EP R&D Software

Graeme and Jakob

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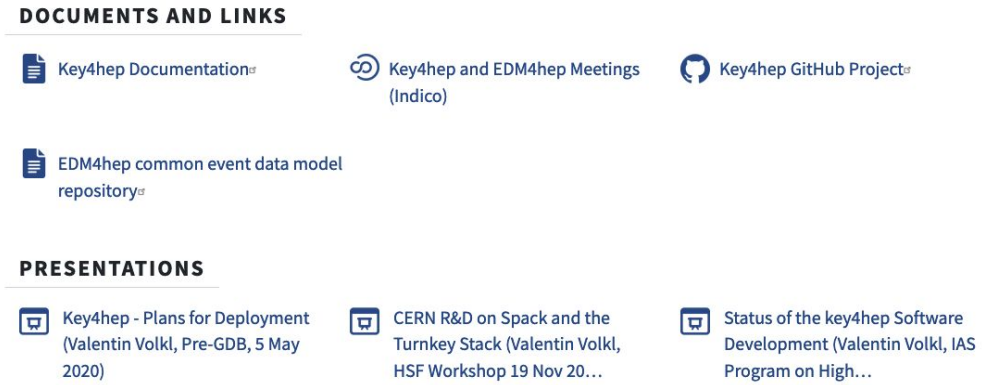
Personnel News

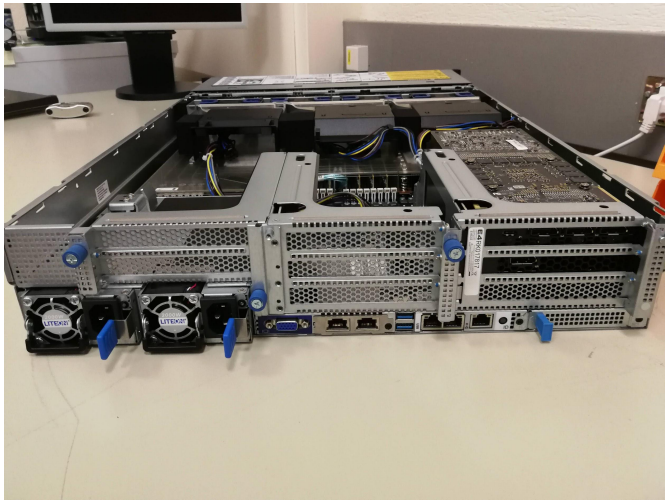
- For the Faster Simulation task, Dalila Salamani started in January 2021
  - A warm welcome to her
- For the Reconstruction Tracking task
  - Moritz Kiehn will leave at the end of this month
    - Thanks to him for the work he did in the last year (see the report in the last Software WP meeting!)
  - Paul Gessinger-Befrut will take over as the tracking fellow on 1 April

Website

- https://ep-rnd.web.cern.ch/topic/software
- Just a reminder to let us know if you have any talks, proceedings or papers that are relevant
  - At the moment the turnkey stack is way in the lead...



Hardware Status



- Machine for Simulation Task available
  - Powerful GPU setup, twin NVIDIA RTX8000 GPUs
  - 2 x AMD EPYC Rome 16 core 2.8GHz
- Machine for Tracking Task available
  - Multi-thread, AMD Ryzen Threadripper 3970X 32 core
  - With an NVIDIA T4 GPU
- Machine for Analysis Task in acceptance testing
  - AMD Epyc with 64 cores
  - ~~2x40~~ 1x100 Gbit NIC, RAID of 5GB/s SSD
    - Thanks to IT colleagues for upgrading the network interface
- We created an OpenStack Ironic project to manage access to the machines, egroup: ep-rdet-wp7-software-server-access
- Overall process takes somewhat longer than we expected, but we're almost there now...

Happy Birthday R&D

- We had a staggered start, but now all of the tasks are on the go
- Christian will be preparing a 1st year report
  - Two to three pages per work package
  - We therefore ask you for ½ page per task, plus a nice picture, if you have one
    - Simulation is exempt
  - Jakob and I will write a short overview
- Also, please let us know if you are applying for the CERN summer student programme or Google Summer of Code
  - Got input so far from Tracking and Sim, we are collecting this here

Plans for 2021...

- Worthwhile to make a short review of what we hope to achieve in 2021
- Are we still on track re. the milestones and goals we set?
  - Are there more concrete targets that are being aimed for?
  - Conference opportunities (vCHEP, ACAT, EPS-HEP, CTD, ...)
  - Publication opportunities

Turnkey Stack

- Work on EDM4hep and podio, adapt as needed
- Packaging: work with SPI on the Spack build stacks
- Adapt iLCSoft algorithms to Key4hep (Gaudi, EDM4hep)
  - On-the-fly and in memory conversion between LCIO ➔ EDM4hep to
  - Run LCFIPlus Flavour Tagging based on Delphes output
  - Run CLIC reconstruction inside the Gaudi framework, starting with wrapper, then going to native algorithms
  - Use adapted algorithms also in FCC reconstruction (e.g., PandoraPFA)
- Adapt FCCSW to Key4hep
- Integrate other EP RnD software projects
- Integrated with a distributed computing solution (iLCDirac) for validation and physics studies
- Conference/Workshop submission options
  - vCHEP, International Linear Collider WS, FCC WS, ACAT

Faster Analysis

Note: this covers only the *EP R&D* contribution to the complete RNTuple PoW

1) **Main Milestones**
   - Merging of the Intel DAOS object store backend.
     Includes unit and integration tests, data mover, in-depth performance validation (see dissemination plan), if possible large-scale test at Argonne
   - Performance comparison to HDF5, it time allows also Apache Arrow & Parquet
   - In collaboration with Key4HEP: RNTuple prototype generator for podio
   - GSoC project: TTree to RNTuple converter (supervised by Javier)
   - IRIS-HEP project: RNTuple nanoAOD generation (Max Orok)

2) **Dissemination**
   - vCHEP 2021: RNTuple DAOS performance evaluation
   - Towards the end of the year: RNTuple overview paper (journal to be selected,
     e.g. Computing & Software for Big Science, Frontiers in Big Data, Platform for Advanced Scientific Computing ACM-PASC)
   - ROOT I/O Workshop (tba)

This Meeting and Future Ones

- Today we look at progress in the Analysis Task
- We think that the rhythm of each task reporting about every six months is a good one
  - This means about a meeting a month, with summer and winter holidays
- We should hear from the Simulation task soon
  - Laying out the startup goals
- Any other task like to volunteer to present in the next few months?