Graduate Operating Systems

Fall 2018

Paper “Xen”

• Goals of Xen; challenges of VMs
• Resource containers
• Accounting issue, QoS crosstalk issue
Paper “Xen”

• Memory management
  – TLB: SW/HW, tagged/flush
  – Push page table responsibility to guest OS
  – Xen avoids TBL flush
    • Give guest OS control over page table management
    • Protect Xen from triggering flushing
Paper “Xen”

- CPU management
  - Privilege levels
  - Validate privileged calls by Xen
  - System calls handled without Xen involvement
- I/O management
  - Xen does not emulate devices
  - Uses shared-memory buffer-descriptor rings

Paper “Xen”

- Hypercalls and events
- I/O rings
- BVT scheduling
- Virtual address translation
- Physical memory
- Virtual firewall-router
- Disk
Paper “VirtuOS”

- Virtualization for “decomposition”
- Service domains
- Device driver crashes
- Microkernels
- Exceptionless system call interface
- I/O virtualization: PCI passthrough and IOMMU

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Paper “VirtuOS”

- Failure models
- Byzantine failures
- Spinning vs. blocking