Cloud-bursting on SWITCH engines

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Who am I and what I do

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S3IT - Service and Support for ScienceIT: http://www.s3it.uzh.ch

Worked for more than 10 years in enabling large scale scientific applications.
Why UZH/S3IT started to look at SWITCH engines.
What use cases did we consider.
How did we do it.
Important/critical requirements.
How do we plan to use SWITCH cloud in future.
Why UZH/S3IT started to look at SWITCH engines

Lack of in-house computational capacity.

Upgrading in-house cloud infrastructure (Hobbes).

http://www.s3it.uzh.ch/infrastructure/sciencecloud

Need to satisfy peak requests from end-users.

Lot of usecases are computing intensive but can be scaled on a loosely coupled infrastructure.
What usecases did we consider

Biochemistry

Business

Geography
What usecases did we consider

Biochemistry

- Docking Ligands to Proteins with rDock.
- 100 - 200 ligands files to dock.
- Data size negligible.
- On SWITCH cloud: 86 cores x 5 days.

Business

Geography
What usecases did we consider

Biochemistry

Business

- Process social network data through Natural Language Processing tools (Stanford NLP tool).
- 20M entries to be processed.
- Data size negligible.
- Data can be processed independently.
- On SWITCH cloud: 100 cores x 5 days.

Geography
What usecases did we consider

Biochemistry

Business

Geography

- Process GPS data.
- 1 RData file to be split in grid regions.
- Each execution analyses 1 grid area.
- Grids processed independently.
- 50 grids to be processed.
- Data size negligible.
- On SWITCH cloud: 50 cores x 2 days.
How we did it: Bursting from Hobbes

Migrate or re-create reference images

Re-create same resource configuration: VMs and data volumes

Adapt workflows
How we did it: Bursting from Hobbes

Migrate or re-create reference images

- **glance tools** to copy existing images.
- **Ansible playbooks** to re-create images from vanilla Linux.

Re-create same resource configuration: VMs and data volumes

Adapt workflows
How we did it: Bursting from Hobbes

Migrate or re-create reference images

Re-create same resource configuration: VMs and data volumes

- elasticluster for creating dedicated SLURM clusters.
- Ansible playbooks underneath.

Adapt workflows
How we did it: Bursting from Hobbes

Migrate or re-create reference images

Re-create same resource configuration: VMs and data volumes

Adapt workflows

- GC3Pie: https://code.google.com/p/gc3pie/
- Can distribute workload on multiple resources.
- Simple change in configuration file on client side.
How we did it: Bursting from Hobbes

SLURM cluster

**elasticcluster**

API

UZH/Hobbes

SLURM cluster

**elasticcluster**

API

S3IT: Service and Support for Science IT

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Important/critical requirements

IaaS API compatibility (OpenStack and/or EC2).

Using existing tools seamlessly.

Use same/similar procedures for creating images, volumes and networks.

Fast allocation of bulk of resources.
Future perspectives

Server hosting: need to have clear SLAs and guaranteed uptime.

Continue in cloud bursting - data transfer is the next question.

Educational purposes - training classes and/or MOOCs (e.g. edx).