Large Facilities Workshop Panel

By Dan Stanzione

Cyberinfrastructure for Major Facilities: Challenges and Path Forward

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CI Compass Cyberinfrastructure for NSF Major Facilities Workshop
LARGE FACILITIES WORKSHOP PANEL

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WHAT IS TACC?

The Texas Advanced Computing Center, at UT Austin is a (primarily) NSF-funded center to provide and apply large scale computing resources to the open science community.
LEADERSHIP-CLASS COMPUTING FACILITY

TACC - 2022
COMPUTATIONAL SCIENCE IS A LOT MORE THAN COMPUTERS...
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Computational science is a lot more than computers. . .

People
Interfaces
Algorithms
Middleware

Compute and Storage Systems

\[ \sum_{i=1}^{n} i^3 = \left( \frac{n(n+1)}{2} \right)^2 \]
Q1 - WHAT IS ONE PREDOMINANT CI PROBLEM THAT YOU WOULD LIKE TO SOLVE?

- Figuring out the needs of the large facilities for CI
- But seriously -- Scientific Computing is a range of problems, with a range of solutions. Figure out how to move the solution space out of "one ring to rule them all"
Q2 - WHAT ARE THE CHALLENGES AND OPPORTUNITIES IN UTILIZING SHARED SERVICES OR SERVICES OFFERED BY THE BROADER NSF CI ECOSYSTEM FOR YOUR FACILITY/PROJECT?

- N/A
- But the “timeline mismatch” has been a big one. .. we are fixing that.
Q3 - WHAT ARE THE CHALLENGES AND OPPORTUNITIES IN COLLABORATIONS AND/OR SHARING BEST PRACTICES FOR CI BETWEEN MFS, PROJECTS, AND THE BROADER CI ECOSYSTEM?

- No one has enough time... and CI is not one discipline, it's a lot of them
  - Good luck hiring one person to manage your design of schemas for metadata, and also have them understand the details of processor vector implementations, AI, and best methods for optimizing Fourier Transforms in Python, while writing javascript for your website. And your networking. And Cybersecurity. Also, have them decide if you should use Quantum computing.
Q4 WHAT ARE THE CHALLENGES AND OPPORTUNITIES IN BALANCING ADOPTION OF NEW/EMERGING TECHNOLOGIES WITH CURRENT OPERATIONS?

Q5 WHAT ARE SOME OF THE SOCIO-TECHNICAL CHALLENGES FACED BY YOUR FACILITY OR PROJECT? WHAT ARE YOUR PLANS FOR SOLVING SOME OF THOSE ISSUES?

- This is an invariant -- new technologies come with benefits and costs. When are you willing to pay one to get the other? There is lots of nuance here.

- Machines are easy, people are hard. Frankly, we could stay in the simulation lane (or stay in the AI lane) and easily be oversubscribed and justify our existence. But I have a more ambitious goal.