

Virtualization Management the oVirt way

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Virtualization Management the oVirt way

Agenda

- What is oVirt?
- Where did it come from?
- What does it do?
- Architecture
- Roadmap
- What's next?

oVirt

What is oVirt?

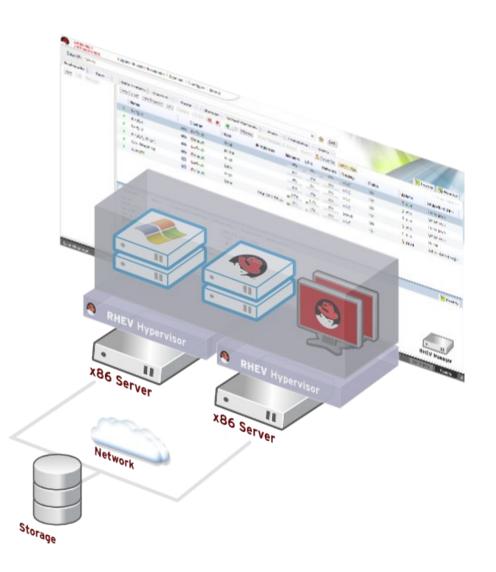
Large scale, centralized management for server and desktop virtualization

Based on leading performance, scalability and security infrastructure technologies

Provide an open source alternative to vCenter/vSphere

Focus on KVM for best integration/performance

Focus on ease of use/deployment



How Does It Look?

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Competitive Landscape

Test Center Scorecard	ł				Infoï	Vorld
	Management	Performance	Reliability	Scalability	Installation	Overall Score
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Citrix XenServer 5.6.1	7	8	8	7	9	7.7 GOOD
	25%	20%	20%	20%	15%	
Microsoft Windows Server 2008 R2 Hyper-V	8	8	9	8	7	8.1 VERY GOOD
	25%	20%	20%	20%	15%	
Red Hat Enterprise Virtualization for Servers 2.2	8	8	8	9	9	8.4 VERY GOOD
	25%	20%	20%	20%	15%	
VMware vSphere 4.1	9	9	9	9	9	9.0 EXCELLENT

InfoWorld "shootout" 2011

oVirt

- Independent analysis of leading virtualization platforms
- 2nd place in management functionality

http://bit.ly/virtshootout

- Build a community around all levels of the virtualization stack – hypervisor, manager, GUI, API, etc.
- To deliver both a cohesive complete stack and discretely reusable components for open virtualization management
- Provide a release of the project on a well defined schedule
- Focus on management of the KVM hypervisor, with exceptional guest support beyond Linux
- Provide a venue for user and developer communication and coordination

Governance



- Merit based, open governance model
- Built using the best concepts taken from Apache and Eclipse Foundations
- Governance split between board and projects
 - oVirt Board
 - Multiple projects under the oVirt brand

Governance (oVirt Board)

Initial board

- Red Hat, IBM, NetApp, Cisco, SUSE, Intel
- A few domain leaders from sub-projects
- Mentors
- There is no limit to the number of board seats
- Additional seats are voted based on merit

How to Start?

- Build from source
- Or, just install pre-packaged
 - yum install ovirt-engine
 - ./ovirt-setup
- Add managed hosts
 - from engine
 - use ovirt-node registr/approve flow

Virt

Administration Console

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Configure Storage Once for Entire Cluster OVirt

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Extend with More LUNs as Needed

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Add Servers or Desktops

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Even Windows via Sysprep

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SPICE or VNC

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🔻 🔒 Hosts	▲ myVm15		Resource Allocation	Allow VM migration only u	pon Administrator specific re	quest	0% Spice	Up	1 day		
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Control Allocated Resources (Disk, Memory) Virt

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Boot Devices

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Assign Permissions to Objects by Roles OVirt

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▶ 🛿 Storage		۵ ۵	PowerUserRole	User Role, allowed to create/manage Vms and Templates		1 day	
Templates		•	UserVmManager	User Role, with permission for any operation on Vms		1 day	
▼ 🙀 Clusters		Ŭ o	TemplateAdmin	Administrator Role, permission for all operations on a specific Template		1 day	
▼ ⓒ intel-cluster ▲ m		•	UserTemplateBasedVm	User Role, with permissions only to use Templates		1 day	
V 🔂 Hosts		0	SuperUser	System Administrators with permission for all operations		1 day	
0 nott-vds2.qa.lab.tlv.n			ClusterAdmin	Administrator Role, permission for all the objects underneath a specific Cluster			
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▼ ■ NFS-RC-DC	-	•	StorageAdmin HostAdmin	Administrator Role, permission for all operations on a specific Storage Domain			
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Define Your Own Roles

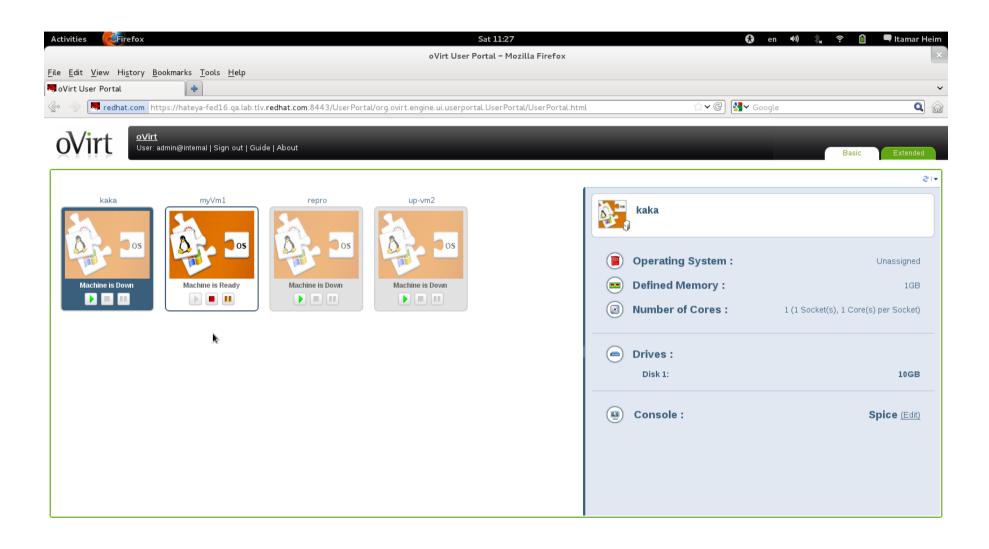
Firefox 🗬 Itamar Heim Fri 22:21 Activities • en **(**) ... oVirt Enterprise Virtualization Engine Web Administration - Mozilla Firefox File Edit View History Bookmarks Tools Help 🍋 oVirt Enterprise Virtualization E... 🛛 🕂 Soogle **Q** 🎧 ~ € 6 🔜 | hateya-fed16.ga.lab.tlv.redhat.com:8080/webadmin/webadmin/WebAdmin.html#vms-application OVirt Open Virtualization Manager Logged in user: admin@internal | Configure | Guide | About | Sign Out * 2 Search: Vms: Configure Data (Events Show 🔍 All Roles 🚨 🔿 Administrator Roles 🚨 🔿 User Roles Tree New Ser 2 << Prev Next > 🍥 New Role Expand All Collapse All System Permissions Uptime Logged-in User **V** Description Name 🕨 📒 Default Account Type: 🔿 User 🖲 Admin ۸ 1 day V 🗐 iSCSI-RC-DC ▲ Check Boxes to Allow Action Storage Expand All Collapse All 1 day m Templates Svstem m 1 day 🔻 👔 Clusters Configure System 1 day m 🔻 傓 intel-cluster 🗆 Manipulate Users 1 day 🔻 🔒 Hosts Manipulate Permissions 1 day m 🛭 nott-vds2.qa.lab.tlv.r 🗆 Manipulate Roles Ister Generic Configuration 🔒 nott-vds3.ga.lab.tlv.r ta Cente Gene Events 🔻 🗌 Data Center 💵 VMs nain Configure Data Center NFS-RC-DC 🔻 🗌 Storage Domain Storage Installed vork Configure Storage Domain Templates Cluster 🕨 👔 Clusters ¥ OK Reset Cancel Bookmarks Close Tags IN 3 Alerts Events

oVirt

Browser Firefox version 9 is currently not supported.

User Portal





Self Provisioning Portal

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User Resource View

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Virtual Machines Templates Resources	Virtual Machines: 25% Defined VMs: 4 Running VMs: 1	Beri	ual CPUs: ned vCPUs: 4 d vCPUs: 1		25%		Memory: Defined Memory: 3328M Memory Usage: 256ME	
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	➡ Disk1		10GB	1GB	1			
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Feature	Description
High Availability	Restart guest VMs from failed hosts automatically on other hosts
Live Migration	Move running VM between hosts with zero downtime
System Scheduler	Continuously load balance VMs based on resource usage/policies
Power Saver	Concentrate virtual machines on fewer servers during off-peak hours
Maintenance Manager	No downtime for virtual machines during planned maintenance windows. Hypervisor patching
Image Management	Template based provisioning, thin provisioning and snapshots
Monitoring & Reporting	For all objects in system – VM guests, hosts, networking, storage etc.
OVF Import/Export	Import and export VMs and templates using OVF files
V2V	Convert VMs from VMware and RHEL/Xen to oVirt

Virtualization Management the oVirt way

Virtual Desktop Infrastructure (VDI)

Centralized management, security and policy enforcement

Virtual desktops with user experience of a physical PC

Multiple monitors

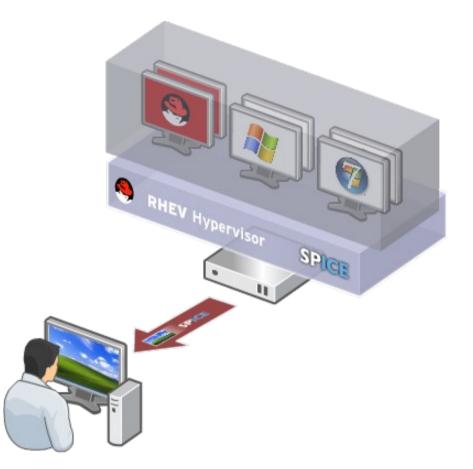
HD quality video

Bi-directional audio/video for VoIP or video-conferencing

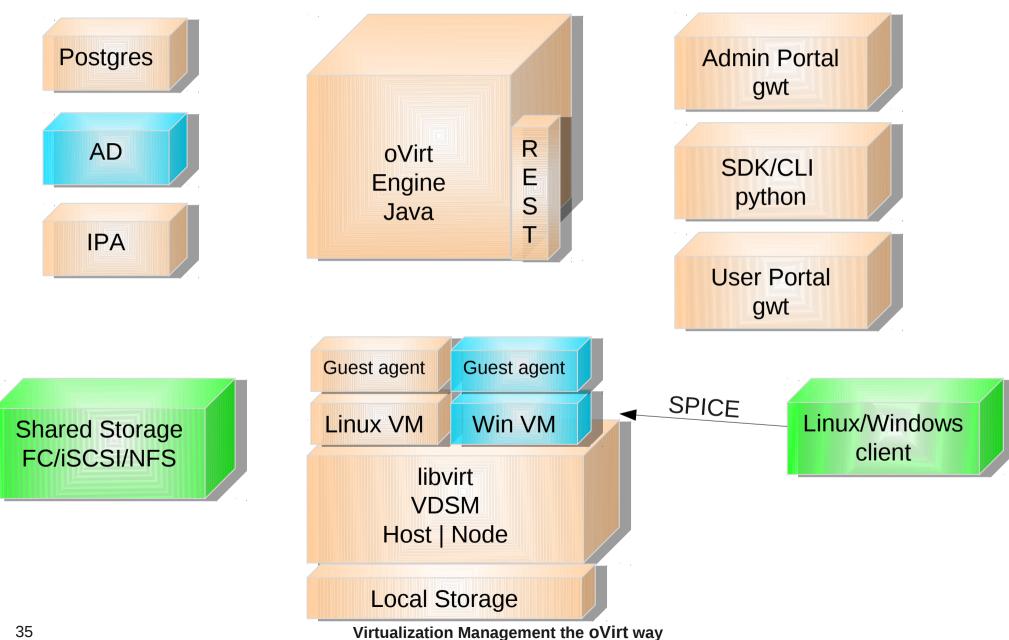
Smartcard support

USB support

Industry leading density of virtual desktops/server



oVirt High Level Architecture



REST API

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Hosts Collection

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   -<host id="15896dce-edd0-415c-a524-c9b02f278895" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895">
          <name>nari11</name>
      -<actions>
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             k rel="activate" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/activate"/>
             k rel="fence" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/fence"/>
             k rel="deactivate" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/deactivate"/>
             krel="approve" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/approve"/>
             k rel="iscsilogin" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/iscsilogin"/>
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             k rel="commitnetconfig" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/commitnetconfig"/>
          </actions>
          _link rel="storage" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/storage"/>
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         <address>nari11.eng.lab.tlv.redhat.com</address>
          <status>UP</status>
          <cluster id="4a5baf0e-7c6d-4d75-9aba-d60f3a188d0b" href="/rhevm-api/clusters/4a5baf0e-7c6d-4d75-9aba-d60f3a188d0b"/>
          <port>54321</port>
          <storage manager>false</storage manager>
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             <enabled>false</enabled>
             <options/>
          </power management>
       -<ksm>
             <enabled>false</enabled>
          </ksm>
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          </transparent hugepages>
      -<iscsi>
             <initiator>ign.1994-05.com.redhat:a7afc41a35b0</initiator>
            Honeis
```

~

Done

Host networks collection

```
Mozilla Firefox
File Edit View History Bookmarks Tools Help
                                                                                                                                Google
        V C
                       http://10.35.1.171/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics
                                                                                                                            ☆ 🗸
                                                                                                                                                               Number 2012 10.35.1.1...b02f278895/nics 🕹
                                                                                                                                                                0
This XML file does not appear to have any style information associated with it. The document tree is shown below.
-<host nics>
 -<host nic id="dbb39d06-3aef-468c-83e6-88eae0a3f346" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/dbb39d06-3aef-468c-83e6-88eae0a3f346">
     <name>eth0</name>
   -<actions>
      k rel="attach" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895 hics/dbb39d06-3aef-468c-83e6-88eae0a3f346/attach"/>
      k rel="detach" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/dbb39d06-3aef-468c-83e6-88eae0a3f346/detach"/>
     </actions>
     k rel="statistics" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/dbb39d06-3aef-468c-83e6-88eae0a3f346/statistics"/>
    <host id="15896dce-edd0-415c-a524-c9b02f278895" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895"/>
   -<network>
      <name>rhevm</name>
     </network>
     <mac address="78:E7:D1:E4:8E:92"/>
     <ip netmask="255.255.252.0" address="10.35.16.151"/>
   </host nic>
 -<host nic id="0d98b08c-9b42-45a4-a226-b7dd3f0854cf" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/0d98b08c-9b42-45a4-a226-b7dd3f0854cf">>
    <name>eth1</name>
   -<actions>
      krel="attach" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/0d98b08c-9b42-45a4-a226-b7dd3f0854cf/attach"/>
      k rel="detach" href="/rheym-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/0d98b08c-9b42-45a4-a226-b7dd3f0854cf/detach"/>
     </actions>
     k rel="statistics" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895/nics/0d98b08c-9b42-45a4-a226-b7dd3f0854cf/statistics"/>
    <host id="15896dce-edd0-415c-a524-c9b02f278895" href="/rhevm-api/hosts/15896dce-edd0-415c-a524-c9b02f278895"/>
     <mac address="78:E7:D1:E4:8E:93"/>
    <ip netmask="" address=""/>
   </host nic>
 </host nics>
```

Done

api.vms.

properties.

- engine.
- Querying collection by custom constraint.

- Querying collection for specific resource.

- Accessing resource methods and

- Querying collection with oVirt search

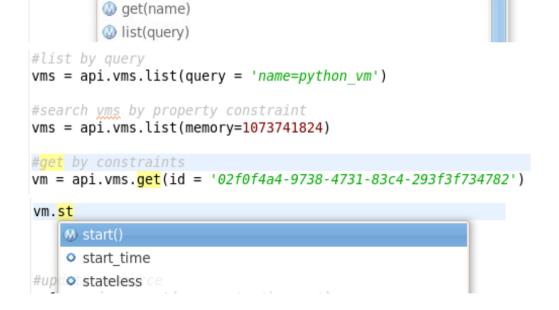
api = API(url='http://localhost:8080', username='user@domain', password='password')

#create proxy

api.

init (url, username, password, key file, cert file, port, s

M add(vm)





Python SDK

- Creating the proxy

- Listing all collections

- Listing collection's methods.

Python SDK (cont.)

- Accessing resource properties and sub-collections.
- Accessing sub-collection methods.
- Querying sub-collection by custom constraint.
- Retrieving sub-collection resource.
- Accessing sub-collection resource properties and methods.

vm.n				
-0-r	ame			
#upd 9 t8	ics _{esource}			
vm.nics	•			
	🔿 add(nic)			
	• · · ·	• • •		
nics =	vm.nics.list(interface=	'e1000')	
nic = vr	n.nics.get(na	me=' <i>eth0</i> ')		
nic. <mark>u</mark>				
) update()			

Virt

oVirt CLI

AVAILABLE COMMANDS

	action cd	execute an action on an object change directory	
	clear	clear the screen	
	connect	connect to a RHEV manager	
		5	
	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	(a)(ist ali) > halp connect
*	save	save configuration variables	(oVirt cli) > help connect
*	set	set a configuration variable	UCACE
*	show	show one object	USAGE
*	status	show status	
*	update	update an object	connect

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 rea from their respective configuration variables (see 'show'). In the second form, the connection details are provided as arguments.

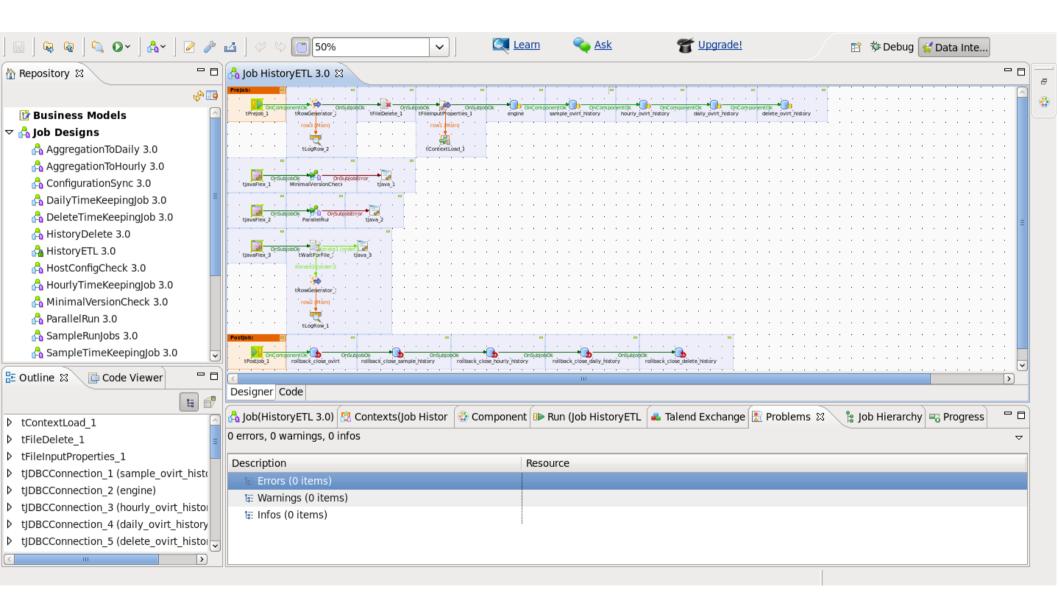
oVirt

The arguments are:

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

Virtualization Management the oVirt way

Data Warehouse based on Talend ETL



oVirt

oVirt Reports



oVirt Reports				ovirt-admin Log Out
🔒 View 🗸 Manage 🗸				
E Folders	Repository Run Edit Open Copy Cut Paste Delete		Sort By: I	Name Modified Date
Organizations Organizations	Active Virtual Machines by OS (BR18) /organizations/ovirtreports/Reports/Executive /active_vms_by_os_br18	The report contains comparative measurements number of running virtual machines and OS usage in for a selected cluster and a selected virtual machine's type within the requested period.	Report	October 18
Reports Recutive Inventory Service Level	Cluster Capactity Vs Usage (BR19) /organizations/ovirtreports/Reports/Executive /cluster_capactity_vs_usage_br19	This report contains charts displaying host's resources usage measurements (CPU core; physical Memory) and charts displaying virtual machine's resources usage measurements (virtual machine's total vCPU; Virtual Memory size) for a selected cluster.	Report	October 18
÷ Service Lever	Host OS Break Down (BR22) /organizations/ovirtreports/Reports/Executive /host_os_break_down_BR22	This report contains a table and a chart displaying the number of hosts for each OS version for a selected cluster within a requested period.	Report	October 18
Resources temp Themes default ovirt-reports-them	Summary of Host Usage Resources (BR17) /organizations/ovirtreports/Reports/Executive /summary_of_host_usage_resources_br17	The report contains a scattered chart of CPU and memory usage data within a requested period and for a selected cluster.	Report	October 18

oVirt Reports





Notification Service

- oVirt allows registration to certain audit events
- The notification service sends emails per audit message to relevant users
- Also monitors engine itself

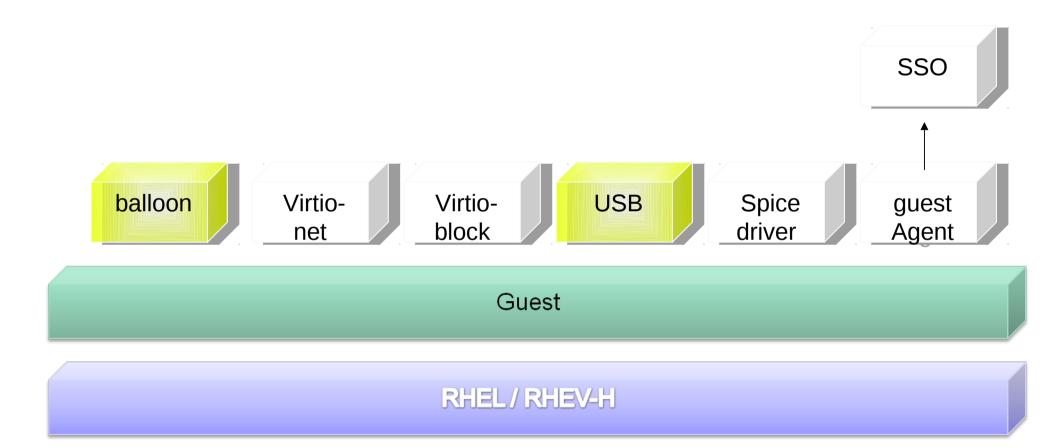
Add Event Notification
Select the Events for Notification:
Expand All Collapse All
🖃 🗌 Host
Host is non-responsive
Host was switched to Maintenance Mode
Failed to switch Host to Maintenance mode
Failed to activate Host
Host failed to recover
Failed to approve Host
☐ Host installation failed
VM cannot be found on Host
Starting migration of VM
Migration failed
VM is not responding
□ □ Storage
Slow storage response time Failed to access Storage
Low disk space
Mail Recipient:
OK Cancel





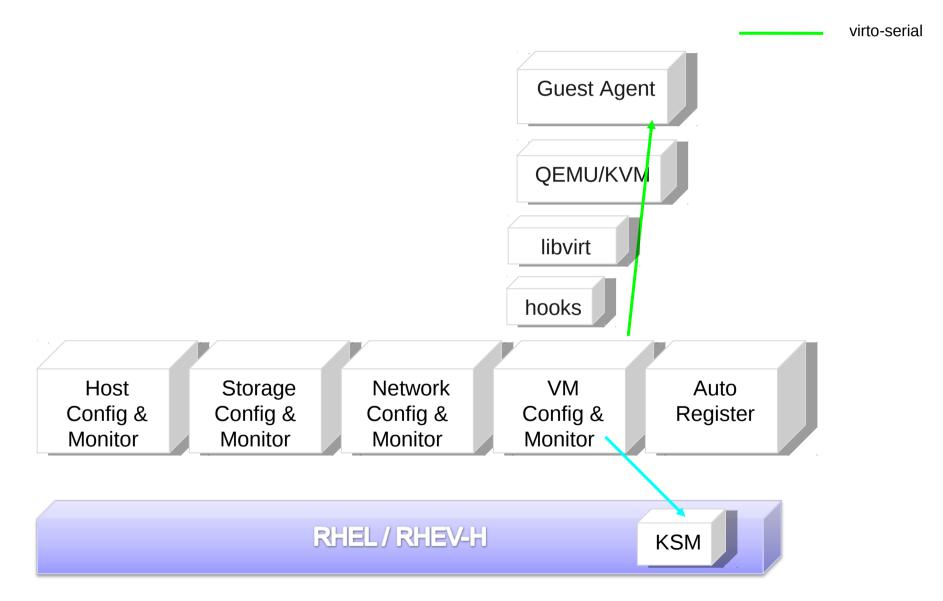
- The guest agent provides additional information to oVirt Engine, such as guest memory usage, guest ip address, installed applications and sso.
- Python code, available for both linux and windows guests
- Communication is done over virtio-serial
- SSO for windows is based on a gina module for XP and a credential provider for windows 7
- SSO for RHEL 6 is based on a PAM module with support for both KDE and Gnome

oVirt



Guest

oVirt Host Agent - VDSM



oVirt

Virtualization Management the oVirt way

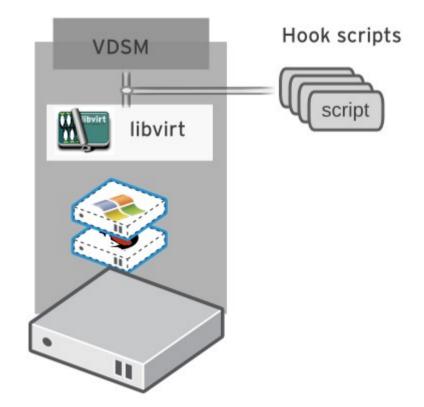
Hooks



- "Hook" mechanism for customization
 - Allows administrator to define scripts to modify VM operation
 - eg. Add extra options such as CPU pinning, watchdog device, direct LUN access, etc
 - Allows oVirt to be extended for new KVM features before full integration is done
 - An easy way to test a new kvm/libvirt/linux feature

Hooks





Hooks



- Hook scripts are called at specific VM lifecycle events
 - VDSM (management agent) Start
 - Before VM start
 - After VM start
 - Before VM migration in/out
 - After VM migration in/out
 - Before and After VM Pause
 - Before and After VM Continue
 - Before and After VM Hibernate
 - Before and After VM resume from hibernate
 - On VM stop
 - On VDSM Stop
- Hooks can modify a virtual machines XML definition before VM start
- Hooks can run system commands eg. Apply firewall rule to VM

Sample Hooks



- CPU pinning
- SR/IOV
- Smart card
- Direct LUN
- Hugepages
- Promiscuous mode network interface
- Cisco VN-Link

- Fileinject
- Floppy
- Hostusb
- Isolatedprivatevlan
- Numa
- Qos
- Scratchpad
- smbios

In the works (engine-devel@ovirt.org)

- Live snapshots
- Live storage migration
- Quotas
- Hot plug
- Multiple storage domains
- Shared disks
- iScsi disk
- Shared file system support
- Storage array integration

- Gluster support
- Qbg/Qbh
- virt-resize, pv-resize
- libguestfs integration
- Stable device addresses
- Network types
- Backup API
- SLA
- SDM
- Many many more...

How To Contribute or Download

- Website and Repository:
 - http://www.ovirt.org
 - http://www.ovirt.org/wiki
 - http://www.ovirt.org/project/subprojects/
- Mailing lists:
 - http://lists.ovirt.org/mailman/listinfo
- IRC:
 - #ovirt on OFTC

oVirt

Virtualization Management the oVirt way

What's Next

- Next Version
 - Scheduled to be released later this week
- Next Workshop
 - Beijing March 21st
 - Hosted by IBM in their Campus
 - http://www.ovirt.org/news-and-events/workshop/





THANK YOU !

http://www.ovirt.org iheim@redhat.com