



Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing

Spoke 2 WP3 - Design and development of science-driven tools and innovative algorithms for Experimental Astroparticle Physics and Gravitational Waves

Regular meeting - 16 February 2023

*Paolo Natoli (Uni Ferrara)
Marco Landoni (INAF)*



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Meeting Agenda

- Review of the survey results
- Discussion on some open points coming from the survey
- Last Action items review
- AoB

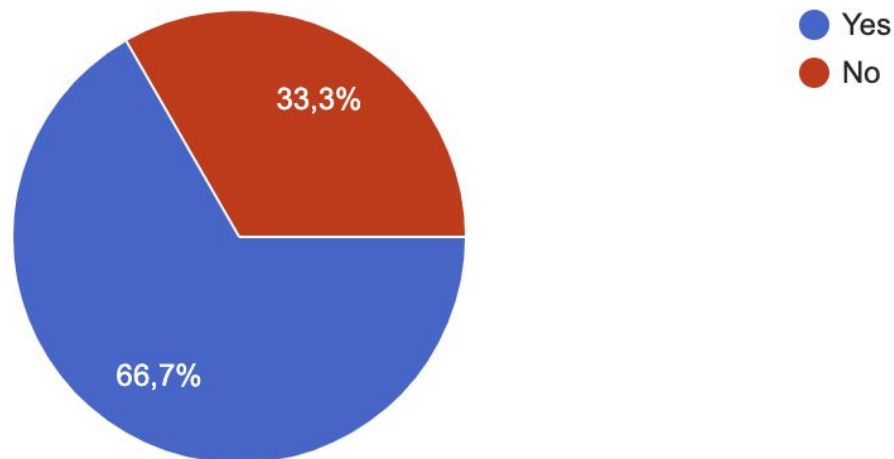


Results from survey about resources (Work in progress)

GPU Usage

Does your project require GPUs?

21 risposte



UC-1 : 5 projects

UC-2: 4 projects

UC-3: 0 projects (are we sure??)

UC-4: 2 projects

UC-5: 2 projects



GPU Usage

Tasks that shall be implemented using GPUs:

- 7/8 Projects for Neural Network training
- 5/6 Projects for data analyses or task parallelization
- 1 TBD

Required GPUs

- Many projects are still in the evaluation phases
- Most demanding: 180 GPU for 2-4 weeks (Pia Astone, Virgo Data Analyses).
- Comments ?

Technologies

- CUDA
- GPU-H100, differences ?



Storage Usage

Macro Use Case	Grand Total	Comments
UC-1 (GW)	50 TB	Not Applicable
UC-2 (Analyses)	150 TB	Posix and xrootd access
UC-3 (Numerical)	800 TB	
UC-4 (Pipelines)	600 TB	RSync / SSH access to the filesystem
UC-5 (Optmisation)	250 TB	

Approximately 2 PB of storage are required !!



CPU Usage

Macro Use Case	Grand Total	Comments
UC-1 (GW)	10 millions of Core hours	Not clear the request made by Milotti, Lenti e DiGirolamo.
UC-2 (Analyses)	?	Hardware request clear. Not clear the CPU/hrs
UC-3 (Numerical)	?	Hardware request clear. Not clear the CPU/hrs
UC-4 (Pipelines)	?	Hardware request clear. Not clear the CPU/hrs
UC-5 (Optmisation)	5 millions of Core Hours	Not clear the request from Nucita.

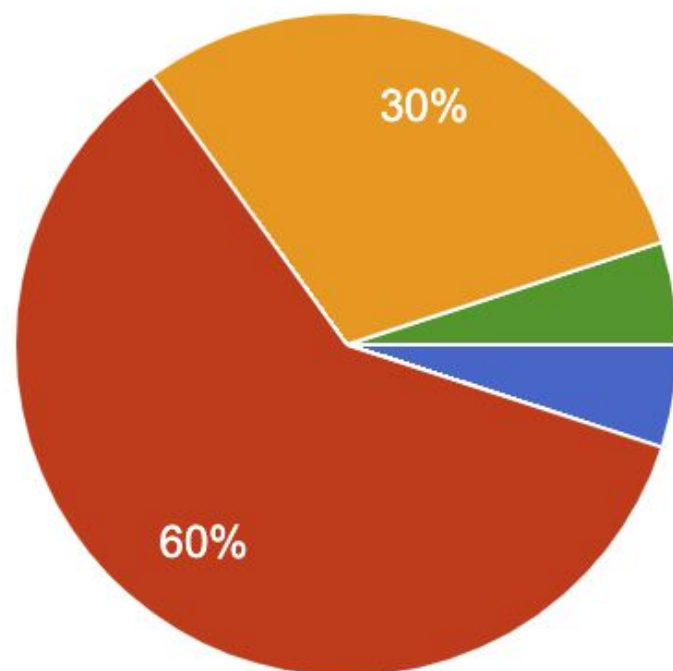


RAM Usage

Macro Use Case	Grand Total	Comments
UC-1 (GW)	4 GB per core	Not clear the request made by Garufi and DiGirolamo.
UC-2 (Analyses)	4-8 GB per core	
UC-3 (Numerical)	1 TB / node	
UC-4 (Pipelines)	3-4 GB per core	
UC-5 (Optmisation)	3-4 GB per core	Not clear the request from Nucita.



Sandbox Availability



- No impact, I can develop directly on my machine
- Low impact, I can develop on my own machine but have to test the codes/ algorithms on dedicated resources
- Medium impact, the development of the codes / algorithms will soon need access to the sandbox
- High impact, development stalled without access to sandbox



Projects that should be prioritized for the sandbox

Project	Macro Use Cases
CYGNO prototipo use case per piccoli e medi esperimenti di CSN2	Pipeline optimization for space and ground based experiments
Modeled transient signals searches in Virgo and ET	Boosting the analysis of GW signals
JUNO HPC test	Pipeline optimization for space and ground based experiments
Sviluppo di metodologie ed expertise per la gestione di pipeline complesse di elaborazione dati, con particolare riferimento a procedure dedicate alla determinazione orbitale di precisione	Pipeline optimization for space and ground based experiments
Optimised likelihood codes for CMB and LSS	Optimization techniques in Astrophysics and Cosmology
GW transient event analysis with machine learning + code acceleration	Boosting the analysis of GW signals
The Pierre Auger Observatory for Multi-messenger Astronomy	Analysis techniques for astroparticles and high energy photons



Potential issues

- LIGO/Virgo Data Analyses (Pia Astone). MATLAB is required. License ? Can we compile the code ?
- Docker availability
- Use of database. SQLite scalability ???