oneMKL Technical Advisory Board

Session 1

May 20, 2020

Agenda

- Introduction of TAB Members - all (10 minutes)
- What participation in the TAB means - Craig Garland (10 minutes)
- Overview of oneAPI/DPC++ programming model - Jeff Hammond (30 minutes)
- Overview of oneMKL programming model - Maria Kraynyuk (25 minutes)
- Next steps for TAB - Sarah Knepper (5 minutes)

oneMKL TAB Members

- Mark Hoemmen, Stellar Science
- Nevin Liber, Argonne National Laboratory (ANL)
- Piotr Luszczek, Innovative Computing Laboratory (ICL) at University of Tennessee, Knoxville (UTK)
- Pat Quillen, MathWorks
- Nichols Romero, ANL
- A couple others, unable to attend today's meeting

Introductions!

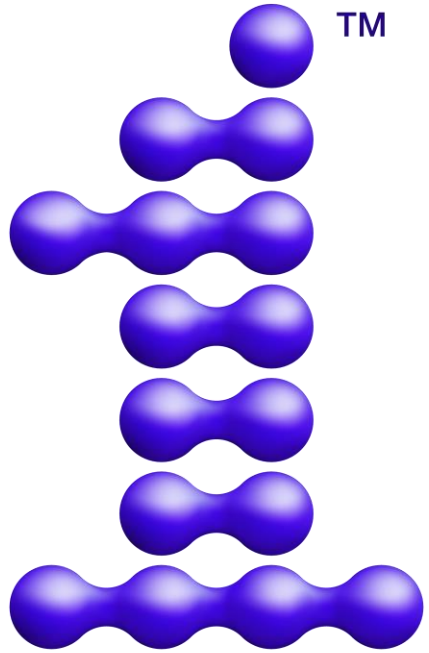
(1-2 minutes each)

- Your name
- Job/What you do
- How you use math libraries

Intel Folks on Today's Call

- Jeff Hammond, HPC End User Enablement team
- Alison Richards, oneAPI marketing
- Gergana Slavova, oneAPI industry engagement

- Anita Annamalai, oneMKL program manager
- Peter Caday, BLAS developer
- Marius Cornea, manager of Numerics team
- Craig Garland, manager of Intel Performance Libraries
- Maria Kraynyuk, library engineering developer
- Sarah Knepper, manager of LAPACK team
- Spencer Patty, manager of Sparse, FFT team
- Shane Story, manager of BLAS team
- Julia Sukharina, manager of Library Engineering team



oneAPI

Welcome and Thanks

- A unique opportunity to steer the parallel programming ecosystem

- A problem worth solving
  - Multi-architecture, avoiding lock-in to 1 specific hardware architecture
  - Direct and library-based programming
  - Extending existing models
  - Performant

- Your leadership, input, and feedback is critical

Rules of the Road

- DO NOT share any confidential information or trade secrets with the group
- DO keep the discussion at a High Level
  - Focus on the specific Agenda topics
  - We are asking for feedback on features for the oneMKL specification (e.g. requirements for functionality and performance)
  - We are NOT asking for feedback on any implementation details
- Please submit feedback in writing on Github in accordance with the Contribution Guidelines at spec.oneapi.com. This will allow Intel to further upstream your feedback to other standards bodies, including The Khronos Group SYCL* specification.

Notices and Disclaimers

The content of this oneAPI Specification is licensed under the Creative Commons Attribution 4.0 International License . Unless stated otherwise, the sample code examples in this document are released to you under the MIT license.

This specification is a continuation of Intel's decades-long history of working with standards groups and industry/academia initiatives such as The Khronos Group*, to create and define specifications in an open and fair process to achieve interoperability and interchangeability. oneAPI is intended to be an open specification and we encourage you to help us make it better. Your feedback is optional, but to enable Intel to incorporate any feedback you may provide to this specification, and to further upstream your feedback to other standards bodies, including The Khronos Group SYCL* specification, please submit your feedback under the terms and conditions below. Any contribution of your feedback to the oneAPI Specification does not prohibit you from also contributing your feedback directly to The Khronos Group or other standard bodies under their respective submission policies.

By opening an issue, providing feedback, or otherwise contributing to the specification, *you agree that Intel will be free to use, disclose, reproduce, modify, license, or otherwise distribute your feedback in its sole discretion without any obligations or restrictions of any kind, including without limitation, intellectual property rights or licensing obligations.* For complete contribution policies and guidelines, see Contribution Guidelines on www.spec.oneapi.com.

oneAPI Math Kernel Library (oneMKL) Definitions
Spec / Open Source / Intel Product

Specification	Open Source Product	Intel Proprietary Product
• **oneAPI Specification**	• **oneAPI Math Kernel Library (oneMKL) Interfaces**	• **Intel® oneAPI Math Kernel Library(Beta)**
• https://spec.oneapi.com/	• https://github.com/oneapi-src/oneMKL	• https://software.intel.com/content/www/us/en/develop/tools/oneapi/components/onemkl.html
• Specification for oneAPI and its various language and libraries for creating parallel applications	• oneMKL interfaces are an open-source implementation of the oneMKL Data Parallel C++ (DPC++) interface according to the oneMKL specification. It works with multiple devices (backends) using device-specific libraries underneath.	• Intel Product, precompiled , tested and with support options

oneAPI industry initiative

Open Industry Specification

- Specifies Language, APIs, Low level Hardware Interface
- Cooperative relationship with Khronos SYCL standard
- Promotes community and Industry support
- Supports code reuse across architectures and vendors

Technical Advisory Board

Collaborative advancements to specification

Industry Brand

Drives cross-industry adoption

Governance of oneAPI specification

Vision

Model loosely after the MPI Forum
low overhead, no foundation,
open, participation drives voting rights

Work with standards bodies
Khronos, ISO C++, BLAS forum
Preview and test ideas
Goal is sufficient agreement to pass feedback to standards and projects

Focused meetings on different oneAPI components
DPC++, HPC libraries, AI, System interface

For now

TAB is private.
Seeking feedback only

IP

Creative Commons License
Intel feedback clause to facilitate routing to standards

Open to different licensing after 1.0, if necessary

Spec Roadmap

https://github.com/oneapi-src/oneAPI-spec

Version	Date	oneAPI Notes	oneMKL Notes
0.5.0	17 Nov 2019	First Public Release	
0.6.0	30 Jan 2020	Open source Release	Transition to reStructuredText (rst)
0.7.0	26 Mar 2020	50% content	Common sections; USM support; BLAS domain updates
0.8.0	28 May 2020	80% content	Finalize BLAS and LAPACK domains
0.9.0	30 Jul 2020	~100% content	Finalize FFT, sparse BLAS, RNG, and VM domains
1.0.0	30 Aug 2020	Gold Release	Minor cleanup

Logistics

- Notes from oneMKL TAB meetings will be posted to GitHub repository: https://github.com/oneapi-src/oneAPI-tab
- If you do NOT want your name and affiliation to be published, let us know; otherwise, we will include meeting attendance with notes

- Continue bi-weekly meetings at this time (7-8am Pacific on Wednesdays)

Overview of oneAPI/DPC++ Programming Model

Next Steps

- Look over current oneMKL Spec v. 0.7
  - Focus most on oneMKL Architecture (section 1) and BLAS APIs
- Focuses for next meeting(s):
  - Overview of oneMKL programming model (if not finished today)
  - Walk-thru the oneMKL Spec
  - Overview of the open source oneMKL interfaces GitHub project
  - Particular feedback requests on oneMKL Spec:
    - Asynchronous execution
    - Multi GPU execution
    - Exceptions/error codes

Resources

- oneAPI Main Page: https://www.oneapi.com/
- Latest release of oneMKL Spec (currently v. 0.7): https://spec.oneapi.com/versions/latest/elements/oneMKL/source/index.html
- GitHub for oneAPI Spec: https://github.com/oneapi-src/oneAPI-spec
- GitHub for oneAPI TAB: https://github.com/oneapi-src/oneAPI-tab
- Latest build of oneAPI Spec: http://staging.spec.oneapi.com.s3-website-us-west-2.amazonaws.com/exclude/ci/branches/refs/heads/master/versions/latest/index.html

- GitHub for open source oneMKL interfaces (currently BLAS domain): https://github.com/oneapi-src/oneMKL