



# Virtualization with KVM(and Libvirt)

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# Agenda

- 1 **KVM Virtualization overview and architecture**
- 2 **libvirt, libguestfs and virt-tools**
- 3 **Demonstration**
- 4 **In the works/Upcoming**



## Section 1

# **KVM Virtualization overview and architecture**

# KVM overview

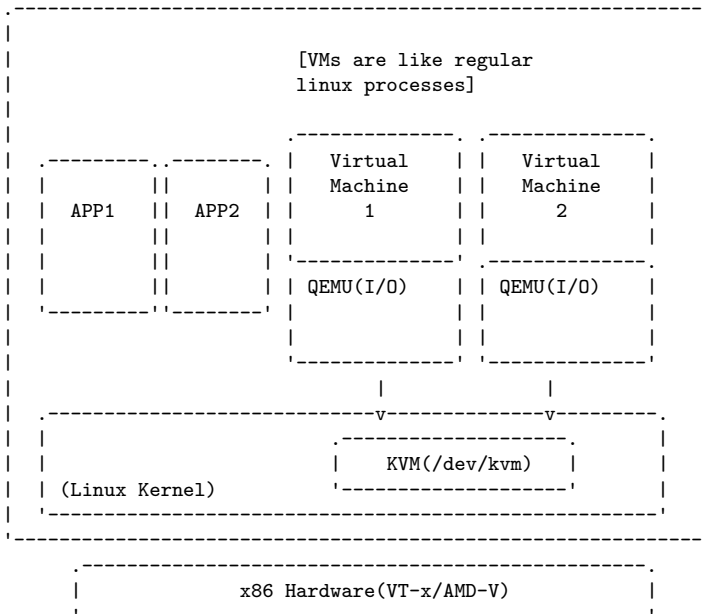
- Hardware-assisted
  - Uses CPU virtualization extensions(Intel-**vmx** /AMD-**svm**)
  - Enables a 'guest operating mode'

- A loadable kernel module

```
root@~$ modprobe -l | grep kvm
kernel/arch/x86/kvm/kvm.ko
kernel/arch/x86/kvm/kvm-intel.ko
kernel/arch/x86/kvm/kvm-amd.ko
root@~$
```

- Turns Kernel into hypervisor
  - **/dev/kvm** character device is used by user-space to create guests
  - Re-uses Linux kernel features — CPU scheduling, Memory mgmt, Power mgmt, Drivers...
  - Design & development driven by hardware specs

# KVM Architecture





## Section 2

# **libvirt, libguestfs and virt-tools**



# Libvirt

- A library, daemon, tool to manage virtual{machines, infrastructure}:
  - General VM life-cycle management
  - XML format to store/define VM configuration
  - Management shell interface – **virsh**
  - CPU Pinning
  - Manage: Devices, Networks, Snapshots, Storage pools. . .
  - Security: POSIX user/groups; sVirt(SELinux based)
  - **Plenty others. . .**



# Libguestfs and virt-tools

- A library/API and a set of tools
  - Inspect, edit, resize, rescue VM disk images
  - **GUEST** Filesystem Interactive **SHell** – **guestfish**
  - Scriptable using `guestfish` or lang. bindings{python, perl, ruby...}
  - **libguestfs** based virt tools — `virt-inspector`, `virt-cat`, `virt-edit`, `virt-rescue`, `virt-*`



# Section 3

## **Demonstration**



## Section 4

# In the works/Upcoming

# What's next

- Quite a few interesting things. A random list:
  - Live snapshots/ Live migration
  - Qcow2 (v3)
  - Security: Sandboxing
  - Storage : Virtio-scsi
  - PCI Device assignment enhancements
  - Nested Virt
  - Plenty others...

# References



Fedora virt

[https://fedoraproject.org/wiki/Getting\\_started\\_with\\_virtualization](https://fedoraproject.org/wiki/Getting_started_with_virtualization)



KVM website

<http://www.linux-kvm.org/>



libvirt website

<http://www.libvirt.org/>



libguestfs

<http://libguestfs.org/>



virt-tools based on libvirt and libguestfs

<http://virt-tools.org/>



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# The end.

Thanks for listening.