Using INDIGO DataCloud Services for Building Medical Imaging Processing Infrastructures

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The problem

Medical Imaging Biomarkers - a quantitative analysis of specific physical properties by applying computational methods to medical images - is revealing as a highly effective and harmless procedure for supporting clinical diagnosis and therapy follow-up. The EuroBiomaging Node of Valencia Region (BIM-CV) is developing a use case on top of the INDIGO DataCloud Platform for the analysis of Osteoporotic data by using Deep Learning to extract the Regions of Interest from the Images.

Requirements

• Persistent Storage in the form of POSIX volumes that can be mounted remotely.
• Privacy and security. Data volumes must be available only to users provided of an access credential. IAM and OneData provider can address this requirement.
• User customised software. The capability of defining their own software configuration has been traditionally one of the main hurdles in scientific clouds. A simple mechanism to define the software to be installed, including user-defined software, is needed. This can be achieved through the use of recipes, roles and automated build of containers that is supported in the Mesos cluster and the Infrastructure Manager TOSCA recipes.
• Efficient execution. Projects may require resources or have external resources available, and the applications should work seamlessly. Automatic elasticity is taken for granted.

Procedure

1. Upload of images and IPR-protected software on a OneData volume.
2. Specification of the dependencies as Ansible Yaml and application topologies as TOSCA documents.
3. Deployment of an elastic cluster where VMs mount the ONEData volume.
4. Execution of jobs in the SLURM queue embedded on containers that mount locally the shared volume and run the biomarker job.

Benefits

• INDIGO-DC offers BIMCV
  • Availability of an efficient batch queue.
  • Convenient & secure access to Remote Volumes accessible through POSIX.
  • Convenient integration of user-specific code, including IPR restrictions.
  • Availability of a comprehensive endpoint to interact with.
  • Single sign-on, integrated deployment, QoS.
  • It constitutes the access model and application delivery pattern for the BIM-CV node.
• Despite that EUBIOSTEO use case is tailored for Medical Imaging, it shares many general requirements with most of the applications.

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