REMOTE SHARING OF COMPUTER RESOURCES FOR BETTER EFFICIENCY

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Abstract: Computers are of utmost importance in today's day and age. With rapid changes in design and technology and frequent updates in hardware and technology, a new standard for high-end computational machines is set quite often in the market. Such upgrades may not be available to every user and PC. Also, the price of such updates proves to be a limitation. Our proposal tries to solve the issue by putting forward the idea of "Remote sharing of Computer Resources for better efficiency.

Index Terms - Virtual Machine, Cloud Computing, Remote Sharing, Parallel Processing, Network Inter-connectivity

I INTRODUCTION

With new development in the field of hardware and software for computational machines, it is imperative for one to own the latest specifications in terms of GPU, CPU, and RAM in order to run programs that are resource hungry. This may demand frequent up gradation of user computers by addition of expensive hardware, replacement of certain parts or even complete replacement of the old machine with a new one, dumping the old machine.

The current solution as mentioned would be to upgrade the computer. This approach to solving the issue of having the latest machine is not economically sound and demands a large investment depending on the type of upgrade the user hopes to carry out. Our proposed solution involves having a host computer and several user computers. The host computer possesses higher specifications and the required RAM, CPU and GPU required for resource hungry tasks. The users would remotely connect to the host to make use of its resources, execute its task and disconnect. This eliminates the need for frequent hardware updates and would even reduce e-waste overtime.

The proposed solution would comprise of a lossless real-time connection without any delay to clone the actions of the user. An online cloud-based system to share files and folders between the users a host and a virtual machine environment for each user facilitating multiple users to stay connected at the same time.

II DISCUSSION

Problems and Solutions

The methodology of this segment is structured into three components.

1. Defining the problem.
2. Present solution
3. Proposed solution.

2.1 Problem Definition

Here we are acknowledging the different types of problems we intend to focus on - ·

1. With the exponential advancement in the hardware of a computer, we observe that latest software's have a number of constraints with regard to the minimum specification required for it to be working perfectly on your computer.
2. For the successfully loading and to ultimately play the game without any disturbance, the latest games do demand a much-upgraded version of the graphics card and GPU. Thus this stands as an unavoidable requirement.
3. In the case of complex rendering and also tasks related to video editing the working and performance stand dependent on the Computer's GPU.

2.2 Present Solution

The current market only offers us a straightforward, expensive solution i.e. to purchase newer and newer devices as and when the need occurs. The obvious flaw with the current solution lies in the fact that the approach is far from being an economically optimal solution. It also intensifies the demand of every computer that includes the latest feature thus forcing the generation of more units. Finally keeping in mind that computers are made of heavy metals and dangerous chemicals. Lead, mercury, brominated flame retardants, beryllium, cadmium, PCV are some of the substances used that contributes to global warming as they cause water contamination and air pollution.

2.3 Proposed Solution

Thus in order to tackle the mentioned problems and to overcome the flaws of the current existing solution, our approach lies in the foundation of sharing Computer resources. In simple terms, if we have a user computer that has insufficient features to carry out the

execution of a particular program. The solution out here would be to connect to the cloud and send a request message, asking for access from the host computer.

The host here is a computer with impressive specifications and once the host computer accepts the request, the task the user wishes to perform is shared to the host through the cloud and when the user would now execute the program the components required in the execution are exploited from the host and not of the user. Thus as the user computer is not capable to run the program on its own, with the processor and specifications of the host being used, this is now possible.

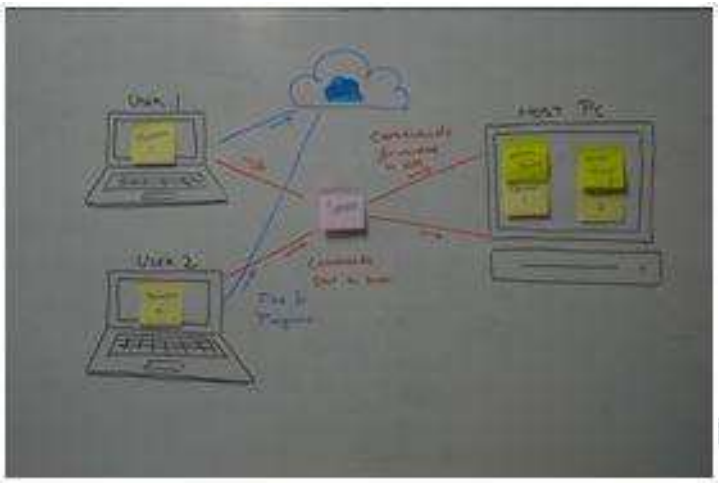

Fig 1: The Working of the system

Moving on, the host computer is capable of hosting more than one user computer simultaneously using the virtual machine and depending on the ultimate availability of resources left in the host computer itself. The screen of the host computer keeps getting divided according to the involvement of more and more user computer.

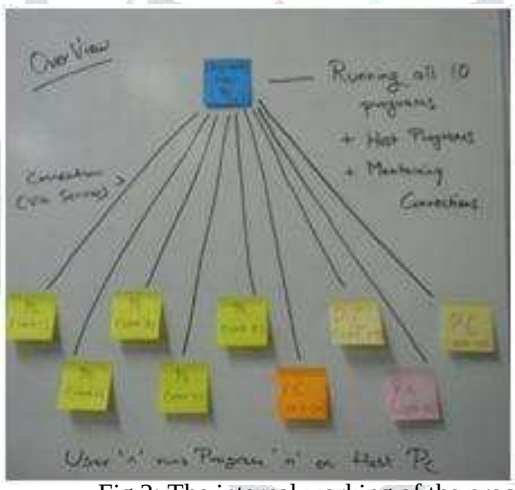

Fig 2: The internal working of the process

Example

A simple example would be where you have two user computers with both having a RAM of 2GB. Although the program that's supposed to be executed on user computer "A" required 4 GB RAM and the program that's supposed to be executed on user computer "B" required 10 GB RAM. Now if we have a host computer with a 16 GB RAM after the link has been formed and the allocation of RAM has been computed, the host would simultaneously run these two programs and the screen would be divided into two parts with the processor of the host being utilized.

III STRUCTURE OF PROJECT PRODUCTION NETWORK

Production connectivity is considered as the basic connectivity of the user for sharing data, CPU resources and memory. The user requests CPU and memory to the host after which the host typecasts the output on the user's screen.

3.1 Interconnection infrastructure:

The infrastructure involves defining various networks with the help of VLAN (Virtual Land Area Network). In a VLAN it will be easier to create a sub-network among different users. Any user can be added/removed/modified as per the requirement. For example, if 4 users require the same functionality from ReSharePro (name of our software), they can all be assigned to the same host in a VLAN until their tasks

are completed. As the tasks of the computers are completed, they can be removed from the VLAN one by one. Simultaneously, another user can be added to perform the same requirement.

3.2 Virtual servers:

The host machines act like virtual servers in the proposed system. A Virtual server shares software and hardware capabilities with its clients. High-end computers are capable of hosting virtual machines and can support one or more virtualization technologies.

3.3 Workstations:

Workstations are the end user machines which cannot implement a particular program. These workstations are computers which are primitive in terms of technologies but are still required to run high CPU and RAM consuming applications.

3.4 Equipment:

Routers:
These are devices which forward data packets between computers in a network. They perform data forwarding functions in the network.

Servers:
The function of a server is to store, retrieve and send files and data to other computers of the network.

Switches:
The main function of a switch is to receive information from any source connected to it and to dispatch that information to the appropriate destination only.

Screencasting:
It involves capturing and encoding the host PC's screen contents and viewing it on the user's desktop in real time. It mostly involves scenes of GUI operations of the host. Each software has a different codec format for the display of videos. Microsoft uses windows media 9, Adobe uses a flash platform, Techsmith's Jing and SJTU's SJSC screen codec. Recently video codecs like H.264 have been used as a generalized screen casting mechanism. Different codec techniques will render the output differently. Hence Rate Control (RC) mechanisms are necessary to be implemented for conversions. Some of them are as follows:

1. AverageBit Rate (ABR)/ Video Buffer Verifier (ABR-VBV) algorithm
2. Constant Quantization Parameter (CQP) algorithm
3. Constant Rate Factor (CRF) algorithm

Of the above 3 algorithms, the CRF algorithm provides a more stable quality with a constant scaling factor that enables the users to specify the quality rather than the bit-rate. Thus it is user-friendly and can provide a high bit rate.

IV CONCLUSION

Experience with Remote Sharing shows that a service-request model, with connection-based service requests, can be used successfully for a personal computer and a simple operating system. This model greatly simplifies the design of a resource-sharing system, since it provides excellent support for components such as the user interface. A simple multitasking facility has been shown to be a good base for service requests. Preliminary performance results indicate that a layered approach to interprocess and inter-machine communication is quite feasible, even for this level of hardware. In contrast to current LAN software products for the PC, which emphasize file sharing, RM Sharing emphasizes application services. This kind of facility has proved effective in a program development environment. RM Sharing is easy to install and to use, and services can easily be built from existing software. The paper has described the features implemented in the prototype. The system provides a good base for further work in these areas.

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