Update on the European HPC Strategy meeting

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Outline

- The process is a bottom-up attempt (yes, experiments are "bottom=users" for HPC centers) for an HPC/HEP strategy

- This talk is mostly a

  - Recap from US meeting (early 2024)

  - A small report from Lubljana EU meeting (Sept 5th+6th)

  - How to go on and some ideas

What is happening?

- It was decided that we (==HEP) would have profited from a more direct link with the HPC world
  - At the **political** (==funders) and **technical** (==sysadmin) levels
  - For **current** systems (==how to get access to, and how to implement our needs) and **future** systems (==how to design future systems)

Granting process, long term support, technical support, …

How to (best) execute our workflows on system X?

Explain our (future needs) and try to negotiate systems able to satisfy them

How to implement this?

- Small groups meeting: no formal agenda (not a conference), as open as possible discussion
  - Which is risky, it needs to find persons in the proper mood – on both sides
    - ~ 1 person per Experiment
    - ~ 1 person per HPC center
    - + CERN and WLCG
  - Going more technical or more political: depends on the people, last second steering of discussion
- Know each other:
  - Who we are, what we do, what we (will) need
  - What we can gain from collaboration

US meeting – a reminder

- Held in in January 2024; present in 13
  - CMS, ATLAS, WLCG, CERN, Argonne, Berkeley, SDSC
- Discussions focused on
  - Provisioning
  - Interfaces
  - Software
  - Data Management
  - Workflows
- There is already a report available

Strategy For HPC Integration (US) Whitepaper

Authors: Debbie Bard, Doug Benjamin, Paolo Calafiura, Simone Campana, Taylor Childers, Ian Fisk, Maria Girone, Oliver Gutsche, Dirk Hufnagel, Alexei Klimentov Eric Lançon, Verena Martinez Outschoorn, Frank Wuerthwein
Indico: https://indico.cern.ch/event/1356688/

Software Strategy

Topics:

• Software Design Enhancements

Provisioning

Topics:

• Adaptive
• Proposal-
• Resource

Interfaces

Takeaways

The software and the application development will be a critical issue

There are not show stopping technical or political issues preventing more active participation by HPC centers

There are many common issues

A common document and strategy would be beneficial

Dat

Topics:

• Scalab
• Data C
• Data M

• Task Splitting for Partial Reconstructions
• Workflow Orchestration

Europe September 5th–6th Lubljana

agenda

+ remote attendance

- Present:
  - CMS, ALICE, ATLAS, LHCb, WLCG, CERN
  - VEGA, LUMI, CSCS, GENCI/SURJF, Juelich, Deucalion, Karolina, Flatiron for US, JENA HPC working group
- Agenda only includes
  - "know each other" – my center, my experiment
  - Open technical discussion on "items"
- Wrap up of the 1st day discussion written during the night, and further elaborated on the second day
- Report in preparation

- Items:
  - Allocation policies and opportunities
  - Edge nodes and AAI
  - Type of workflows
  - Networking
  - SW
  - Storage handling
  - Strategy

Some points from the summaries

Allocation policies and opportunities

- **Review of EuroHPC allocation policies**
- Nearly all systems (but CSCS) are 50% owned by EuroHPC, 50% by the hosting state; hence two paths to obtain grants
- In both cases, at least 3 types of calls
  - **R&D**: show that your code can be executed on the machine (possibly after some negotiations / changes with local admins)
    - *Only technical evaluation*
  - **Benchmarking**: show that your code can scale 1 → N nodes
    - *Only technical evaluation*
  - **Regular Access**: production level, after having shown the readiness of the codes (via the previous two); tens–hundred millions CoreH
    - *Technical + scientific evaluation*
  - (**Strategic access**: top-down, decided by EC or the EuroHPC governing board; up to 10% of the full EuroHPC capacity)
    - *Political evaluation (+ do we want it?)*

We can go one by one, or try to have an umbrella request handled for example by CERN; suggestion is to go the "national path" if there are links.
Fast proposals, 100% success rate if "reasonable"

Previously via PRACE; now handled completely within EuroHPC. Needs a full proposal, and passing scientific evaluation. Success rate well below 100%

Less known; up to now "strategic access status" granted only to Destination Earth (climate) and Human Brain Project (brain simulation)

Edge nodes and AAI

- Possibility to deploy edge services (no root access needed as an assumption) from the user point of view (VM, container, …)
  - Ask for the functionality, not the virtualization technology!
- Have a look at IRI proposals (CHEP 2023) – if not code, as directions (blueprint)
- Is a federated AAI possible (for example, eduGAIN profiles or similar) or even existing?
  - Expected by 2024 – in principle should be adopted by all HPC sites
  - Already now, LUMI supports eduGAIN
- Possible uses of edge nodes: storage, bridging between Condor/Dirac/Panda and SLURM, routing, SQUIDs, …

Type of workflows

- Production only jobs vs also user jobs
  - Fewer users to consider / enable + more tested workflows
- Which is the lowest GPU utilization you tolerate?
  - One answer was as low as 10%
  - Focus on minimum speedup requested? (looking at the cost)

Networking

- LAN not a problem: these sites exceed what we need by factors (current standard is > 200 Gbps per node; AI specialized machines can exceed 1 Tbps per node)

- WAN: more a political problem than anything else; situation very diverse
  - LUMI: all is open (outgoing connections from compute nodes)
  - Juelich: all is closed

- Possible intermediate solutions
  - Networking opened towards some trusted subnets (solution at CINECA)
  - Allow to open (user level) VPNs

- Upcoming EuroHyperConn strategy: how to connect EuroHPC centers between them, and with everyone else

Proxy and fan-out….

Software

- Is CVMFS usage increasing outside HEP so that we can assume it will be available sooner or later?
  - Alternatively: is userland CVMFS (via aFuse or cvmfsexec) an acceptable option?
    - Alternatively: other solutions? An incremental CVMFS dump?
      - *Is that available? Is that a reasonable feature to ask to CVMFS?*

- Is there a site-preferred high level framework (kokkos vs sycl vs alpaka...)?
  - Not really, for them is an application problem

Storage handling

- Edge services as nodes to deploy data management (for example via services which then use internal centre large POSIX)

- The need to deploy caches: again as edge services? How else?

- Some sites have "datamovers" (globus, Fenix, Simpl, …)
  - Evaluate enabling them to FTS

Strategy

- (my personal view): the centers consider us as "technical parties" they would like to work with
  - Much better than usual approach from other domains "we send you a tar file please find a way to execute it"
  - But what about the political level?
  - We probably need 2 different types of channels

- A possible strategy (TBC/D!)
  - Form a domain-wide portfolio of successful "Project Access"-like granted projects
  - Use high level opportunities to inform EuroHPC (or above) about us/our needs
    - The annual EC visit to CERN and similar FA-EC meetings
    - The upcoming European Particle Physics Strategy Update; via the WS and the Briefing Book
    - Initiatives like JENA and SPECTRUM
    - EuroHPC User Forum (Maria deputy-chair)

A few possible "actions" from the meeting

(to be validated by the MB)

- Write a report like that written by the US colleagues (but independent at this point)
- Have a global meeting, including US, EU and Asia
  - Now defined: @ CERN Jan 30th–31st (used to be 13th–14th but changed by popular demand)
  - At that point, aim for a global document
- Prepare a DB of existing (successful) grants
- Discuss at the level of WLCG MB a common strategy between experiments towards EuroHPC, in synergy with CERN efforts
  - Divide and conquer? Common projects?
- Continuously monitor new opportunities from the centers (early access, new systems coming online, …)
  - We have a list from the meeting!
- Prepare a description of main WLCG use cases and inform HPC centers
- Monitor the possibility for a HEP (or more) EuroHPC CoE approval path
  - Submitted in early 2024; not discussed since EuroHPC had a change of plan. Possibly to be reconsidered in early 2025
- Monitor the submission of inputs about HPC utilization to the ESPP