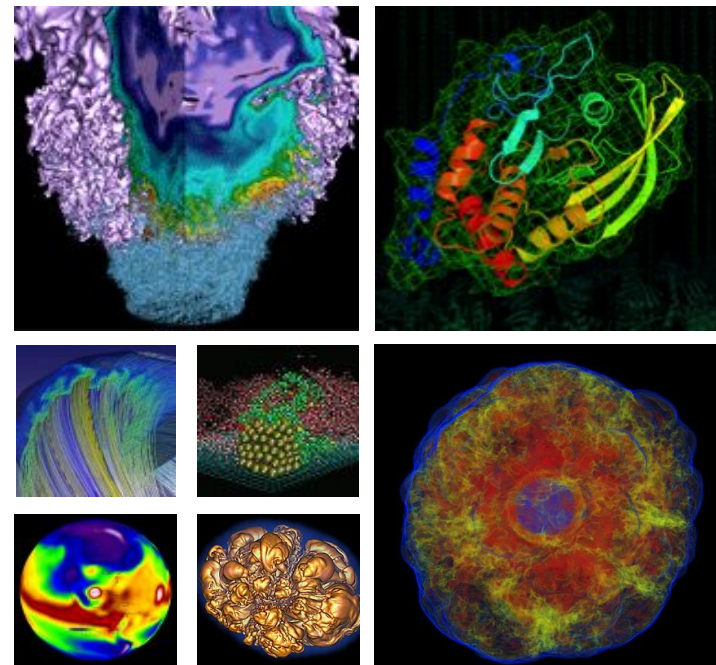


DUNE ND-LAr



Madan Timalisina

NERSC/NESAP Postdoc

Data & AI Services

Sep 13, 2024

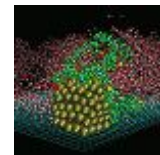
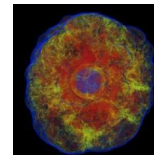
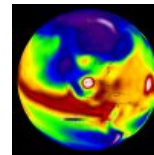
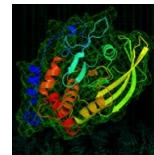
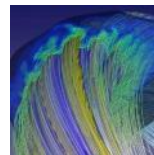
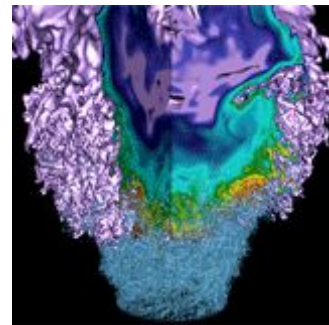


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Benchmarking



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- **Repositories and descriptions:**

- contains code for simulation, written in python, using CUDA-11.7 and GPU
 - <https://github.com/DUNE/larnd-sim>
- Benchmarked branches
 - **develop** (commit 46187d51) and **post-hackathon2024**
- example to use the larnd-sim
 - <https://github.com/lbl-neutrino/larnd-sim-example>
- Benchmark results:
 - <https://github.com/lbl-neutrino/larnd-sim-example/tree/pre-post-hackathon-MT>
 - <https://github.com/lbl-neutrino/larnd-sim-example/tree/pre-post-hackathon-MT/develop>
 - <https://github.com/lbl-neutrino/larnd-sim-example/tree/pre-post-hackathon-MT/post-hackathon2024>

DUNE Iarnd-sim Benchmarking-80GB GPUs



- Benchmarking 1000 input files on GPUs, all completed tasks
- 80GB bandwidth per GPU.
- Batch script submits jobs on 5 nodes.
- 5 arrays, each with 20 GPU tasks.
- Each array processes 200 tasks.
- 20 tasks submitted simultaneously per array.
- 10 submission cycles per array.
- Different random seed for each task

rand_seed=\$((RANDOM % 10000) + 1))

Input files (1000)

[/dvs_ro/cfs/cdirs/dune/www/data/2x2/simulation/productions/MiniRun5_1E19_RHC/MiniRun5_1E19_RHC.convert2h5/EDEPSIM_H5/0000000](#)

Output, analysis file and batch script can also be found here:

[/global/cfs/cdirs/dune/users/madan12/DUNE_nesap/pre-post-hackathon](#)

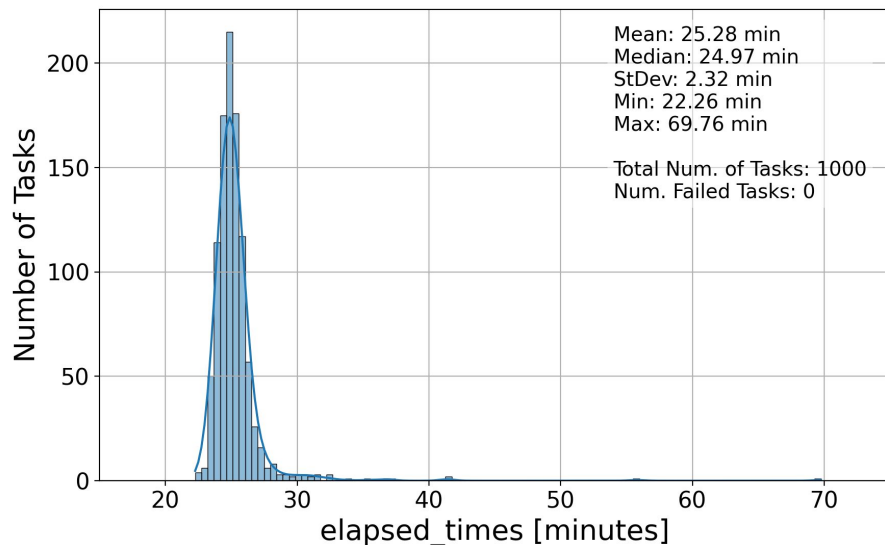
Dataframe (csv file) contains following informations

```
Data columns (total 20 columns):
# Column Non-Null Count Dtype
---
0 file_index 1000 non-null int64
1 input_file 1000 non-null object
2 output_file 1000 non-null object
3 log_file 1000 non-null object
4 gpu_log_file 1000 non-null object
5 sim_start_time 1000 non-null object
6 task_start_time 1000 non-null object
7 elapsed_time(s) 1000 non-null float64
8 task_end_time 1000 non-null object
9 random_seed 1000 non-null int64
10 job_id 1000 non-null int64
11 host_name 1000 non-null object
12 gpu_device_id 1000 non-null object
13 peak_gpu_memory_used 1000 non-null int64
14 gpu_memory_start 1000 non-null int64
15 gpu_memory_end 1000 non-null int64
16 job_completed 1000 non-null bool
17 job_error_msg 0 non-null float64
18 input_file_size_mb 1000 non-null float64
19 output_file_size_mb 1000 non-null float64
dtypes: bool(1), float64(4), int64(6), object(9)
memory usage: 149.5+ KB
```

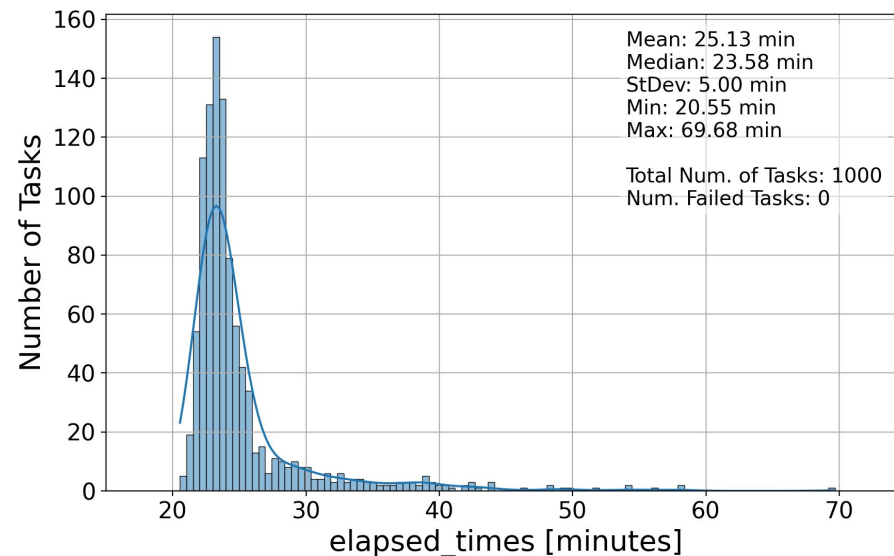
Elapsed Time [minutes]



Develop



post-hackathon2024



~ 6% improvement based on the median

Peak Memory Used [MiB]



Develop



post-hackathon2024

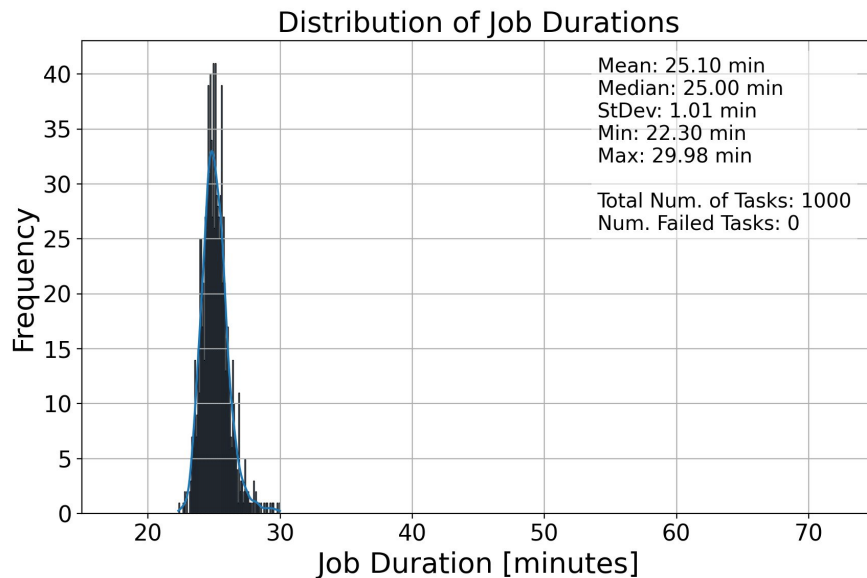


Back-up

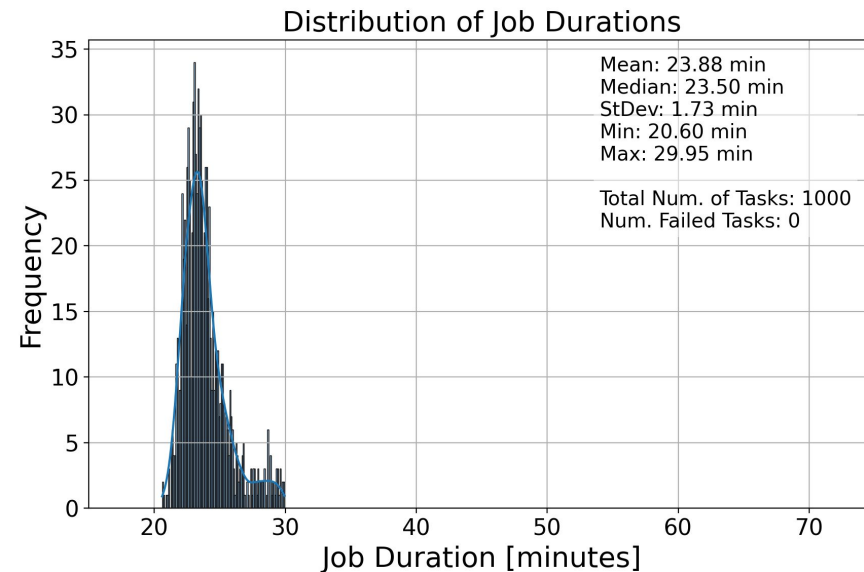
Job Duration [minutes]



Develop



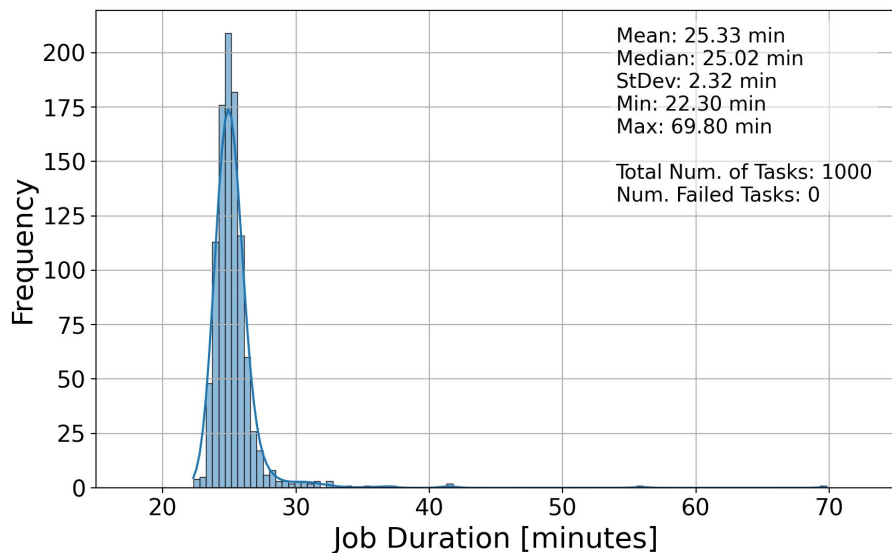
post-hackathon2024



Job Duration [minutes]



Develop



post-hackathon2024

