

Software & computing report 2021

Frédéric Derue, LPNHE Paris

ATLAS France CAF-user meeting

9th december 2021

- CAF and other S&C involvement in France
- ATLAS S&C this year
- Preparation of Run 3

- CAF mandate *indico*

- ensure French S&C activities & resources provided to ATLAS meet expectation
- ensure French physicists get adequate computing infrastructures & resources for analysis

- CAF makes the link between

- French physicists
- French T1 & French T2s sites
- other T2s in the FR-cloud support (China, Hong Kong, Japan, Romania)
- ATLAS S&C
- other projects LCG-FR, DOMA-FR, ESCAPE

- CAF members

- 1 representative/lab APC (G. Marchiori 01/2022 →) ; CPPM (A. Duperrin), IJCLab (L. Duflot), IRFU (J-P. Meyer → 12/2021 then E. Chapon 01/2022 → , A. Formica), L2IT (C. Biscarat → 12/2021 then J. Stark 01/2022 →), LAPP (S. Jézéquel + C. Adam), LPC (D. Calvet), LPNHE (F. Derue, chair), LPSC (P-A. Delsart)
- CC-IN2P3 representative E. Fédé : Technical responsible for T1 A. Vedaee : ATLAS support at T1
- LCG-FR representatives (de facto) L. Duflot, D. Bouvet
- ATLAS-IN2P3 & IRFU resp. ex-officio L. Serin & F. Deliot

ATLAS France web site
<https://atlas-fr.pages.in2p3.fr>

● ATLAS

- International Computing Board (ICB): F. Derue (IN2P3), A. Formica (CEA)
- members of CAF in sites with T2 are also scientist in charge of their local T2
- appointments as appearing in glance

ADAM Coordinator // Activities and Detector Projects // Software and Computing // ATLAS Database and Metadata (ADAM)	ANDREA, Formica	Saclay CEA (France)	2021-01-01	2022-03-31	active	
Conditions Evolution Coordinator // Activities and Detector Projects // Software and Computing // ATLAS Database and Metadata (ADAM)	ANDREA, Formica	Saclay CEA (France)	2021-01-01	2022-03-31	active	
Convener of subgroup: Software // Activities and Detector Projects // Physics // Combined Performance Groups // Flavour tagging CP group	0	ARNAUD, Duperrin	Marseille CPPM (France)	2021-02-01	2023-03-31	active
Convener of subgroup: Reconstruction and Software // Activities and Detector Projects // Physics // Combined Performance Groups // Egamma CP group	0	JEAN-BAPTISTE, De Vivie De Regie	Grenoble LPSC (France)	2021-10-01	2023-09-30	active
Physics Metadata Coordinator // Activities and Detector Projects // Software and Computing // ATLAS Database and Metadata (ADAM)	PIERRE ANTOINE, Delsart	Grenoble LPSC (France)	2021-05-01	2022-09-30	active	

- DOMA access: co-convener S. Jézéquel

● Other

- WLCG/LCG-FR: member of CoDir / scientific director L. Duflot

Software institutional commitments

Information taken from OTP report

→ either Activity= «Computing & Software », either appears the key-word « software »

System	Activity	Task	Institution	Description	Committed [FTE]	Allocated [FTE]	Task requirement [FTE]
Pixel	Computing and Software	Software Development/Maintenance and Physics Performance	CPPM	Performance studies and software development	0.80	0.10	2.98
LAr	Data Preparation	Reconstruction,EDM,Validation	CPPM	Software validation (J. Toth)	0.20	0.07	0.17
DAQ/HLT	Detector Operation	DataFlow	CPPM	Node-level dataflow management software maintenance	0.15	0.00	0.10
General Tasks	Computing and Software	TAG/EI and Conditions/Metadata Database Development	IJCLab	Develop and operate the EventIndex (Hadoop)	1.00	0.55	3.22
General Tasks	Computing and Software	TAG/EI and Conditions/Metadata Database Development	IRFU	Develop and maintain the conditions database infrastructure	0.65	0.20	1.49
LAr	Detector Operation	LAr online software	LAPP	LAr online SW maintenance & development, TDAQ version migration	1.00	1.19	5.07
LAr	Detector Operation	LAr online software	LAPP	LAr online SW maintenance & development, TDAQ version migration	1.00	1.19	5.07
LAr	Detector Operation	Home stations	LAPP	online software test station	0.10	0.00	0.00
Pixel	Computing and Software	Software Development/Maintenance and Physics Performance	LPNHE	Radiation Damage Group Coordinator and general performance studies	0.50	0	0.89
Pixel	Computing and Software	Software Development/Maintenance and Physics Performance	LPNHE	Offline software, rad damage, performance studies	0.25	0.02	2.98
General Tasks	Computing and Software	Reconstruction	LPSC	JET-Athena-Reconstruction	0.20	0.20	1.74
General Tasks	Data Preparation	Dataset-level metadata catalogs and infrastructure (AMI)	LPSC	Support and developemnt for AMI	2.70	0	0

Some of these commitments (e.g part of AMI) are also in-kind contributions

Software & computing FTEs involvement

	Software					ADAM	Computing				
	Core	Upgrade	Data/ Detector	Recol/ Ana	Total [S&C+AS]	Total	C2	C3	C4	Other	Total
APC*			0.08	0.10	0.18 [0.18]						
CC-IN2P3									3.30		3.30
CPPM		2.34	3.16	0.54	6.04 [2.00]			0.05	0.65		0.70
IJCLab	0.20			0.28	0.58 [0.58]	1.12			0.30	0.40	0.70
IRFU						0.60		0.05	0.60		0.65
LAPP			2.80	0.42	3.22 [0.42]		0.06	0.10	1.10		1.26
LPC			0.15	0.40	0.55 [0]				0.75		0.75
LPNHE			0.60	0.68	1.28 [1.04]		0.13	0.45	0.85		1.43
LPSC				0.48	0.48 [0.40]	2.02			0.90		0.95
L2IT		3.00			3.00 [0]						
Total	0.20	5.34	6.79	2.90	15.33 [4.62]	3.74	0.19	0.65	8.45	0.40	9.74

(*contributions from mid-October to December, for earlier period counted as LPNHE)
 S&C report of year 2021, CAF-user meeting, 9/12/2021

- **Computing (9.7 FTE)**

- 8.5 FTE for FR-T1/2 (Class 4)
 - was 9.4 in 2020, 10 in 2019
- 0.65 FTE for Class 3
 - 0.55 for FR-cloud support/management
 - was 0.75 in 2020, 1.35 in 2019
 - 0.10 for other Class 3
 - was 0.4 in 2020, 0.4 in 2019
- 0.19 FTE for shifts (Class 2)
 - was 0.5 in 2020

⇒ computing reduced by ~1.3 FTE wrt 2020 mostly due to departure of one syst admin at IRFU (Class 4) but reduction also in Class 3 (-1 FTE since 2019, departures of Sabine, Luc, in part Stéphane) and also Class 2 (-0.3 FTE)

⇒ ADAM activities are stable

⇒ software activities are increased by >2 FTE (mostly on Upgrade)

- most of software activities (~10 FTE over 15) not in S&C+AS
- ~3 FTE not in OTPs (L2IT, LPC)
- ML and ACTS-like activities counted for L2IT (~3 FTE) but not for some others (IJCLab, LAPP) for ~2-3 more FTEs ...

- **Software (15.3 FTE)**

- 4.6 FTE are labelled as S&C or Analysis Support for ATLAS OTPs
- 0.2 FTE SW core, 5.3 FTE Upgrade (Run 4), 6.8 FTE data/detector, 2.9 FTE reco/analysis

- **ADAM (3.7 FTE)**

- WG management 0.24 FTE
- AMI, EventIndex 3.5 FTE

These numbers include (in general) contributions to other projects on computing to LCG-FR, DOMA-FR, ESCAPE 2

● Talks and publications [[link](#)]

Publications

Les membres d'ATLAS France participent aux publications de la collaboration.

Physique et détecteurs

Les publications sont accessibles sur le site suivant [géré par la collaboration ATLAS](#).

Software & Computing

Les résultats publics de la collaboration sur les aspects software et computing sont disponibles sur la page [suivante](#).

2021

- Acts: A common tracking software, Computing and Software for Big Science, <https://arxiv.org/abs/1910.03128>
- C. Biscarat, S. Caillou, C. Rougier, J. Stark, J. Zahreddine (L2IT), Towards a realistic track reconstruction algorithm based on graph neural networks for the HL-LHC, [arXiv:2103.00916 \[physics.ins-det\]](https://arxiv.org/abs/2103.00916)
- G. Kasieczka et al. (LPC), The LHC Olympics 2020: A Community Challenge for Anomaly Detection in High Energy Physics, [arXiv:2101.08320](https://arxiv.org/abs/2101.08320)
- A. Stakia et al (LPC), Advanced Multi-Variate Analysis Methods for New Physics Searches at the Large Hadron Collider, [Rev. Phys. 7 \(2021\) 100063](https://doi.org/10.1103/RevPhys.7.100063)
- D. Rousseau (IJCLab), Resource-efficient inference for particle physics, Nat Mach Intell 3, 656–657 (2021), [author shareable link](#)

2020

- ATLAS HL-LHC Computing Conceptual Design Report, [CERN-LHCC-2020-015 ; LHCC-G-178](https://cds.cern.ch/record/2605215)
- Xiyao Wang, Lonni Besançon, David Rousseau, Mickael Sereno, Mehdi Ammi, Tobias Isenberg, Towards an Understanding of Augmented Reality Extensions for Existing 3D Data Analysis Tools, CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems April 2020 [Pages 1–13](#)

Présentations

Les membres d'ATLAS France font régulièrement des présentations de leurs travaux.

Physique et détecteurs

La plupart des présentations effectuées en conférences sont accessibles sur le site suivant [géré par la collaboration ATLAS](#).

Software & Computing

2021

- S. Joube (IJCLab), Comparing SyCL data transfer strategies for tracking use cases, [poster](#), ACAT 2021, Virtual and IBS Science Culture Center, Daejeon, South Korea, 28 novembre-3 décembre 2021
- C. Biscarat, S. Caillou (L2IT), Comment la future phase de haute luminosité du collisionneur LHC du CERN, qui doit permettre l'étude des interactions du boson de Higgs, bouscule notre façon de calculer, séminaire de la SFP Midi-Pyrénées (présentiel), 29 octobre 2021
- S. Caillou (L2IT), Graph Neural Network pour la reconstruction de traces dans le détecteur ATLAS, Journée informatique IRFU-IN2P3 2021 (présentiel), 15-17 novembre 2021
- A. Sanchez Pineda (LAPP), A proposal for Open Access data and tools multi-user deployment using ATLAS Open Data for Education, 25th International Conference on Computing in High-Energy and Nuclear Physics, [vCHEP 2021](#), mai 2021
- T. Calvet (CPPM), Artificial Neural Networks on FPGAs for Real-Time Energy Reconstruction of the ATLAS LAr Calorimeters, 25th International Conference on Computing in High-Energy and Nuclear Physics, [vCHEP 2021](#), mai 2021
- C. Rougier (L2IT), Towards a realistic track reconstruction algorithm based on graph neural networks for the HL-LHC, 25th International Conference on Computing in High-Energy and Nuclear Physics, [vCHEP 2021](#), mai 2021
- Louis Vaslin (LPC), pyBumpHunter : bump hunting in python, Poster, Top LHC France 2021, mai 2021
- D. Rousseau (IJCLab), Recent progresses in using Artificial Intelligence for Particle Physics, Invited talk, (American Physical Society April Meeting)(<http://meetings.aps.org/Meeting/APR21/Session/H01>), Data

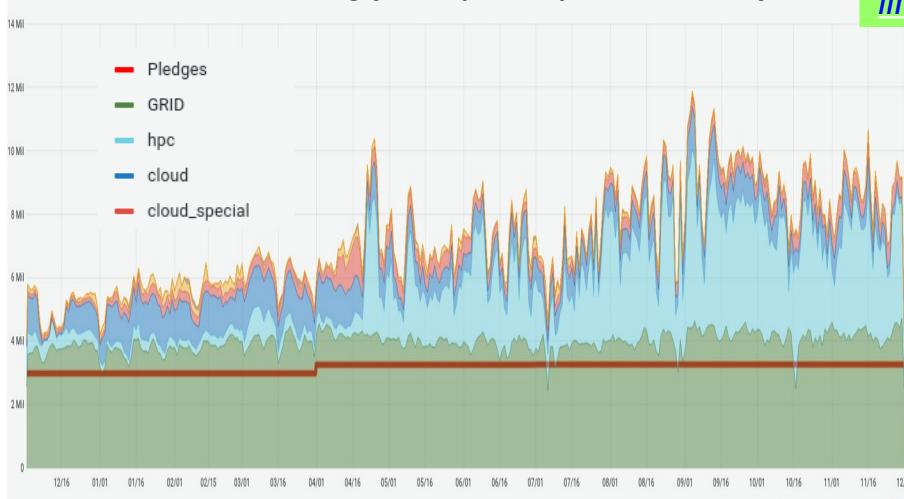
Formations

Des membres d'ATLAS France participent à différentes actions de formations.

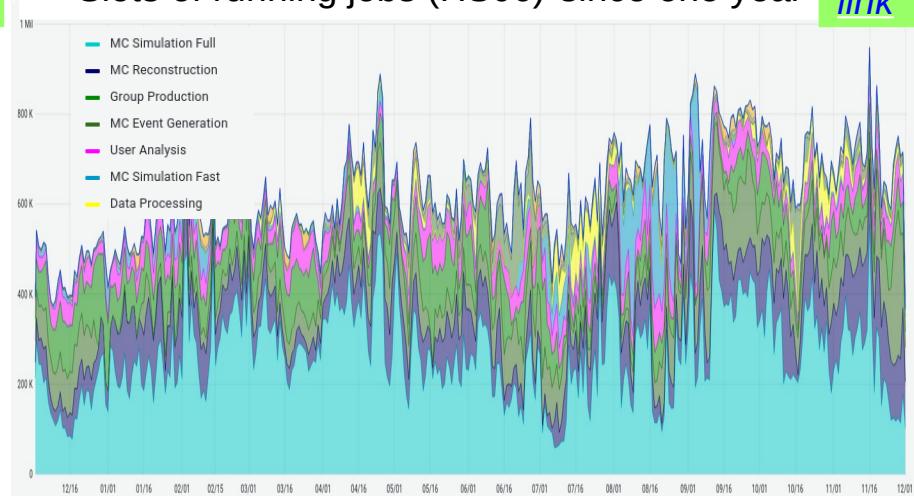
Organisation d'écoles

- Ecole [School of Statistics](#), une Action Nationale de Formation du CNRS/IN2P3 : consacrée aux méthodes statistiques d'analyse des données employées en physique subatomique, en astroparticule, cosmologie observationnelle et dans les domaines connexes tels que l'imagerie. Elle a lieu tous les deux ans
- S. Caillou, formateur à l'Institut de Formation centralisé d'Ile de France (IFSeM) du CNRS. formation "Fondamentaux pour le ML et le DL en Python" (8 demi-journées en 2020 et 2021)

Slots of running jobs (HS06) since one year

[link](#)

Slots of running jobs (HS06) since one year

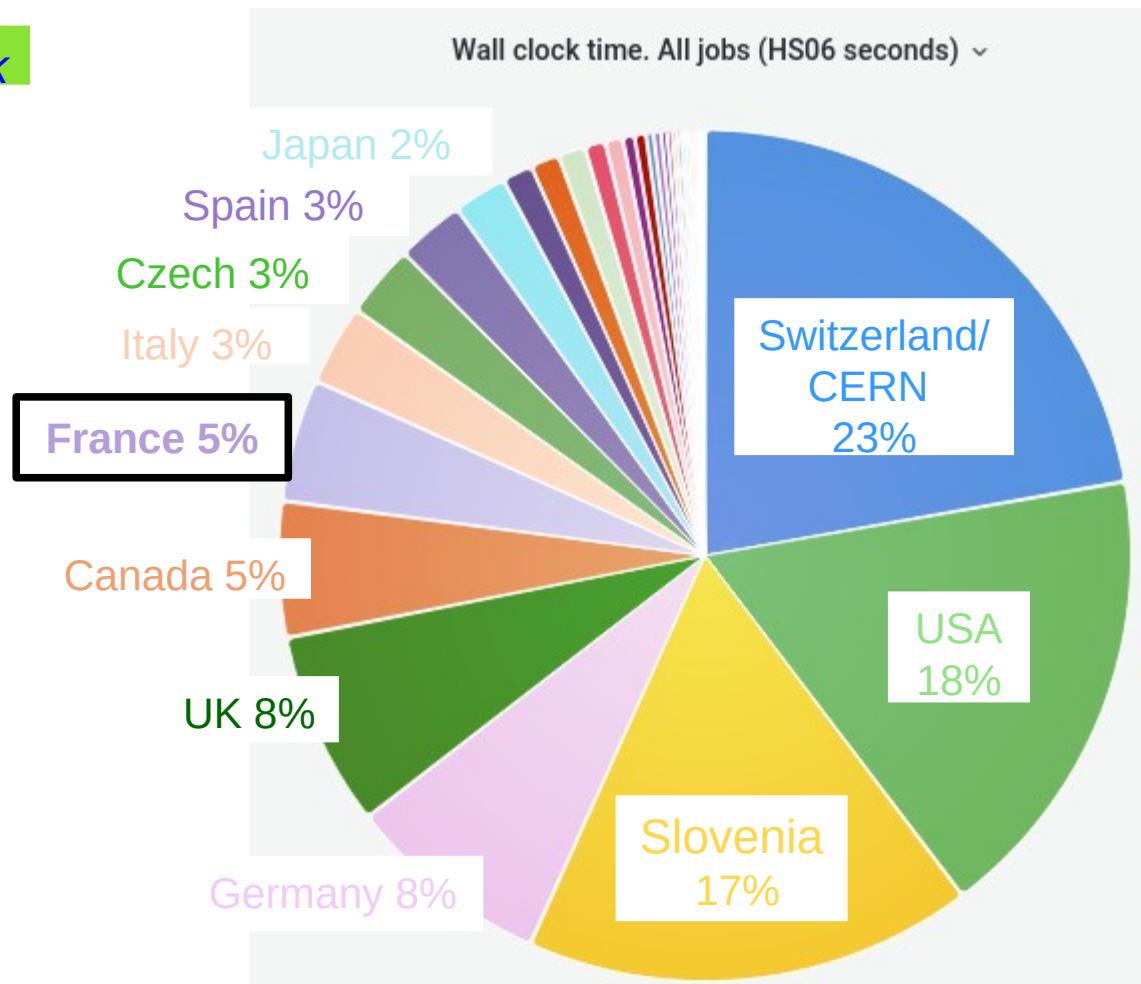
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- **Excellent performance of the distributed computing infrastructure**
 - on the grid, HPC, cloud, HLT farm, T0
 - opportunistic resources (HPCs and HLT farm) are doubling our pledge
 - CPU only – no additional disk from these sites
 - opportunistic – may disappear at any time
 - 500-800 k jobs per day
 - many activities in parallel
 - ~3/4 of MC simu, reco, evgen
 - Run 2 data reprocessing just starting, with Run 2 MC repro that will follow “soon”

Computing usage per country

- Computing usage (HS06) realized on Tier 0, grid, HPC and cloud (pledge+opportunistic) by each country since one year

[link](#)



France has realized 5% of all ATLAS usage of computing resources this year

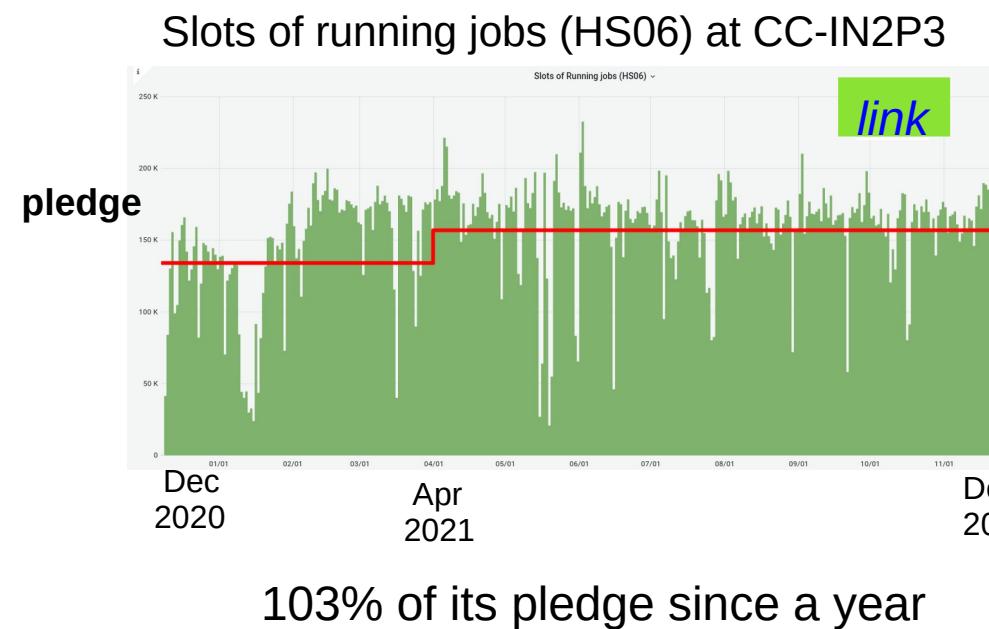
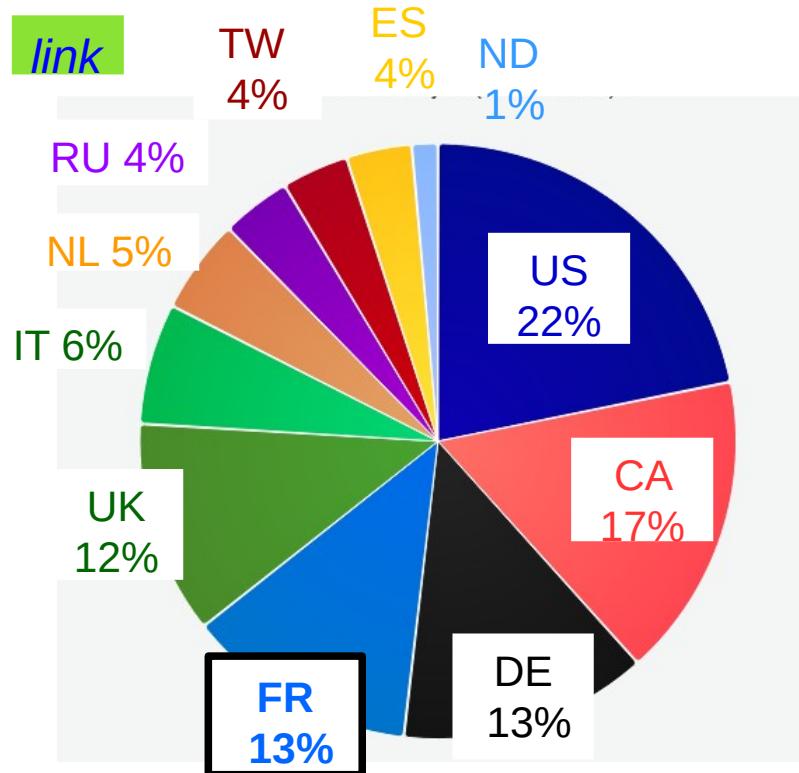
CPU usage on grid in Tier 1

- **Pledge of CC-IN2P3 (see cric)**

- represents 12.6% of all T1s in 2021
- for 2022 pledge increases by 15%
- will represent 13.9% of all T1s

Pledge 2021 (HS06)	Pledge 2022 (HS06)
156780	
	180700

- **CPU realized on grid by each T1 since one year**



France has realized 13% of T1 ATLAS usage of computing resources this year

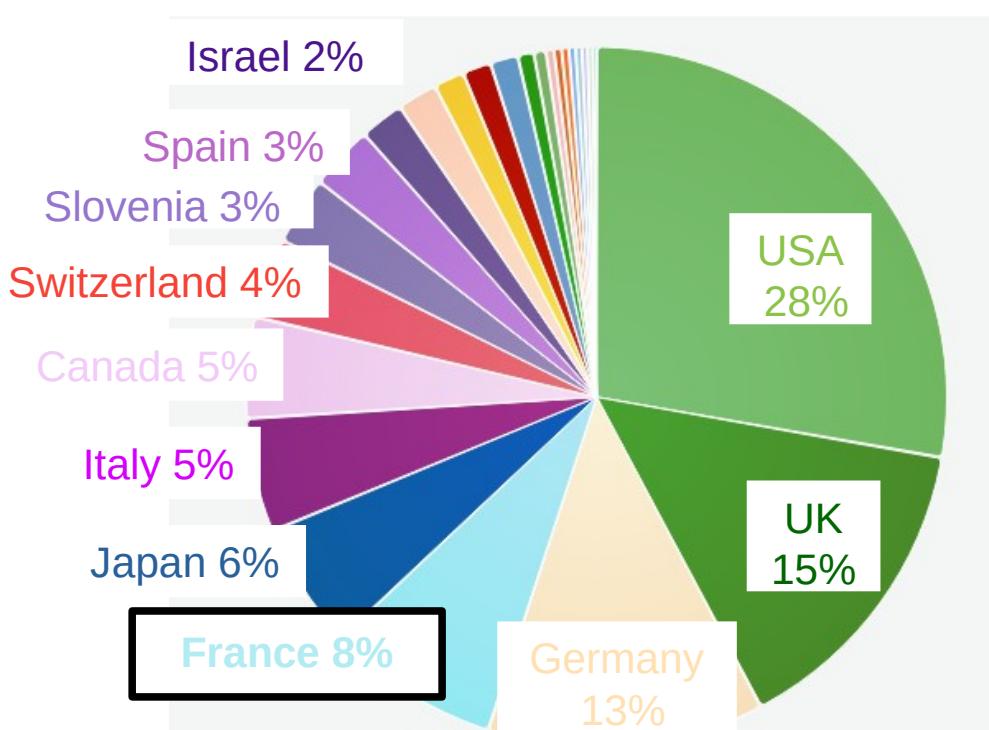
CPU usage on grid in FR-cloud Tier2s

- **Pledge (see cric)**

- FR-cloud : France, Japan, Romania, China
14.9% of T2 in 2021, 14% in 2022
- France : 8.6% of T2 in 2021, 9% in 2022
 - pledges increase by 7% in 2022

- **realized by each country since one year**

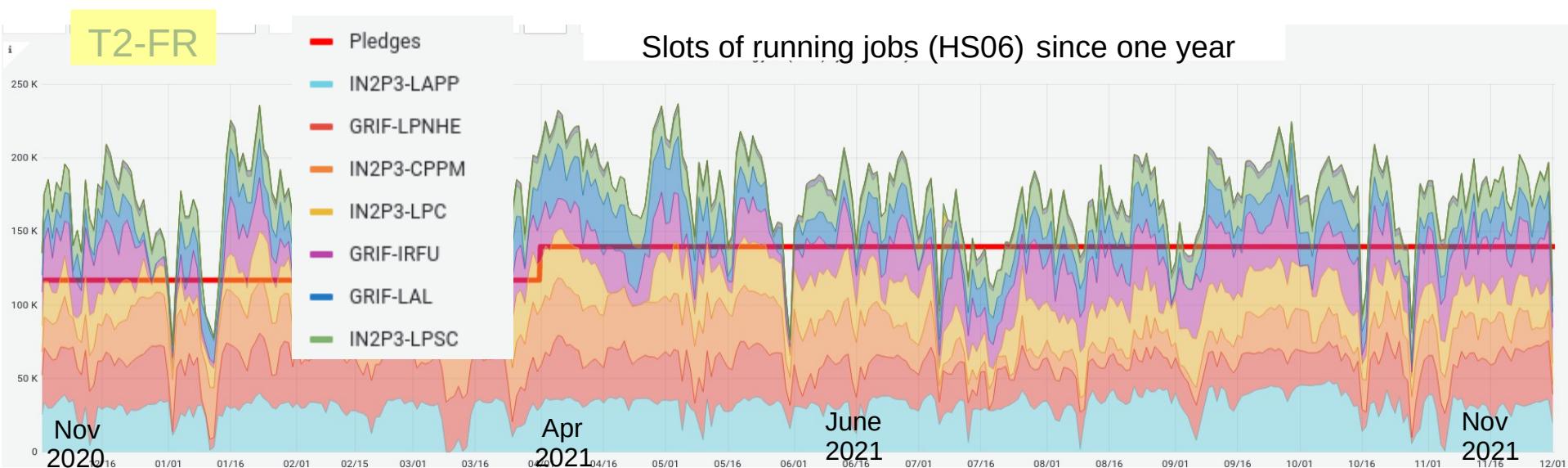
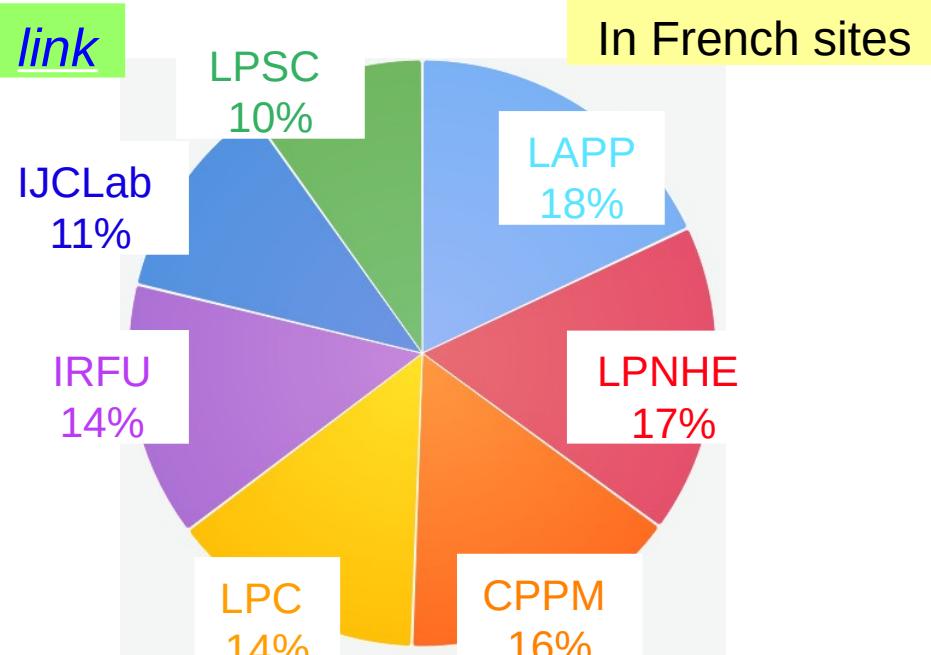
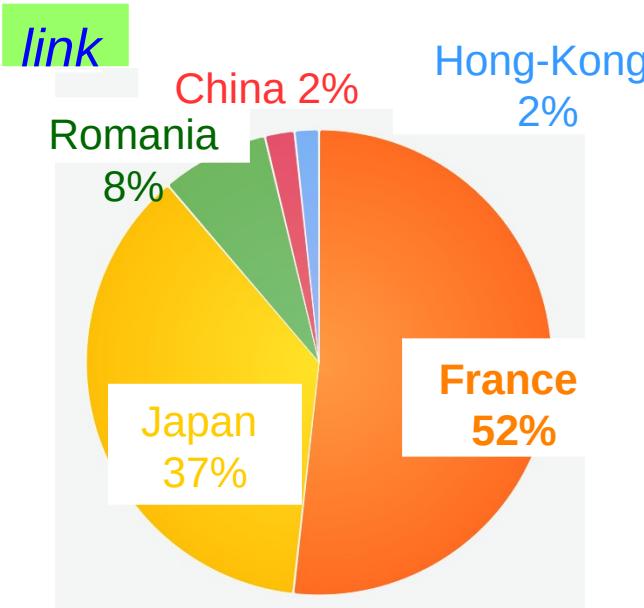
[link](#)



France has realized 8% of T2 ATLAS usage of computing resources this year

Site	Pledge 2021 HS06	Pledge 2022 HS06
GRIF	53320	59391
Tokyo	48000	52000
LAPP	30000	36000
GRIF-IRFU	24000	25900
CPPM	24000	24000
RO-LCG	35000	24000
LPC	19000	24000
GRIF-LAL	16600	18400
GRIF-LPNHE	13200	17200
LPSC	13300	11900
Beijing	8000	8000
Hong-Kong	1000	1000

CPU usage on grid in FR-cloud and French Tier2s



France has realized 134% of its ATLAS T2 pledge of computing resources this year

CC-IN2P3 as « Lyon » (CPU)

The analysis model of ATLAS is to send jobs on grid
 Thanks to CC-IN2P3 we can use our own resources on local batch system

- **local batch system**

- UGE/SLURM batch system based on HTCondor
- pledge ~500 jobs but up to 3500 jobs
- no priorities within ATLAS jobs first arrived first served

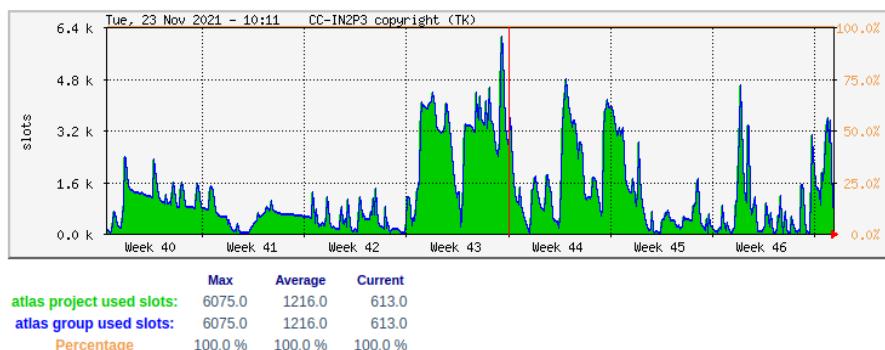
<https://portail.cc.in2p3.fr/>

- **running and requested jobs accessing sps**

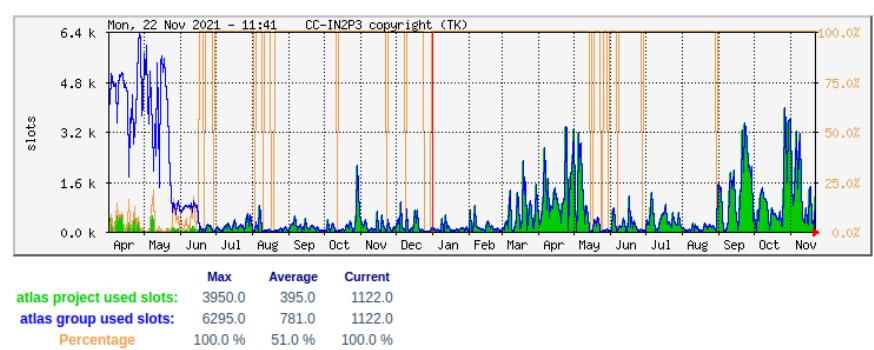
- 4.2% of ATLAS CPU at CC-IN2P3 rest is grid production
- large increase compared to last year

http://cctools.in2p3.fr/mrtguser/mrtguser/atlas/sge_project_atlas_atlas.html

‘Monthly’ Graph (2 Hour Average)



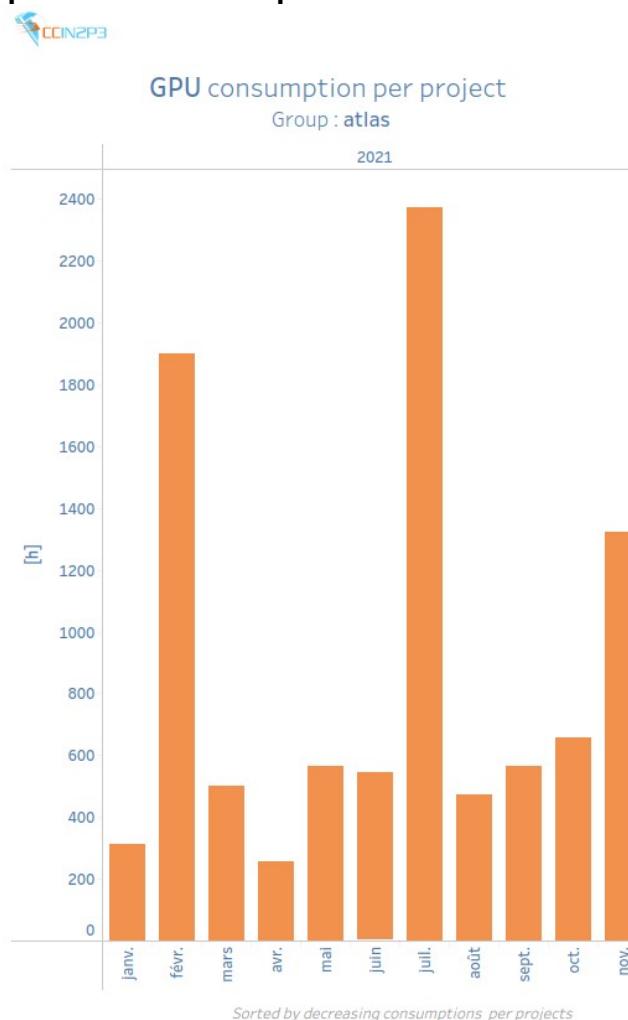
‘Yearly’ Graph (1 Day Average)



Request to CC-IN2P3 for cpu on batch for 2022 is the same as in 2021

Usage of GPUs at CC-IN2P3

<https://portail.cc.in2p3.fr/>



- **Request 2020**

- 4 GPU-year, ~0.5 per lab
- 35kh or ~400h per lab

- **Realized 2020**

- 9 users in total
 - 3 users=90% of usage
- 4600h used
 - 13% of our request

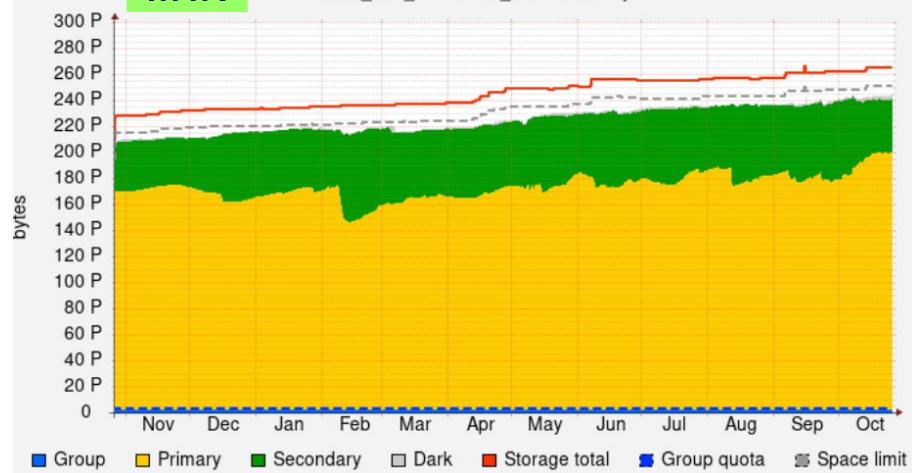
- **Request 2021**

- 2 GPU-year, ~0.25 per lab
- 17kh or ~200h per lab,
or 1400h/month

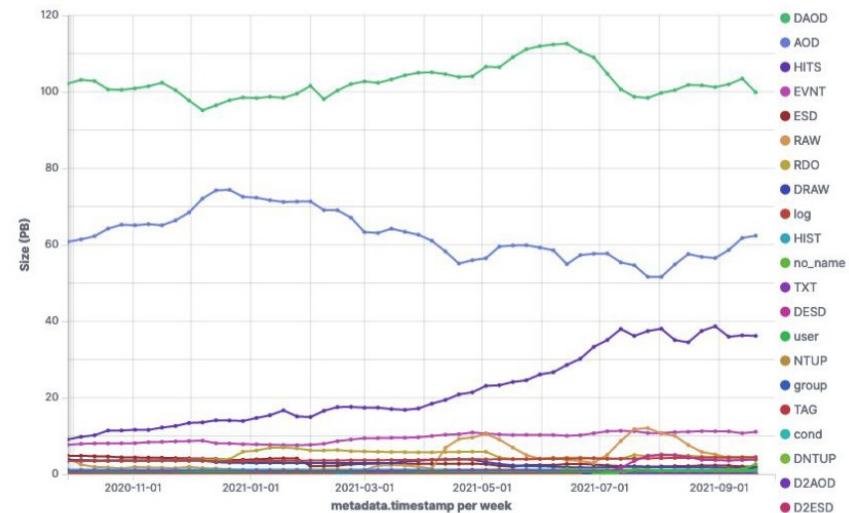
- **Realized 2021**

- 10 users
- ~10000h used, 2/3 of our request
on this period which includes
peaks of usage in Feb/July.

ATLAS France usage of GPUs at CC-IN2P3 in 2019 close to 0
a request of 4 GPU-year has been done to CC-IN2P3 for 2020
pledge reduced to 2 GPU-year (17 000 hours) for 2021 & 2022

[link](#)

ATLAS Global Accounting - DISK bytes split by datatype - date histogram



● Storage evolution

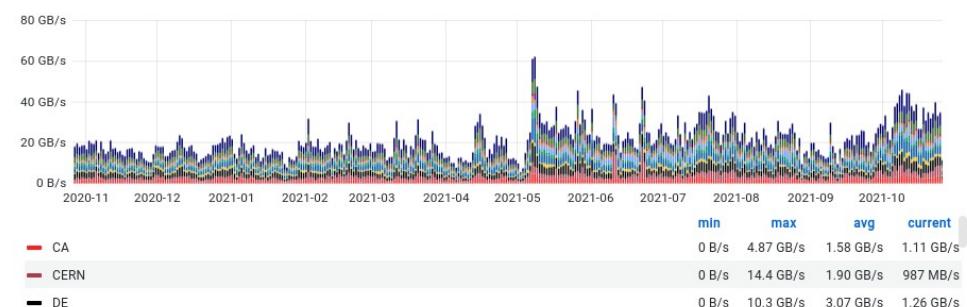
- >500 PB disk+tape used
- disk pledge of 270 PB – 230 TB filled
- AOD policy change, no longer keep a disk replica: larger disk buffer of secondary data
- further use of data carousel beyond RAW and HITS, now less popular (mainly MC) AOD inputs

● Data movement (per day)

- moving 2 PB/d (1.5M files)
@20 GB/s with peaks at 60 GB/s
- deleting ~1-2 PB/d

[link](#)

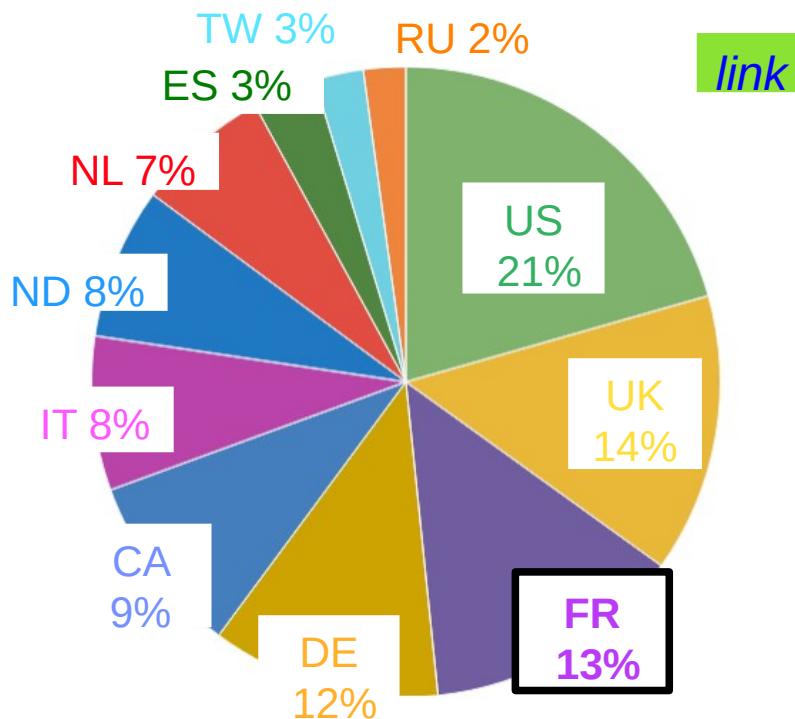
Transfer Throughput



Storage at CC-IN2P3 (disk/tape)

- **Pledge of CC-IN2P3 as a Tier-1 (see cric)**

- represents 13.3% of all Tier 1 in 2021
(12.2 % for disk, 13.9% for tape)
14.3% in 2022 (12.2 % for disk, 13.9% for tape)
- **pledge increases by 17% for tapes and 28% for disk in 2022**



	Pledge 2021 (TB)	Pledge 2022 (TB)
Disk	14175	16240
Tape	33605	40256

- **LOCALGROUP [link]**

- non pledged, accessed from grid/batch
 - 9 users=400 TB on LGD
- **pledge will not increase in 2022**

	Total (TB)	Free (TB)
DISK	520	120
TAPE	250	

- **semi-permanent sps (see link)**

- accessed from batch/interactive
- data not accessed since a year moved to ATLASLOCALGROUPTAPE
- **pledge on sps will not increase in 2022**

	Total (TB)	Free (TB)
sps	360	100

France has realized 13% of T1 ATLAS usage of storage resources this year

Storage usage in FR-cloud Tier2s

- **Pledge (see cric)**

- FR-cloud : 18% of T2s in 2021, 19% in 2022
- France : 9% of T2s in 2021, 10% in 2022
 - pledges increase by 16% in 2022

- **LOCALGROUP**

live-storage

- non pledged resources
- local storage for our analyses

	Total (TB)	Free (TB)
CPPM	245	-1
GRIF	1014	546
GRIF-IRFU	396	103
GRIF-LAL	26	12
GRIF-LPNHE	592	433
LAPP	147	110
LPC	22	11
LPSC	82	22
Beijing	18	9
Tokyo	1300	252
RO-07	11	6

live-storage	Pledge 2021 (TB)	Pledge 2022 (TB)	Installed (TB)
CPPM	2200	2200	2264
GRIF	4962	5510	5238
GRIF-IRFU	1945	2124	2142
GRIF-LAL	1507	1646	1586
GRIF-LPNHE	1510	1740	1510
LAPP	2940	3700	3762
LPC	1500	2188	1735
LPSC	734	-734	1133
Beijing	400	400	370
Hong Kong	1050	1050	1146
Tokyo	7200	8000	7200
RO-07	2500	3500	2635

France has realized 11% of T2 ATLAS usage of storage resources this year

Network in France

- LHCOPN/GEANT @100 Gbps

- LHCONE

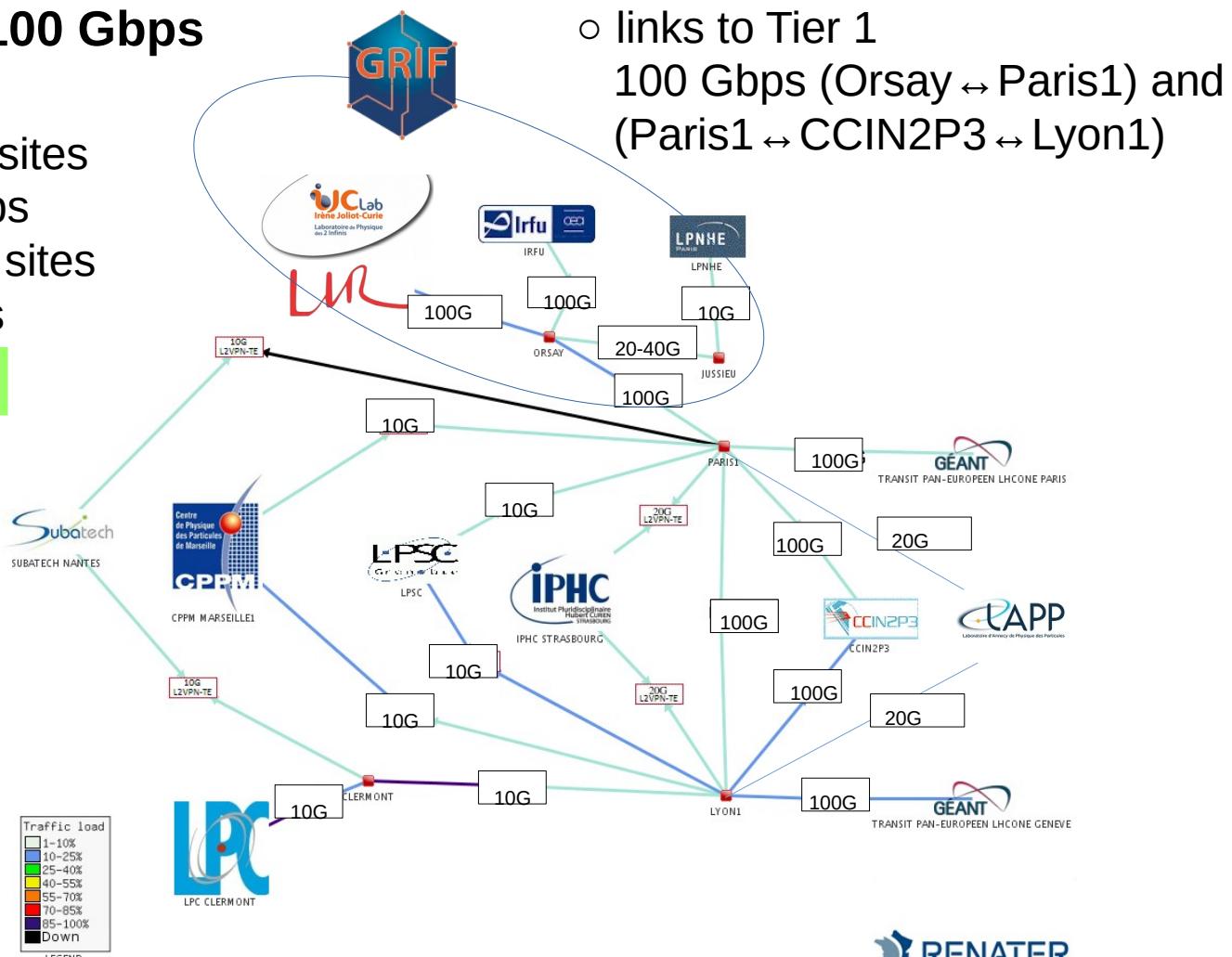
- links in between north sites are now at 10-100 Gbps
- links in between south sites are now at 10-40 Gbps

foreseen upgrade

[link](#)

Site	2020	2021	2023
CPPM	10	20	40
IRFU	100	100	100
IJCLab	20	100	100
LAPP	20	40	40
LPC	10	20	40
LPNHE	10	20	40

barely enough to handle production and R&D at same time



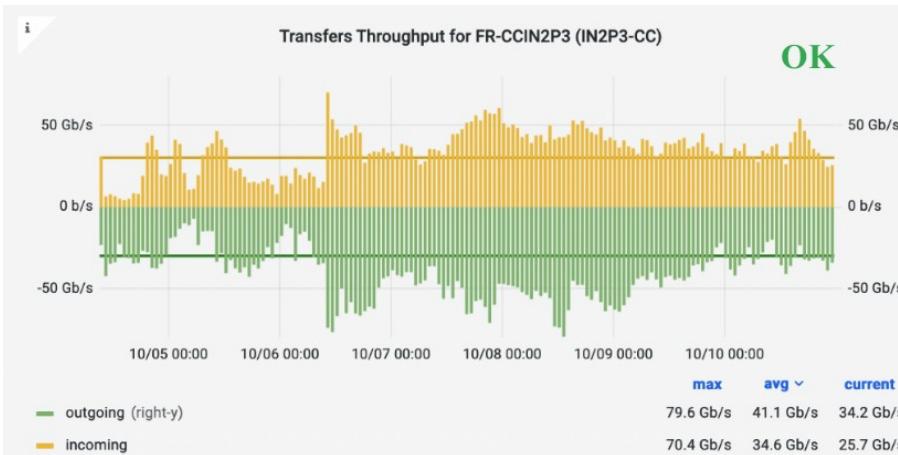
Data challenge : network/disk

● Main goals

- commission transfer protocol HTTP-TPC
- demonstrate we can fill 10% the bandwidth that is requested at HL-LHC scale
- set of challenges to gradually test bandwidth between start of Run 3 and Run 4 increasing the bandwidth expectation each year

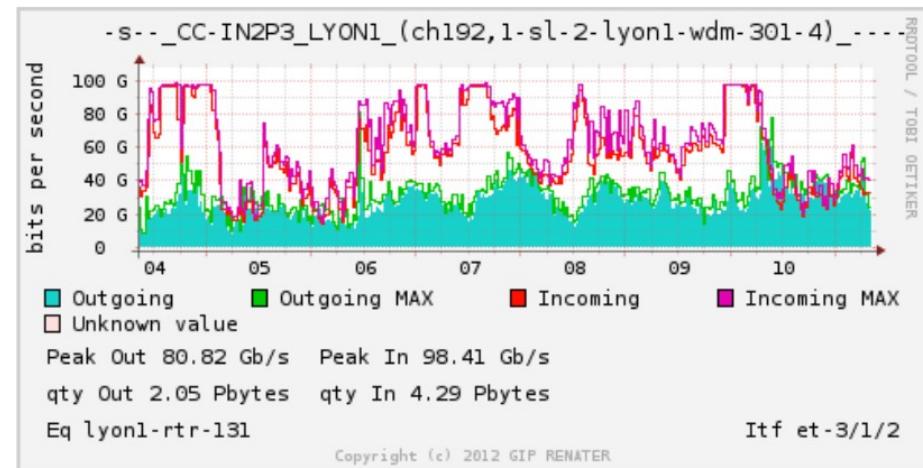
● Challenge running all together

- ATLAS using real data, mainly shipping between the T1s (+CPPM/LAPP/IRFU)
- aim: 30 Gbps minimal, 70 Gbps flexibl



CPPM was limited by its 10 Gbps link,
LAPP was close to its 20 Gbps link (+now get transfer of LPSC during decommissioning)
IRFU was far from its 100 Gbps (not stressed enough)

	Minimal Scenario 2027	Flexible scenario 2027	Minimal scenario ingress/egress targets 2021	Ingress (hourly avg/max)	Egress (hourly avg/max)	comments
T1						
CA-TRIUMF	200	400	10/10	17/49	25/70	ok
DE-KIT	600	1200	30/30	33/77	52/143	ok
ES-PIC	200	400	10/10	11/18	11/17	ok
FR-CCIN2P3	570	1140	30/30	35/70	41/80	ok
IT-INFN-CNAF	690	1380	30/30	25/57	43/87	sum ok
KR-KISTI-GSDC	50	100	0	0	0	Alice T1
NDGF	140	280	10/10	26/49	27/82	ok
NL-T1 (NIKHEF)	-	-	10/10	10/37	12/53	ok
NL-T1 (SARA)	180	360	10/10	13/51	16/79	ok
RU-JINR-T1	200	400	10/10	11/26	12/31	ok
RU-NRC-KI-T1	120	240	10/10	9/18	12/34	sum ok
TW-ASGC	-	-	10/10	8/16	10/13	explain
UK-T1-RAL	610	1220	30/30	16/41	25/43	explain
US-FNAL-CMS	800	1600	40/40	16/49	19/49	explain
US-T1-BNL	450	900	20/20	29/75	38/117	ok
Atlantic link	1250	2500	60/60			
Sum	4810	9620	240/240	259 avg	343 avg	ok



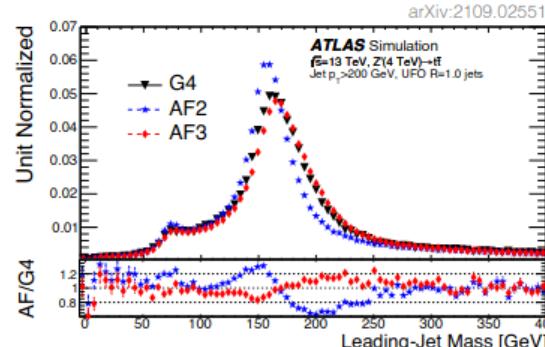
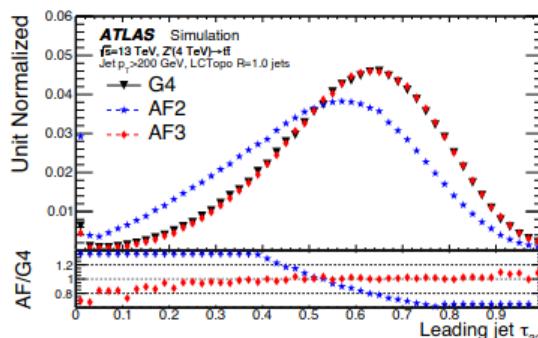
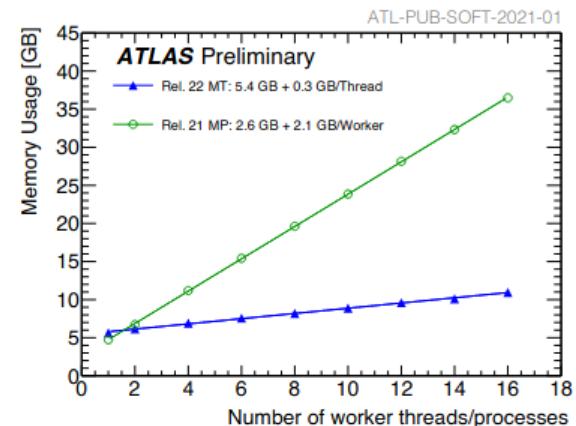
South link often saturates at 100 Gbps

• Software

- see presentation by Pierre-Antoine this afternoon

Software and data preparation efforts focused on multi-threading release 22 for Run 3

- Release fully validated, **Run-2 data and MC reprocessing launched**
- New pileup model and pre-digitised pileup overlay for MC, and new, slimmer analysis model
- New fast (calorimeter) simulation AF3 with much improved G4 fidelity ready; task force to speed up G4 by > 20%
- Now focus on preparations of Run-3 MC (new CM energy, new G4 version, Run-3 geometry with Phase-I detectors (NSW, BIS78), Run-3 trigger with Phase-I systems, updated conditions and calibrations, etc)



Preparations of Run-3 data taking also in full swing

- Consolidation of online and offline Data Quality in new framework
- Re-establishing calibration loop and prompt reconstruction

• HL-LHC readiness and milestones

- see resume of LHCC Review of november at
<https://indico.cern.ch/event/1096616/>

● Database infrastructure

- Oracle19c : long term support extended until April 2027: covers the entire Run 3
- but in 2023, the current Oracle Campus License contract comes to an end.
 - new licensing model is expected to change to Oracle processor based cost proportional to number of CPU cores deployed in DB servers
 - due to licensing cost, Tier1s will probably phase out
 - we need to guarantee we can run with Oracle (and Frontier launchpads) at CERN only

● Application area : AMI

- Oracle DB migration from CC-Lyon to CERN
 - primary AMI service will move @CERN
 - removal of Golden Gate replication from CC-Lyon to CERN
- ongoing activities
 - prepare AMI DB snapshots
 - Openstack cloud AMI nodes @ CERN ready to be used on the snapshot
- migration procedure
 - expected today !
 - simple update of DB connection string
 - transparent for the users in terms of clients (web and pyAmi)

● Protocole 2018-2022

- a yearly budget of 2000 k€ on the 2018-2022 period
- ensure to maintain T1 resources and Analysis Facility at CC-IN2P3
- level of annual financial support of LCG-FR to maintain T2s (not including CC-IN2P3) of 70%
 ⇒ lab/groups need to find the other 30% + find fundings for +10/20% increase of resources following what is recommended by the experiments

	Coûts renouvellement CPU+Disque					
	2018	2019	2020	2021	2022	Σ 2018-2022
GRIF-IN2P3	165 k€	145 k€	186 k€	235 k€	200 k€	931 k€
CPPM	20 k€	55 k€	16 k€	154 k€	18 k€	263 k€
IPHC	44 k€	87 k€	91 k€	106 k€	54 k€	381 k€
IPNL	k€	k€	k€	k€	k€	k€
LAPP	42 k€	135 k€	81 k€	77 k€	62 k€	397 k€
LPC	31 k€	74 k€	107 k€	103 k€	50 k€	366 k€
LPSC	49 k€	49 k€	64 k€	60 k€	56 k€	277 k€
SUBATECH	49 k€	k€	k€	73 k€	86 k€	208 k€
Total T2 IN2P3	400 k€	545 k€	544 k€	807 k€	525 k€	2822 k€

Tableau 7 : coût du renouvellement du matériel dans les sites T2 hors CC-IN2P3 (CPU et disque sommés) avec une hypothèse de coûts constants (scénario 2).

● Protocole 2023-2027

- IN2P3/LCG-FR meeting with lab directors (DUs IN2P3) on 29th November
- maintain/develop resources
- keep an eye on the repartition key between experiments
-

- **GRIF-IRFU**

- after many years of good and loyal services,
Frédéric Schaer has left GRIF duties at the beginning of the year
Jean-Pierre Meyer has left / is leaving GRIF / CAF duties this year

- **LAPP**

- new contact is/will be Cécile Barbier to foresee replacement
of Frédérique Chollet

A **HUGE** thanks to all of them !

- **LPSC**

- decommissioning foreseen for January 2023 but in practice....
- we started mid-October to remove the LPSC storage from the PandaQueues
- it will let time to DDMOps to empty the storage and move files elsewhere
 - SCRATCHDISK has been emptied
 - DATADISK → ongoing
 - LOCALGROUPDISK, 55 TB → need cleaning, then move to one of our LGD (CC-IN2P3 or LPNHE)
- the LPSC CPU resources are still used of course !
→ close-site, to send/receive data, is LAPP (with more pressure on network)

- **CAF group and activities**

- some ongoing changes in the list of CAF representatives
- also involved in support for FR-cloud !

- **S&C in France**

- smooth operation of CC-IN2P3 as a Tier-1 and our Tier-2s
- level of resources for ATLAS-FR users reviewed by CAF in september
 - adequate level of resources of CC-IN2P3 as Analysis Facility in 2021 (batch, sps, LGD), keep same level in 2022
 - CC-IN2P3 offers GPU farm less used than expected, request of 2 GPU-year done for 2022
 - many other resources also available in laboratories (Tier-2s, local batch/disk)

**A BIG thanks to CC-IN2P3 and all our Tier-2s colleagues for
the operation, maintenance and development
of our computing infrastructure especially in this complicated year !**

- **S&C in ATLAS, preparation of Run 3 and Run 4**

- for Run 3 new analysis model will be used, in particular fewer/smaller DAODs
- preparation of Run 4 within WLCG(-FR) and DOMA(-FR)
- participation to technical activities – see this afternoon presentations on software readiness for Run 3 & tape carousel

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