Type 1: Native Hypervisors

Dedicated Hypervisor kernel, e.g.:
- VMware ESX
- IBM VM/CMS
- Xen

High-level OS
- Lightweight OS
- Or regular, just with extra privileges

- Console (Mgmt) operating system
- Guest operating system
- VMM
- Hypervisor
- Real hardware
Type 2: Hosted Hypervisors

Regular OS with extensions:
- VMware Workstation
- Linux KVM
- Microsoft Hyper-V
Memory addressing in virtual machines

Saturday, December 22, 2018    12:18 PM

Guest 1:

Virtual AS

Guest

Physical AS

Machine

Memory

Guest 2:

Virtual AS

Guest

Physical AS

Machine

Memory
Shadow page tables

- Guest changes optional, but help with batching, knowing when to unshadow
- Latest algorithms work remarkably well

Page tables created by the guest kernel to be used to construct on demand.

"Shadow" page tables used by the MMU directly map guest virtual to machine addresses.
Memories allocated in guest kernel by balloon driver are returned to the hypervisor.

1. Memory returned to the balloon driver by the hypervisor is deallocated by the driver, returning it to guest kernel.
Virtual Machines Page 8
Virtual hardware driver "created" as a demand, direct-mapped into a new VM.