oVirt: Open Your Virtual Data Center

Jason Brooks
jbrooks@redhat.com
Agenda

- Who am I
- What is oVirt
- oVirt Anatomy
- Getting oVirt
- Extending oVirt
- What's missing
- Get involved
Who am I?

• Tech journalist (until last year)
• Red Hat OSAS (since last year)

• Testing products & projects
• Fan of Virtualization
• Fan of Open Source
In a nutshell

- Large scale, centralized management for server and desktop virtualization
- Provides an open source alternative to vCenter/vSphere
- Upstream for RHEV
Feature highlights

- Small footprint, bare metal hypervisor
- Optimized drivers for Linux and Windows guests
- Memory overcommit & page sharing
- High availability
- Live migration: VM & Storage
- Remote console
- iSCSI, NFS, FC, Gluster, local storage support
- CPU, storage & memory quotas
- Enterprise Directory integration
- Thin provisioning
- Live VM snapshots
- VM conversion tools
- OVF import/export
- VM templates
- Web-based admin & user portals
Roots

- **Feb 2007:** Qumranet's KVM becomes part of mainline Linux kernel
- **Sept 2007:** Qumranet's KVM-based Windows VDI product, Solid ICE, ships
- **Oct 2007:** First commit in old oVirt repo (git.et.redhat.com)
- **Feb 2008:** oVirt project emerges publicly (for the 1st time)
- **Sept 2008:** Red Hat acquires Qumranet, Inc.
- **Nov 2009:** RHEV 2.1 ships w/ .NET-based management server
- **Nov 2011:** oVirt Project re-launches w/ Java-based management server
- **Jan 2012:** RHEV 3.0 ships w/ new engine in tech preview
- **Feb 2012:** oVirt 3.0 release (first community release)
- **Aug 2012:** oVirt 3.1 release
- **Feb 2013:** oVirt 3.2 release
Admin Console

oVirt Overview -- SCALE11x
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
    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.
<api>
  <link rel="capabilities" href="/rhevm-api/capabilities"/>
  <link rel="clusters" href="/rhevm-api/clusters"/>
  <link rel="clusters/search" href="/rhevm-api/clusters?search={query}"/>
  <link rel="datacenters" href="/rhevm-api/datacenters"/>
  <link rel="datacenters/search" href="/rhevm-api/datacenters?search={query}"/>
  <link rel="events" href="/rhevm-api/events"/>
  <link rel="events/search" href="/rhevm-api/events?search={query}"/>
  <link rel="hosts" href="/rhevm-api/hosts"/>
  <link rel="hosts/search" href="/rhevm-api/hosts?search={query}"/>
  <link rel="networks" href="/rhevm-api/networks"/>
  <link rel="roles" href="/rhevm-api/roles"/>
  <link rel="storagedomains" href="/rhevm-api/storagedomains"/>
  <link rel="storagedomains/search" href="/rhevm-api/storagedomains?search={query}"/>
  <link rel="tags" href="/rhevm-api/tags"/>
  <link rel="templates" href="/rhevm-api/templates"/>
  <link rel="templates/search" href="/rhevm-api/templates?search={query}"/>
  <link rel="users" href="/rhevm-api/users"/>
  <link rel="groups" href="/rhevm-api/groups"/>
  <link rel="domains" href="/rhevm-api/domains"/>
  <link rel="vmpools" href="/rhevm-api/vmpools"/>
  <link rel="vmpools/search" href="/rhevm-api/vmpools?search={query}"/>
  <link rel="vms" href="/rhevm-api/vms"/>
  <link rel="vms/search" href="/rhevm-api/vms?search={query}"/>
  <system_version revision="428" build="0" minor="6" major="4"/>
</api>

<summary>
  <vms>
    <total>22</total>
    <active>5</active>
  </vms>

  <hosts>
    <total>6</total>
    <active>5</active>
  </hosts>

  <users>
    <total>3</total>
  </users>
</summary>
### Python SDK

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

api.vms.

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

# search vms by property constraint
vms = api.vms.list(memory=107341824)

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

vm.start()  # start

vm.setState()  # stateless
```

**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>
<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>
Create VM From Template
Run a VM
Connect To Guest

sonar:0 - Press shift+f12 to Release Cursor

Red Hat Enterprise Linux Server release 6.2 (Santiago)
Kernel 2.6.32-228.el6.x86_64 on an x86_64

sonar login: _

Name: sonar
Description: sonar-eng.lab.th.redhat.com
Template: Blank
Operating System: Red Hat Enterprise Linux 6.x x86
Default Display Type: Space
Priority: Low

Defined Memory: 3056 MB
Physical Memory Guaranteed: 3054 MB
Number of CPU Cores: 4 (4 Socket(s), 1 Core(s) per Socket)
Highly Available: False
USB Policy: Enabled
Resides on Storage Domain: FHEV-1L/V-7STORAGE-FC

Origin: FHEV
Run On: Any Host in Cluster
Custom Properties: Not Configured
VM Migration

Migrate Virtual Machine(s)
- Select Host Automatically
- Select Destination Host

Host: mac04

Close
Network

![Setup Host Networks](image)

- **Interfaces**
  - `bond0`
  - `eth1`
  - `eth2`
  - `bond1`
  - `eth3`
  - `eth4`
  - `eth0`

- **Assigned Logical Networks**
  - `NOVM_VLAN_MTU_5 (VLAN 500)`
  - `VLAN_MTU_5000 (VLAN 222)`
  - `VLAN_MTU_5000_2 (VLAN 52)`

- **Unassigned Logical Networks**
  - **Required**
    - `NON_VM_MTU_5000`
  - **Non Required**
    - `NON_VM_MTU_9000`
    - `NOVM_VLAN_MTU_9 (VLAN 9)`
    - `VLAN_MTU_9000 (VLAN 9)`
    - `VLAN_MTU_9000_2 (VLAN 92)`

- **Options**
  - Verify connectivity between Host and Engine
  - Save network configuration

- **Actions**
  - OK
  - Cancel
Reports

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
- Period: Quarterly
- VM Type: All
- Show Deleted Virtual Machines: Yes

Graphs showing the distribution of virtual machines by operating system.
Anatomy

- Engine
- DB
- Storage
- Client
oVirt Engine

- JBoss-based Java application
- Communicates with hypervisor nodes
- Manages VM lifecycle
- Controlled with:
  - Admin Portal
  - User Portal
  - REST API
  - Python SDK
  - Command Line Shell
Virtualization Host

- Machine w/ Intel VT/AMD-V CPUs
- Linux OS – bits for network, storage, etc.
- KVM – hypervisor, part of Linux kernel
- libvirt – virtualization API
- vdsm – virtualization node management
oVirt Node

- Dedicated hypervisor
- JEOS
- Built on Fedora
- Firmware
  - Install and forget about it
  - Similar to ESXi or OpenWRT
- Small Footprint (< 200MB)
Getting oVirt

- oVirt Live: http://wiki.ovirt.org/wiki/OVirt_Live
- All in One: ovirt-engine-setup-plugin-allinone
- Engine + oVirt Node(s)

- Packaged releases target latest Fedora
- Community-provided packages for CentOS
- oVirt 3.1 in F18 and F17 repos
- Build from source
Vdsm 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.
import hooking

    cpu_nested_features = {
        "kvm_intel": "vmx",
        "kvm_amd": "svm",
    }

    for kvm_mod in ("kvm_intel", "kvm_amd"):
        kvm_mod_path = "/sys/module/%s/parameters/nested" % kvm_mod
        try:
            with file(kvm_mod_path) as f:
                if f.readline().strip() == "Y":
                    break
        except IOError:
            pass
    else:
        kvm_mod = None

    if kvm_mod:
        domxml = hooking.read_domxml()
        feature_vmx = domxml.createElement("feature")
        feature_vmx.setAttribute("name", cpu_nested_features[kvm_mod])
        feature_vmx.setAttribute("policy", "require")
        domxml.getElementsByTagName("cpu")[0].appendChild(feature_vmx)
        hooking.write_domxml(domxml)
UI Plugins

- New in oVirt 3.2
- Extend or customize oVirt Engine functionality by adding UI components to the Admin Portal (Webadmin)
- Plugins integrate with the Admin Portal on the client side using JavaScript
- Plugins can be packaged and distributed for use with the oVirt Engine
Shell-in-a-Box

dhcp-1: login: root
    root@dhcp-1: ~]# service shellinaboxd status
    shellinaboxd (pid 30628) is running...
[root@dhcp-1 ~]# service vdsmd status
    VDS daemon server is running
[root@dhcp-1 ~]#
## Foreman plugin

<table>
<thead>
<tr>
<th>Description</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hosts that performed modifications without error</td>
<td>0</td>
</tr>
<tr>
<td>Hosts in Error State</td>
<td>0</td>
</tr>
<tr>
<td>Good Host Reports in the last 35 minutes</td>
<td>0 / 4 hosts (9%)</td>
</tr>
<tr>
<td>Hosts that had pending changes</td>
<td>0</td>
</tr>
<tr>
<td>Out Of Sync Hosts</td>
<td>0</td>
</tr>
<tr>
<td>Hosts With no Reports</td>
<td>4</td>
</tr>
<tr>
<td>Hosts With Alerts Disabled</td>
<td>0</td>
</tr>
</tbody>
</table>

### Puppet Clients Activity Overview

![Puppet Clients Activity Overview](image)

### Run Distribution in the last 30 Minutes

![Run Distribution in the last 30 Minutes](image)
NetApp Virtual Storage Console
Nagios monitoring
Deltacloud & Aeolus

- Deploy Deltacloud server
- Manipulate oVirt via:
  - EC2 API
  - CIMI API
  - Deltacloud API
- Aeolus Project
  - Create & manage cloud resources across multiple providers...
  - ... including oVirt
govirt & GNOME Boxes

- govirt: C library to access the oVirt REST API
- Boxes: A simple GNOME 3 application to access remote or virtual systems
  - Creates and manages local KVM virtual machines using libvirt
  - Remote machine access through SPICE or VNC
OpenStack Quantum integration

- Early stage work
- Quantum provides network connectivity-as-a-service
  - Quantum for managing VM networks
  - oVirt for managing infrastructure networks (Migration network, storage network etc.)
- External networks can be discovered in oVirt and then can be used within oVirt for example in VMs.
Node plugins

- Adds functionality not included in the base image
  - Install or update packages
  - Install new kernel modules
  - Add vdsm hooks
- Non-oVirt uses
  - OpenStack POC
  - YOUR PROJECT HERE
Engine, sans oVirt
Top feature requests

1. Allow disk resize
2. Integrate Nagios/Zabbix monitoring
3. Highly Available engine
4. Open vSwitch integration
5. Allow cloning VMs without template
6. Enable hypervisor upgrade/updates through engine
7. Allow engine on an oVirt hosted VM
8. Enable guest configuration (root password, SSH keys, network) via guest agent in engine
9. Integrate v2v into engine
10. Bond/extend ovirtmgmt with a second network for HA/increased bandwidth
11. Integrate scheduling of snapshots and VM export for backups in engine
12. Spice Support in Chrome
Get Involved!

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

twitter: @jasonbrooks
google+: superlongURL
e-mail: jbrooks@redhat.com
irc: jbrooks on #ovirt
blog: blog.jebpages.com

http://www.ovirt.org
oVirt: Open Your Virtual Data Center

Jason Brooks
jbrooks@redhat.com
Agenda

- Who am I
- What is oVirt
- oVirt Anatomy
- Getting oVirt
- Extending oVirt
- What's missing
- Get involved
Who am I?

- Tech journalist (until last year)
- Red Hat OSAS (since last year)
- Testing products & projects
- Fan of Virtualization
- Fan of Open Source

image credit: [http://www.flickr.com/photos/oxygeon/238163317/]
In a nutshell

- Large scale, centralized management for server and desktop virtualization
- Provides an open source alternative to vCenter/vSphere
- Upstream for RHEV

Cloud is of course cloudy, and oVirt can be part of a cloud, but the primary focus here is the VMware-style, virtual infrastructure-type deal – IT people familiar w/ vSphere will feel comfy

Cloud style is the new hotness, why pay attn to virtual infrastructure

Less sexy, perhaps, but the community of VMware users is HUGE, and they need free software, too!
### Feature highlights

- Small footprint, bare metal hypervisor
- Optimized drivers for Linux and Windows guests
- Memory overcommit & page sharing
- High availability
- Live migration: VM & Storage
- Remote console
- iSCSI, NFS, FC, Gluster, local storage support
- CPU, storage & memory quotas
- Enterprise Directory integration
- Thin provisioning
- Live VM snapshots
- VM conversion tools
- OVF import/export
- VM templates
- Web-based admin & user portals

---

wall of text, selected items from a Versus vSphere/Hyper-V doc for RHEV 3.1

from:

Roots

- **Feb 2007**: Qumranet's KVM becomes part of mainline Linux kernel
- **Sept 2007**: Qumranet's KVM-based Windows VDI product, SolidICE, ships
- **Oct 2007**: First commit in old oVirt repo (git.et.redhat.com)
- **Feb 2008**: oVirt project emerges publicly (for the 1st time)
- **Sept 2008**: Red Hat acquires Qumranet, Inc.
- **Nov 2009**: RHEV 2.1 ships w/.NET-based management server
- **Nov 2011**: oVirt Project re-launches w/ Java-based management server
- **Jan 2012**: RHEV 3.0 ships w/new engine in tech preview
- **Feb 2012**: oVirt 3.0 release (first community release)
- **Aug 2012**: oVirt 3.1 release
- **Feb 2013**: oVirt 3.2 release

- **June 2010**: RHEV 2.2 (still .NET)
- **Dec 2012**: RHEV 3.1 ships w/new engine as default

Another wall of text, some back story to the hows and whys of oVirt, for instance, why is oVirt (a new project) mature-looking (solely my view from the outside, BTW)

more interesting background on SolidICE to RHEV:
http://nthadani.wordpress.com/2012/02/02/a-retrospective-analysis-on-the-road-to-red-hat/

.NET to Java management server background:
Admin Console

UI made w/ Google Web Toolkit
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.
**Python SDK**

```python
api = API(url='http://localhost:8888', username='user@domain', password='password')

api.
  - vms
    @ _init_url, username, password, key_file, cert_file, port,

api.vms[
  - addvm
  - getname
  - list(query)

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

# search vms by property constraints
vms = api.vms.list(memory=187341824)

# get by constraints
vm = api.vms.get(id = '0f79f4a4-9738-4731-83c4-29f3f734782')

vm.st
  - start
  - start_time
  - uuid
    - stateless
```
Create VM From Template

![Create VM From Template](image_url)
## Run a VM

### oVirt Overview --> SCALE11x

**Image:**
- The image shows the oVirt Manager interface.
- The focus is on the "Run a VM" section.
- The interface includes search filters, data centers, clusters, and virtual machines.
- A specific virtual machine named "Run a VM" is highlighted, indicating it is selected or ready for action.

**Details:**
- The oVirt interface is interactive, allowing users to manage virtual machines and resources.
- Users can search and filter virtual machines by various criteria such as data centers, clusters, and virtual machine tags.
- Selecting a virtual machine for "Run a VM" typically initiates the process to run or start the virtual machine.

**Note:**
- The interface provides a streamlined way to manage and run virtual machines, ensuring efficient resource allocation and management.
- Custom configurations and settings can be applied to tailor the virtual machine to specific needs.
Connect To Guest

oVirt Overview -- SCALE11x
VM Migration
Network
based on jaspersoft reports – this screen shows RHEV, but reports are now part of oVirt, as of 3.2
oVirt Engine

- JBoss-based Java application
- Communicates with hypervisor nodes
- Manages VM lifecycle
- Controlled with:
  - Admin Portal
  - User Portal
  - REST API
  - Python SDK
  - Command Line Shell
vdsm is the new bit in here – it's like a management agent for the engine, the engine talks to vdsm, vdsm controls VM lifecycle operations through libvirt, and it handles other configuration duties, like to network & storage

this last bit introduces some distro-specificity – it's the main reason that ovirt's attached to the RH family right now – work is underway to make these operations distro-agnostic – multi-distro is a priority for the project
oVirt Node

- Dedicated hypervisor
- JEOS
- Built on Fedora
- Firmware
  - Install and forget about it
  - Similar to ESXi or OpenWRT
- Small Footprint (< 200MB)
Getting oVirt

- oVirt Live: http://wiki.ovirt.org/wiki/OVirt_Live
- All in One: ovirt-engine-setup-plugin-allinone
- Engine + oVirt Node(s)

- Packaged releases target latest Fedora
- Community-provided packages for CentOS
- oVirt 3.1 in F18 and F17 repos
- Build from source

setting up all in one:
Vdsm 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.

http://www.ovirt.org/VDSM-Hooks
Nested KVM hook

```python
import hooking

cpu_nested_features = {
    "kvm_intel": "vmx",
    "kvm_amd": "svm",
}

for kvm_mod in ("kvm_intel", "kvm_amd"):
    kvm_mod_path = "/sys/module/%s/parameters/nested" % kvm_mod
    try:
        with file(kvm_mod_path) as f:
            if f.readline().strip() == "y":
                break
        except IOError:
            pass
    else:
        kvm_mod = None

if kvm_mod:
    domxml = hooking.read_domxml()
    feature_vmx = domxml.createElement("feature")
    feature_vmx.setAttribute("name", cpu_nested_features[kvm_mod])
    feature_vmx.setAttribute("policy", "Require")
    domxml.getElementsByTagName("cpu")[0].appendChild(feature_vmx)
    hooking.write_domxml(domxml)
```

Nested KVM is really cool – lets you host VMs on VMs, there's a performance hit, but it's not crazy-bad

It's pretty simple, boils down to having your KVM module loaded w/ the nested option on, and on including a bit in the xml that defines the VM.

UI Plugins

- New in oVirt 3.2
- Extend or customize oVirt Engine functionality by adding UI components to the Admin Portal (Webadmin)
- Plugins integrate with the Admin Portal on the client side using JavaScript
- Plugins can be packaged and distributed for use with the oVirt Engine

http://www.ovirt.org/Features/UIPlugins
http://derezvir.blogspot.com/2013/01/ovirt-webadmin-shellinabox-ui-plugin.html
The Foreman is a complete lifecycle management tool for physical and virtual servers. Works with Puppet.

http://ovedou.blogspot.com/2012/12/ovirt-foreman-ui-plugin.html
Netapp working to integrate management of some of their NetApp-specific features into oVirt UI, like hardware-side clone offloading – relatively early stage – saw this demoed last month at an oVirt workshop at their campus.

Nagios monitoring

https://labs.ovido.at/monitoring/wiki/ovirt-monitoring-ui-plugin
Deltacloud & Aeolus

- Deploy Deltacloud server
- Manipulate oVirt via:
  - EC2 API
  - CIMI API
  - Deltacloud API
- Aeolus Project
  - Create & manage cloud resources across multiple providers...
  - ... including oVirt

govirt & GNOME Boxes

- govirt: C library to access the oVirt REST API
- Boxes: A simple GNOME 3 application to access remote or virtual systems
  - Creates and manages local KVM virtual machines using libvirt
  - Remote machine access through SPICE or VNC

www.ovirt.org/images/6/6c/Fergeau-ovirt-boxes.pdf

http://cgit.freedesktop.org/~teuf/gnome-boxes/log/?h=ovirt
OpenStack Quantum integration

- Early stage work
- Quantum provides network connectivity-as-a-service
  - Quantum for managing VM networks
  - oVirt for managing infrastructure networks (Migration network, storage network etc.)
- External networks can be discovered in oVirt and then can be used within oVirt for example in VMs.

http://www.ovirt.org/Quantum_and_oVirt

demo screencast:

http://www.youtube.com/watch?v=yXqN17KktjE
http://www.youtube.com/watch?v=uW3vrY2Y3xc
Node plugins

- Adds functionality not included in the base image
  - Install or update packages
  - Install new kernel modules
  - Add vdsm hooks
- Non-oVirt uses
  - OpenStack POC
  - YOUR PROJECT HERE

http://www.ovirt.org/Node_plugins

http://lists.ovirt.org/pipermail/node-devel/2012-October/000327.html

https://gitorious.org/ovirt/ovirt-node-openstack-plugin
Engine, sans oVirt

```
<table>
<thead>
<tr>
<th>Name</th>
<th>Volume Type</th>
<th>Number of Nodes</th>
<th>Transport Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>vVMM</td>
<td>Replicate</td>
<td>1</td>
<td>TCP</td>
<td>Up</td>
</tr>
<tr>
<td>node1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>node2</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>node3</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Address: 10.10.10.10
-rhguvast-BOX1
Up
-BOX2
Up
```

```
Top feature requests

1. Allow disk resize
2. Integrate Nagios/Zabbix monitoring
3. Highly Available engine
4. Open vSwitch integration
5. Allow cloning VMs without template
6. Enable hypervisor upgrade/updates through engine
7. Allow engine on an oVirt hosted VM
8. Enable guest configuration (root password, SSH keys, network) via guest agent in engine
9. Integrate v2v into engine
10. Bond/extend ovirtmgmt with a second network for HA/increased bandwidth
11. Integrate scheduling of snapshots and VM export for backups in engine
12. Spice Support in Chrome
Get Involved!

• Wiki
  • http://www.ovirt.org

• Mailing lists
  • users@ovirt.org — oVirt user list
  • announce@ovirt.org — oVirt announce list
  • engine-devel@ovirt.org — oVirt engine devel list
  • node-devel@ovirt.org — oVirt node devel list

• IRC
  • #ovirt on irc.oftc.net
THANK YOU!

twitter: @jasonbrooks
google+: superlongURL
email: jbrooks@redhat.com
irc: jbrooks on #ovirt
blog: blog.jebpages.com

http://www.ovirt.org