

# Virtualisation Shootout Forum

3 February 2009

Campbell-Lange Workshop

# What is Virtualization?

Coined in the 1960s it was used by IBM to describe a software implementation providing the facilities of a computer.

# Virtualization types

- Full** A virtual machine in software simulates hardware
- Hardware** Hardware-assisted virtualisation provides support for the hosting of several guest OS clients.
- OS** A physical server is virtualized at operating system level

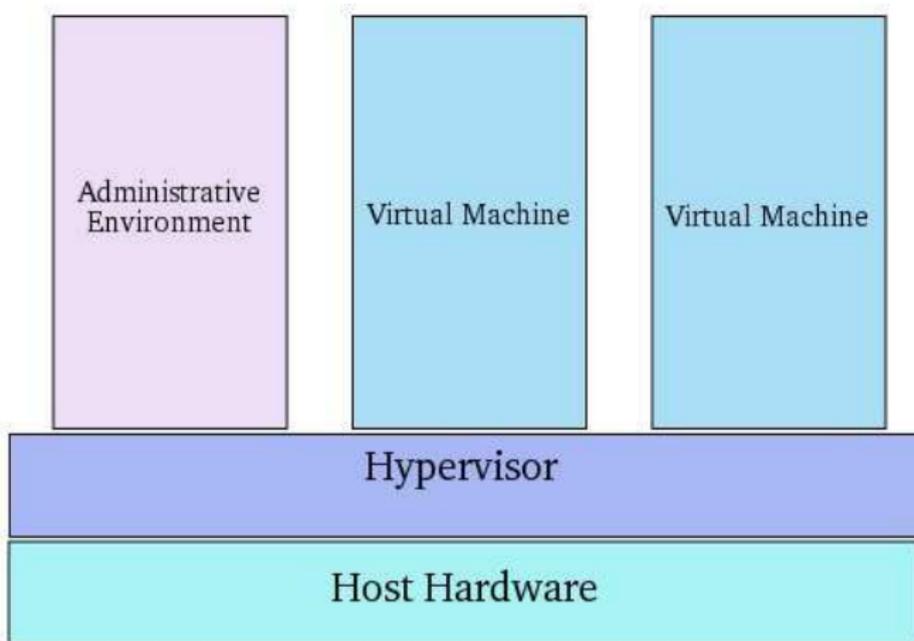
# Elements of a Virtualized environment

- Hardware** One or more computers hosting virtualization
- Host OS** Required for hosting a hypervisor in a fully virtualized environment. Not needed for hardware-assisted virtualization.
- Hypervisor** A hypervisor is a hardware virtualization platform that allows multiple operating systems to run on a host computer concurrently.
- Guest** A guest operating system that runs on the hypervisor

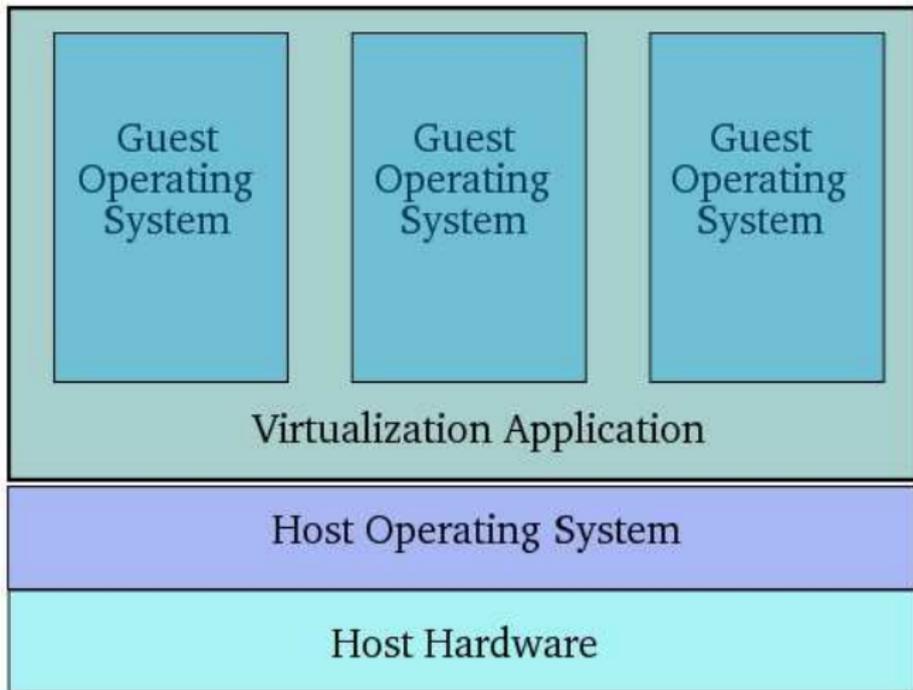
# Hypervisor Types

- Native** These run directly on the host hardware and monitor guest operating systems. The guest runs at a level above the hypervisor. Also known as “bare metal” e.g. VMWare ESX Server, Xen, Citrix XenServer, Parallels Server, Sun Logical Domains
- Hosted** These run within a normal operating system environment.  
e.g. VMWare Server, VMWare Workstation, Sun’s VirtualBox, Parallels Workstation

# Native Type



# Hosted Type



# Considerations

- ▶ The “Native” type tends to run faster, but have more hardware dependencies
- ▶ The “Native” type tends to require Intel VT or AMD-V processors
- ▶ The “Native” type may cause problems with procedures such as hibernation/system suspension, memory paging
- ▶ There are sophisticated ways of sharing memory available to Hosted or “Paravirtualised” systems that aren’t available to Native approaches.
- ▶ 32 and 64 bit emulation problems

# Advantages of Virtualization

- ▶ Modern machines can be used to do more things
- ▶ Reduced space, power and plumbing requirements
- ▶ Consolidation of services on fewer servers cuts costs
- ▶ Increased security when running multiple services as each can be contained within an operating system “shell”
- ▶ Multiple OSes and applications can be run on the same hardware
- ▶ Pre-packaged VM images can be run easily
- ▶ Dynamic Load Balancing and Disaster Recovery

# Issues with Virtualisation

- ▶ Where is the service? Losing your services in a VM world
- ▶ Hypervisor bugs (e.g. vendor software problems) and rootkits
- ▶ I/O performance may be slow due to virtualisation, and affected by server consolidation
- ▶ Increased administrative complexity
- ▶ Licensing issues
- ▶ VM promises more flexibility but provides finite service improvements
- ▶ Virtualised servers will soon be serving the virtualised corporate desktop