Status of the SPD software project

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Main objectives

- Provide the software and computing infrastructure to develop the physics research program and to prepare the CDR and TDR
- Write chapters 'Offline Software' and 'Computing' for CDR and for TDR.
- Develop the software and computing infrastructure for Day-1 of SPD operation
- To organize the software team including the collaborating institutes.

SpdRoot

Simulation

- Generators
- Vertex
- Straw Tracker
- TOF
- ECAL
- Magnet
- Muon
- Polarimeter
- [ZDC]

Reconstruction

- Pattern recognition
- Track fitting
- Primary vertex reco
- Secondary vertex reco
- TOF, DEDX, MUON [=PID]
- ECAL Clustering
- Polarization

+ Testbeam area simu/reco

- **Lack of manpower**
  - we need at least one person from each subsystem
  - + 1-2 experts to work on general reconstruction topics besides the LPI group
- **Priority**
  - should be determined by physics program studies
- **We need a software development plan**
  - milestones (e.g. ECAL cluster reco …)
  - basic functionality needed for physics studies should be available by ~ Sep 2020

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?

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Please, tell about the missing functionality of the software which hinders your studies!

Current release policy

- Essentially, no release policy
- Development version = Production version
- Release merge, building, testing done by the main SpdRoot developer
- Current SpdRoot cannot be built with recent FairSoft/FairRoot (cmake problems)

Good release policy

- **Production version for MC studies**
  - set of supported OSes
  - available at afs and cvmfs
  - capable to run at hybrilit, lxpub and LHEP farm
  - replaced by dev version after major improvement and testing (following milestones determined by physics studies)
- **Development version**
  - independent commits
  - regular merge and release building
  - CMakeLists.txt maintenance, migration to fresh FairSoft, FairRoot etc
- **Tests and reference plots**
  - Can we define the first set during/after this meeting?

Write chapters 'Offline Software' and 'Computing' for CDR and for TDR. Develop the software and computing infrastructure for Day-1 of SPD operation (in close contact with DAQ team)

- For CDR and TDR we need a Computing Model
  - including CPU, storage and network requirements
- SpdRoot is a nice tool for MC studies, but much more functionality is necessary for the real experiment:
  - event building, calibration and alignment, geometry db, conditions db, mass production etc.
- Computing infrastructure (in close contact with DAQ team)
- Online monitoring, Slow control and Data quality assessment

Long term R&D

- New hardware
  - multicore CPUs, GPUs, FPGA etc
- New software tools
  - machine learning
  - parallel computing
  - new software frameworks (ALFA, Key4Hep etc)
- New computing approaches
  - distributed computing, clouds etc.

The SPD timescale

CDR by the end of 2020

TDR by the end of 2021

Detector construction >= 2021
Detector operation >= 2025

I believe a set of R&D on new IT technologies is necessary

External software groups