

**SRM UNIVERSITY AMRAVATI**

**PROJECT REPORT**

**Distributed Systems (CSE 316)**

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**TOPIC - Gaming**

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Abstract:

With an estimated 2.1 billion players worldwide in 2016, the popularity of video games is rapidly increasing. Games must successfully captivate players in order to persuade them to invest time and money in the gaming industry. The authors examine how games might be used to increase the accessibility of volunteer computing, and they also give a brief overview of how games and gaming technology have been applied in the past. They suggest a plugin technology for a game-based volunteer computing system that enables users to share computational resources while they play. The method to distributed computing called "volunteer computing" (VC) asks people to donate their unused computing power to various mathematical and scientific issues. For security and dependability considerations, the majority of online games have a classic client-server design, where the majority of the simulation's calculations take place on the server.

By incorporating in-game micro transactions, the developer makes money from the game by letting players speed up progress, alter their appearance and/or experience, or access extra content. The key to these games' success is to keep the player interested and inspired to spend money to get the result they want. We might develop a new fabric for small gaming studios based on cloud computing resources and services in order to get around the scaling obstacles and mass-market online games. With the aid of this fabric, game developers may instantly add resources to their infrastructure and lease resources from commercial clouds.

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INTRODUCTION

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The simplest use of networking is to store the user names and game scores on a central network server. Gaming API’s enables communication and sharing of between two applications.

Keeping user names and game results on a central network server would be the most basic application of networking. Multiplayer games that employ the infrastructure

(client-server or internet peer-to-peer) model require networking APIs. In server-based multiplayer games, the client game software is typically used for input, displaying graphics, playing audio, and other features.

A central game server typically manages the majority of the game activities. For a good gaming experience, network transmission speed and latency must be considered.

These are the more popular network APIs for games.

* **TCP and sockets** :
* Provides a reliable connection.
* We can use TCP for game operations that don’t need security.
* **TCP and sockets using SSL** :
* Provides a reliable connection that prevents spying.
* Use TCP connections with SSL for game operations that need security. The encryption and overhead of SSL adds a cost in latency and performance, so it is only used when security is needed.
* TCP with SSL is commonly used for login, game character creation and management.
* The [Stream Socket](https://learn.microsoft.com/en-us/uwp/api/Windows.Networking.Sockets.StreamSocket) class provides a TCP socket that supports SSL.
* **UDP and sockets** :
* Provides unreliable network transfers with low overhead. UDP is used for game operations that require low latency and can tolerate some packet loss.
* This is often used for fighting games, shooting and tracers, network audio, and voice chat.

**Distributed computing models:**

Game companies have their preferred computing model and would provide high level libraries to implement the model.

Two common models:

* **distributed object:** Characters and environment maintained as objects.

Player inputs are applied to objects (at server) Changes to objects propagated to all players at end of game loop Object update usually implemented as one or more library calls

* **Message parsing:** Player inputs (either button pushes or higher-level movements) are sent to other players (or server).

**Type of message passing/shared memory is used for gaming**

1. DEDICATED SHARED MEMORY
2. SHARED SYSTEM MEMORY

**DEDICATED SYSTEM MEMORY**  
Dedicated memory means applications using memory for rendering purposes will use only the memory on the discrete graphics card thus drastically improving performance.

* it can be accessed much quickly without needing to go through a series of buses and motherboard to access the main system RAM.
* Graphics chip internal to the CPU, will have access to some of the CPU's very high-speed memory, then get further memory from the system RAM on the motherboard.
* It can only use the memory of the graphic hardware

**SHARED SYSTEM MEMORY**

Shared system memory means sharing of the system memory with the onboard graphics chip.

* It can use the areas of memory that only the operation system can use.
* we can run application which require more VRAM than the actual VRAM is present. For things like computer usage, our RAM is used for this task. It can use only a certain amount of it, depending on how much RAM you have.
* VRAM or Video Random-Access Memory is the memory a GPU uses to store the information it needs to render images on a display.

**Can You Use Shared GPU Memory for Gaming?**

Yes, you can, especially when your game starts to lag after playing it for some time. This happens mainly because the memory share is lower.

* Typically, in order to play a game and have a wonderful gaming experience you will need both, a dedicated video memory as well as the shared system memory.
* It is true that if only there is an adequate amount of VRAM for the operating system to use, the shared GPU memory will not be included. However, in the absence of a shared memory, the game will not run continually.

**good graphics adapter needs to have a dedicated memory rather than shared memory because it is faster performance than shared memory.**

**Dedicated memory to be preferred:**

* it makes games fast because they can actually send lot of information to different textures (VRAM).
* Better Gaming Experience A better graphics card can make a big difference when it comes to gaming on a computer.
* It uses its own built-in components, not touching any of your computer’s memory or other peripherals. It renders graphics faster than a human can imagine.

Online games require low latency (i.e low latency is ideal as this means you are experiencing smoother gameplay). Players' expectation can adapt to latency. it is better to be slow but smooth than to battery.

Online games require moderate amount of internet bandwidth. Any type of service except dial-up internet provides sufficient bandwidth for individual game sessions. However, if several people in a household intend to play online games simultaneously, you may need to upgrade your internet connection bandwidth.

**Which Transport Protocol to Use?**

**Gaming requirements:**

 late packets may not be useful anymore and lost information can sometimes be interpolated (though loss statistics may still be useful).

Use UDP in game: It can send absolute values, not deltas, or if deltas are used, regularly send "baseline" data. It can priorities data, conduct reliability if necessary, filter out redundant data, use soft-state, and send baseline data if deltas are used.

**Conclusion**

From the past few years there has been a significant increase in the gaming development. To make it more user friendly and to increase the accessibility it’s very important to work in the area of networking in the gaming. As through our project we found that UDP connections are more useful for gaming network as they need not to store the lost information. Also, for a good gaming experience, network transmission speed and latency must be considered. In future there is a lot of scope for the research in the gaming which can bring some revolutionary changes in the gaming world.