CERN IT GPU Update

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https://indico.cern.ch/event/1005984/

Reminder

https://clouddocs.web.cern.ch/gpu/README.html

GPU availability on virtual machines, batch, kubernetes clusters, …

And higher level services: *lxplus, gitlab, swan, ...*

Request for GPUs: *GPU Platform Consultancy Functional Element*

https://cern.service-now.com/service-portal?id=functional_element&name=gpu-platform

#GPU channel on IT-dep mattermost

Access to GPU resources

Server Provisioning Service (Ticket created in FE = GPU Platform Consultancy)

Fill this form for requesting **access to GPU resources**.
If you don't need access but you have another kind of request for the GPU Platform Consultancy, please use **this form** instead.

N.B. it will create a ticket directly into "GPU Platform Consultancy" 2nd level.

Usage pattern expected (spiky if <30% overall usage, full if >80%)

(•) Spiky ( ) Medium ( ) Full

Specific performance requirements for floating point precision

(•) Double ( ) Single ( ) None

Type of interface desired

(•) Notebook ( ) Batch ( ) Kubernetes ( ) VM ( ) Other

Openstack project name (required for Kubernetes and VM)

CUDA drivers and versions required (custom if you need specific drivers)

(•) Custom ( ) Any

ML framework being used (for machine learning workloads only)

(•) Tensorflow ( ) PyTorch ( ) scikit-learn ( ) Other

Distributed training possible or desired (for machine learning workloads only)

No

* Number of GPUs required

* Project Description (overview, purpose, software, specific requirements)

Usage

Requests for GPU access coming at a steady pace

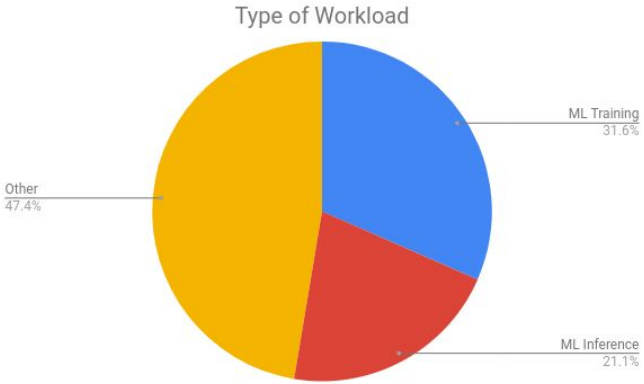
- Spread over different departments and projects

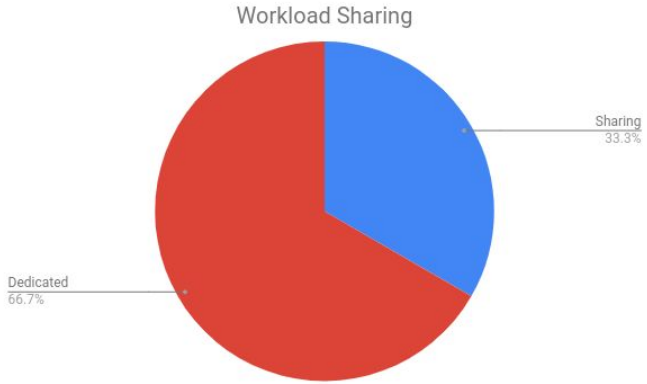
Many requests forwarded to higher level services (batch, notebooks, …)

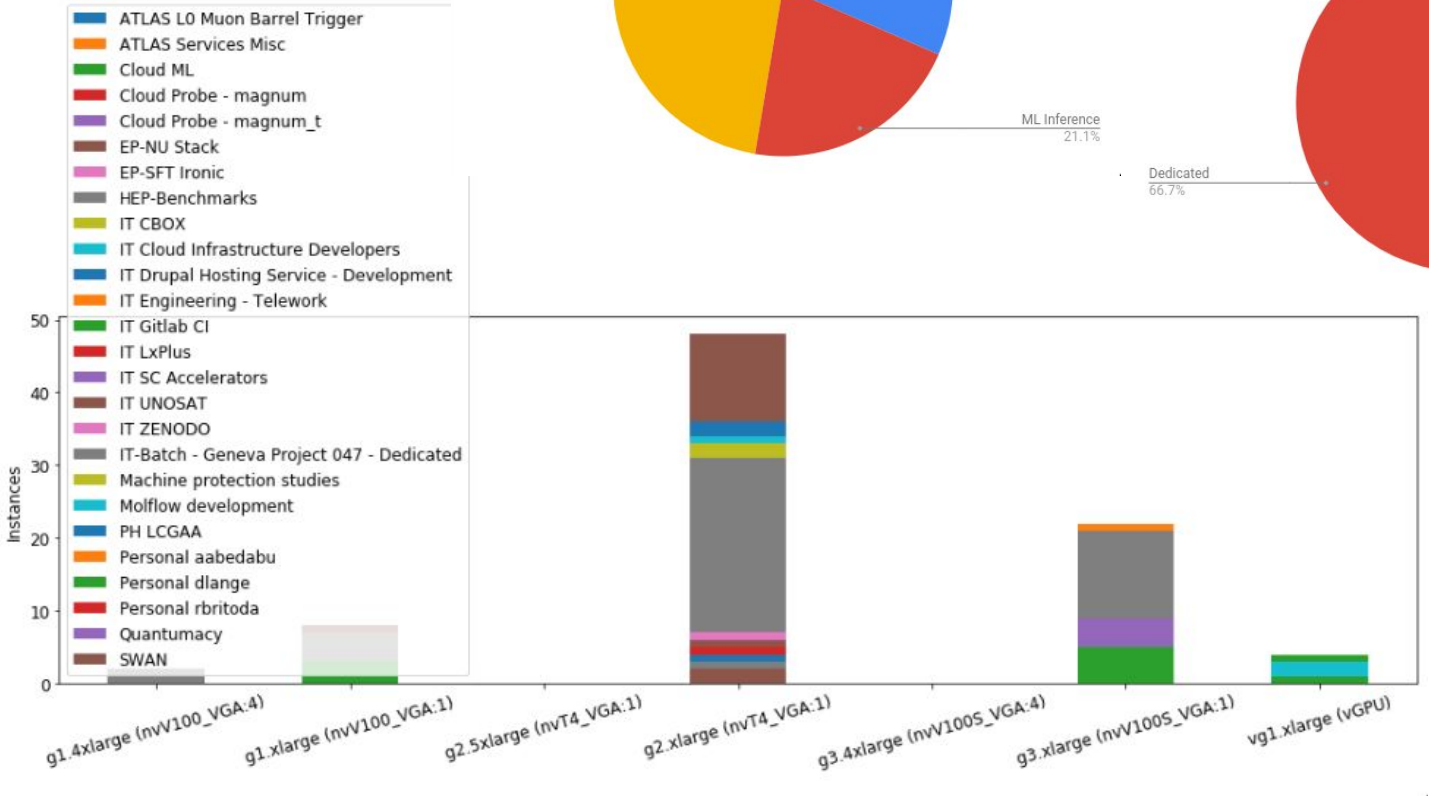
Overall we’re always full regarding assignment of available resources

- But keep flexibility so we can accommodate big requests (tutorials, …)
- Dedicated assignments are made with limited duration for non shared services

Usage


Type of Workload
ML Training
31.6%
Other
47.4%
ML Inference
21.1%


Workload Sharing
Sharing
33.3%
Dedicated
66.7%


ATLAS L0 Muon Barrel Trigger
ATLAS Services Misc
Cloud ML
Cloud Probe - magnum
Cloud Probe - magnum_t
EP-NU Stack
EP-SFT Ironic
HEP-Benchmarks
IT CBOX
IT Cloud Infrastructure Developers
IT Drupal Hosting Service - Development
IT Engineering - Telework
IT Gitlab CI
IT LxPlus
IT SC Accelerators
IT UNOSAT
IT ZENODO
IT-Batch - Geneva Project 047 - Dedicated
Machine protection studies
Molflow development
PH LCGAA
Personal aabedabu
Personal dlange
Personal rbritoda
Quantumacy
SWAN
Instances
0
10
20
30
40
50
g1.4xlarge (nvV100_VGA:4)
g1.xlarge (nvV100_VGA:1)
g2.5xlarge (nvT4_VGA:1)
g2.xlarge (nvT4_VGA:1)
g3.4xlarge (nvV100S_VGA:4)
g3.xlarge (nvV100S_VGA:1)
vg1.xlarge (vGPU)

What's New

Action items from the last update in this forum (Feb 2021)

- https://indico.cern.ch/event/1005976/
- GPUs on lxplus: done - lxplus-gpu.cern.ch
- GPUs on Gitlab CI (as shared runners): done

Other items

- GPUs on SWAN (done)

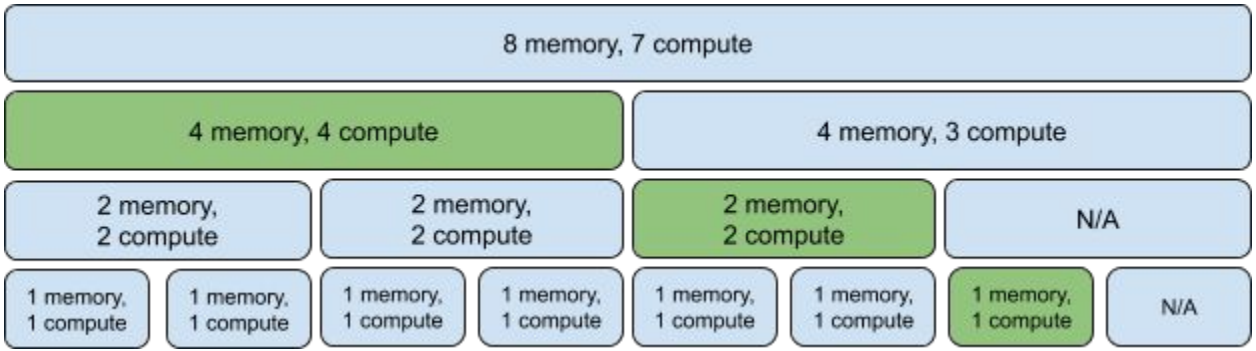
Coming Soon...

New Nvidia A100 cards should be available early next year

Significant performance improvements for ML but also other use cases

Ability to **physically** partition each card up to x7 - Multi-Instance GPU (MIG)

With many other layouts possible depending on what we need



Ongoing Work

Preparing support for Multi-Instance GPU (MIG)

- Kubernetes (done) and OpenStack (ongoing)

Adding support for GPU profiling in vGPU nodes

- vGPU is not physical partitioning but time sharing up to 4x != MIG
- Lack of support for profiling has been a stopper for general usage of vGPUs
- Should be possible with the new 13.x Nvidia drivers (under validation)

Upgrade default drivers in our recipes and automated installations

- Adding support for CUDA 11.1/11.2, popular request

Questions?