

Deployment of Cloud stacks on Grid'5000

Lucas Nussbaum
lucas.nussbaum@loria.fr



Motivations

- ▶ Grid'5000:
 - ◆ 502 active users over the last year, 2762 overall
 - ◆ Mostly Computer Science researchers
 - ◆ Mostly doing research in Clouds, HPC, Big Data
- ▶ Many users need to **deploy Cloud stacks** for their experiments
 - ◆ Typical experiment: compare vanilla vs customized OpenStack
 - ◆ Testbeds should factor this into standard tool or *appliances*
- ▶ Challenging, because:
 - ◆ Cloud stacks are **complex beasts**
 - ◆ **Short release cycles** (6 months) vs staying up-to-date
 - ◆ Need a **low entry barrier** (for tutorials etc.)
 - ◆ Need **support for customization**
 - ◆ Need to **scale** (many-nodes experiments)

Historical efforts

- ▶ Grid'5000 school, **June 2011**: tutorial about Nimbus and OpenNebula (custom-made scripts)
- ▶ **April 2012**: workshop about *IaaS on Grid'5000*
 - ◆ One solution for OpenStack (custom-made script)
 - ◆ Three solutions for OpenNebula (two using Ruby+Chef, one unspecified)
- ▶ Grid'5000 school, **December 2012**, tutorials:
 - ◆ Nimbus, OpenNebula and Cloudstack (*engines* for an orchestration tool, g5k-campaign)
 - ◆ OpenStack (using PuppetLabs' OpenStack modules + script)
 - ★ Maintained until Grizzly (2013.1)
 - ★ **2014**: Attempts to port it to IceHouse (2014.1) by the technical team, additional problems with Neutron (required 3 NICs)

Current solution

- ▶ **2015: Users survey:** 10 different ways to deploy OpenStack on Grid'5000 (various versions, various tools)
 - ◆ Most promising user solution made *official*
 - ★ Core: **OpenStack's official Puppet modules**
 - ★ Instantiated on an basic Ubuntu 14.04 image
 - ★ Orchestration using Rake (\approx Ruby's make)
 - ★ 😊 Liberty and Mitaka supported (complexity in Puppet modules)
 - ★ 😊 Easy to customize (already received users contributions)
 - ★ 😞 Slow to deploy (\approx 30 mins, inc. resources reservation)
- ▶ Related work:
 - ◆ **CloudLab:** One image per node type, Python + bash scripts for setup, Liberty supported, no customization instructions
 - ◆ **Chameleon:** DevStack-based single node deployment, Mitaka supported

Future challenges

- ▶ **Reduce bootstrap time**
 - ◆ Prepared images? Tradeoff with reproducibility, maintenance effort?
- ▶ **Cost of populating datastores** (VM image repositories, object stores)
 - ◆ Use managed datastores (permanent, testbed-provided)?
 - ★ Tradeoff with reproducibility?
 - ◆ Better strategies for data import?
- ▶ **Extend approach to other frameworks** (e.g. Big Data framework)