



# Open Source Virtualisierung mit oVirt



DI (FH) René Koch



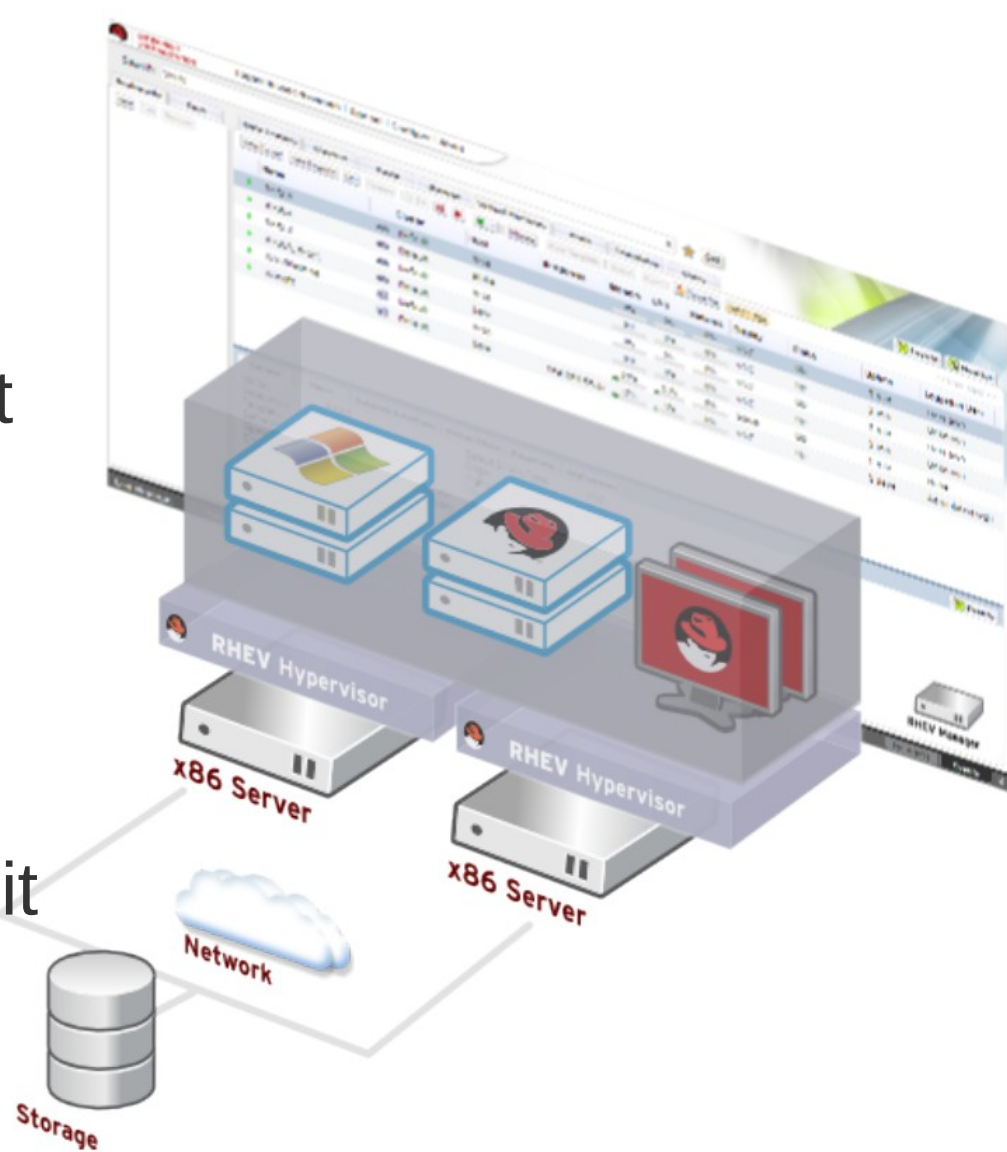
# Agenda

- ▶ Einführung
- ▶ Komponenten
- ▶ Erweiterungen & Monitoring
- ▶ Use Cases & Herausforderungen

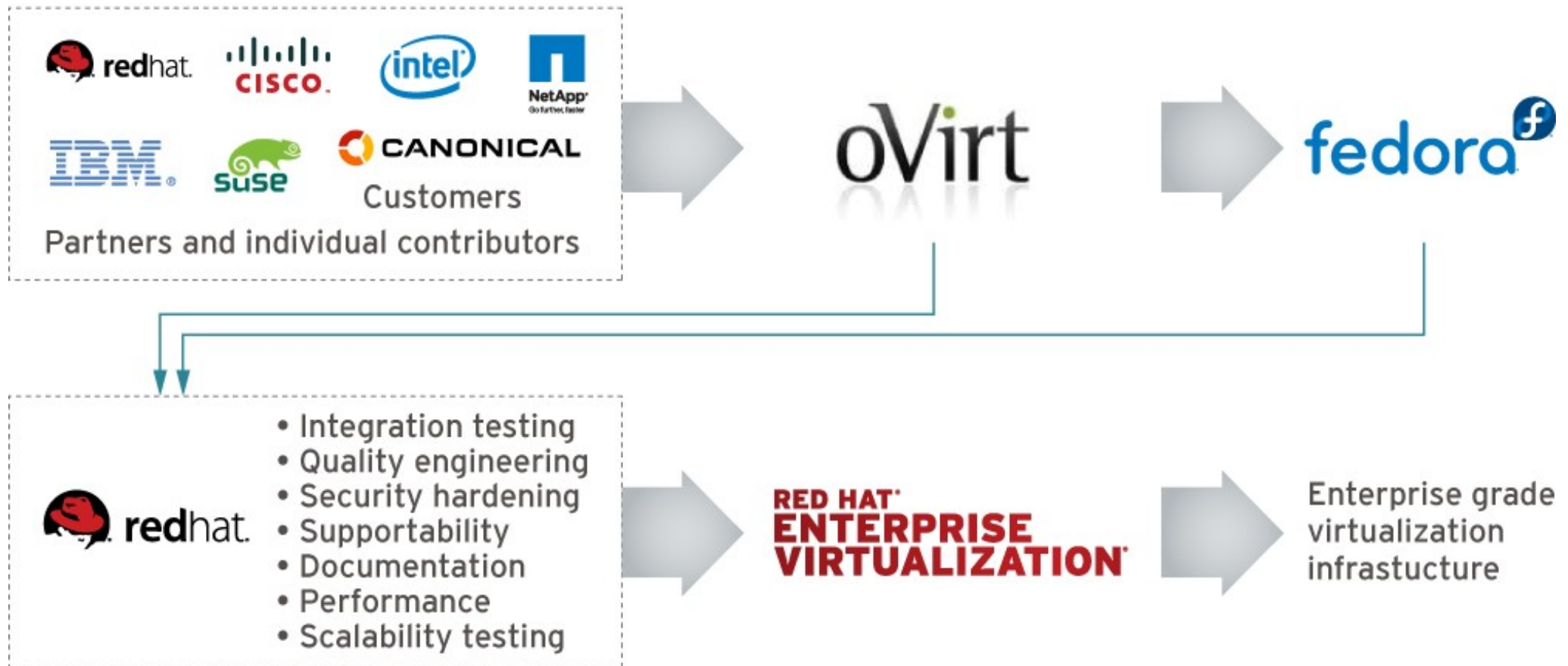


# Einführung – oVirt

- ▶ Zentralisiertes Management für Server und Desktop-Virtualisierung
- ▶ Basierend auf KVM
- ▶ Führend bei Performance, Skalierbarkeit und Sicherheit
- ▶ Open Source Alternative zu VMware vSphere/vCenter



# Einführung – oVirt

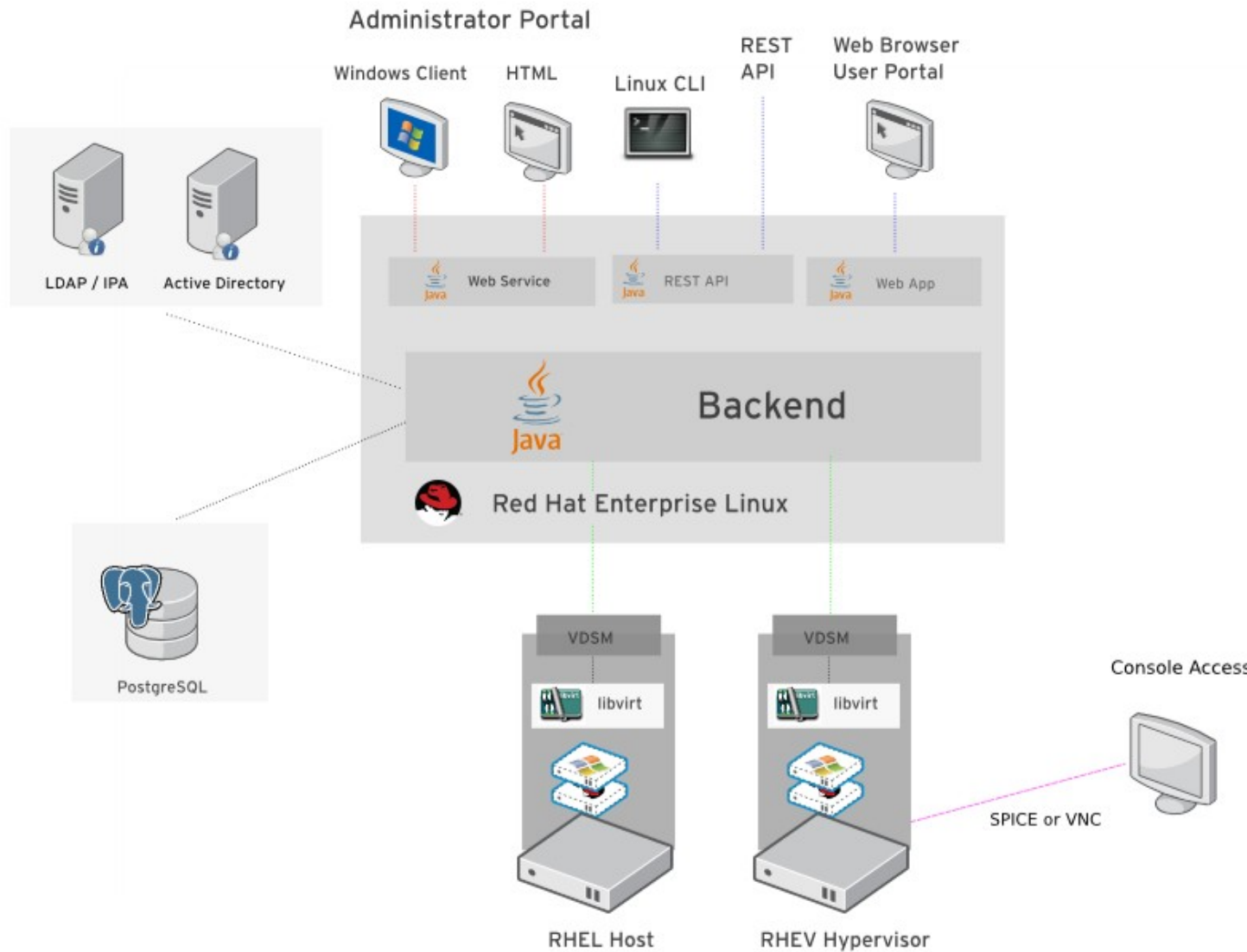


# Komponenten

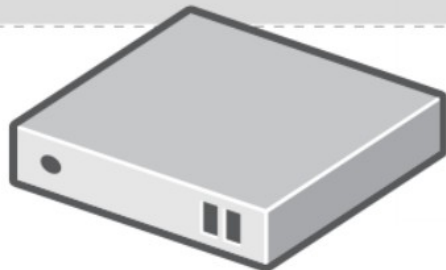
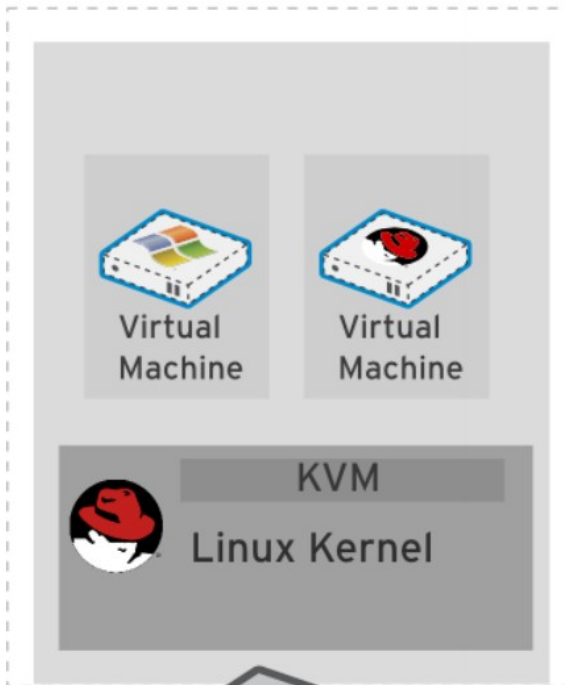
- ▶ oVirt Node (Hypervisor)
- ▶ oVirt Engine (Management-Server)
- ▶ User Portal
- ▶ Self-Provisioning Portal
- ▶ REST-API, Python-, Java-SDK
- ▶ oVirt-Shell
- ▶ Reporting Engine
- ▶ UI-Plugins



# Komponenten - Architektur



# Komponenten – oVirt Node

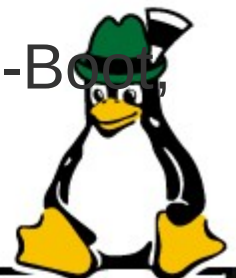


x86 Hardware

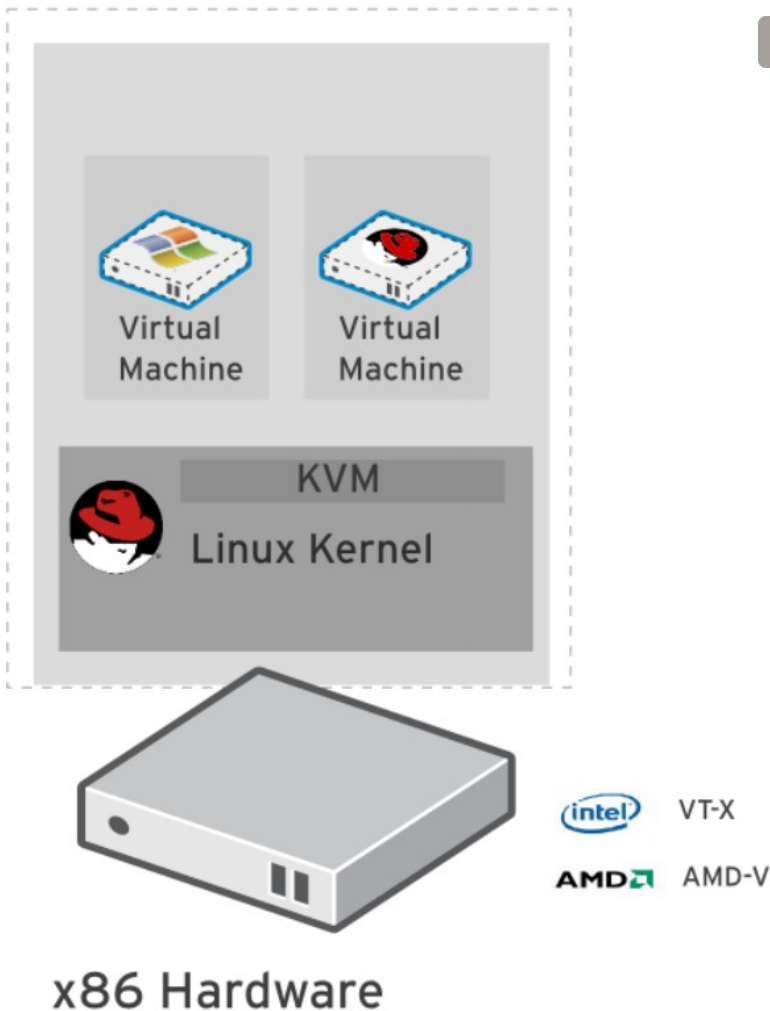


## ▶ Standalone Hypervisor

- Geringe Größe < 200MB
- Minimales Fedora + KVM
- Sicherheitsfeatures (read-only, iptables und SELinux)
- Läuft auf allen Servern mit Intel VT/AMD-V CPUs
- Einfache Installation, Konfiguration und Upgrademöglichkeit
- Installation via PXE-Boot, USB-Boot CD oder Festplatte

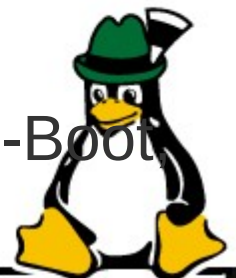


# Komponenten – Fedora/CentOS Hypervisor



## ▶ Fedora 18 / CentOS 6

- Fedora/CentOS + KVM
- Sicherheitsfeatures (SELinux, iptables,...)
- Läuft auf allen Servern mit Intel VT/AMD-V CPUs
- Benutzerdefinierte Installation, Konfiguration und Upgrade-möglichkeit
- Unterstützt Hook-Skripte
- Installation via PXE-Boot, USB-Boot, CD oder Festplatte





# Komponenten – oVirt Engine

- ▶ Hochverfügbarkeit
- ▶ Live Migration
- ▶ Load Balancing (DRS)
- ▶ Power Saver (DPM)
- ▶ Maintenance Manager (oVirt Node Updates)
- ▶ Image Management (Templates, Thin Provisioning, Snapshots)
- ▶ Zentrales Storage- und Netzwerkmanagement
- ▶ Monitoring und Reporting
- ▶ V2V und P2V (VMware, XEN, KVM -> oVirt)
- ▶ VDI für Windows und Linux Gäste



# Komponenten – oVirt Engine

oVirt Open Virtualization Manager

Logged in user: **admin@internal** | [Configure](#) | [Guide](#) | [About](#) | [Sign Out](#)

Search: DataCenter:

**Data Centers** Clusters Hosts Networks Storage Disks Virtual Machines Pools Templates Volumes Users Events

New Edit Remove Force Remove Guide Me

Name	Storage Type	Status	Compatibility Version	Description
ovido-local	Local on Host	Up	3.2	

Storage Logical Networks Clusters Permissions Events

Attach Data Attach ISO Attach Export Detach Activate Maintenance

Domain Name	Domain Type	Status	Free Space	Used Space	Total Space
dvalin-ISOs	ISO	Active	468 GB	252 GB	720 GB
centos-hyp01-lab-ovido-at-Loc: Data (Master)		Active	103 GB	70 GB	173 GB

Last Message: 2013-Apr-19, 14:43 User admin@internal logged in. Alerts (0) Events Tasks (0)

# Komponenten – oVirt Engine

## ▶ Storage

## ▶ Data Domain

- NFS
- iSCSI
- Fibre Channel
- POSIX compliant storage
- Local on host

## ▶ ISO Domain

## ▶ Export Domain



# Komponenten – oVirt Engine

## ▶ GlusterFS-Support für GlusterFS 3.4 (alpha)

The screenshot displays the oVirt Open Virtualization Manager interface. The main window shows a navigation tree on the left with categories like System, Storage, Networks, Templates, Clusters, Hosts, and Volumes. The central area is titled 'Volumes' and contains a 'Create Volume' dialog box. The dialog box has the following fields and options:

- Data Center:** ovido-local
- Volume Cluster:** ovido-local
- Name:** ovirt-vms
- Type:** Replicate
- Replica Count:** 2
- Transport Type:**  TCP
- Bricks:** Add Bricks (0 bricks selected)
- Access Protocols:**
  - Gluster:
  - NFS:
  - CIFS:
- Allow Access From:** \*

At the bottom of the dialog box, there are 'OK' and 'Cancel' buttons. The background interface shows the 'Volumes' tab selected, and the status bar at the bottom indicates 'Last Message: 2013-Apr-19, 14:45' and 'User admin@internal logged in.'.

# Komponenten – oVirt Engine

## ▶ Virtuelle Maschinen

oVirt Open Virtualization Manager

Logged in user: **admin@internal** | [Configure](#) | [Guide](#) | [About](#) | [Sign Out](#)

Search: Vms:

Data Centers Clusters Hosts Networks Storage Disks **Virtual Machines** Pools Templates Volumes Users Events

New Server New Desktop Edit Remove Run Once Migrate Cancel Migration Make Template Export Change CD Assign Tags Guide Me

Name	Host	IP Adr	Cluster	Data Center	Memory	CPU	Network	Display	Status	Uptime
debian6			ovido-local	ovido-local	0%	0%	0%		Down	
f18-beta			ovido-local	ovido-local	0%	0%	0%		Down	
fedora18-icinga			ovido-local	ovido-local	0%	0%	0%		Down	
fedora-packaging	centos-hyp01.lab.ov		ovido-local	ovido-local	0%	1%	0%	SPICE	Up	44 days
obs			ovido-local	ovido-local	0%	0%	0%		Down	
openstack-master			ovido-local	ovido-local	0%	0%	0%		Down	
ovirt-build	centos-hyp01.lab.ov		ovido-local	ovido-local	0%	0%	0%	SPICE	Up	56 days
ovirt-test			ovido-local	ovido-local	0%	0%	0%		Down	
puppet-master			ovido-local	ovido-local	0%	0%	0%		Down	
rhel6	centos-hyp01.lab.ov	10.0.0.10	ovido-local	ovido-local	26%	1%	0%	SPICE	Up	41 days
solaris10-compile			ovido-local	ovido-local	0%	0%	0%		Down	
ubuntu-12.04	centos-hyp01.lab.ov	10.0.0.10	ovido-local	ovido-local	0%	1%	0%	SPICE	Up	62 days
ubuntu-12.04-desktop			ovido-local	ovido-local	0%	0%	0%		Down	

System

Expand All Collapse All

System

- ovido-local
  - Storage
  - Networks
    - ovirtmgmt
    - demo1
    - demo2
  - Templates
  - Clusters
    - ovido-local
      - Hosts
        - centos-hyp01.lab.ov
      - Volumes
      - VMs

Bookmarks

Tags

Last Message: 2013-Apr-19, 14:48 User admin@internal logged out.

Alerts (0) Events Tasks (0)

# Komponenten – oVirt Engine

- ▶ Suche über Datacenter hinweg
- ▶ Kombination verschiedener Parameter
- ▶ Bookmarks von Suchoperationen

Search:

Data Centers Clusters Hosts Networks Storage Disks **Virtual Machines** Pools Templates

New Server New Desktop Edit Remove Run Once Migrate Cancel Migration Make Template Export Change CD

Name	Host	IP Address	Cluster	Data Center	Memory	CPU
rhel6	centos-hyp01.lab.ov	10.0.0.1	ovido-local	ovido-local	<div style="width: 26%;"><div style="background-color: green;">26%</div></div>	<div style="width: 1%;"><div style="background-color: gray;">1%</div></div>

System

Bookmarks

New Edit Remove

VMs\_high\_cpu

VMs\_high\_memory



# Komponenten - VDI

## Virtual Desktop Infrastructure



- ▶ Zentralisiertes Management
- ▶ Virtuelle Desktops mit „physical PC experience“
  - Mehrere Monitore
  - HD Videos
  - Bi-direktionale Audio/Video-Übertragungen für VoIP und Videokonferenzen
  - Smartcard Unterstützung
  - USB Unterstützung
- ▶ Windows und Linux-Gäste
- ▶ Desktop Pools



# Komponenten – User Portal



## oVirt Engine

Logged in user: r.koch | [Sign Out](#) | [Guide](#) | [About](#)

fedora-packaging

ubuntu-12.04-desktop



fedora-packaging



Operating System :

OtherLinux



Defined Memory :

512MB



Number of Cores : 1 (1 Socket(s), 1 Core(s) per Socket)



Drives :

fedora-packaging\_Disk1:

20GB



Console :

[Spice](#)([Edit](#))





# Komponenten – Self-Provisioning Portal

## ▶ Self-Provisioning virtueller Maschinen

The screenshot displays the oVirt Engine web interface. At the top, the 'oVirt Engine' header shows the user is logged in as 'admin@internal' with links for 'Sign Out', 'Guide', and 'About'. The interface is divided into a left sidebar with 'Virtual Machines', 'Templates', and 'Resources' sections, and a main content area. The main area shows a list of virtual machines, with 'rhel6' selected and its details expanded. The details are organized into tabs: General, Network Interfaces, Disks, Snapshots, Permissions, Events, Applications, Monitor, and Sessions. The 'General' tab is active, showing the following configuration:

Property	Value	Property	Value	Property	Value
Name:	rhel6	Defined Memory:	512 MB	Origin:	oVirt
Description:		Physical Memory Guaranteed:	512 MB	Run On:	Any Host in Cluster
Template:	Blank	Number of CPU Cores:	1 (1 Socket(s), 1 Core(s) per So	Custom Properties:	Not-Configured
Operating System:	Red Hat Enterprise Linux 6.x xt	Highly Available:	No	Cluster Compatibility Version:	3.2
Default Display Type:	SPICE	USB Policy:	Disabled		
Priority:	Low				

# Komponenten - REST-API

## ▶ Representational State Transfer

## ▶ HTTP-Aktionen:

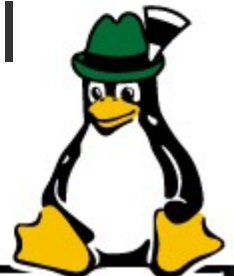
- GET
- PUT
- POST
- DELETE

```

- <hosts>
- <host href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4" id="4a5801d8-17b1-11e1-84ed-0025901dd0b4">
  <actions>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/deactivate" rel="deactivate"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/approve" rel="approve"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/iscsilogin" rel="iscsilogin"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/iscsidiscover" rel="iscsidiscover"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/commitnetconfig" rel="commitnetconfig"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/fence" rel="fence"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/install" rel="install"/>
    <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/activate" rel="activate"/>
  </actions>
  <name>rhev.lab.ovidio.at</name>
  <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/storage" rel="storage"/>
  <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/nics" rel="nics"/>
  <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/tags" rel="tags"/>
  <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/permissions" rel="permissions"/>
  <link href="/api/hosts/4a5801d8-17b1-11e1-84ed-0025901dd0b4/statistics" rel="statistics"/>
  <address>10.0.100.12</address>
- <certificate>
  <organization>ovidio it solutions</organization>
  <subject>O=ovidio it solutions,CN=10.0.100.12</subject>
</certificate>
- <status>
  <state>up</state>
</status>

```

## ▶ (Fast) alle Tasks möglich wie im Admin-Portal



# Komponenten – Python/JAVA-SDK

▶ JAVA-SDK ab oVirt 3.2

▶ Python-SDK:

```
from ovirtsdk.api import API
from ovirtsdk.xml import params
try:
    api = API (url="https://HOST",
              username="USER",
              password="PASS",
              ca_file="ca.crt")
    print "Connected to %s successfully!" % api.get_product_info().name
    api.disconnect()
except Exception as ex:
    print "Unexpected error: %s" % ex
```

Connected to Red Hat Enterprise Virtualization Manager successfully!



# Komponenten – oVirt-Shell

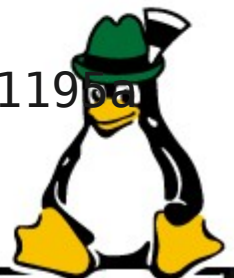
## ▶ CLI-Interface für oVirt

```
# ovirt-shell -c -l "https://ovirt-engine/api" -P 443 -u  
"admin@internal" -p 'secret'
```

```
[oVirt shell (connected)]# list vms | grep fedora  
name : fedora18-icinga  
name : fedora-packaging
```

```
[oVirt shell (connected)]# show vm  
id name storagedomain  
[oVirt shell (connected)]# show vm --name debian6
```

```
id : 22058af2-6d97-4d59-b234-516431f2d215  
name : debian6  
cluster-id : f3e98007-3695-4f28-aaa7-5b9df501190a  
cpu-mode : CUSTOM  
cpu-topology-cores : 1  
cpu-topology-sockets : 1
```



# Komponenten – UI Plugins

- ▶ Infrastruktur und API zum Erstellen von User Interface Plugins für oVirt-Engine
- ▶ Verfügbar ab oVirt 3.2
- ▶ Erweiterung durch:
  - Main Tabs
  - Sub Tabs
  - Buttons
- ▶ Informationen:  
<http://www.ovirt.org/Features/UIPlugins>



# Komponenten – UI Plugins

## ▶ oVirt Monitoring UI Plugin

▶ Author: René Koch <r.koch@ovidio.at>

▶ Project web site:

<https://labs.ovidio.at/monitoring/wiki/ovirt-monitoring-ui-plugin>

▶ Installation documentation:

<https://labs.ovidio.at/monitoring/wiki/ovirt-monitoring-ui-plugin:install>

▶ UI plugin source code:

<https://labs.ovidio.at/monitoring/wiki/ovirt-monitoring-ui-plugin:svn>



# Komponenten – UI Plugins

## oVirt Monitoring UI Plugin

oVirt Open Virtualization Manager

Logged in user: admin@internal | Configure | Guide | About | Sign Out

Search: Vms:

Data Centers Clusters Hosts Networks Storage Disks **Virtual Machines** Pools Templates Volumes Users Events

New Server New Desktop Edit Remove Run Once Migrate Cancel Migration Make Template Export Change CD Assign Tags Guide Me

Name	Host	IP Address	Cluster	Data Center	Memory	CPU	Network	Display	Status	Uptime
debian6	centos-hyp01.lab.ovi		ovido-local	ovido-local	0%	0%	0%	SPICE	Up	4 days
f18-beta			ovido-local	ovido-local	0%	0%	0%		Down	
rhel6	centos-hyp01.lab.ovi	10.0.100.200	ovido-local	ovido-local	28%	1%	0%	SPICE	Up	20 days
solaris10-compile			ovido-local	ovido-local	0%	0%	0%		Down	
ubuntu-12.04	centos-hyp01.lab.ovi	10.0.100.187	ovido-local	ovido-local	0%	2%	0%	SPICE	Up	3 days
ubuntu-12.04-deskto	centos-hyp01.lab.ovi	10.0.100.189	ovido-local	ovido-local	0%	3%	0%	SPICE	Up	3 days

General Network Interfaces Disks Snapshots Applications Permissions Sessions **Monitoring Details** Events

Acknowledge Comment Downtime Notifications Schedule

Service	Output
Check_MK	OK - Agent version 1.2.0p4, execution time c
CPU load	OK - 15min load 0.05 at 1 CPUs
CPU utilization	OK - user: 0.0%, system: 0.0%, wait: 0.0%
Disk IO SUMMARY	OK - 0.00B/sec read, 341.33B/sec write, IOs
fs_/	OK - 21.5% used (3.00 of 14.0 GB), (levels a
fs_/boot	OK - 16.8% used (0.04 of 0.2 GB), (levels at
Interface 1	OK - [eth0] (up) speed unknown, in: 195.21I
Kernel Context Switches	OK - 10/s in last 60 secs

Name	Value
last_state_change	2013-02-18 12:41:04
lastcheck	2013-02-18 17:57:04
latency	0.172
long_plugin_output	
next_check	2013-02-18 17:58:04
notifications_enabled	1
output	OK - Agent version 1.2.0p4, execution time 0.1 sec
perf_data	execution_time=0.055

Bookmarks

Tags

Last Message: 2013-Feb-18, 17:58 User admin@internal logged out.

Alerts (0) Events Tasks (0)

# Komponenten – UI Plugins

## oVirt Monitoring UI Plugin

oVirt Open Virtualization Manager

Logged in user: admin@internal | [Configure](#) | [Guide](#) | [About](#) | [Sign Out](#)

Search: Host:

Data Centers Clusters **Hosts** Networks Storage Disks Virtual Machines Pools Templates Volumes Users Events

New Edit Remove Activate Maintenance Configure Local Storage Power Management Assign Tags

Name	Hostname/IP	Cluster	Data Center	Status	Virtual Machines	Memory	CPU	Network	SPM
centos-hyp01	lab.ovid.at 10.0.100.42	ovido-local	ovido-local	Up	4	75%	1%	0%	SPM

System

Expand All Collapse All

- System
  - ovido-local
    - Storage
    - Networks
    - Templates
    - Clusters

General Virtual Machines Network Interfaces Host Hooks Permissions Hardware Information **Monitoring Details** Events

Acknowledge Comment Downtime Notifications Schedule

Service	Output
RHEV CPU Load Check	RHEV OK: cpu ok - 1% used (centos-hyp01.l
RHEV Host Load Check	RHEV OK: cpu.load.avg.5m ok - 0.020 (cento
RHEV Host Status Check	RHEV OK: Hosts ok - 1/1 Hosts with state UF
RHEV KSM Load Check	RHEV CRITICAL: ksm.cpu.current critical - 90:
RHEV Memory Check	RHEV WARNING: memory warning - 75.00%
RHEV Network Status Chec	RHEV CRITICAL: Hosts critical - 1/2 Nics with
RHEV Network Traffic Check	RHEV OK: traffic ok - eth1: 0 Mbit/s eth0: 0 M
RHEV Swap Check	RHEV OK: swap ok - 19.27% used (centos-h

Bookmarks

Tags

Last Message: 2013-Feb-18, 17:58 User admin@internal logged in.

Alerts (0) Events Tasks (0)

Monitoring Details

Details Graphs

PNP Performance Graphs

4 Hours

Load utilization for 10.0.100.42

load utilization

cpu.load.avg.5m last: 0.031 max: 0.138 average: 0.07794



# Monitoring

- ▶ Überwachung einer RHEV und oVirt-Umgebung mittels Icinga/Nagios

- ▶ **check\_rhev3**

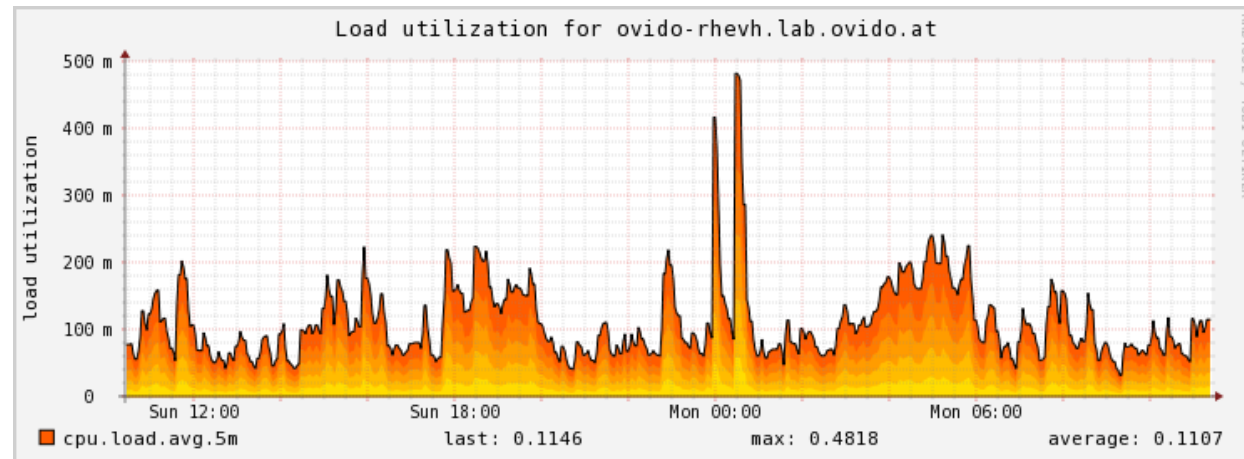
- Author: René Koch <r.koch@ovido.at>
- Project web site:  
[https://labs.ovido.at/monitoring/wiki/check\\_rhev3](https://labs.ovido.at/monitoring/wiki/check_rhev3)



# Monitoring - check\_rhev3

## ► Überwachung von:

- Datacenter
- Cluster
- Hosts
- Storagedomains
- Virtual Machines
- Virtual Machine Pools



```
$ check_rhev3 -H ovirt-engine -a admin@internal:password -D default -l status
RHEV OK: Datacenters ok - 1/1 Datacenters with state UP|Datacenters=1;1;1;0
```



# Use Cases

- ▶ Server-Virtualisierung
- ▶ Desktop-Virtualisierung
- ▶ Private Clouds
  - Abrechnung von Ressourcen-Auslastung oder Laufzeit via PostgreSQL-Datenbank
  - Entwickler-Portal
- ▶ Virtualisierte Call Center
- ▶ Anbindung von Außenstellen



# Herausforderungen

- ▶ Benötigt SAN/NAS
- ▶ Lokales Storage vermeiden (NFS besser)
- ▶ Komplexe Netzwerkkonfiguration etwas mühsam konfigurierbar
- ▶ Verhalten teilweise konservativ
- ▶ Funktioniert wie Cluster → Fencing!
- ▶ Nicht alles via GUI lösbar (z.B. Manager-Updates)
- ▶ Fedora ist nicht optimal als Grundlage für oVirt



## Weitere Informationen - oVirt

- ▶ Webseite: <http://www.ovirt.org/Home>
- ▶ Dokumentation:  
<http://www.ovirt.org/Documentation>
- ▶ Download: <http://www.ovirt.org/Download>
- ▶ Mailinglisten: [http://www.ovirt.org/Mailing\\_lists](http://www.ovirt.org/Mailing_lists)  
[users@ovirt.org](mailto:users@ovirt.org) - User Mailingliste
  
- ▶ oVirt Live (CD): [http://wiki.ovirt.org/OVirt\\_Live](http://wiki.ovirt.org/OVirt_Live)



## Weitere Informationen - Referent

- ▶ Name: René Koch
- ▶ E-Mail: [r.koch@ovidio.at](mailto:r.koch@ovidio.at)
- ▶ Nagios-Plugins für RHEV/oVirt:  
[https://labs.ovidio.at/monitoring/wiki/check\\_rhev3](https://labs.ovidio.at/monitoring/wiki/check_rhev3)
- ▶ oVirt Monitoring UI Plugin:  
<https://labs.ovidio.at/monitoring/wiki/ovirt-monitoring-ui-plugin>



Herzlichen Dank für Ihre Aufmerksamkeit!