Compute Infrastructure for ELIXIR-ES/INB

ELIXIR-ES node integrates a new cloud platform service into the ELIXIR Compute Platform.

The new infrastructure, called **STARLIFE**, is hosted at the Barcelona Supercomputing Center (BSC) and it is mean to provide support for high performance computing (HPC) applications as well as cloud-based services. STARLIFE accounts for 2,640 cores with a total of 7.5PB of storage - 2PB on shared disk, 1PB of storage for fast data retrieval, and 4.5 PB on tape. Part of these resources are going to be dedicated to the European Genome-phenome Archive (EGA), while others are going to be offered as a PaaS-like (Platform as a Service) for the ELIXIR-ES Compute platform.

Users
- ✓ Collaborative research
- ✓ Devops

Open to European and National projects given a positive evaluation by scientific committee

Gateway
- ✓ Authentication
- ✓ App customization

Auth Server — elixir IDP SPAIN

REST

Web

Centralized authentication and authorization management (view poster #23)

PaaS
- ✓ Orchestration
- ✓ Image repository
- ✓ Provisioning

App Repositories

PMES

COMPSs

Occi

SGE

oneflow

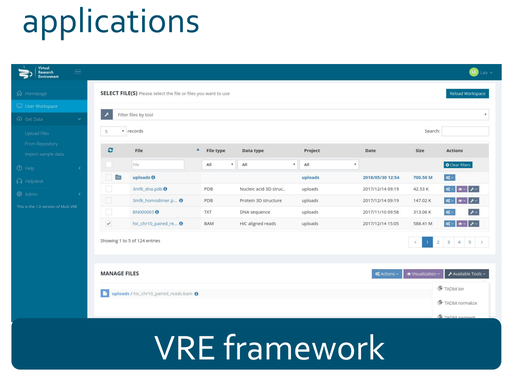
HPC

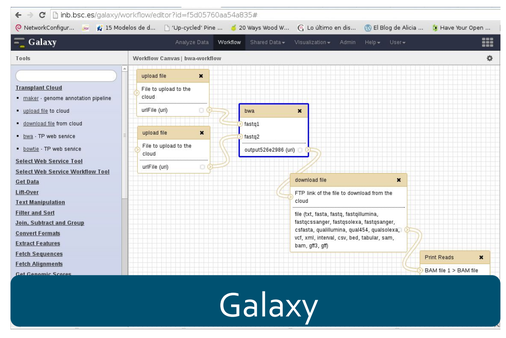
User Data

Repositories

EUROPEAN GENOME-PHENOME ARCHIVE

Customizable web interfaces are offered for pre-packaged applications





Cloud ware
- ✓ Resources
- ✓ Apps virtualized & containerized

OpenNebula

App

docker

HPC
- ✓ Marenostrum

Data services
- ✓ Storage
- ✓ FAIR data

OpenNebula is the chosen cloud middleware, yet the PaaS is compatible with OCCI[1] (Open Cloud Computing Interface) compliance clouds, like OpenStack or AWS.

ELIXIR-ES dedicated resources
8x Intel Xeon Gold 6138 40 cores / 160 GB RAM
4x Intel Xeon Gold 6138 40 cores / 320 GB RAM
480 cores 2,5 TB RAM ~ 4.3 Millions CPU/hour year

The infrastructure is going to support both, long running services and the automatic deployment of pre-packaged applications. These customized compute-on-demand applications are going to be banked on a repository of images or containerized applications.

- Virtual machines are going to be deployed on the underlying OpenNebula cloud via the OCCI[1] standards.
- PMES[2] is responsible of the automatic application deployment, managing the cloud provisioning and providing scaling capabilities to the system.
- For those applications decorated with pyCOMPSs[3], workflow tasks are going to be transparently orchestrated in multiple hosts in a parallel way.

ELIXIR relying services like a EGA-external cloud are going to be included in the services catalog.

EGA dedicated resources
18x Intel Xeon Gold 6138 40 cores / 160 GB RAM
4.5 PB storage
720 cores 2,8 TB RAM ~ 6.3Millions CPU/hour year.

1. OCCI - Open Cloud Computing Interface
2. PMES - Programming Model Enactment Service
3. COMPS Superscalar

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