

Architects Forum Meeting

Date / Time: 03 December 2020, 14:00

Agenda: <https://indico.cern.ch/event/980273/>

Present:

Remote: Axel, Jakob, Predrag, Andre, Pere Mato, Michal, Johannes, Ed Moyse, Andrea Valassi, Maria, Alberto di Meglio

Excused: Graeme Stewart, Marco Clemencic, Gerardo Ganis, Giulio Eulisse

Next meeting: 04 February 2021

Announcements and upcoming events

Draft minutes of the last meeting can be found [here](#).
Minutes of the previous meetings can be found [here](#).

6 November - 18 December 2020 Every Friday at 10:30-12:30	“A practical introduction to quantum computing: from qubits to quantum machine learning and beyond” lecture series (https://indico.cern.ch/event/970903/)
18-22 January 2021	HSF/SIDIS 2nd C++ course
1-3 February 2021	CernVM workshop (remote)
21-26 March 2021	ISGC 2021 (videoconference only)
17-21 May 2021	vCHEP2021 (organised by CERN)
14-16 July 2021	Xrootd Workshop in Ljubljana (tentative)
Nov 29 - Dec 3 2021	ACAT Korea

SFT Line Management

- The KT-MA Selection Committee decided to fund our project "Applying Machine Learning to support

SARS-Cov-2 diagnosis using X-Rays Image Classification” for 6 months.

- Intel OneAPI student selected to work on the simulation R&D
- Room 32/S-C-22 (the room where the AF meetings have place) has been refurbished (new table, video equipment, etc)
- Mandatory teleworking (for everybody that can do it) will be extended till end of January

Report from the SFT Projects

ROOT

- v6.22/06 is out, adds macOS Big Sur (11.0) and Apple ARM M1 support.
- Architecture-agnostic RANLUX++ implementation

Simulation

- The new release of Geant4, 10.7 is ready and will be announced tomorrow December 4th. Among all features included in this release, the possibility to exploit (Beta version) a new tasking library, fully compatible with Intel/TBB; Python module integrated and configurable through CMake; new EM models for single Coulomb scattering, polarised gamma elastic scattering, gamma-ray elastic interactions; extensions to cover heavy hadrons in hadronic interactions and enabled charm and bottom hadronic physics in nearly all configurations.

Measurable overall CPU speedup up to 10% compared to previous release.

The details can be found in the release notes:

<https://cern.ch/geant4-data/ReleaseNotes/ReleaseNotes4.10.7.html>

Source code and binaries for the supported platforms will be installed on CVMFS as usual.

	• The new release comes with updated CLHEP (version 2.4.4.0) and VecGeom (version 1.1.8). • The code is ported on most recent systems/compilers, including macOS Big Sur.
CernVM	• The team is busy preparing the 2.8 release: the main functionality is merged but still ~30 remaining tickets, some of them might need to move to a future version • EL6 EOL: cvmfs on EL6 is not supported anymore. We will nevertheless continue building cvmfs for EL6 for about 6 months • Investment in macOS required: there is a new operating system (Big Sur), a new architecture (M1), and a new fuse (osxfuse → macFUSE), which requires additional hardware, development, and testing. We currently target supporting macFUSE and Big Sur / Intel for the 2.8 release. • The LHCb nightly build repository runs now in gateway mode and three concurrent publishers with a significant performance improvement. Ongoing work on improving robustness and usability. • Call for the CernVM workshop input: we'd be interested to hear about experiments HL-LHC requirements for cvmfs. For instance, a focus of work is publishing throughput for nightly build repositories. What else do we need to address?
SPI	• Releases • LCG_98a was started after an intermediate green light from ROOT for 6.22.04, but pulled after a new blocking issue in ROOT was spotted by CMS. • The next release will be LCG_99, based on root v6.22.06. With Python3.8.6 as the default and also available for ubuntu20 and centos8 • New layers created in the last month: ○ LCG_97a_FCC_4, LCG_97a_FCC_5 ○ LCG_98python3_ATLAS_2 ○ LCG_geant4ext20201111 ○ LCG_97apython3spark3, LCG_97apython3spark3_nxcals

	○ LCG_97apython3_LHCB_4 ● Gaudi master and tests: Work continues to integrate the running of the Gaudi tests into the dev3 builds. Tests can now be run, but some are failing. Marco and Pere in contact. ● webEOS: issues affecting http://service-spi.web.cern.ch/ and http://lcpackages.web.cern.ch : Instabilities and httpS cannot be disabled, affecting lcg nightlies and users of the releases, geant4 nightlies and users (GDML schema). Random failures during the nightly builds. Tickets: RQF1700567, INC2631995
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Related Projects & IT	
Xrootd	● Since XRootD5 we had 3 small bugfix releases (mostly fixes for XrdHttp and corner cases in XrdTls); 5.0.2 is the first one from XRootD5 series that was pushed to EPEL; DPM and GFAL2 have been rebuild with XRootD5 (it passed all devs and ops tests) in EPEL ● XRootD 4.12.4 & 4.12.5: backports for the most important fixes from XRootD5 (XrdHttp TPC and XrdVoms) ● Currently we are working on 5.1.0 (which will be the last one built for SLC6) ● For reference, presentation on XRootD5: https://indico.cern.ch/event/974839/contributions/4105061/attachments/2152172/3629130/sft_grmeeting.pdf

HSF	• Workshop was a success (particularly interesting open R&D session on the last day). Survey for feedback: https://forms.gle/uzHnRfPUmFp1GRDz9 • Open call for some convenors for 2021 (see https://groups.google.com/u/1/g/hsf-forum/c/C3e71TGLhuA) • Training WG are organising an end of year Hackathon to develop the HEP curriculum, 16-18 Dec. More participants very welcome: https://indico.cern.ch/event/975487/ • Compute Accelerator Forum next week, NVidia Nsight Tool: https://indico.cern.ch/event/962112/ ◦ Planning for 2021 meetings now, regular slot on 2nd Wednesday of every month. Topic suggestions to compute-accelerator-forum-organizers@cern.ch (it's Graeme Stewart, Stefan Roiser, Maria Girone, Ben Morgan and Michael Bussman (from CASUS))
CERN openlab	• oneAPI project with Intel fully approved, project sequencing being discussed • Organised Nvidia training on Nsight for the Accelerator Forum • Various demo projects from experiments and other CERN teams being run on cloud resources as part of the cloud broker contract
IT-SC-RD	• The next Accelerator Forum will be held next Wednesday 9 December, https://indico.cern.ch/event/962112. This will focus on Nvidia presentations of their Nsight System and Nsight Compute profilers (I recommend them both!). ◦ I also recommend GPU hackathons where these are routinely used. • The dates for the HSF/SIDIS 2nd C++ Course are now fixed, 18-22 January 2021 (virtual Zoom event), https://indico.cern.ch/event/979067. Registration will open soon.

	We are still looking for mentors! • The generator session of the HSF Workshop was well attended and had interesting presentations and discussions, on GPU and on negative weights. See the live notes. • MadGraph reengineering on GPU (and CPU) is progressing well. ◦ Status was presented at the HSF workshop with interesting discussion. ◦ Status also presented to the benchmarking WG, with whom we will collaborate to use Madgraph for benchmarking CPUs, GPUs and heterogeneous systems. ◦ Backport of latest ee->mumu into code-generating code is almost complete. Will allow us to do better tests/developments of LHC gg->ggtt processes on GPU. Also pursuing vectorization on the CPU, as well as multithreading. • ISGC 2021 (March 21-26) will no longer be physically in Taiwan, but will be purely virtual instead. Abstract submission is open for two more weeks.
EP R&D	•
CERN QTI	•

Stakeholders feedback	
ALICE	•

ATLAS	• Working on post feature freeze bug-fixes and performance tuning for the Run2 reprocessing using AthenaMT planned for next spring • Recently infrastructure instabilities in our CI caused by webEOS problems
CMS	• All activities are progressing smoothly. • Moved development release cycle to gcc9. Currently investigating performance differences between clang and gcc builds. • Software performance of G10.7 studied, +10% to be confirmed. Physics performance in depth studies will be accomplished according to standard CMS procedure. • Nice progress with event display based on ROOT Web Graphics. • DD4Hep: all workflows look good, also privately produced high stats samples. Full validation will follow standard CMS procedures. Target release for DD4Hep production usage: 11_3 (April). • Current DD4Hep issue: runtime needed to build the geometry ◦ Presently looking at several solutions ◦ DD4Hep devel team likely to be needed • Current DD4Hep issue: race condition, fixed with a lock ◦ https://github.com/cms-sw/cmssw/issues/32249 ◦ CMS has to work that around • Thanks for merging the CLHEP PR ◦ We look forward to knowing more about the support plans for CLHEP
LHCB	• Struggling with the nightly builds infrastructure recently, with extra problems introduced by the new webEOS system ◦ A new system is being developed ◦ Validation of LCG 99 (dev3 and dev4) delayed • Migrated nightly builds CVMFS Stratum-0 to new system ◦ Very happy about the performance

CLIC	• Ongoing work to integrate LCIO <-> EDM4hep conversion to MarlinWrapper • Adapting to Gaudi v35 cmake
FCC	• Working towards FCCSW v1.0 fully based on key4hep components and EDM4hep. Identified and polished components of common interest (k4Gen, k4SimGeant4, ...). Restructuring of cmake files to cope with changes introduced by Gaudi v35r0. • Builds provided via LCGCmake and Spack. Investigating optimal workflows to cope with development.

Action items
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