

1. Which paper did you choose?

The paper, *Virtual machine monitors: current technology and future trends*, by Mendel Rosenblum and Tal Garfinkel.

2. What struck you the most about the paper?

The way the paper understood the current challenges facing VMs at the time and then forecast the development of VMs into the versatile tools we utilize today is what impressed me most. This is especially because many of the “Future support” sections under each of the virtualization challenges ended up being developed into modern VMs to make them more efficient and effective.

3. What did you learn by reading this paper?

There were many aspects of older VMM configurations and development that I was able to learn about through this paper. One of these was the basic layout of a classic virtual machine monitor, which can handle control of multiple guest operating systems by separating them from the hardware of the system. This layout is shown in the paper in Figure 1. The paper also introduced the layout of a VMWare hosted architecture in Figure 2 where the guest operating system could access I/O since the virtualization layer would use the device drivers obtained from the host operating system to access the I/O devices. There were also examples of other VMMs, like Disco, ESX Server, and others, that the paper provided clear descriptions for readers to learn about the current state of VMMs utilized at the time.

4. What features/aspects described do you have first-hand knowledge with?

I have some first-hand knowledge regarding how an operating system separates the hardware of a system from applications based on what we’ve learned in class. The paper builds upon this knowledge by adding that VMMs take place of the that spot the operating system had so that it can separate all of the guest operating systems from the hardware, as well as, from each other. The paper also mentioned the idea of making sure that guest operating systems could not disable interrupts in its “CPU virtualization” section, and this aligns with the knowledge we gained in class of managing system interrupts so that it will not affect how the system runs negatively.

5. What features/aspects described do you not have first-hand knowledge with?

One aspect of the paper that I do not have first-hand knowledge of is the use of a VMM like ESX Server since it is designed to run directly on hardware without a host operating system and I haven’t worked with systems like this. Another feature I do not know about is the idea of paravirtualization, which seeks to replace certain portions of an instruction set for a VMM since they are nonvirtualizable. These portions need to be replaced with equivalents that are more easily virtualized and this has to be done by whomever is building the VMM.

6. What terms were unfamiliar and caused problems in reading?

I only encountered three terms while reading that I was unfamiliar with and they were paravirtualization, shadow page table, and balloon process. I believe the paper adequately explained the terms, paravirtualization and shadow page table, but not the balloon process term since it was only really used and never quite defined.

7. What was interesting in reading the paper that you would like to study more in the class?

The topic of security with regards to VMs interests me because I would like to know the aspects of VMs that malicious sources target in more modern cases. Studying more about what the potential security risks of prominent VMs today would be a topic that I would like to see in class.