Operating Systems
Spring 2018

S09

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Exercise 2

`a)`

A Type 1 hypervisor is the only programm that is running in the privileged mode. A Type 1 hypervisor has to hold multiple copies of the hardware called virtual machines, these hypervisor run directly on the host's hardware to control the hardware and to manage guest operating systems.
A Type 2 hypervisor has to relies on an existent operating system to manage existing resources. guest operating system runs as a process on the host. Type-2 hypervisors abstract guest operating systems from the host operating system.

`b)`

Virtual mahcine don't care about the disk partition, the hypervisor divide the partition and give to each of its virtual machine one of them.

Exercise 3

Paravirtualization is a virtualization technique that presents to virtual machines a software interface, which is similar yet not identical to the underlying hardware-software interface.
The paravirtualization offers a set of hypercalls which allow the guest to communicate directly with the hypervisor (like system call on an operating system).

Exercise 4

`a)`

The host PC need to support multiple virtual machines operating system and all of its applications, as well as the programm of the hypervisor (functions, data structures, ...). One way to reduce the memory usage is to detect the identical memory segment and share them among multiple virtual machines. For example, if multiple virtual machines are running the same OS, we can use only one memory segment for the OS and share it among multiple virtual machine.

b)

The idea is to avoid storing the data twice, the technique is to analyze the memory of each virtual machines on a host and create a hash value, then identical hash value represent the same memory segment and therefore we can remove on of them and share the last one among multiple instances.