Architects Forum Meeting

Date / Time: 10 June 2021, 14:00

Agenda: https://indico.cern.ch/event/1045081/

Present:

Remote: Predrag, Graeme Stewart, Giulio Eulisse, Maria Girone, James Letts (CMS), Johannes Elmsheuser, Michal Simon, Andre Sailer, Gabriele Cosmo, Ed Moyse, Jakob Blomer, Pere Mato, Marco Clemencic, Andrea Valassi

Excused: G Ganis

Next meeting: 01 July 2021

Announcements and upcoming events	
Draft minutes of the last meeting can be found here. Minutes of the previous meetings can be found here.	
5-9 July	PyHEP 2021 Workshop (virtual - registration open and call for abstracts until 6 June). The

	event will again be extremely popular - more than 600 people signed up already
Nov 29 - Dec 3 2021	ACAT "Korea". Virtual, abstract submission open: https://cern.ch/acat2021

SFT Line Management
Nothing to report

Report from the SFT Projects	
ROOT	• About to release 6.24/02 with some important bug fixes • RNTuple progress with CMS, PR • LHCC input doc(s) progressing; about to share "Foundation" table of content • Several important, ROOT-related vCHEP presentations: Accelerating ML Inference, Portable PRNGs, Data Caching, Object Stores
Simulation	• Preparing a new Geant4 patch release (10.7.p02) to be released in the next days, including several fixes. Details in the draft notes: http://cern.ch/geant4-data/ReleaseNotes/Patch4.10.7-2.txt

	• The new development release of Geant4 (10.7.ref05), including the developments of the last month, was deployed last week and is installed on CVMFS at CERN. • Works are progressing towards the new Beta release, Geant4 11.0-beta, scheduled for June 25th, now entering in the final release phase. • The Beginners course on Geant4 took place a couple of weeks ago, virtually through Zoom. Full attendance with 35 participants, 2/3 of which from CERN Learning Hub., the rest externals. Overall successful and positive experience, with hands-on sessions organised through VM and on-line interaction through Mattermost. • Next [advanced] course, still virtual, will take place in fall and subscriptions for CERN affiliated participants are already open through the CERN learning Hub: https://indico.cern.ch/e/geant4_advanced_course_2021 Registrations for externals will open on Indico later in summer.
CernVM	• Ongoing work on the 2.9 release: various improvements to publishing speed and gateway publisher deployments • Ongoing discussion with experiments on necessary extensions for efficient user code distribution • Two CHEP presentations on container distribution and on performance engineering of distributed publishing • LHCP overview talk on software management tools (CVMFS + SWAN) • GSoC student project started on bulk caching of files (particularly useful to increase container startup time as well as large Python applications)
SPI	• Dev[34] and LCG_100 builds with gcc10fp (enable-frame-pointer), clang11.1(gcc10.3) created ○ clang10 based nightly builds will be disabled soon • Enabled dev4 builds with gcc11 (number of packages need updates: https://sft.its.cern.ch/jira/browse/SPI-1917) and clang12 (all packages compiling)

	• dev[34]python39 with python 3.9.5 completed (except cartopy package) • Nightly Julia registry update

Related Projects & IT	

Xrootd	• Last month we released 5.2.0 (client EC plugin, plugin for data-at-rest-integrity, ZTN security plugin, C++14, TPC/HTTP fixes)
	• Ongoing debugging effort to understand the XCache vs TLS problems at UCSD
	  ○ implemented better recovery mechanism for TLS errors
	  ○ optimal TLS error queue handling still under investigation
	• Working towards 5.3.0 (new features under construction like ZIP append, PgWrite)

HSF	• Meeting with the LHCC Referees last week (slides are on the HSF agenda).
	• Discussion points:
	  ○ ROOT praised for their involvement with STEM students with disabilities
	  ○ Discussion of Power builds came up (CMS have a port of CMSSW)
	  ○ Discussion of how AdePT will plug-in to Geant4
	• HL-LHC review documents now in preparation, drafts will be ready for 30 June
	• Lots of meetings and activities on going
	  ○ PyHEP module of the month
	  ○ Analysis meetings (metadata, non-LHC expts.)
	  ○ Generators meetings

	○ Software Round Table and Compute Accelerator Forum ● HSF Frameworks WG reviewed DUNE framework requirements document last week, report in progress ● GSoC - as an umbrella organisation we have 27 students this year
CERN openlab	● Thanks to CERN EP-SFT contacts we had a discussion with Linaro and we have agreed to participate in a broad HPC-AI on Arm event organized by Linaro and devoted to benchmarking, with Arm, Fujitsu, Red Hat, Sandia Labs, HPE and SiPearl/EPI: at HPE they manufacture the Apollo-80 platform based on the Fujitsu chip while at the European Processor Initiative (EPI) they are designing the first EU HPC supercomputer chip, based on Arm. Red Hat and Sandia have been members of the Linaro Datacenter and Cloud Group and the HPC-AI project for several years. Linaro expressed a strong interest in collaborating in benchmarking HEP applications and we could set an openlab project. ● The IBM Minsky cluster is being upgraded to Power 9. We are collecting input on the users' interest on Power 9.
IT-SC-RD	● Reported status of Madgraph port to GPU and vector CPUs at vCHEP (https://indico.cern.ch/event/948465/contributions/4323568). Completing the proceedings. ● Many HSF generator WG meetings in the pipeline, https://indico.cern.ch/category/8460. Had three in May (EvtGen, Pythia, Madgraph). Planning two more in June (Herwig, Powheg, Lhapdf). Will then be busy preparing the document for the LHCC review of HL-LHC. ● Discussion about vectorization and compiler flags at the benchmarking task force (https://indico.cern.ch/event/1030673). Forward looking, not relevant to upcoming HEP-SCORE21 benchmark. ● Last two Compute Accelerator Forums were held on May 12th about Alpaka/LLAMA

	(https://indico.cern.ch/event/975010) and yesterday about JUWELS and Belle2 (https://indico.cern.ch/event/975011). Next one on July 7th about FPGAs (https://indico.cern.ch/event/975012). • Next HSF/SIDIS C++ course on Aug30-Sep03 (https://indico.cern.ch/event/1019089). Still looking for mentors! Please contact Stefan Roiser if interested/available. Registration will open on June 28, limited to 75 places.
EP R&D	• Now at our full complement of fellows - Placido Fernandez joins the Turnkey Stack project • Last month had a meeting on Tracking Reco, this month look at Key4hep again
CERN QTI	•

Stakeholders feedback	

ALICE	• Ongoing activities with Run3 preparations taking most of the time.
	• Multiple vCHEP and LHCP contributions detailing the effort, in particular wrt analysis.
	  ○ https://indico.cern.ch/event/948465/contributions/4324158/attachments/2244927/3806955/Alkin-vCHEP-Run3AnalysisFramework-180521.pdf
	  ○ https://indico.cern.ch/event/948465/contributions/4324159/attachments/2244937/3806972/2021-05-18_vCHEP_HFO2.pdf
	  ○ https://indico.cern.ch/event/905399/contributions/4291621/attachments/2260734/3837657/v8.pdf
	• aliBuild now deployed using official OS tools (yum for Centos, apt / launchpad for Ubuntu, homebrew for macOS, including M1 support). PIP support remains for

	development and exotic platforms.
ATLAS	• Migrated all Athena and Analysis master branch builds to LCG100/ROOT 6.24 • Chasing the last multi-threaded related bugs and performance bottlenecks (high thread counts) in reconstruction and will start Run2 reprocessing before the summer vacation period • Hold a successful SW development training for GPU usage on NVidia and CERN resources

CMS	• Core SW for data taking release cycle (CMSSW_12) decided. Highights:
	  ○ DD4Hep, G4 10.7, ROOT 6.24/x
	  ○ All the GPU code needed to HLT is integrated
	• Release plan until Q1 2022 has been put toger, mainly linked to experiment specific development
	• As previously anticipated, work has been ongoing to submit work to M100, an HPC with Power9 GPUs. Last month the first “scale” test succeeded, 3k cores used to run the copy of a real production workflow which had been injected previously. All steps of the MC chain executed (a good test for ROOT, G4 and cvmfs). No failure. Physics validation being discussed.
	  ○ Workload management upgraded to support non-x86 cpus. These modification will allow also to run on ARM, for which CMS also has builds.

LHCB	• Released a first version of the software stack on top of LCG 100
	• Just completed the first Run3 FEST (Full Experiment System Test) exercise
	  ○ Still a lot of work to do, but most of the systems are working
	• Change to the platforms we will use in production
	  ○ Adopted the new x86-64 microarchitecure feature levels (https://en.wikipedia.org/wiki/X86-64#Microarchitecture_levels)

	○ Switching to gcc10 as production compiler
CLIC	● NTR
FCC	● Physics performance studies now fully based on Key4hep components built with Spack

Action items
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