

## **Short report from WP4**

**Spoke2-WP leaders' meeting @ Bologna / 25.07.2023**

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## Followed approach

- We start assuming that WP4 will not have specific (exclusive) use cases.  
The idea is that WP4 is a technological WP that is directly supporting the scientific WPs (WP1-3 and maybe WP6).  
Thus... a few flagships and related use cases can be considered shared between the specific WPx and WP4 (see next slide).
- On the other hand, we discussed that the training and dissemination activities, that we started organizing in june and we plan to well extend in the next 6 months (september 23 - march 24), can be better considered as a deliverable (not a flagship itself).  
This deliverable will have an extended timeline, i.,e. will be considered *delivered* within a certain due term in the future (to be identified later).
- In view of the “MS6” due term, the WP4 commitment is to release a document about...  
“Best practises for heterogeneous computing”... ([link](#))  
... where we are going to rely on and report results and conclusions taken/derived from the current literature.
  - We expect some overlap with some state-of-art documentation in the flagships’ documents in the scientific WPs (see next slide), thus we started a bit later with the idea to try to deliver a document avoiding as much as possible overlaps, namely a document well integrated/harmonized with the other WPs’ documents.  
We plan to converge within next week.
  - Not clear (right now) where/whether we can mention in the Spoke report that we started the training activities: in a Spoke overview part or in the WP4 “best practises” document?

## WP1

Multilevel Hybrid Monte Carlo for lattice QCD [essentially MPI/OpenMP ... so → WP5?]  
QCD under extreme conditions [numerical simulations should scale at 5-10K cores ... so → WP5?]  
Advanced Calculus for Precision Physics [work on parallelization of MadGraph on GPU's also using Machine Learning methods ...so → WP4?]  
Large Scale Simulations of Complex Systems [MPI code for multiphase 3D active fluids ... so → WP5?]

## WP2

Quasi interactive analysis of big data with high throughput → WP5  
Advanced Machine Learning for Flash Simulation as a bleeding edge application → WP5  
Porting of algorithms to GPUs → WP4  
Development of ultra-fast algorithms running on FPGAs → WP4  
Validation of HEP reconstruction code on ARM → WP5

## WP3

Boosting GW (M. Moresco) [they plan to improve the performance of the code with GPU porting or improving the already-existing GPU code and moving to other languages to speed up performance ... so → WP4?]  
Other flagships involving WP4 ??