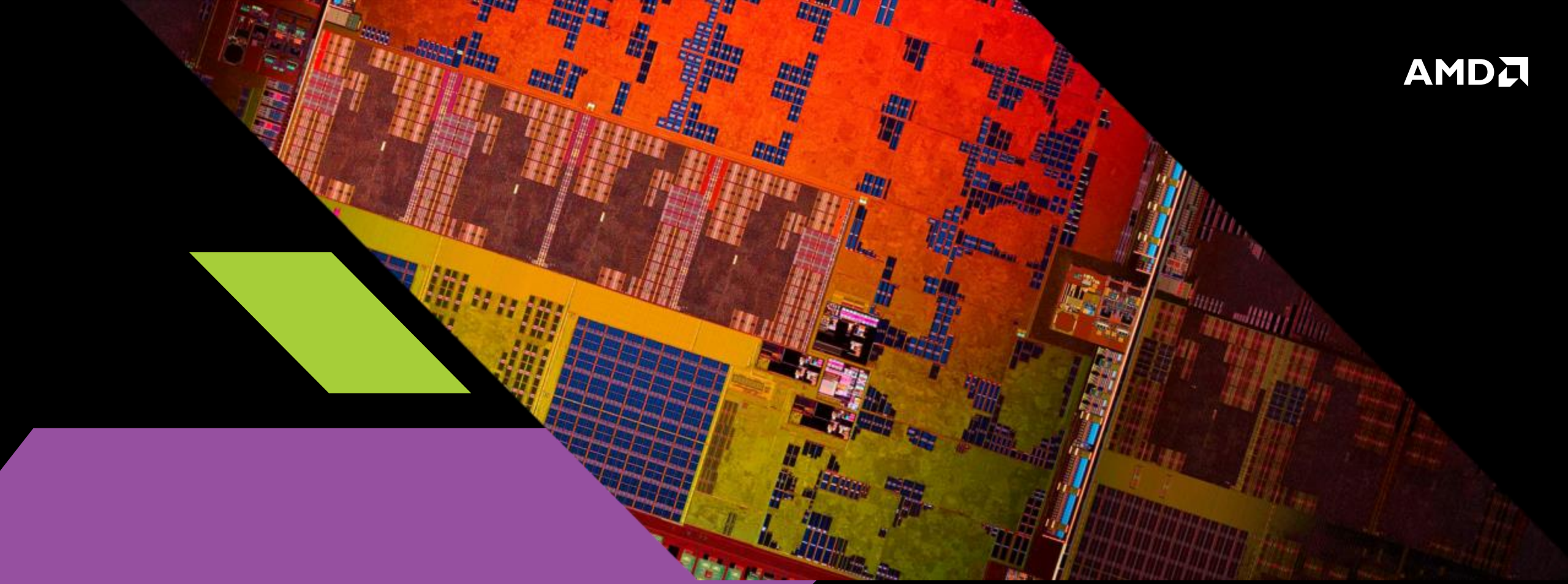


AMD

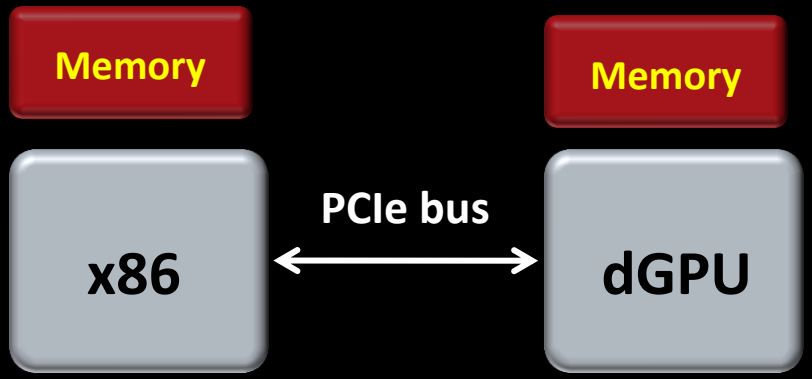
Singapore
HPC Advisory Council

October 7th 2014

AMD GPU COMPUTING

JC BARATAULT
JC.BARATAULT@AMD.COM
GLOBAL GPU COMPUTING

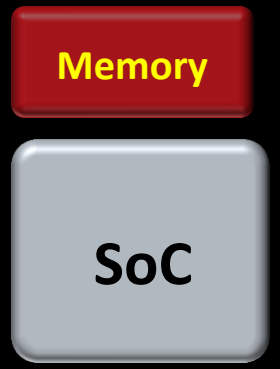
1 EXAFLOPS
20 MW
50 GFLOPS DP/W



DATA TO WORK

Since 2007

Not efficient!



WORK TO DATA

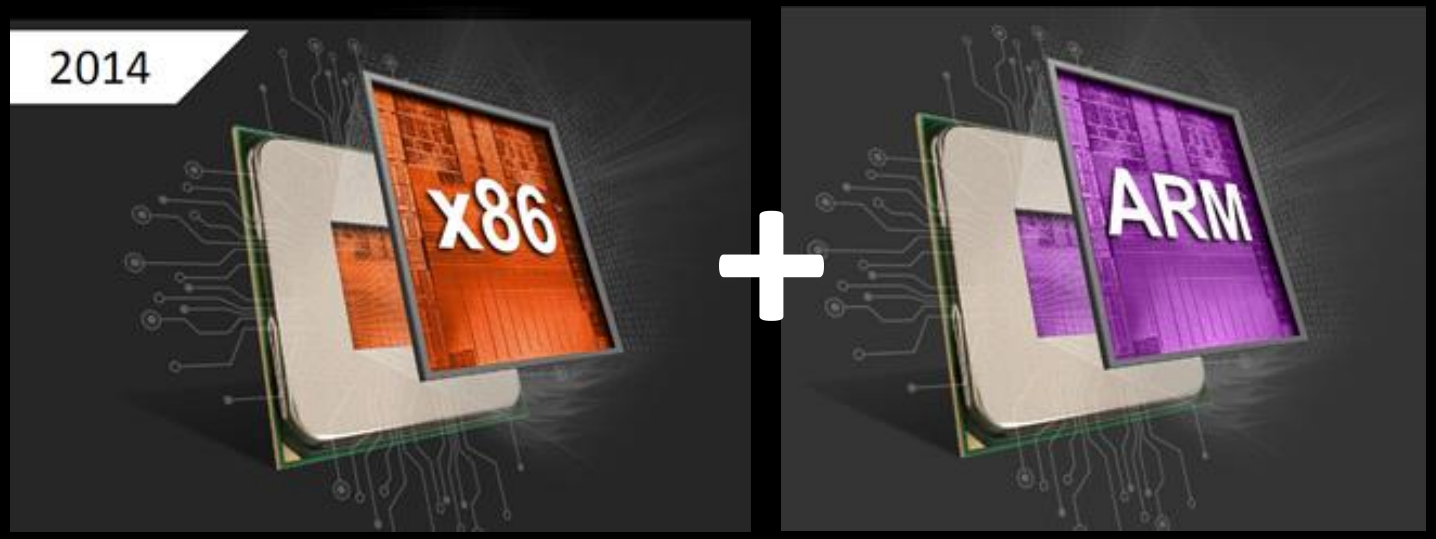
Beyond 2015

Run indifferently serial and parallel codes

WHY AMD

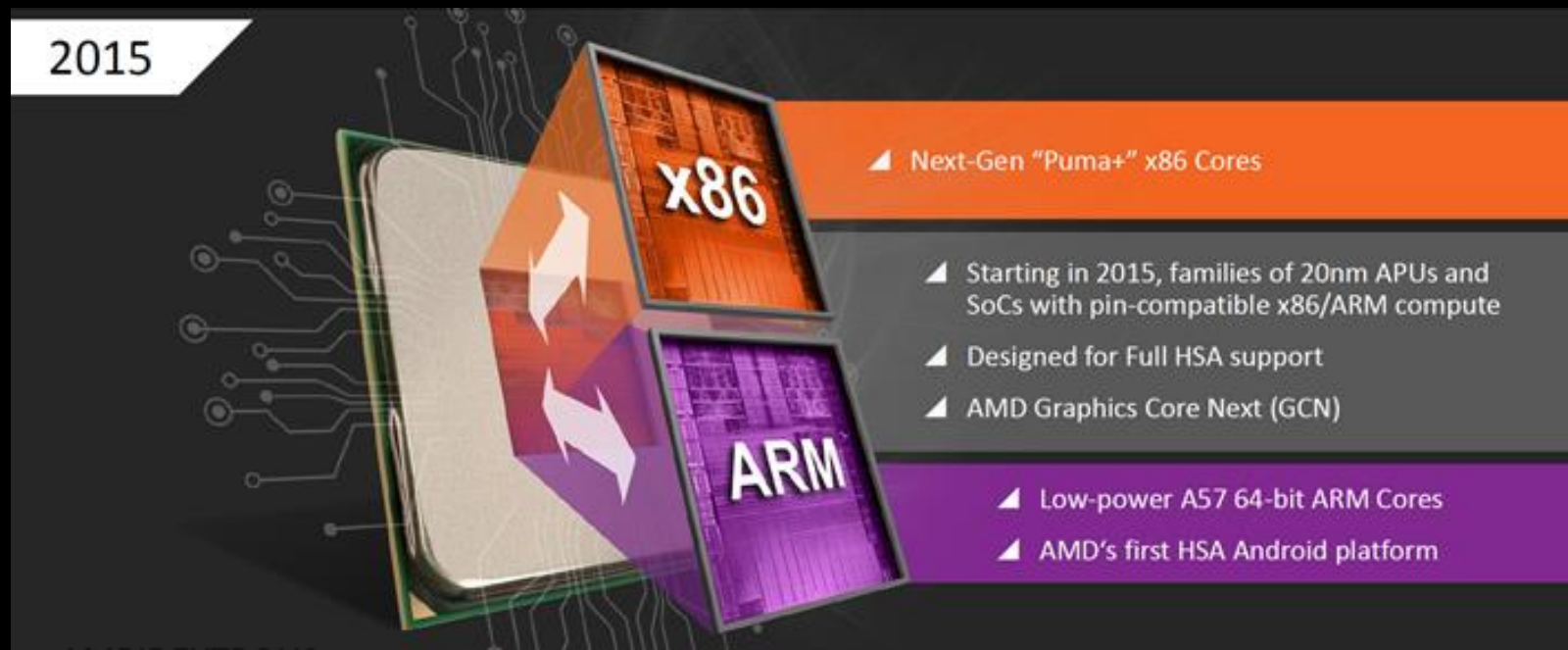

AMD
64
TM
+
AMD
FIREPRO
S SERIES
+
ARM

Ambidextrous Computing



HSA compliant & Lower power APU

28nm 64-bit ARM server processor



AMD FIREPRO

AMD FirePro Professional Graphics

AMD FIREPRO

Professional GPUs
OpenGL + OpenCL

All PCIe Gen3

AMD FIREPRO W SERIES

Workstations

AMD FIREPRO S SERIES

Datacenters

Active cooling

Passive cooling

AMD STREAM TECHNOLOGY

GPU Computing

AMD SKY TECHNOLOGY

VDI & Cloud

FirePro S9150

16 GB

2 TF DGEMM

AMD

ADVANTECH
Enabling an Intelligent Planet

ASUS
Rock Solid · Heart Touching

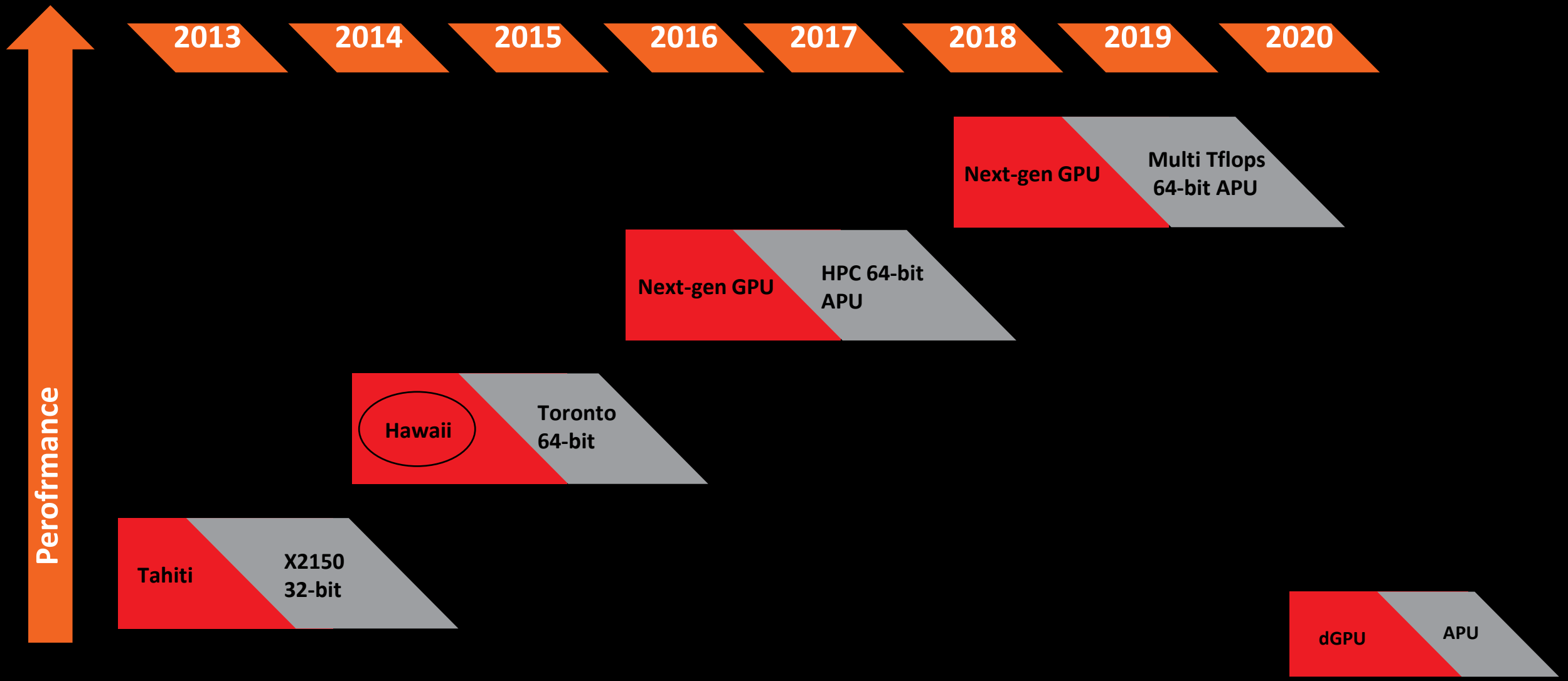
ASRock

GIGABYTE
TECHNOLOGY

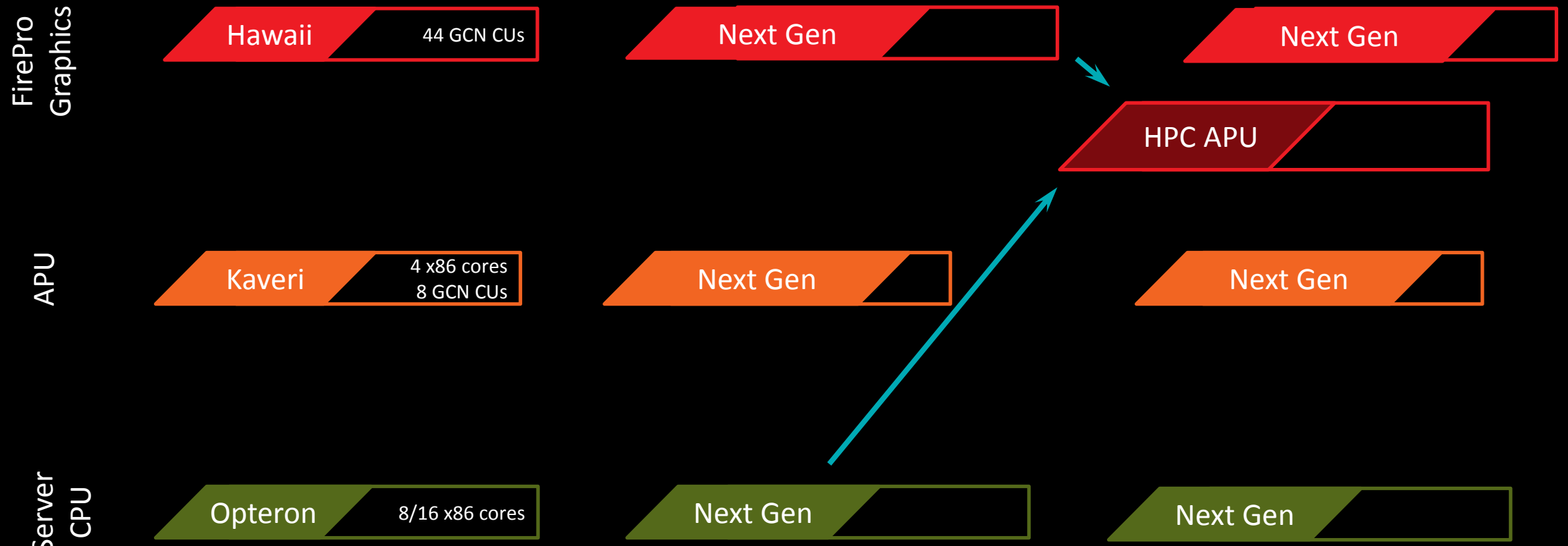
SUPERMICRO

TYAN

We have plans for the coming 10 years



Smooth and Efficient Transition from dGPU to SoC



LEGACY CODES

From dGPU to SoC

Need for open programming framework for legacy and future-proof codes

Heterogeneous System Architecture

Write-once-run-everywhere for heterogeneous systems

HSA Foundation

Write-once-run-everywhere for heterogeneous systems

AMD

- Industry leaders setting an industry standard
- Designed for developers, by developers
- One architecture, differentiated ‘IP’ vendors
  - Multiple hardware solutions to be exposed to software through a common standard low-level interface layer
- Support high-level parallel programming languages and models, including C++ AMP, C++, C#, FORTRAN, **OpenCL**, **OpenMP**, Java and Python

DIVERSE PARTNERS DRIVING FUTURE OF HETEROGENEOUS COMPUTING

Founders

AMD
ARM
Imagination
MEDIATEK
QUALCOMM
SAMSUNG
Texas Instruments

Promoters

LG Electronics

Supporters

Arteris
FABRICENGINE
KHRONOS
Lawrence Livermore National Laboratory
Argonne National Laboratory
allinea
codeplay
MULTICORE WARE
Linaro
Sandia National Laboratories
SUSE
OAK RIDGE National Laboratory

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SONICS
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augmented
Swarm64
HUAWEI
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tensilica
ubuntu
VIVANTE
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ORACLE

Academic

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NTHU System Software Lab
University of BRISTOL
informatics
ILLINOIS COMPUTER SCIENCE
清華大學 Tsinghua University
TAMPERE UNIVERSITY OF TECHNOLOGY

OpenCL 2.0

OpenCL 2.0
HSA compliant

AMD

- **Focus on HSA and HSA-like devices**
  - GPU and CPU are capable of sharing memory, pointers, cache, and more
  - OpenCL 1.x is already capable of running on these devices, but it lacks effective means to take advantage of the interconnected hardware, which is where OpenCL 2.0's additions come in
- **Shared Virtual Memory**
  - Host and device kernels can directly share complex and pointer containing data structures eliminating costly data transfer between host and devices
- **Dynamic Parallelism**
  - Device kernels can enqueue kernels to the same device without host interaction
- **Generic Address Space**
  - Functions can be written without specifying a named address space for arguments

AMD
- OpenCL 1.2 today
- OpenCL 2.0 Q4 2014

INTEL
- OpenCL 1.2 today
- OpenCL 2.0 Q3 2014 (CPU)

ALTERA
- OpenCL on FPGA

MICROSOFT
- OpenCL ‘Windows Server 2015’

APPLE
- 100% OpenCL

OpenMP 4.0

"Pathscale's ENZO Compiler with OpenMP 4.0 and support for C, C++, and Fortran is used by customers in the Oil and Gas, Computational Science, Computer Aided Engineering, and other HPC segments.

Our support for the AMD FirePro S9150 will enable these customers to benefit from the tremendous compute performance of the S9150 while leveraging their existing investment in OpenMP software."

Christopher Bergstrom, CTO, PathScale

Support for OpenMP 4.0 & OpeACC 1.0

- Full OpenMP 4.0 implementation
- OpenACC 1.0 all Hawaii and Tahiti-based FirePro cards with C, C++, Fortran
  - FirePro S-series: S10000, S9150/S9100, S9050/S9000
  - FirePro W-series: W9100, W9000, W8100, W8000
- November 2014 Beta
- December 2014 Production release

- ✓ Open software stacks
- ✓ Users not locked in
- ✓ Future proof solutions

Thank you

JC.BARATAULT@AMD.COM

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