

PPS Introduction

Oliver Gutsche (FNAL), Charles Leggett (LBNL), Meifeng Lin (BNL)

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Portable Parallelization Strategies (PPS)

- Investigate a range of portability solutions such as
 - Kokkos / Raja
 - SyCL
 - Alpaka
 - OpenMP / OpenACC
- Port a small number of HEP testbeds to each language
 - Patatrack (CMS)
 - WireCell Toolkit (DUNE)
 - FastCaloSim (ATLAS)
- Define a set of metrics to evaluate the ports, and apply them
 - ease of porting, performance, code impact, relevance, etc
- Make recommendations to the experiments
 - must address needs of both LHC style workflows with many modules and
- many developers, and smaller/simpler workflows

	OpenMP Offload	Kokkos / Raja	dpc++ / SyCL	HIP	CUDA	Alpaka
NVidia GPU	Supported	Supported	Under Development	Supported	Supported	Supported
AMD GPU	Supported	Under Development	3rd Party	Supported	Not Supported	Under Development
Intel GPU	Supported	Under Development	Supported	Not Supported	Not Supported	Under Development
CPU	Supported	Supported	Supported	Not Supported	Not Supported	Supported
Fortran	Supported	Not Supported	Not Supported	3rd Party	3rd Party	Not Supported
FPGA	Under Development	Under Development	Supported	Not Supported	Not Supported	Not Supported

Supported
Under Development
3rd Party
Not Supported

Planned Timeline from first All-Hands meeting

Changed the plan, started with the same technology (Kokkos) for all 3 use cases

- Phase 1: Preparation
 - Q1: Deliverable: matrix of benchmarks of the unaltered use cases
- Phase 2: First Implementation
 - Q4: Deliverable: choose one use case, implement in all selected parallelization technologies and benchmark them.
 - Determine the best 3 technologies according to the metrics.
 - Q5-7: Deliverable: implement all use cases in one of the three chosen technologies.
- Phase 3: Consolidate benchmarking results
 - Q8: Deliverable: write-up summarizing the benchmarking results of the use cases and recommending parallelization strategies for the HEP community.
- Phase 4: Fully-functional prototypes
 - provide recommendations on portability strategies to experiments
 - Q12: Deliverable: fully-functional prototypes made available to the experiments.



People Involved (sorry if we missed you!)

- Important people (contributing code, etc.)
 - Alexei Strelchenko
 - Charles Leggett
 - Haiwang Yu
 - Kwang Min Yu
 - Kyle Knoepfel
 - Mark Dewing
 - Matti Kortelainen
 - Meifeng Lin
 - Taylor Childers
 - Vince Pascuzzi
 - Yunsong Wang
 - Zihua Dong



Plan for today

- Reports from all 3 use cases
- Talk about: RNGs for SYCL's CUDA backend
- Year 2 Plans

