

## EUROCC - Report on the Twinning and Mentoring Activities – Analytic Report

The Greek and North Macedonian National Competence Centers have twinned within the framework of HPC EuroCC project. The scope of the twinning activities was to exchange important and valuable experiences concerning public awareness, knowledge transfer on high-performance computing from academia to industry and specific use-cases where high-performance computations were required by industrial partners.

Mentoring and twinning activities were realised amongst the EuroCC@Greece and EuroCC@North Macedonia Competence Centers.

## **<u>1. GRNET – UKIM Mentoring</u>**

The mentoring of NCC@Greece, GRNET, to NCC@North Macedonia, UKIM, was realized on the 22-24.11.2022. The mentor from GRNET was Dimitris Delis while the involved people from UKIM were Kiril Kjiroski and Vladislav Bidikov. The areas of provided support were the following:

- Existing system (ARIS), short description
- Description of operation issues and procedures
- User support procedures, allocation of resources, accounting, monitoring.
- Plans for the new infrastructure Daedalus
- GRNET academic network short description

In the following, a short description of the most notable ideas and organizational solutions implemented by GRNET is provided:

a) All resources are pooled and distributed in an organized manner, i.e., by using "Call for projects" every 6 months, which help in capacity planning, as well as making decisions on scientific justification and realistic technical needs of accepted projects.

b) The documentation of ARIS (user support) can be found in <u>https://doc.aris.grnet.gr/</u>. In the documentation the user information and support include amongst others the system information (hardware and storage), instructions concerning the login and the data transfer, the user environment and the jobs running in ARIS.

c) The eligibility conditions on the HPC portal (<u>https://hpc.grnet.gr</u>) as well as the production projects (up to 80% of ARIS), development projects and preparatory projects and trainings. Concerning production projects proposals, the applicants need to provide data, size of the problem, performance of the code.

d) The resources management concerning data and how the backup procedures are conducted.

e) The best practices implemented by GRNET concerning the management and maintenance of HPC resources:



- GPGPU usage not only important to utilize GPGPU in percentage, but also to utilize power consumption. Not consuming appropriate level of power indicates GPU cores waiting for IO.
- Implementation of resource monitoring (Ganglia).
- Accounting is made in cpu-hours, on top of slurm, and requires appropriate slurm configuration.
- Slurm should use database accounting.
- Teams and projects producing scientific paper, need to mention project acronym and project ID in the call.
- Umgmt.grnet.gr system for keeping project applications, statuses, references, project IDs, etc.
- Distributed file systems using BeeGFS or GPFS.
- All teams and projects applying to the calls must adhere to HPC Acceptable Usage Policy and Terms Of Use.

## 2. AUTH – UKIM Twinning

The twinning activities between Aristotle University of Thessaloniki (AUTH) and the Faculty of Computer Science and Engineering of the Ss. Cyril and Methodius University (UKIM) took place on the 14.-15.11.2022 (UKIM visit to AUTH) and 23.-24.11.2022 (AUTH visit to UKIM). From the AUTH side the people involved were Paschalis Korosoglou, Vasileios Asteriou, Pavlos Sermpezis, Hara Charalambous, Stamelos Ioannis and Athena Vakali, while from the UKIM side Boro Jakimovski, Petre Lameski, Sonja Filiposka, Riste Stojanov and Vojdan Kjorveziroski.

During those meetings discussions were made and experiences were exchanged about the implementation of the EuroCC and in particular concerning the public awareness and usecases with industry and academia. Furthermore, it was discussed the law limitations in each country regarding fostering collaboration and what the universities can do to collaborate with industry. Additional discussions were done on the possibility for joint project proposals. The Faculty Dean from UKIM also participated in the meetings between AUTH and UKIM.

The participants from the two Universities exchanged experience about the management of HPC resources within the University and the access for academia and industry as well as previous experience on the collaboration with industry and the relevant difficulties when approaching industry. Finally, discussions were performed concerning products used for HPC and models of collaboration in academia.

## 3. NTUA – UKIM Twinning

The twinning activities between National Technical University of Athens (NTUA) and the Faculty of Computer Science and Engineering of the Ss. Cyril and Methodius University (UKIM) took place on the 22.-24.11.2022 (NTUA visit to UKIM) and 29.11-01.12.2022 (UKIM visit to NTUA). From the NTUA side the people involved were Dionisios Pnevmatikatos, Ioannis Aviziotis, Dimitris Theodoropoulos and Kyriakos Giannakoglou, while from the UKIM side Sonja Filiposka, Anastas Mishev, Boro Jakimovski, Riste Stojanov and Vojdan Kjorveziroski.

Both NCCs exchanged their approaches to reach out to industry and establish contacts with industrial companies that would have the benefit of using an HPC infrastructure. Different use



cases and experience were presented by both parties with detailed description of the success stories, but also attempts that have not been successful in order to learn and adapt approaches according to the type and/or size of the industry. It was concluded that the collaboration with industry is a high priority issue for both NCCs and might be alleviated if it is implemented within an interdisciplinary/industrial study degree. The NCCs discussed the implementations of MSc and PhD study programmes on the national level and identified possibilities to create interdisciplinary industrial study programmes. The different approaches to training the academic and industry community taken by each NCC were exchanged together with lessons learnt while tackling common problems. Both sides agreed that a highlevel approach that lowers the learning curve for beginners to take advantage of parallelisation is easier to be adopted by industry and efforts towards its implementation were exchanged. Overall, it was concluded that there are many commonalities in the approaches and issues faced by both NCCs and that this first twinning activity between the NCCs has opened the possibility of joint work on tackling the identified concerns. Therefore, both NCCs feel that they would greatly benefit from continuation of the twinning activity in the next project.