Hobbes:
the University of Zurich's
IaaS cloud

Sergio Maffioletti
S3IT: Service and Support for ScienceIT,
University of Zurich

why is the University of Zurich
investing in IaaS ?

Today's computational research needs

Requirements from research groups are variegated. They need more and more integrated services and not a collection of individual infrastructure.

- A computational cluster is only one of the services that needs to be provided.
- Need of specialized resources
- Need to integrate local storage
- Need to access Windows based resources
- Need to attach computational and storage resources to specific instrument

Let's have few examples of what we have to deal with

– Dedicated processing server: users creates their own customized processing services for their specific data analysis. (like a supersized version of their workstation)

– Customized environments: users can deploy and configure their own applications and all sort of tools they might require (e.g. mysql database).

– Community tools: users wish to reuse tools tailored for their research but developed for specific platforms (e.g. Hadoop, Shark, etc.).

Let's have few examples of what we have to deal with

– Interactive Windows: some image processing tools are only available in Windows and require interactive access.

– Reuse existing pipelines: users wish to re-use existing pipelines written for a specific batch-system (e.g. SGE, condor) or a specific type of resource (e.g. CentOS 5.3).

– Scale from application level: run Matlab mDCE or parallel R or iPython cluster.

the Research Infrastructure provider point of view

- – Accommodate all of these needs (and there are much more) is complicated.
- – I wish they could all be supported with a single infrastructure.

the UZH IaaS Hobbes

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

OpenStack-based IaaS solution, specifically targeted to address large scale computational research.

The main research infrastructure instrument available for the whole university.

Cloud @ UZH

October 2012	first prototype installation
March 2013	testbed open to academic users (co-dename: Hobbes)
Mar-Dec 2013	used as High-Throughput data analysis system

    – 94 users (on average 70% active)

    – 40 different research groups (30 internal 10 external)

October 2013	Increased capacity (860 cores and 3.2TB RAM)
January 2014	Enter production stage

Hardware specs

Veeery heterogeneous hardware...

Q.ty	Model	CPU	RAM
17x	Dell PE1955	2x Quad-core	8GB
12x	Dell M605	2x Quad-core	16GB
10x	Dell M600	2x Quad-core	16GB
12x	Dalco Servers	2x Quad-Core	32GB
14x	Dell M620	2x Eight-core	128GB
1x	SGI UV100	8x Six-core	512GB

Hobbes helps us provide user support

Application level integration

- Matlab mDCE supported through automated tools: elasticluster
- Easily accommodate existing workloads.
- No longer need batch-processing system if not required: gc3pie
- Provide support at application integration level.

Hobbes helps us provide user support

Build support infrastructure

- Dedicated processing server: User can create their own instances, attach their own volumes and run their own processing service.

- Customized environments and Community tools: Users can evaluate all sort of platforms and/or existing community solutions.

- Possibility of accessing commercial providers

- Possibility of supporting usecases already running on commercial providers.

What next

- – Fall 2014: Public procurement published for further expand Hobbes
- – Q1 2015: Integrate existing Hobbes with purchased system and re-purposed nodes from Schroedinger
- – This should lead to a 100TFlop cloud system.
- – http://www.s3it.uzh.ch/infrastructure/hobbes.

Thank you for your attention!

Software specs

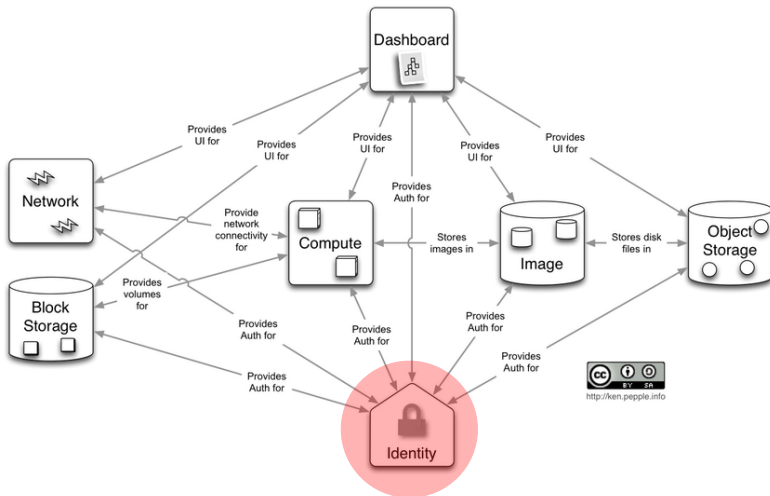(Folsom) IaaS cloud infrastructure

deployment and configuration manager
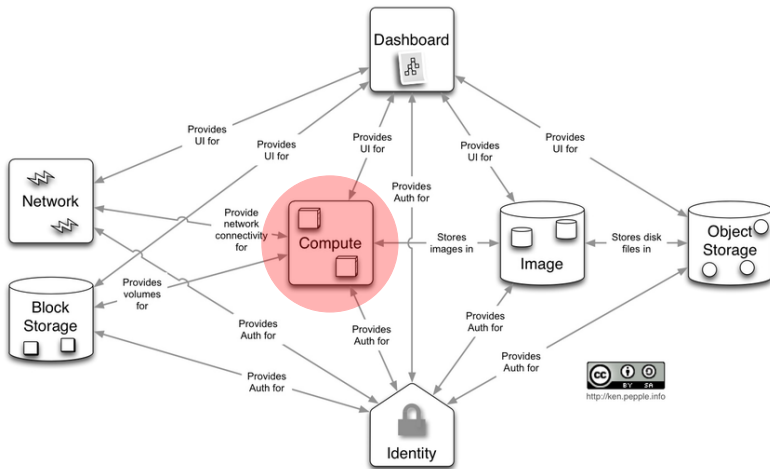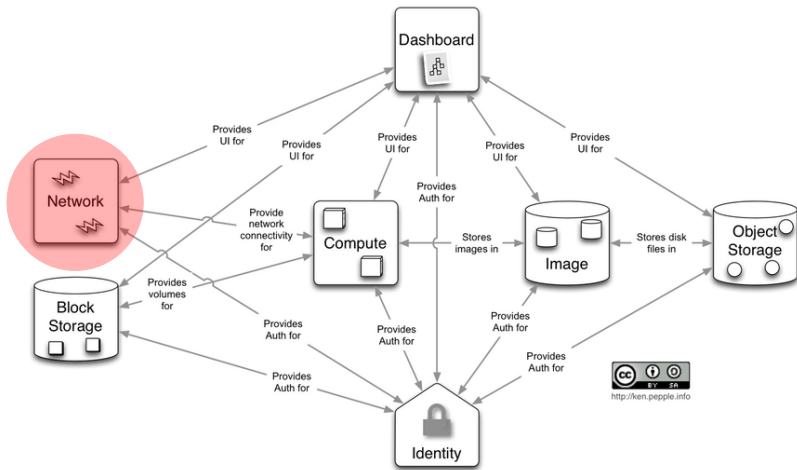
12.04 as base system

OpenStack logical view
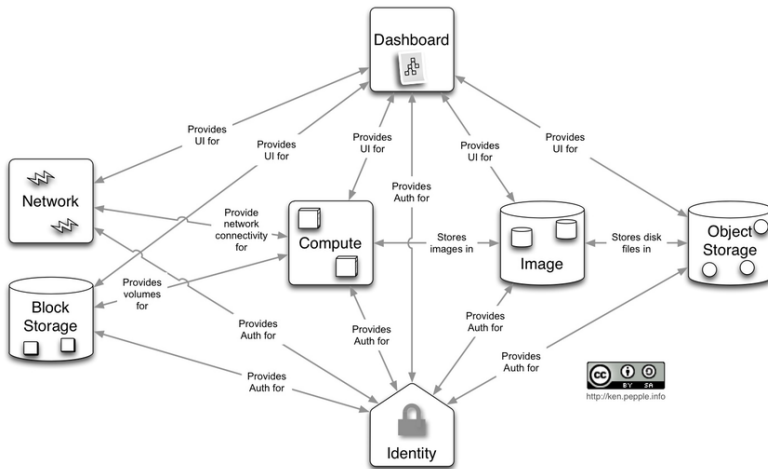
OpenStack logical view

Keystone provides the authentication service
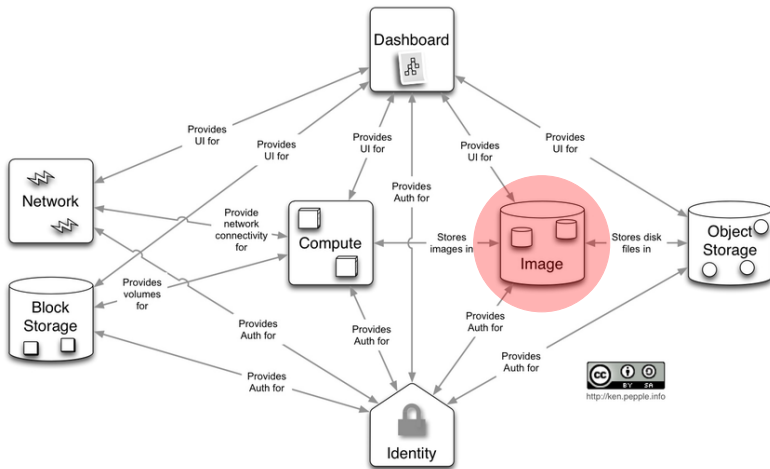
OpenStack logical view

Nova provides computational services

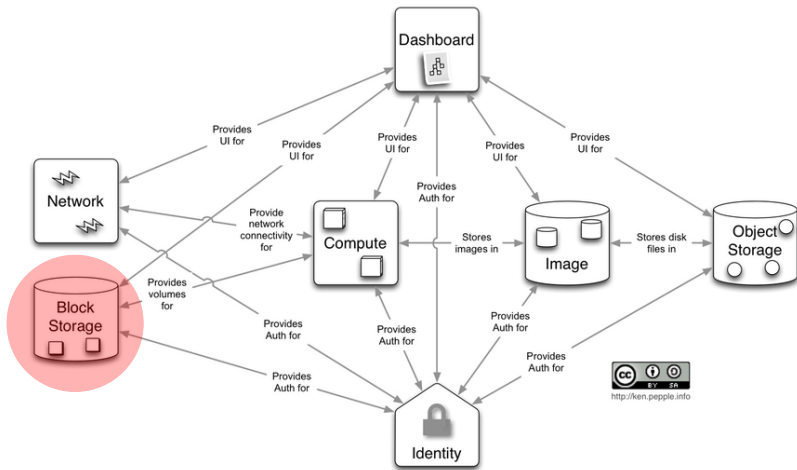# OpenStack logical view

Neutron provides network services

OpenStack logical view
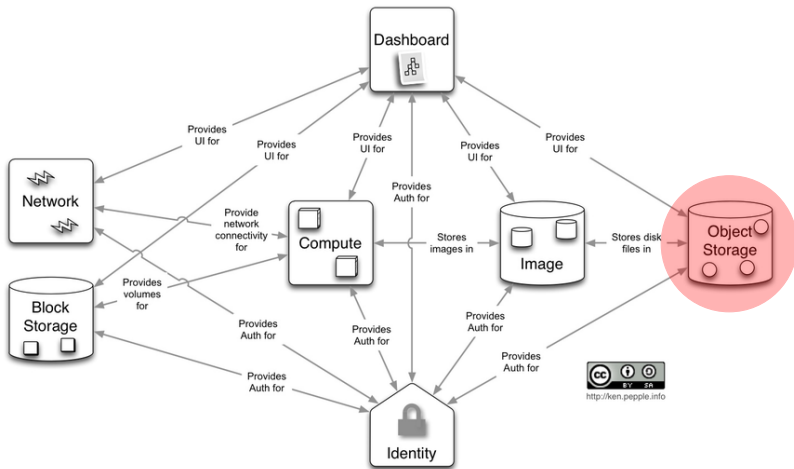

Glance provides image store
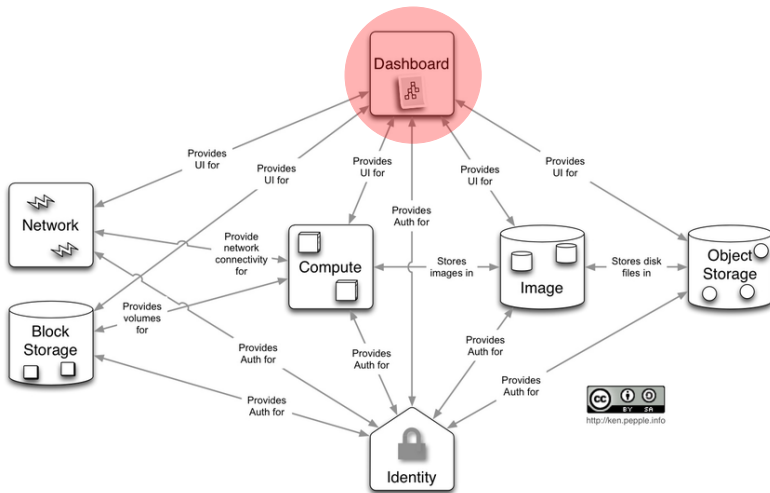
OpenStack logical view

Cinder provides block persistent store

OpenStack logical view

Swift provides object persistent store

OpenStack logical view

Horizon provides web user interface