Report on software

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Status of Muon Collider software

Release 2.10.1

- Replaced lcgeo with k4geo (MUSIC geometry included)
- Supported amd64 and arm64 architectures (issue with arm64 on CVMFS)
- Docker container available

Guadi workflow

- Both simulation and reconstruction up to jet clustering
- Docker container available
- Testing environment available
- **Physics validation required**

Status of Muon Collider software

Short term plan

- Still using ACTS 39 with Marlin wrapper
- Must migrate to guadi native processor (k4ActsTracking) with ACTS 44
- ACTS 44 contains GNN-based tracking (to be investigated)

- AlmaLinux 9 is getting old (problem with gcc version)
- Candidate solutions: Ubuntu 24 or AlmaLinux 10

Long term plan

- Complete the migration of Marlin processors to Gaudi native algorithms
  - Muon Identification is a good example
- Remove LCIO from the distribution, use EDM4HEP

Status of the software in INFN

For ESPPU we used a modified old version of the stack (v 2.9)

Many components must be synchronized with key4HEP:

- DDMarlinPandora
- MarlinTrkProcessors
- LCTuple

RPM packages are still available (complete key4HEP stack)
AlmaLinux 10 is the reference platform

An experimental release is ready to be tested:

- Both Marlin and Gaudi workflow
- Latest version for the external dependencies (ACTS 44, Pandora 4.17)

Physics validation is required

Software sustainability

Proposal submitted to HORIZON-INFRA-2025-01-TECH-02 call

WP 10: software

- Enhancing Key4HEP framework – for performance, heterogeneous computing and seamless integration of AI/ML inference
- Coordinated by CERN and DESY
- INFN could be involved (to be clarified)

International
MUON Collider
Collaboration

Thank you for your attention

Any questions?