SAGA
Simple API for
Grid Applications

# The Current State of Grid Computing: The SAGA Worldview

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What is SAGA?

☐ Simple, integrated, stable, uniform and community-standard

- Simple and Stable: 80:20 restricted scope

- Integrated: Similar semantics & style across primary functional areas

- Uniform: Same interface for different distributed systems

- The building blocks upon which to construct "consistent" higher-levels of functionality and abstractions

- OGF-standard, "official" Access Layer/API of EGI, NSF-XD

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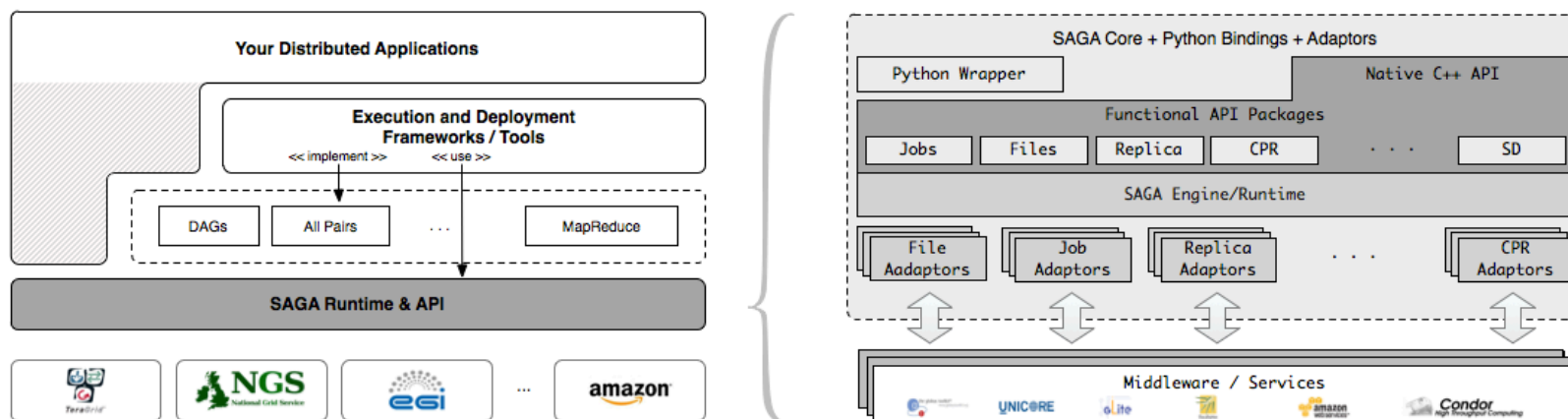
What is the Current State-of-Play in Production-Ready Grid Infrastructure?

- ◻ Separate grid technologies, from production grid infrastructure (PGI), from grid/distributed applications

- ◻ Individual Grid technologies:
  - • Mostly maturing, strengthening, seeing uptake
    - • e.g., Many grid technologies are to be found in cloud space
  - • Federation does not have to be difficult, but is due to tech & policy
    - • e.g., security, underlying policy behind security token

- ◻ Most PGI don't work as grid infrastructures!
  - • Except for the elite few applications/projects
  - • Narrow grids vs general-purpose grids *[Jha, Merzky, Fox, CCPE'08]*

- ◻ Applications:
  - • Develop distributed applications as localized applications, and then export to distributed environments a posteriori
    - • Need to factor distribution and services *a priori*
  - • Abstractions for developing distributed applications missing

Open Challenge

◻ *Integrated end-to-end solutions for science & engineering*

◻ Low impedance between levels and across capabilities

- There exist many moving parts and degrees-of-freedom
  - Individual components exist, but not integrated within consistent architectures
  - Multiple point-solutions but very few end-to-end solutions
- Most PGI effort: Individual software, not application capabilities

◻ Research Questions that are engendered?

- How do we integrate software across levels?
- How do we integrate capabilities?

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The Road Ahead

◻ Context set by open challenge: *Integrated end-to-end solution*

◻ The need for broadly and deeply Integrated capabilities

- Broadly Integrated:
    - Integrated end-to-end solutions for applications require transparent federation of capabilities and the interoperability of services
- Deeply Integrated:
    - Upper-level integration between application and middleware
    - Lower-level Integration between middleware and hardware

◻ One suggestion for NSF + DOE

- Test-beds exist, but need to support end-to-end effort to use them to transition from experimental to production-grade