LIBVIRT ADMIN API
A DIFFERENT KIND OF MANAGEMENT FOR LIBVIRT

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WHAT IS LIBVIRT?
VIRTUALIZATION TOOLSET

TOOLSET TO UTILIZE VIRTUALIZATION CAPABILITIES OF VARIOUS HYPERVERSORS

- C library
- libvirtd daemon (backend)
- virsh CLI (frontend)
LIBVIRT
MIDDLEWARE LAYER

virsh  virt-manger  OpenStack  oVirt

libvirt

QEMU/KVM  LXC  ESX  OpenVZ  Xen
LIBVIRT

MIDDLEWARE LAYER

- abstract layer dealing with specifics of the underlying hypervisor
- secure, remote, management of
  - virtual machines
  - virtual networks
  - storage
LIBVIRTDB

WHY DO WE EVEN NEED IT?

- means for remote management of a VM
- store VM's state in a safe manner

CAN IT MANAGE ITSELF?

- originally no support for runtime configuration
- `libvirtd.conf` → persistent configuration only
- restart is needed every time daemon's configuration is changed
LIBVIRT-ADMIN

WHAT IS IT?
- new set of APIs
- independent library
- virt-admin binary

WHY SHOULD I CARE?
- live reconfiguration of daemon settings
- monitoring (threadpool monitoring, client monitoring, ...)
LIBVIRT-ADMIN

WHAT CAN IT DO?

- reconfiguration of logging parameters
- threadpool management
- client management
  - listing all connected clients
  - client details
  - force disconnect of a client
  - modification of client limits
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THREAD POOL MANAGEMENT

SERVER LOAD MIGHT CAUSE ALL WORKER THREADS TO BE OCCUPIED...

- next request to arrive would block → delay in service delivery
- identify which one of libvirtd's servers is hitting the limit on active workers

```
# virt-admin srv-list
<table>
<thead>
<tr>
<th>Id</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>admin</td>
</tr>
<tr>
<td>1</td>
<td>libvirtd</td>
</tr>
</tbody>
</table>
```
LIBVIRT INTERNALS

DETOUR

Public API

Driver API

libvirt

QEMU

LXC

XEN

OpenVZ

test

remote

qemu://host/system

Application

RPC

libvirtd

QEMU

LXC

XEN

OpenVZ

test

remote
LIBVIRT D UNDERNEATH

server libvirtd

libvirt API

thread pool

service UNIX
- RO UNIX socket

service UNIX
- RW UNIX socket

service TCP
- TCP/IP socket

service TLS
- TCP/IP socket

drivers
- storage
- network
- hypervisors
LIBVIRT UNDERNEATH

server admin
- service UNIX
  - root-only UNIX socket

server libvirtd
- thread pool
- service UNIX
  - RO UNIX socket
  - RW UNIX socket
- service TCP
  - TCP/IP socket
- service TLS
  - TCP/IP socket

libvirt API

drivers
- storage
- network
- hypervisors
LIBVIRT D UNDERNEATH

JOBS - WHEN A REQUEST ARRIVES...

1. event loop extracts raw data from a file descriptor
2. deserializes the header of the message and creates a job for worker threads (decoded header + message payload)
3. worker thread deserializes the message payload to extract the procedure arguments
4. dispatch the registered method associated with the RPC procedure
5. serialize the results and send a reply back to the client
LIBVIRT-ADMIN

THREAD POOL MANAGEMENT CONT.

SO WE ADDED MORE RESOURCES, HOW CAN WE MAKE USE OF THEM...

- retrieve thread pool runtime info
  - standard vs priority worker thread
- modify thread pool's parameters to allow spawning more threads or kill existing ones

# virt-admin srv-threadpool-info libvirtd
# virt-admin srv-threadpool-set libvirtd
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CLIENT MANAGEMENT

CONNECTIONS, CONNECTIONS, CONNECTIONS...

- how many clients will be connected
- setting the limit too low vs too high
- runtime support for tuning the max number of allowed clients

# virt-admin srv-clients-info libvirtd
# virt-admin srv-clients-set libvirtd --max-clients --max-unauth-clients
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CLIENT MANAGEMENT CONT.

- policy enforcement by 3rd party management applications
- provide detailed information about connected clients
  - IP (PID, GID, UID), timestamp, authentication, readonly connection
- list all connections
- force disconnect of a client

# virt-admin srv-clients-list libvirtd
# virt-admin client-info libvirtd <ID>
# virt-admin client-disconnect libvirtd <ID>
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LOGGING

DAEMON OR DOMAINS ENTER AN INVALID STATE, BUT...

- debugging is not enabled
- changing the config requires daemon restart
- we want to inspect current state
- modify the logging settings on the fly
qemuDomainMaybeBreakMagically:16374 : Maybe performing magic

to block copy still active: disk 'vda' already in active block job

LIBVIRT-ADMIN
LOGGING

17
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LOGGING CONT.

- switch on debugging by modifying the global logging level
  - *debug, info, warning, error*
- provide a custom set of filters (extremely verbose modules)
- define a custom set of logging outputs
  - *file, stderr, syslog, journald*

```
# virt-admin dmn-log-info libvirtd
# virt-admin dmn-log-define libvirtd --level --filters
   --outputs
```
FUTURE IMPROVEMENTS

- client discover events
- support for remote access
- logging client's activity
HOW TO REACH US

HELP

- <libvirt-users@redhat.com>
- API documentation
- IRC #virt (irc.oftc.net)
- http://wiki.libvirt.org

DEVELOPMENT

- <libvir-list@redhat.com>
- contributor guidelines
- http://libvirt.org
Q & A
THANK YOU