ATLAS Status report

Frédéric Derue, LPNHE Paris

LCG France meeting, CC-IN2P3 Lyon

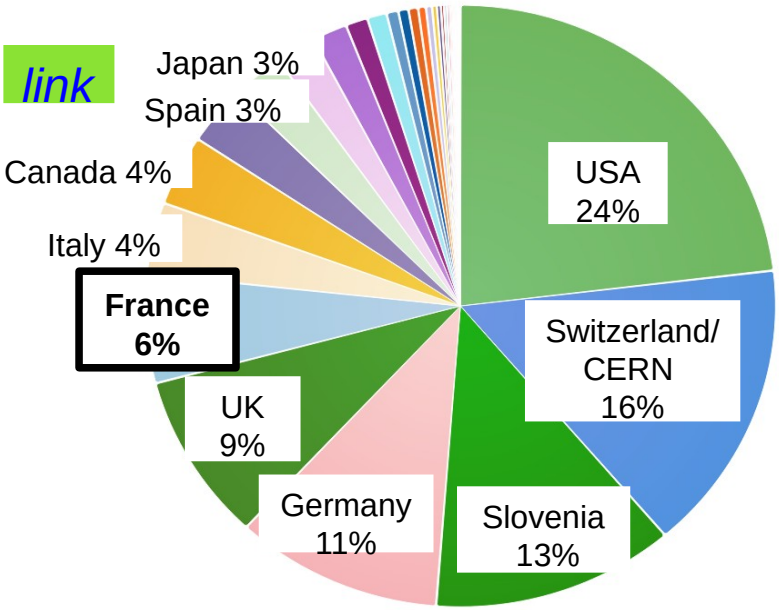
26th June 2025

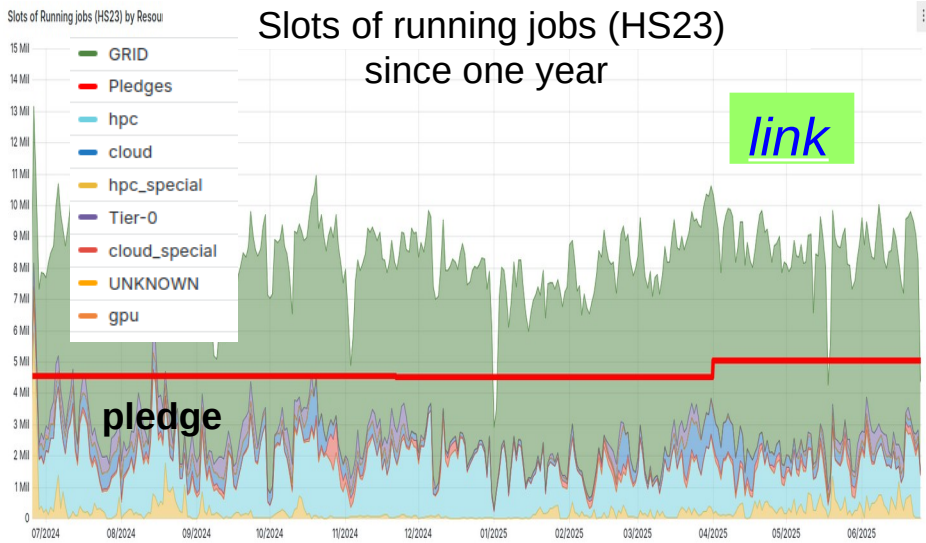
- **Ongoing ADC topics**
- **WLCG CPU/storage in ATLAS France in 2025**
- **Mini Data Challenges**
- **Analysis Facilities**

Next ATLAS Software & Computing week
- 7-11 July at CERN (Run 4 & TDR)
- 22-26 Sep. in Lubjana

ATLAS resource usage

- **Computing usage**

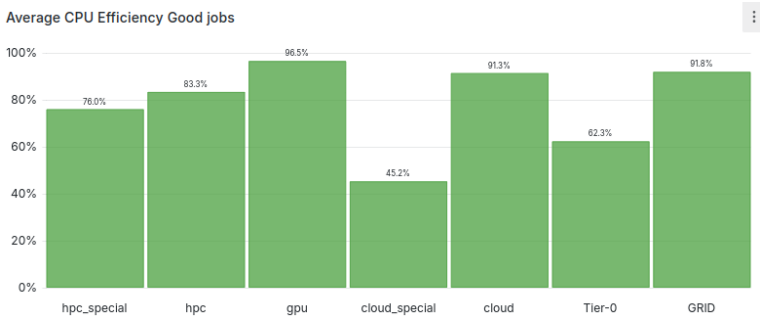




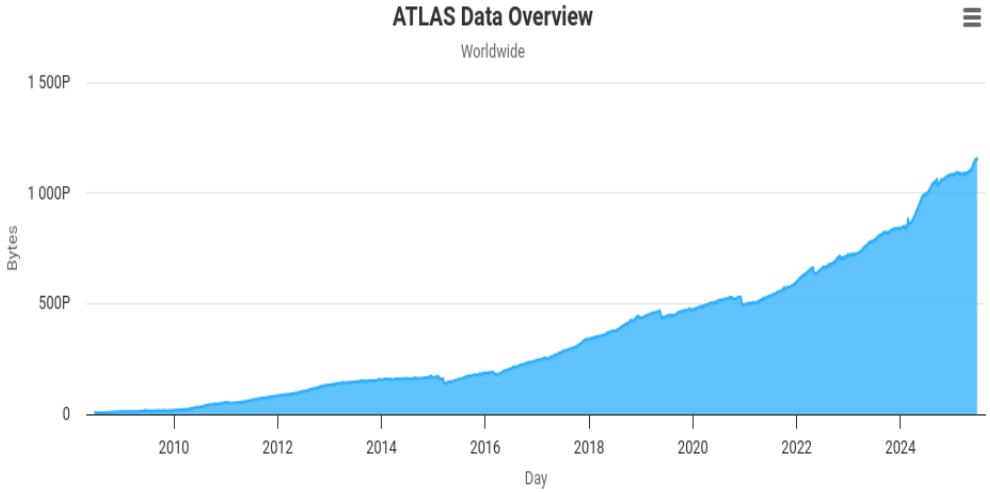
Slots of running jobs (HS23) since one year

link

- **Smooth computing operation**
  - 6-800k jobs/d on grid
    HLT farm, HPC, cloud, gpu
  - cpu on grid=71%, hpc=21%
    cloud=6%, Tier0=3%, gpu~0%



- **More than 1 Exabyte of rucio-managed data !**



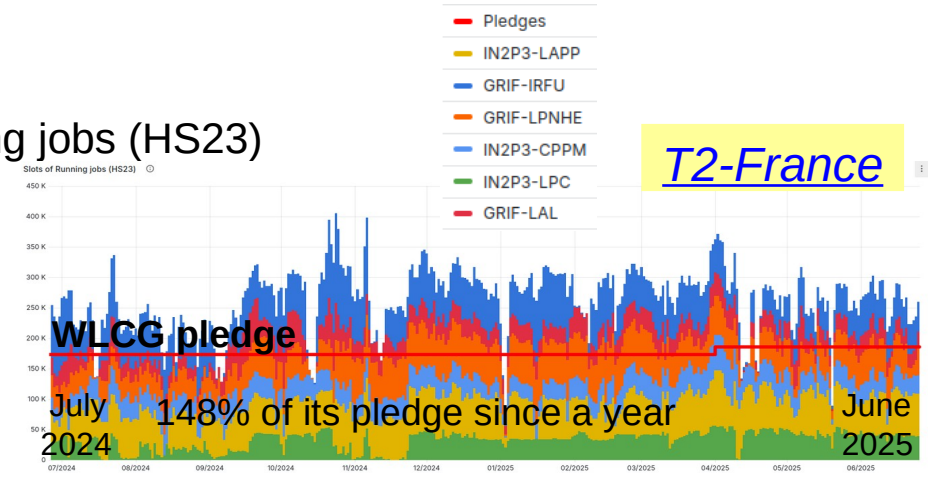
WLCG CPU/storage in France

- **Pledges (see *cric*)**
  - CPU
    - CC : 14.2% of T1s, +4% wrt 2024
    - T2s : 7.5% of T2s, +7% in 2025
  - Storage
    - CC : disk=13.5%, tape=14.3% of T1s
      wrt 2024 : +14% for disk, +24% for tapes
    - T2s = 9.5% of T2s, +9.5% in 2025

Site	CPU Pledge 2024 (HS23)	Disk Pledge 2025 (TB)	Tape Pledge 2024 (TB)
IN2P3-CC	212550	25510	81345
GRIF	73404	8078	-
IN2P3-CPPM	24000	2200	-
IN2P3-LAPP	60000	7500	-
IN2P3-LPC	28000	2914	-

- **CPU realized**
  - CPU : CC : 15% of T1s, T2s : 15% of T2s

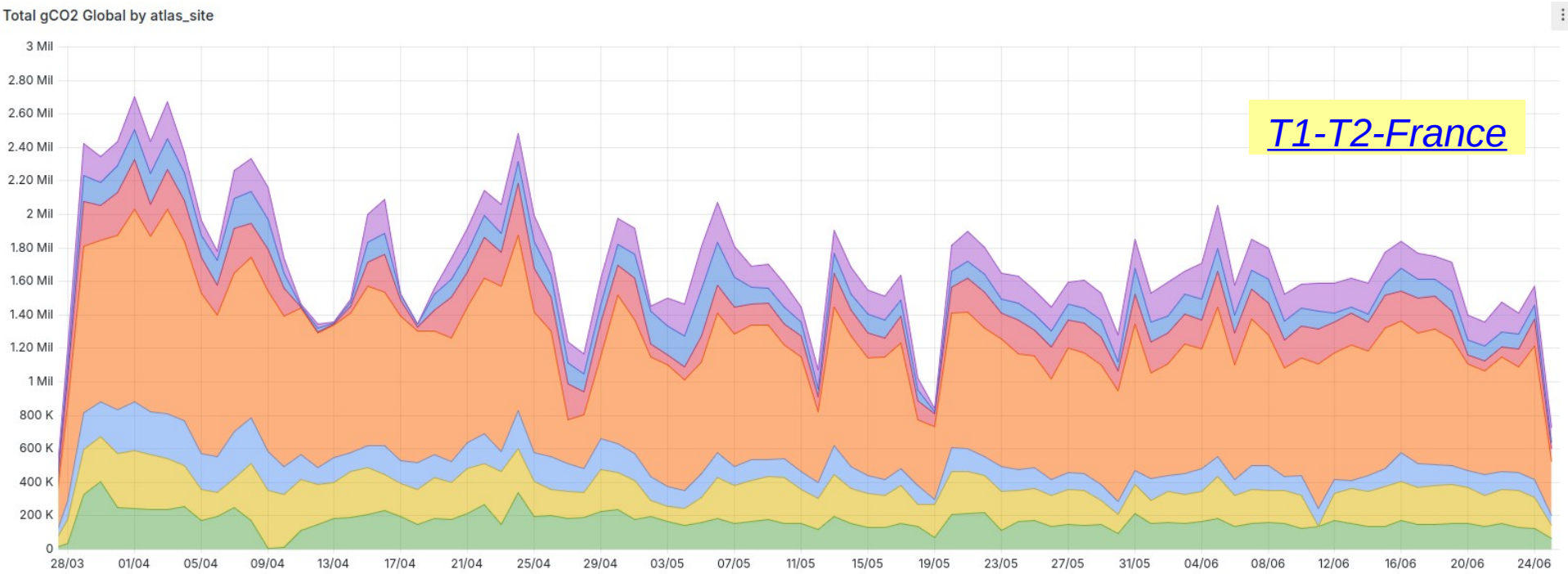
Slots of running jobs (HS23)



  - French pledges (in %) remain at same level as last years
  - + « local » resources in Lyon and labs.
  - no HPC cpu resources in France
  - « recent » increase of price of TB/cpu !

Total gCO2 Global in France

Available since 3 months



CPU energy per core = 10 W

⇒ in CRIC, same values for all sites

conversion W→ gCO2 from where ?

Mini Data Challenges

- **DC27**
  - 2 times the rate of DC24, corresponding to ~50% HL-LHC
    ⇒ to be confirmed during LCG workshop 2026
  - could include rates of tape read/write
  - exact scenarios to be defined

- **Intermediate mini Data Challenges**
  - coordinated by DOMA :
    https://twiki.cern.ch/twiki/bin/view/LCG/DomaMiniChallenges
  - ATLAS T2 sites with 100Gb/s against other FR sites
  - should we test T1 to test rate of I/O on tape ?
  - Jumbo frame evaluation on short and long RTT (Round Trip Delay Time)
  - monitoring
    - adapt these FTS dashboards ?

  ⇒ no more news than what was said during WLCG workshop,
  next during ATLAS S&C week 7-11th July

Analysis Facilities

Requirements for the physics analysis and computing infrastructure for HL-LHC

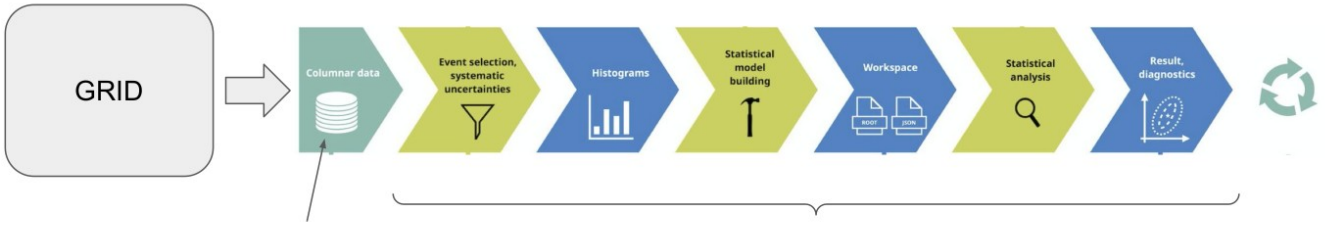
S. Albin, CHEP 2023

	LHC (Run 1 and Run 2)		HL-LHC (Run 4+)
Analysis dataset size	10 TB	Run 3	1000 TB
Target scan turnaround time	Weeks		Hours
Minimum analysis team size	5-10		< 5
Typical analysis resource	....		Analysis Facilities
Analysis specifics	• Search & Precision Physics • Simple ML techniques (BDT) • Basic analysis reproducibility		• Very High Precision Physics • Modern ML (Deep Learning) • Reproducible and Open Data

Need for specialized infrastructures different from the Grid to support analysis workflows in Run-4

ATLAS analysis facility contribution
E. Torro Pastor, WLCG workshop, May 2025

* Specifics in backup



Analysis Facilities

Track 9 summary: Analysis facilities and interactive computing
E. Saaverda, CHEP conference, Oct 2024

Evolution of national AFs

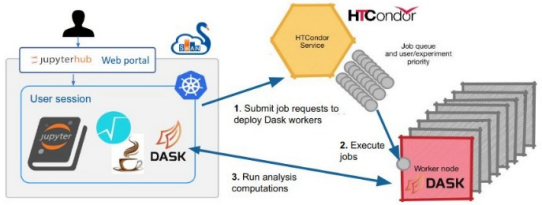
- Chinese HEPS
- German DESY NAF
- Spanish CIEMAT
- Spanish Tier1 and Tier2

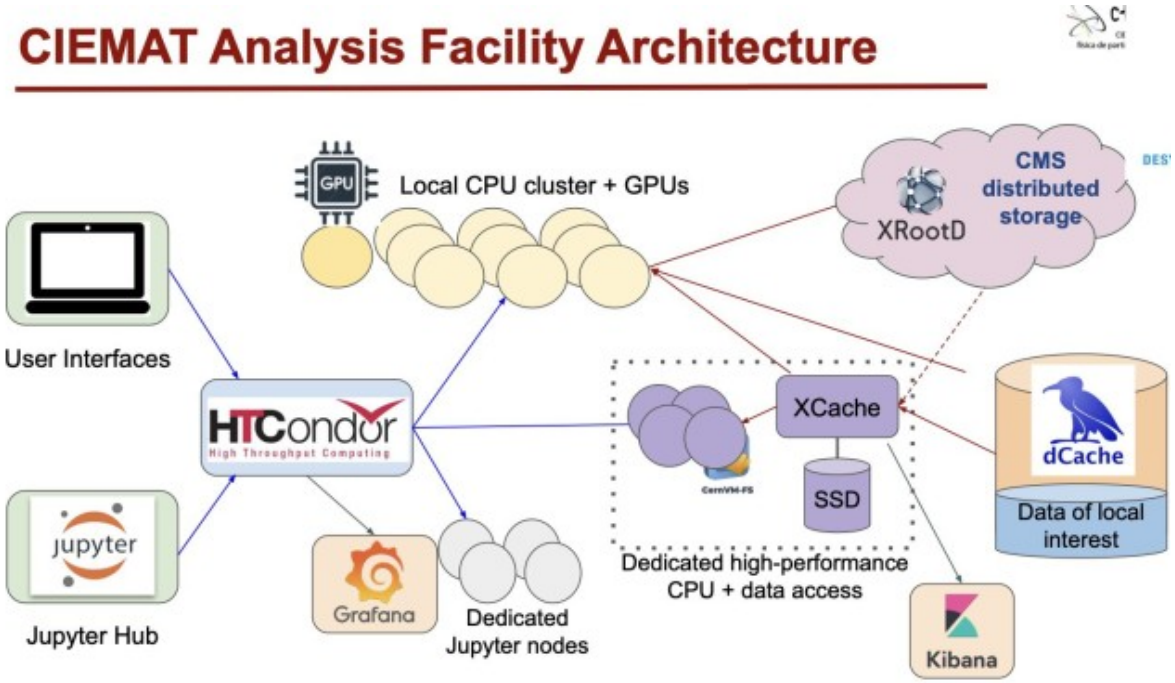
CERN Analysis Facility Pilot

- Available for **scale out of interactive analysis**
- Positive feedback from early testers

The pilot

- Focus on **scale out of interactive analysis**
  - On **already existing** CERN Batch system resources
  - Via RDataFrame / coffea + Dask

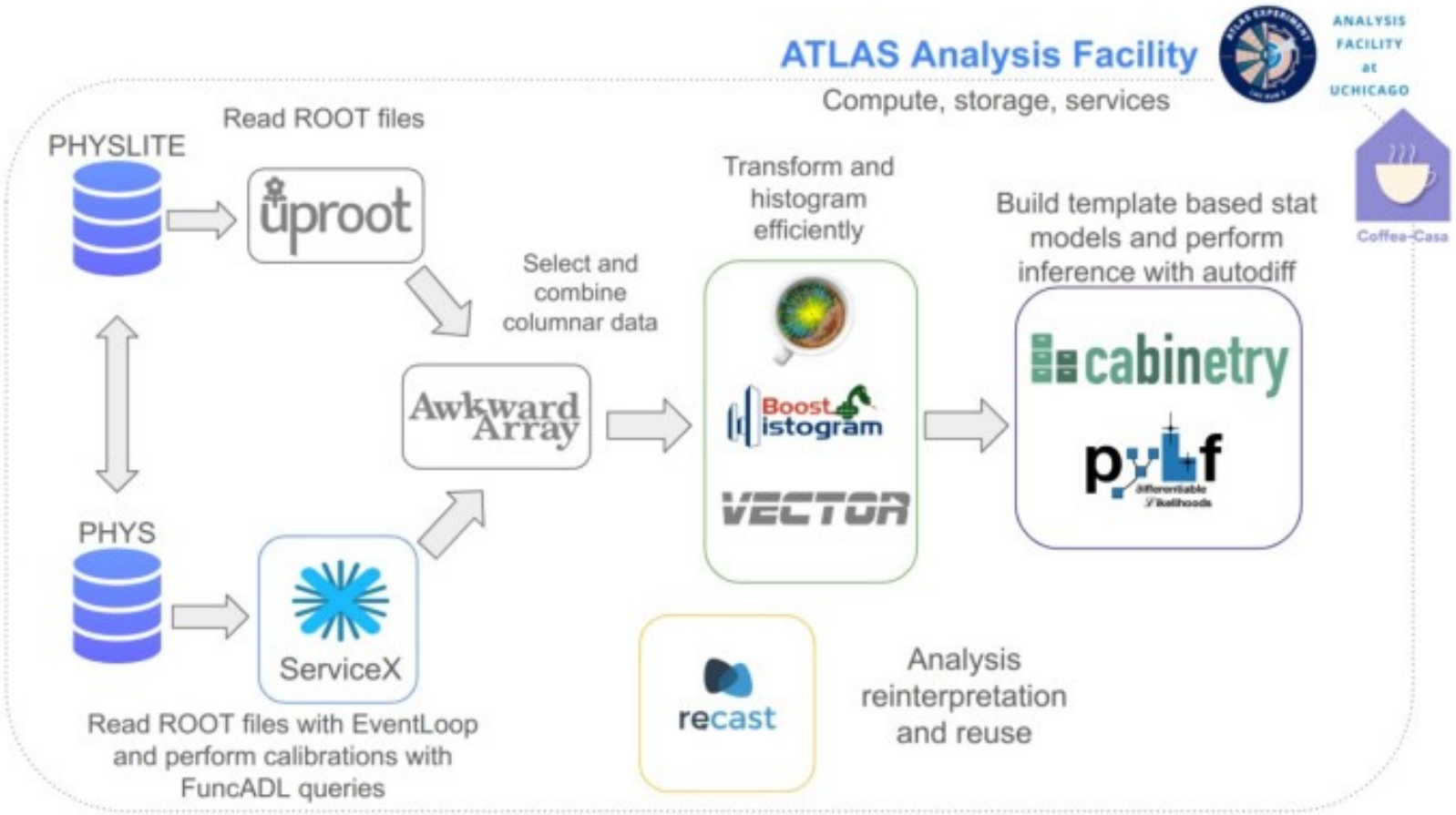




Analysis Facilities

[The 200 Gbps Challenge: Imagining HL-LHC analysis facilities](#)
A. Held, CHEP conference, Oct 2024

The IRIS-HEP software institute

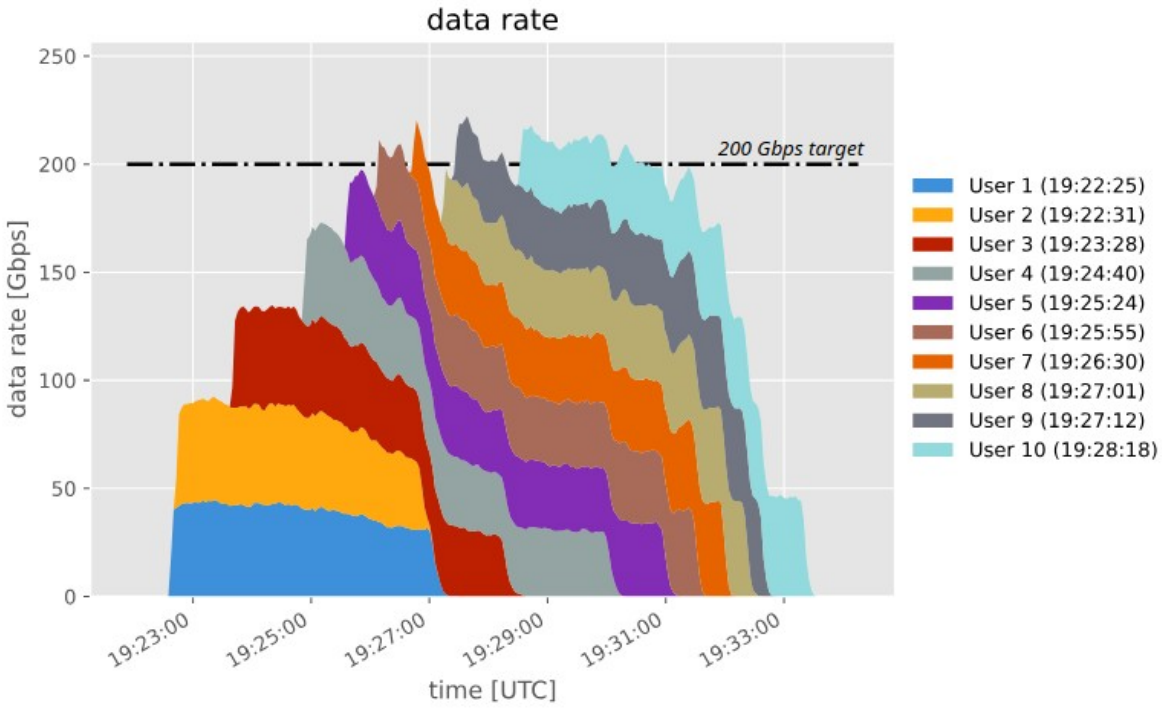


Components of an ATLAS Analysis Grand Challenge (AGC) demonstrator pipeline (c.f. The 200Gbps Challenge (Alexander Held, Monday plenary))

Analysis Facilities

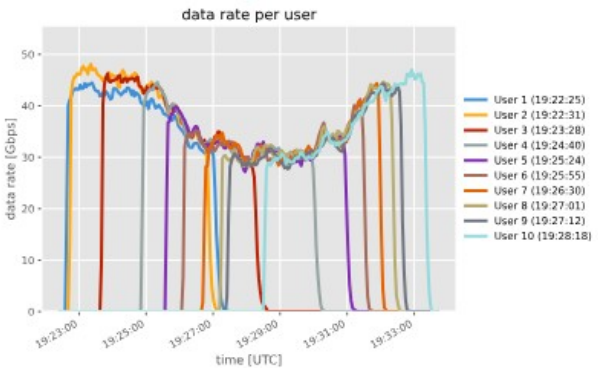
The 200 Gbps Challenge: Imagining HL-LHC analysis facilities
A. Held, CHEP conference, Oct 2024

Bandwidth shared between multiple users



task launch times were randomly distributed to simulate reality of random submissions

- Test with **ten simultaneous users at UChicago**
  - users limited to max 200 cores
- Reached **200 Gbps collectively**
  - network saturation effect visible



Analysis Facilities

- **User experience**
  - mix of grid and local usage
  - multiple users working in Analysis groups
    - not the same level of knowledge of the complete analysis chain
    - not the same needs : grid, local, streams, copy, CPU, high mem, interactivity

  ⇒ learning all new code/frameworks take time with learning curve
  (so many changes that my own « knowing curve » has collapsed !)

- **Links between CC/plateforms/mesocentres**
  - which are the needs of labs/groups ?
  - developments and adaptibility are easier when infra is close to the researchers
  - but more resources available centrally at CC
  - how to use massively notebooks – for analysis, for IA ?
  - access to HPC sites : how to acess IDRIS via FITS ?

  ⇒ very complicated to get any real answer from (French) physicists about their needs

  ⇒ (French) ATLAS physicists doing computing are less and less and are grid oriented – and over busy ! We need new blood, but don't have

  ⇒ my very own point of view : slowly increase the storage « sps type » at CC to ease the analyses
  But for example all GPU usages are done locally / mesocentres !

AOB

Sabine is very email-prolific these weeks !
In general to answer, I contact more physicists through CAF (Computing ATLAS France) than engineers from LCG-FR

- **Recensement des activités actuelles et besoins futurs pour le computing de vos expérience à l'IN2P3**
  - Recensement C&D Expérience-ATLAS.xlsx in attachement on indico
    ⇒ many of the points are in fact more for you … (IAM, VOMS, FTS …)

- **Développements pour votre expériences actuels ou futurs sur les outils Calcul, Données, SO dans le cadre de la collab ESCAPE**
  - Les activités dans ESCAPE qui était un projet Européen H2020 ds le cadre de la construction d'EOSC se poursuivent via un accord de collaboration ouverte entre différentes infrastructures de recherche (CERN: for HL-LHC and its other infrastructures, CTAO, KM3NeT, EGO, ESO: for ELT and its other infrastructures, EST, FAIR, JIV-ERIC, SKAO)
  - les activités en cours : sujet, type de personnels impliqués (IE, IR, CR, DR etc) et le nombre de FTE, et labos sur les 2 dernières années
  - les besoins pour les années qui viennent sur lesquels vous aimeriez vous investir: type d'outils (Rucio, DIRAC, VRE etc), de développements et les RHs associées qui pourraient être disponibles
  - https://box.in2p3.fr/s/gEb9aEWgYH8YZJL
    ⇒ avant le 13 juin mais pas répondu

Conclusion

- **S&C in ATLAS France**
  - smooth operation of CC-IN2P3 as a Tier-1 and our Tier-2s
    but less person-power in sites, FR-support and ADC/DDM central Ops
    ⇒ life is harder and we can feel it !

A BIG thanks to CC-IN2P3, all our Tier-2s colleagues,
& LCG-FR management for the operation, maintenance
and development of our computing infrastructure

R&D for storage/analysis evolution requires person power
– syst admins and physicists –
in order to use solutions which fit our needs !