EOSC Compute Platform

Status and Way Forward

Smitesh Jain, Innovation Management Specialist, EGI Foundation

Giuseppe La Rocca, Community Support Lead at the EGI Foundation

Christian Pagé, Research Engineer and Project Management, CERFACS

József Kovács, Senior Research Fellow, SZTAKI

Hakan Bayındır, Senior Researcher, TUBITAK ULAKBIM

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Outline of this session

- **Project overview**
  - Smitesh Jain, Innovation Management Specialist, EGI Foundation
- **User engagement and impact**
  - Giuseppe La Rocca, Community Support Lead, EGI Foundation
- **User experience stories:**
  - *Building a Climate indices dataset for climate change impacts assessment*
    - Chrisitan Pagé Research Engineer and Project Management, CERFACS
  - *Bring-your-own-resources: How the NEANIAS project became compatible with EGI computing services and introduced a new resource utilization approach*
    - Jozsef Kovacs, Senior Research Fellow, SZTAKI
- **HPC services in the EOSC Compute Platform**
    - Hakan Bayındır, Senior Researcher, TUBITAK ULAKBIM

Bring-your-own-resources: How the NEANIAS project became compatible with EGI computing services and introduced a new resource utilization approach.

Presenter:

- Dr. József Kovács (SZTAKI)

Co-Authors:

- Dr. Nikos Chondros (NKUA)
- Prof. Mema Roussopoulou (NKUA)
- Eleni Petra (NKUA)
- Dr. József Kovács (SZTAKI)

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NEANIAS Project Overview

- ✓ Call: INFRAEOSC-02-2019,
  Project ID: 863448
- ✓ Duration: 36 months
- ✓ 21 partners, 10 countries
- ✓ **Produced 14 EOSC Services!**

NEANIAS

Novel EOSC Services for Emerging Atmosphere, Underwater & Space Challenges

NEANIAS Project Goals

To provide Sustainable Innovative Services to the Research Communities

- Address community-specific needs for underwater, atmosphere and space research sectors
- Onboard communities to the Open Science, EOSC and interdisciplinary research era
- Nurture new business opportunities
- Power-up EOSC

NEANIAS Before EGI ACE

- Most of the services deployed at GARR, using:
  - OpenStack
  - Private Kubernetes Cluster (managed by us)
- Pros
  - Our service providers (mostly coming outside CS) were introduced to contemporary “cloud” technologies in a controlled environment
- Cons:
  - Tightly coupled to a single infrastructure
  - Limited resources
  - No GPU availability

NEANIAS and EGI ACE

- NEANIAS was accepted at EGI ACE Q1 2022
- Hosting organization: CESNET
- Resources offered as:
  - OpenStack with GPUs
  - Shared Kubernetes cluster, managed by CESNET

How NEANIAS utilized these resources

- Deployed Horovod (for machine learning workloads) at OpenStack, utilizing GPUs and gaining significant performance improvements
- Deployed Spark-ML at the managed K8s cluster, again with GPU access for performance gains
- But also, allowed a series of service providers to become compatible with the managed k8s offering
  - This is a new model for EGI, and NEANIAS was one of the first projects to validate it
  - Allowed our service providers to understand the differences, restrictions or gains, and prepare for moving around EGI members

Bring your own resources: why?

- No matter where a (thematic) EOSC service is deployed, can it serve all of Europe from a single service provider?
- What if the service scales with its input (e.g. RAM): can the service provider prepare for any possible input?
- Shouldn’t the burdain be on the service consumer to allocate any specialized resources?

Bring your own resources: how

- What we tested at NEANIAS was the following:
  - Assume a service deployed in a “host” K8s cluster that normally submits k8s Jobs to the same cluster based on user input (e.g., an input file)
    - These jobs are the “heavy” “scientific” computation
  - Allow the user to pass a kubeconfig file for an alien cluster, along with her request for computation
  - In this case, submit the job to this alien cluster
    - Maintaining log aggregation/accounting info (using sidecar containers)
    - Maintaining U/I feedback

Bring your own resources: pros and cons

- What we gain
  - The burdain is now on the service consumer to allocate the needed resources for her computation
  - At its extreme, this can minimize costs for a (thematic) service, that only needs to cater for its web interface resources
- What we lose
  - Control. Now the service's code is running in a different environment.
  - What about support?
- Model was successfully validated but not in production use yet.
  - For open-source services, things are simple and straightforward
  - There are, however, security concerns for not fully open-sources cases.

Issues addressed

- CESNET was VERY helpful in resolving issues (Thank You!)
  - Wrote code to resolve technology stack differences (log aggregation)
  - Provided a storage provider that allows to mount WebDAV resources
  - Introduced Rancher “projects” to allow privacy between our service providers
    - Without this feature, our service providers lacked isolation and did not trust the platform

Conclusions

- What NEANIAS gained
  - Now we are better prepared to move around clouds between EGI members
  - Our ML workloads are now more performant because of GPUs
- Our suggestions
  - EGI to work on authorization integration between EGI Check-in and both OpenStack and the managed k8s offerings
  - Dissemination of the managed k8s offering, because for many reasons, we strongly believe this is the future.
  - Strong technology compatibility across EGI members, to assist services to “move” around with minimal friction.

Experiences and the Future of the EOSC Compute Platform

Smitesh Jain, Innovation Management Specialist, EGI Foundation

Tiziana Ferrari, Director, EGI Foundation

Christian Pagé, Research Engineer and Project Management, CERFACS

József Kovács, Senior Research Fellow, SZTAKI

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Thank you!

Contact: **egi-ace-po@mailman.egi.eu**
Website: **www.egi.eu/projects/egi-ace**

EGI Foundation

@EGI_eInfra

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