SWITCH

• Non Profit Foundation
• IT Services for Universities and Higher Education
  – Traditional Internet (SWITCHlan)
  – Federated Single Sign On (SWITCHaai)
  – Lecture Recording & Videos (SWITCHcast / SWITCHtube)
  – Many, many more

• A partner to Academia
• Registry for .ch (since 1987)
• And Domain registration until 2015
SWITCH Services

• Established services:
  – Network
  – Authentication and authorization infrastructure
    PKI, SWITCHham, SMS, videoconf
  – Security
  – Collaboration, e-learning services

• New(er) services:
  – Procurement
  – Cloud services

• Under development:
  – Swiss edu-ID, Information Security Management (ISMS)
“Cloud”

• Infrastructure as a Service
  – SWITCHengines

• Software as a Service
  – SWITCHdrive – an Academic Sync & Share Service
  – SWITCHfilesender – overcome the 10 MB Mailbox limit
  – SWITCHcast – record and edit lectures
  – SWITCHtube – a secure video distribution tool
Timeline for IaaS Cloud Offering

• 2012: Start of Project BCC – Building Cloud Competency

• 2013: Decision that SWITCH builds Swiss Academic Cloud services

• 2014: SCALE project. One of the deliverables – build an initial cloud infrastructure - 64 Servers purchased and installed

• 2015: Pilot usage with production load. End of SCALE project Start of SCALE-UP project

• 2016: SWITCHengines – an official SWITCH service

• 2017: End of SCALE-UP project
Current Status

- SWITCHengines has been in “public beta” and “internal production” since December 2014
- Several SWITCH services run on it (SWITCHdrive, SWITCHengines, SWITCHfilesender, SWITCHtube)
- Over 630 individual users and around 40 research projects online
- Around 1000 VMs running on the cloud right now (2200 cores, 3700 GB RAM, 360 TB of storage allocated)
- Over 60’000 VMs have been created / decommissioned since the beginning
Cloud Usage

Growth VMs and CPU

- VMs
- vCPUs

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Cloud Usage
Expansion under way

• Double the number of compute nodes (and increase the number of CPUs by 150% - Moore’s Law at Work)
  – 2000 CPU cores
• Increase the storage capacity by 50%
  – 2.25 PB raw storage

• Online end of 2015
Building

https://www.flickr.com/photos/criminalintent/5101528210
Hardware is easy

• Commercial Off the Shelf

• “Low Cost, Medium Performance” (but lots of it)
Building SWITCHengines

- **2 Geographic Locations**
  - ZHdK
  - UNIL

- **32 Storage Nodes**
  - 384 4TB SATA Disks (and a bunch of SSDs for Journals)
  - 1.5 PB RAW Storage

- **41 Compute Nodes**
  - 1240 Cores
  - 9.2 TB RAM
Software
But wait, there’s more
Architecture
Infrastructure - Foreman

Overview

Host Configuration Status
- Hosts that had performed modifications without error: 0
- Hosts in error state: 0
- Good host reports in the last 35 minutes: 84
- Hosts that had pending changes: 0
- Out of sync hosts: 0
- Hosts with no reports: 0
- Hosts with alerts disabled: 3

Total Hosts: 87

Host Configuration Chart
- 97% OK

Latest Events

<table>
<thead>
<tr>
<th>Host</th>
<th>A</th>
<th>R</th>
<th>F</th>
<th>FR</th>
<th>S</th>
<th>P</th>
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<tr>
<td>network.zhd...</td>
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<td>0</td>
<td>3</td>
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<td>controller....</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>controller....</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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<tr>
<td>controller....</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>controller....</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Run distribution in the last 30 minutes

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Ceph

- When 12 * 4 TB aren’t enough, go distributed storage systems

$ ceph -s

    cluster yyyyyyyyy-bdae-464b-a864-xxxxxxxxxxx
    health HEALTH_OK
    monmap e2: 3mons at
{zhdk0009=[2001:xxx::1009]:6789/0,zhdk0013=[2001:yyy::1013]:6
789/0,zhdk0025=[2001:yyy::1025]:6789/0}, election epoch 612,
quorum 0,1,2 zhdk0009,zhdk0013,zhdk0025
    osdmap e44762: 125 osds: 125 up, 125 in
    pgmap v20730639: 3336 pgs, 17 pools, 85088 GB data,
23864 kobjects
    279 TB used, 174 TB / 454 TB avail
    3317 active+clean
    19 active+clean+scrubbing+deep
    client io 10031 kB/s rd, 14072 kB/s wr, 1472 op/s
Foreman – Server Definition
### Included Classes

- aadm
- ceph
- nagios::openstack_cinder
- nagios::openstack_glance
- nagios::openstack_heat
- nagios::openstack_nova_head
- scale::controller
- switch::controller_mount_rbd
- nagios
- nagios::puppet_agent
- switch

### Available Classes

```
<table>
<thead>
<tr>
<th>Included Classes</th>
<th>Available Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>aadm</td>
</tr>
<tr>
<td></td>
<td>+ apache</td>
</tr>
<tr>
<td></td>
<td>+ apt</td>
</tr>
<tr>
<td></td>
<td>+ ceilometer</td>
</tr>
<tr>
<td></td>
<td>+ ceph</td>
</tr>
<tr>
<td></td>
<td>+ cinder</td>
</tr>
<tr>
<td></td>
<td>+ concat</td>
</tr>
<tr>
<td></td>
<td>+ epel</td>
</tr>
<tr>
<td></td>
<td>+ erlang</td>
</tr>
<tr>
<td></td>
<td>+ firewall</td>
</tr>
<tr>
<td></td>
<td>+ glance</td>
</tr>
<tr>
<td></td>
<td>+ heat</td>
</tr>
<tr>
<td></td>
<td>+ horizon</td>
</tr>
<tr>
<td></td>
<td>+ keystone</td>
</tr>
<tr>
<td></td>
<td>+ ldap</td>
</tr>
<tr>
<td></td>
<td>+ memcached</td>
</tr>
<tr>
<td></td>
<td>+ ntp</td>
</tr>
<tr>
<td></td>
<td>+ openstack</td>
</tr>
<tr>
<td></td>
<td>+ passenger</td>
</tr>
<tr>
<td></td>
<td>+ postgresql</td>
</tr>
<tr>
<td></td>
<td>+ proxy</td>
</tr>
<tr>
<td></td>
<td>+ qpid</td>
</tr>
<tr>
<td></td>
<td>+ qubyte</td>
</tr>
<tr>
<td></td>
<td>+ rabbitmq</td>
</tr>
<tr>
<td></td>
<td>+ radvd</td>
</tr>
<tr>
<td></td>
<td>+ rsync</td>
</tr>
<tr>
<td></td>
<td>+ ruby</td>
</tr>
<tr>
<td></td>
<td>+ rvm</td>
</tr>
<tr>
<td></td>
<td>+ scale</td>
</tr>
<tr>
<td></td>
<td>+ ssh</td>
</tr>
<tr>
<td></td>
<td>+ stdlib</td>
</tr>
<tr>
<td></td>
<td>+ swift</td>
</tr>
</tbody>
</table>
```
Puppet – Configuration Management

- [http://puppetlabs.com](http://puppetlabs.com)

- [https://github.com/puppetlabs/puppetlabs-openstack](https://github.com/puppetlabs/puppetlabs-openstack)

- Modules for every component of OpenStack

- Generic Glue Modules that build the actual Cluster
Split between Code – Puppet

```puppet
# Class scale::controller
# The class to install an OpenStack full controller:
# - keystone
# - glance
# - cinder
# - nova
# - horizon
#
# == Copyright
#
# Copyright (c) SWITCH, 2014
#
class scale::controller inherits ::openstack::role {
  include switch::interfaces
  # .class { '::openstack::profile::firewall' } ->
  class { '::scale::profile::rabbitmq' } ->
  class { '::openstack::profile::memcache' } ->
  class { '::scale::profile::mysql' } ->
  class { '::scale::profile::mongodb' } ->
  class { '::scale::profile::glance::api' } ->
  class { '::scale::profile::cinder::api' } ->
  class { '::scale::profile::nova::api' } ->
  class { '::scale::profile::neutron::server' } ->
  class { '::scale::profile::heat::api' } ->
  class { '::scale::profile::glance::auth' } ->
  class { '::scale::profile::cinder::volume' } ->
  class { '::scale::profile::horizon' } ->
  class { '::scale::profile::auth_file' }
}
```
Configuration - Hiera

```ruby
# configuration

# Domain
cloud.switch.ch.yaml
hot.tcloud.switch.ch.yaml
local.yaml
s1.scloud.switch.ch.yaml
s2.scloud.switch.ch.yaml
unil.cloud.switch.ch.yaml
vgos.tcloud.switch.ch.yaml
vgovb.tcloud.switch.ch.yaml
zhdk.cloud.switch.ch.yaml

# Infrastructure
development.yaml
production.yaml
staging.yaml
test.yaml
testboot.yaml

# Node
.hiera
controller.yaml
controller-keystone.vgos.tcloud.switch.ch.yaml
controller-keystone.yaml
dhcp.s1.scloud.switch.ch.yaml
dhcp.s2.scloud.switch.ch.yaml
dhcp.unil.cloud.switch.ch.yaml
dhcp.vgos.tcloud.switch.ch.yaml
dhcp.vgovb.tcloud.switch.ch.yaml
dhcp.zhdk.cloud.switch.ch.yaml
foreman.cloud.switch.ch.yaml
foreman.scloud.switch.ch.yaml
foreman-proxy.s1.scloud.switch.ch.yaml
foreman-proxy.zhdk.cloud.switch.ch.yaml
network.s1.scloud.switch.ch.yaml
network.s2.scloud.switch.ch.yaml
network.unil.cloud.switch.ch.yaml
```

---

```ruby
# Keystone
scale::keystone::service::protocol: 'http'
scale::keystone::service::host: ... "controller-keystone.%{::domain}"

# OpenStack API proxying
## req -> proxy -> controller APIs
scale::api::service::protocol: 'http'
scale::api::service::host: ... "controller.%{::domain}"

# Interfaces
switch::interfaces::reboot_on_change: false

# Networks
ipv6::site_number: 'fd'
ipv4::site_number: '253'

# IPv6 networks
ipv6::gateway::mgmt_rtd: %{hiera('ipv6::mgmt_rtd')}:2
ipv6::gateway::api: %{hiera('ipv6::api')}:2
ipv6::gateway::floating: %{hiera('ipv6::floating')}:2

# IPv4 networks
ipv4::mgmt_rtd: "192.168.28" # .32/27
ipv4::api: "192.168.28" # .32/27
ipv4::floating: "192.168.30" # /23
ipv4::floating_end: "192.168.31" # /23

# Note: the host ip are formed by here string concatenation -> no
ipv4::gateway::mgmt_rtd: ... "%{hiera('ipv4::mgmt_rtd')}:34"
ipv4::gateway::api: ... "%{hiera('ipv4::api')}:2"
ipv4::gateway::floating: ... "%{hiera('ipv4::floating')}:1"

# MTU
scale::mtu::dhcp_advertised: "1450"
scale::mtu::guest: "1450"
scale::mtu::management_network: "1500"

# OpenvSwitch
switch::openvswitch::vlan_network: "%{hiera('ipv6::mgmt')}"::1
switch::openvswitch::vlan_network2: "%{hiera('ipv6::mgmt')}"::2
```

---

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Puppet Glue
Orchestrating the Orchestrator

- Ansible - http://www.ansible.com/home

```bash
ansible-playbook disable_puppet.yml -i cloud --sudo --ask-sudo-pass --extra-vars "hosts=production"
```

```bash
ansible-playbook prepare_release.yml -i cloud --sudo --ask-sudo-pass --extra-vars "modules=v1.3 config=v1.3.1"
```

```bash
ansible-playbook test_release.yml -i cloud --sudo --ask-sudo-pass --extra-vars "hosts=canary-vm-unil"
```

```bash
ansible-playbook do_release.yml -i cloud --sudo --ask-sudo-pass --extra-vars "hosts=zhdk-all"
```
Version? What version?
Discussions

11 participants

Valéry Tschopp @valery.tschopp · 12 days ago
Status changed to merged

Valéry Tschopp @valery.tschopp · 12 days ago
mentioned in commit ce099324b520b79766310d64072c5b6f030733f

Simon Leinen started a discussion on the diff

modules/nagios/templates/check_logfiles_nova_head_conf.cfg.erb

<table>
<thead>
<tr>
<th></th>
<th>warningpatterns =&gt; [</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 7</td>
<td>'WARNING', 'WARN', 'error', 'ERROR', 'ERR'</td>
</tr>
<tr>
<td>8 8</td>
<td>]</td>
</tr>
<tr>
<td>9 9</td>
<td>warningexceptions =&gt; 'WARNING keystoneclient.middleware.auth_token [-] Authorization failed for token',</td>
</tr>
<tr>
<td>10 10</td>
<td>+   warningexceptions =&gt; [</td>
</tr>
</tbody>
</table>

Simon Leinen @leinen · 12 days ago
In case I reviewed the original change: I'm sorry that I didn't catch this. I noticed this in the overall diff between releases v1.16 and v1.17, and found it suspicious that the warningpatterns should be an array, and warningexceptions a simple string. But I didn't want to hold up the release for this.

@all Everybody (including myself), please try to be a little more careful in the future, thanks.

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## Merge Requests

<table>
<thead>
<tr>
<th>User</th>
<th>Action</th>
<th>Merge Request #</th>
<th>URL</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simon Leinen</td>
<td>accepted</td>
<td>336</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>Add sas2ircu disk blink utility</td>
</tr>
<tr>
<td>Simon Leinen</td>
<td>accepted</td>
<td>329</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>End to end nagios plugin, addition of total number of VMs as published KPI</td>
</tr>
<tr>
<td>Valéry Tschopp</td>
<td>accepted</td>
<td>335</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>Fixed wrong parsing of filtered warning message</td>
</tr>
<tr>
<td>Valéry Tschopp</td>
<td>accepted</td>
<td>334</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>Fixed wrong parsing of filtered message</td>
</tr>
<tr>
<td>Simon Leinen</td>
<td>accepted</td>
<td>5</td>
<td>PetaSolutions.switch.ch / scale-test</td>
<td>Make layout less irregular</td>
</tr>
<tr>
<td>Simon Leinen</td>
<td>accepted</td>
<td>4</td>
<td>PetaSolutions.switch.ch / scale-test</td>
<td>Node controller no longer needs RBD mount</td>
</tr>
<tr>
<td>Valéry Tschopp</td>
<td>accepted</td>
<td>333</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>Fixed problem with filtering of WARNING keystonemodule.auth_token [-]</td>
</tr>
<tr>
<td>Valéry Tschopp</td>
<td>accepted</td>
<td>332</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>Authorization failed for token for Juno</td>
</tr>
<tr>
<td>Valéry Tschopp</td>
<td>accepted</td>
<td>330</td>
<td>PetaSolutions.switch.ch / puppet-modules</td>
<td>2 disable glance image cache</td>
</tr>
</tbody>
</table>
Monitoring

monitor@switch.ch
To: Jens-Christian Fischer

Service: zhdk0024.zhdk.cloud.switch.ch/L_check_logfiles
State: WARNING
Notificationtype: PROBLEM
Recipients: check_mk-mrpe

Host: zhdk0024.zhdk.cloud.switch.ch
Alias: zhdk0024.zhdk.cloud.switch.ch
Address: 2001:620:5ca1:100::1024
Service: L_check_logfiles
Command: check_mk-mrpe

Message=2015-06-15 13:34:15.900352 7f45b7fe700 0 -- [2001:620:5ca1:100::1024]:6835/185927 submit_message osd_op_reply(923361 rbd_data.bd32471a66d894.00000000000001e2 [stat, set-alloc-hint object_size 8388608 write_size 8388608, write 15360004096] v4476210069454
uv10069454 ondisk = 0) v6 remote, [2001:620:5ca1:100::1009]:0/1089960, failed lossy con, dropping message 0x5810d00 ...

Peridata: osd_logs83_lines=0; osd_logs83_warnings=0; osd_logs83_criticals=0; osd_logs83_unknowns=0; osd_logs41_lines=1; osd_logs41_warnings=0; osd_logs41_criticals=0; osd_logs41_unknowns=0; osd_logs19_lines=2; osd_logs19_warnings=0; osd_logs19_criticals=0; osd_logs19_unknowns=0; osd_logs70_lines=1; osd_logs70_warnings=0; osd_logs70_criticals=0; osd_logs70_unknowns=0; osd_logs75_lines=0; osd_logs75_warnings=0; osd_logs75_criticals=0; osd_logs75_unknowns=0; osd_logs38_lines=1; osd_logs38_warnings=0; osd_logs38_criticals=0; osd_logs38_unknowns=0; osd_logs101_lines=0; osd_logs101_warnings=0; osd_logs101_criticals=0; osd_logs101_unknowns=0; osd_logs119_lines=2; osd_logs119_warnings=2; osd_logs119_criticals=0; osd_logs119_unknowns=0; syslog_lines=1; syslog_warnings=0; syslog_criticals=0; syslog_unknowns=0; kern_log_lines=0; kern_log_warnings=0; kern_log_criticals=0; kern_log_unknowns=0; [sudo]
Usage

SWITCHengines Load

ZH Region

Hypervisor User/System CPU

Hypervisor Memory Usage
Usage (5 months later)

ZH Region

Hypervisor User/System CPU

Hypervisor Memory Usage

© 2015 SWITCH
Performance
Monitoring
Reporting

Mandant: switch.ch

Virtuelle Maschinen smashbox (8bb2841b-7f87-4248-b53f-72ae6f3c5dc7)

Allgemeine Informationen

<table>
<thead>
<tr>
<th>Titel</th>
<th>smashbox</th>
</tr>
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<tbody>
<tr>
<td>Server ID</td>
<td>8bb2841b-7f87-4248-b53f-72ae6f3c5dc7</td>
</tr>
<tr>
<td>Mandant</td>
<td>switch.ch</td>
</tr>
<tr>
<td>Image</td>
<td>---</td>
</tr>
<tr>
<td>Flavor</td>
<td>c1.medium</td>
</tr>
<tr>
<td>Region</td>
<td>LS</td>
</tr>
<tr>
<td>Projekt</td>
<td>SWITCHdrive7Staging</td>
</tr>
<tr>
<td>Benutzer</td>
<td><a href="mailto:jens-christian.fischer@switch.ch">jens-christian.fischer@switch.ch</a></td>
</tr>
<tr>
<td>Open stack created at</td>
<td>Freitag, 08. Mai 2015, 11:36 Uhr</td>
</tr>
<tr>
<td>Open stack updated at</td>
<td>Donnerstag, 14. Mai 2015, 17:50 Uhr</td>
</tr>
<tr>
<td>Erstellt am</td>
<td>Freitag, 29. Mai 2015, 14:24 Uhr</td>
</tr>
<tr>
<td>Aktualisiert am</td>
<td>Freitag, 29. Mai 2015, 14:24 Uhr</td>
</tr>
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</table>

Trackings

<table>
<thead>
<tr>
<th></th>
<th>CPU Hours</th>
<th>RAM Hours</th>
<th>DISC Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aktuelle Woche</td>
<td>26</td>
<td>26 GB</td>
<td>260 GB</td>
</tr>
<tr>
<td>Letzte Woche</td>
<td>362</td>
<td>362 GB</td>
<td>3.54 TB</td>
</tr>
<tr>
<td>Letzter Monat</td>
<td>554</td>
<td>554 GB</td>
<td>5.41 TB</td>
</tr>
<tr>
<td>Total</td>
<td>554</td>
<td>554 GB</td>
<td>5.41 TB</td>
</tr>
</tbody>
</table>
User Interface

Launch Instance

- **Availability Zone:** nova
- **Instance Name:**
- **Flavor:** c1.micro
- **Instance Count:** 1
- **Instance Boot Source:**

Specify the details for launching an instance.
The chart below shows the resources used by this project in relation to the project's quotas.

**Flavor Details**

- **Name:** c1.micro
- **VCPUs:** 1
- **Root Disk:** 20 GB
- **Ephemeral Disk:** 0 GB
- **Total Disk:** 20 GB
- **RAM:** 512 MB

**Project Limits**

- **Number of Instances:** 4 of 100 Used
- **Number of VCPUs:** 6 of 128 Used
- **Total RAM:** 12,288 of 1,638,400 MB Used

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## New UI

![Quickstart Launch instance](image)

**Instances**
- 8 of 10

**RAM**
- 6 GB of 50 GB

**Disk space**
- 64GB of 100000GB

**Floating IPs**
- 5 of 50
- Allocated 2 of 50

**CPUs**
- 8 of 20

**Volumes**
- 7 of 10

### Instance details

<table>
<thead>
<tr>
<th>Instance name</th>
<th>IPs</th>
<th>SSH keypair</th>
<th>Status</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>vt-quickstart</td>
<td>192.168.1.117</td>
<td>valery-dsa</td>
<td>Running</td>
<td></td>
</tr>
<tr>
<td></td>
<td>86.119.1.210</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sl-test</td>
<td>10.0.0.144</td>
<td>SL-RSA</td>
<td>Running</td>
<td></td>
</tr>
<tr>
<td></td>
<td>86.119.1.218</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>canary-canary.s2.scloud.switch.ch</td>
<td>10.12.10.2</td>
<td>SL-RSA</td>
<td>Running</td>
<td></td>
</tr>
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<td></td>
<td>86.119.1.240</td>
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<td></td>
</tr>
<tr>
<td>vt-u-private</td>
<td>10.0.0.28</td>
<td>valery-dsa</td>
<td>Running</td>
<td></td>
</tr>
<tr>
<td></td>
<td>86.119.1.152</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>coreos-7a992eb5-3d5e-4b19-8c5e-11b101582472</td>
<td>172.31.0.12</td>
<td>Running</td>
<td></td>
<td></td>
</tr>
<tr>
<td>coreos-a10b99a1-8e3d-48c2-a300-d9717ec3b770</td>
<td>172.31.0.11</td>
<td>Running</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New UI

Create instance

- Debian
- Fedora
- Test_saverio
- U14.04
- Ubuntu

Flavor

Due to your quota some flavors cannot be selected!

<table>
<thead>
<tr>
<th>Name</th>
<th>CPU</th>
<th>RAM</th>
<th>Disk</th>
</tr>
</thead>
<tbody>
<tr>
<td>m1.tiny</td>
<td>1</td>
<td>512 MB</td>
<td>1 GB</td>
</tr>
<tr>
<td>m1.small</td>
<td>1</td>
<td>512 MB</td>
<td>20 GB</td>
</tr>
<tr>
<td>c1.micro</td>
<td>1</td>
<td>512 MB</td>
<td>20 GB</td>
</tr>
<tr>
<td>test.micro</td>
<td>1</td>
<td>512 MB</td>
<td>20 GB</td>
</tr>
<tr>
<td>c1.small</td>
<td>1</td>
<td>1 GB</td>
<td>20 GB</td>
</tr>
<tr>
<td>c1.medium</td>
<td>2</td>
<td>2 GB</td>
<td>20 GB</td>
</tr>
</tbody>
</table>

Launch instance  | Cancel
OpenStack ++

• There is more to cloud than just cloud
• You need the tools
• You need the team

• And when you start to actually run the cloud, things get fun
When you build it, they will come

• Network simulations
• Digital Humanities
• Aerial Photography of Lake shores (Leman / Baikal)
• CoreOS / Docker Container orchestration
• Classroom VMs
• ATLAS computation nodes
• Lotus Domino Servers
• Web servers from University IT departments
• TOR exit nodes
• …
Joys of running a cloud

- User chooses “Public” network, her VM doesn’t launch
- Your network node takes down all VMs network connections
- A faulty disk causes major performance problems in a distributed, no SPOF storage system
- Your Performance test framework doesn’t delete default security rules => IPTables with 70’000 entries
- Your keystone service catalog entries get duplicated, all API access breaks because Keystone tokens are hashed differently
- …
Joys of running a cloud

• Deleting a Cinder volume takes down your whole Storage API services (bug in the Cinder/Ceph integration)
• Users enable password login to their VM (because: Easier)
• Your organisation changes the way the Firewall rules are distributed to the routers
• You need to manage access for 650 users and 50 groups/tenants
• Your users exhaust the number of floating (public) IP addresses you have assigned to the Cloud network
• …
Watch the network traffic
Part of a DDOS attack

• Users VM was hacked

• (see above: User enables password login)