Agenda

• What you get with SWITCHengines
• Status of the service
• Use Cases in the Community
• Service take up by users and organisations
  – Distribution Model
  – Tariff Model (Draft)
• Timeline and Roadmap (SCALE-UP)
• Q & A
SWITCH Positioning

„We expand the boundaries of your infrastructure under maximal consideration of your needs“

under your control

SWITCHlan, IDM, security.

Data in CH, support, billing and pooling benefits
What you get with SWITCHengines

Virtual Machines in different sizes
• Cores, Disk, RAM, Public IP address

Preinstalled Operating Systems
• Linux: CentOS, Debian, Fedora, Ubuntu
• Windows Server*

Block Storage for Virtual Machines
Object Storage (S3 compatible)

Support for users to get the preinstalled VMs running.

* 2012 R2 Evaluation Version, MS licensing currently open
It’s much more than OpenStack

Monitoring
- Nagios
- graphite

Virtualization
- openstack
- ceph
- Quobyte
- Open vSwitch

Automation, Linux
- FOREMAN
- GitLab
- puppet
- Ansible
- ubuntu
Status of SWITCHengines

From pilot to the service
• Launched as a pilot service in October 2014
• Pilot phase until mid 2015
• Service with tariff effective from 2016

Community Usage
• More than 500 virtual machines
• More than 100 active users from the community

SWITCH Usage
• Used at SWITCH for SWITCHdrive, SWITCHfilesender, sourceforge mirror, …

In development
• License Agreement with Microsoft
• Academic Software as a Service ("R" statistical software)
Results from recent user survey

• 79 respondents, mainly from universities of applied sciences, also universities, EPFL (and SWITCH)
• More long term usage (70%) of VMs than short term
• Requirement for “Compute” is stronger than for “Storage”
• Without SWITCHengines, users would:
  – Use existing or buy new hardware: 36 %
  – Use commercial offerings: 14 %
  – Ask the IT service department: 30 %

> 98 % of the users would use SWITCHengines if the services would be offered at their institution
SWITCHengines

Typical Use Cases

Research
• Use SWITCHengines instead of buying hardware ("under-the-desk hardware")
• Analyse scientific datasets, e.g. texts, measurement data

Teaching
• Individual virtual machines for student projects
• Use personalized environment during semester, e.g. for computer science courses

SWITCH
• SWITCHdrive, SWITCHengines, SWITCHfilesender

Available for projects within CUS P-2
• Storage and compute platform for national services, e.g. for Data Lifecycle Management, Open Access Data, …
Service Take Up Overview

Information for heads of IT services mid of this year
• Ordering process and distribution model
• Tariff proposal
• Description of the service (scope, support, terms of use)
• Sample reporting (which information do IT services get from SWITCH)
Distribution model

Manager
(Billing Contact)
more than one possible per institution

Administrators
(resource allocation, quota)

• Head of IT services
• Head of department, institute

• IT service managers
• Local IT support

Virtual Machines

Storage

Software
(licenses …)

User
Ordering process from the perspective of IT services (as of 2016)

Shall SWITCHengines be offered for members at your institution?

- no
  - If members of your institution state interest in using SWITCHengines we inform you.

- yes
  - Do you take up SWITCHengines into your service portfolio?

- no
  - If members of your institution state interest in using SWITCHengines we inform you.
  - Service take up by individual organisation units will be reported to you.

- yes
  - Your institution gets a basic package. It contains a free quota.
What is the price?

Virtual CPU (Core) pro Server
Durchschnittliche Anzahl Cores pro Server.

Virtual RAM (GB) pro Server
Durchschnittliche Größe des Arbeitsspeichers pro Server.

Virtual Storage (GB) pro Server
Durchschnittlicher Storage (GB) pro Server (ohne Backup).

Server Management
Wählen Sie Ihr Management Level.

Monatliche Gesamtkosten
ab CHF 182'400.00

http://www.swisscom-cloud-computing.ch/de/konfigurator/
Tariff model (1 of 2)

Elements in the tariff for SWITCHengines

- CPU Cores
- Disk storage
- RAM
- Public IP addresses
- Software licenses

- Reporting and billing is based on the time a user books the resources (running VMs, used storage)
- Reporting is done with a granularity per day
Tariff model (2 of 2)

- Aggregation of the volumes at the billing contact
- Higher volumes, better conditions (cloud credit will be lower for high volumes)
- Initial package for IT services with free usage
- For our capacity planning we would ask for a non-binding prognosis
## Cloud Credits

<table>
<thead>
<tr>
<th>Element</th>
<th>Cloud Credits (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VM CPU per Core</td>
<td>36</td>
</tr>
<tr>
<td>VM RAM per GB</td>
<td>18</td>
</tr>
<tr>
<td>VM Disk storage per GB</td>
<td>0.5</td>
</tr>
<tr>
<td>Object storage per GB</td>
<td>0.14</td>
</tr>
<tr>
<td>Disk storage volume per 10 GB</td>
<td>1.1</td>
</tr>
<tr>
<td>Public IPv4 address</td>
<td>2</td>
</tr>
</tbody>
</table>

Costs per Cloud Credit (*current estimate*): 4 CHF
Examples with different usage profiles, 1

### Basic VM

<table>
<thead>
<tr>
<th>Elements</th>
<th>Usage over 1 year</th>
<th>Cloud credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Cores</td>
<td>2</td>
<td>2 * 36 = 72</td>
</tr>
<tr>
<td>RAM</td>
<td>2 GByte</td>
<td>2 * 18 = 36</td>
</tr>
<tr>
<td>VM Disk storage</td>
<td>20 GByte</td>
<td>20 * 0.5 = 10</td>
</tr>
<tr>
<td>Public IP addresses</td>
<td>1</td>
<td>1 * 2 = 2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>120 Cloud Credits</strong></td>
</tr>
</tbody>
</table>

### Medium Usage

<table>
<thead>
<tr>
<th>Elements</th>
<th>Usage over 1 year</th>
<th>Cloud credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Cores</td>
<td>4</td>
<td>4 * 36 = 144</td>
</tr>
<tr>
<td>RAM</td>
<td>8 GByte</td>
<td>4 * 18 = 144</td>
</tr>
<tr>
<td>VM Disk storage</td>
<td>20 GByte</td>
<td>20 * 0.5 = 10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>298 Cloud Credits</strong></td>
</tr>
</tbody>
</table>
# Examples with different usage profiles, 2

## CPU Intense

<table>
<thead>
<tr>
<th>Elements</th>
<th>Usage over 1 year</th>
<th>Cloud credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Cores</td>
<td>8</td>
<td>$8 \times 36 = 288$</td>
</tr>
<tr>
<td>RAM</td>
<td>8 GByte</td>
<td>$8 \times 18 = 144$</td>
</tr>
<tr>
<td>VM Disk storage</td>
<td>20 GByte</td>
<td>$20 \times 0.5 = 10$</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>442 Cloud Credits</strong></td>
</tr>
</tbody>
</table>

## CPU Intense for a Short Period of Time

<table>
<thead>
<tr>
<th>Elements</th>
<th>Usage over 12 days</th>
<th>Cloud credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 virtual machines “CPU intense” (same as above) for 12 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Cores</td>
<td>$30 \times 8$</td>
<td>$30 \times (8 \times 1.184) = 283$</td>
</tr>
<tr>
<td>RAM</td>
<td>$30 \times 8$ GByte</td>
<td>$30 \times (8 \times 0.592) = 142$</td>
</tr>
<tr>
<td>VM Disk storage</td>
<td>$30 \times 20$ GByte</td>
<td>$30 \times (20 \times 0.016) = 10$</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>435 Cloud Credits</strong></td>
</tr>
</tbody>
</table>

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## Examples with different usage profiles, 3

### Storage intense

<table>
<thead>
<tr>
<th>Elements</th>
<th>Usage over 1 year</th>
<th>Cloud credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Cores</td>
<td>2</td>
<td>2 * 36 = 72</td>
</tr>
<tr>
<td>RAM</td>
<td>2 GByte</td>
<td>2 * 18 = 36</td>
</tr>
<tr>
<td>VM Disk storage</td>
<td>20 GByte</td>
<td>20 * 0.5 = 10</td>
</tr>
<tr>
<td>Disk storage (volumes)</td>
<td>6 TByte</td>
<td>600 * 1.1 = 660</td>
</tr>
<tr>
<td>Public IP addresses</td>
<td>1</td>
<td>1 * 2 = 2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>780 Cloud Credits</strong></td>
</tr>
</tbody>
</table>
## Comparison with the market

Different tariff models and offerings make it very difficult to compare prices. In general, providers bill depending on the intensity of usage (network traffic, disk activity – IOPS, etc.). Predictability of the costs is hard because they depend on the usage!

### Costs (CHF) per year

<table>
<thead>
<tr>
<th>Provider</th>
<th>Small (2 Cores)</th>
<th>Medium (4 Cores)</th>
<th>Large (8 Cores)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>840</td>
<td>2'614</td>
<td>* 3'200</td>
</tr>
<tr>
<td>MS Azure</td>
<td>450</td>
<td>1'935</td>
<td>2'838</td>
</tr>
<tr>
<td>Google</td>
<td>423</td>
<td>* 1'300</td>
<td>2'252</td>
</tr>
<tr>
<td>Swisscom</td>
<td>720</td>
<td>2'808</td>
<td>2'772</td>
</tr>
<tr>
<td>CloudSigma</td>
<td>522</td>
<td>1'012</td>
<td>1'992</td>
</tr>
<tr>
<td>Exoscale</td>
<td>768</td>
<td>1'404</td>
<td>2'772</td>
</tr>
<tr>
<td>SWITCHengines</td>
<td>472</td>
<td>904</td>
<td>1'768</td>
</tr>
</tbody>
</table>

* estimate

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How do users get the service?

• Pilot phase, until end of September 2015:
  – Users contact SWITCH (see http://www.switch.ch/engines) or write an Email to engines-support@switch.ch
  – They will get an invitation URL to obtain SWITCHengines via Cloud Service Plattform
  – IT services are notified about new users within their institution (starting 1 July 2015)

• As of October 2015:
  – Availability of SWITCHengines depends on the decision of IT services
  – IT departments and other entities of institution (institutions, departments) enable the service for their users

• CUS P-2 project participants
  – directly contact SWITCH
Roadmap: SCALE-UP project

What is it?
• Collaborative project with the Swiss academic community in the CUS P-2 program
• 9 project partners with work packages, 15 letters of support

Goal
• Create academic services for research and education on cloud infrastructure

Status
• Proposal submitted in February 2015, to be approved

Duration
• August 2015 to end of 2016 (extension to 2017 pending)
Scalable Infrastructure for Cloud Services

Research in the Cloud

- Big Data Analytics
- Statistics Tools
- Scalable Database
- Scientific Datapools
- Container Technology
- Collaborative Apps

Classroom in the Cloud

- Virtual Private Cloud
- IPv6

Cloud Infrastructure
Questions and Answers

You can always contact us!

• konrad.jaggi@switch.ch
• patrik.schnellmann@switch.ch

https://www.switch.ch/engines