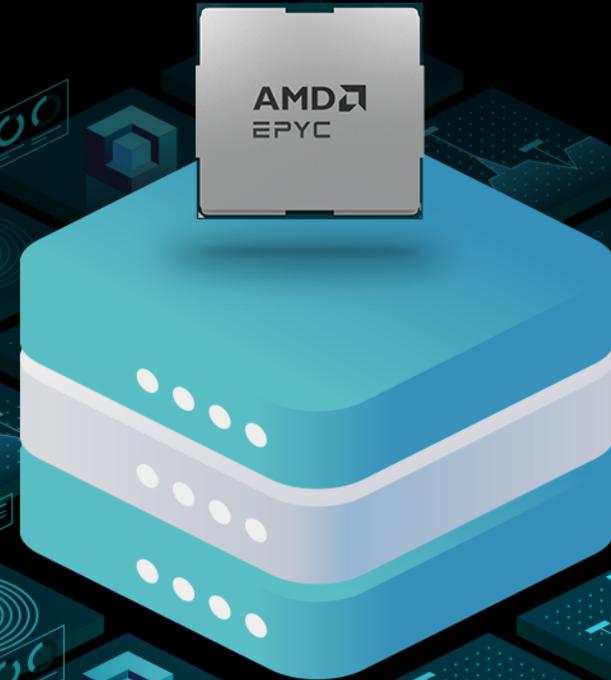**AMD**

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THE AMD GUIDE TO
REFRESHING
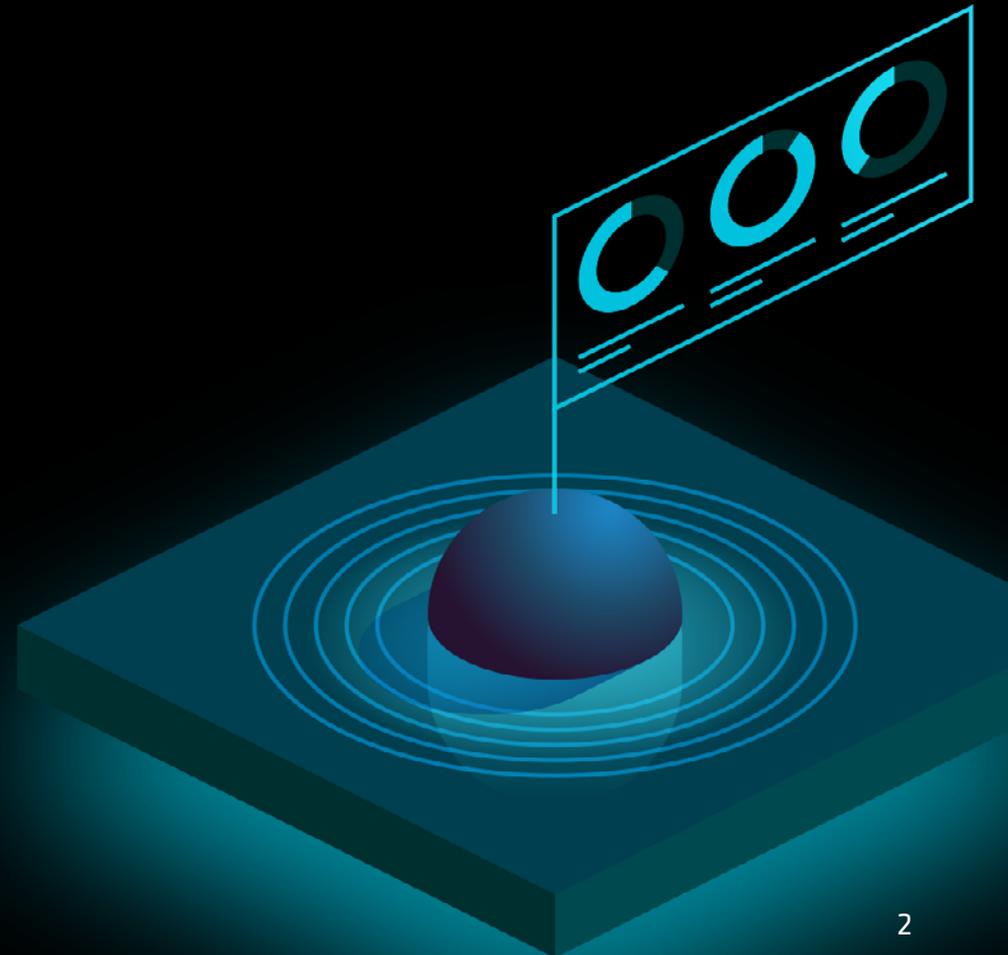# *GENERAL-PURPOSE*
SERVERS

INTRODUCTION

WHEN IS IT TIME TO SAY GOODBYE?

General-purpose servers are the unsung heroes of IT, toiling away in small racks, server rooms, and closets, faithfully delivering the mail, serving up files, and keeping vital business apps up and running. They work so reliably that it can be easy to take them for granted.

We advise you don't, because eventually every server reaches the end of its productive life.

This guide will help you identify when it's time to say goodbye and introduce you to the remarkable upgrades you'll find as you search for your next general-purpose server.

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SERVER HEALTH SIGNALS

SERVERS TELL YOU WHEN THEY ARE READY TO RETIRE

Slow-loading apps, user complaints, and crashes are major signs that an aging general-purpose server is nearing the end of its useful life. Upgrading before your clients start noticing issues is a wise strategy. Here are five server health signals to monitor and act on.

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1 SERVERS ARE CONSISTENTLY RUNNING OUT OF RESOURCES

Check your logs for CPU, memory, disk, I/O, and network utilization. If you're seeing utilization rates above your service level agreements (SLAs) — or your comfort zone — the server is out of headroom for your current workloads. Growing demands or new workloads could push systems to failure.

SIGNS AND SYMPTOMS OF RESOURCE SATURATION

- Slowing performance
- Lagging or unresponsive applications
- Users complaining of freezes and hangs
- Lost emails, corrupt files, and server crashes

↗ PRO TIP

If CPU utilization rates stay **above ~80%**, memory usage **surpasses ~90%** with constant swaps, or free disk space drops **below ~15%**, the server is reaching resource exhaustion.[1]

BREAK THE BOTTLENECKS

The latest server generations can have dozens of high-performance cores per CPU, each with up to 12 channels of fast DDR5 memory and up to 128 PCIe® Gen 5 lanes — if they're equipped with AMD EPYC™ 9000 Series Server CPUs.

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2 YOU'RE PATCHING PATCHES

Keeping infrastructure up to date is critical for stability and security, which is why you should always apply the latest firmware and software patches.

Some updates may improve performance by making resource utilization more efficient. Others can degrade it, especially fixes for hardware-level flaws. As patches accumulate, they can create bottlenecks, waste resources, and make components and software obsolete.

SIGNS AND SYMPTOMS PATCHES ARE OVERWHELMING YOUR SERVER

• Performance benchmarks fall dramatically with updates

• Server stability and uptime decrease significantly

• Critical components or software become incompatible after patching

• You start paying for extended support or trying risky runarounds

• IT spends inordinate time and money patching and resolving server issues

↗ PRO TIP

Track performance before and after applying patches. If you see **significant latency** increases or **throughput declines**, it may be time for a new server.

LET THE HARDWARE HANDLE IT

Many patches and security fixes are baked into new CPUs, which can help make newer servers more performant, secure, and stable.

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3 A NEW WORKLOAD DEGRADES SERVER PERFORMANCE

During the pandemic, supporting a suddenly remote workforce pushed some older infrastructure past its breaking point. Today, AI is the workload consuming everyday servers as it integrates with everything from email apps to database software and instant messaging platforms. At a certain point, general-purpose systems slow down — if they're capable of running the new workloads at all.

SIGNS AND SYMPTOMS NEW WORKLOADS ARE MORE THAN YOUR SERVERS CAN HANDLE

- Users report slowing logins, application launches, and file opens
- New application features like animations, dashboards, and visualizers crawl or hang
- Synchronous tools like chat and instant messaging stop being instant
- Users request features — like AI assistants — that current systems simply can't support

↗ **PRO TIP**

Overall CPU utilization should stay **below ~80%**.[1] Higher sustained usage could mean you're starting to exhaust resources, which may hurt performance.

TODAY'S GENERAL-PURPOSE SERVERS ARE AI CAPABLE

With AMD, general-purpose servers can support AI alongside traditional workloads. AMD EPYC™ 9000 Series Server CPUs deliver the performance your demanding IT workloads need today — plus the memory, I/O, and scalable headroom to power AI tomorrow.

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4 SOFTWARE LICENSING CHANGES

A change in how your software is licensed probably won't impact server performance, but it can make perfectly functional infrastructure financially unsound in an instant.

Recent licensing shifts from per seat and per socket to core-based licensing made older servers far more expensive to run because they need more cores and physical systems to maintain service levels.

SIGNS AND SYMPTOMS A NEW SOFTWARE LICENSING AGREEMENT WILL MAKE A SERVER PROHIBITIVELY EXPENSIVE

- Your software vendor sunsets per-seat or per-socket licenses
- New licenses charge by the CPU core
- Your current servers need a lot of cores to deliver adequate service levels
- Your software costs increase unilaterally after a licensing change

↗ PRO TIP

For businesses that run Microsoft SQL Server®, every additional two-core pack **costs $15,123** (source: Microsoft). Upgrading to CPUs that can run more instances per core can help you get more value from your software licenses.

OPTIMIZE YOUR SOFTWARE SPEND

AMD EPYC 9000 Series Server CPUs deliver high performance per core and per socket, which means you can consolidate servers to minimize software licensing fees.

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5 YOUR SERVERS HAVE REACHED THE END OF SUPPORT

End of life comes to all technology products, including operating systems, applications, and hardware. When manufacturers and providers announce the end of support, security patches stop and software updates cease — or are offered at a substantial cost.

Your servers and applications will still work, but they're running on borrowed time. While it is possible to function without the latest software features, operating without the latest security updates can be a very risky proposition — one that can make you a prime target for malware and ransomware.

SIGNS AND SYMPTOMS SERVERS ARE NEARING THE END OF SUPPORT

- The servers only support PCIe Gen 4 and DDR4 memory, which are out of production

- You receive official end of service/end of life notices

- News coverage and forums discuss the impending deadline

- Partners and integrators start knocking on your door with offers to help you refresh

↗ **PRO TIP**

Server support periods vary, but five to seven years after the server's end of sale date is typical.

PLAN AHEAD FOR SMOOTH TRANSITIONS

Most organizations plan well for major infrastructure refreshes, but general-purpose servers that run in the background can fall off the radar. Check on your entire fleet regularly and start planning for replacements well before support ends.

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MODERN SERVER ADVANCES

IF IT'S BEEN A FEW YEARS SINCE YOUR LAST REFRESH, YOU'RE IN FOR A VERY PLEASANT SURPRISE

Performance that was strictly supercomputer class just a few years ago is now available in off-the-shelf, mid-range servers. Memory channels and PCIe lanes are significantly faster, and there are a lot more of them — even in entry-level enterprise servers.

With AMD EPYC 9000 Series Server CPUs, you can choose between single-socket and dual-socket servers. Today's single-socket servers deliver excellent performance per dollar and low total operating costs. Dual-socket servers are a great choice if you need high core counts, lots of PCIe lanes, and lots of RAM.

"We saw a 40 percent reduction in co-location cabinet space and a 40 percent drop in power consumption for the same workloads by switching to AMD EPYC CPUs."

—ARTHUR HUANG, PRODUCT OPERATIONS MANAGER
ZENLAYER

Read the Zenlayer case study

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UPGRADE WITH AMD AND REPLACE 4 CPUs WITH 1

One modern single-socket server with a 32-core AMD EPYC™ 9355P CPU can do more work than two older dual-socket servers with Intel® Xeon® 5218 CPUs (code name: Cascade Lake).[2]

TRUSTED AND RELIABLE

Most Fortune® 100 Companies Trust Their Data Centers to AMD EPYC™ CPUs.[3]

STATE-OF-THE-ART SECURITY

AMD EPYC Server CPUs feature AMD Infinity Guard,[4] a suite of security technologies that provides hardware root of trust, encryption, and advanced capabilities that help defend against internal and external threats.

BUILT-IN CONFIDENTIAL COMPUTING

AMD EPYC 9005 Server CPUs include AMD Secure Encrypted Virtualization (SEV), a hardware-based confidential computing solution that can be enabled to help protect data in use and can extend the trusted boundary to TDISP-enabled, PCIe-attached devices such as GPUs, NICs, and storage.

GET AMD "ZEN" COMPUTE DENSITY AND THROUGHPUT IN A GENERAL-PURPOSE SERVER
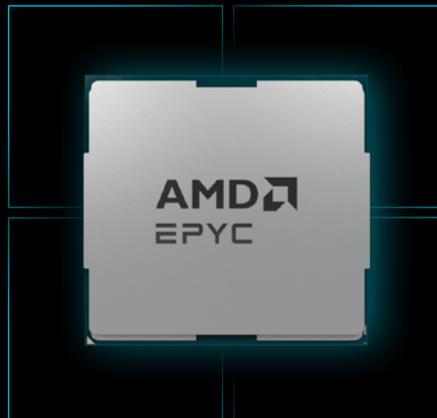
AMD EPYC

All AMD EPYC 9000 Series Server CPUs share the same "Zen" architecture and features as the CPUs inside hyperscale data centers and the world's fastest supercomputers.

PERFORMANCE REDEFINED

AMD EPYC 9000 Series Server CPUs deliver 16 to 64 cores to the general-purpose IT server market.

NO MEMORY COMPROMISES

All AMD EPYC 9000 Series Server CPUs support up to 12 channels of DDR5 memory.

DATA-CENTER SCALE I/O

Get up to 128 PCIe 5.0 lanes in a single-socket configuration with AMD EPYC 9000 Series Server CPUs.

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10

REDUCING COSTS

AMD EPYC™ SERVER CPUs DELIVER MORE VALUE

In the past, IT departments had to run dual-socket servers to get enough cores, memory, and I/O – even for general-purpose servers. Those days are long gone.

With AMD EPYC Server CPUs, you can get data-center levels of memory and I/O lanes with excellent performance per dollar and performance per watt in dual- or single-socket configurations. Overall, refreshing with AMD EPYC Server CPUs helps you lower CapEx, OpEx, and total cost of ownership (TCO).

"When we moved from our traditional infrastructure to the new virtualized commodity server based one, we reduced the cost by 75 percent."
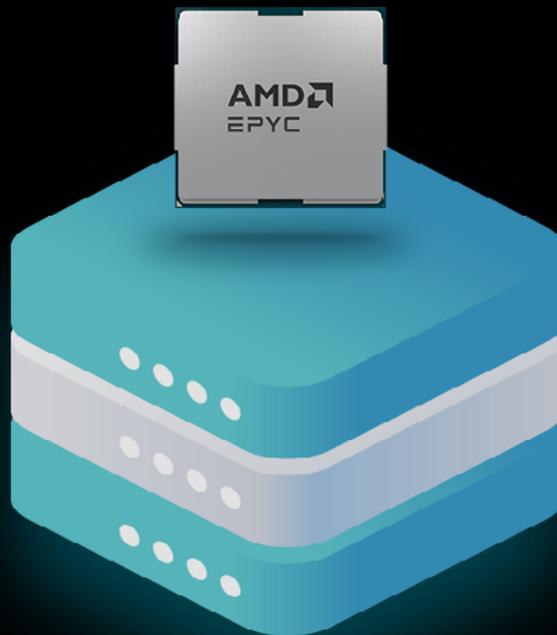
—CHOON BOON TAN, MANAGING DIRECTOR, HEAD OF CLOUD ENGINEERING & SERVICES, DBS

Read the DBS case study

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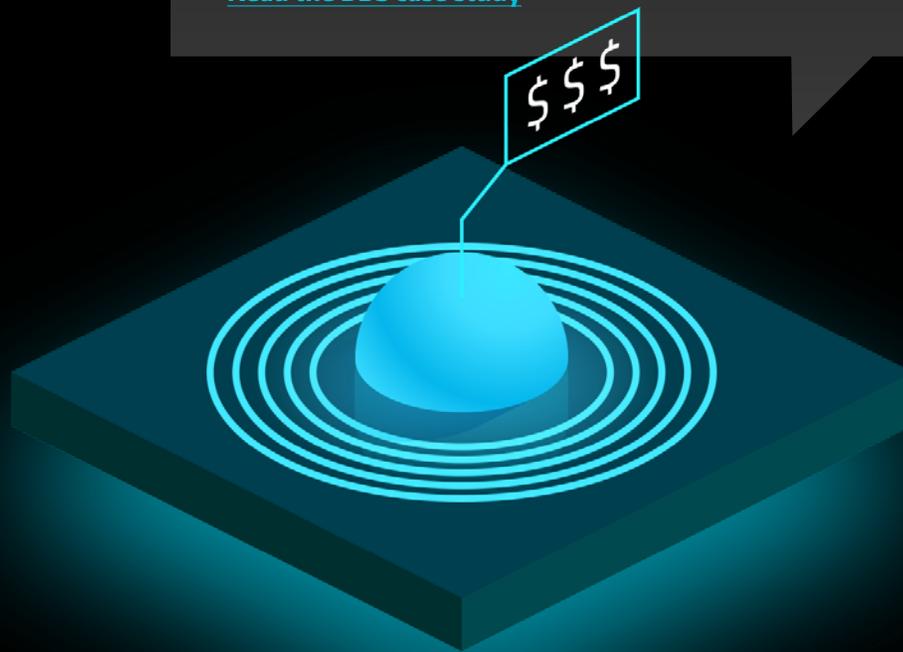
UPGRADING WITH AMD DELIVERS MAJOR GAINS

With AMD, you can easily replace older, dual-socket servers with single-socket servers
that can save space, lower power consumption, and cut costs.

Up to
>2:1
SERVER CONSOLIDATION[2]

Up to
53%
LESS POWER[2]

Up to
$389K
SAVINGS OVER FIVE YEARS[2]

A modern, single-socket server equipped with a 5th Generation AMD EPYC 9355P CPU can do more work
than two 16-core 2nd Gen Intel® Xeon® 5218 CPU-equipped, dual-socket servers. See note 2 for details.

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CHOOSE AMD EPYC SERVER CPUs OVER THE COMPETITION FOR THE MAXIMUM UPGRADE

In integer performance, energy savings, and total costs, AMD EPYC 9000 Series Server CPUs can outperform the latest Intel® Xeon® 6 (Granite Rapids) CPUs.[5]

FOR GENERAL-PURPOSE 48-CORE SERVERS, AMD IS THE SMARTER CHOICE

Up to
1.2X
BETTER INTEGER PERFORMANCE[5]

Up to
31%
LESS POWER[5]

Up to
22%
LOWER CAPEX[5]

Up to
22%
LOWER TCO[5]
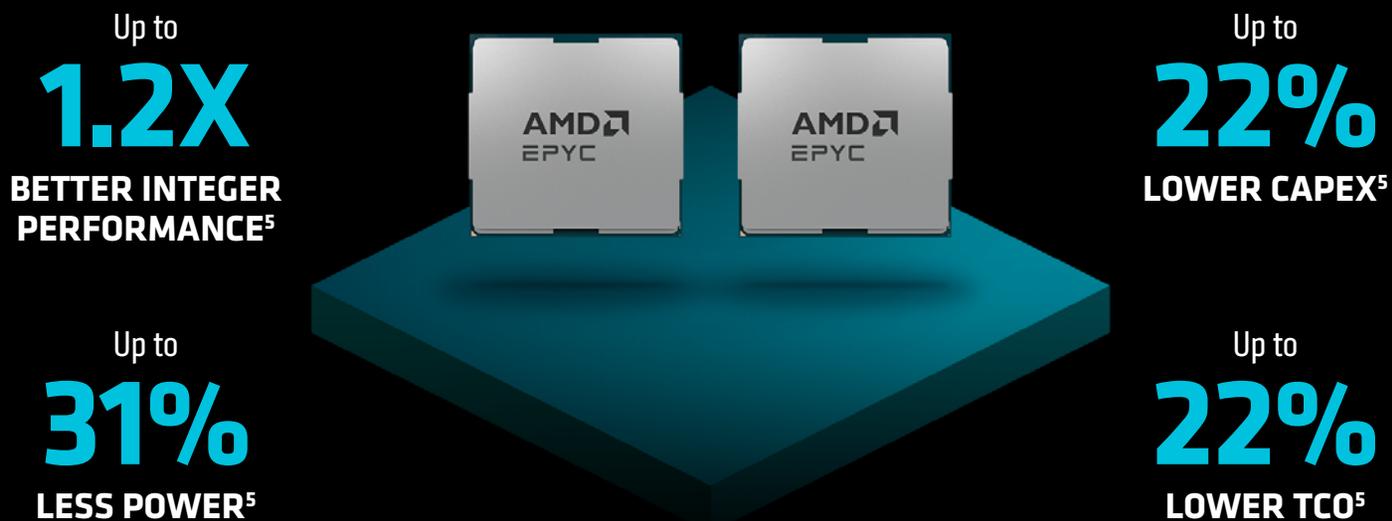
Claims based on dual-socket, 48-core servers equipped with two 24-core AMD EPYC™ 9255 CPUs versus two 24-core Intel® Xeon® 6527P CPUs (Xeon 6). See note 5 for details.

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13

ARE DUAL SOCKETS NECESSARY FOR GENERAL-PURPOSE SERVERS?

Ten years ago, when server CPUs had a maximum of 16 or 18 cores, dual-socket servers were worth the higher purchase price and extra power consumption, even for standalone, general-purpose servers.

Today, the middle range of AMD EPYC 9000 Series Server CPUs has 16 to 64 cores. With processing power like that, single-socket servers are more than enough for most general-purpose applications. There are exceptions, including a few general-purpose workloads that perform better with two CPUs.

ARE SINGLE-SOCKET SERVERS RISKIER THAN DUAL-SOCKET SERVERS?

Short answer: no. A CPU failure creates the same outcome in single-socket and dual-socket configurations — the server goes down. If your workloads demand failover support, you need two or more servers, not two CPUs in a single server.

SINGLE- VERSUS DUAL-SOCKET SERVERS

Guidelines for general-purpose servers

WORKLOAD	RECOMMENDED SOCKETS	RECOMMENDED CORE COUNT
File and print servers	Single	16
Networking	Single	16
Security	Single	16
Systems management	Single	16
Local/edge virtual desktop infrastructure (VDI)	Single	16
Web serving	Single	32
Structured data and data analytics applications	Single	32–64
Content applications	Single	64
General virtualization	Dual	32
Collaborative applications	Dual	64
Application development and testing	Dual	64
Media streaming	Dual	64
Customer relationship management (CRM)	Dual	64

These guidelines are based on AMD engineering recommendations. Please use them as a starting point, not a purchasing guide.

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PREPURCHASE QUESTIONS

QUESTIONS TO ASK YOURSELF AND YOUR HARDWARE PROVIDER

So, which server should you buy? As always, it depends. For general-purpose servers, the decision often comes down to how much performance you can get with your budget.

Budget is a great place to start. But growing AI workloads, expanding Java® apps, and virtualization demands may make extra headroom a smart investment. Provisioning a server with extra cores, memory channels, and PCIe lanes today can help extend its useful lifespan.

☐ **WHAT WORKLOADS WILL THE SERVER RUN?**
Virtualization, in-memory databases, and growing AI workloads benefit from high core counts and large memory pools.

☐ **HOW MUCH WILL THE SERVER NEED TO SCALE AND EXPAND?**
Plan for growing head counts, more AI, and richer media. If you want to run fewer total servers, choose high-core count CPUs that can support consolidated workloads.

☐ **WHAT ARE YOUR INTERNAL SERVICE LEVEL AGREEMENTS (SLAs)?**
Consider if you need maximum uptime, redundant power supplies, and hot-swap drives. For failover, you may want two servers for continuity.

☐ **IS THE NEW SERVER COMPATIBLE WITH YOUR OS AND APPLICATIONS?**
Check with your software providers and check that the system drivers and firmware are compatible with your infrastructure.

☐ **WILL THE NEW INFRASTRUCTURE MEET YOUR SECURITY, PRIVACY, AND COMPLIANCE REQUIREMENTS?**
Look for advanced security and encryption capabilities. Check that the system supports confidential computing out of the box.

☐ **IS THE HARDWARE YOU WANT AVAILABLE AND WELL SUPPORTED?**
Avoid consistently backordered systems and don't settle for in-stock servers with yesterday's technology.

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WHY AMD

MIGRATION IS EASIER THAN YOU MIGHT THINK

Many IT managers believe it would be too complex to migrate virtual machines from Intel-based servers to servers equipped with AMD EPYC Server CPUs. In reality, migrating from Intel to AMD takes a similar level of effort as upgrading from legacy Intel-based servers to new ones.

DELL

380 VMs
MIGRATION TIME: <1 HOUR

Dell migrated 380 VMs in less than an hour using the VMware Architecture Migration Tool (VAMT).[6] The migration replaced five legacy Intel-powered servers with a single modern server powered by AMD EPYC Server CPUs.

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GET DATA CENTER PERFORMANCE AT GENERAL-PURPOSE PRICES

AMD EPYC 9000 Series Server CPUs are the no-compromise choice for general IT servers. They're built on the same architecture as our flagship CPUs, include the same security features, and deliver the same number of I/O lanes — all at prices that beat the competition's second-tier CPUs.

Some might call it overkill to pack so much into a general-purpose server CPU. We call it delivering the maximum value for our customers.
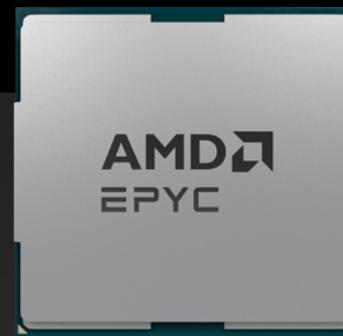
AMD EPYC SERVER CPUs FOR GENERAL-PURPOSE IT SERVERS

- Enterprise-class reliability, availability, and service (RAS)

- Leadership performance per dollar

- 16 to 64-core CPUs

- 13 SKUs for single- and dual-socket servers

- Clock speeds up to 4.4 GHz

- 125W to 360W default thermal design power (TDP)

- Up to 128 PCIe Gen 5 lanes

- Up to 12 channels of DDR5, up to 6400 MT/s memory

- Up to 6 TB of memory per socket

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WHERE TO FIND

GENERAL IT RUNS ON AMD EPYC SERVER CPUs

Talk to your preferred reseller, integrator, or OEM today about new infrastructure powered by AMD EPYC Server CPUs. You'll find a wide range of server solutions for general-purpose servers to fit your requirements and your budget.

Learn more about AMD EPYC Server CPUs

SERVERS AVAILABLE FROM:

CISCO

DELLTechnologies

HPE

Lenovo

SUPERMICRO

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1. Zuzia, Essential Server Performance Metrics You Must Monitor - Comprehensive Guide, 2026.

2. 9xx5TCO-022: This scenario contains many assumptions and estimates and, while based on AMD internal research and best approximations, should be considered an example for information purposes only, and not used as a basis for decision making over actual testing. The AMD Server & Greenhouse Gas Emissions TCO (total cost of ownership) Estimator Tool - version 1.55, compares the selected AMD EPYC™ and Intel® Xeon® CPU based server solutions required to deliver a TOTAL_PERFORMANCE of ~7,920 units of SPECrate®2017_int_base performance as of December 3, 2025. This analysis compares a 1P AMD 32 core EPYC_9355P powered server with a SPECrate2017_int_base score of 490, https://spec.org/cpu2017/results/res2025q1/cpu2017-20250106-45892.pdf; compared to a 2P Intel Xeon 16 core Xeon_6517P based server with a SPECrate2017_int_base score of 404, https://spec.org/cpu2017/results/res2025q4/cpu2017-20251117-50326.pdf; versus legacy 2P Intel Xeon 16 core Gold_5218 based server with a SPECrate2017_int_base score of 198, https://spec.org/cpu2017/results/res2020q2/cpu2017-20200608-22659.pdf.

   Environmental impact estimates made leveraging data from the 2025 International Country Specific Electricity Factors and can be found at https://www.carbondi.com/#electricity-factors/ and the US EPA Greenhouse Gas Equivalencies Calculator used in this analysis was sourced on 09/04/2024 and can be found at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

   For additional details, see https://www.amd.com/en/legal/claims/epyc.html#q=9xx5TCO-022.

3. Top 100 U.S. companies by revenue according to 2025 Fortune 500 list as of June 2, 2025. https://fortune.com/ranking/fortune500/. 'Fortune 100' refers to the top 20% ranked companies in the 2025 Fortune 500 list, published in June 2025. From Fortune Magazine. ©2025 Fortune Media IP Limited. All rights reserved. Used under license. Fortune and Fortune Media IP Limited are not affiliated with, and do not endorse products or services of Advanced Micro Devices, Inc.

4. GD-183A4: AMD Infinity Guard features vary by EPYC™ Processor generations and/or series. Infinity Guard security features 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.

5. 9xx5TCO-023: This scenario contains many assumptions and estimates and, while based on AMD internal research and best approximations, should be considered an example for information purposes only, and not used as a basis for decision making over actual testing. The AMD Server & Greenhouse Gas Emissions TCO (total cost of ownership) Estimator Tool - version 1.55, compares the selected AMD EPYC™ and Intel® Xeon® CPU based server solutions required to deliver a TOTAL_PERFORMANCE of ~11,480 units of SPECrate®2017_int_base performance as of December 3, 2025. This analysis compares a 2P AMD 24 core EPYC_9255 powered server with a SPECrate2017_int_base score of 733, https://spec.org/cpu2017/results/res2025q3/cpu2017-20250908-49474.pdf; compared to a 2P Intel Xeon 24 core Xeon_6527P based server with a SPECrate2017_int_base score of 606, https://spec.org/cpu2017/results/res2025q2/cpu2017-20250421-47759.pdf; versus legacy 2P Intel Xeon 24 core Gold_6252 based server with a SPECrate2017_int_base score of 287, https://spec.org/cpu2017/results/res2019q4/cpu2017-20190916-18249.pdf.

   Environmental impact estimates made leveraging data from the 2025 International Country Specific Electricity Factors and can be found at https://www.carbondi.com/#electricity-factors/ and the US EPA Greenhouse Gas Equivalencies Calculator used in this analysis was sourced on 09/04/2024 and can be found at https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator.

   For additional details, see https://www.amd.com/en/legal/claims/epyc.html#q=9xx5TCO-023.

6. Based on Dell testing using the VMware VAMT tool to migrate 380 VMs from 5x 2U servers with Intel Xeon 8180 processors (TDP: 205 W) to one Dell PowerEdge R7625 server with the AMD EPYC 4th Gen 9654 (TDP: 360 W) processors on 11/5/2022. Actual results will vary depending on actual product configuration, usage, operating conditions, power management settings, and other factors.

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