Cornell

CASC: Federation Lessons Learned

Susan Mehringer

Center for Advanced Computing

Aristotle Cloud Federation

NSF CC*DNI DIBBs project #1541215 (2015-2020)

David Lifka, PhD
PI and Project Director
VP for Information Technologies & CIO
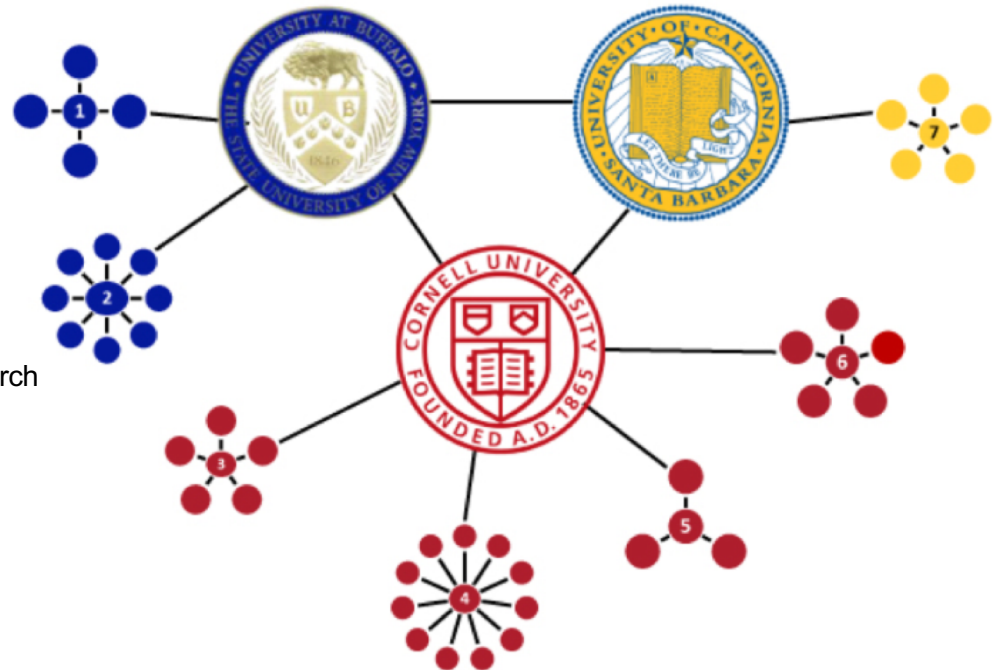Director, Center for Advanced Computing
Cornell University

Tom Furlani, PhD
Co-PI
Director, Center for Computational Research
University at Buffalo

Rich Wolski, PhD
Co-PI
Professor, Computer Science
University of California, Santa Barbara

Setting allocations limits and expectations

- Compute allocations
  - Current allocations: while building federated cloud accounting, metrics …
    - Allocation values equal despite differences in hardware/software
  - Future allocations: once fully federated
    - Need equitable way to exchange credits that reflect differences
    - Considering a lease concept
- Consulting allocations
  - Experts often needed to onboard cloud applications
    - Federations expand and deepen pool of expertise available
  - Aristotle consulting expertise shared across the federation
    - Considering how to formalize this exchange

ARISTOTLE
CLOUD FEDERATION

Overcoming data infrastructure/sharing issues

- Authentication
  - Agree on single authentication method
- Accounting
  - Set up federated accounting before creating local accounts
  - Share accounting/usage data via simple interface, e.g. JSON web page
- Infrastructure software choices: measure 3x
- Data sharing
  - Researchers bring data to federation; others bring analyses (VM) to data
- Containers/published build scripts make software super portable
- Network isolation is a challenge
- Usage metrics via Open XDMoD

ARISTOTLE
CLOUD FEDERATION

Encouraging collaboration success

- Federations succeed or fail together
- Funding was equal share/participant
  - Everyone gets their fair share
  - Each site focuses and contributes their area of expertise
  - Each site builds interface to local resource (federation model is not forced)
- "The whole is greater than the sum of its parts" - Aristotle
  - Cloud federations provide access to more tools, software, and data than a local cloud can
  - Federations must demonstrate that you get more when you share, so your CIO and VP are motivated to share
- Aristotle will be sustained by adding new members/users (2020)
- Communication is essential in a federation

>Σ ARISTOTLE
CLOUD FEDERATION