# Meeting ATLAS-IT calcolo : highlights from S&C week
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Highlights from last S&C: Computing

Outstanding performance of our distributed computing infrastructure : could run up to 800k jobs per day (in many different workflows).

❏ Run 2 data and MC reprocessing expected to finish this month

❏ Run 3 MC reconstruction for Combined Performance samples now underway
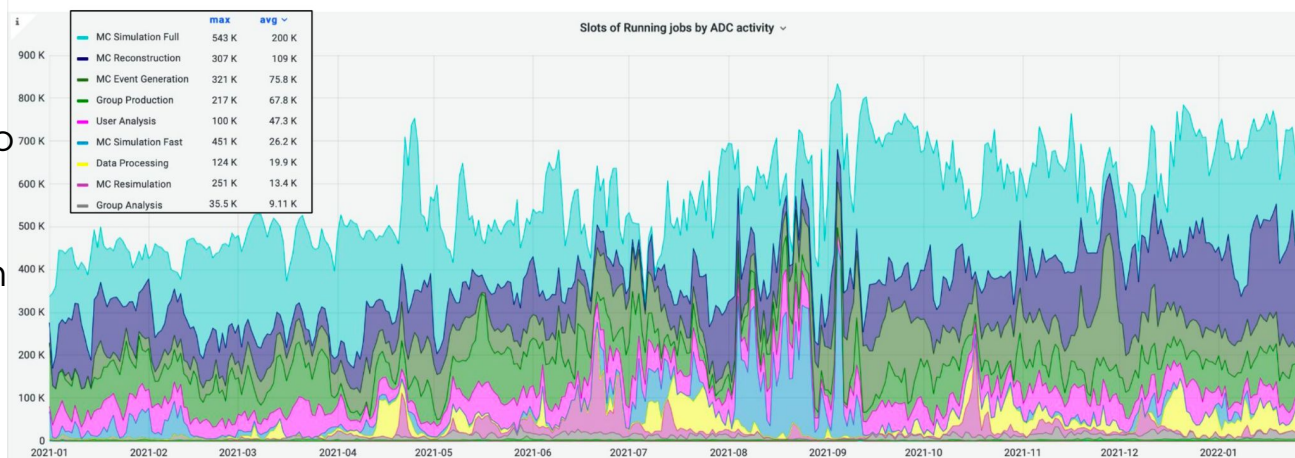

❏ HPCs continue to deliver at a feverish pace : ATLAS was able to run almost all data-flows
  ❏ in the last few months HPC contributed up to 100% of the pledged computing resources

❏ Disk space is currently a critical item, basically reached to pledge, no contingency

❏ Data carousel mode running at full speed (both reco and derivation) : maximal usage of the tape resources

Highlights from last S&C : Software

Continuous effort to improve the software performance. Several important achievements :

❏ First production relying on multi-threaded reconstruction (AthenaMT) : full reprocessing running at full speed
  ❏ 3.5x memory savings
  ❏ 20% workflow speed-up
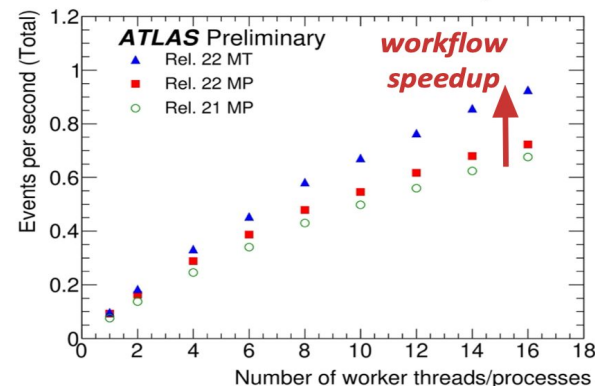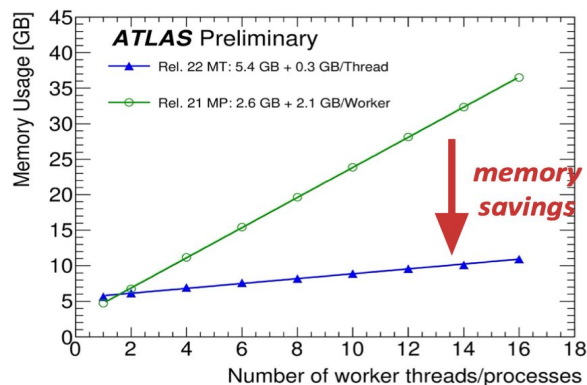
❏ Impressive results from G4 optimisation task force : simulation up to 35% faster when including several optimisations, more to come

❏ New Analysis Model well advanced : two centrally produced formats
  ❏ DAOD_PHYS : ~30 kB/ev validated on Run2, ready for Run3
  ❏ DAOD_PHYSLITE : ~12 kB/ev currently being validated, crucial for HL-LHC

Current Status of ATLAS (1)

https://indico.cern.ch/event/1115413/contributions/4708335/attachments/2384202/4074331/Token_S%26C_220203-1.pdf
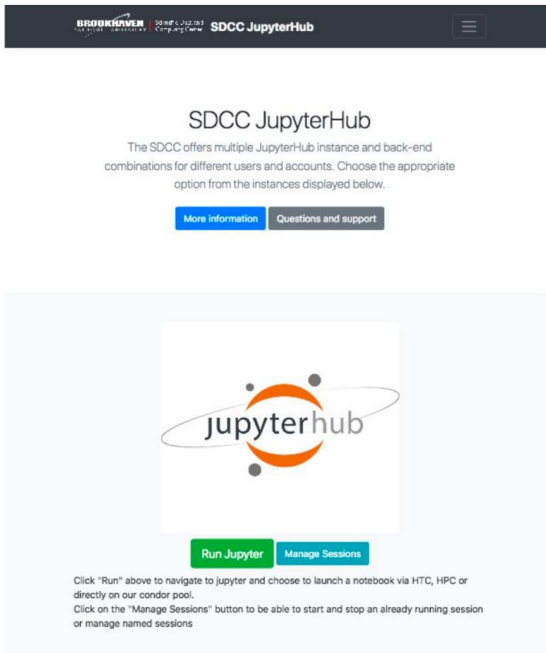
- Central Harvesters have been submitting with <u>both voms proxy and ATLAS IAM token</u>
    - Since 1 Nov. 2021: Met WLCG Token Transition Timeline M4 by end of Oct. 2021
    - "Central Harvesters": Harvester_ID = **CERN_central_A** , **CERN_central_B**

    - Central Condor instances upgraded to v9.0.6 (still supports GSI)

    - Harvester is configured to update tokens for all CEs on CRIC every 30 minutes
        - Token lifetime was originally 1 hr, while upcoming ATLAS IAM change will allow 6 hr
    - Harvester picks up the corresponding token file according to the CE chosen to submit to

    - If the CE (HTCondor-CE) supports token, it will authenticate with the token
        - Otherwise, will fallback to voms proxy
        - Harmless to ARC CEs or HTCondor-CEs without token setup

    - Currently, tokens with different IAM IDs are used to distinguish production vs analysis

    - Reference: <u>ATLAS talk in OSG Token Transition workshop in Nov. 2021</u>

ATLAS Site Updates in 2022

https://indico.cern.ch/event/1115413/contributions/4708346/attachments/2384056/4074544/ATLAS%20S%26C%20Week%20%2371%20-%20Timeline%20for%20grid%20site%20middleware%20updates.pdf

- HTCondor-CE with token support – by June 2022
  - OSG 3.6 HTCondor-CE with default mapping to local usatlas{1,2,3} user
    - OSG have their own timeline given by OSG 3.5 EOL
  - Non-OSG HTCondor-CE 5.x/6.x(?) + user mapping configuration
- ARC-CE with REST support – by June 2022
  - 70% already OK, the rest not reachable (firewall?)
- ATLAS VOMS updates
  - Add "vomses" for new ATLAS IAM VOMS – January 2022
  - Next steps (removing "legacy" VOMS) – Autumn 2022
- Storage
  - Support for GridFTP protocol become optional in March 2022
    - Be aware we may still need / use SRM for space reporting at some sites
  - Updates to get production quality WLCG JWT token support
    - We may come with recommendation already at the end of 2022
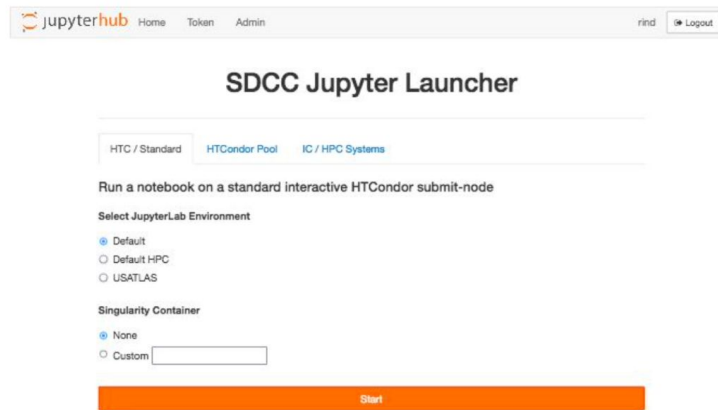   - The goal is to be ready for WLCG Data Challenge in 2023

BNL SDCC Jupyterhub Portal

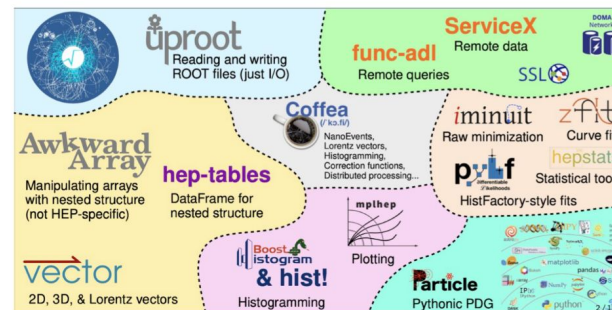Custom Jupyterhub interface to multiple resources backends with account-based access control:
- Dedicated set of Jupyterhub nodes
  - Dask scheduling onto HTCondor pools
- Notebook spawning onto HTCondor pools
- Notebook spawning onto HPC cluster via Slurm

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Advanced Tools

- **Coffea-Casa** - low latency columnar analysis based on Dask and Jupyter
- **ServiceX** - data extraction and delivery
- **REANA** - platform for reusable analysis
- **RedHat OKD cluster** - k8s platform for current Reana and ServiceX deployments on test cluster at BNL
  - Chosen for use at DOE labs (BNL, FNAL) due to stronger security policies than k8s, but requires additional development effort

Close collaboration with IRIS-HEP!

https://indico.cern.ch/event/1121552/contributions/4708724/attachments/2383561/4072980/AMGPerspective.pdf

https://indico.cern.ch/event/1115413/contributions/4705819/attachments/2382697/4071473/Tape%20Commissioning%20for%20Run3%20v3.pdf

Tape challenge '22 (1/4)

- We are planning tape challenge '22, again with multi-VOs
- The dates ?
  - Coordinate with detector commissioning
    - SFO available in the 3rd week of March for the tape challenge
    - So either the 2nd+3rd week or the 3rd+4th week of March
  - Coordinate with other experiments
    - To be discussed at the joint meeting with other experiments
- Again to cover both modes : data-taking (DT) mode and after-data-taking (A-DT) mode, one after the other

Distributed Computing				
MID	**DID**	**Description**		**Due**
DC-1		Transition to tokens		Q4 2025
	1.1	Submission from Harvester to all HTCondor CEs with tokens		Q4 2022
	1.2	All users move from VOMS to IAM for X509		Q4 2022
	1.3	All job submission and data transfers use tokens		Q4 2025
DC-2		Storage evolution		Q4 2025
	2.1	No GridFTP transfers at any site		Q1 2022
	2.2	SRM less access to tape		Q4 2025
	2.3	Recommended transition plan from DPM completed		Q4 2021
	2.4	Transition plan from all DPM sites		Q4 2022
	2.5	All sites moved away from DPM		Q2 2024
DC-3		Next operating system version		Q4 2024
	3.1	Ability to run on "future OS" on grid sites		Q4 2022
	3.2	Central services moved to "future OS"		Q4 2023
	3.3	(CentOS 7/8 EOL)		Q2 2024
DC-4		Network infrastructure ready for Run 4		Q4 2027
	4.1	Network challenge at 10% expected rate		Q4 2021
	4.2	Network challenge at 30% expected rate		Q4 2023
	4.3	Network challenge at 60% expected rate		Q4 2025
	4.4	Network challenge at 100% expected rate		Q4 2027

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■ CentOS Stream 9 already available, RHEL/ELC 9s coming in the next few months
■ [ADC: would prefer sites to do such upgrades in winter shutdowns]
○ Centos 8 may also be used already as needed for hardware compatibility or functionality

Highlights from last S&C : sistemi operativi

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