



2ND GEN AMD EPYC™ PROCESSORS

The New Standard for the Modern Data Center

DIRECT CONNECT ARCHITECTURE

32GB HBM2 SERVER GPU

INFINITY FABRIC

PCI[®] GEN4 SERVER GPU

DEDICATED SECURITY PROCESSOR

TOP500 #1 ORNL TITAN

AMD64

SINGLE CHIP TFLOP GPU

DIRECT CONNECT MCM

TOP500 #1 ORNL JAGUAR

MULTI-CORE CPU

7NM SERVER GPU

12TFLOPS GPU

32 CORE CPU

DOUBLE PRECISION GPU

REACHED 40% SHARE OF TOP50

EIGHT CPU MEMORY CHANNELS

GROWING CUSTOMER ADOPTION

H L R I S

High-Performance Computing Center | Stuttgart



ORACLE
Cloud



ulm university



UNIVERSITY OF
NOTRE DAME



Oregon State
University

SPINVFX

POWERING THE EXASCALE ERA



>1.5 ExaFLOPs

7x higher performance¹

2021 delivery

¹Comparison of theoretical peak double precision FLOPs to Summit supercomputer

AMD DATACENTER ROADMAP

LONG-TERM COMMITMENT



Roadmaps subject to change

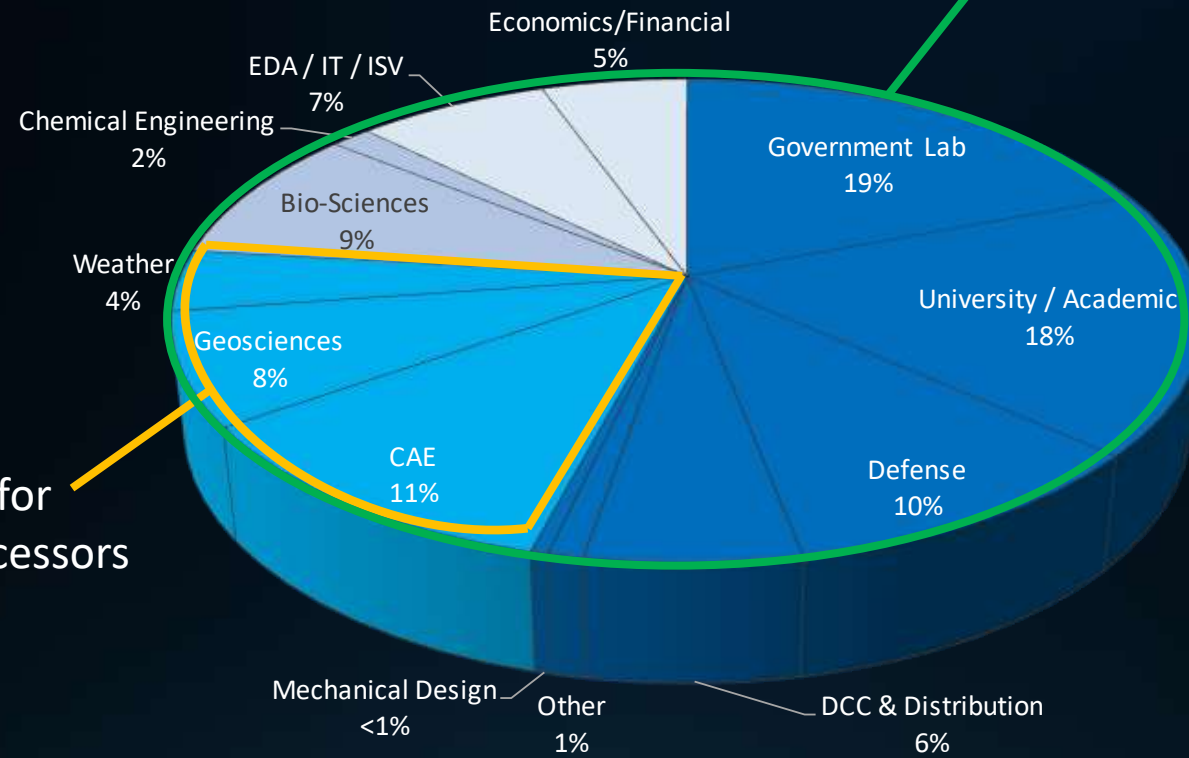
AMD EPYC™ HPC TARGET MARKETS

HPC Target Markets for 2nd Gen AMD EPYC™ Processors

2018 HPC Market (\$M)

ALL MODELING AND SIMULATION WORKLOADS

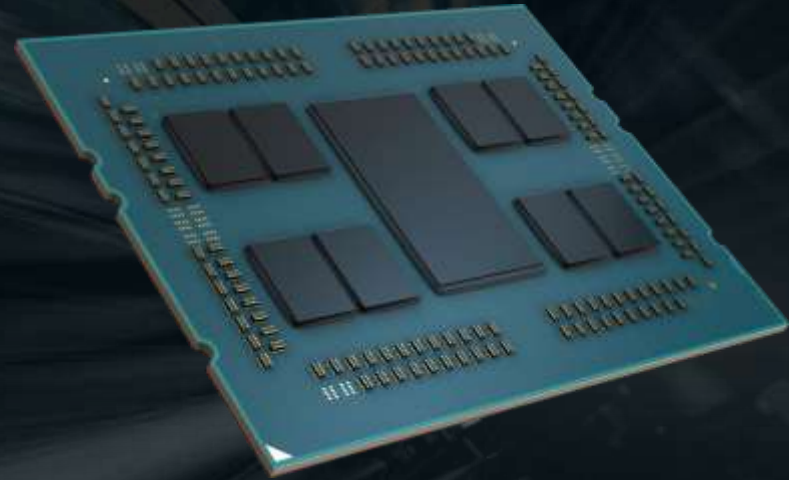
HPC Target Markets for 1st Gen AMD EPYC™ Processors



- Balanced
- Memory Bandwidth sensitive
- FLOPs sensitive
- Frequency sensitive

AMD EPYC™ 7002 SERIES PROCESSORS

THE NEW STANDARD FOR THE MODERN DATA CENTER



LEADERSHIP ARCHITECTURE

AMD Infinity Architecture delivers performance, scale, efficiency and security for the agility to move at the speed of your business, now and into the future.

LEADERSHIP PERFORMANCE

AMD EPYC™ 7002 Series Processors deliver world record performance¹ with ~2.2X generational² performance increase, and outpace Intel Xeon Platinum 8280L by up to 84%.³

LEADERSHIP SECURITY

Advanced security features with silicon-embedded processor that helps your organization take control of security and minimize risks to your most important assets.

LEADING EDGE 7NM PROCESS TECHNOLOGY

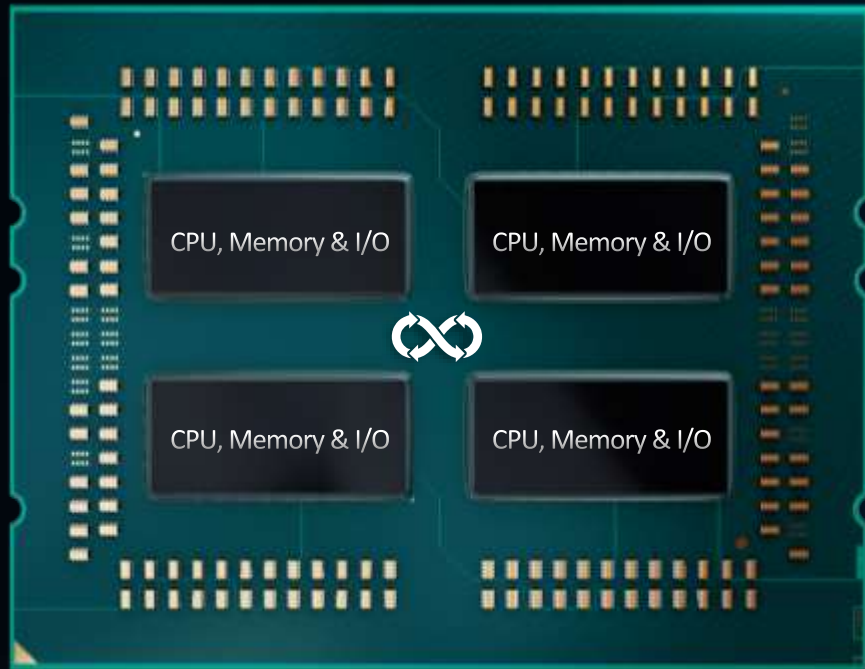
Major Node,
Significant Investment

Faster, Smaller,
Lower-Power Transistors

2X Density

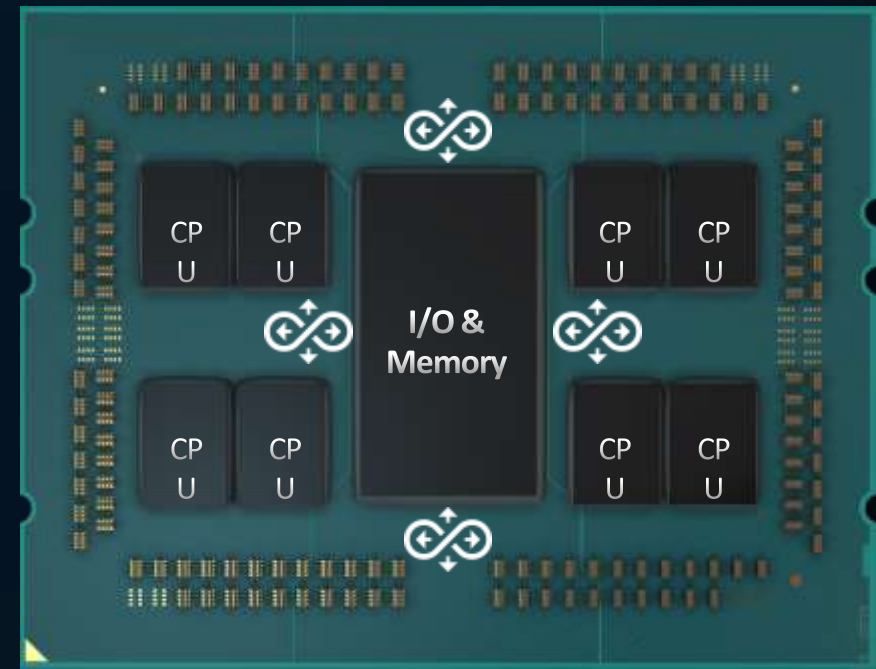
Half Power at
Same Performance

1st Gen | AMD EPYC



Four SOC's Interconnected
via 1st Gen AMD Infinity Architecture

2nd Gen | AMD EPYC



Eight 7nm Chiplet CPUs and One 14nm Chiplet I/O
Interconnected via 2nd Gen AMD Infinity Architecture

Each IP in its Optimal
Process Technology

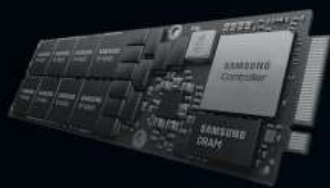
Distributed
Control

I/O Die and CPU Die Optimizes
Latency and Power

Flexible and More Unified
Memory Architecture

REMOVING SYSTEM BOTTLENECKS

DELIVERING BREAKTHROUGH PERFORMANCE WITH PCIe® 4.0



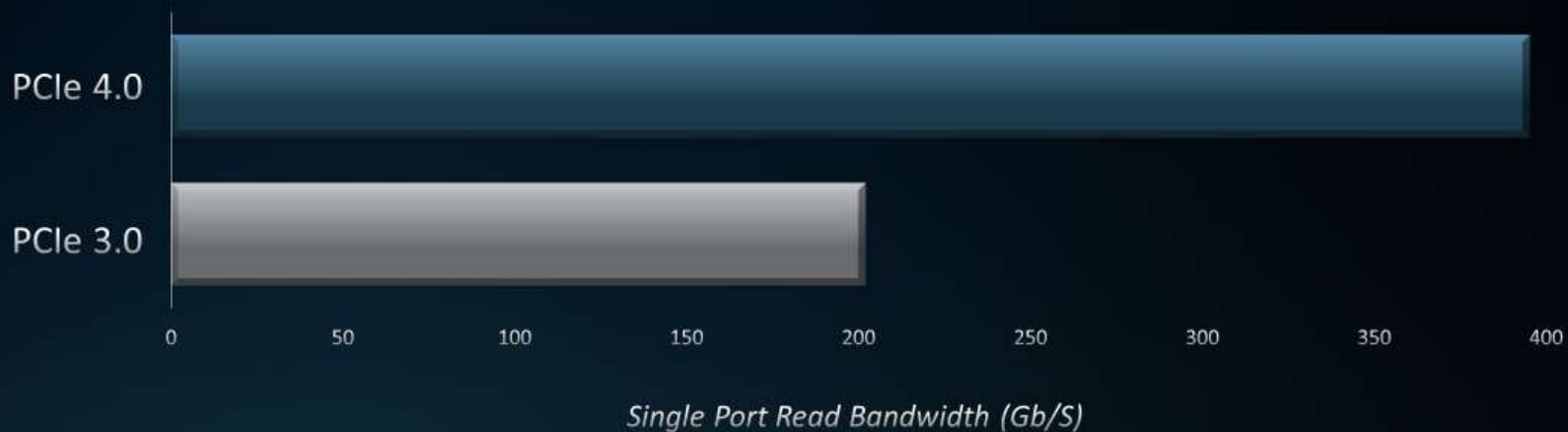
NVME PERFORMANCE

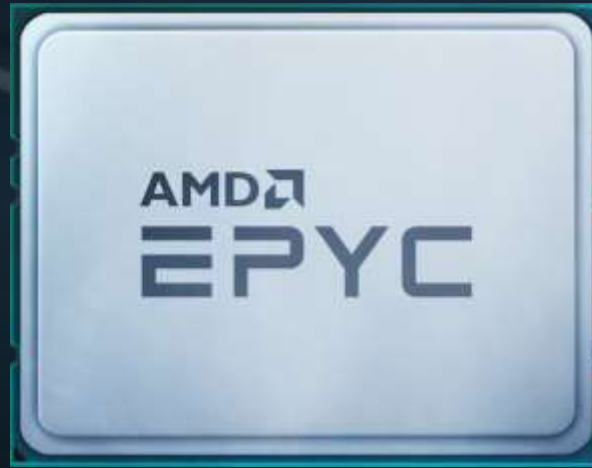
2X Read/Write Bandwidth | Linear Scaling



NETWORK PERFORMANCE

2X Infiniband Read Bandwidth





2ND GEN AMD EPYC™

HIGHEST PERFORMANCE x86 PROCESSOR*

Up to

64

Cores

Up to

128

Threads

128<sup>OR
HIGHER</sup>

PCIe® 4.0 Lanes

Up to

225

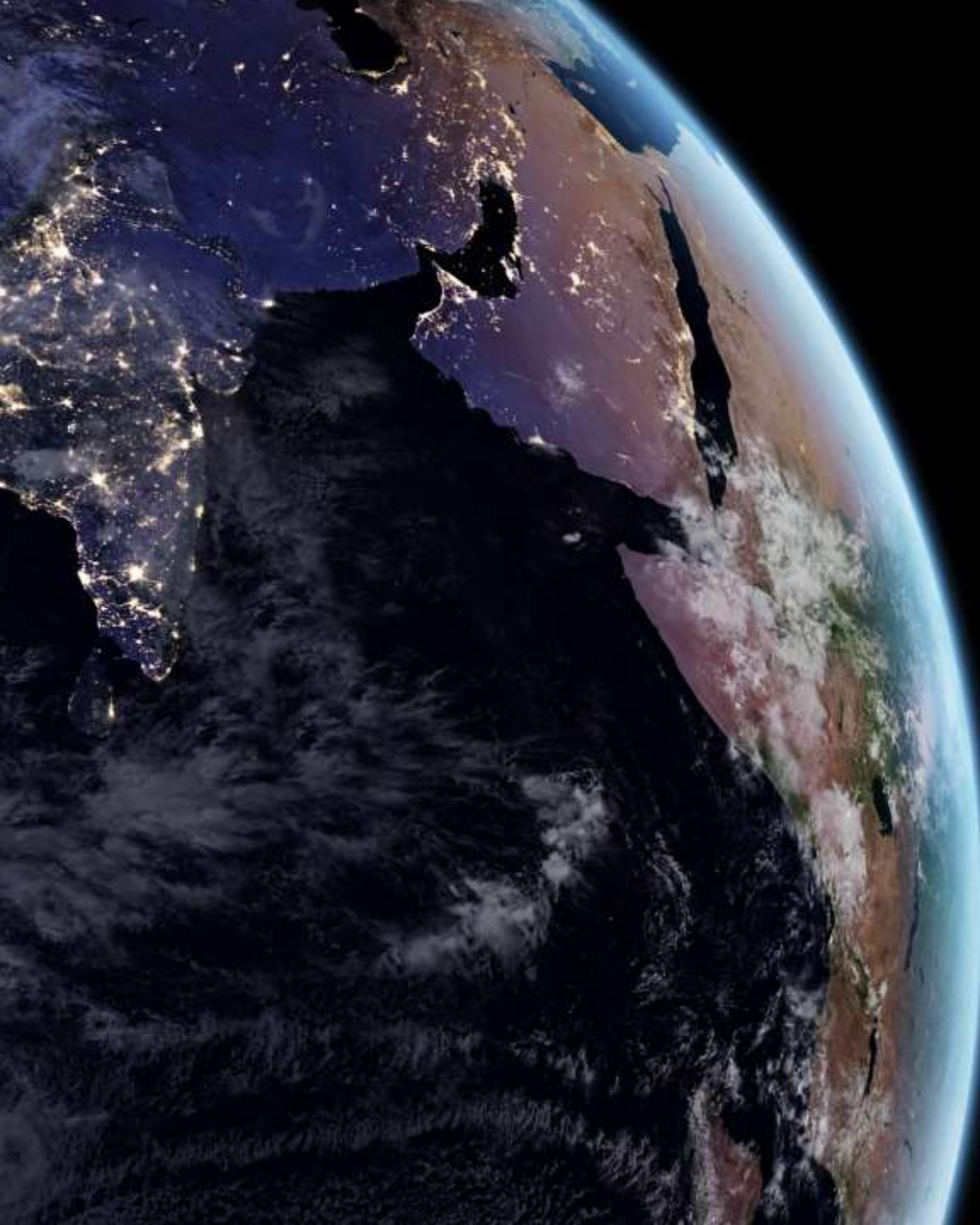
Watt TDP

Up to

3.4 GHz

Precision Boost

UP TO 2x PERFORMANCE OF 2ND GEN INTEL XEON 8200 PROCESSORS



80

WORLD RECORDS AND COUNTING

STRONG SECURITY GETS STRONGER

“ZEN” SECURITY RESILIENCY

		
Spectre	Firmware and OS/VMM	Hardware and OS/VMM
Speculative Store Bypass <small>(Spectre V4)</small>	OS/VMM	Hardware and OS/VMM
Meltdown, Foreshadow, Spoiler, Lazy FPU, MDS	N/A*	N/A*

2nd GEN AMD EPYC™ SECURITY FEATURES

Secure Root-of-Trust Technology	Secure Encrypted Virtualization (SEV2)	Only AMD Offers Secure Memory Encryption (SME)
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*AMD has not been able to reproduce the issue nor is AMD aware of a third party being able to do so.

2ND GEN AMD EPYC™

MODERN DATACENTER WORKLOADS

Up to **2X**
Performance

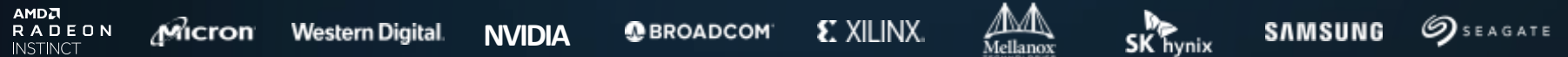
~2X
Performance Per Dollar*

Up to **55%** Higher
Performance-per-Watt

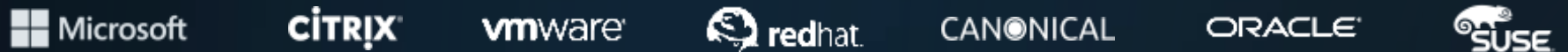
2ND GEN AMD EPYC™

BROAD ECOSYSTEM SUPPORT

Hardware Partners



OS

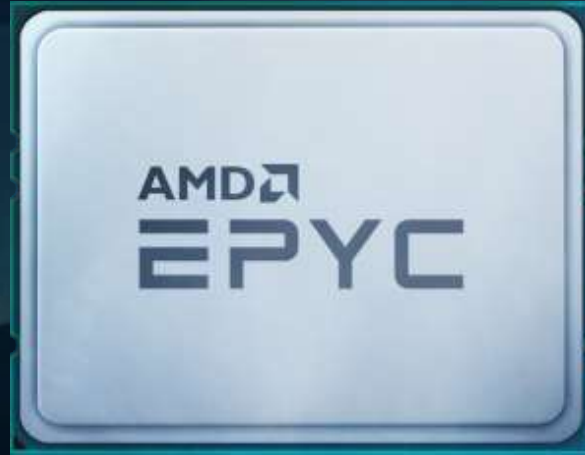


Apps



Server + Cloud PLATFORMS





THE NEW STANDARD FOR THE MODERN DATACENTER

80 WORLD RECORDS

Across Cloud, Enterprise and HPC

~2X

Performance-per-dollar*

2X PLATFORMS

of First Generation

AVAILABLE TODAY

ENDNOTES

- EPYC-07 - Based on June 8, 2018 AMD internal testing of same-architecture product ported from 14 to 7 nm technology with similar implementation flow/methodology, using performance from SGEMM.
- ROM-06 - Some supported features and functionality of 2nd Gen AMD EPYC™ processors require a BIOS update from your server manufacturer when used with a motherboard designed for the 1st Gen AMD EPYC series processor. A motherboard designed for 2nd Gen EPYC processors is required to enable all available functionality.
- ROM-07 - Motherboards designed for 1st Gen EPYC processors may not be compatible with 2nd Gen AMD EPYC processors with a TDP greater than 200 watts. Contact the server manufacturer to confirm compatibility.
- ROM-42 - Based on AMD internal testing of ANSYS FLUENT 19.1, Im6000_16m benchmark, as of July 17, 2019 of a 2P EPYC 7742 powered reference server versus a 2P Intel Xeon Platinum 8280 powered server. Results may vary.
- ROM-77 - Based on AMD internal testing of ANSYS FLUENT 19.1, Im6000_16m benchmark, as of July 17, 2019 using a 2P EPYC 7742 powered reference server versus a 2P Xeon Platinum 8280 powered server. Results may vary. ROM-77
- ROM-114 - Based on SPECrate®2017 peak integer scores. A 2P EPYC™ 7742 processor powered server has higher SPECrate®2017_int_peak score of 749 and a base score of 682 as of August 7, 2019, <http://spec.org/cpu2017/results/res2019q3/cpu2017-20190722-16242.html>. The next highest int_peak score with a 2P Intel Platinum 9282 of 676 and a base score of 643, <http://spec.org/cpu2017/results/res2019q3/cpu2017-20190624-15369.pdf>, on July 28, 2019. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org for more information. ROM-114.
- ROM-169 - For a complete list of world records see <http://amd.com/worldrecords>. ROM-169
- ROM-173 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-173
- ROM 174 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-174
- ROM 175 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-175
- ROM 176 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-176
- ROM-245 - Projections as of August 2, 2019. The AMD EPYC 7502, \$2,600 per processor, has a projected SPECrate®2017_int_peak of 416 (base of 380 which is 2.0X the performance / dollar of the Intel Gold 6252, \$3,655 per processor, with peak score of 285 (base of 274) <http://spec.org/cpu2017/results/res2019q3/cpu2017-20190709-16044.pdf> on Aug 7, 2019 . $(416 / \$2,600) / (285 / \$3,655) = 2.05 = 2.0X$ the performance/dollar. AMD 1kU prices as of Aug 7, 2019; Intel prices as of Aug 7, 20019 from <https://ark.intel.com/>. SPEC®, SPECrate® and SPEC CPU® are registered trademarks of the Standard Performance Evaluation Corporation. See www.spec.org for more information. ROM-245

ENDNOTES (“REMOVING SYSTEM BOTTLENECKS”)

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- ROM 174 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-174
- ROM 175 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-175
- ROM 176 – AMD internal testing completed on 29Jul2019 on AMD reference platform configured with Samsung PCIe Gen4 PM1733 NVMe 3.84TB drives compared to an Intel server from a major OEM configured PCIe Gen3 Samsung PM1725b 1.6TB drives. Results may vary. ROM-176
- AMD internal testing completed on 06Aug2019 on AMD reference platform configured with 2 x EPYC 7742 and a Mellanox ConnectX-6 InfiniBand using Windows 2019 compared to an Intel server from a major OEM configured with 2 x Intel Platinum 8280 processors and a Mellanox ConnectX-6 using Windows 2019.
- AMD internal testing completed on 06Aug2019 on AMD reference platform configured with 2 x EPYC 7742 and a Mellanox ConnectX-6 InfiniBand using Windows 2019 compared to an Intel server from a major OEM configured with 2 x Intel Platinum 8280 processors and a Mellanox ConnectX-6 using Windows 2019.

DISCLAIMERS AND ATTRIBUTIONS

The information contained herein is for informational purposes only, and is subject to change without notice. Timelines, roadmaps, and/or product release dates shown in these slides are plans only and subject to change. “Polaris”, “Vega”, “Radeon Vega”, “Navi”, “Zen”, “Naples”, and “Rome” are codenames for AMD architectures, and are not product names.

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