

Automated Parallel Event Generation and Analysis

Scientific Achievement

Fermilab researchers developed two HPC parallel codes using DIY.

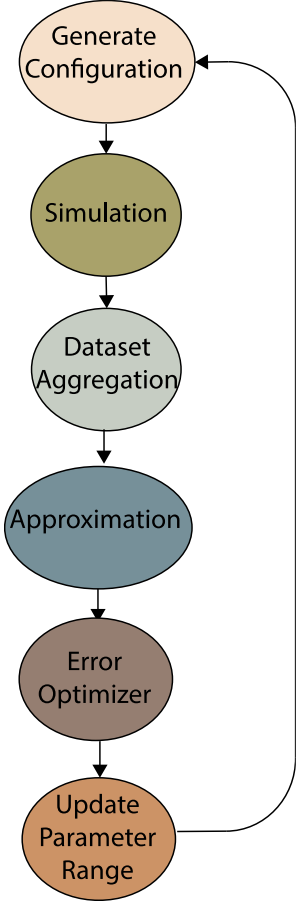
- Pythia8 Monte Carlo event generator [1]
- Feldman-Cousins correction [2]

Significance and Impact

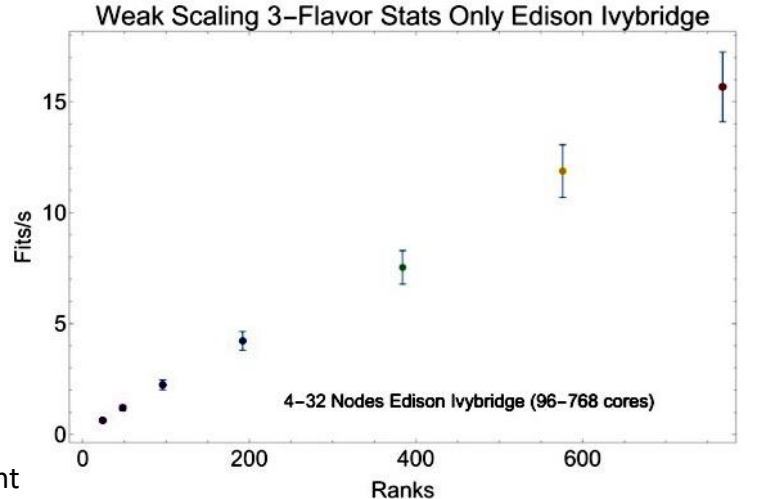
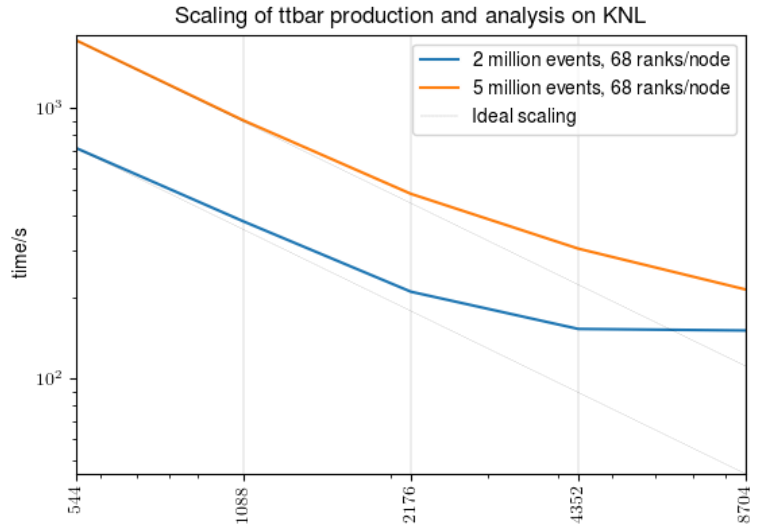
DIY and Decaf-Henson manage HPC workflows, resources, and HEP community tools.

Research Details

- Allows for extremely short turn-around of large parameter space explorations (e.g. generator tuning)
- Paves the way for new and advanced optimization algorithms, e.g. LHC search analyses.



Workflow: Automated workflow combining event generation, approximation, and error correction to search for optimal simulation parameters.



Scalability: Top: strong scaling of Pythia8 DIY code. Bottom: weak scaling of Feldman-Cousins DIY code.

[1] Hoche et al., *arXiv 2019*.
[2] Sousa et al., *CHEP 2018*.