oVirt Architecture

Itamar Heim

Presented here by Dan Kenigsberg
danken@redhat.com
Agenda

- oVirt Components
  - Engine
  - Clients
  - Host
    - Engine Agent - VDSM
  - Guest
- Storage Concepts
- Data Warehouse & Reports
- User flows
Architecture From 30,000 Feet

Client

Engine

Servers
The Real World

- DB
- LDAP Server
- Shared Storage
- Local Storage
- Engine
- Guest agent
- Guest
- VDSM
- Host
- Web Clients
- Python SDK
- Python CLI
- Spice client
oVirt Engine

- VM & Template Life Cycle: create, schedule, snapshot
- Load Balancing
- HA
- Storage: Configuration & Monitoring
- Network: Configuration & Monitoring
- Host Register/Install
- Host Monitoring
- Host Maintenance
- Host Fencing
- Authentication, Authorization, Audit
- Inventory
oVirt Engine

- Active Directory
- RHDS
- IDM

- Postgres DB

- Engine

- REST
The Real World

- DB
- LDAP Server
- Shared Storage
- Local Storage
- Engine
- REST
- Guest agent
- Guest
- VDSM
- Host
- Web Clients
- Python SDK
- Python CLI
- Spice client
The Clients

- Engine
- REST

- Admin Portal
- User Portal
- Python SDK
- Python CLI
User Portal

Ovirt Engine
Logged in user: masayo | Sign Out | Guide | About

demo-vm
Linux
Machine is Down

linux-vm
Linux
Machine is Down

demo-vm

Operating System: OtherLinux
Defined Memory: 512MB
Number of Cores: 1 (1 Socket(s), 1 Core(s) per Socket)

Drives:
    some-vm_Disk1: 2GB

Console: Spice[Edit]
## Power User Portal

### oVirt Engine
Logged in user: **masayag** | Sign Out | Guide | About

### Virtual Machines:
- Defined VMs: 2
- Running VMs: 0

### Virtual CPUs:
- Defined vCPUs: 2
- Used vCPUs: 0

### Memory:
- Defined Memory: 2012MB
- Memory Usage: 0MB

### Storage:
- Total Size: 32GB
- Number of Snapshots: 2
- Total Size: <1GB

### Table:

<table>
<thead>
<tr>
<th>Description</th>
<th>Disks</th>
<th>Virtual Size</th>
<th>Actual Size</th>
<th>Snapshots</th>
</tr>
</thead>
<tbody>
<tr>
<td>demo-vm</td>
<td>1</td>
<td>2GB</td>
<td>0GB</td>
<td>1</td>
</tr>
<tr>
<td>linux-vm</td>
<td>1</td>
<td>30GB</td>
<td>0GB</td>
<td>1</td>
</tr>
<tr>
<td>linux-vm_Disk1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SDK

```python
# create proxy
api = API(url='http://localhost:8080', username='user@domain', password='password')

api.vms.

# list by query
vms = api.vms.list(query = 'name=python_vm')

# search vms by property constraint
vms = api.vms.list(memory=1073741824)

# get by constraints
vm = api.vms.get(id = '02f0f4a4-9738-4731-83c4-293f3f734782')

vm.start()
```

oVirt Overview
**CLI**

**AVAILABLE COMMANDS**

* action  
  execute an action on an object
* cd  
  change directory
* clear  
  clear the screen
* connect  
  connect to a RHEV manager
* console  
  open a console to a VM
* create  
  create a new object
* delete  
  delete an object
* disconnect  
  disconnect from RHEV manager
* exit  
  quit this interactive terminal
* getkey  
  dump private ssh key
* help  
  show help
* list  
  list or search objects
* ping  
  test the connection
* pwd  
  print working directory
* save  
  save configuration variables
* set  
  set a configuration variable
* show  
  show one object
* status  
  show status
* update  
  update an object

```
(oVirt cli) > help connect
```

**USAGE**

```
connect <url> <username> <password>
```

**DESCRIPTION**

Connect to a RHEV manager. This command has two forms. In the first form, no arguments are provided, and the connection details are read from their respective configuration variables (see 'show'). In the second form, the connection details are provided as arguments.

The arguments are:

* `url`  
  - The URL to connect to.
* `username`  
  - The user to connect as. Important: this needs to be in the `user@domain` format.
* `password`  
  - The password to use.
The Real World

- DB
- LDAP Server
- Shared Storage
- Local Storage
- Engine
- Guest
- Guest agent
- VDSM
- Host
- Shared Storage
- Web Clients
- Python SDK
- Python CLI
- Spice client
The Host

Fedora oVirt Node

- QEMU/KVM
- libvirt
- VDSM
- MOM
- KSM

Configuration Monitoring:
Network, Storage, Host, VMs
The Real World

- DB
- LDAP Server
- Shared Storage
- Local Storage
- VDSM
- Engine
- REST
- Guest agent
- Guest
- Host
- Web Clients
- Python SDK
- Python CLI
- Spice client
The Guest

virtio-net  virtio-block  virtio-serial

guest Agent

spice qxI  virtio-balloon

Linux | Windows  Guest

Fedora | oVirt-node | RHEL

spice client
Virtio Balloon

Guest Memory space:

Space for other guest applications

Inflate

deflate
Putting the Pieces Together

- Web Clients
- Python SDK
- Python CLI

- DB
- LDAP Server
- Shared Storage
- Local Storage
- VDSM
- Guest
- Guest agent
- Host
- REST
- Engine
- Web Clients
- Python SDK
- Python CLI
- Spice client
Storage Concepts

- Shared Storage
- Local Storage
- Host

Diagram showing a shared storage pool connected to multiple hosts, and a local storage block for one host.
Storage Concepts

Storage Pool

* Master Storage Domain

Storage Pool Manager (SPM)
Data Warehouse

Operational DB → ETL → History DB → API

ETL

API

Operational DB

History DB
DWH & Reports

- Operational DB
- ETL
- History DB
- API
- Jasper Report Server

Predefined reports
Customized reports
Example Report

Active Virtual Machines by OS in Clusters of Data Center DC_30_IC136_tiger

Criteria:
- Datacenter: DC_30_IC136_tiger
- Cluster: All

Date Range: 2011-08-01 - 2011-10-31
- VM Type: All
- Period: Quarterly
- Show Deleted Virtual Machines: Yes

Charts:
1. RHEL vs Other Linux OS
2. Distribution of Windows Versions
3. RHEL vs Windows OS
4. Virtual Machines With Known OS vs Unknown OS
User Flows

Create -> Start
Start -> Stop
Stop -> Create
Create VM From Template
Create VM From Template

Admin Portal → Engine → VDSM → SPM Node → SD

DB Postgres
Run a VM
Run a VM

Admin Portal

Engine

Choose a host on which to start the VM

Guest

VDSM → libvirt → QEMU KVM
What are Hooks?

- A mechanism for customization
- Allows the administrator to manipulate the VM life cycle
- Points of manipulation
  - Before / after VM start
  - Before / after VM migration in/out
  - On VM stop
  - Etc.
Use Hooks
Start VM With Hooks

Choose a host on which to start the VM

Admin Portal → Engine → Guest

VDSM → libvirt → QEMU KVM

Manipulate libvirt XML

Engine

Admin Portal
Connect to Guest

sonar:0 - Press shift+f12 to Release Cursor

Red Hat Enterprise Linux Server release 5.2 (Santiago)
Kernel 2.6.32-22B.16.el6.x86_64 on an x86_64

sonar login: _

General | Network Interfaces | Virtual Disk | Snapshots | Permissions | Events | Applications | Icon
---|---|---|---|---|---|---|---
Name: | sonar | | | Defined Memory: 0960 MB | | | |
Description: | sonar.eng.lab.th.redhat.com | | | Physical Memory Guaranteed: 3094 MB | | | |
Template: | Blank | | | Number of CPU Cores: 4 (4 Core(s), 1 Core(s) per Socket) | | | |
Operating System: | Red Hat Enterprise Linux 6.x x64 | | | Highly Available: True | | | |
Default Display Type: | X11 | | | USB Policy: Enabled | | | |
Priority: | Low | | | Resides on Storage Domain: PHENV:VMP-RAID-PC | | | |

Origin: | RHEV | Run On: | Any Host in Cluster | Custom Properties: Not-Configured |
Connect To Guest

User Portal → Active-x XPI → Spice client

Engine

Set ticket
Return ticket

Spice Protocol

Guest

VDSM → libvirt → Spice Server
QEMU/KVM
VM Migration

oVirt Overview
VM Migration

Admin Portal

Engine

SRC Host

VDSM
libvirt
QEMU
KVM

Prepare

DST Host

VDSM
libvirt
QEMU
KVM

oVirt Overview
Summary

- Review of various oVirt components
- User Action -> Flow in the system
- Everything is open sourced
  - http://www.ovirt.org
Get Involved!

- Wiki
  - http://www.ovirt.org/wiki
- Mailing lists
  - users@ovirt.org — oVirt Platform user list
  - announce@ovirt.org — oVirt Platform announce list
  - engine-devel@ovirt.org — oVirt-engine devel list
  - node-devel@ovirt.org — oVirt-node devel list
  - vdsm-devel@fedorahosted.org
- IRC
  - #ovirt@irc.oftc.net
  - #vdsm@irc.freenode.net
THANK YOU!

http://www.ovirt.org