

---

# SSL

## News, Status, Plans

Rob Gardner  
Enrico Fermi Institute  
University of Chicago



---

IRIS-HEP Retreat  
Fermilab  
September 13, 2019



## Distributed platforms

materialized with tools like  
containerized edge services.

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



# 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



**Lincoln Bryant**

University of Chicago



**Edgar Fajardo**

University of California,  
San Diego



**Diego Davila**

University of California,  
San Diego



**Igor Sfiligoi**

University of California,  
San Diego



**Rob Gardner**

University of Chicago



**Andrew Chien**

University of Chicago



**Frank Wuerthwein**

University of California,  
San Diego

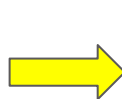


**Mark Neubauer**

University of Illinois at  
Urbana-Champaign

# 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 ([doc](#)):
  - Kubernetes as “common denominator”
  - Federated “substrate” project identified
  - Industry partnerships explored



# SSL Successes thus far

DOMA iDDS development on Google Cloud  
reproduced on IRIS-HEP SSL with Docker  
containers and Kubernetes

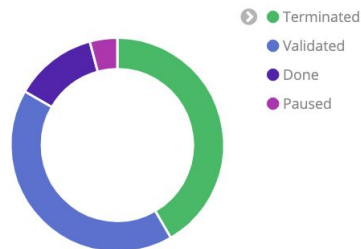
The diagram illustrates a data architecture with the following components and flow:

- Data Factory**: Represented by a factory icon, it feeds into the Data Store/Lake.
- Data Store/Lake**: Represented by a cylinder icon, it feeds into the Intelligent Data Delivery Service (IDDS) and Data Cache.
- Intelligent Data Delivery Service (IDDS)**: Represented by a cloud icon with circuitry, it feeds into the Data Cache and Compute Nodes.
- Data Cache**: Represented by a hexagon icon with a list, it feeds into the Compute Nodes.
- Compute Node**: Represented by a lightning bolt icon, it is the final destination for the data.
- Tape-backed Storage**: A label indicating the storage type for the Compute Nodes.
- Rucio/FTS**: A label indicating the data management service between the Data Store/Lake and the IDDS/Data Cache.

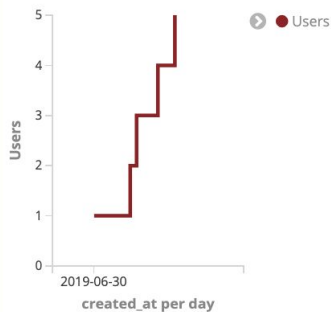
A red circle highlights a specific interaction between a Data Cache and an IDDS component, suggesting a focus on this part of the architecture.

# Service Metrics & Dashboards

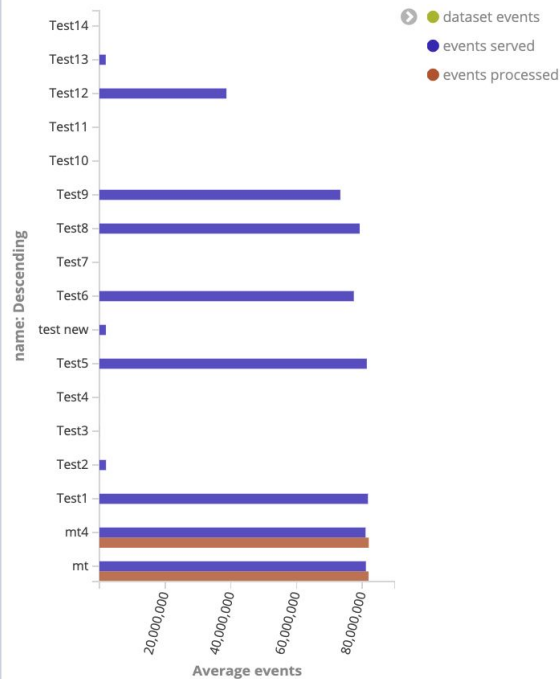
Requests states



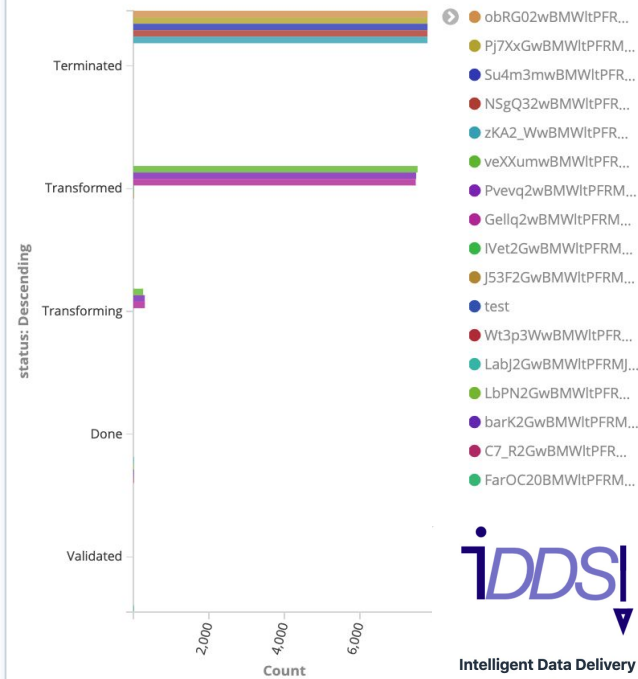
Users



events



Files states

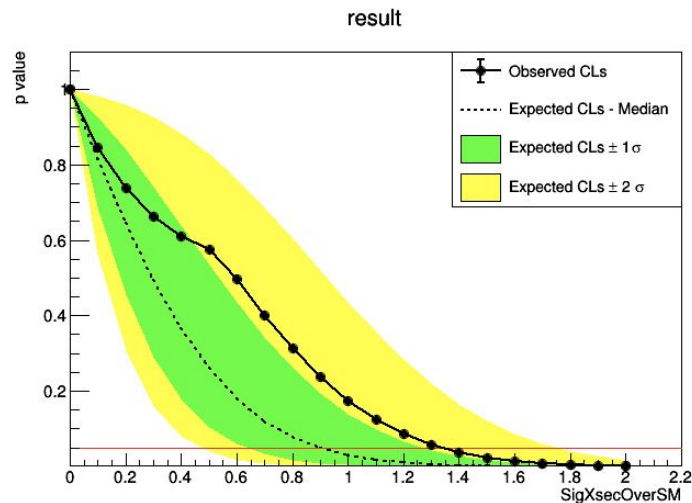




# REANA on SSL

- UChicago CS Student (Neha Lingareddy) was able to deploy the REANA framework on SSL over the summer
- Started with no knowledge of Kubernetes, REANA, etc – was able to produce ATLAS “Recast demo” plots in a couple of days

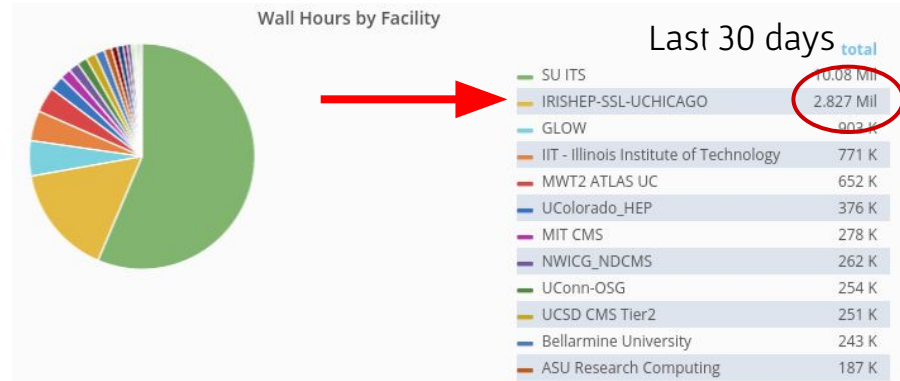
Neha Lingareddy is a rising Third Year in the College at UChicago majoring in computer science.





# Backfill from OSG

- Deployed OSG-like worker containers via SLATE
  - Most of the usual trimmings: CVMFS, glidein startup scripts (no singularity yet)
  - Flocking from OSG Connect
- Large contributor to OSG!
  - 2.83M core-hours over last 30 days



# Cyberinfrastructure for training on "SSL"



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

 Scalable Systems Laboratory

[Home](#) [About](#) [Services](#) [Login](#)

## 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](#)

# 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; SLATE enabled
- 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



# Moving forward

---



- Adding more resources to SSL
  - ◆ clearing house to k8s resources & building the community
  - ◆ some federation-like activity where it makes sense
- Providing additional services to the SSL
  - ◆ For user access and storage volumes for services
- Supporting DOMA milestones
  - ◆ Data Lake+ServiceX+Skyhook, iDDS
- Supporting AS milestones
  - ◆ Deployment & benchmarking of existing systems, focus on RECAST/REANA

Thank You<sub>2</sub>