**6-1 Assignment: Memory and Storage Management**

Southern New Hampshire University

CS-230 Operating Platforms

Winnie Kwong

Professor Fredericks

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**Overview**

Assuming The Game Room will have 200 high-definition image files to choose from, each approximately 8 megabytes, it would require at least 1600 MB (or almost 2GB) of data to store in either memory or storage management. Memory management is essential because it ensures blocks of memory space can be managed and allocated correctly into the operating system to enhance performance. Storage management helps to organize a balance between performance and storage capacity.

**Approach to Memory Management in Software Applications**

Considerations to think about are the ram speed and capacity, which can be resolved with some approaches such as paging, cache memory, and virtual memory to ensure that memory is effectively managed in the software application, Draw It or Lose It? Paging is a storage mechanism that can retrieve processes from secondary storage into the memory as pages. According to Wikipedia, "Paging is an important part of virtual memory implementations in modern operating systems, using secondary storage to let programs exceed the size of available physical memory." (*Memory Paging*, 2021, para 1). By doing so, paging can eliminate the need for continuous allocation of physical memory. Cache memory is a chip-based computer component to retrieve data from the computer's memory and acts as a temporary story. Cache memory can hold data that the processor can require next, making it easier to access memory than RAM, and it can reduce the need for slower memory retrievals from the main memory, making the game's performance faster. Virtual memory, one of the most common techniques, requires hardware and software to compensate for memory shortages. Virtual memory can free up RAM by swapping data that can improve system performance using large programs. The gaming software application can boost its performance when dealing with ram speed and capacity by using paging, memory, or virtual memory approaches.

**Approach to Storage Management in Software Applications**

Storage space must be considered for any applications, the operation system, and room for expansion. Focusing on hybrid storage, setting up a Redundant Array of Inexpensive Disks or Redundant Array of Independent Disks (RAID), and cloud storage are some approaches to ensure that memory is effectively managed in the software application. With Hybrid clouds, the business can enhance their flexibility in their storage deployment while increasing the organization's scalability. Using approaches such as object storage or hybrid cloud storage can offer opportunities to manage storage space while considering room for expansion. In defining RAID, according to Yang, "is a data storage virtualization technology that combines multiple physical disk drive components into one or more logical units for data redundancy, performance improvement, or both." (Yang, 2022, Para 1). The Game Room would be able to use RAID 10, which combines mirroring and striping, allowing more data storage while offering data protection that would be viable for company expansion. Cloud storage enables the accessibility to access files remotely on any device while being able to provide higher performance and availability. Cloud data warehouses allow the Game Room a way to store and manage data that can enhance faster loading time and smoother gameplay. By considering options for hybrid storage, RAID, or cloud storage, the Game Room could improve the gaming experience for its users.

**How Memory and Storage Differ in Functionality**

Different ways memory and storage are used, in terms of game application functionality, are the way it is stored, how it is retrieved, and what is their speed. Data makes it easier to retrieve information, however, data is temporarily in the memory storage while files are permanently saved in a storage system. This is vital because memory storage allows instant storage for temporary data while storage can hold both temporary and permanent files. Besides the way it is stored, the retrieval is also different. Retrieving data stored in memory is faster than retrieving data from storage because it can access data from the primary memory while storage memory does not have direct access to the CPU. Furthermore, when upgrade memory and storage, “…adding more RAM to a system increases its performance on a core level. Adding more storage, on the other hand, won’t affect the system’s performance whether it has a 256 GB storage or 1000 GB storage.” (*Difference between Memory and Storage | Difference Between*, n.d., para 14). By upgrading memory, the CPU will be able to handle simultaneous tasks on multiple applications while when upgrading storage, it only helps to store large volumes of data and software. By understanding the difference between memory and storage functionality, the Game Room can determine how much of both will be needed to run their application.

**Conclusion**

By understanding the concepts of memory and storage as well as their differences in functionality, The Game Room will have better ways to upgrade their systems. Improving memory management means no fragmentation in the internal memory, responsible for managing the computer’s primary memory, and keeping track of every memory location. By enhancing storage management, it helps to maximize performance, ensure reliability, and ensures that data is available to users when needed.

**References**

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