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Advanced Machine Learning. Flash Simulation and bleeding edge applications

DRAFT

FlashSim: *Detailed plan to M10*

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What was in the original project

- First period (ICSC month 13-18, before and during commissioning of HPC resources - aligned with MS7):
  - Focus on the development of the algorithms;
  - Study of the deployment and validation of the Fast Simulation;
  - Harmonization of the ML use-cases beyond fast simulation.
- Second Period (ICSC month 19-22, early availability of dedicated HPC resources - aligned with MS8):
  - Setup of the optimization campaigns on the hardware provisioning model made available.
  - Tests on the scalability of the models (effect of longer trainings, larger networks)
- Third Period (ICSC month 23-26, dedicated HPC resources in production - aligned with MS9)
  - Refinement of the models on the fully commissioned setup.
  - Full optimization campaigns.
- Fourth Period (ICSC month 27-36 - aligned with MS10)
  - Validation of the quality of the models with detailed comparison with traditional, Geant4-based simulation.
  - Integration with the computing models of the experiments.
  - Documentation and release of the software packages developed.

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Months 19-22 testbed for the provisioning model available (~~early availability of dedicated HPC resources~~ - aligned with MS8)

- Porting of the Validation workflow to Cloud resources
  - Integration with the Kubernetes-native batch system designed for training
  - Evaluation of CERN Reana solution to manage workflows
- Additional and more detailed validation campaigns performed on cloud resources
- Support to the development of the offloading (WP5 activity) model for the specific use-case of the LHCb Flash Simulation
- Support to the ramp-up of the new AI_INFN platform (INFN CSN5 activity)

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Months 23-26 early availability of dedicated HPC resources (~~dedicated HPC resources in production~~ - aligned with MS9)

- Setup of the optimization campaigns on the hardware provisioning model made available.
- Organization of a book-keeping repository for the simulated samples (nTuples)
- Tests on the scalability of the models (effect of longer trainings, larger networks)
- Scalability and automation of larger productions

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Months 27-36 (aligned with MS10)

- Validation of the quality of the models with detailed comparison with traditional, Geant4-based simulation.
- Integration with the computing models of the experiments.
- Documentation and release of the software packages developed.