



## SYCL WG State of the Union 2020

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# SYCL Present and Future Roadmap (May Change)



C++11



C++14



C++17



C++20



C++23



SYCL 1.2  
C++11 Single source  
programming



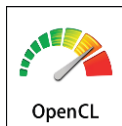
SYCL 1.2.1  
C++11 Single source  
programming



SYCL 2020  
C++17 Single source  
programming  
Many backend options

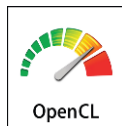


SYCL 2021-?  
C++20 Single source  
programming  
Many backend options



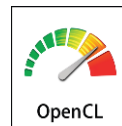
2011

OpenCL 1.2  
OpenCL C Kernel  
Language



2015

OpenCL 2.1  
SPIR-V in Core



2017

OpenCL 2.2



2020

OpenCL 3.0



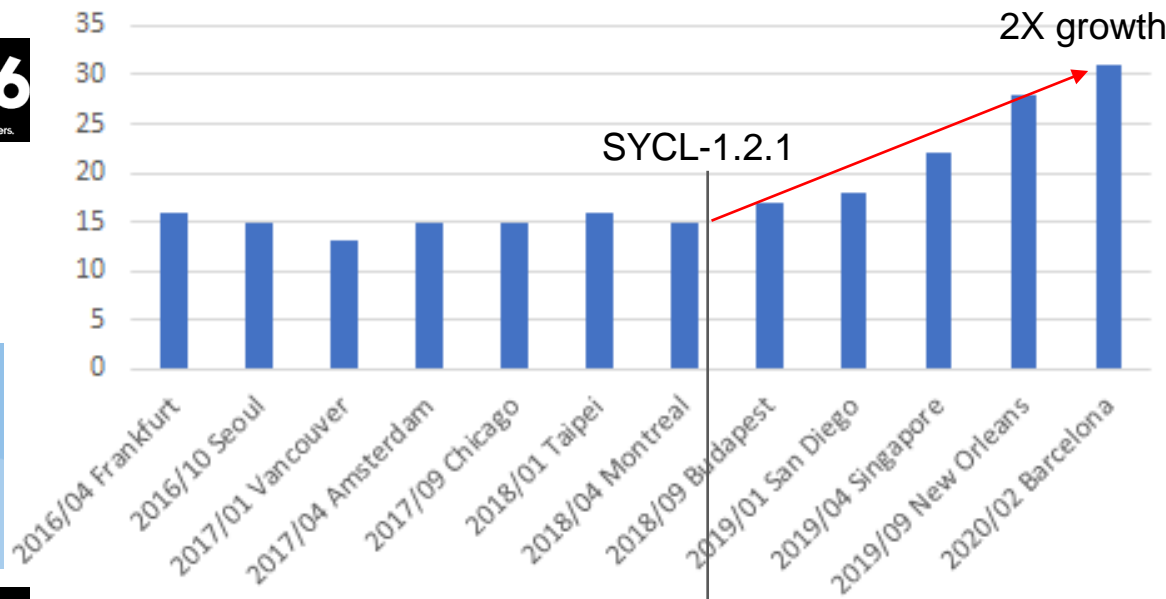
2021-????



# SYCL community is vibrant



SYCL F2F meetings attendance

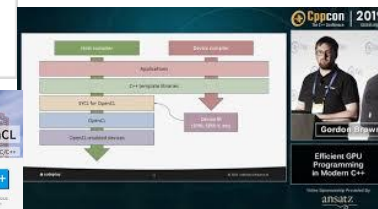
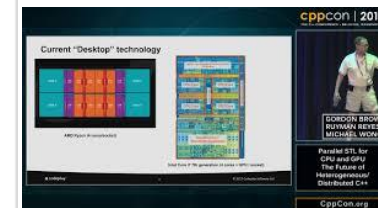


2X growth

SYCL-1.2.1



Toronto, Canada  
May 16-18, 2017



# SYCL Evolution

## SYCL 2020 Potential Features

Generalization (a.k.a the Backend Model) presented by Gordon Brown  
 Unified Shared Memory (USM) presented by James Brodman  
 Improvement to Program class Modules presented by Gordon Brown  
 Host Task with Interop presented by Gordon Brown  
 In order queues, presented by James Brodman

## SYCL 2020 compared with SYCL 1.2.1

Easier to integrate with C++17 (CTAD, Deduction Guides...)  
 Less verbose, smaller code size, simplify patterns  
 Backend independent  
 Multiple object archives aka modules simplify interoperability  
 Ease porting C++ applications to SYCL  
 Enable capabilities to improve programmability  
 Backwards compatible but minor API break based on user feedback

## Integration of successful Extensions plus new Core functionality

Converge SYCL with ISO C++ and continue to support OpenCL to deploy on more devices

CPU  
 GPU  
 FPGA  
 AI processors  
 Custom Processors



SYCL 2020 Roadmap (WIP, MAY CHANGE)



2017  
 SYCL 1.2.1

## Improving Software Ecosystem

Tool, libraries, GitHub

## Expanding Implementation

DPC++  
 ComputeCpp  
 triSYCL  
 hipSYCL

## Regular Maintenance Updates

Spec clarifications, formatting and bug fixes

<https://www.khronos.org/registry/SYCL/>

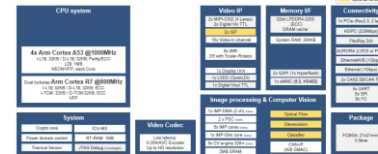
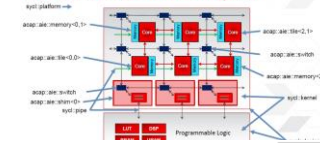
Target 2020  
 Provisional Q3 then Final Q4

## Selected Extension Pipeline aiming for SYCL 2020 Provisional Q3

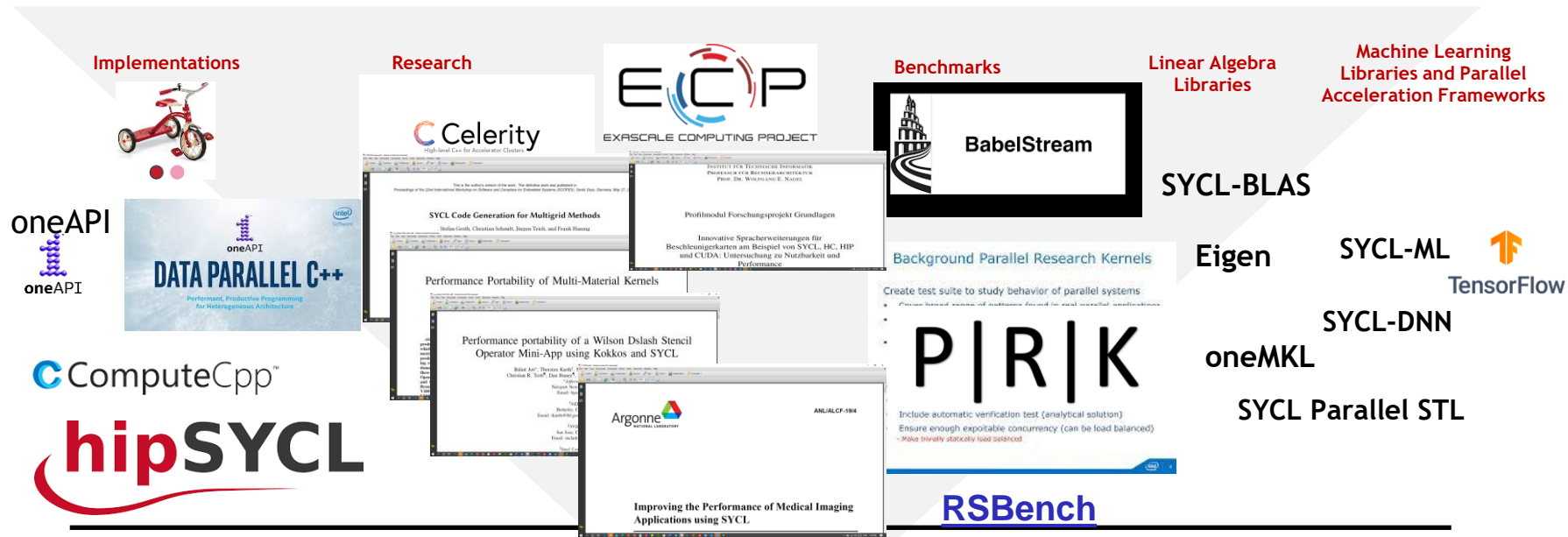
Reduction  
 Subgroups  
 Accessor simplification  
 Atomic rework  
 Extension mechanism  
 Address spaces  
 Vector rework  
 Specialization Constants

Repeat The Cycle every 1.5-3 years

## Xilinx ACAP Versal: a lot of address spaces?



# SYCL Ecosystem, Research and Benchmarks



Active Working Group Members

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# SYCL 2020 Provisional is coming

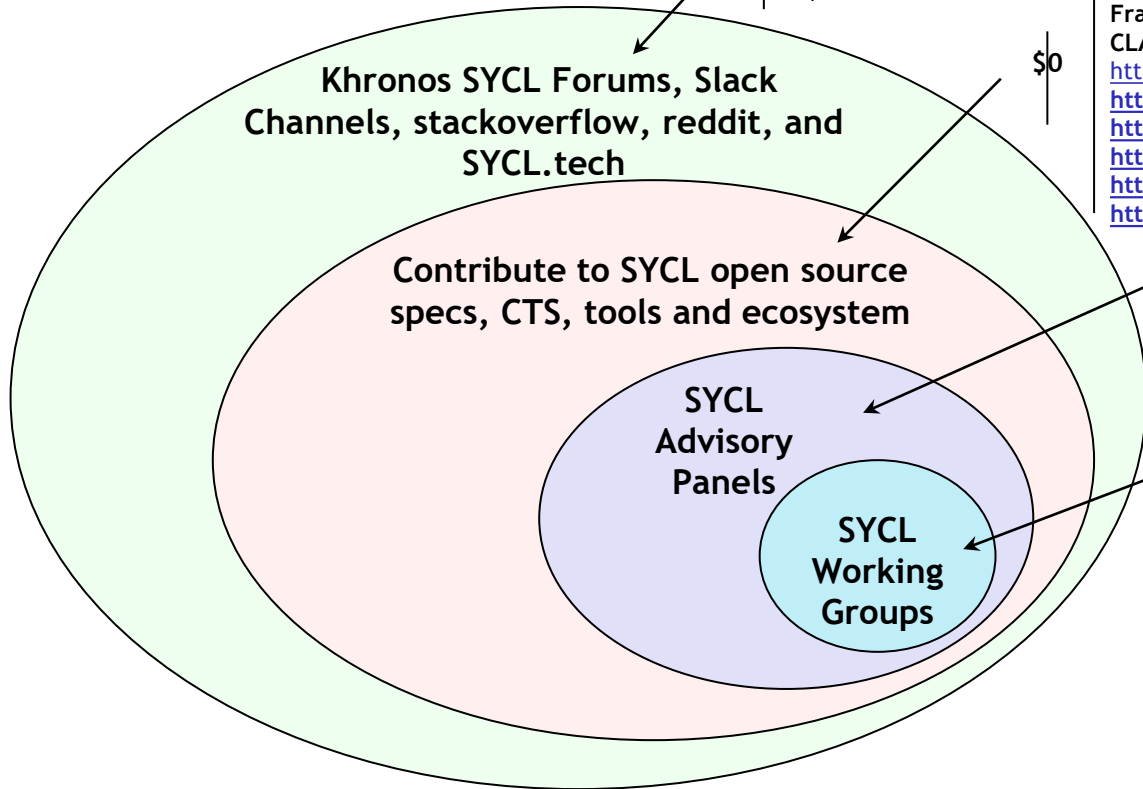
- In a few months, SYCL 2020 provisional will be released
- We need your feedback asap
  - <https://app.slack.com/client/TDMDFS87M/CE9UX4CHG>
  - <https://community.khronos.org/c/sycl>
  - <https://sycl.tech>
- What features are you looking for in SYCL 2020?
- What feature would you like to aim for in future SYCL?
- How do you join SYCL?

# Engaging with the Khronos SYCL Ecosystem



Open to all!

- <https://community.khronos.org/www.khr.io/slack>
- <https://app.slack.com/client/TDMDFS87M/CE9UX4CHG>
- <https://community.khronos.org/c/sycl/>
- <https://stackoverflow.com/questions/tagged/sycl>
- <https://www.reddit.com/r/sycl>
- <https://github.com/codeplaysoftware/syclacademy>
- <https://sycl.tech/>



Spec fixes and suggestions made under the Khronos IP Framework. Open source contributions under repo's CLA - typically Apache 2.0

- <https://github.com/KhronosGroup>
- <https://github.com/KhronosGroup/SYCL-CTS>
- <https://github.com/KhronosGroup/SYCL-Docs>
- <https://github.com/KhronosGroup/SYCL-Shared>
- <https://github.com/KhronosGroup/SYCL-Registry>
- <https://github.com/KhronosGroup/SyclParallelSTL>

Invited Advisors under the Khronos NDA and IP Framework can comment and contribute to requirements and draft specifications

<https://www.khronos.org/advisors/>

Khronos members under Khronos NDA and IP Framework participate and vote in working group meetings. Starts at \$3.5K/yr.

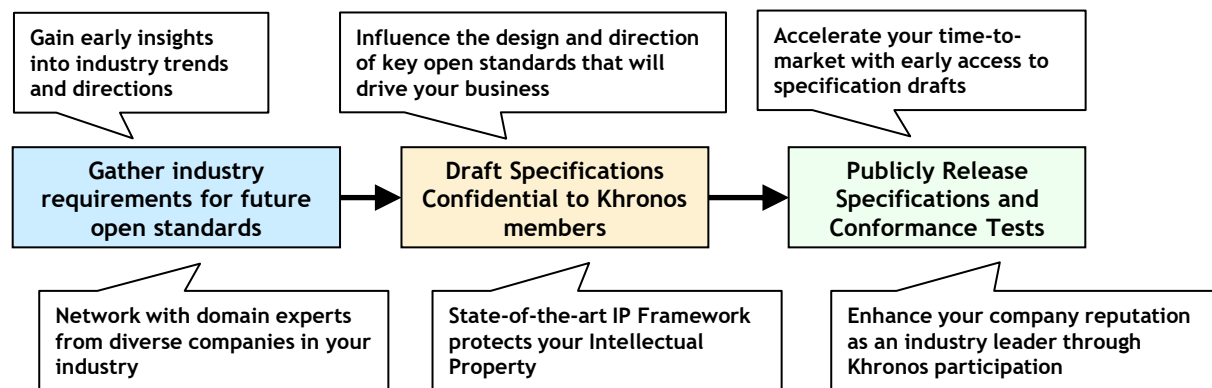
<https://www.khronos.org/members/>

<https://www.khronos.org/registry/SYCL/>

**Any member or non-member can propose a new SYCL feature or fix**

# Thank You!

- Khronos SYCL is creating cutting-edge royalty-free open standard
  - For C++ Heterogeneous compute, vision, inferencing acceleration
- Information on Khronos SYCL Standards: <https://www.khronos.org/sycl>
- Any entity/individual is welcome to join Khronos SYCL: <https://www.khronos.org/members>
- Join the SYCLCon Tutorial Monday and Wednesday Live panel : Wednesday Apr 29 15:00-18:00 GMT
  - Have your questions answered live by a group of SYCL experts
- Michael Wong: [michael@codeplay.com](mailto:michael@codeplay.com) | [wongmichael.com/about](http://wongmichael.com/about)



## Benefits of Khronos membership