

# IRIS-HEP and US ATLAS Operations (PC, 11/25/19)

DOMA



Physics  
Generators



Visualization

Data and  
Software  
Preservation



Machine  
Learning



Software  
Trigger & Event  
Reconstruction



Detector  
Simulation



Workflow and  
Resource  
Management



Data-Flow  
Processing  
Framework



Data Analysis &  
Interpretation



Networking,  
Storage  
Infrastructure and  
Facilities



Software Development,  
Deployment, Validation, Verification



Training



# Key IRIS-HEP Contributions to US ATLAS R&D

DOMA



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Training



## DOMA

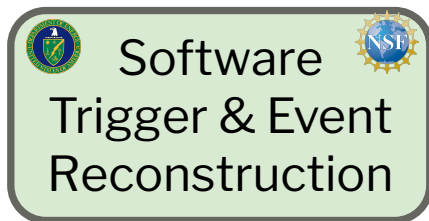


- Shared vision: Data Access through caches and intelligent delivery
- Concern: need to make sure that US ATLAS and IRIS-HEP efforts in iDDS/ServiceX do not duplicate effort or grow apart

## Machine Learning



- Shared vision:
  - Common, curated datasets
  - FastML -  $\mu$ s inference for HLT
- Opportunity: build through IRIS-HEP blueprint activities a coherent HEP message to share with ML, math, and CS experts when scoping the upcoming NSF and DOE ML initiatives
- Challenge: Connect ML R&D with “real work” from experiments’ simulation, reconstruction, and trigger teams



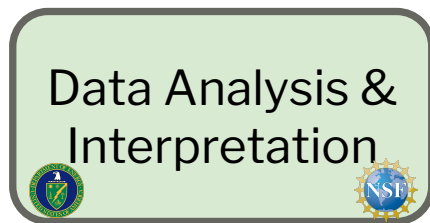
- Shared vision: New tracking algorithms for HL-LHC (also other reco areas such as jets)
  - IRIS-HEP is doing a great job helping ATLAS/CMS rewrite their tracking codes
- Opportunity: Collaborate with CCE in developing portable parallel tracking algorithms
- Challenges:
  - Duplication of effort within IRIS-HEP.
  - Programming to next-year architecture

- Shared vision:
  - Data+software preservation is part of LHC mandate
- Opportunities:
  - Democratize access to LHC analysis
- Challenge: avoid the bleeding edge

Data and  
Software  
Preservation



- **Shared vision:**
  - Analysis model supporting modern hardware and software is central to HL-LHC computing strategy and R&D
- **Opportunities:**
  - Provide experiments with guidance in defining their analysis models
- **Challenge: avoid the bleeding edge**



- Shared vision: Share effort to develop and deploy complex computing infrastructure, such as an analytics platform
- Opportunity: Collaborate with ATLAS Intelligent Operations group
- Challenges: Possible conflict (due to limited resources) with main mission to support IRIS-HEP R&D platforms



Software Development,  
Deployment, Validation, Verification





- Shared vision: Nurture the next generation of HEP computational physicists
- Opportunity: Collaborate with experiments' training groups

Training



# Last but certainly not least

IRIS-HEP Blueprint workshops are a...  
blueprint for cross-experiment and  
cross-project collaboration.

US ATLAS is following a similar  
approach with our HPC meeting series.

I hope that CCE will be able to engage  
our stakeholders as vigorously and as  
enthusiastically as IRIS-HEP does.

OSG-LHC remains a crucial  
component of US ATLAS computing  
operations.

The evolution of network performance  
and requirements is an area of concern  
for Run 4.

OSG networking team can play a major  
role there together with ESnet and the  
experiments.

Backup: R&D planning

# Contributors to US ATLAS HL-LHC C&S R&D

- US ATLAS Operations
  - HL-LHC Computing and Software Lvl2
- US ATLAS Research Program
  - Snowmass, ATLAS Upgrade Physics, etc.
- HPC Centers (early science and similar programs)
  - [4th US ATLAS HPC meeting](#) (5th in Spring) - Parallelization
- DOE HEP-CCE (recently approved)
  - Kick-off workshop early spring - Portable parallelization, HPC I/O, parallel evgen, HPC WFEs
- NSF IRIS-HEP
  - Blueprint workshops ([Coherency workshop Oct 23-25](#))
- Industry collaborations (Google/US ATLAS recently started)
  - Clouds, Workflows, and ML

# Timeline to define HL-LHC C&S R&D Plan

- *Spring 2020: Clarification of scope and responsibilities amongst all entities*
  - 5th U.S. ATLAS HPC workshop (follow up discussion with U.S. ATLAS HPC centers).
  - CCE kickoff workshop
  - Continue close collaboration with US CMS, CCE, IRIS-HEP and Google.
- *Spring 2020: Snowmass process starts after conveners are chosen*
- Circa May 2020: Submit **ATLAS HL-LHC S&C Conceptual Design Report**
- June 4-6 2020: LHCC meeting
- June 2020: US ATLAS **HL-LHC R&D Strategy Plan (BNL PEMP notable)**
- Spring 2021: NSF CA proposal submission
- *July 2021: Snowmass*
- *2022: HSF Community White Paper update*
- WLCG & LHC experiments Software & Computing TDRs: 2022/23