GLENNA2 – The Nordic Cloud

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NORDIC E-INFRASTRUCTURE COLLABORATION

GLENNA

The goal of the project is to share knowledge and set best practices on managing cloud services and <u>to create a Nordic federated cloud service</u>, driven by the need of the Nordic researchers.

Glenna2 Project Structure: the Four Aims

1. Supporting national cloud initiatives to **sustain affordable IaaS** cloud resources.

2. Establish an internationally leading collaboration on **data-intensive computing** on the above national infrastructure.

3. Leveraging the pooled competency for assessing future **hybrid cloud technology.**

4. Supporting use of resources by pooling national cloud **application expert support** and create a Nordic support channel for cloud and big data.

Glenna Cloud Platforms and Services

Infrastructure as a Service (IaaS)
CSC - Finland, SNIC - Sweden, Uninett
Sigma2 - Norway

IaaS Cloud Data: data.deic.dk
DeIC Denmark
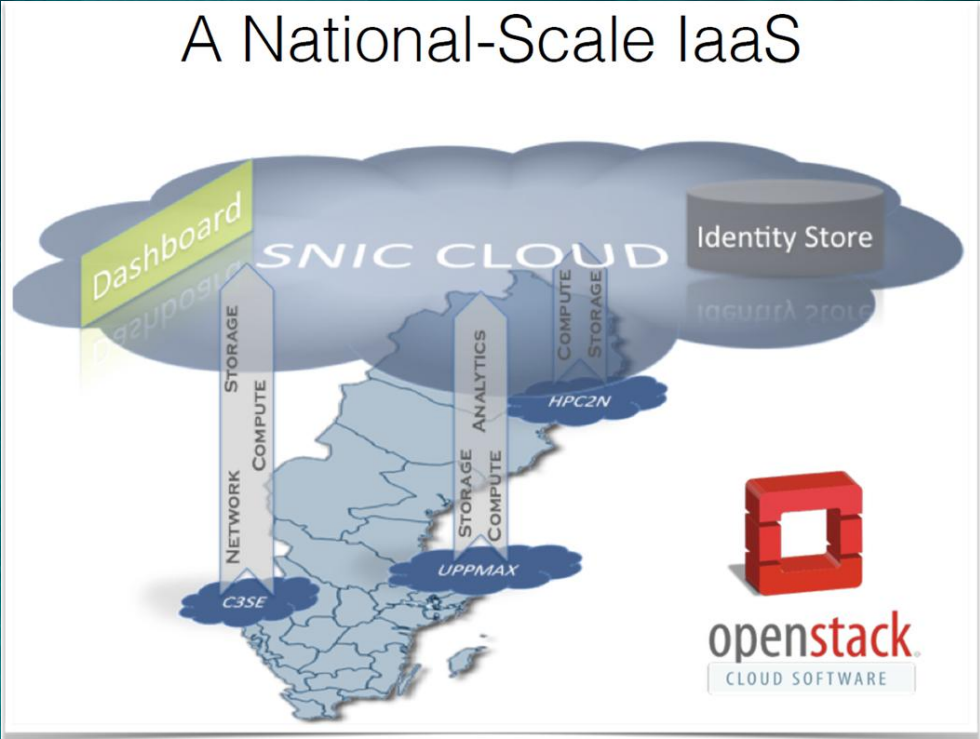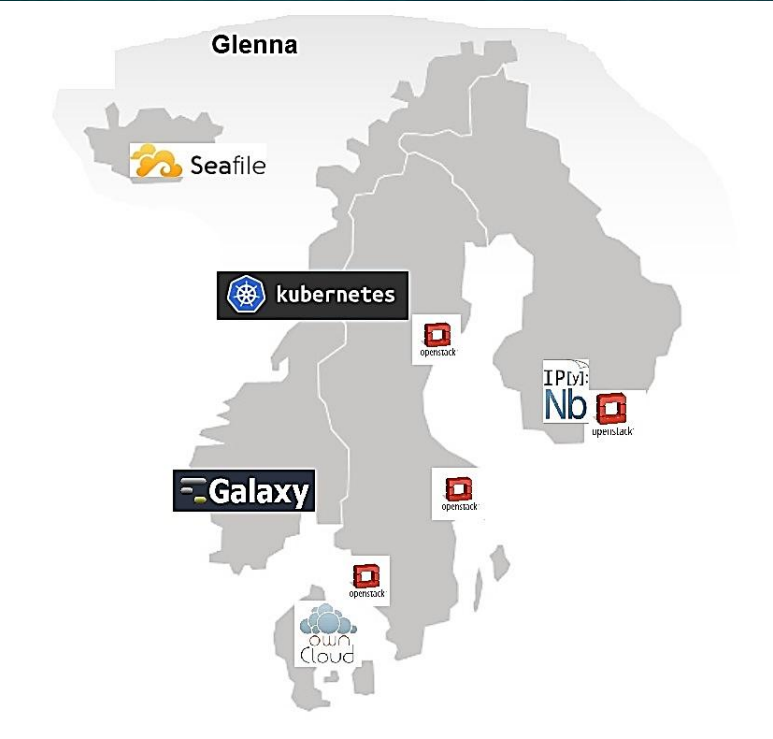University of Iceland: Geymsla.hi.is

Software as a Service (SaaS):
Lifeportal UiO Norway

Containers as a Service (CaaS):
Uninett Norway
Rahti Container Cloud CSC Finland

The Glenna Environment

Cloud Applications

The Aim2 team has collaborated on building user application stores (UNINETT/Sigma2 APPstore, Blueprints CSC) with ability to deploy applications across Kubernetes instances such as environments for Tensorflow and Spark leveraging the Dataporten service. This task has also included implementing Red Hat's OpenShift environment and the Rahti service (CSC) is now in pre-production.
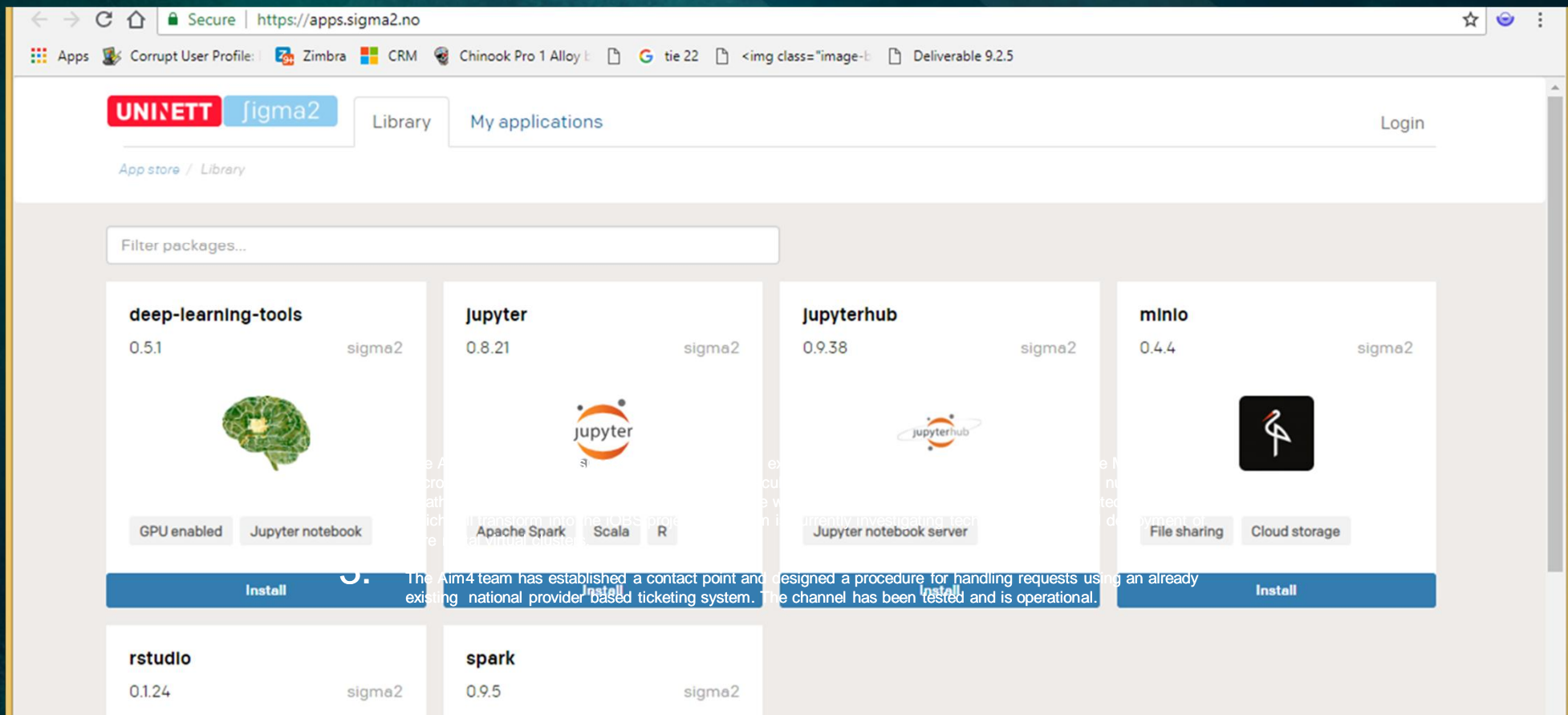
The UNINETT Sigma2 APPstore – NIRD Toolkit

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NWP in the Cloud

The Aim3 team has has successfully compiled and executed concurrent MPI based HPC jobs in the MPI enabled Microsoft Azure cloud.

The Harmonie AROME numerical weather prediction code have been configured and tested with Azure HPC. The work is an achievement connected to the Glenna2 Meteo use case which will transform into the iOBS project.

The Aim4 team has established a contact point and designed a procedure for handling requests using an already existing national provider based ticketing system. The channel has been tested and is operational.

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Glenna Use Cases: Harmonie MUSC

- **HARMONIE is a collaborative NWP development of many European countries, including all Nordic countries**

- **HARMONIE MUSC = single-column version of HARMONIE**

- **widely used R&D tool in meteorological institute and collaborative universities**

Benefits:

- **much improved overall performance in the installation and configuration as a cloud image** => more time on actual research

- **no platform induced differences** => inter-comparison between different user experiments straightforward

- **input data sets available into the cloud storage** => no tedious data transfers

- **pave the way towards an open science type of use of the HARMONIE system** => growing need due to emerging open NWP data in Nordics

    => way to improve the whole HARMONIE system
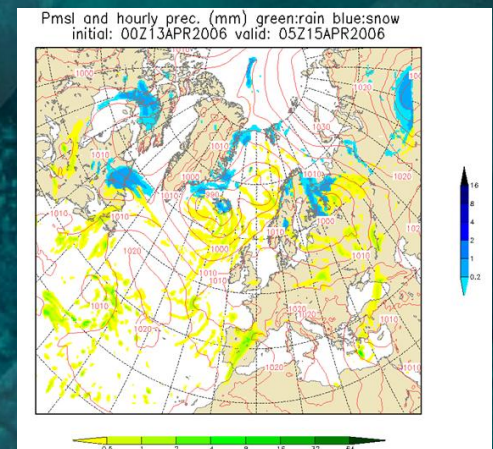
Computational Metabolomics Use Case
Pharmaceutical Bioinformatics Uppsala University

1. KubeNow platform: containerize tools and orchestrate microservices with workflow systems on top of Kubernetes.
2. In terms of cloud technology, a very strong use case within Glenna2.

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PhenoMeNal Approach & Use Case Achievement

- Achievement: enable users to deploy their own virtual infrastructure on a national or community IaaS provider, in the Glenna2 case: a Nordic national IaaS provider.

- Tested for SSC (SNIC Science Cloud) and cPouta (CSC) IaaS clouds.

- The KubeNow approach will work even more efficiently on the new container clouds at UNINETT and CSC.

- KubeNow can be used in Estonian biodiversity portal PlutoF use case in INFRAEOSC b) for running jobs in Nordic clouds.

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In Preparation for EOSC and EOSC-Nordic

The EOSC-hub will deliver a catalogue of services, software and data from the EGI Federation, EUDAT CDI, INDIGO-DataCloud and major research e-Infrastructures. The project has a large number of partners, including CSC, DeIC, SNIC and UNINETT Sigma2.