Virtualization in Fedora
(KVM based)

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Outline

Virtualization at a glance
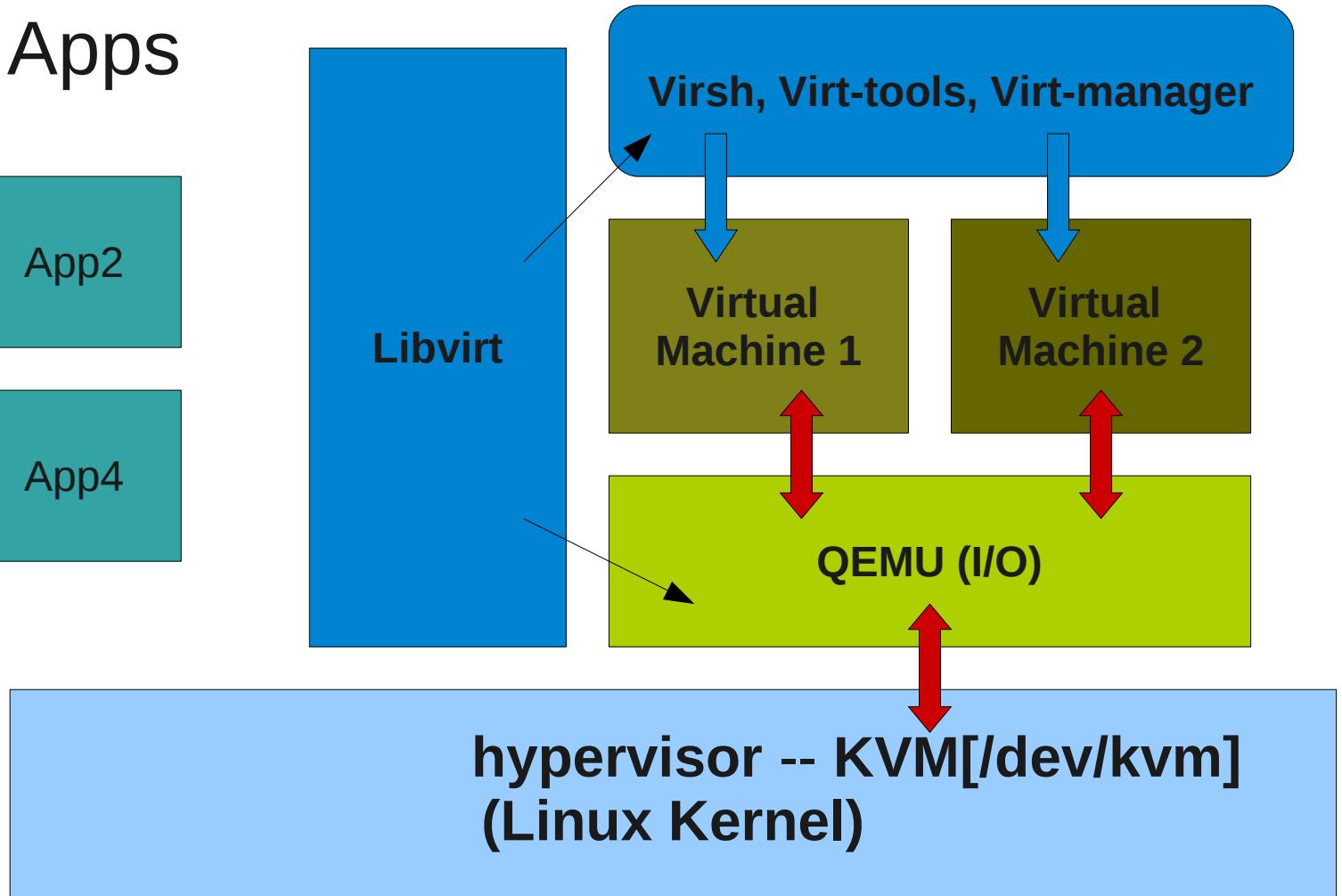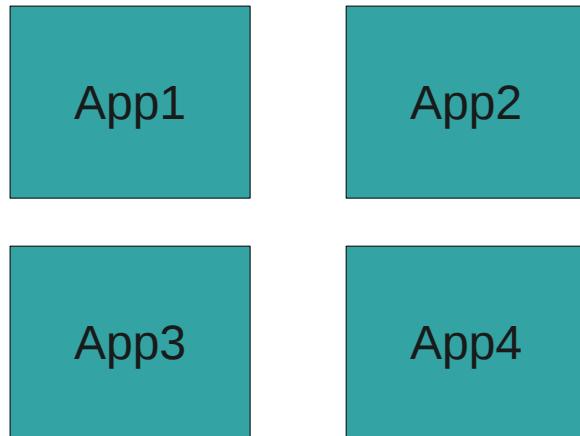
- Server Consolidation

- Greeeeeeeeeeeeeeeeen Planet
  - Data Center -- Space, Power, Cooling, Maintenance cost savings

- Run multiple operating systems

Overview of KVM

- Hardware-Assisted
    - CPU Extensions – Intel **VMX** ; AMD **SVM**

- Turns linux kernel into **hypervisor**

- Re-uses *existing* kernel features :
    - CPU scheduling
    - Memory, Power Management
    - Device Drivers, Timer handling, plenty more..

Virt Architecture

Regular Apps

App1

App2

App3

App4

Libvirt

Virsh, Virt-tools, Virt-manager

Virtual Machine 1

Virtual Machine 2

QEMU (I/O)

hypervisor -- KVM[/dev/kvm] (Linux Kernel)

X86 Hardware(Intel/AMD)

Enabling KVM on Linux

- Grep for Virt extension support
  - *# egrep -i 'svm|vmx' /proc/cpuinfo*

- Check the kernel modules are loaded
  - *# lsmod | grep kvm*

- Ensure kvm device node is present
  - *# file /dev/kvm*

Libvirt

- ✔ Excellent for managing single nodes. (supports a variety of hypervisors)

- ✔ XML format to define guests

- ✔ start; stop; shutdown; reboot; save; restore; sanpshot -- a guest

- ✔ Secure(**svirt/selinux**) ; Manage Networking, Storage, etc

Virt Tools

- Virt-manager(Brilliant graphical tool)
- Virt-install (python-virtinst)
- Virsh (Virt Shell for managing guest life cycle)
- Libugestfs/guestfish(Disk Manipulation)
- Virt-cat, Virt-ls, Virt-df, Virt-dmesg, and a gazillion more

Virt-install Illustration1

- virt-install --connect=qemu:///system \

  --name f**edora15** \

  --disk **/export/vmimgs/fedora15.img,size=5** \

  --ram **1024** \

  --vcpus=**2** \

  --check-cpu \

  --hvm \

  --cdrom **/export/isos/Fedora-15-Beta-x86_64-Live-Desktop.iso**

Virt-install Illustration2

- Guest install via shell

  $ virt-install –connect=**qemu:///system** \

  --name f**15-vm2** \

  --extra-args=**"console=tty0 console=ttyS0"** \

  --disk **/var/lib/libvirt/images/f15-vm2.img, size=5** \

  --ram **1024** \

  --vcpus=**2** \

  --check-cpu \

  --hvm \

  --location \
  http://download.fedora.redhat.com/pub/fedora/linux/releases/15/Fedora/x86_64/os/

Conclusion

- Simple. Does not re-invent the wheel
- Takes massive advantage of kernel features
- Impressive performance
- Terrific tooling

Resources

- http://fedoraproject.org/wiki/Getting_started_with_virtualization
- http://fedoraproject.org/wiki/How_to_use_qemu
- http://virt-tools.org/
- http://kashyapc.wordpress.com/2011/08/18/unattended-guest-install-with-a-local-kickstart/