

# SC19 briefing notes

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# Intel Ponte Vecchio GPU and OneAPI SW

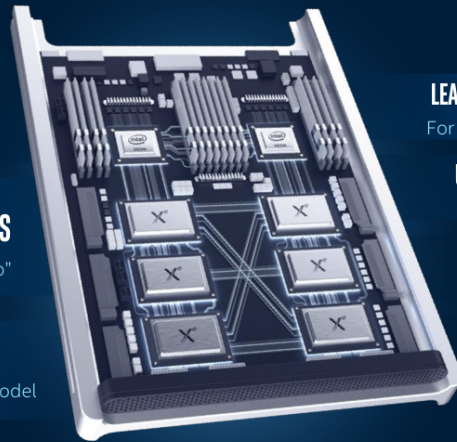
Promotional keynote at Intel sponsored HPC Developer Conference by Raja Koduri: senior VP, chief architect, and GM of Architecture, Graphics, and Software at Intel Corporation.

## Building the Foundation for Exascale Computing

**2** INTEL XEON SCALABLE PROCESSORS  
"Sapphire Rapids"

**6** XE ARCHITECTURE BASED GPU'S  
"Ponte Vecchio"

**ONEAPI**  
Unified programming model



**LEADERSHIP PERFORMANCE**  
For HPC, data analytics, AI

**UNIFIED MEMORY ARCHITECTURE**  
Across CPU & GPU

**ALL-TO-ALL CONNECTIVITY WITHIN NODE**  
Low latency, high bandwidth

**UNPARALLELED I/O SCALABILITY ACROSS NODES**  
8 fabric endpoints per node, DAOS

DELIVERED IN 2021



- Official announcement of the Xe Graphics Architecture spanning mobile, desktop, and HPC.
- First generation "Ponte Vecchio" product designed for HPC and AI (Aurora exascale).
- Low latency, high BW interconnect on node permits memory coherency.
- "Sapphire Rapids" CPU in 2021

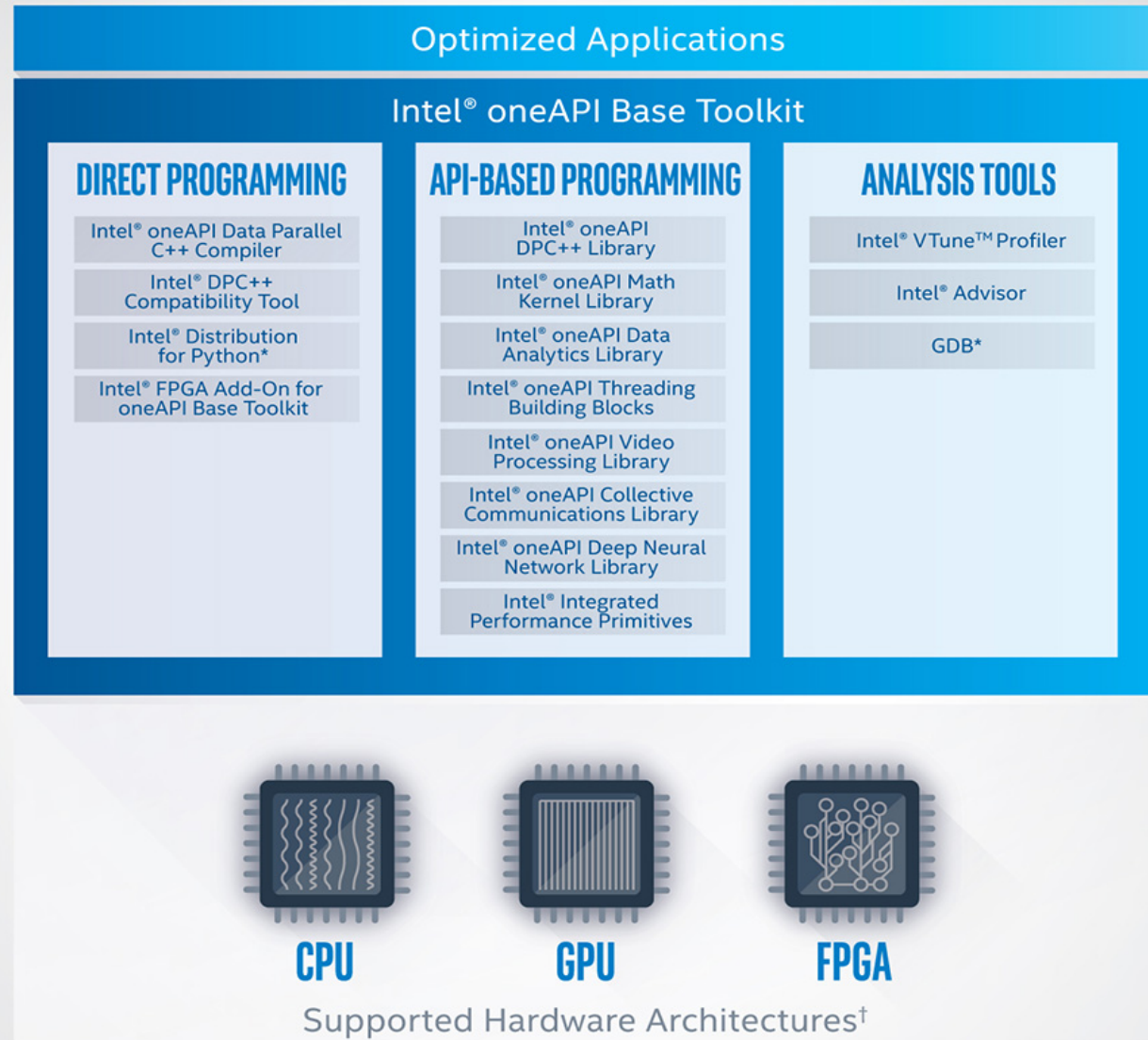
# OneAPI

Intel promoted software tools – open standard

Bundles many familiar Intel SW products under one umbrella

Data Parallel C++ (DPC++) an evolution of C++ based on SYCL with Intel extensions







- Platform model
- Data management
- Expressing || - kernels



†Hardware support varies by individual oneAPI tool. Additional architecture support will be expanded over time.  
\*Other names and brands may be claimed as the property of others.

# Learn DPC++ and oneAPI

**learn DPC++ and oneAPI**

-  Preview: Chapters 1-4 from the new DPC++ Book
-  Download: DPC++ Code from DPC++ Book
-  View Currently Known (Book) Errata
-  Online Training (Great Complement to Book!)
-  Download: DPC++ Code and Labs for Online Training
-  Download: Slides used in Online Training
-  Intel oneAPI (and DPC++) website for Software Developers
-  DPC++ Open Source (github)

Book preview and online training available from <https://jamesreinders.com/dpcpp/>

Free accounts on Intel Devcloud <https://software.intel.com/en-us/devcloud/oneapi> provides a pre-configured development sandbox to test code.

Hardware: Xeon (CPU+GPU) and Arria (FPGA)

# Lustre BOF

- Lustre is > 20yrs old, still leading in features
- Will be used at Aurora and Perlmutter installations. NERSC will deploy a 30 PB all VME instance
- Lustre v2.10 is most used in production
- Lustre v2.12 LTS is current, supports recent kernels
- [Integrated Manager](#) is GA; simple, powerful management / monitoring tools and dashboard.
- Under development:
  - Small files stored on MDS
  - Persistent VME cache local to clients, use HSM to manage files

# SLURM BOF

- I spoke with staff at SchedMD booth. I will follow up on possibility of arranging SLURM half/full day training on an hourly basis by a consultant.
- Current release 19.05
  - Plugin 'cons\_res' will be removed in the future
  - Can move to newer, better 'cons\_tres' (consumable trackable resource, e.g. GPUs, CPUs, memory) plugin without losing queued jobs
  - There is also a 'nersc\_cli\_filter' that runs slow computational checks on job submissions on the client side. Example: checking resource quotas requested at job submission. Users can bypass checks with some ingenuity!
- Next release is 20.02
  - REST API to slurmctl
  - No more *slurm.conf* file, slurmd processes do RPCs to server for configuration
- Only the last two tagged releases are to be supported