5 REASONS WHY AMD EPYC[™] PROCESSORS MATTER FOR GOOGLE CLOUD

AT A GLANCE

Google Cloud virtual machine instances powered by AMD provide competitive performance and price-performance, power-efficient processing, confidential computing and a range of options to help customers optimize their workloads for cost-efficiency.



EXCEPTIONAL PERFORMANCE

High performing virtual machines (VMs) powered by AMD EPYC[™] processors. C3D series VMs powered by 4th Gen EPYC deliver a 44% average performance boost versus previous-generation N2D VMs.¹ Flexible VM choices enable right-size workloads, helping users avoid over- and under-provisioning. AMD processors use simultaneous multithreading (SMT) for optimized performance and stability.



COST OPTIMIZATION

Up to 13% cost savings over other comparable Google Cloud VMs.² C3D brings 29% cloud OPEX savings over previousgeneration Intel®-based N2 VMs. C3D also has a 45% average price-performance uplift and 25% lower cloud OPEX spend compared to N2D VMs.¹

3

SECURITY

One-click Confidential Computing extends encryption and protection to data during processing on GCE, GKE and other Google Cloud products. With AMD processor-embedded security with AMD Infinity Guard⁴ built into the silicon, no additional software work is required. Encrypted virtualization for each VM can employ one of up to 509 unique hardware-generated, nonexportable encryption keys known only to the processor.



SUSTAINABILITY

AMD is committed to achieving a 30X increase in energy efficiency by 2025 over the 2020 baseline, equating to a 97% reduction in energy use per computation from 2020 to 2025.⁵ With AMD EPYC CPU core density advantage, only 11 AMD EPYC powered servers are needed to run 2,000 VMs vs. 17 Intel-powered servers. This can result in 35% fewer servers and 29% less power used annually,⁶ which helps Google Cloud to meet its environmental impact commitments.



EASE OF MIGRATION

Offering x86 compatibility allows for seamless migration, especially in comparison with migrating to different processor architectures such as Arm. In most cases, x86 migration requires no retooling/refactoring, with multiple customer and partner programs available to help facilitate the transition.

AMD EPYC[™] POWERED GOOGLE CLOUD INSTANCES

GENERAL PURPOSE	C3D	 4th Gen AMD EPYC (formerly codenamed "Genoa") Up to 360 vCPUs/VM 	Consistently high performance	 High traffic web, app and ad servers Medium-to-large databases Game servers Media streaming and transcoding Data analytics CPU-based inferencing
	T2D	 3rd Gen AMD EPYC (formerly codenamed "Milan") Up to 60 vCPUs/VM 	Single-threaded price/performance for scale-out	 Containerized microservices Compression/decompression Image processing Data-logging processing Large-scale Java applications
	N2D Confidential Computing option	 3rd Gen AMD EPYC (formerly codenamed "Milan") Up to 224 vCPUs/VM 	Most flexible VM shapes	 Low-medium traffic web and app servers Small-medium databases Business intelligence applications Desktop virtualization CRM applications Dev/test environment
HPC & COMPUTE INTENSIVE	C3D highcpu	 4th Gen AMD EPYC (formerly codenamed "Genoa") Up to 360 vCPUs/VM 	High performance computing	 Scale-out high-performance computing (HPC) EDA/CFD/WRF Molecular dynamics Genomics Media transcoding AI/ML
	C2D Confidential Computing option	 3rd Gen AMD EPYC (formerly codenamed "Milan") Up to 112 vCPUs/VM 	Highest single- threaded performance (per core)	 Scale-up high-performance computing (HPC) EDA/FEA CAE (applications licensed per core) Modeling and simulation High-performance game servers

CUSTOMER AND PARTNER PROGRAMS

Migration Assessment

Txture assessment tool to right-size BOMs and estimate carbon emissions.

Google Cloud Migration Center (StratoZone) to estimate costs, inventory assets and assess infrastructure for migration.

Proof of Concept (PoC) program

Allows customers to take AMD EPYC powered Google Cloud VMs for a test drive.

Migration Funding

Assists customers in moving their workloads to AMD based Google Cloud VMs for approved projects.

AMD Center of Excellence (CoE)

Provides technical support for migration and workload optimization to customers deploying on AMD based Google Cloud VMs.

Google Cloud

GOOGLE CLOUD

Google Cloud allows customers to use Google's core infrastructure, data analytics and machine learning. Customers can protect their data and applications with the same security technology Google uses and avoid vendor lock-in to run their apps on open-source solutions.

AMD EPYC[™] PROCESSORS

AMD is the recognized market leader in high-performance computing technology at a time when many businesses are moving to the cloud.

That's why AMD is teaming with leading cloud providers to deliver solutions powered by EPYC processors that provide outstanding value, easy scalability and advanced security features.



LEARN MORE ABOUT GOOGLE CLOUD INSTANCES POWERED BY AMD EPYC PROCESSORS:

AMD CLOUD COMPUTING SOLUTIONS | AMD EPYC AND GOOGLE CLOUD INSTANCES GOOGLE CLOUD-AMD TECHNOLOGY PARTNERSHIP

AMD together we advance_cloud computing

- 1. Source: Optimize Your Cloud and Drive Performance with C3D VMs, <u>https://www.amd.com/content/dam/amd/en/documents/epyc-business-docs/performance-briefs/optimize-your-cloud-and-drive-performance-with-c3d-vms.pdf</u>.
- AMD-powered VMs on Google Cloud provide up to 13% cost savings over comparable alternatives is based on: N2D Rome is 13% lower cost than comparable N-series, N2D Milan is priced the same as N2D Rome, C2D is up to 13% lower cost than C2 - pricing available at https://cloud.google.com/compute/vm-instance-pricing - for example, C2 on-demand price in lowa is \$0.03398, and C2D on-demand price in lowa is \$0.029563. Using a percentage difference formula, you will find C2D is ~13% lower cost than C2.
- AMD Infinity Guard features vary by EPYC Processor generation. Infinity Guard security features on AMD EPYC processors must be enabled by server OEMs and/or cloud service providers to operate. Check with your OEM or provider to confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of these features. Learn more about Infinity Guard at https://www.amd.com/en/technologies/infinity-guard. Confirm support of the support o
- 4. Source: Help Reduce CapEx and OpEx and Advance Sustainability Goals with 4th Gen AMD EPYC, <u>https://www.amd.com/en/corporate/co</u>
- 5. Source: AMD EPYC[™] Energy Efficiency, <u>https://www.amd.com/en/campaigns/epyc-energy-efficiency</u>.

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