BACKGROUND
Switzerland contributes with up to 4% of the ATLAS T2 CPU capacity with four standard linux clusters. We investigate usage of HPC Crays and academic cloud resources for more compute for same money. Since 2015 the Swiss National Research and Education Network (NREN) offers hours on an OpenStack infrastructure for academic usage. Since 2016 ATLAS runs on the infrastructure.

IaaS
SWITCHengines ([www.switch.ch/engines](http://www.switch.ch/engines)) is an infrastructure as a Service (IaaS) based on OpenStack. In 2016 ATLAS has access to testbed quota with 304 logical cores on Intel x86_64, 2 GB RAM and 2.5 GB disk per core, and ethernet interconnect.

CLUSTER
The Elasticluster software ([http://elasticluster.readthedocs.io/](http://elasticluster.readthedocs.io/)) developed and maintained at the University of Zurich is used for setting up and resizing a SLURM cluster with CentOS nodes. This SW runs on a separate manage-ment node. With a minimal configuration, basically telling number of nodes, flavour of nodes, and image, it fires up a 300 nodes cluster on the IaaS within 30 minutes.

GRID INTEGRATION
A remote Advanced Resource Connector Computing Element (ARC CE) is integrated within the ATLAS production system. The node ARC CE node mounts the SLURM head node via sshfs. Wrapper scripts for the ARC CE back-end, formerly written and used by University of Bern to integrate HPC, are used for job submission and monitoring via ssh (Figure 1 and 2).

PERFORMANCE
Running MC simulation only, the ATLAS accounted CPU time relative to the IaaS accounted PAY time is up to 90% (Figure 3). For comparison, relative to quota time this is up to 75%, on average lower.

PRICES
In 2016 regular price ([www.switch.ch/engines](http://www.switch.ch/engines)) for 1000 cores with 2GB RAM per core is 73 kCHF p.a. This is comparable to prices from other academic providers.

CONCLUSIONS
- Cloud compute cluster is very convenient: Setup in half a day.
- Full elasticity may give about 40% gain relative to quota.
- Cost is competitive with other outsourcing options.