oneIPL Technical Advisory Board

Kickoff meeting

Nov, 2021

Participants:

oneAPI Image Processing Technical Advisory Board Members:

- Siemens Healthineers
- Philips
- Adobe
- Samsung Medison
- Sonoscape
- Xinje

Intel:

- OpenCV, G-API, Intel oneIPL

oneIPL managers

Business Development Group

Technical Consulting Engineers

What is oneAPI industry initiative?

Open Industry-wide Collaboration

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

Industry Brand

Drives cross-industry adoption

Find more on https://www.oneapi.io/

What is TAB?

Technical Advisory Board
Collaborative advancements to specification

Open Industry-wide Collaboration

- Alive cross-industry collaboration on the Image Processing area
- An opportunity to steer the parallel programming ecosystem
- Multi-architecture, avoiding lock-in to 1 specific hardware architecture
- Extending existing models
- Your leadership, input, and feedback is critical

Other oneAPI TABs:

- Language (DPC++ & oneDPL)
- oneMKL
- AI (oneDNN & oneCCL)

Find more on https://www.oneapi.io/spec/ and https://spec.oneapi.io/versions/latest/introduction.html

What is to be discussed on oneIPL TAB?

The new oneAPI specification for Image Processing (oneIPL):

architecture overview, models, data abstractions, APIs

https://spec.oneapi.io/oneipl/latest/index.html

Goal of TAB: To review and collect feedback on oneIPL spec.

Make the new specification to address the challenges of Image Processing development and adjust it to the industry needs

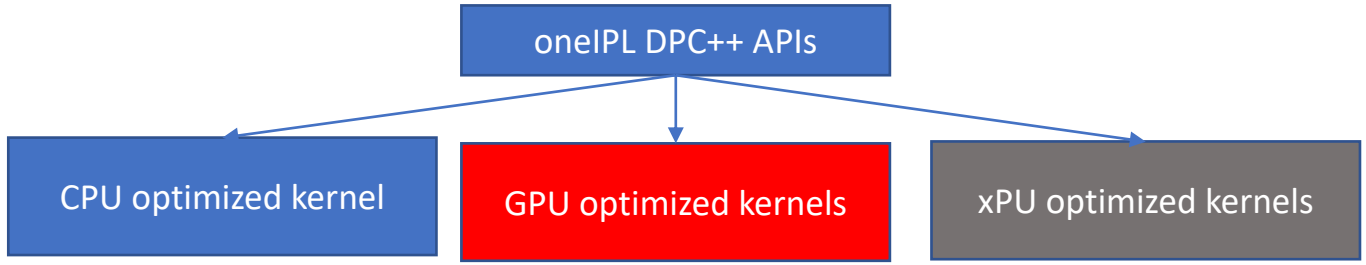
This input will help to shape its next revisions

Find more on https://spec.oneapi.io/versions/latest/introduction.html#contribution-guidelines

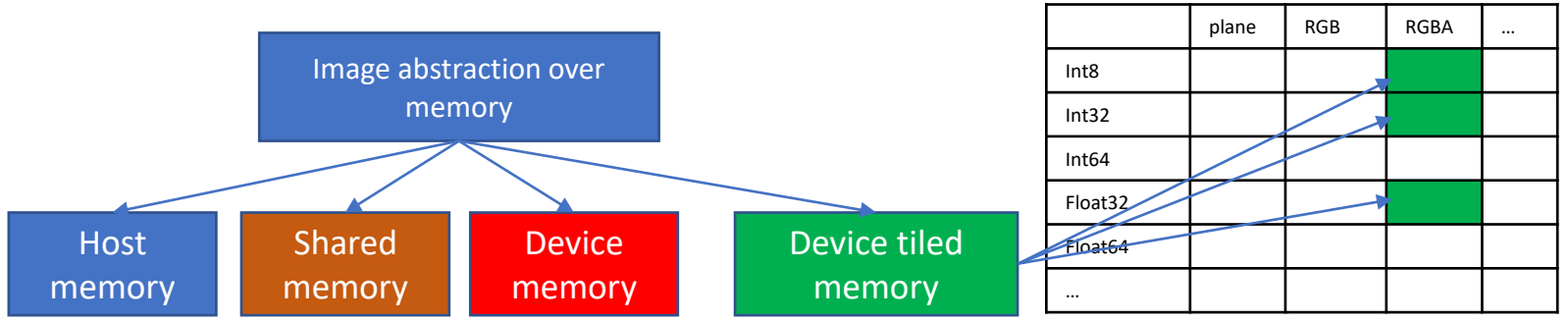
oneIPL overview

oneIPL is DPC++ image processing library for xPU. Provisional Spec v0.5 is published. Major features:

oneIPL provides DPC++ API for image processing functionality inherited from IPP and working on XPU.

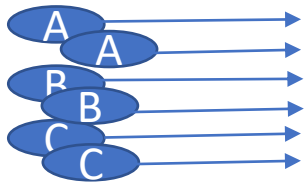


oneIPL API provides C++ abstraction over image data which maps to the most accelerated memory available for format and data type.

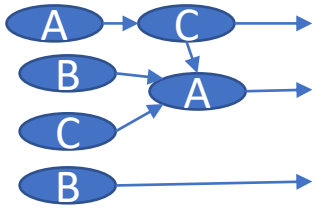


oneIPL API is based on DPC++ and sycl::queue to be able to construct pipelines of image processing and include any oneAPI API calls based on DPC++ queue targeted to different xPUs. Calls are asynchronous and scheduled by runtime.

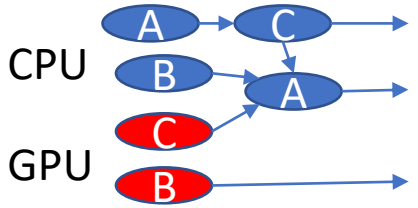
Multiple instances of asynchronous function calls



Scheduling by runtime considering dependencies

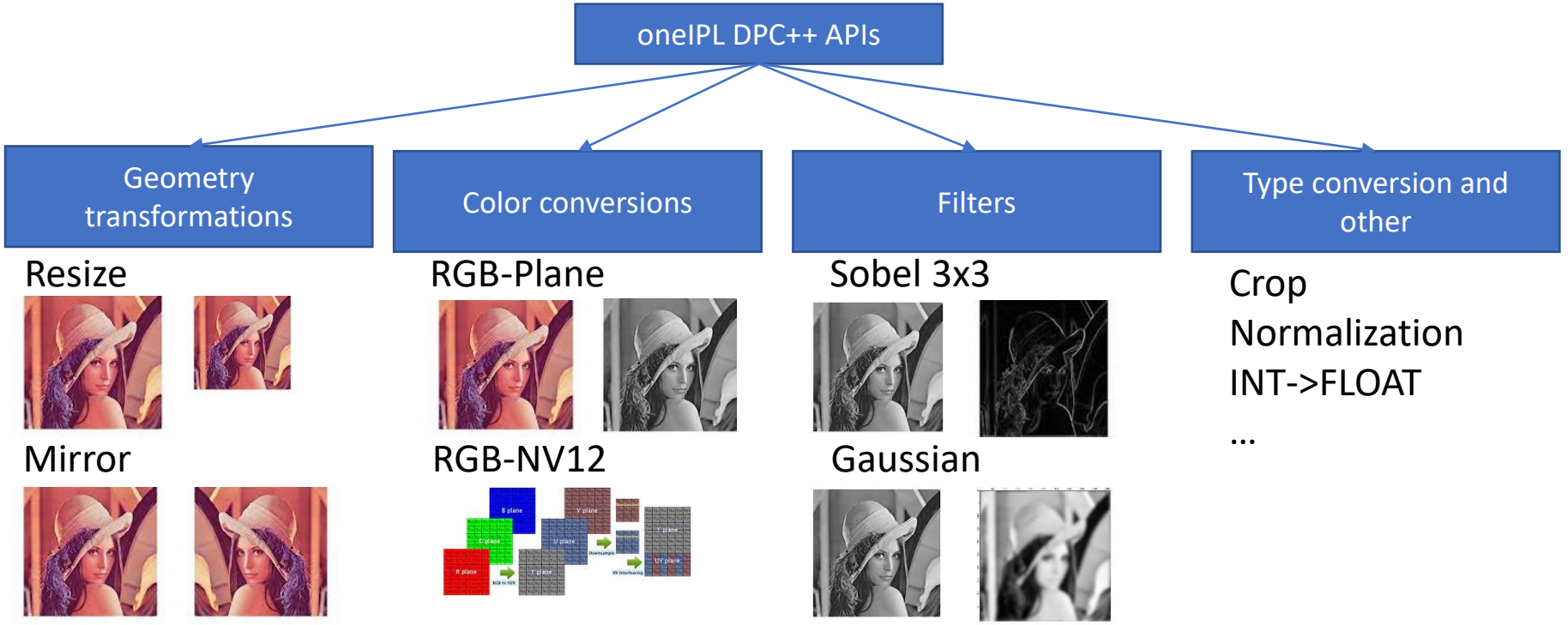


Mapped to devices and executed in parallel by DPC++ queues



oneIPL overview

oneIPL provisional Spec v0.5 contains all functionality targeted for oneIPL 2022 Q1 beta release.
Examples of the functionality:



oneIPL Technical Advisory Board meetings

The goal is to provide the feedback and define future development of the Spec.

First topics planned to discuss are at the table below, but it might be adjusted later.

Topic	Plan
1.oneIPL overview	1.Programming model 2.Execution model 3.Image processing pipelines 4.Image data abstraction 5.Memory model
2. oneIPL Image data abstraction	1.HW images and data formats and types coverage 2.IPL image data abstraction 3.Interoperability with USM 4.Memory allocation and temporary images
3. oneIPL Library design details	1.Domains 2.Reference code and optimized backends 3.Error handling mechanism 4.Interoperability with other oneAPI libraries
4. oneIPL Functions overview	1.ML oriented APIs for image preprocessing 2.Data type support in the functions 3.Color formats and conversions

The oneIPL TAB rules

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 oneIPL specification (e.g. requirements for functionality and performance)
- We are NOT asking for the feedback on any implementation details

Please submit the feedback in writing on GitHub in accordance to Contribution Guidelines at spec.oneapi.io. This will allow Intel to further upstream your feedback to other standards bodies, including The Khronos Group SYCL specification.

The oneIPL TAB process

1-hour meeting once per 2 weeks at first (to cover initial material of oneIPL Spec v0.5)

1-hour meetings once per 4 weeks after the main topics are covered

- Technical expert presents the topic, the discussion and input is collected for further versions of oneIPL Spec
- All materials and minutes of meetings will be published on GitHub and will be available for the offline review (the offline feedback of invited TAB members will be also processed and discussed on next TAB meeting)
- The cross-component TAB could be organized for mid-area topics

The next technical discussions:

December 14th (Cross TAB)
December 16th
January 20th or February 3rd (ww4 or ww6)

Find more on https://spec.oneapi.io/versions/latest/introduction.html#contribution-guidelines

Q & A

Resources:

https://www.oneapi.io/spec/ - oneAPI Specification

https://spec.oneapi.io/oneipl/latest/index.html - oneIPL spec (current version: v0.5)

https://github.com/oneapi-src/oneAPI-tab - GitHub with oneAPI TAB materials

https://spec.oneapi.io/versions/latest/introduction.html#contribution-guidelines - oneAPI Specification contribution guidelines