Module 1: Critical Thinking

Comparing and Contrasting Process Management Utilities of Linux and Windows

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Module 2: Critical Thinking

A process can be defined as “an instance of a program running on a computer”, or an entity that consists of program code, and various properties that are associated with the program (Stallings, 2018, pg. 104) These properties could include an identifier, state, priority, program counter, memory pointers, context data, I/O status information, and accounting information (Stallings, 2018, pg. 104). The information of the processes that are running and the associated properties are stored in a data structure, called the process control block, which is managed and created by the operating system. For a user to view all this information, they could use the Process Management utility of their respective operating system. With a Windows operating system, it is called Task Manager and System Monitor if they are using Linux. This paper compares Windows Task Manager to Linux’s System Monitor, describes the information that is displayed, and an opinion on which process management utility is easier to use.

The process management utilities on a Windows machine have a Processes Tab, which contains columns for the Name of the application running, Status, CPU, Memory, Disk, Network, GPU, Power Usage, and Power Usage Trend. In my Linux machine, the columns in the Processes tab are Process Name, User, % CPU, ID, Memory, Disk read total, Disk write total, Disk write, and Priority. In the Linux machine, there is a button to “End Process”, whereas in Windows, the button is called “End Task”. On the Linux machine, when right-clicking one of the processes, you have the option to Stop, End, Kill, Change Priority, or Set Affinity. In Window’s task manager, there is no option to Stop or Kill, but you could set the affinity and priority by switching to the details tab.

With Windows Task Manager, you can view graphs that display the CPU use, disk use, graphics card utilization, and network use. With Linux’s System Monitor on the Resources tab, you can see graphs that show the CPU utilization, Memory and Swap, and Network activity. System Monitor lacks the graph that shows the graphics card utilization.

In Linux System Monitor on the Resources tab, instead of “Memory”, Linux has “Memory and Swap”. Kumar explains that Swap “is a space on a disk that is used when the amount of physical RAM memory is full. When a Linux system runs out of RAM, inactive pages are moved from the RAM to the swap space” (Kumar, 2020, para. 1). I think using disk space to substitute for RAM memory when RAM is being overloaded is a great idea to help prevent a system crash, but it is important to note that although the swap space is being used to substitute RAM, it is slower than RAM, since it is using disk space. Windows also utilizes swap; however, it is not mentioned or displayed in task manager.

In Windows Task Manager, it has a tab for Startup programs, which allow you to Enable/Disable Startup programs. Linux System Monitor does not have this tab, and instead, you would need to use the “Startup Applications Utility” to add or remove programs to begin running at startup (Prakash, 2015). I do like how Windows has a startup programs tab in their task manager, because if I am trying to improve performance, I may want to see which programs are running at startup and being able to disable applications from running at start may help. Having the ability to enable/disable startup applications from the Task Manager is convenient, whereas with Linux, I would need to open a different utility to view and enable/disable startup applications.

I think the Windows Process Management utility would be easier to use than the process management utility in the Linux Machine. I felt that the data displayed on Windows Task manager was easier to read than on Linux System Monitor. I also felt that the Processes tab on Task Manager had a simple view, which gave all the details that we would want to know about the running processes and having some of the other advanced options on separate tabs, whereas on Linux System Monitor, it did not look as clean, and had some of the advanced options on the Processes tab, which is convenient for someone experienced with Linux, but could be overwhelming to others. I did like how Linux displayed each of the core’s utilization in the Resources tab as well as the utilization percentage associated with each core. With Windows task manager, the default is to show the overall utilization graph of the CPU, and there is an option to show graphs for each of the logical processors, however, when it is selected, you do not see the usage percentage of each of the cores, and you see multiple graphs, representing each of the cores, which can be overwhelming, and we do not get to see what the percentage of utilization. With Linux’s System Monitor, it is only one graph, and you see the utilization percentage of each of the cores.

If I were to make my own process management utility, I would go with the way that Microsoft has their Task Manager, but I would change the CPU graph in the performance tab, to where I could see all the core’s utilizations to be on one graph, and the utilization percentage displayed as they do with Linux’s System Monitor. I would maintain the simplicity of the Processes tab in Windows Task Manager and allow for some of the more advanced options on separate tabs. I would also include the details of Swap on the Performance tab, so if I am utilizing all my RAM, I would be able to see if I am pushing the limits of what I have designated for Swap memory, although I would hope my computer is not frequently getting to the point where Swap memory is being used.

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