Validation of event reconstruction code on ARM Spoke 2 use case

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ICSC Italian Research Center on High-Performance Computing, Big Data and Quantum Computing

Missione 4 • Istruzione e Ricerca

People involved in this use case

Participating Institutions

- Leader: INFN (Francesco Noferini, Daniele Spiga, Tommaso Boccali, Lucio Anderlini, Concezio Bozzi)
- Participants: INFN, UNIBO
- Experiments: ALICE (F. Noferini), CMS (D. Spiga, T. Boccali), ATLAS (L. Rinaldi, L. Carminati), LHCb (L. Anderlini, M. Veltri)

KPI

KPIs

KPI ID	Description	Acceptance threshold
KPI2.2.5.1	Software validation on ARM in the full GRID chain	50% (2/4 LHC experiments)
KPI2.2.5.2	Presentation at conferences	>=2
KPI2.2.5.3	Technical notes (in experiments and ICSC)	>=2

- **First period (tentatively month 13-22 - aligned with MS8): procure and configure ARM machines in order to provide access to the experiment software and storage via a production infrastructure; select and document workflows to be benchmarked from the most representatives; prepare a validation strategy agreed with the experiments.**
- Second Period (tentatively month 23-36 - aligned with MS10): test and validate the selected workflows (most probably from data reconstruction and simulation); validate the submission infrastructure and perform O(1 week) exclusive tests as needed by the validation strategy. Report the results to the experiments and in the ICSC documentation; disseminate the results at topical conferences.

Updates with respect the previous report

- CMS, ATLAS and ALICE have set GRID job submission
  - Last week also arm-02 was added to full production (interactive access no longer allowed)
  - All experiments are using updater/singularity images (same setting as in Glasgow site)
  - CMS: Running in production mode since last year both DATA and MC
  - ATLAS: in the last week adding more pressure in the queue
  - ALICE:only MC jobs tested so far (since mid of January)

- Since last week we have no longer the possibility to access arm-02 node but we are discussing for having the possibility to run some debug jobs in interactive mode in a different node

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CMS

HTCondor/GRID

- Integration in the production scenario
  - CE configured with the possibility of routing on arm nodes (done in the last months of 2023)
  - CMS submitting pilot jobs since last year
    - MC jobs
    - **DATA relval**
  - Still observing a relevant Xrootd failure rate → the goal is to move to gpfs as soon as possible
  - Some software-related failures observed → under investigation

Workflow release validation

- CNAF is one of the test bed (with Glasgow) for the validation on ARM

ATLAS

HTCondor/GRID

- In the last week adding more pressure in the queue
  - **3 kHS23 (4-days average) with MC 8-core jobs**
- no major issues observed so far

From previous report

- software ARM available on cmvfs
- Using container from cvmfs
- Full detector simulation -> validated
- NN training -> in setup
- next step: job via batch system -> **done**
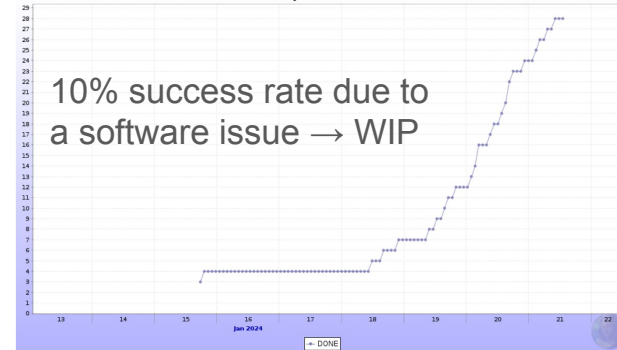
ALICE

HTCondor/GRID

- Validation: access to alien, pythia MC jobs with a tag from Dec22 from cvmfs (last year)
- **Since January 2024 ALICE moved to production scenario (MC jobs)**
- Issues under investigation:
  - Issue with arm-builds reported last year → **fixed**
  - **updater/singularity images** now used also at CNAF by the GRID jobs
  - **Software issue under investigation** (not reproducible at Glasgow) →ALICE MC expert is looking into that (interactive access requested)
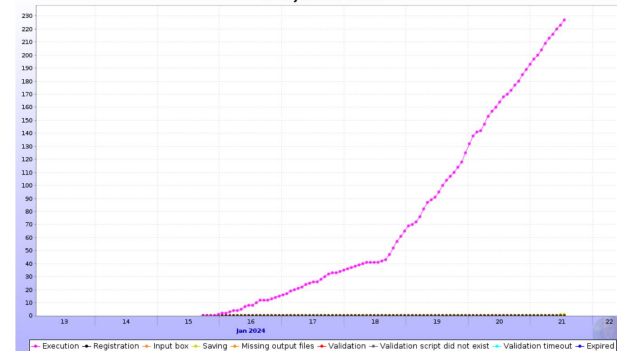
Workflow release validation

- **Setting of data reconstruction jobs → work in progress (first attempt will run at Glasgow since we are debugging software issue at CNAF)**

Done jobs in Phoenix

10% success rate due to a software issue → WIP

Error jobs in Phoenix

Next plan

We foresee an internal discussion next thursday (01/02/2024)

In particular focusing on collecting material and preparing a plan for the next conferences → abstract submission for CHEP 2024 (we need to coordinate also with LHC experiments)

27th INTERNATIONAL CONFERENCE ON COMPUTING IN HIGH ENERGY & NUCLEAR PHYSICS (CHEP 2024)

Saturday
19 OCT/24

08:00 (Europe/Zurich)
Ends: **25 Oct/24** 17:00

27th INTERNATIONAL CONFERENCE ON COMPUTING IN HIGH ENERGY & NUCLEAR PHYSICS (CHEP 2024)

• **Go to Indico Event**

☐ **Import to my calendar**

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backup

Current resources at CNAF

There are 2 ARM nodes (one already available)

- 256 cores
- 512 GB ram

Current setting (still work in progress)

- Cvmfs available
- Network: access to external network
- Gpfs client -> not available for ARM
- Condor -> not yet available

Opening access request was announced at the last CNAF Cdg

Some experiments already got access and start to play with it.

Data displayed in the following table are available in csv format in the github repository of HEPiX-Forum

CPU	SMT enabled	Online CPUs	# Sockets	Cores/Socket	Threads/core	L2 cache	L3 cache	# Meas	Score	Spread	RAM	SWAP	Site	hash
filter	filter	filter	filter	filter	filter	filter	filter	filter	filter	filter	filter	filter	filter	filter
AMD EPYC 9654 96-Core Processor	1	0-383	2	96	2	1024K	32768K	26	6000.578	0.714	1 TiB	4 GiB	IHEP	71892
AMD EPYC 9654 96-Core Processor	0	0-191	2	96	1	1024K	32768K	25	4955.599	0.421	1 TiB	4 GiB	IHEP	71892
Neoverse-N1	0	0-255	2	128	1	256 MiB (256 instances)	not_available	3	3767.707	0.989	497 GiB	500 GiB	INFN-T1	71892

It is in third position in the Hepscore23 DB

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