Operating System Environments

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**Objective**

The objective of this paper is to compare three operating system environments. This comparison will be made by describing the unique resource allocation needs of each of the operating system environments. The paper will explain what the challenges are associated with designing each operating system environment. Finally, the paper will give examples of where each operating system environment would be the most advantageous. The three operating system environments in which I have chosen to focus on are peer-to-peer computing, virtualization, and real-time embedded systems.

**Peer-to-Peer Networks**

Peer-to-peer computing is one model of a distributed system where all nodes within the network are considered peers, and each acts as both client and server depending on whether it is providing a service or requesting one. According to Silberschatz, Galvin, and Gagne (2014, 1.11.5), once a node joins the network, it may participate in accessing and providing services to the rest of the network. A peer-to-peer network has an advantage over a client-server network in that the nodes are not bottlenecked by having to go through a server. However, one challenge in the peer-to-peer network, each node is responsible for it’s own security and protection.

Peer-to-peer networks can vary greatly in size. Some examples of peer-to-peer networks include a few people getting together for a LAN (Local Area Network) party, Bit Torrent sites, and the well known Napster or Limewire file-sharing services.

**Virtualization**

Virtualization, as described in [Operating System Concepts essentials](https://ashford.instructure.com/courses/66667/modules/items/3374055)(2nd ed.)(2014, 1.11.6), “is a technology that allows operating systems to run as applications within other operating systems.” The number of reasons for using virtualization are endless. Virtualization first came into play in IBM mainframes to allow multiple users to run tasks concurrently on systems designed for a single user (Silberschatz, Galvin, & Gagne, 2014, 1.11.6). One challenge faced with virtualization is performance. The host system performance is affected by each guest instance and each guest is impacted by the other guests in the system as a result of taxing the host’s resources. I use virtualization myself for a number of things. I have virtual machines to allow me to play some of my older games using an instance of Windows 98 or Windows XP on my Windows 10 laptop. I use virtualization to learn, experiment, and play around with LINUX. I also use virtualization as a sandbox to test software that I am unfamiliar with to protect my system from anything that will cause damage or instability to the operating system.

**Real-time Embedded Systems**

Real-time embedded systems are everywhere, from your microwave to your television to your automobile. Real-time embedded systems are in our modern thermostats in our homes, on our wrists in every digital watch, and the robotic part picking machines in Amazon’s warehouses. Real-time embedded systems are generally designed for specific purposes and thereby with limited functionality. “They generally have little or no user interface, preferring to spend time monitoring and managing hardware devices.” (Silberschatz, Galvin, & Gagne, 2014, 1.11.8). The most significant challenge with Real-time Embedded systems is when they fail, it usually requires replacing, at the least, the entire board comtaining the processor for the system.

**Conclusion**

This paper is far from complete. Having lost the original and starting over from scratch while attempting to keep up with the other assignments, I am turning this in for the sake of completion. I do not expect to receive any credit for this paper as it is a week late, not long enough, and does not meet the source requirements. I can only attempt to keep the rest of my grades from here out up enough to minimize the damage as much as possible.

**References**

Silberschatz, A., Galvin, P. B., & Gagne, G. (2014). [Operating system concepts essentials](https://ashford.instructure.com/courses/66667/modules/items/3374055)(2nd ed.). Retrieved from https://redshelf.com/