

HEP-CCE Efforts in the Context of DUNE

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A banner for the High Energy Physics - Center for Computational Excellence (HEP-CCE). The background is dark with a complex, glowing orange and yellow geometric pattern of lines and shapes. The text "High Energy Physics - Center for Computational Excellence" is written in white, sans-serif font. Below the main text, the acronym "HEP-CCE" is written in a smaller, white, sans-serif font.

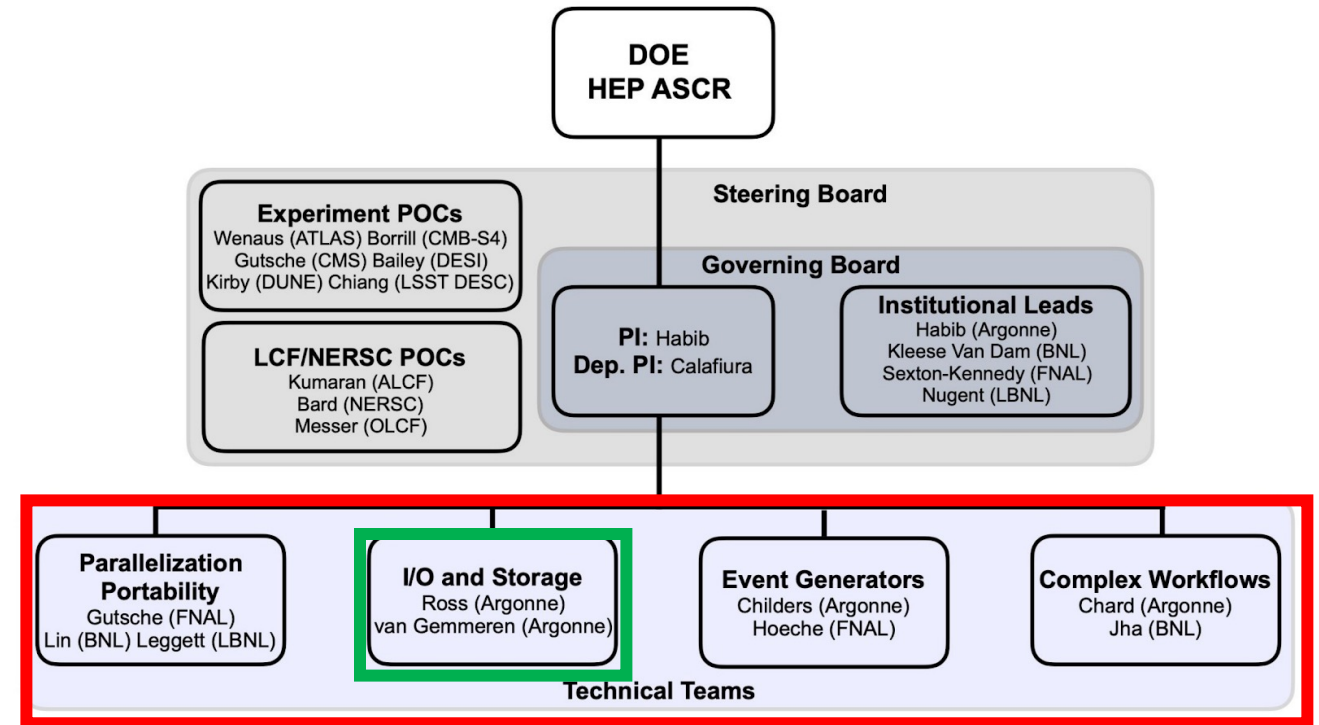
High Energy Physics - Center for
Computational Excellence

HEP-CCE

HEPCCE (High Energy Physics Center for Computing Excellence)

- **3 Years Pilot project** including **4 US labs** and **6 experiments**.
- Development and Implementation of HEP scientific applications in next generation **computing, storage and networking**.
- Focus on Parallelization and Portability, **I/O and Storage**, Complex workflows etc.

The **goals of the HEP-CCE** are to facilitate the **requirements for experiments** like DUNE to utilize the HPC resources.



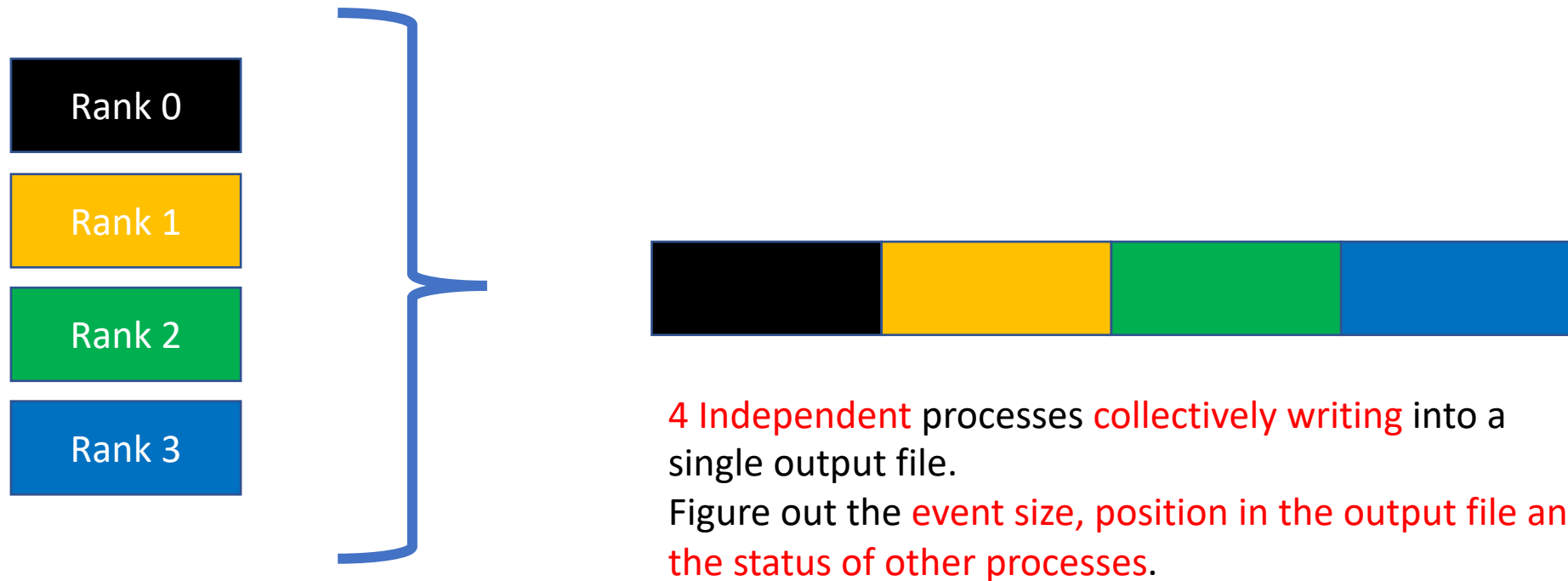
HEPCCE Organizational structure. I am mostly involved in the I/O and Storage.

ROOT vs. HDF5 Format

- **DUNE jobs** will be hosted by both the **grid and HPC facilities** all over the world.
- **Maximum utilization** of the current and future HPC facilities require **the parallelization of the data.**
 - ROOT is great for a lot of things but parallel data-processing is not ROOT's forte.
 - **HDF5** is widely used in various fields in the **HPC facilities** and **optimized for parallel IO and handling the complex workflows.**
- **CCE/IOS** efforts from Amit Bashyal (ANL), Saba Sehrish (FNAL) etc. on HDF5 data-format studies.

HEP-CCE Efforts in the DUNE Paradigm

- Testing of the Parallel IO to write objects in the HDF5 format.
- Link to the code [here](#).
- Multiple MPI Ranks writing parallelly on the HDF5 File.



HEP-CCE Efforts in the DUNE Paradigm

- In the future, tests with the available DUNE data:
 - Performance test, data-size, data-layout, event indexing, compression and their effects in the IO.
- Port lessons learnt from HEP-CCE to DUNE vice versa.