# CompF4: Storage and processing resource access (Facility and Infrastructure R&D)

**Wahid Bhimji** (LBL)
**Meifeng Lin** (BNL)
**Frank Wuerthwein** (UCSD)

- Our report highlights the challenges and research directions driven by the **complexity** and **diversification** of the future computational infrastructure.
- Divided into six topic areas
  - Processing
  - AI Hardware
  - Storage
  - Analysis Facilities
  - Edge Services
  - Networking

- CompF4 Draft Report v0
- Google Docs for CompF4

# CompF4: Draft Recommendations

*Recommendation I - Efficiently exploit specialized compute architectures and systems.*

- Allocate **dedicated facilities** to specific processing steps in the HEP workflows
- Design effective **benchmarks** to exploit novel hardware
- Improved **network visibility and interaction**
- Enhance **I/O libraries** such as lossy compression and custom delivery of data

# CompF4: Draft Recommendations

*Recommendation II - Invest in portable and reproducible software and computing solutions to allow exploitation of diverse facilities*

- The need for **portable software libraries, abstractions and programming models** is recognized across all the topics discussed here, and is especially called out in Processing, AI Hardware, and Storage.
- Software frameworks to enable **reproducible HEP workflows** are also greatly needed to ensure a variety of resources can be utilized.

# CompF4: Draft Recommendations

*Recommendation III - Embrace disaggregation of systems and facilities*

- The HEP community will need to **embrace heterogeneous resources** on different nodes, systems and facilities and effectively balance these accelerated resources to match workflows.
- To do so will require **software abstraction** to integrate accelerators, such as those for AI ; **orchestration of network resources**; exploiting **computational storage**; as well as exploiting system rack-level **disaggregation technology** if adopted at computing centers

# CompF4: Draft Recommendations

*Recommendation IV - Extend common interfaces to diverse facilities*

- Encourage **edge-service platforms** on dedicated facilities as well as Cloud and HPC.
- Develop **portable edge-services** that are re-usable by other HEP projects and exploit commonality within HEP and other sciences.
- Extend these **common interfaces** into all aspects of HEP workflows including data management and data movement; as well as the deployment of compute resources for HPC, Cloud, Grid and dedicated analysis facilities.