



The CERNVM infrastructure

Our proposal to provide a
virtual service



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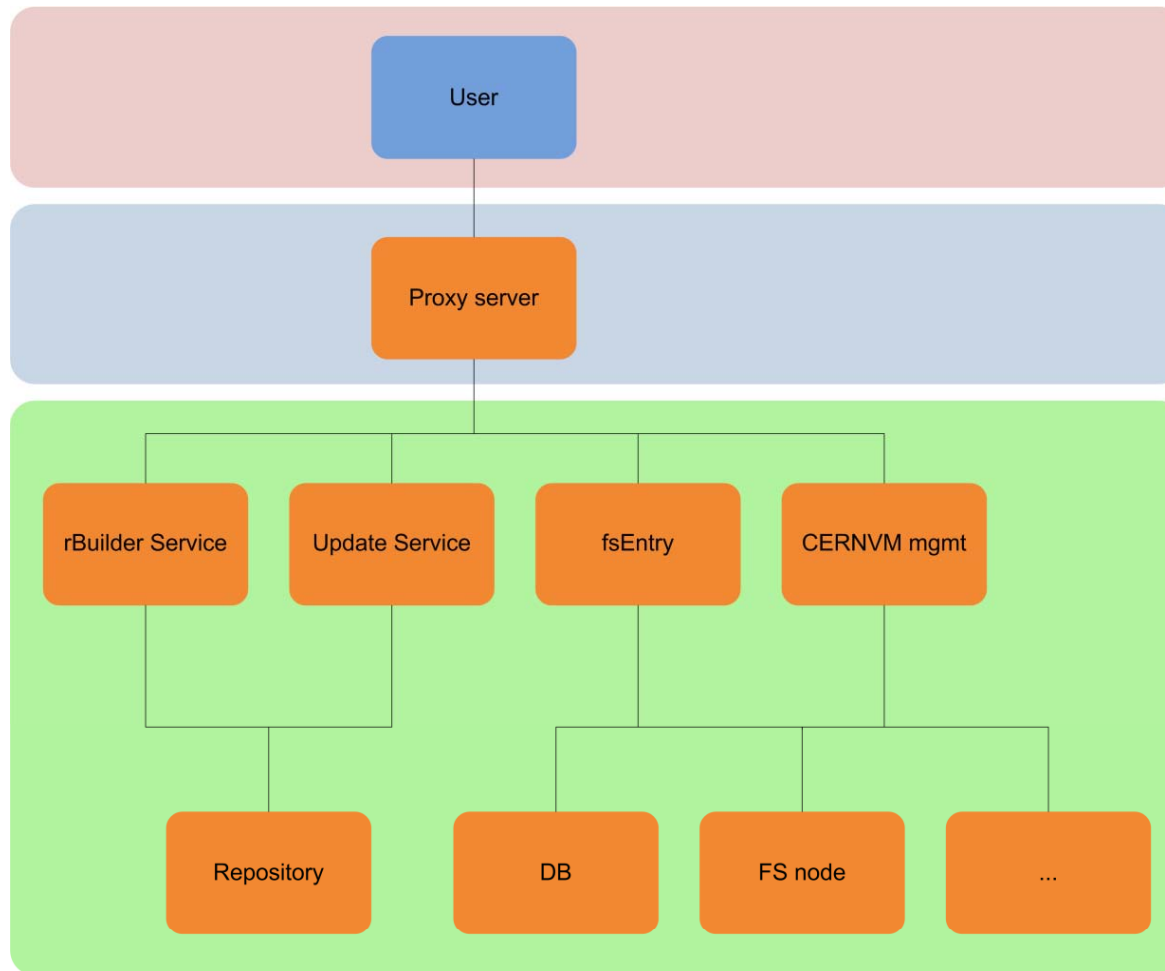
- Context
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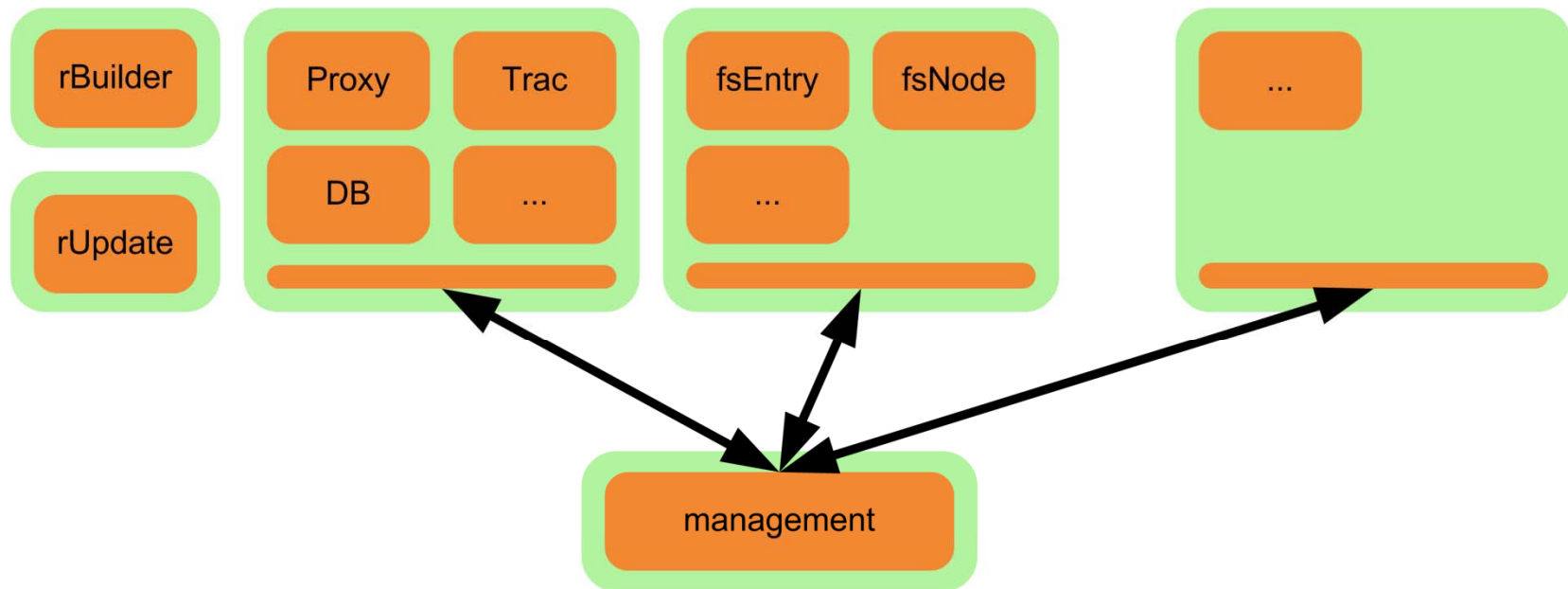


Context – virtual appliances

- To enable a better user experience with volatile and heavy distributed software
- To provide an end-user oriented portable analysis environment
 - Light and simple
 - Easy to configure and maintain
 - Wide support of software suites
 - Acceptable level of performance

Logical structure







Functional requirements

- Friendly and powerful user interface
- Automatic distribution of releases
- Scalability: simple to attach and manage as many machines as required
- Full control of the virtual environment: cpu, memory, hard disk, net interfaces, etc.
- Full control of the VM lifecycle: start, pause, freeze, etc.



Optional requirements

- Widely accessible (web-based)
- Monitoring and statistics of use
- Fine-grained access control
- Self-contained configuration, modifiable within the GUI



State of Art

- Different alternatives:
 - Web based: openQRM, cobbler, vgrid, enomalism
 - GUI based: xenman
 - Commercial: Novel Zenworks



Our choice: enomalism2

- Simple and intuitive user interface: AJAX based and customizable
- Automatic provision of vimages via RSS2.0
- Easy to scale 1..n physical nodes
- Full control of the VM lifecycle and its parameters

CernVM

Software Appliance



INFRASTRUCTURE



ELASTIC VALET

Clusters

- default
 - cernvm.cern.ch
 - vappcluster.cern.ch
 - vappi3.cern.ch
 - vappi4.cern.ch
 - vappi5.cern.ch
 - pcalienvm01.cern.ch
- x86.pae
- x86

Summary Default

start stop pause restart delete

VIRTUAL MACHINE SEARCH

OS	NODE	VM URL	CONTROLS	CPU Total	RAM
	cernvm.cern.ch [UID:979cd534-04a6-42c5-9ba0-0a19c579a2d8] This dom0 Address: 137.138.170.211 , Private: NA,	Physical Machine		0.000S	0M
	vappcluster.cern.ch [UID:16b3500b-0ec7-46a9-aa00-77a8f1675b75] Powered On Address: 137.138.213.60 , Private: NA,	Physical Machine		0.000S	0M
	vappi3.cern.ch [UID:47a3d766-018b-11dd-a8c4-00508d98bdea] Powered On Address: 137.138.213.12 , Private: NA, Parent: vappcluster.cern.ch XML	xen:///		0.155S	512M

vappi3.cern.ch

State: Powered On
 OS Type: Off
 Configuration XML: [\[XML\]](#)
 Package Source: joomla1point5 (0.0.5) for x86-root.ext3

Hypervisor: libvirt > xen:///
 Cluster(s): [\[View/Edit\]](#)
 Public IP: [137.138.213.12](#)
 Private IP: [137.138.213.12](#)

Commands

- shutdown this virtual machine
- suspend this virtual machine
- poweroff this virtual machine
- reboot this virtual machine
- store and lock current machine state (experts only)
- power off and completely delete machine (no undo)
- VNC to this VM (via the parent)
- Edit VM XML Definition

Resource Usage

No data source available

Hypervisors

Add Hypervisor

	vappi4.cern.ch [UID:6bd6b978-0195-11dd-aeed-00508d98bdea] Off Address: 137.138.213.10 , Private: NA, Parent: vappcluster.cern.ch XML	xen:///		0.000S	512M
	vappi5.cern.ch [UID:76b4d707-0195-11dd-9588-00508d98bdea] Off Address: 137.138.213.11 , Private: NA, Parent: vappcluster.cern.ch XML	xen:///		0.000S	512M
	pcalienvm01.cern.ch [UID:0ff1abf5-0541-11dd-9489-0002a54ccfb0] Idle Address: 137.138.170.232 , Private: NA, Parent: cernvm.cern.ch XML	xen:///		72.463S	511M



If you want to use an module or VM in Enomalism , you should simply click the "plus" button. This will download the files from the remote server, and put them in the repo folder, ready to be installed. If the file is a python egg, it will be installed into your site-packages, and prepped for use in Enomalism. You can enable new modules in the Admin->Config area.

Appliance List

	Title	Description	Type	Last Update	Category
	rpath (1.0.7) for x86_64-root.ext3 vmcast service for PH-SFT CERN	rpath rPath-generated image for x86_64-root.ext3 (1.0.7)	Free	2008-04-04 18:13:17	application/enomalism2-xvm2
	rpath (1.0.7) for x86-root.ext3 vmcast service for PH-SFT CERN	rpath rPath-generated image for x86-root.ext3 (1.0.7)	Free	2008-04-04 18:13:17	application/enomalism2-xvm2
	nemesis (0.0.3) for x86-root.ext3 vmcast service for PH-SFT CERN	nemesis rPath-generated image for x86-root.ext3 (0.0.3)	Free	2008-04-04 18:13:17	application/enomalism2-xvm2
	icomb1point5	icomb1point5 rPath-generated image for x86-root.ext3 (0.0.5)	Free	2008-04-04 18:13:17	application/enomalism2-xvm2

CernVM

Software Appliance

Dashboard Virtual Infrastructure Repository Admin Users/Groups

INFRASTRUCTURE ELASTIC VALET

Rename Machine

New machine name:

Clusters

- default
 - cernvm.cern.ch
 - vappcluster.cern.ch
 - vappi3.cern.ch
 - vappi4.cern.ch
 - vappi5.cern.ch
 - pcalienvm01.cern.ch
- x86_pae
 - x86

Add:

Summary

VIRTUAL MACHINE SE

	OS	NODE	VM URL	CONTROLS	CPU Total	RAM
<input type="checkbox"/>		cernvm.cern.ch [UID:979cd534-04a6-42c5-9ba0-0a19c579a2d8] This dom0 Address: 137.138.170.211 Private: NA,	Physical Machine		0.000S	0M
<input type="checkbox"/>		vappcluster.cern.ch [UID:16b3500b-0ec7-46a9-aa00-77a8f1675b75] Powered On Address: 137.138.213.60 Private: NA,	Physical Machine		0.000S	0M

vappcluster.cern.ch SSH VM

State: Powered On
OS Type: Enomalism2

Cluster(s): [View/Edit](#)
Public IP: [137.138.213.60](#)
Private IP: [137.138.213.60](#)

Commands

- provision a new VM on this machine
- Edit VM XML Definition

Resource Usage


No data source available

Hypervisors


- libvirt aemu:///session
- libvirt aemu:///svstem
- libvirt xen:///
- Add Hypervisor

CernVM

SOFTwARE Appliance



INFRASTRUCTURE



ELASTIC VALET

Clusters

- default
- cernvm.cern.ch
- vappcluster.cern.ch
- vappi3.cern.ch
- vappi4.cern.ch
- vappi5.cern.ch
- pcalenvm01.cern.ch
- x86.pae
- x86

Summary

start stop

VIRTUAL MACHINE SE

OS	NODE
cernvm	This dom0
vappi4	Powered On
vappi3	Powered On

vappi3.cern.ch

State: Powered On
OS Type: Off
Configuration XML:
Package Source: joo

Commands

- shutdown this virtual machine
- suspend this virtual machine
- poweroff this virtual machine
- reboot this virtual machine
- store and lock current machine state (experts only)
- power off and completely delete machine (no undo)
- VNC to this VM (via the parent)
- Edit VM XML Definition

Hypervisors

Add Hypervisor

OS	NAME	STATE	CPU Total	RAM
xen:///	vappi4.cern.ch [UID:6bd6b978-0195-11dd-aeed-00508d98bdea]	Off	0.000S	512M
xen:///	vappi5.cern.ch [UID:76b4d707-0195-11dd-9588-00508d98bdea]	Off	0.000S	512M
xen:///	pcalenvm01.cern.ch [UID:0f1abf5-0541-11dd-9489-0002a54ccfb0]	Idle	72.463S	511M

Edit Configuration XML

```
<domain type="xen">
  <name>47a3d766-018b-11dd-a8c4-00508d98bdea</name>
  <uuid>47a3d766-018b-11dd-a8c4-00508d98bdea</uuid>
  <os>
    <type>linux</type>
    <kernel>/boot/vmlinuz-2.6.16.29-0.11.smp.pae.gcc3.4.x86.i686.xen.domU</kernel>
  </os>
  <initrd>/boot/initrd-2.6.16.29-0.11.smp.pae.gcc3.4.x86.i686.xen.domU.img</initrd>
  <cmdline>root=/dev/sdal</cmdline>
  </os>
  <memory>524288</memory>
  <vcpu>1</vcpu>
  <on_poweroff>destroy</on_poweroff>
  <on_reboot>restart</on_reboot>
  <on_crash>restart</on_crash>
  <devices>
    <interface type="bridge">
      <target dev="vif5.0" />
      <mac address="00:16:3E:27:1A:FC" />
      <script path="vif-bridge" />
    </interface>
    <disk device="disk" type="file">
      <driver name="file" />
    </source>
  </devices>
</domain>
```

Update



Issues

- Just released in alpha status
- Xen support but VMWare or Fusion?
- Python dependencies



What's next?

- Directly populate VMs with vimages from rBuilder (like within Amazon EC2)
- Customize to facilitate access to running VMs: rAAA, VNC
- Move to another vApp



Q&A