Hewlett Packard Enterprise

FAST MATH: HPE APOLLO 80 SYSTEM

Tom Bradicich, PhD.
VP & Hewlett Packard Fellow
@TomBradicichPhD

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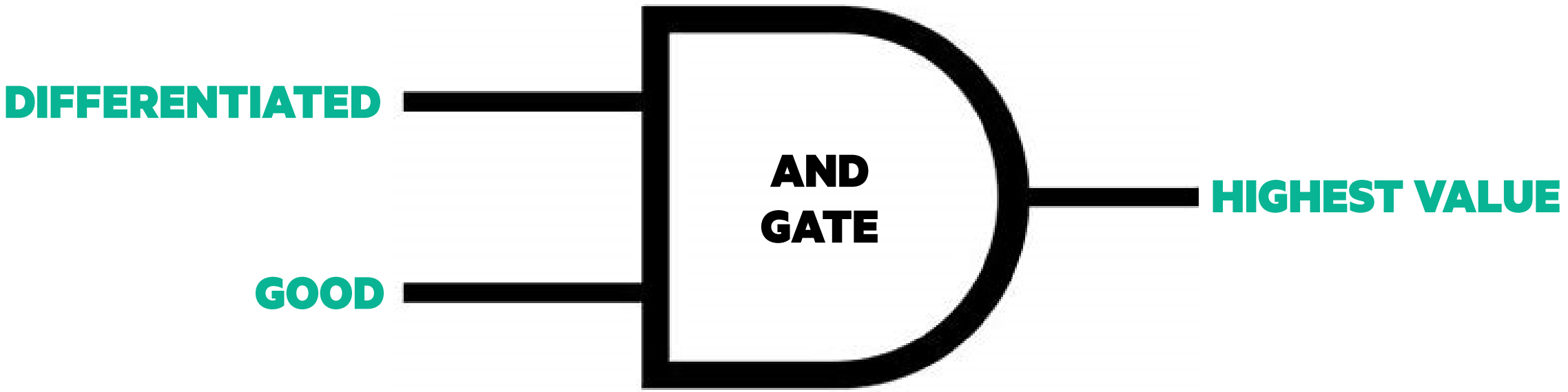
THE GENIUS OF THE 'AND' – MY BUSINESS PHILOSOPHY



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A QUICK WALK BACK IN TIME – SOME HISTORY OF HPE, CRAY, AND ARM

- HPE Apollo 70
  - Dual Socket 4 nodes in 2U chassis
  - Up to 84 nodes in standard 42U rack

- Building block for Astra, 2 years as world's fastest Arm based supercomputer
- Currently #198 on Top500 list at 1.833 petaflops*
  - 2,592 compute nodes (145k cores, 663TB memory)
  - 54 Racks (36 Compute, 12 CDU, 4 Admin/Net, 2 Storage)
  - HPE Adaptive Rack Cooling System (ARCS)

* Nov2019 Top500

- Cray® XC50™
  - Supported in Cray's legendary XC liquid cooled system
  - Up to 192 compute nodes per cabinet
  - Complete, HPC-optimized software stack including the Cray Linux® Environment and Cray Programming Environment.

- Building block for Isambard, the world's first production Arm supercomputer
  - Cluster of 168 nodes and 10, 496 ThunderX2 cores
  - To be expanded this year with the **new HPE Apollo 80 A64FX Arm platform**
  - Isambard 2 with HPE Apollo 80 is fastest Arm Supercomputer in Europe

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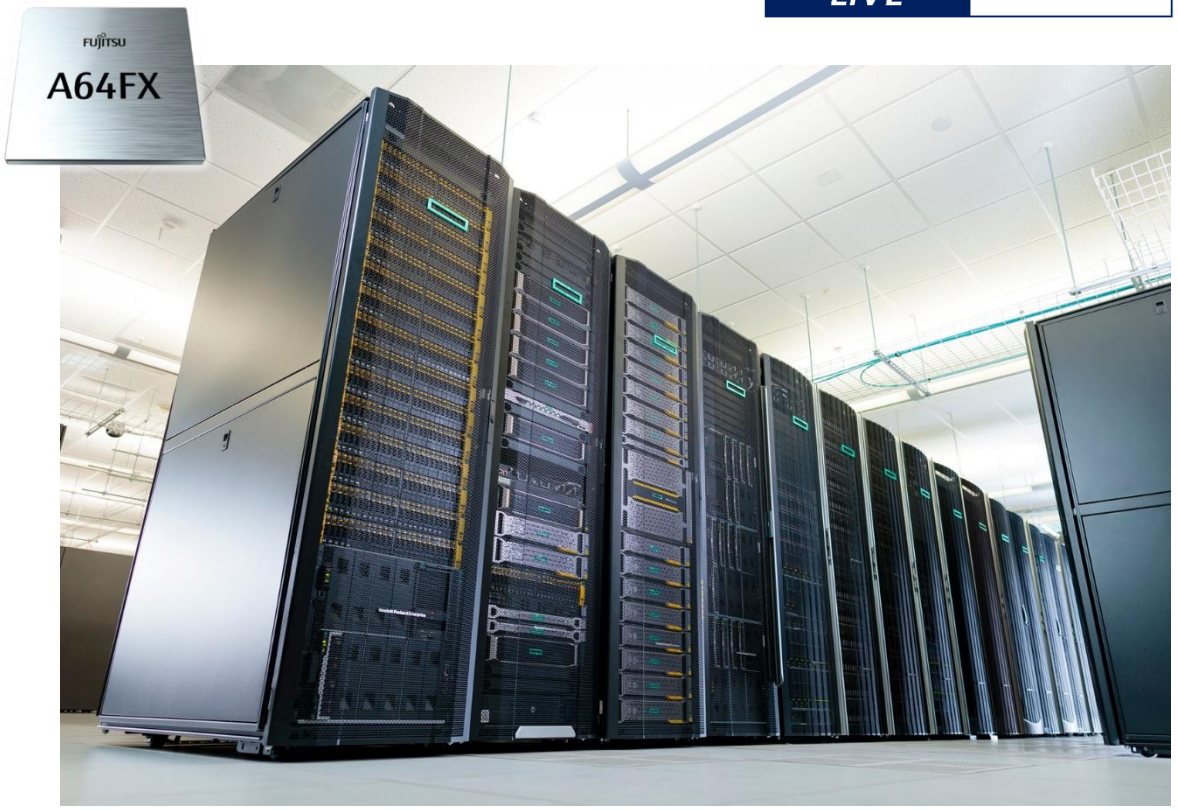
INTRODUCING THE HPE APOLLO 80

- Next generation Arm® solution enabled through HPE Fujitsu Technology Agreement
- Builds on Cray and Fujitsu strong history with vector processing and supercomputing
- Leadership performance for many memory intensive, bandwidth constrained FSI applications
  - High dimensional data
  - Pricing and risk analysis, fraud detection
  - Historical analysis and future scenario simulations
- Choice and flexibility
- Supported by award-winning HPE Cray Programming Environment*



Purpose-Built HPC Processor

Cluster Ready Solution

Comprehensive Software Portfolio and Support

***2019 HPCwire Readers' and Editors' Choice Awards**
Best HPC Programming Tool or Technology
Editors' Choice: Cray Programming Environment for Arm

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A64FX—WORLD'S FIRST PURPOSE BUILT HPC PROCESSOR

A64FX processor

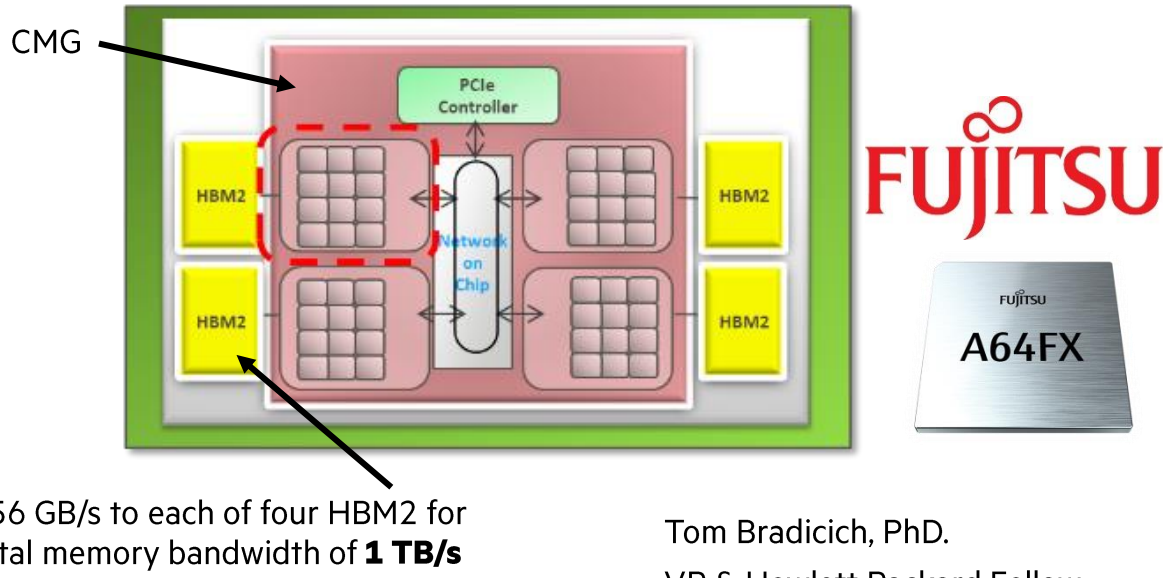
- Purpose built for HPC applications unlike leading x86 alternatives
- Industry leading 7nm FinFET technology with >8.7 billion transistors
- 48 cores each with 64KB L1 arranged into 4 CMGs (Core Memory Groups)

High Bandwidth Memory

- Each CMG consists of 12 cores, an 8 MB L2 cache and a memory controller
- Each CMG connects to 8 GB of HBM2 memory at 256 GB/s
- Total Memory Bandwidth of **1 TB/s**

A64FX processor

- First industry implementation of Arm Scalable Vector Extensions (SVE)
- Each core has 2 512-bit wide SIMD SVE FMA units
- The SVE units deliver an aggregate 3.1 TFlops for the processor



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HPE APOLLO 80 IS A HPC CLUSTER READY SYSTEM SOLUTION

Advanced Cluster Management Support

- HPE Performance Cluster Manager (HPCM) delivers fully integrated system management for HPE HPC systems
- Proven cluster management solution for over 13 years

Density

- Single Processor nodes in 2U chassis
- Over 8,000 cores and over 500 TFlops per 42U rack

Power Efficient

- Fujitsu A64FX processor capable of >16 GFlops/Watt*
- >3X non-accelerated x86 platforms

*based on Fujitsu Nov2019 Green500 result

Designed for Large HPC Cluster Deployments

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HPE APOLLO 80 SUMMARY

- New A64FX Arm platform with SVE and HBM2
- Leadership performance for many memory intensive HPC applications
- Growing and robust Arm ecosystem
- HPE Cray Programming Environment
- Compact, 8 Arm node 2U Platform
- Full support from leading HPC vendor

FUJITSU

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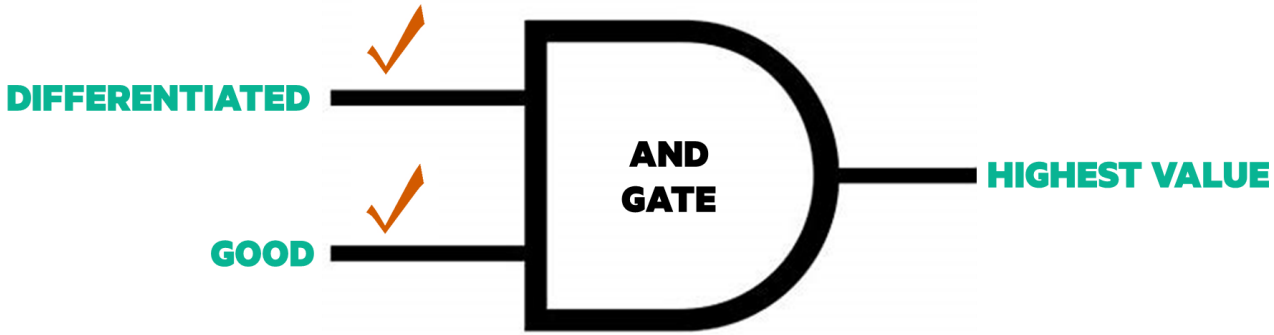
What would you do with this performance?



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THANK YOU!

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