

XVM VirtualBox 3.0

KansasFest 2009

Date: July 24, 2009

Presenter: Geoff Weiss

Contains content

Copyright (c) 1996 - 2009,

Daniel Stenberg,

daniel@haxx.se.



www.virtualbox.org

Session Overview

Topics

- Product Introduction
- Recent Releases
- Example: Java One 2009
- Demo of Desktop usage
- VirtualBox SDK/API
- VBoxManage Features
- Upcoming Features



Introduction

Sun VirtualBox is a collection of powerful virtual machine tools, targeting desktop computers, enterprise servers and embedded systems. With VirtualBox, you can virtualize 32-bit and 64-bit operating systems on machines with Intel and AMD processors, either by using hardware virtualization features provided by these processors or even entirely in software, at your option.



VirtualBox Basics

With VirtualBox, you can run unmodified operating systems – including all of the software that is installed on them – directly on top of your existing operating system, in a special environment called a “virtual machine”. Your physical computer is then usually called the “host”, while the virtual machine is often called a “guest”.



VirtualBox Basics

VirtualBox allows the guest code to run unmodified, directly on the host computer, and the guest operating system “thinks” it’s running on a real machine. In the background, however, VirtualBox intercepts

certain operations that the guest performs to make sure that the guest does not interfere with other programs on the host.



VirtualBox Uses

The techniques and features that VirtualBox provides are useful for several scenarios:

- Operating system support
- Infrastructure consolidation.
- Infrastructure consolidation.



Terminology

Host Operating System

- Physical Computer

Guest Operating System

- Virtual Computer



Virtual Machine

- Virtual environment

Guest Additions

- Software to improve user environment

Hardware Virtualization

VT-X and AMD-V

Nested Paging and Extended Page Tables (EPT)



Recent Past Major Release

Virtual Box 2.2.0 (2009-04-08)

- Virtual Appliances
- 32GB Guest
- Network: host-only
- SCSI Disks



Recent Major Release

Version 3.0.0 (2009-06-30)

- Guest SMP with up to 32 virtual CPUs (VT-x and AMD-V only)

- Windows guests: ability to use Direct3D 8/9 applications / games (experimental)

- Support for OpenGL 2.0 for Windows, Linux and Solaris guests



Recent Release

Version 3.0.2 (2009-07-10)

- Bug fixes
- Install on Pardus Linux
- NT4 Guest Service supports Time Synch and Guest Properties



Java One 2009 Usage

7,000 attendees.

150 Thin clients

3 OS choices: Ubuntu, Vista, OpenSolaris

21,000 desktops

2 System Administrators



Java One 2009 Usage

Server environment:

- One rack of hardware
- Four servers to handle Virtual Box (Fire 4450, 64 GB RAM, 4x4core).
- Three for VDI Core (HA setup)
- Three storage arrays (7000's-8 core, 44 TB).



Java One 2009 Usage

Sun VDI 3 -- Sun commercial software

- Originally relied on VMWare, now VirtualBox savvy.
- Enterprise desktop PC costly to manage.
- Virtual desktop--use from anywhere.
- RDP connections to VirtualBox sessions.
- Runs in the data center.
- mySQL for configuration mgmt (running hosts, etc.).
- LDAP for user authentication.
- Released March 2009



Live Demo

Full Screen

Seamless Mode

OpenGL

DirectX 8 and 9

SMP

32-bit/64-bit Guests/Create

Virtual Machine Configuration

Snapshots

Save/Start Session States

RDP Connect



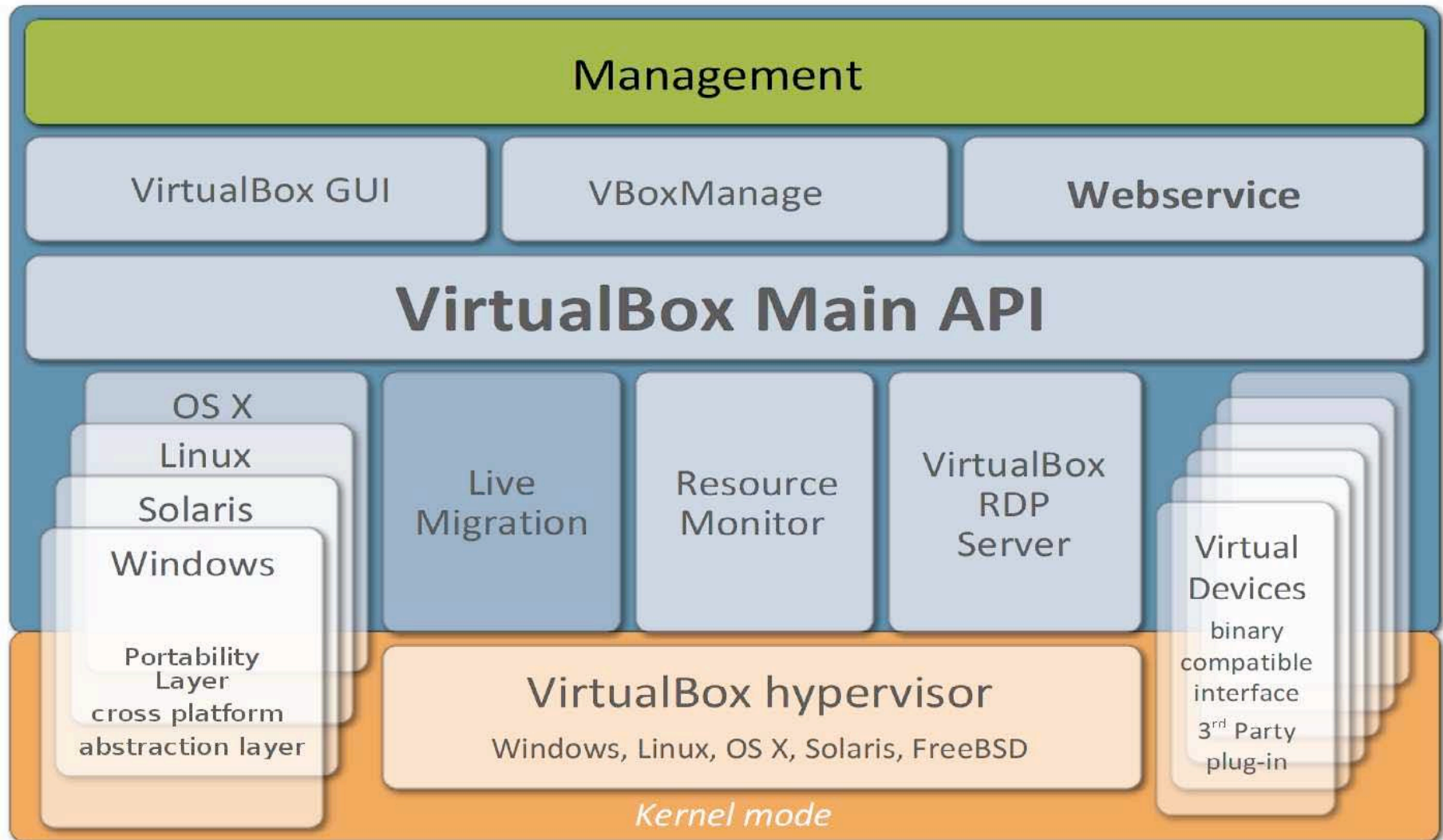
Virtual Appliances

Preinstalled downloads

- <http://virtualboximages.com>
- <http://ovfappliances.com>



VirtualBox API



VirtualBox SDK

Free download from virtualbox.org

Language bindings: python, java, PERL, C
(MSCOM and XPCOM)



VBoxManage

Does everything that the GUI does
And a whole lot more!

Command line tool

- should be in your default path



VboxManage

Usage: VboxManage list [-l | --long] <option>

- * vms lists all virtual machines currently registered with VirtualBox. By default this displays a compact list with each VM's name and UUID; if you also specify --long or -l, this will be a detailed list as with the showvminfo command (see below).
- * runningvms lists all currently running virtual machines by their unique identifiers (UUIDs) in the same format as with vms.
- * hdds, dvds and floppies all give you information about virtual disk images currently registered in VirtualBox, including all their settings, the unique identifiers (UUIDs) associated with them by VirtualBox and all files associated with them.
- * ostypes lists all guest operating systems presently known to VirtualBox, along with the identifiers used to refer to them with the modifyvm command.
- * hostdvds, hostfloppies and hostifs, respectively, list DVD, floppy and host networking interfaces on the host, along with the name used to access them from within VirtualBox.
- * hostusb supplies information about USB devices attached to the host, notably information useful for constructing USB filters and whether they are currently in use by the host.
- * usbfilters lists all global USB filters registered with VirtualBox -- that is, filters for devices which are accessible to all virtual machines -- and displays the filter parameters.
- * systemproperties displays some global VirtualBox settings, such as minimum and maximum guest RAM and virtual hard disk size, folder settings and the current authentication library in use.
- * hddbackends lists all known hdd backends of VirtualBox. Beside the name of the backend itself, descriptions about the capabilities, configuration and other useful informations are displayed.



VBoxManage

VBoxManage showvminfo <uuid>|<name> [--details] [--statistics]
[--machinereadable]

VBoxManage registervm <filename>

VBoxManage unregistervm <uuid>|<name> [--delete]

VBoxManage createvm --name <name>
[--ostype <ostype>]
[--register]
[--basefolder <path> | --settingsfile <path>]
[--uuid <uuid>]



VBoxManage

VBoxManage modifyvm <uuid|name>
[--name <name>] [--ostype <ostype>] [--memory <memorysize in MB>]
[--vram <vramsize in MB>] [--acpi on|off] [--ioapic on|off] [--pae on|off] [--hwvirtex on|off]
[--nestedpaging on|off] [--vtxvpid on|off] [--cpus <number>] [--monitorcount <number>]
[--accelerate3d <on|off>] [--bioslogofadein on|off] [--bioslogofadeout on|off]
[--bioslogodisplaytime <msec>] [--bioslogoimagepath <imagepath>]
[--biosbootmenu disabled|menuonly|messageandmenu] [--biossystemtimeoffset <msec>]
[--biospxedebg on|off] [--boot<1-4> none|floppy|dvd|disk|net] [--hd<a|b|d> none|<uuid>|<filename>]
[--idecontroller PIIX3|PIIX4] [--sata on|off] [--sataportcount <1-30>] [--sataport<1-30> none|<uuid>|<filename>]
[--sataideemulation<1-4> <1-30>] [--scsi on|off] [--scsiport<1-16> none|<uuid>|<filename>]
[--scsitype LsiLogic|BusLogic] [--dvd none|<uuid>|<filename>|host:<drive>] [--dvdpassthrough on|off]
[--floppy disabled|empty|<uuid>| <filename>|host:<drive>] --nic<1-N> none|null|nat|bridged|intnet|hostonly]
[--nictype<1-N> Am79C970A|Am79C973| 82540EM|82543GC|82545EM] [--cableconnected<1-N> on|off]
[--nictrace<1-N> on|off] [--nictracefile<1-N> <filename>] [--nicspeed<1-N> <kbps>]
[--bridgeadapter<1-N> none|<devicename>]
[--hostonlyadapter<1-N> none|<devicename>] [--intnet<1-N> <network name>]
[--natnet<1-N> <network>|default] [--macaddress<1-N> auto|<mac>]
[--uart<1-N> off|<I/O base> <IRQ>] [--uartmode<1-N> disconnected| server <pipe>|
client <pipe>| file <file>| <devicename>]
[--gueststatisticsinterval <seconds>]
[--audio none|null|dsound|solaudio|oss|alsa|pulse|coreaudio]
[--audiocontroller ac97|sb16]
[--clipboard disabled|hosttoguest|guesttohost| bidirectional]
[--vrdp on|off] [--vrdpport default|<port>] [--vrdpaddress <host>]
[--vrdpauthtype null|external|guest] [--vrdpmulticon on|off]
[--vrdpreusecon on|off] [--usb on|off] [--usbhci on|off]
[--snapshotfolder default|<path>]



VBoxManage

VBoxManage import <ovf> [--dry-run|-n] [more options]
(run with -n to have options displayed for a particular OVF)

VBoxManage export <machines> --output|-o <ovf>
[--legacy09]
[--vsys <number of virtual system>]
[--product <product name>]
[--producturl <product url>]
[--vendor <vendor name>]
[--vendorurl <vendor url>]
[--version <version info>]
[--eula <license text>]
[--eulafile <filename>]



VBoxManage startvm <uuid>|<name>
[--type gui|sdl|vrpb|headless]

VBoxManage

```
VBoxManage controlvm <uuid>|<name>
    pause|resume|reset|poweroff|savestate|
    acpipowerbutton|acpisleepbutton|
    keyboardputscancode <hex> [<hex> ...]
    injectnmi|
    setlinkstate<1-N> on|off |
    usbattach <uuid>|<address> |
    usbdetach <uuid>|<address> |
    dvdattach none|<uuid>|<filename>|host:<drive> |
    floppyattach none|<uuid>|<filename>|host:<drive> |
    vrdp on|off] |
    setvideomodehint <xres> <yres> <bpp> [display]]
    setcredentials <username> <password> <domain>
        [--allowlocallogon <yes|no>]
```



```
VBoxManage discardstate <uuid>|<name>
```

```
VBoxManage adoptstate <uuid>|<name> <state_file>
```


VBoxManage

VBoxManage snapshot <uuid>|<name>
take <name> [--description <desc>] |
discard <uuid>|<name> |
discardcurrent --state|--all |
edit <uuid>|<name>|--current
[--name <name>]
[--description <desc>] |
showvminfo <uuid>|<name>

VBoxManage openmedium disk|dvd|floppy <filename>
[--type normal|immutable|writethrough] (disk only)

VBoxManage closemedium disk|dvd|floppy <uuid>|<filename>

VBoxManage showhinfo <uuid>|<filename>



VBoxManage

VBoxManage createhd --filename <filename>
--size <megabytes>
[--format VDI|VMDK|VHD] (default: VDI)
[--variant Standard,Fixed,Split2G,Stream,ESX]
[--type normal|writethrough] (default: normal)
[--comment <comment>]
[--remember]

VBoxManage modifyhd <uuid>|<filename>
[--type normal|writethrough|immutable]
[--autoreset on|off]
[--compact]

VBoxManage clonehd <uuid>|<filename> <outputfile>
[--format VDI|VMDK|VHD|RAW|<other>]
[--variant Standard,Fixed,Split2G,Stream,ESX]
[--type normal|writethrough|immutable]
[--remember] [--existing]



VBoxManage

```
VBoxManage convertfromraw <filename> <outputfile>  
    [--format VDI|VMDK|VHD]  
    [--variant Standard,Fixed,Split2G,Stream,ESX]  
VBoxManage convertfromraw stdin <outputfile> <bytes>  
    [--format VDI|VMDK|VHD]  
    [--variant Standard,Fixed,Split2G,Stream,ESX]
```

```
VBoxManage addscsidisk --server <name>|<ip>  
    --target <target>  
    [--port <port>]  
    [--lun <lun>]  
    [--encodedlun <lun>]  
    [--username <username>]  
    [--password <password>]  
    [--type normal|writethrough|immutable]  
    [--comment <comment>]  
    [--intnet]
```



VBoxManage

VBoxManage getextradata global|<uuid>|<name>
<key>|enumerate

VBoxManage setextradata global|<uuid>|<name>
<key>
[<value>] (no value deletes key)

VBoxManage setproperty hfolder default|<folder> |
machinefolder default|<folder> |
vrdpauthlibrary default|<library> |
websrvauthlibrary default|null|<library> |
loghistorycount <value>



VBoxManage

```
VBoxManage usbfilter    add <index,0-N>
                        --target <uuid>|<name>|global
                        --name <string>
                        --action ignore|hold (global filters only)
                        [--active yes|no] (yes)
                        [--vendorid <XXXX>] (null)
                        [--productid <XXXX>] (null)
                        [--revision <IIFF>] (null)
                        [--manufacturer <string>] (null)
                        [--product <string>] (null)
                        [--remote yes|no] (null, VM filters only)
                        [--serialnumber <string>] (null)
                        [--maskedinterfaces <XXXXXXXXXX>]
```



VBoxManage

```
VBoxManage usbfilter    modify <index,0-N>
                        --target <uuid>|<name>|global
                        [--name <string>]
                        [--action ignore|hold] (global filters only)
                        [--active yes|no]
                        [--vendorid <XXXX>|'']
                        [--productid <XXXX>|'']
                        [--revision <IIFF>|'']
                        [--manufacturer <string>|'']
                        [--product <string>|'']
                        [--remote yes|no] (null, VM filters only)
                        [--serialnumber <string>|'']
                        [--maskedinterfaces <XXXXXXXXXX>]
```



```
VBoxManage usbfilter    remove <index,0-N>
                        --target <uuid>|<name>|global
```

VBoxManage

VBoxManage sharedfolder add <vmname>|<uuid>
--name <name> --hostpath <hostpath>
[--transient] [--readonly]

VBoxManage sharedfolder remove <vmname>|<uuid>
--name <name> [--transient]

VBoxManage vmstatistics <vmname>|<uuid> [--reset]
[--pattern <pattern>] [--descriptions]

VBoxManage guestproperty get <vmname>|<uuid>
<property> [--verbose]

VBoxManage guestproperty set <vmname>|<uuid>
<property> [<value> [--flags <flags>]]

VBoxManage guestproperty enumerate <vmname>|<uuid>
[--patterns <patterns>]

VBoxManage guestproperty wait <vmname>|<uuid> <patterns>
[--timeout <timeout>]

VBoxManage metrics list [*|host|<vmname> [<metric_list>]]
(comma-separated)



VBoxManage

```
VBoxManage metrics      setup
                        [--period <seconds>]
                        [--samples <count>]
                        [--list]
                        [*|host|<vmname> [<metric_list>]]
```

```
VBoxManage metrics      query [*|host|<vmname> [<metric_list>]]
```

```
VBoxManage metrics      collect
                        [--period <seconds>]
                        [--samples <count>]
                        [--list]
                        [--detach]
                        [*|host|<vmname> [<metric_list>]]
```



VBoxManage

```
VBoxManage hostonlyif ipconfig <name>  
    [--dhcp |  
    --ip<ipv4> [--netmask<ipv4> (def: 255.255.255.0)] |  
    --ipv6<ipv6> [--netmasklengthv6<length> (def: 64)]]
```

```
VBoxManage dhcpserver add|modify --netname <network_name> |  
    --ifname <hostonly_if_name>  
    [--ip <ip_address>  
    --netmask <network_mask>  
    --lowerip <lower_ip>  
    --upperip <upper_ip>]  
    [--enable | --disable]
```

```
VBoxManage dhcpserver remove --netname <network_name> |  
    --ifname <hostonly_if_name>
```



Upcoming Features

Announced at Java One in June 2009:

- Mac OS X Guest (on Mac OS X Hosts)
- Live Migration

Listed On Wikipedia

Memory ballooning

More portable snapshots

Next-generation seamless windowing with better desktop integration

Paravirtualization using Virtual Machine Interface (VMI) and Windows

"Enlightenments" paravirtualization



Thank You

Any questions?

