Desktop Hypervisor Framework

SYSTOR 2007 - Virtualization Workshop

By Neocleus

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About Neocleus

- We are a Software Company
  - in stealth mode
- Not a Virtualization company per se
  - Utilizing other Hypervisors as the basis
- Part of what we do is Open Source

Desktop Virtualization

HVM requirements in a Desktop environment are different

- There is an end-user (surprise!)
- Dynamic configuration (e.g. network)
- Unknown hardware characteristics
- P2V is a must

Neocleus is focused on Desktops…

It’s a Game Changer

- Hardware Virtualization changes the “software stack” on end-points
- A multitude of new opportunities

What's missing?

A Framework to solve the issues with having multiple VMs on the desktop

Critical Success Factors For Desktop Virtualization

- Performance
  - Emulation doesn't deliver
- Security
- Usability
  - Minimal changes
- Hardware Compatibility
  - A multitude of devices out there

Basic Concepts

- NativeDom
  - A single domain that is considered to be native
  - Most hardware devices are seen by NativeDom
    - The Disk is being emulated
- Emulated Hardware vs. Real Hardware
  - “Multiplexed” devices managed by Dom0
  - Selective pass-through
    - USB - UHCI/EHCI (Keyboard/Mouse)
    - SATA / IDE (DVD-RW)

Hardware Pass-through Motivation

Addresses most of the Critical Success Factors

- Performance
- Usability
- Hardware Compatibility

But… introduces new security problems!

Neocleus' "Open" Virtualization Innovation

- Device Pass Through
  - 1-to-1 memory mapping
    - Supporting non-IOMMU platforms
  - Optimizing the User Experience (Performance, Usability) for
    - Graphics/Networking/USB
- Interrupt Sharing
  - Supporting multiplexing of devices utilizing shared resources

Neocleus' "Proprietary" Virtualization Innovation

- **Productization**
  - Installer
  - Switching between environments
- Physical-to-Virtual (P2V)
  - "Virtualizing" an installed Windows
  - Does not require partitioning
- **Security;** Securing the Hypervisor and all VMs

Everything required to virtualize an existing Windows installation

Security Issues

- Direct Device Access opens the door for DMA attacks
  - TXT / NoDMA solves this as well
- Denial-of-service
  - NativeDom can crash the entire system
    - Same as above, it has direct access to hardware
    - But this is also true without virtualization
    - Buggy device drivers

“Desktop Hypervisor Framework”

- A common framework is required in order to make desktop virtualization a reality
  - Efficiency
  - Usability
- How the end-user and/or an organization managed multiple “Software Appliances”?
- Deal with common tasks
  - Networking/NAT
  - Cross-Domain APIs

Spurring an Ecosystem

Desktop Hypervisor Framework

- Enable 3rd party ISVs to focus on applications, instead of virtualization
- Enables installation of additional virtualized appliances