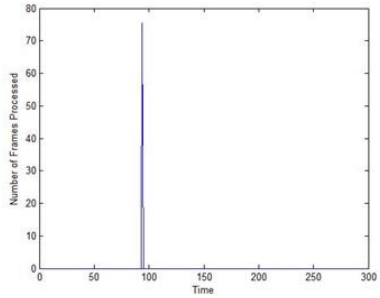

Figure 3.1: Grid System Performance.

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On the other hand the grid system overcomes all old system problems like delay, bottleneck problems with available bandwidth that enhance system throughput our system ask user to enter the video files size from GUI as shown in figure 3 and then the result shown the compare between old system and grid system delay as shown below:

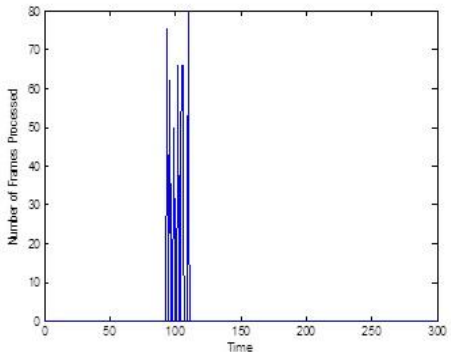

Figure 3.2: Old System Performance.

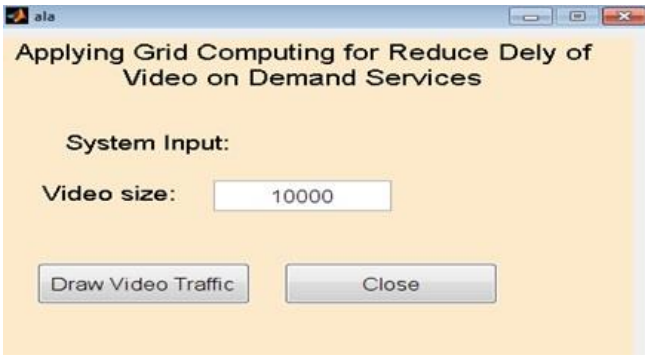

Figure 3.3: GUI for users to enter video file size=10000 MB.

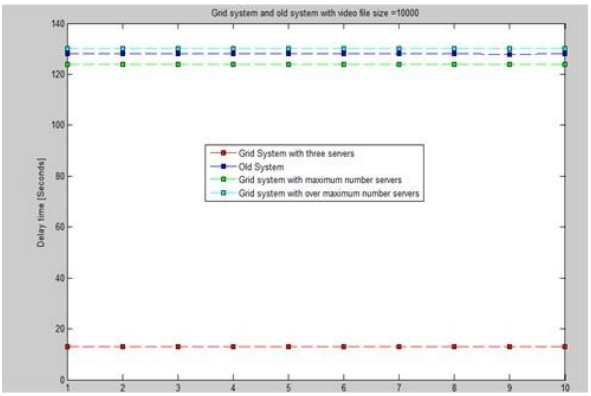

Figure 3.4: Comparison between old system and grid system video.

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V. CONCLUSION

Grid computing is the next generation model for enterprise computing based on the core tenets of virtualization and provisioning of every resource in Information Technology (IT). Grid computing delivers benefits of increased utilization and greater flexibility for infrastructure, applications, and information resources. The delivering of digital media content over the Internet remains a challenging task.

In this research we present the implementation of grid computing to enhance the performance of video on demand through fragment, distribute video file to multiple clusters to reduce load balance over network and to handle multiple for multiple clients' service, and to enhance the delivering time of video to watch as real-time video.

These technologies may still be in their infancy but the foundation and standards for building better tools that use them have mainly been established and I expect that the use of these technologies will increase significantly in the next few years as the migration from standalone systems to service oriented applications continues to evolve.

VI. RECOMBINATION AND FUTURE WORK

This research can be improving by enhance the Grid computing system by increase number of clusters node to handle more services video request. Future work in this research can be achieve by enhance video on demand quality of service (QoS) with available bandwidth.

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