Math Special Interest Group

October 02, 2024

Agenda

- Discussion on Discrete Fourier Transform APIs – Raphael Egan (Intel)
- Updates from last meeting - Sarah Knepper
  - oneMKL Specification
  - oneMKL Interfaces Open Source Project
  - oneAPI Dev Summit

oneMKL Specification

Recent updates:

- New distributions added for RNG, plus other extensions/bug fixes
- Improvements to sparse BLAS
- Programmatic versions enabled (RFC #561)
  - E.g., #define ONEMKL_BLAS_SPEC_VERSION 103 //for oneAPI 1.3 rev 1

Open PRs:

- #583: [spblas] Add sorted_by_rows property
- #593: [DFT] Type-safety-motivated changes, other corrections

oneMKL Interfaces Open Source Project

- Completed all Q3/Q4 tasks in the open source checklist work package
  - Introduced RFC process
  - Added “help wanted” label to open issues
  - Documented project maintainer roles and how to become one
- [RFC] oneMKL Interface Renaming (#564)
- [sparse] Update oneMKL backends to match new sparse API (#500)
- [BLAS] Add generic device and initial support in portBLAS (#566)
- [WIP][DFT] Add generic device support in portFFT (#570)

- oneMKL Interfaces successfully built/ran on Bede Grace Hopper machine with Arm host CPU and Nvidia GPU
  - Compiled with version of DPC++ that was built with Arm host CPU support and offloading computations to Nvidia GPU

A friendly reminder, if you haven't yet done so, to register for the oneAPI Dev Summit, hosted by the UXL Foundation to be held on October 9 & 10.

Talks on topics including:

- Codeplay's Rafal Bielski will explain how you can use oneMKL to run highly optimized math routines on a range of GPUs, from AMD, Nvidia and Intel. The GROMACs science project is already benefiting from this ability.
- Yu-Hsiang Tsai has been working to integrate Ginkgo, a linear algebra library used by research groups around the world, with SYCL and oneAPI to accelerate on multiple GPUs.

Resources

- Unified Acceleration Foundation: https://uxlfoundation.org/
- GitHub for UXL Foundation: https://github.com/uxlfoundation/foundation
- Latest release of oneMKL Spec (currently 1.3): https://oneapi-spec.uxlfoundation.org/specifications/oneapi/latest/elements/onemkl/source/
- GitHub for oneAPI Spec: https://github.com/uxlfoundation/oneAPI-spec
- GitHub for open source oneMKL interfaces (currently BLAS, RNG, LAPACK, DFT, and sparse BLAS domains): https://github.com/oneapi-src/oneMKL
- UXL Foundation Slack #sig-math #onemkl channels