



HEPCloud and g-2

HEPCloud Team
g-2 & SCD Workshop
March 2, 2022

HEPCloud and g-2



HEPCloud has been working with g-2 recently to expand the resource pool that is available to the experiment

We have g-2 enabled with HEP Cloud to major sites and there are allocation pools that g-2 can use both at standard grid sites and a supercomputing sites.

Highlight from 2021:

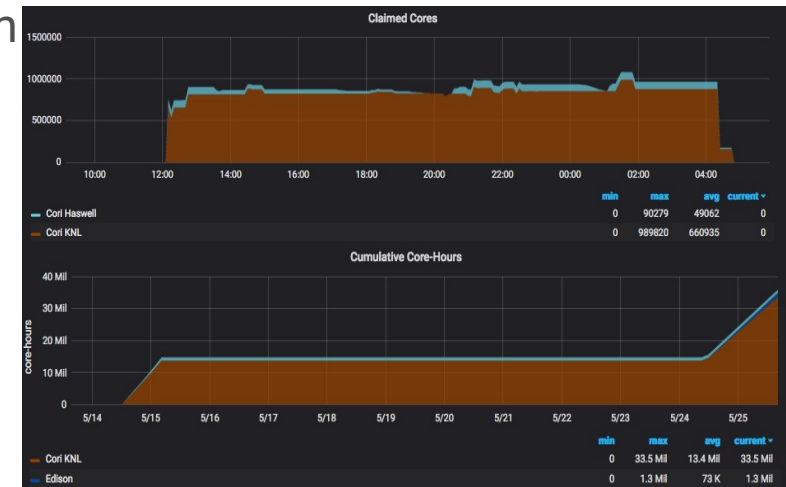
- G-2 ran simulation for 11 billion muons @ NERSC on Cori-Haswell

We want to continue to help g-2 and right now we are in a phase of HEP Cloud development where we can be responsive to g-2's needs through new capabilities that are in development.

What is HEPCloud and Its Capabilities?



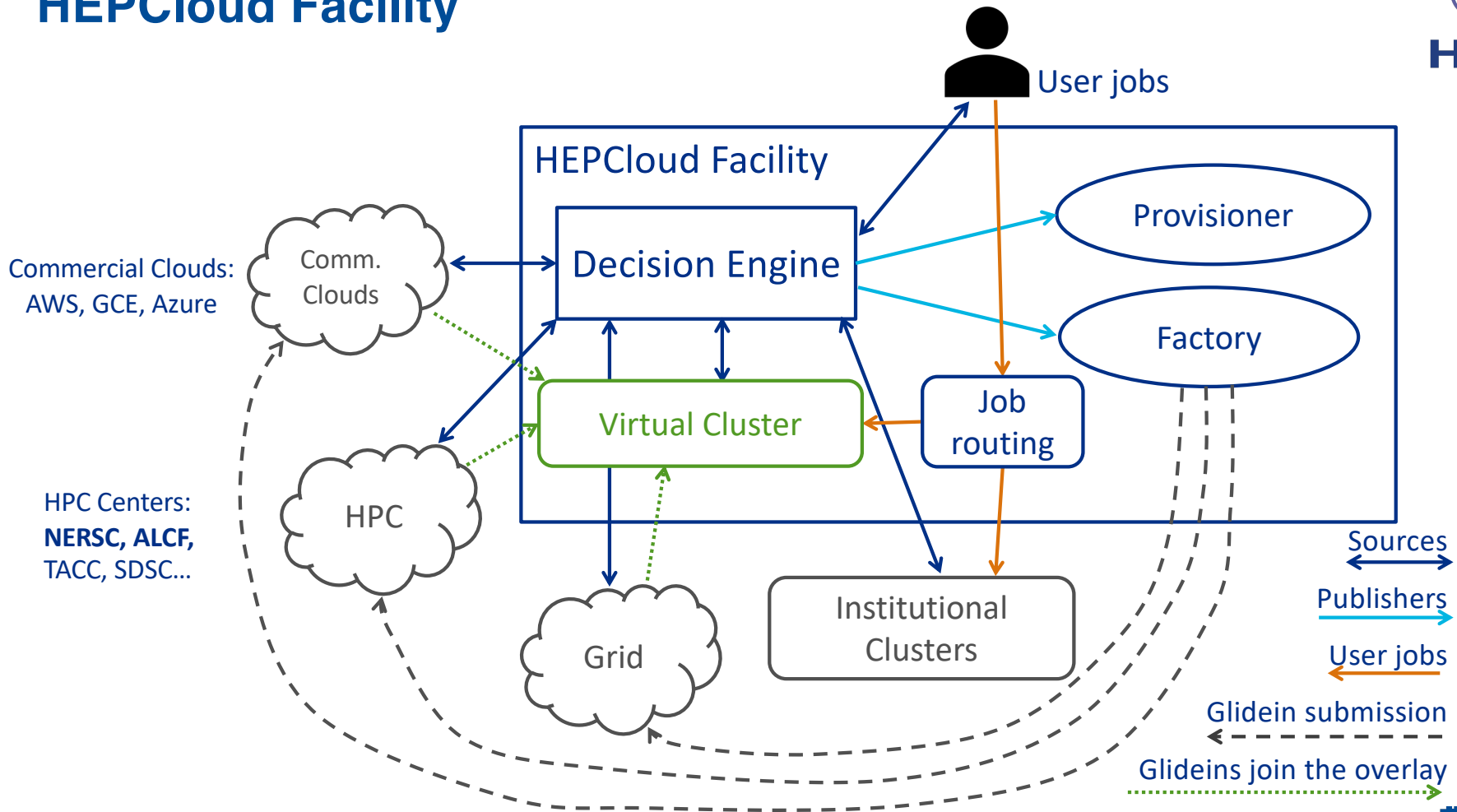
- HEPCloud is a common portal system with an ML based “decision engine” that intelligently provisions resources across a heterogenous computing ecosystem.
- It supports provisioning from HPC centers, Grid computing sites, the Open Science Grid, Commercial clouds, and other resource providers
 - HEPCloud aggregates the resources into a common “virtual pool” and then routes workflows to the resources that match their needs
- It allows HEP experiments to seamlessly access new resources with their existing code bases and take advantage of NERSC, ANL, and other computing facilities as a major resource centers.
 - CMS, DUNE, NOvA, g-2, Mu2e, MicroBooNE, ICARUS, SBND and other major HEP experiments all use HEPCloud



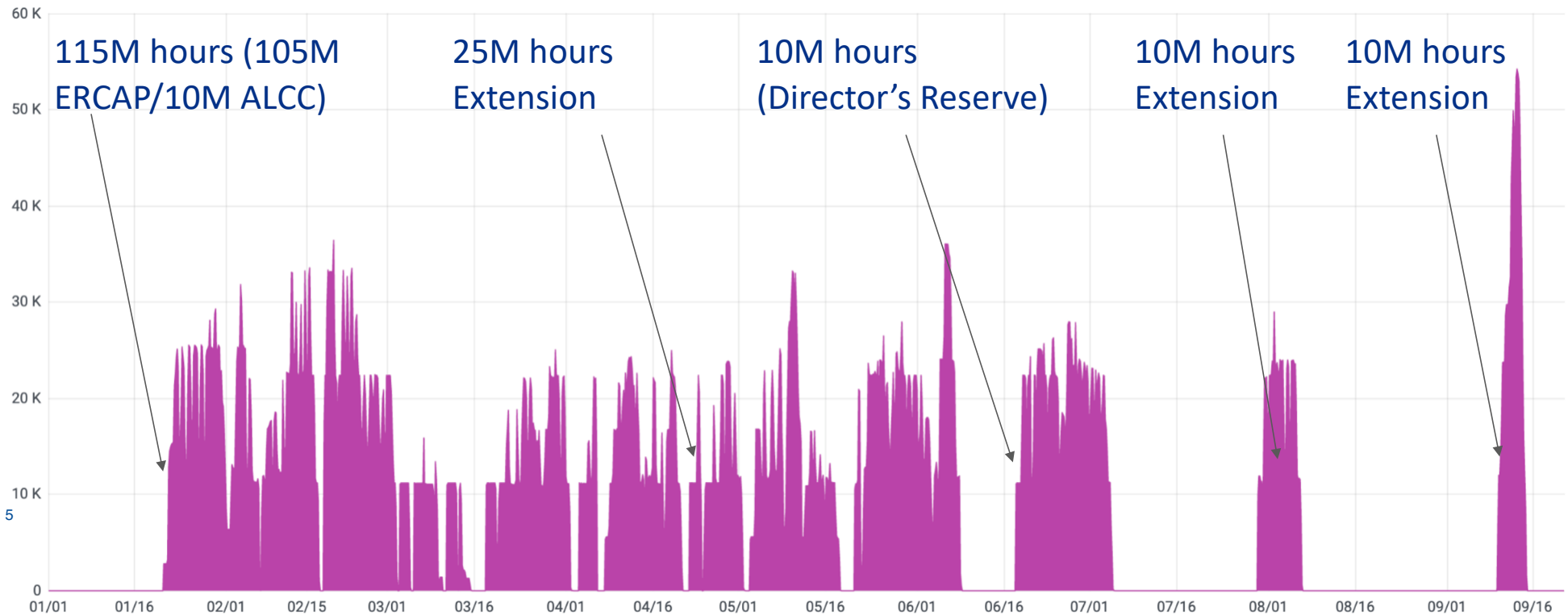
HEPCloud Provisioning of over 1 million cores at NERSC for NOvA



HEPCloud Facility



NERSC Cores for CMS through HEPCloud (2021)



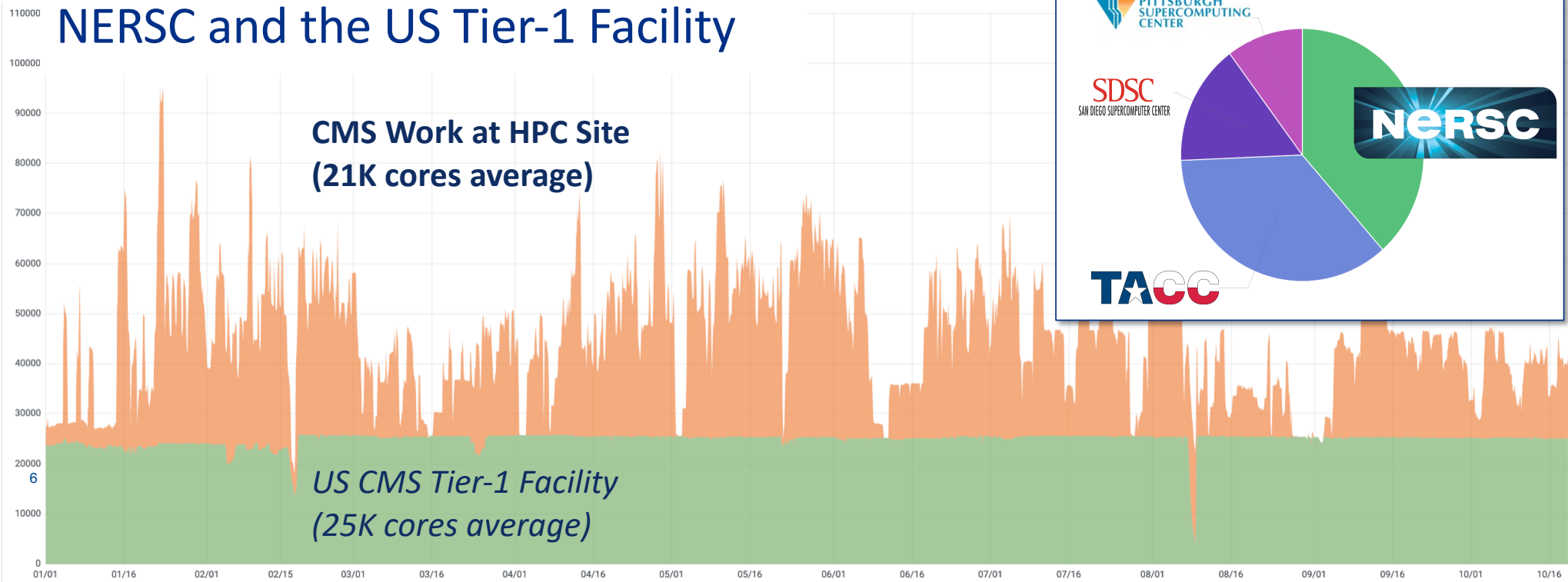
170M Hours of Data Intensive Science for CMS in 2021



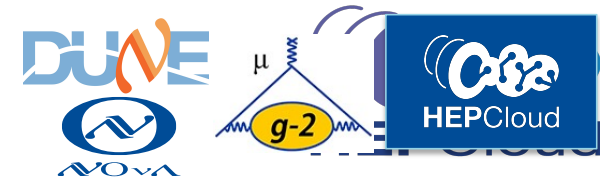
NERSC Contributions to CMS



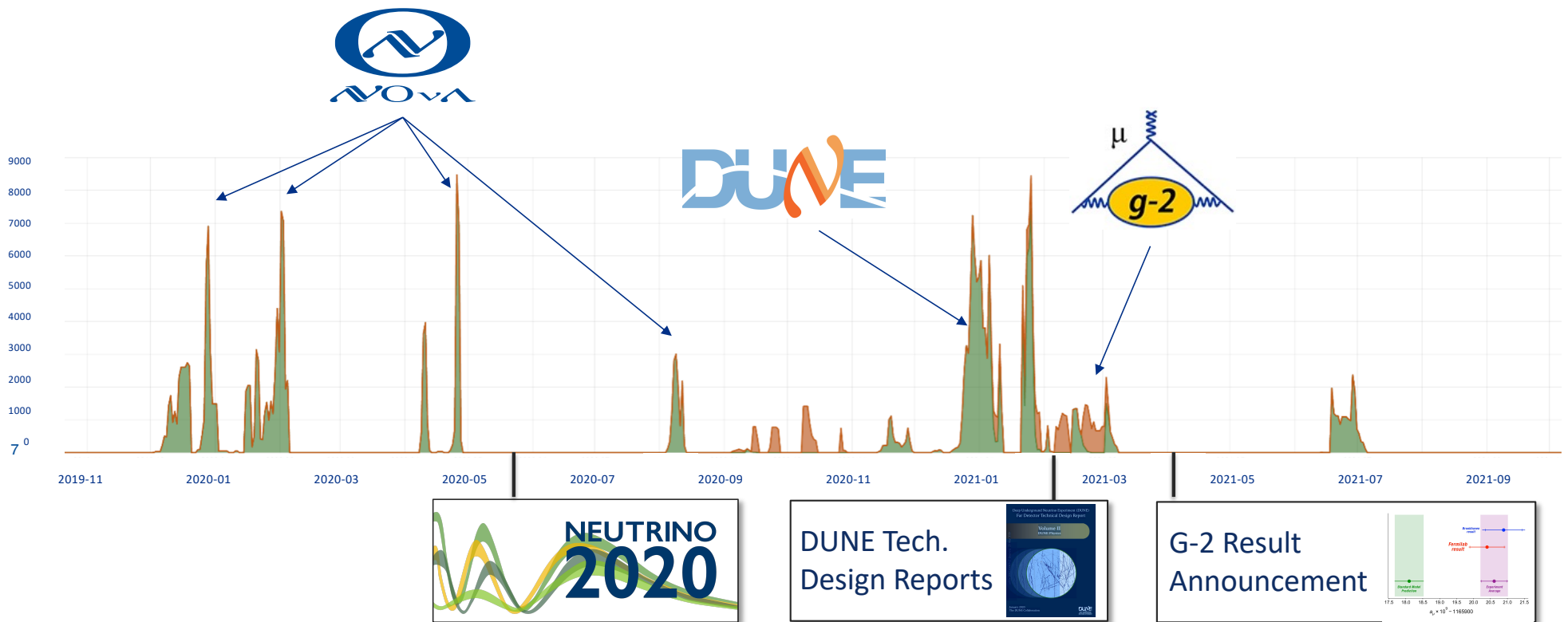
NERSC and the US Tier-1 Facility



NERSC Cores for Neutrino and Muon Science through HEPCloud



Neutrino Science Experiments Use NERSC in a “burst” computation model



HEPCloud Roadmap 2022/2023

HEPCloud has been working on a series of restructuring of core technologies and upgrades to expand capabilities and improve stability of the system.

'21/'22 Highlights:

- Aug-21 – First scale runs at ANL Theta (new paradigm for site integration)
- Oct-21 -- Final 1.7 Release of Decision Engine (last of old design series) **[Stable/Production]**
- Dec-21 – First 2.x series release candidate (new decision engine design)
- Feb-21 – v2.0 Decision Engine/HEPCloud public release

2022 Capabilities Roadmap:

- Mar-21 – First integration runs w/ Perlmutter
- Mar-21 – Separation from GlideinWMS factory code
- Q2 - New provisioning channel designs
- Q3 – New channels for **multi-node provisioning** and MPI environments
- Q3 – New support for **complex accelerator workflows** and co-scheduling (e.g. inference servers)
- Q4 – Production integration of new HPC sites

HEPCloud Questions to g-2

We want to hear from g-2:

- What do you need from HEPCloud?
- **What are the roadblocks that are preventing g-2 from using HEPCloud more?**
 - You have used HEPCloud, why is the use not more widespread?
 - Are there specific workflows that aren't supported?
 - Is the g-2 code base not portable enough?
 - Is the submission infrastructure not integrated with g-2's code stack?
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- **What are the experiment's projected needs?**
 - Can these fit into the resource pools that HEPCloud provides?
 - Are there other resources that g-2 wants to access (but has trouble with?)
- **What are your needs for more advance computing?**

...Discussion...