



High Energy Physics and Instrumentation Center at IFUSP

COMPUTING FOR ALICE IN THE UNIVERSITY OF SÃO PAULO - IFUSP (SAMPA site) IN 2022/2023 BRAZIL

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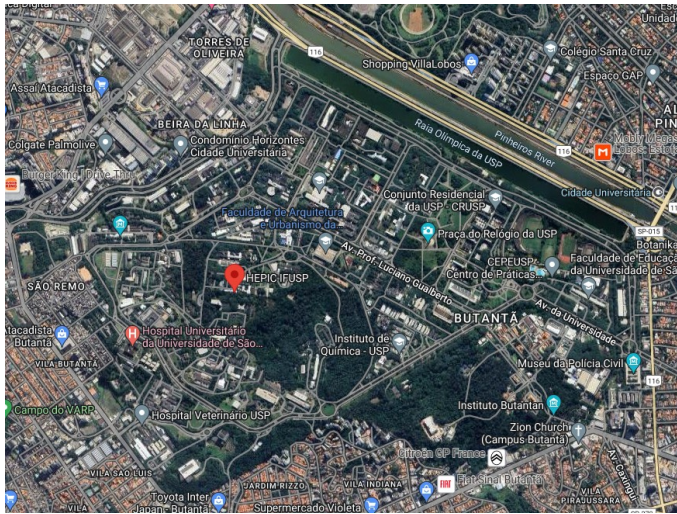
High Energy Physics and Instrumentation Center at IFUSP

Outline

- Description of our Computing Cluster: SAMPA
- Report of the pledged delivered resources
- Future Planning
- Summary and Outlook



USP overview and HEPIC Building



USP in numbers:

- 8 campuses
- 42 institutes
- 97k students
- 5k professors
- 13k employees
- 333 undergraduate courses
- 264 postgraduate courses



Main USP Campus in Butantã 3.7M m²

HEPIC Building where is hosted
CCIFUSP Datacenter



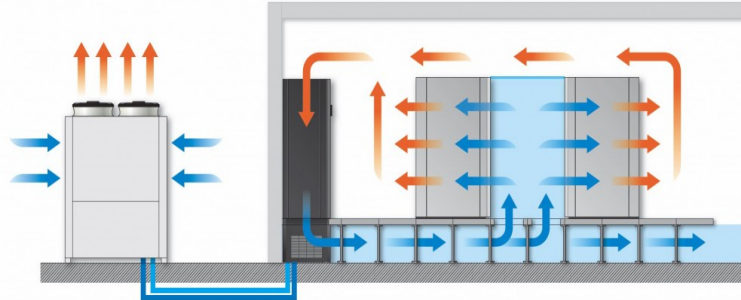
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CCIFUSP Data Center



Inside the HEPIC-IFUSP Building on the first floor is hosted CCIFUSP data center, which is designed to separate the cold corridor from the hot corridor

Cooled air flows only into enclosed area from the perforated floor tiles
The SAMPA rack row of hardwares



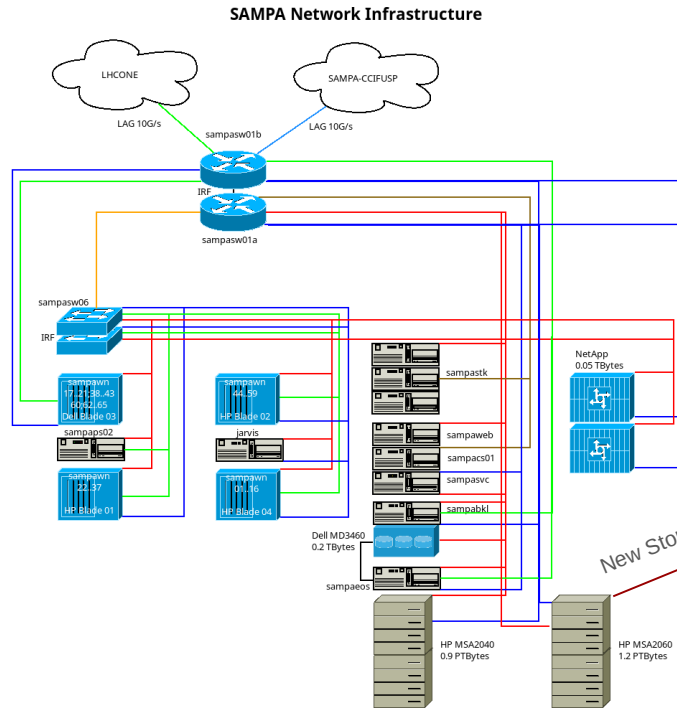
Description of our Computing Cluster: SAMPA

The bigger T2 site in Latin America running ALICE, ATLAS and local users jobs:

- 2384 slots to processing jobs on HTCondor;
- 900 TBytes disk space on EOS the first one outside Cern;
- 90 TBytes disk space to CVMFS stratum one repositories, the first one in South hemisphere;
- Around 95% of the availability and reliability;
- Hosted on CCIFUSP data center:
 - Door with electronic lock access
 - 3x1 UPS 80kVA (battery banks)
 - Diesel electric generator of the 313kVA
 - 2 air-conditioning of the 16TR/each one with precision cooling capabilities



SAMPA Site infrastructure overview



Hardware	Amount
HP DL 360 Gen 10	4
HP DL 380 Gen 8	4
HP DL 360 Gen 8	1
Enclosure HP BS 7000c	3
Enclosure Dell 1000Me	1
HP A5120	4
HP A5820X	2
HP FlexFabric 5710	1
HP MSA 2060 1.2 PBytes	1
HP MSA 2040 900 TBytes	1
NetApp 50 TBytes	1
Dell MD3460 200TBytes	1

New Storage, not yet in production

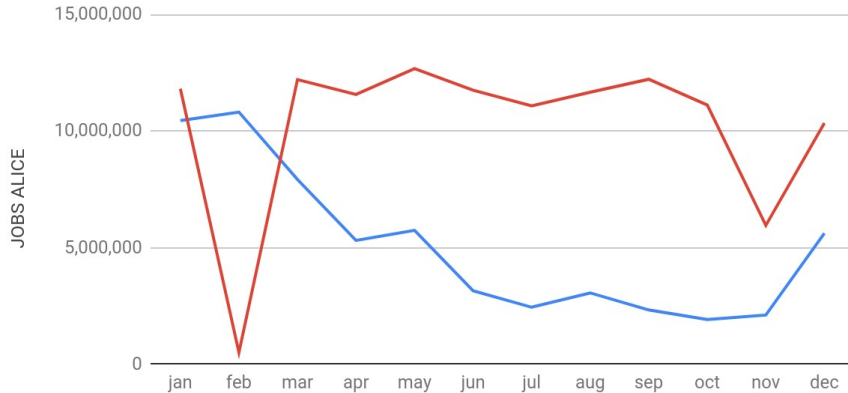


Report of the pledged delivered resources

Accounting Summary

HEPSPEC-HR

— 2023 — 2022

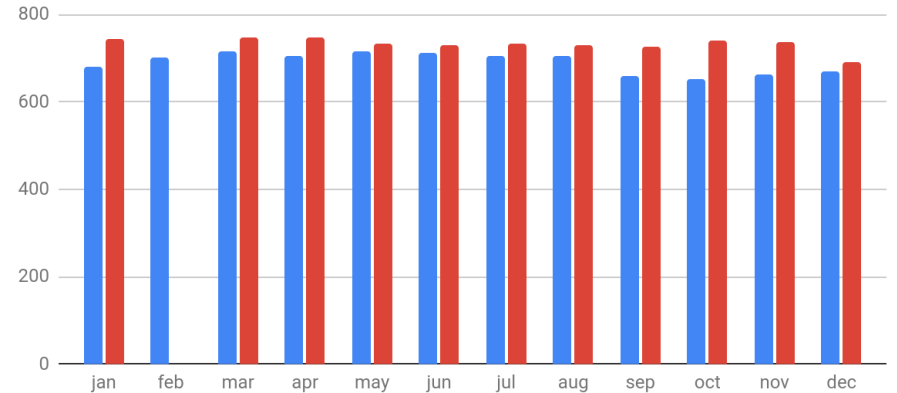


Average CPU Power delivered in 2023 was 16,800 and 2022 was 22,000

Accounting Summary

Disk Used in TBytes per month

■ 2023 ■ 2022

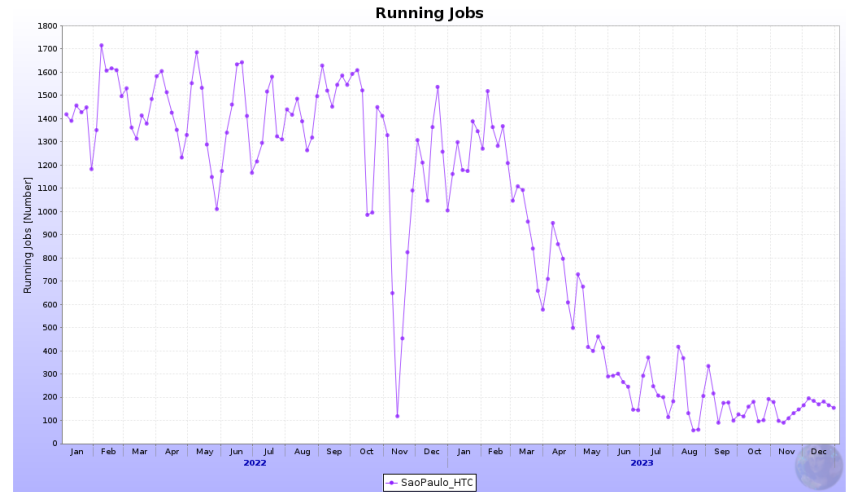
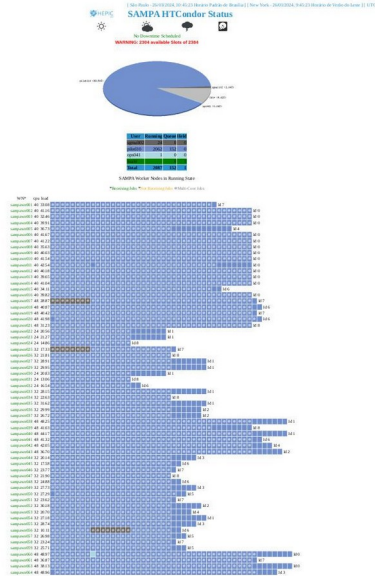


Average Disk usage 2023 was 689 delivered and 2022 was 732



Report of the pledged delivered resources

2023 HEPSPEC Accounting		
	Delivered CPU Power	Total
jan	22,394.43	16,661,453
feb	22,162.97	14,893,513
mar	18,302.96	13,617,405
apr	16,784.11	12,084,559
may	14,870.06	11,063,328
jun	16,094.15	11,587,789
jul	12,863.15	9,570,187
aug	16,714.50	12,435,591
sep	19,247.53	13,858,219
oct	16,373.55	12,181,919
nov	16,339.93	11,764,747
dec	22,035.33	16,394,283



Report of the pledged delivered resources

Grid ALICE M&O Pledge

Requested			Delivered/Foresee		
Year	CPU(kHS06)	Storage (PB)	Count Year	CPU(kHS06)	Storage (PB)
2022	20.7	2.12	1	18.4	0.55
2023	23.4	2.42	2	18.4	1.95
2024	25.4	2.72	3	25.4	1.95
2025	29.,2	3.12	4	25.4	1.95
2026	33.6	3.59	5	33.6	3.59

Since 2019 the SAMPA cluster hasn't increased neither CPU power nor storage system and we have a shortfall of disk space

IFUSP Computing Federation going to help to increase opportunistic CPU power sharing computing resources with the SAMPA cluster, and increase the delivered CPU power in the upcoming years in the end in accordance with new FAPESP rules



Future Planning

- Creation of a Clusters Federation to facilitate fundraising and the usage of opportunistic resources from other clusters in our Institute
- Docker container for all services to make easy to install a new cluster in the IFUSP Computing Federation
 - SAMPA private registry
 - SAMPA private ROOT CA
 - Ansible Orchestrator



Summary and Outlook

In 2020, was approved our funding request for our HPC project by FAPESP (São Paulo Public Funding Agency)

The first investment was a storage server with a capacity of 1.2PBytes

The creation of a cluster federation to use opportunistic processing and increasing our CPU power eventually, make it easy to the SAMPA site to acquire more CPUs from FAPESP Funding Agency too

Initiative to turn CBPF opportunistic CPUs in permanent on ALICE VO

We design a new computational environment to optimize the use of the hardwares and make it easy to install a new entire cluster to increase the number of slots and opportunistic CPUs keeping in mind the IFUSP Computing Federation initiative

Good perspectives to keep up the reliability and availability level of the services and fulfill our pledge duties

