What is new in Libvirt?

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Introduction

What for?

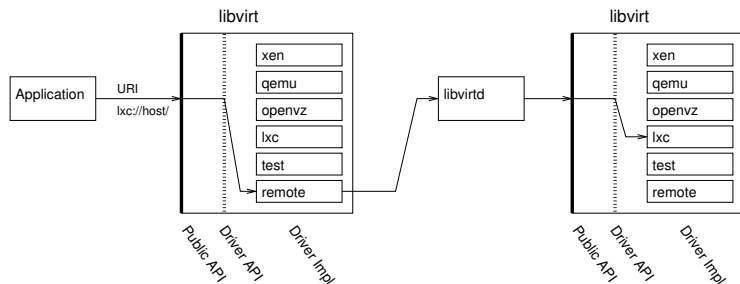|	
security	Guest is isolated from host
reliability	Guest is host indepent
recovery	Guest can be saved at any point
testing	One can run many different environments
shareability	Guest can be shared among multiple users

libvirt

- ▶ Stable: protection from hypervisor API changes
- ▶ Portable: Linux, Windows, OS-X, . . .
- ▶ Secure: TLS, SASL, (lib-)SSH, PolicyKit
- ▶ Simple: rapid application developement
- ▶ Open: LGPLv2+

libvirt

Basic structure

- Supported HV: QEMU, KVM, ESX, Xen (XenD, XenStored, Xen Hypervisor, Xenlight), LXC, VirtualBox, **Parallels**, UML, Hyper-V, OpenVZ, Phyp, VMWare, test

libvirt

What else?

- ▶ Storage: LVM, disk, SCSI, iSCSI, NFS
- ▶ Network: bridge, bonding, vlan, VEPA, OpenVSwitch
- ▶ QoS, filtering (iptables + ebtables)
- ▶ CGroups: CPU, memory, disk I/O limits
- ▶ PCI/USB device passtrhough
- ▶ Guest agent
- ▶ Host management

libvirt

Language bindings:

- ▶ Core: C
- ▶ Perl, Python, Java, Ocaml, Ruby, C#, PHP

Mappings to different models:

- ▶ CIM/DMTF: libvirt-cim
- ▶ AMQP/QMF: libvirt-qmf
- ▶ SNMP: libvirt-snmp
- ▶ GObject: libvirt-glib

virsh

```
zippy@bart ~ $ virsh -c qemu:///system
Welcome to virsh, the virtualization interactive terminal.

Type:  'help' for help with commands
       'quit' to quit

virsh # list --all
 Id    Name                           State
----------------------------------------------------
 1     f17                            running
 -     f16                            shut off
 -     f16_nfs                        shut off
 -     win7                           shut off

virsh # start f16
Domain f16 started

virsh # █
```

CLI for managing libvirt

virsh

- Nearly every API is exposed
- Ported to many platforms: Linux, OS-X, Windows, Solaris, . . .
- Capable of talking to some HVs directly
- Remote access
- Stable output $\Rightarrow$ easily usable in scripts

libvirt-1.0.0

```
tag v1.0.0
Tagger:     Daniel Veillard <veillard@redhat.com>
TaggerDate: Fri Nov 2 12:09:46 2012 +0800

Release of libvirt-1.0.0

Yay !!!
7th birthday of the project see the first commit:
d77e1a9642fe1efe9aa5f737a640354c27d04e02 initial revision
-----BEGIN PGP SIGNATURE-----
Version: GnuPG v1.4.12 (GNU/Linux)

iEYEABECAAYFAlCTR88ACgkQRga4pd6VvB9ImgCgl0U348QSwRu3j79Nerd
FOEAoI4wAVVB3rt2EOzqrE2a3JMz5pZ3
=d/6i
-----END PGP SIGNATURE-----
```
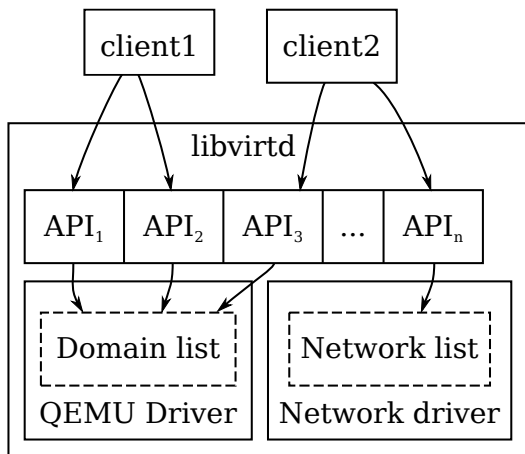
The Big Libvirt Lock

The driver's list is bottleneck. Dropping it speeds up domain starting process by 200%.

Snapshots

disk Content of disk is saved at given point of time
memory Tracks state of RAM and other resources
checkpoint Combination of disk + memory
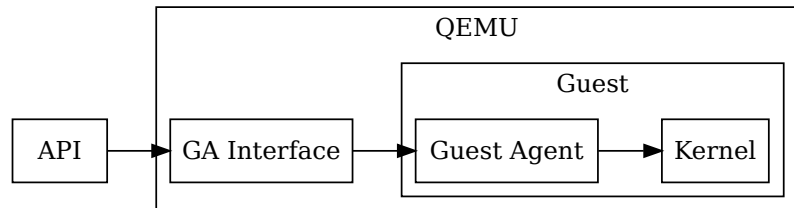

Small live example

virlockd

The "sanlock" plugin for libvirt allows integration with the sanlock daemon for locking.

Explicit leases Management application must add leads in the guest XML to represent exclusion policy is desired. Leases are not directly associated with any device.

Automatic leases libvirt creates leases for each disk device, based on the filepath of the disk backing store. Assumes that the app is using stable file paths, across all hosts.
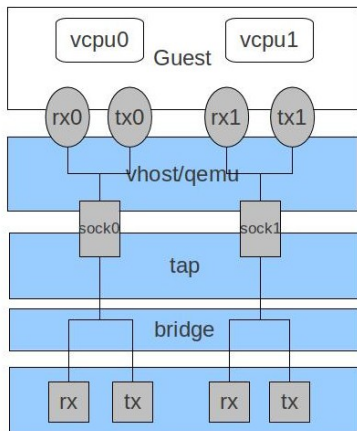
QEMU Guest Agent

- Execute operations from inside the guest (poweroff, FS freeze, thaw, trim, . . .)
- Side channel to standard qemu monitor

Multiqueue Network

- ▶ Packet sending/receiving process scale with number of vCPUs
- ▶ Create multiple TX/RX queues, each can be handled with a different vCPU
- ▶ Changes involve kernel, qemu & libvirt

http://www.linux-kvm.org/wiki/images/e/e3/Ver1.jpg

libvirt-sandbox

Sandbox on the top of LXC/KVM with libvirt

```
zippy@bart ~ $ virt-sandbox -p -c lxc:/// /bin/date
Mon Apr 30 21:21:46 CEST 2012
zippy@bart ~ $ █
```

- ▶ Host filesystem passtrhough bind mounts or P9FS
- ▶ small overheads: LXC 200ms, KVM 3000ms
- ▶ Boot kernel+initrd (KVM) "init" binary (LXC)

Usage scenarios: run apache per virtual host inside sandbox, mock RPM build

libvirt-designer

Produce domain XML for libvirt

- ▶ Reimplementation of virt-install
- ▶ Based on libosinfo[1] and libvirt-glib[2]
- ▶ To cooperate with libvirt-builder (not started yet)

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[1]http://libosinfo.org/
[2]ftp://libvirt.org/libvirt/glib/

Google Summer of Code

Libvirt participate in GSoC:

- ▶ More intelligent virsh auto completion
- ▶ Libvirt RPC protocol Wireshark dissector
- ▶ Introduce API to query IP addresses for given domain

Where to go?

- Libvirt http://libvirt.org
- libvirt-snmp
  http://wiki.libvirt.org/page/Libvirt-snmp
- libvirt-sandbox http://berrange.com/tags/sandbox/

GNOME Shell - not standalone mgmt applications, but
virtualization builtin desktop (gnome-boxes)

The End

Questions?