What is new in Libvirt?

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Introduction

What for?

- **security**  Guest is isolated from host
- **reliability**  Guest is host independent
- **recovery**  Guest can be saved at any point
- **testing**  One can run many different environments
- **shareability**  Guest can be shared among multiple users
Stable: protection from hypervisor API changes
Portable: Linux, Windows, OS-X, ...
Secure: TLS, SASL, (lib-)SSH, PolicyKit
Simple: rapid application development
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
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 passthrough
- Guest agent
- Host management
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
CLI for managing libvirt

```bash
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 #
```
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 ⇒ 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)

iEYEABECAAYFA1CTR88ACgkQRga4pd6VvB9ImgCgl0U348QSwRu3j79NercdFYOEa0l4wAVVB3rt2E0zqrE2a3JMz5pZ3
di
-----END PGP SIGNATURE-----
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

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Small live example
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
Sandbox on the top of LXC/KVM with libvirt

- Host filesystem passthrough 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)

\(^1\)http://libosinfo.org/
\(^2\)ftp://libvirt.org/libvirt/glib/
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](http://libvirt.org)
- libvirt-snmp
  [http://wiki.libvirt.org/page/Libvirt-snmp](http://wiki.libvirt.org/page/Libvirt-snmp)

GNOME Shell - not standalone mgmt applications, but virtualization built-in desktop (gnome-boxes)
The End

Questions?