



# VirtualBox

VirtualBox Graphical User Interface Version 2.1.4\_OSE  
© 2004-2009 Sun Microsystems, Inc.

# Virtualization With:



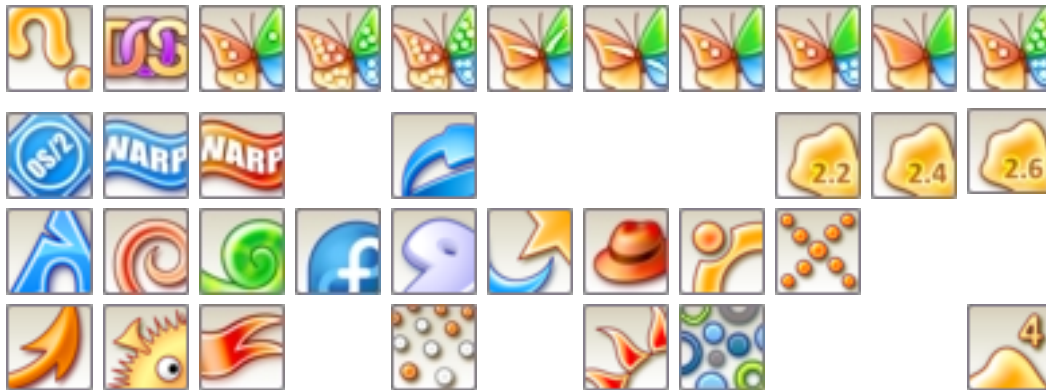
**Sun xVM  
VirtualBox®**

# What Kind of Virtualization?

- Full virtualization
  - Platform
  - Resource

# Platform Virtualization

- Guest operating systems are loaded and run as a virtual machine
- Virtualization performed by software with some hardware assistance if the host is capable
- Many Guests OS's supported



# Resource Virtualization

- Disk space is assigned to each guest OS
- Memory
- Network interfaces
- Removable media attachments
- Audio abstraction
- Serial Ports
- Files shared with the host or other guests

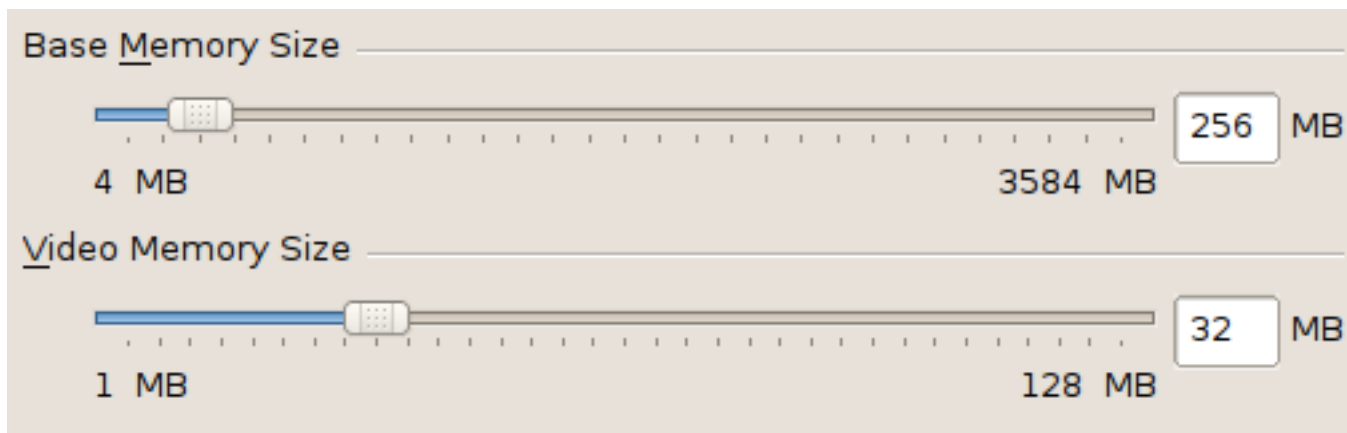
# Virtual Disk Space

- A host file is assigned to the guest to act as a physical disk
- This image can dynamically expand to a limit or remain a fixed size.
- Three container formats supported:
  - VDI – Sun VirtualBox
  - VMDK – VMWare
  - VHD – Microsoft
- Image can be normal, immutable, or write-through.



# Memory

- Dial in the amount of memory Guest can use
- Guest memory clobbers don't affect host or other guests
- Set the size of video memory



# Network Interfaces

- Presents a common NIC type to the guest (AMD PcNET FAST III)
- Four types of network are possible
  - Use NAT through the host
  - Use guest-to-guest internal network
  - Use 'real' interface on the host via netfilter with routing/bridging to host's LAN
  - Have no network

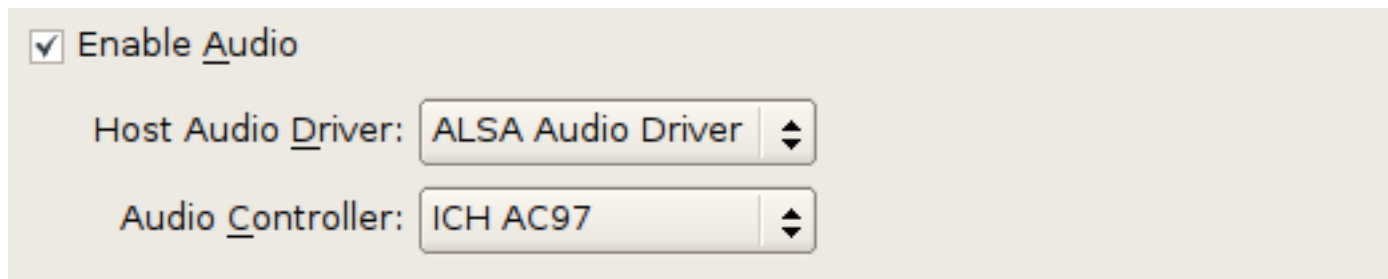


# Removable Media Attachments

- Host CD/DVD or floppy drive can be attached to guest
- ISO images can be attached as a CD or DVD
- Floppy disk images can be attached as a floppy drive

# Audio Abstraction

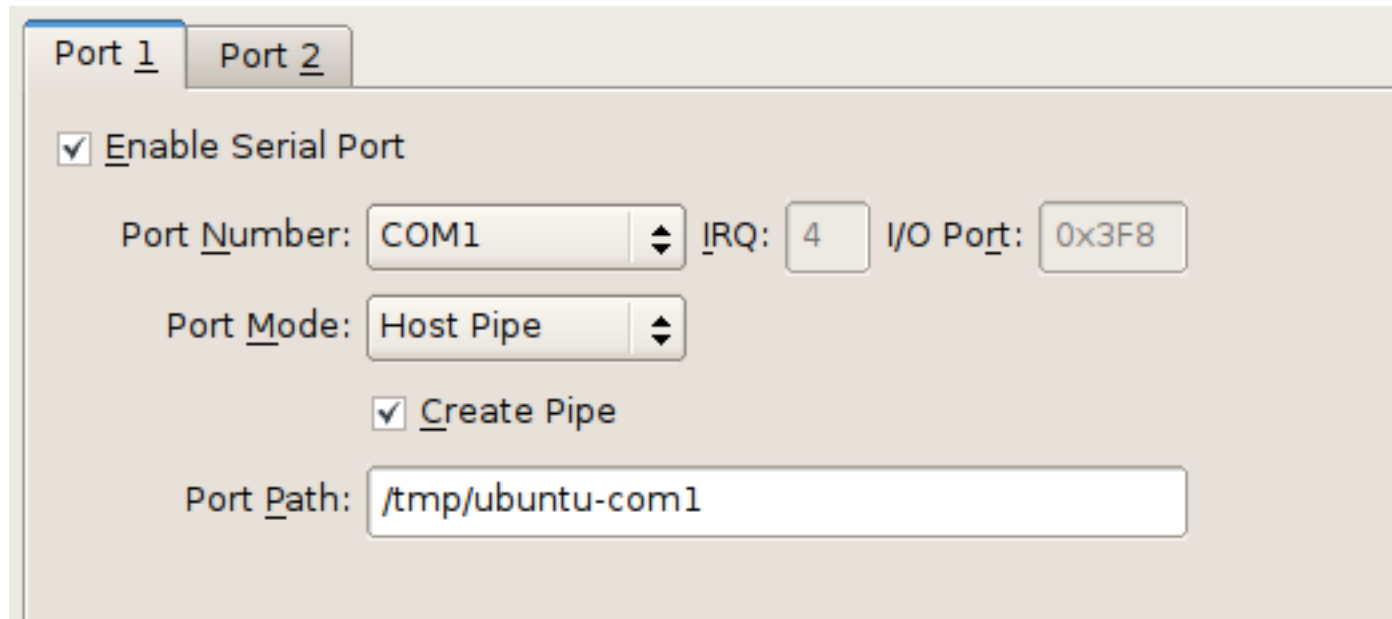
- Presents an ac97 or Soundblaster 16 virtual device to the guest
- Host can use ALSA or OSS audio driver



A screenshot of a virtual machine configuration window showing audio settings. The background is a light beige color. At the top left, there is a checked checkbox labeled "Enable Audio". Below this, there are two dropdown menus. The first is labeled "Host Audio Driver:" and has "ALSA Audio Driver" selected. The second is labeled "Audio Controller:" and has "ICH AC97" selected. Both dropdown menus have a double-headed arrow icon on the right side.

# Serial Ports

- Supports up to four virtual serial ports
- Useful for headless configurations
- Sooo retro



The image shows a configuration window for virtual serial ports. It has two tabs: "Port 1" (selected) and "Port 2". The window contains the following settings:

- Enable Serial Port
- Port Number: COM1 (dropdown)
- IRQ: 4 (text input)
- I/O Port: 0x3F8 (text input)
- Port Mode: Host Pipe (dropdown)
- Create Pipe
- Port Path: /tmp/ubuntu-com1 (text input)

# File Sharing

- Files can be shared between the Host and Guests
- Requires add-in installed in the Guest
- Only supported with  $\geq$  Win2K and Linux Guests
- Guest can be assigned read-only access
- Linux Guest accesses via *mount*
- Win Guest accesses via Network Places (CIFS)

# Hosts

- Linux
  - Uses vboxdrv and vboxnetflt to provide virtual services to Guests
- Windows
- OpenSolaris
- Mac OS X (Intel only)

# Guest Add-ins

- Drivers added to the guest to improve performance and function
  - Video
  - Mouse/keyboard 'capture'
  - Cut-n-paste Guest ↔ Host
- Not required but can reduce Guest overhead and improves the usability of the Guest desktop

# Virtual Disk Manager

- Internal registry of:
  - Hard disk images
  - CD/DVD images
  - Floppy images
- After registration, images can be attached to one or more Guests

# Running a Virtual Machine

- Start and pause
- Snapshots
- Change removable media
- Close machine
  - Save state
  - Send shutdown signal (ACPI)
  - Power off (Scotty says “Cap'n, pull the plug”)



# VboxManage

- CLI
- Define, start/stop, control Guests
- Write scripts (cookie cutters) to define and control Virtual Machines. mmm-good.

# Caveats

- Guest add-ins don't play well with system management tools like Yast
  - xorg.conf is modified for screen resize
- Guest timer interrupts can consume large amounts of a Host CPU resource.

# Licensing

- GPLv2 – Open Source Edition
- Personal Use and Evaluation License – Full package is free for personal use or evaluation
  - RDP Server
  - USB Support
  - RDP over USB
  - Serial ATA Controller (faster virtual I/O)
- Commercial – for deployment to non-family by an administrator. Contact Sun for pricing.

# Demo: Guest Install

- Distro: ttylinux
- OS: Linux 2.6
- HD: 16 MB
- RAM: 64MB
- Sound: Yes
- NIC: NAT
- Serial: Pipe

## ttylinux

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You have found the homepage of **ttylinux**, a small GNU/Linux system. This small system has an 8 MB file system and runs on i486 computers, but provides a complete command line environment and is ready for Internet access.

The goal this project is to make one of the smallest, up-to-date Linux systems, yet keep it similar to a larger distribution.

End users may want to use **ttylinux** on old computers for accessing the Internet, or on a bootable USB disk for a portable system. Developers may want to use **ttylinux** as the base for building a new distribution or embedded system.

# Demo: LTSP server/client testing

- Use 'internal' network
- Start server on a VM
- PXE boot a client from another VM

# Demo: Enhance Ubuntu W/Addins

- Mount Sun's VirtualBox Addin .ISO
- Run the script there

# And Beyond...

- API/SDK exposes the feature set of the virtualization engine to third-party developers
- VBoxHeadless can start an RDP only VM
- VBoxManage includes many actions not available in the GUI
- Snapshot – preserve the state of a VM prior to risky operations
- Convert existing install to a Virtual Machine

# Links

- <http://www.virtualbox.org>