Relax and sit tight

The workshop will begin at 9:00 am PST

Migrating from CUDA to C++ with SYCL

Rakshith Krishnappa, Developer Evangelist @Intel

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About Our Speakers

Rakshith Krishnappa - Developer Evangelist

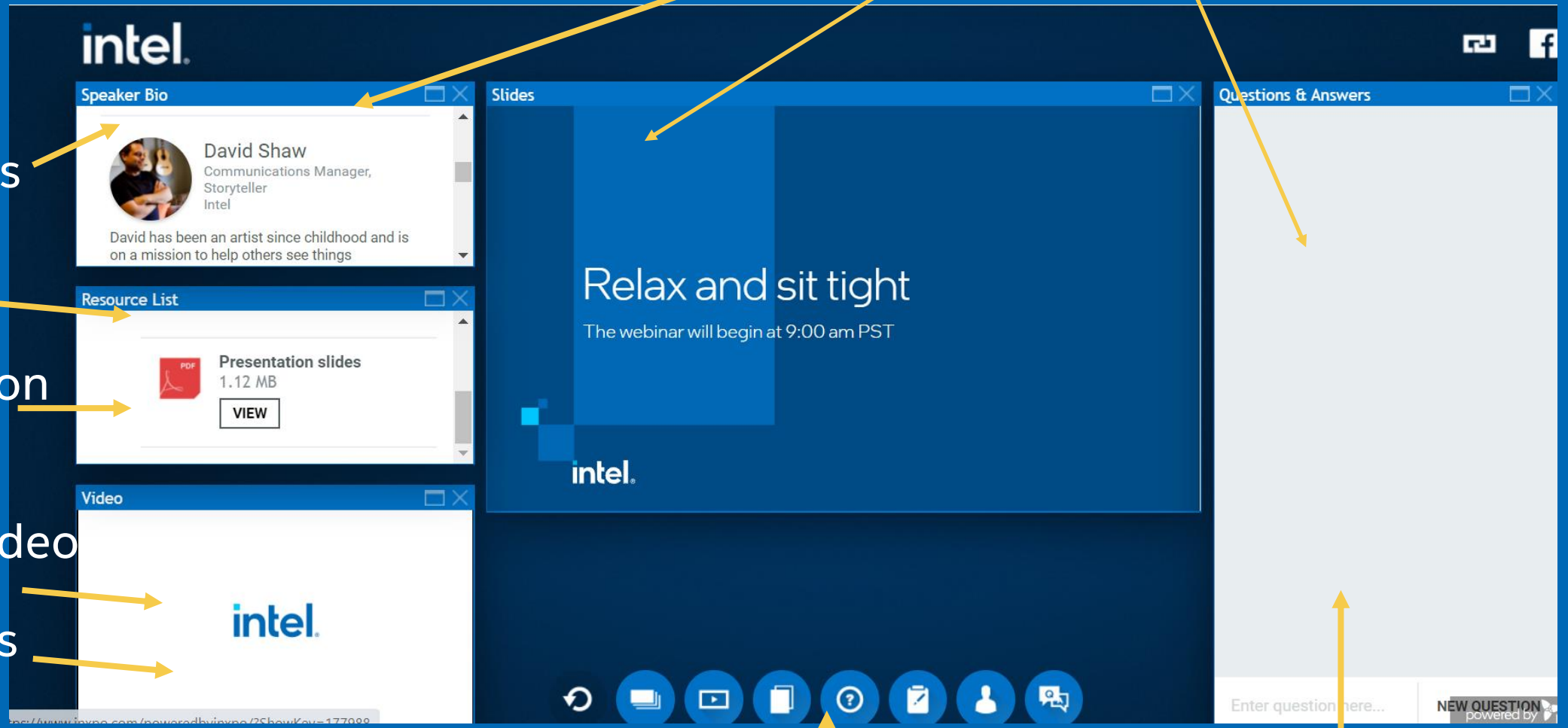
Rakshith is a Developer Evangelist at Intel with over 17 years of experience in software development and Intel products. He graduated from Illinois Institute of Technology with master's in Electrical and Computer Engineering. His main focus currently at Intel is in High Performance Computing and oneAPI Products and Solutions.

Karl Qi - oneAPI Technical Evangelist

As an oneAPI technical evangelist, Karl focuses on enabling HPC and AI customers to create the optimal solution for their needs using the Intel® oneAPI toolkits. He has a particular interest in software that can leverage the capabilities of heterogeneous parallel computing environments. Karl has a bachelor's degree in Electrical Engineering from Cornell University.

Using the Console

Resize and move windows around



Biographies

Resources

Presentation

Speaker video

Live demos

Quick links

Questions and Answers

Migrating from CUDA to C++ with SYCL

Who is this for?

This course is designed for developers who are familiar with Nvidia CUDA development who want to migrate CUDA projects to C++ SYCL and run on heterogenous hardware from different vendors.

What will you learn?

- Programming Challenges with Multiple Hardware Architecture
- Migration Tools
- CUDA to C++ SYCL migration example
- Compiling SYCL code
- Hands-on workshop for migrating CUDA to C++ SYCL

Programming Challenges

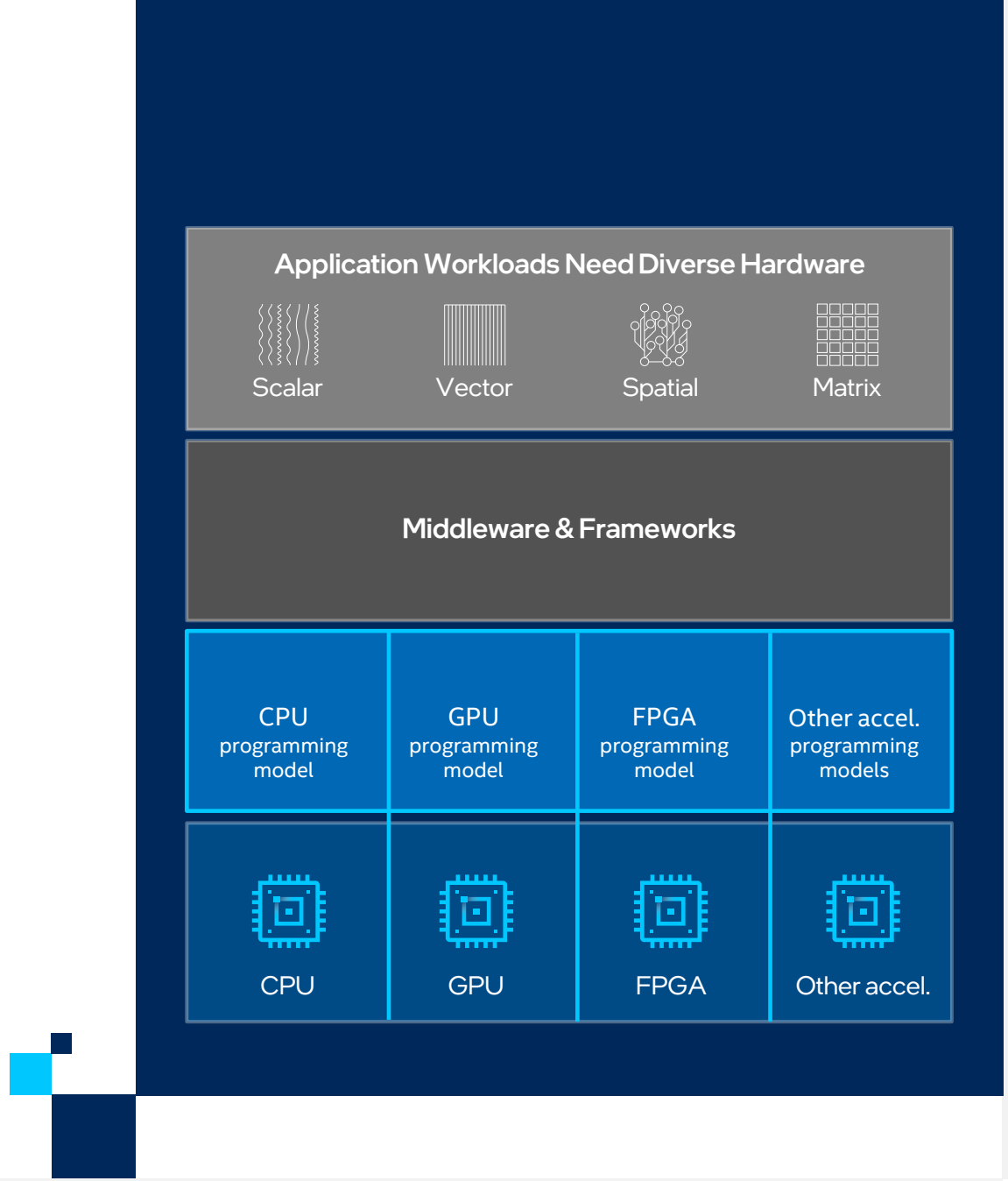
for Multiple Architectures

Growth in specialized workloads

Variety of data-centric hardware required

Separate programming models and toolchains for each architecture are required today

Software development complexity limits freedom of architectural choice



oneAPI

One Programming Model for Multiple Architectures and Vendors

Freedom to Make Your Best Choice

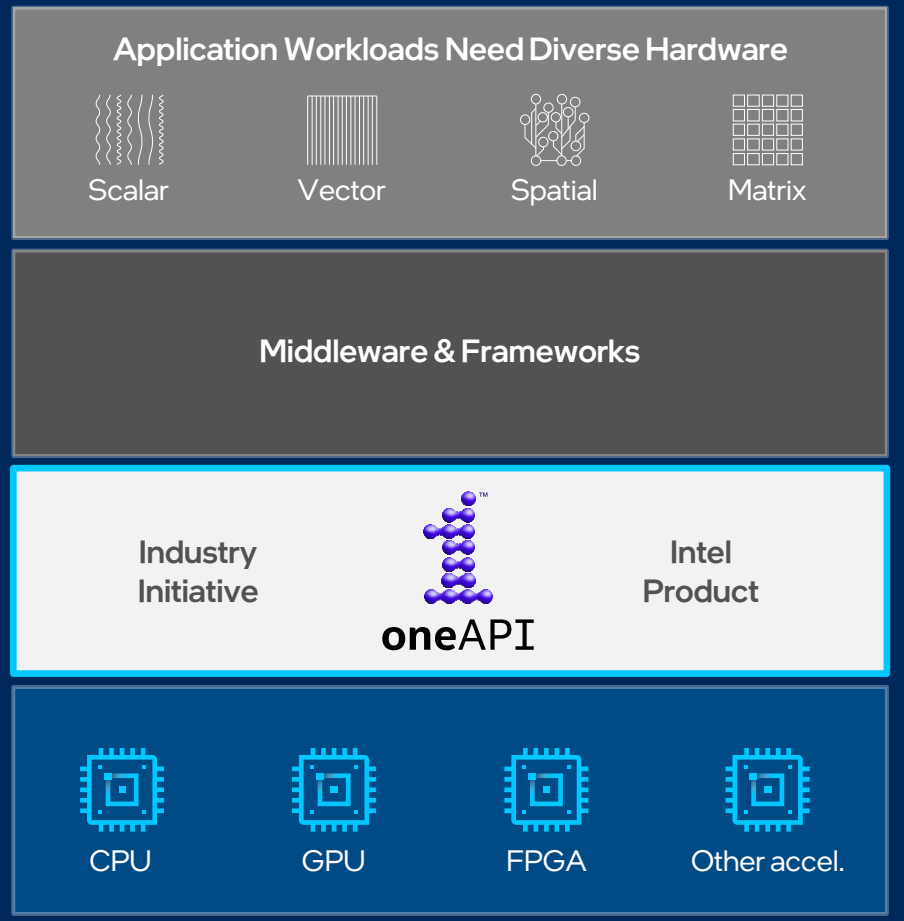
- Choose the best accelerated technology the software doesn't decide for you

Realize all the Hardware Value

- Performance across CPU, GPUs, FPGAs, and other accelerators

Develop & Deploy Software with Peace of Mind

- Open industry standards provide a safe, clear path to the future
- Compatible with existing languages and programming models including C++, Python, SYCL, OpenMP, Fortran, and MPI



Migration Tools

1. Intel® Data Parallel C++ Compatibility Tool available in Intel oneAPI Base Toolkit
2. Intel Open-Source SYCLomatic Migration Tool (https://github.com/oneapi-src/SYCLomatic)

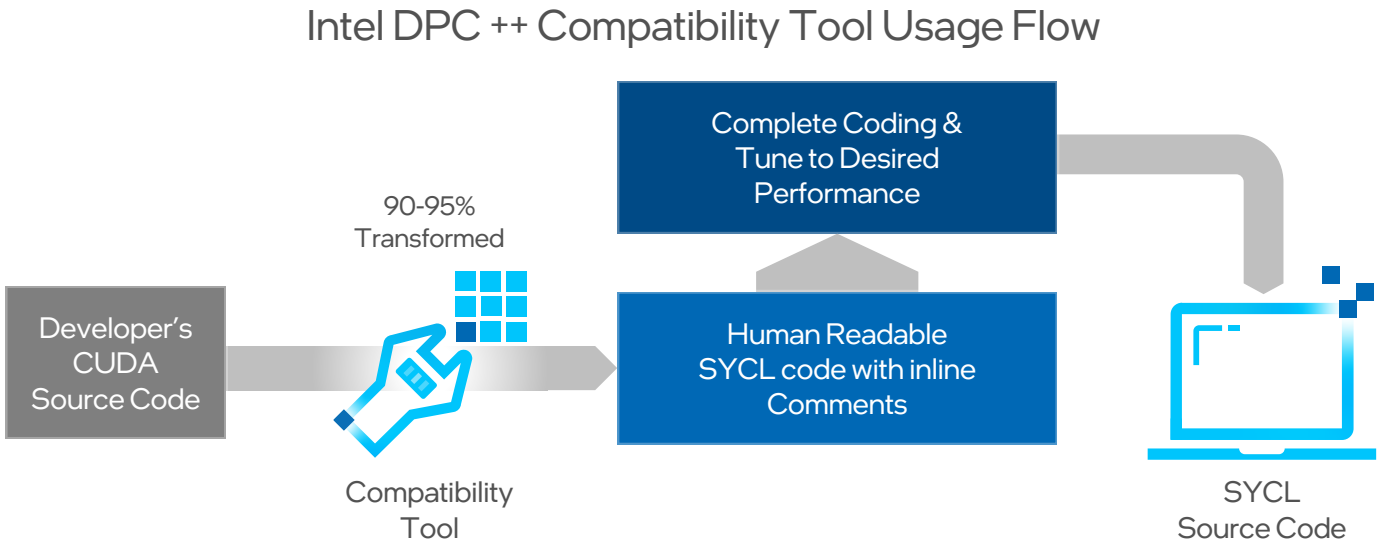
Intel® DPC++ Compatibility Tool

Minimizes Code Migration Time

Assists developers migrating code written in CUDA to SYCL once, generating **human readable** code wherever possible

~90-95% of code typically migrates automatically[1]

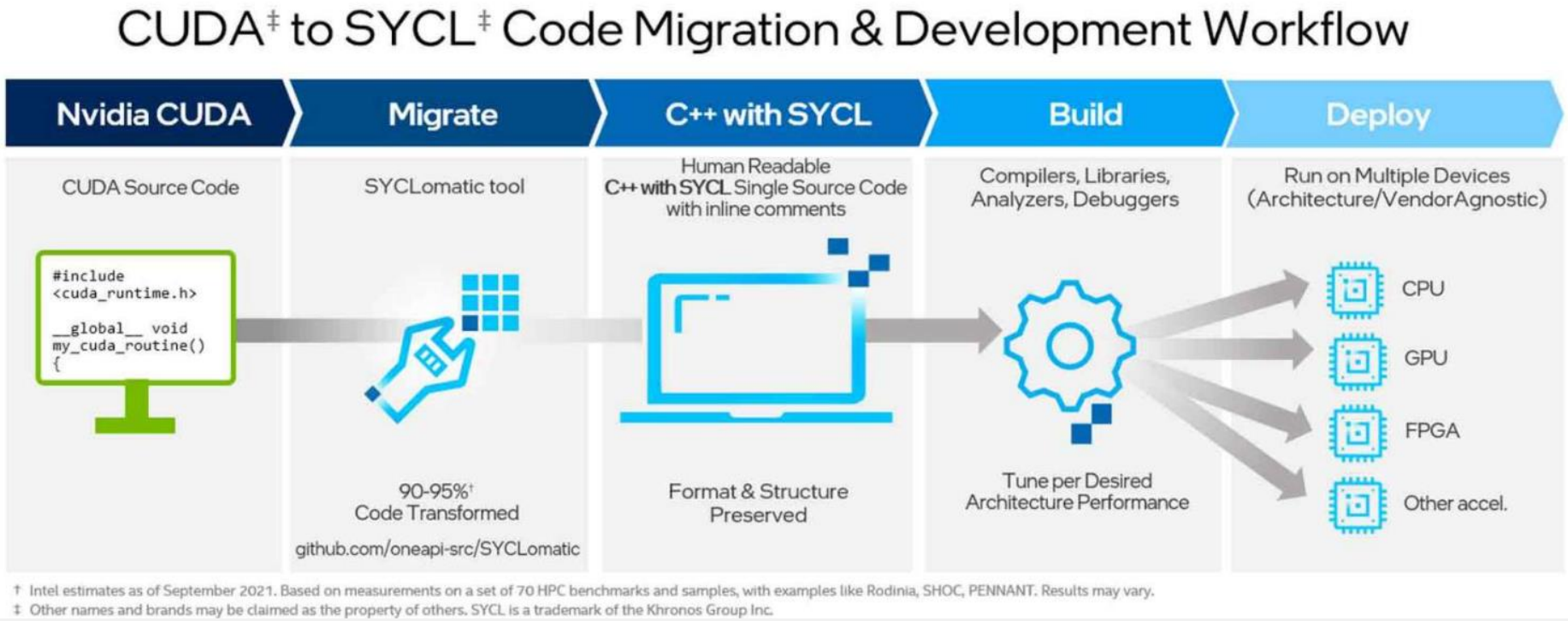
Inline comments are provided to help developers finish porting the application



[1]Intel estimates as of September 2021. Based on measurements on a set of 70 HPC benchmarks SYCLbench samples, with examples like Rodinia, SHOC, PENNANT. Results may vary.

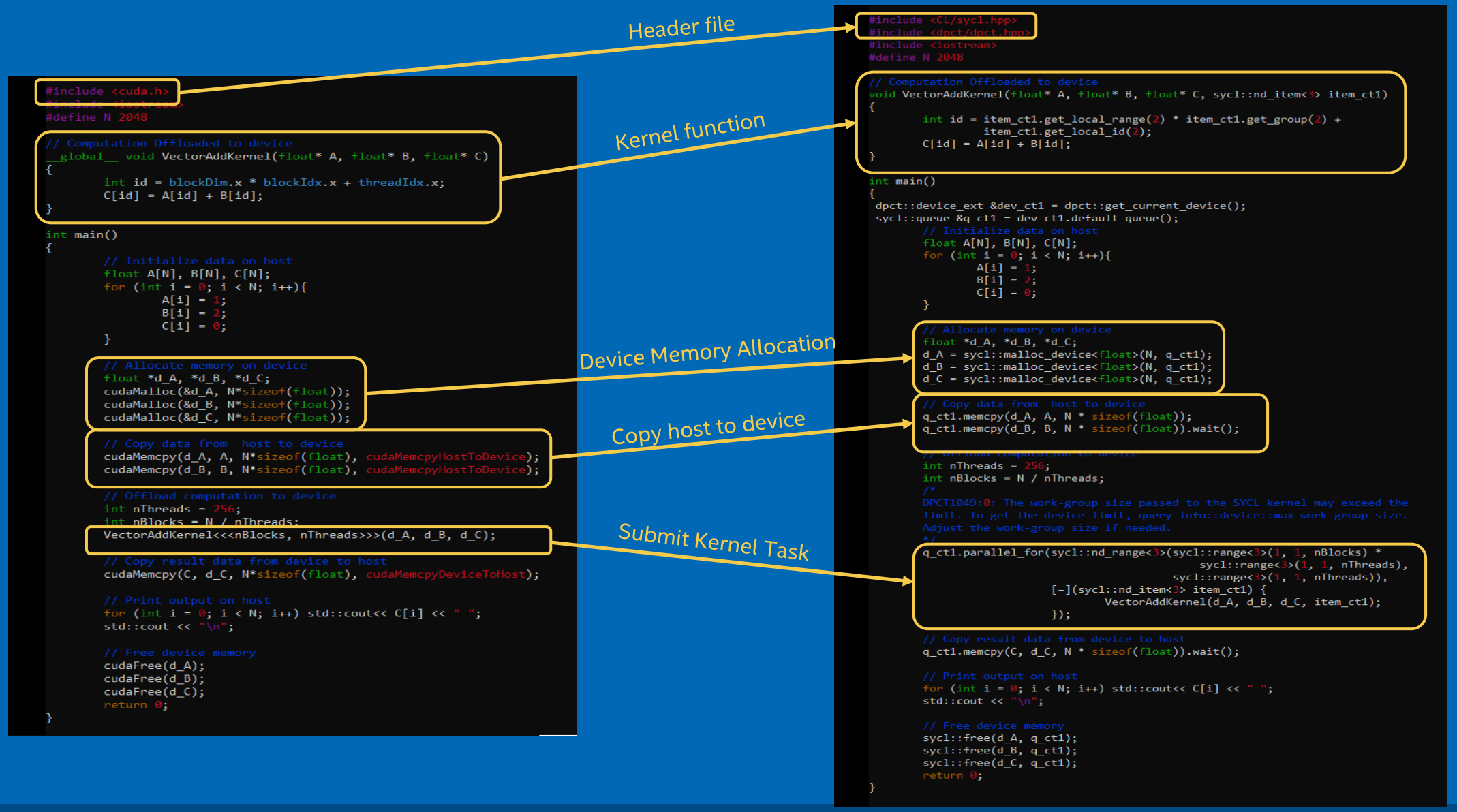
Intel Open-Sources SYCLomatic Migration Tool to Help Developers Create Heterogeneous Code

This open source project enables community collaboration to advance adoption of the SYCL standard, a key step in freeing developers from a single-vendor proprietary ecosystem.



† Intel estimates as of September 2021. Based on measurements on a set of 70 HPC benchmarks and samples, with examples like Rodinia, SHOC, PENNANT. Results may vary.
‡ Other names and brands may be claimed as the property of others. SYCL is a trademark of the Khronos Group Inc.

CUDA to C++ SYCL Migration



Compiler for C++ SYCL

1. Intel® oneAPI DPC++/C++ Compiler available in Intel oneAPI Base Toolkit
2. Intel Open-Source llvm (https://github.com/intel/llvm)

Hands-on Workshop

Step #1

Migrate CUDA projects to SYCL on your CUDA Development Machine

Step #2

Analyze migrated SYCL code and implement any warnings or unmigrated code and test on Intel DevCloud or on your Development Machine with heterogenous hardware from different vendors.

Resources

One stop shop portal

https://developer.intel.com/cuda2sycl

Open-source Compiler for SYCL

https://github.com/intel/llvm

SYCLomatic Migration Tool

https://github.com/oneapi-src/SYCLomatic

Find more workshops, webinars, and events here!

- One API Events and Training calendar

  –https://software.seek.intel.com/oneapi-training-calendar#gs.8qflef

- Intel Software Developer Zone events

  - calendar#gs.8qf9ffhttps://www.intel.com/content/www/us/en/events/developer/overview.html

- Upcoming Webinars

  -https://software.seek.intel.com/techdecoded-webinars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