

PA200 -- Project #3

Using COMPSs with MetaCloud

Description

This PA200 project should motivate students to explore scientific computing tools in a dynamic cloud-based environment. It aims to give them a brief introduction into resource provisioning, basic automation tools and techniques, including containerized application deployment. Students are not expected to have in-depth knowledge in any specific scientific discipline or experience with any specific scientific computing tools or frameworks. For demonstration purposes, the COMPSs (COMP Superscalar) programming model, runtime and task examples are used. Each student is expected to utilize the resources provided by MetaCentrum's MetaCloud HPC cloud infrastructure to provision and use a non-trivial (≥ 3) number of virtual machines in an automated fashion.

Teacher's Input

- Problem description
- MetaCloud (OpenNebula) description
- Docker description (Dockerfiles, DockerHub)
- Necessary documentation and helpful links
- Access to MetaCloud (GUI & OCA)

Student's Output

- COMPSs Dockerfile
- Container usage documentation
- Provisioning mechanism description (script, recipe, application)
- Proof of a successful testing run (job execution)

Evaluation

- 8 pts for COMPSs containerization (Dockerfile)
- 2 pts for documented container usage (deployment + configuration)
- 8 pts for automation (deployment + provisioning + configuration + job execution)
- 2 pts for proof of a successful job execution

Up to 5 bonus points may be awarded to students with novel solutions.

Resources, Guides, References

[1]

<http://www.bsc.es/computer-sciences/grid-computing/comp-superscalar/downloads-and-documentation>

[2]

<https://compss.bsc.es/projects/bar/wiki/Applications>

[3]

<https://docs.docker.com/engine/userguide/intro/>

[4]

<https://docs.docker.com/machine/overview/>

[5]

<https://gist.github.com/arax/8c331d1c2c229bf01e2c>