2ND GEN AMD EPYC™ PROCESSORS
The New Standard for the Modern Data Center
GROWING CUSTOMER ADOPTION

High-Performance Computing Center | Stuttgart
Microsoft Azure
Nikhef
Oracle Cloud
University of Notre Dame
Oregon State University
SPINVFX

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POWERING THE EXASCALE ERA

>1.5 ExaFLOPs  7x higher performance\(^1\)  2021 delivery

\(^1\)Comparison of theoretical peak double precision FLOPs to Summit supercomputer
AMD DATA CENTER ROADMAP
LONG-TERM COMMITMENT

AMD EPYC™ 7001
"Zen" Shipping

AMD EPYC™ 7002
"Zen 2" On Track Shipping

"MILAN"

MI25
14nm GPU Shipping

MI50
First 7nm GPU Shipping

"MI-NEXT"
On Track

Roadmaps subject to change
AMD EPYC™ HPC TARGET MARKETS

HPC Target Markets for 1st Gen AMD EPYC™ Processors

HPC Target Markets for 2nd Gen AMD EPYC™ Processors

2018 HPC Market ($M)

Government Lab 19%
University / Academic 18%
Defense 10%
DCC & Distribution 6%
Other 1%
Mechanical Design <1%
CAE 11%
Geosciences 8%
Weather 4%
Bio-Sciences 9%
Chemical Engineering 2%
EDA / IT / ISV 7%
Economics/Financial 5%

ALL MODELING AND SIMULATION WORKLOADS

SOURCE: Hyperion Research, ISC19 HPC Update, June 2019
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

Four SOCs Interconnected via 1st Gen AMD Infinity Architecture

2nd Gen

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

See Endnotes ROM-172, ROM-174, ROM-175, and ROM-176
2ND GEN AMD EPYC™

HIGHEST PERFORMANCE x86 PROCESSOR*

Up to 64 Cores
Up to 128 Threads
Up to 128 OR HIGHER 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

*EPYC 7742  SEE END NOTES ROM-114, ROM-06, ROM-07, ROM-42
80 WORLD RECORDS AND COUNTING
# Strong Security Gets Stronger

**“Zen” Security Resiliency**

<table>
<thead>
<tr>
<th></th>
<th>Firmware and OS/VMM</th>
<th>Hardware and OS/VMM</th>
</tr>
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<tbody>
<tr>
<td>Spectre</td>
<td></td>
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<tr>
<td>Speculative Store Bypass (Spectre V4)</td>
<td>OS/VMM</td>
<td>Hardware and OS/VMM</td>
</tr>
<tr>
<td>Meltdown, Foreshadow, Spoiler, Lazy FPU, MDS</td>
<td>N/A*</td>
<td>N/A*</td>
</tr>
</tbody>
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**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

*ESTIMATED; SEE ENDNOTES ROM-77, ROM-186, ROM-245
2ND GEN AMD EPYC™
BROAD ECOSYSTEM SUPPORT

Hardware Partners
- AMD
- Radeon
- Instinct
- Micron
- Western Digital
- NVIDIA
- Broadcom
- Xilinx
- Mellanox
- SK Hynix
- Samsung
- Seagate

OS
- Microsoft
- Citrix
- VMware
- Red Hat
- Canonical
- Oracle
- SUSE

Apps
- Altair
- VMware
- Microsoft
- Cloudera
- LTC
- Simplivity
- Siemens
- Docker
- Ansys
- AWS
- Salesforce
- Avanir
- Ceph
- Nutanix
- PostgresQL
- Vertica
- Elastic
- BeAM
- Cricsson
- Red Hat
- SAP
- Nokia
- Qumulo
- CRACl
- Weka.io
- NVSQL
- Mapr
- Couchbase
- Bassett Enterprises
- Cadence
- Tredzskopf
- Databricks
- Synopsys
- MongoDB
- Menlo
- MarkLogic

Server + Cloud Platforms
- Hewlett Packard Enterprise
- Dell EMC
- Cray
- Lenovo
- Arista
- Atos
- Gigabyte
- Tian ci
- Inventec
- AWS
- Microsoft Azure
- Oracle
- Google Cloud

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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

*ESTIMATED; SEE ENDNOTES ROM-169, ROM-245
▪ 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, lm6000_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, lm6000_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-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

ENDNOTES (“REMOVING SYSTEM BOTTLENECKS”)

- 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
- 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 ConnnectX-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 ConnnectX-6 using Windows 2019.
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