
SSL

Scalable Systems Laboratory for Innovation & Integration

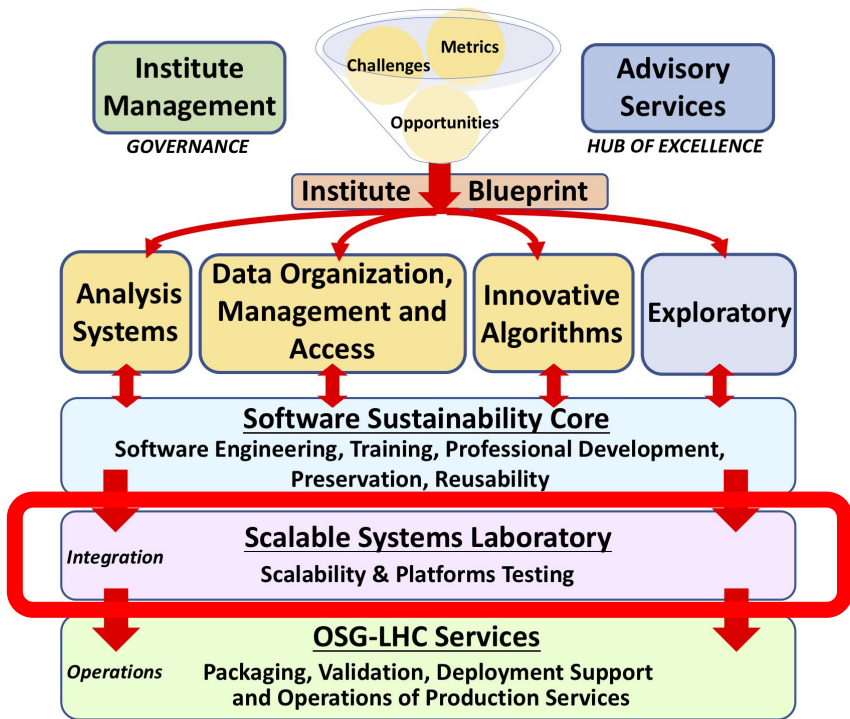
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FASTML Workshop
September 9, 2019



Innovation & training platform for IRIS-HEP



Growing a Global Collaboration



UCSD/SDSC
January, 2017
HSF CWP



Anney
June, 2017
HSF CWP



JLab
March, 2018
HSF/OSG/WLCG



Naples
March, 2017
WLCG/HSF

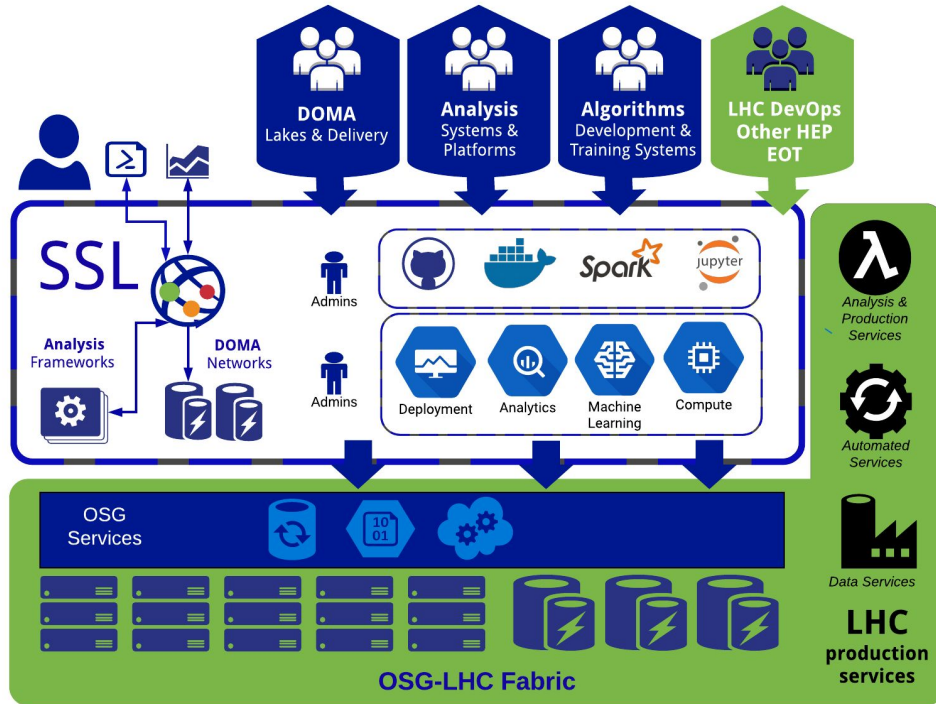
An infrastructure supporting **collaborative** software R&D and integration

SSL: Path to Production

Provisioning of software **environments** and development tools.

Distributed platforms materialized with tools like containerized edge services.

Integration point with the OSG and LHC experiment services (data, analysis).



SSL Opportunities

- Spark adhoc collaborations across traditional organizational boundaries (e.g. experiments)
- Contributions and involvement from diverse resource providers
- New modes of infrastructure development, supporting more rapid innovation
- Redeployable artifacts and reproducible patterns

SSL People

- Core group to support base environment
- CS research on accelerated services
- Leverages effort from R&D areas, external projects & research computing staff
- Organizes contributed resources for scalability testing



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Desired SSL capabilities



- Support a diverse catalog of deployment patterns & models
- Experiment patterns (scalability tests)
- Usability
 - Modality, Reservation
 - Metrics, logging, analytics
- Operation & Support
- Openness
 - to providers to contribute
 - to developers to conduct experiments
- Recording value
 - Analysis platform "blueprints" :
 - Single site/region deployments
 - Multi-region deployment
 - Multi-cloud hybrids – e.g. SSL+GCP+CERN, etc..
 - Demonstrations & archival of demo artifacts

Orchestrating services in the SSL



- Need flexible infrastructure for supporting the workloads we expect from SSL
- Dynamically reconfigure existing hardware to be a HTCondor cluster today, Spark tomorrow, whatever is needed.
- Containerized services are getting a lot of attention in Industry right now– can we take advantage of the momentum?
- Want to “glue” clusters together, but abstract away infrastructure to whatever extent possible – clear a smooth road for the developers
- Potentially mimic cloud native groupings: e.g. create “zones” of resources

Analysis Systems & SSL Blueprint

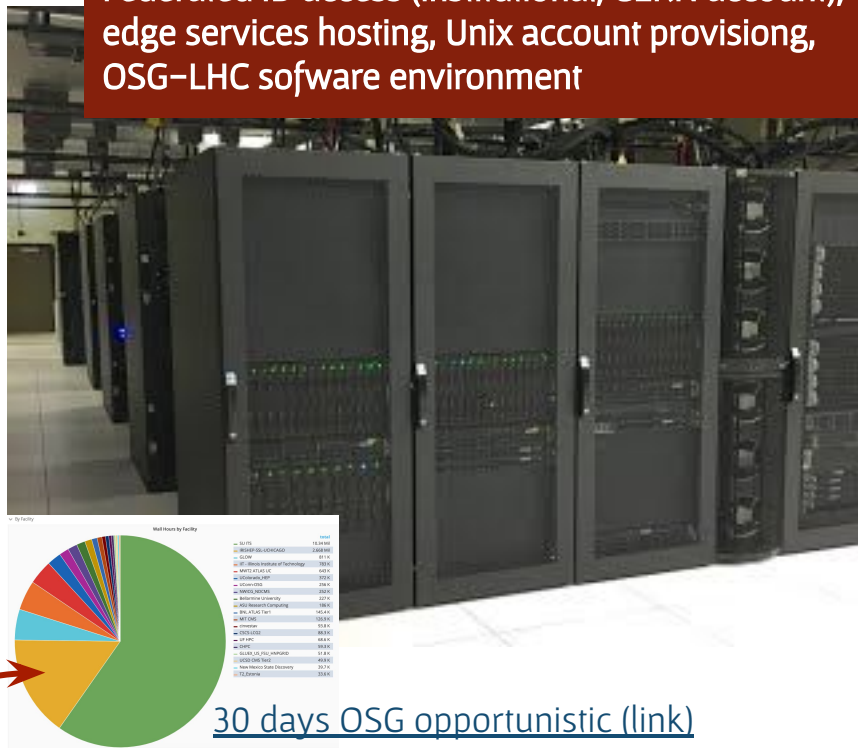
- June 21–22, 2019 @ NYU
- Engagement with AS team, SSL team and representatives from NCSA, SDSC, NYU Research Computing, Google and RedHat (26 participants)
- Key outcomes:
 - **Kubernetes** identified as “common denominator” among system deployments
 - Federated “**substrate**” project discussed to aggregate contributions from clusters



First piece of the substrate

- Repurposed R&D cluster
 - Vintage but nice (3k cores)
 - 2x40g to campus 100g SciDMZ
 - Kubernetes for flexibility for services and compute
- Deployed REANA application
- Deployed DOMA ServiceX components
- Deploy HTCondor workers and backfill with OSG Connect

Federated ID access (institutional, CERN account), edge services hosting, Unix account provisioning, OSG-LHC software environment



Cyberinfrastructure for training



- JupyterLab machine learning platform for 55 [CoDaS-HEP](#) students @ Princeton
- Use Kubernetes from Pacific Research Platform – short term GPU access

 Scalable Systems Laboratory

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CODAS PLATFORM

Supporting Computational and Data Science
for High Energy Physics



Purpose

A computational platform optimized for machine learning applications, supporting the second school on tools, techniques and methods for Computational and Data Science for High Energy Physics (CoDaS-HEP), 22-26 July, 2019, at Princeton University.

Links

[CODAS-HEP.org](#)

[2019 School Program](#)

[HEP Software Foundation](#)

Moving forward



→ Resource Providers

- ◆ Important for scalability testing, bespoke hardware
- ◆ We need your contributions!
- ◆ And your help building a federated kubernetes "substrate" platform

→ Users & Developers

- ◆ SSL would like to "align" with you -- methods & services
- ◆ Training events similar to CoDaS-HEP coordinated by IRIS-HEP [TEO team](#)

→ Getting involved

- ◆ [SSL-TEAM forum](#) – monthly calls focused on building out federated kubernetes platform
- ◆ [WishList](#) – drop your suggestions for the SSL team here today

Thank You