

LOOKING TOWARDS THE COMPUTING
HORIZON:
A NORTHEAST
CYBERINFRASTRUCTURE LABORATORY

NECI LAB

2018 MOC Workshop

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WHAT DO WE DO WELL?

Large scale HPC Deployments

BU - RCS

- RSS: 14k cores, 600 software packages, 725 research projects, 2240 active users
 - 4.5 Full-time staff focused on systems engineering
 - 9 Full-time staff focused on researcher engagement: systems use, application package installation and usage, numerical methods, code tuning, parallelization, and visualization

Harvard - FASRC

- Odyssey: 82k cores, 1000+ scientific software, 425 PI research groups, 3500 active users
 - 6 Full-time staff focused on systems engineering
 - 8 Full-time staff focused on researcher engagement (tickets, office hours, training)

How do we work on HPC together?

- US Atlas Tier 2 (NET2)
- <http://ask.ci>

HPC VS CLOUD COMPUTING

HPC environments provide:

- Fixed computing environment deployed (and controlled) by Systems Group
- Large scale computing via batch processing (queuing) system
- Normal operation via command-line tools
- Tailored to parallel processing
- Tailored to large centralized shared scratch storage

Cloud computing environments provide:

- Flexible (customizable) computing environments controlled by researcher
- Orchestrated on-demand computing services with a variety of resource types
 - IaaS, PaaS, SaaS
- Tailored to many single core tasks
- Tailored to object or distributed storage
- Ideal for scale out on-demand computing
- Basis for modern research tool deployment

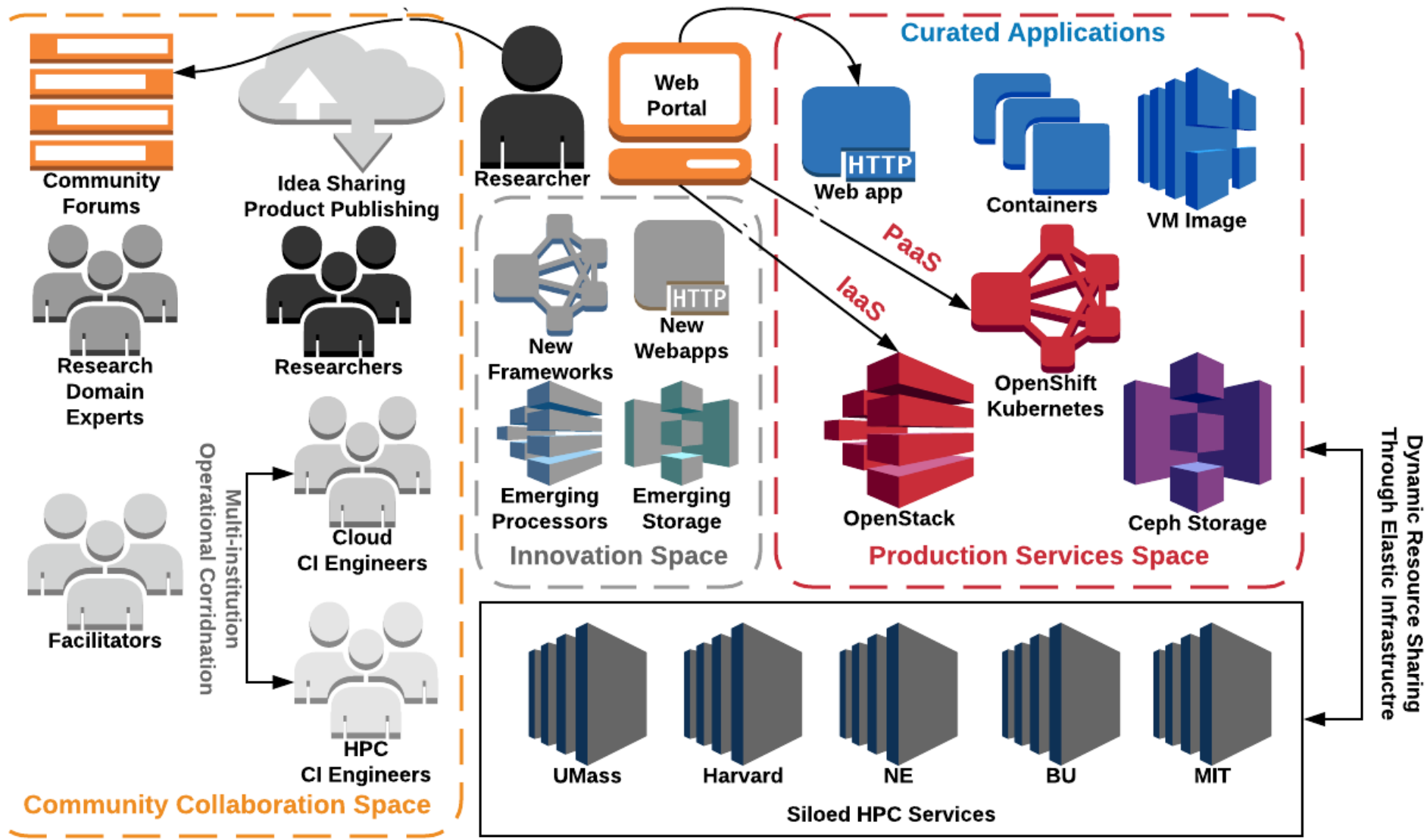
NECI LAB VISION

- Build a cohesive, sustainable partnership between domain scientists and advanced computing professionals with a large-scale multi-institutional cloud framework that is tailored for data-driven discovery.
- Build on the prior expertise of the MOC and the MGHPCC organizational framework, which has already delivered physical economies of scale, to create the NECI Lab to address the emerging needs of modern data-driven discovery

3 KEY COMPONENTS FOR NECI LAB

1. The **Production Space** will provide a multi-institutional large-scale cloud computing platform with shared operations and facilitation that enables researchers to “just get their research done” without the need to master the intricacies of deploying and managing the computational capabilities,
1. The **Collaboration Space**, will enable the aggregate human resources (CI Engineers, Facilitators, Industry partners, and researchers) from a broad set of institutions to be exploited in the support of radically expanding set of computational platforms
1. The **Innovation Space**, will enable new disruptive technologies to be introduced, evaluated, and used by researchers on a pilot basis, before being (possibly) integrated into full production use.

BIG PICTURE



THINKING ABOUT NEXT STEPS

1. The **Production Space** will be successful with:
 - Systems Group commensurate with the scale of the project
 - Group of Facilitators to coach researchers in workflow design and deployment options
2. The **Collaboration Space**, will be successful when:
 - Domain staff are building and sharing tools across institutions
 - Seasoned researchers are helping build up new generations
3. The **Innovation Space**, will be successful:
 - As it draws computer scientists and electrical engineers to the environment to test and deploy their latest technology, tools, ...
 - As it allows systems engineers to study the large-scale system