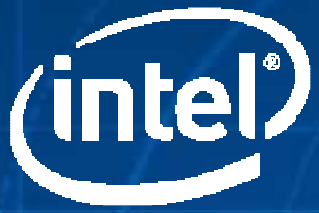

Moore's Law and a Scalable System Framework

The next decade of HPC and Big Data

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General Manager, High Performance Computing

August 12, 2015

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“Creating a National Strategic Computing Initiative”

White House Executive Order, July 29 2015

“The NSCI is a whole-of government effort designed to create a cohesive, multi-agency strategic vision and Federal investment strategy executed in collaboration with industry and academia, to maximize the benefits of HPC for the United States”

“Creating a National Strategic Computing Initiative”

White House Executive Order, July 29 2015

(1)Accelerating delivery of a capable exascale computing system…

(2)Increasing coherence between the technology base used for (HPC and Big Data)…

(3)Establishing a viable path forward for future HPC systems

(4)Employing a holistic approach…to increasing the capability of a national HPC ecosystem

(5)Developing an enduring public-private collaboration…

Intel views HPC as absolutely strategic. The NSCI mirrors the Intel HPC playbook and we are "all-in" – not just for an Exascale system but for the broader benefits this call to action provides for HPC, science, and mankind

Celebrating 50 Years of Moore's Law

Ongoing Exponential Growth in Performance

From the biggest, fastest system to a single socket in ~15 years

Source: *Top500.org and internal Intel estimates*

= Performance of Top500's #1 Supercomputer by year

Knights Landing: A Balanced Approach to HPC

Server Processor

Peak DP FLOPS

3+ TF

Memory Bandwidth

>400 GB/s STREAM Triad

Deep Learning

up to 2.5x faster[1]

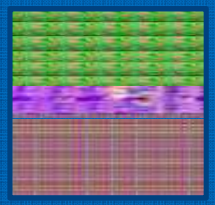
General Purpose Compute (Perf/Watt)

Comparable [1]

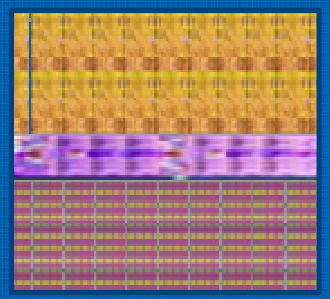
1. 1 KNL Vs. 2x Intel® Xeon® processor E5-2697v3 product family

A Scalable Framework that will accommodate new compute paradigms

Today

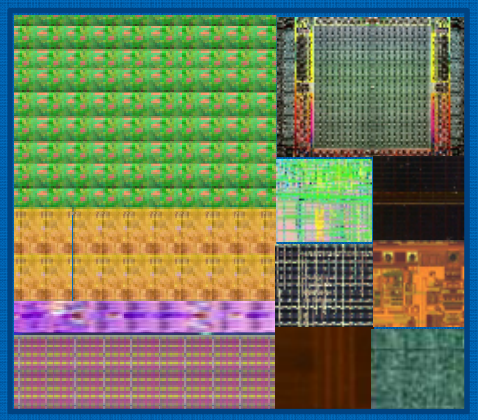


Multi-Core



Many-Core

The Future?

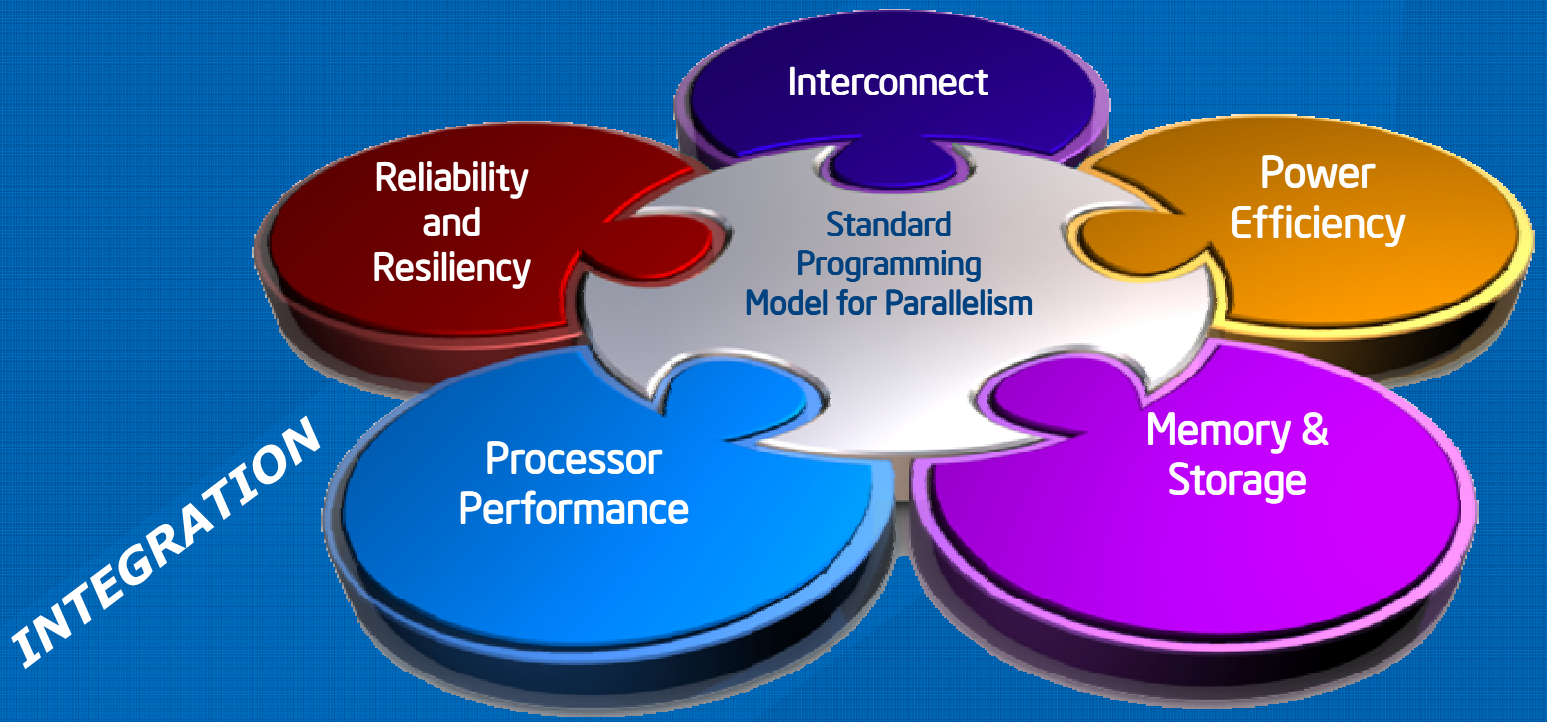


Mix of cores, Integrating FPGA, Accelerators….

Goal #1

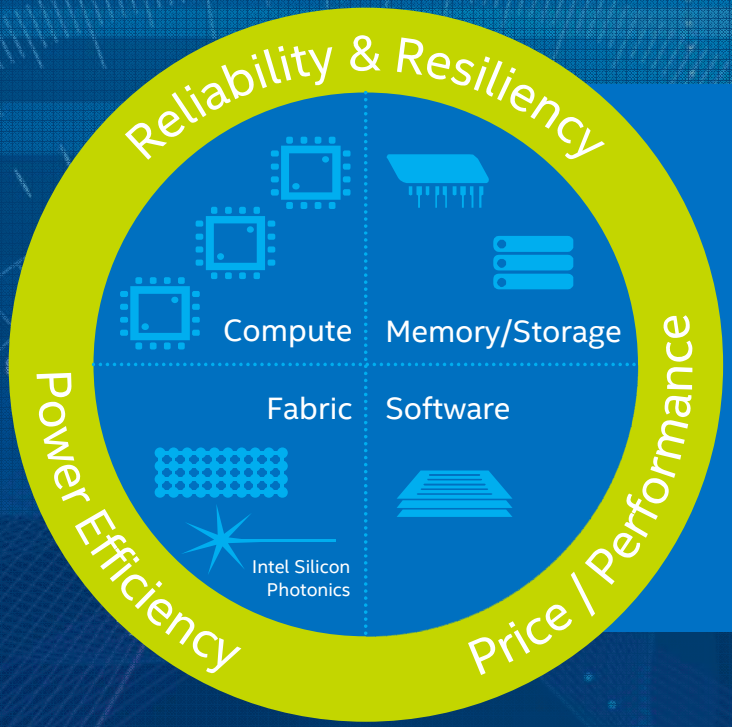
Intel will continue to lead and drive the large scale semiconductor process technology and manufacturing required to deliver an economical Exascale system

Future Systems Require Innovation Across Multiple Vectors



Intel's HPC Scalable System Framework

A configurable design path customizable for a wide range of workloads



Small Clusters through Supercomputers

Standards-Based Programmability

Compute and Data-Centric Computing

On-Premise and Cloud-based

Intel® Xeon® Processors
Intel® Xeon Phi™ Coprocessors
Intel® Xeon Phi™ Processors

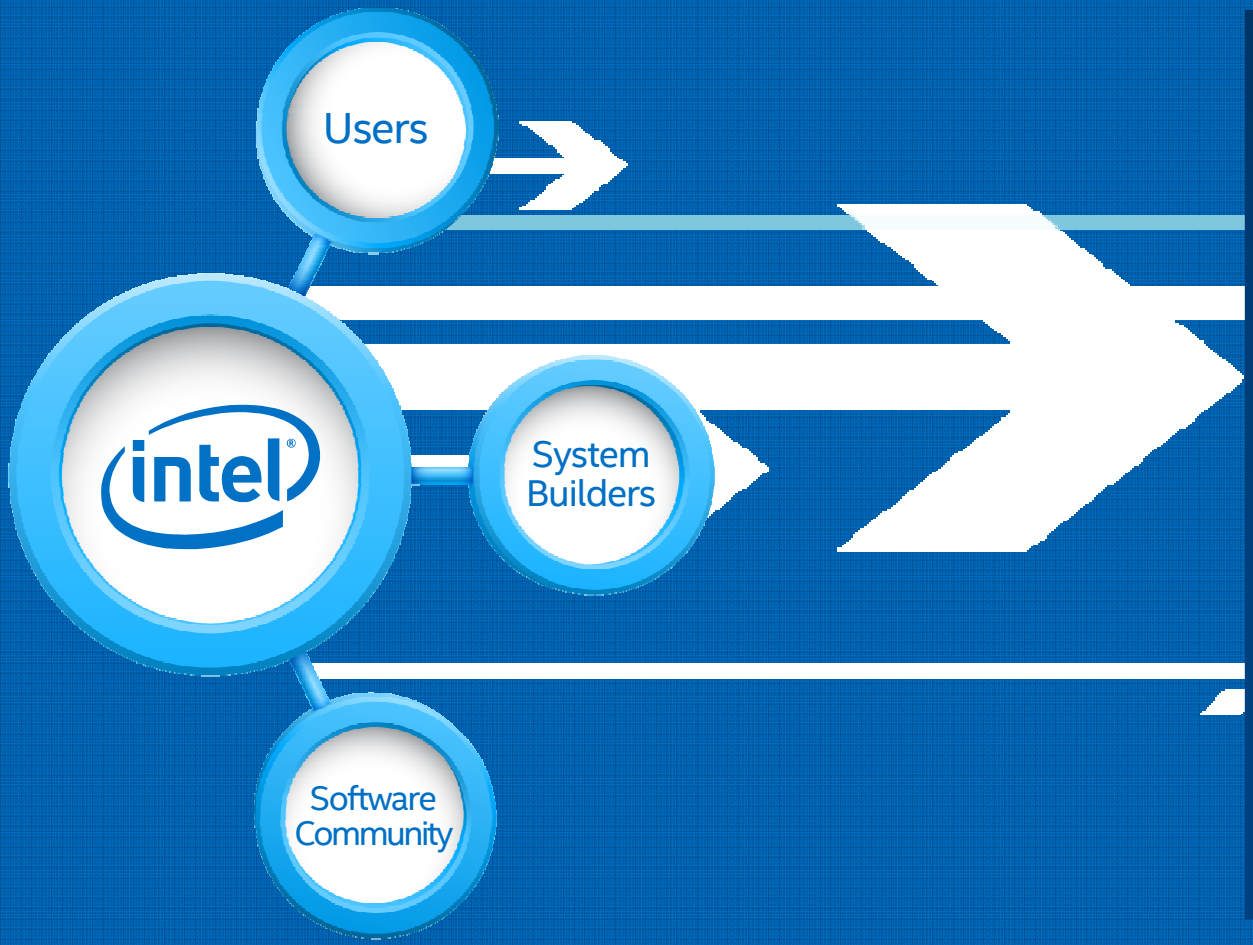
Intel® Omni-Path Architecture
Intel® Ethernet
Intel® Silicon Photonics Technology

Intel® SSDs
Intel® 3DxPoint NVM
Intel® Lustre-based Solutions

Intel® Software Tools
HPC Scalable Software Stack

More needed: Co-Design with the Ecosystem

Brings innovations, holistic designs, and the means to deliver the full benefits to users



Expanding portfolio of game changing technologies in a scalable system design framework

Co-design approach that optimizes for overall workload performance, efficiency and reliability

Thriving, open, enabled, and innovating ecosystem

Goal #2

Intel will continue to invest in scalable system level solutions and collaborate with leading HPC talent and institutions

NREL

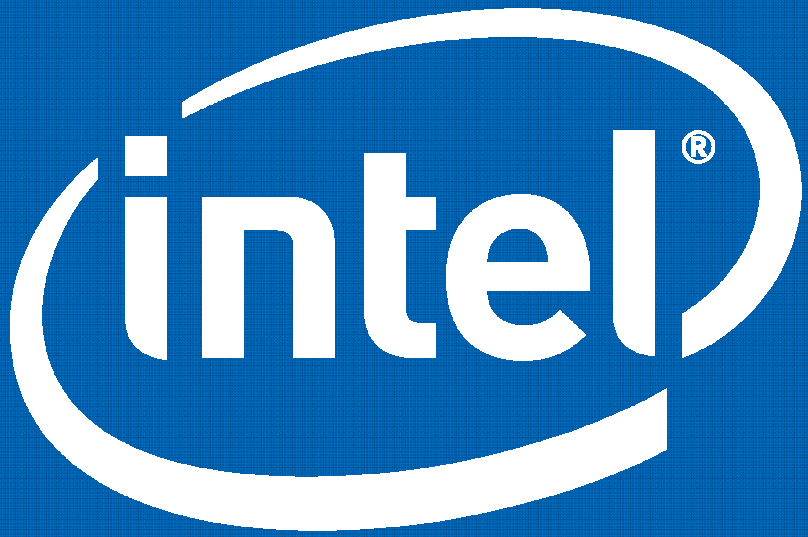
NCAR

University of Colorado

University of Utah

The Intel HPC Path Forward

1. *The continued progression of Moore's Law*
2. *Investment and collaboration in delivering scalable systems level solutions*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