

DEPLOYING SAP WORKLOADS ON AMAZON EC2 INSTANCES POWERED BY 3RD GEN AMD EPYC™ PROCESSORS

AMAZON WEB SERVICES

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Amazon Elastic Compute Cloud (EC2) instances powered by AMD EPYC™ processors provide full x86 compatibility and thoroughly tested software stacks to migrate applications currently running on other x86 on-premise servers to AMD EPYC processor-based instances with little to no modification. Amazon EC2 M6a instances powered by 3rd Gen AMD EPYC™ processors offer the lowest cost per x86 vCPU in the EC2 family. Frequencies as high as 3.6 GHz¹ deliver optimal performance for a variety of general-purpose workloads, including web applications, small to medium databases, and DevTest environments.

Amazon EC2 M6a instances deliver up to 35% better price-performance than previous-generation M5a and 10% lower cost than other comparable x86-based EC2 instances.² Table 1 lists the available Amazon EC2 M6a instance types.

| INSTANCE SIZE | VCPU CORES | MEMORY (GB) | INSTANCE STORAGE (GB) | NETWORK BANDWIDTH (GBPS) |
|---------------|------------|-------------|-----------------------|--------------------------|
| m6a.large | 2 | 8 | EBS-Only | Up to 12.5 |
| m6a.xlarge | 4 | 16 | EBS-Only | Up to 12.5 |
| m6a.2xlarge | 8 | 32 | EBS-Only | Up to 12.5 |
| m6a.4xlarge | 16 | 64 | EBS-Only | Up to 12.5 |
| m6a.8xlarge | 32 | 128 | EBS-Only | 12.5 |
| m6a.12xlarge | 48 | 192 | EBS-Only | 18.75 |
| m6a.16xlarge | 64 | 256 | EBS-Only | 25 |
| m6a.24xlarge | 96 | 384 | EBS-Only | 37.5 |
| m6a.32xlarge | 128 | 512 | EBS-Only | 50 |
| m6a.48xlarge | 192 | 768 | EBS-Only | 50 |

Table 1: Available Amazon EC2 M6a instance types

PURPOSE BUILT FOR HPC WORKLOADS

Amazon EC2 Hpc6a instances offer the latest generation AWS Nitro cards and 100 Gbps Elastic Fabric Adapter networking for inter-node communications. You can also use Amazon FSx for Lustre for sub-millisecond latencies, hundreds of GB/s of storage throughput, and AWS Parallel Cluster to provision Amazon EC2 Hpc6a instances alongside other instance types within the same cluster.

AMD EPYC 7003 FOR HPC

AMD EPYC 3rd Gen CPUs can deliver outstanding per-core performance by taking advantage of fast CPU frequencies, low latency memory, and unified cache structure.

AMD EPYC processors provide high bandwidth between nodes with support for PCIe® Gen 4 network devices and accelerators that greatly benefit HPC applications.

SAP HOSTING USING AMAZON EC2

Migrating SAP workloads to the cloud and selecting AWS as two strategic decisions today's IT pros can make for their SAP landscapes. AWS offers SAP hosting on AMD EPYC-powered EC2 instances with SAPS-based sizing, broad platform support, high availability with worldwide datacenters, and flexible options for SAP test, dev, and production deployments for businesses worldwide.

OPTIMAL PRICE-PERFORMANCE

Amazon EC2 M6a instances featuring 3rd Gen AMD EPYC processors deliver up to 35% better price performance than M5a instances and 10% lower cost than other comparable x86-based EC2 instances. M6a instances also offer larger sizes with up to 192 vCPUs and 768 GiB of memory, enabling you to consolidate workloads on fewer instances and lower per-core licensing costs.²

Amazon EC2 M6a instances include the following key features:

- Reduced latency with up to 40 Gbps for Amazon Elastic Block Store (EBS) and 50 Gbps for networking.
- Always-on memory encryption that helps protect your data while it is in use, thanks to AMD Transparent Single Key Memory Encryption (TSME), which is part of the AMD Infinity Guard architecture.³
- Support for new Advanced Vector Extension (AVX2) instructions for faster execution of cryptographic algorithms useful for OpenSSL to encrypt data-in-transit.

FAST START YOUR SAP WORKLOADS DEPLOYMENTS ON AMAZON EC2 WITH AMD EPYC PROCESSORS

Migrating SAP workloads to the cloud and selecting Amazon Web Services are two of the most strategic decisions today's IT leaders make when deciding how to run their SAP landscapes. Amazon EC2 instances powered by AMD EPYC processors are an ideal choice because:

- AWS provides the most choice and proven approaches to SAP on cloud success.
- Lift-and-shift your existing SAP systems as the first step toward modernization.
- Gain new capabilities by modernizing business processes with AWS services.
- Maintain the flexibility to resize your environment to meet evolving needs while maintaining a consistent, cloud-native experience across all instances and services.
- Right-size your SAP landscape, eliminate over-provisioning, and consolidate systems/data.
- Deploy production-ready SAP landscapes in less than two hours with AWS Launch Wizard.
- Improve SAP system reliability by running on the most secure, extensive, and reliable global cloud infrastructure.⁴
- The only cloud vetted and accepted as secure enough for top-secret workloads with 90 security standards and compliance certifications.⁵
- Leverage over 200 AWS services, including offerings for IoT, data lakes, AI/ML, image recognition, chatbots, and more.
- Offset migration costs through service credits and partner support via the AWS Migration Acceleration Program (MAP) for SAP.

The 10 available Amazon EC2 M6a instance configurations listed in Table 1 make it fast and easy to deploy SAP applications with all the flexibility and agility needed to handle high and fluctuating loads in CPU usage, memory usage, and network latency.

SAP APPLICATIONS WORKLOADS LANDSCAPE

The SAP applications landscape consists of various types of enterprise applications that include Enterprise Resources Planning (ERP) applications a.k.a. modules (e.g. Finance Apps-FI, Sales and Distribution-SD, etc.), SAP Netweaver Component Applications (e.g., Business Warehouse-BW, Business Intelligence & Data Warehousing (BIW), Information Systems Management Applications (e.g. Master Data management-MDM, Monitoring - MON, etc.), and SAP Business Suite (e.g. CRM), SAP Business One, SAP Business Objects, SAP Commerce (Hybris), SAP Databases and Mobile solutions (e.g. SAP HANA, Mobile Platform, etc.)

SAP Landscape

■ = NetWeaver

■ = S/4 or BW/4

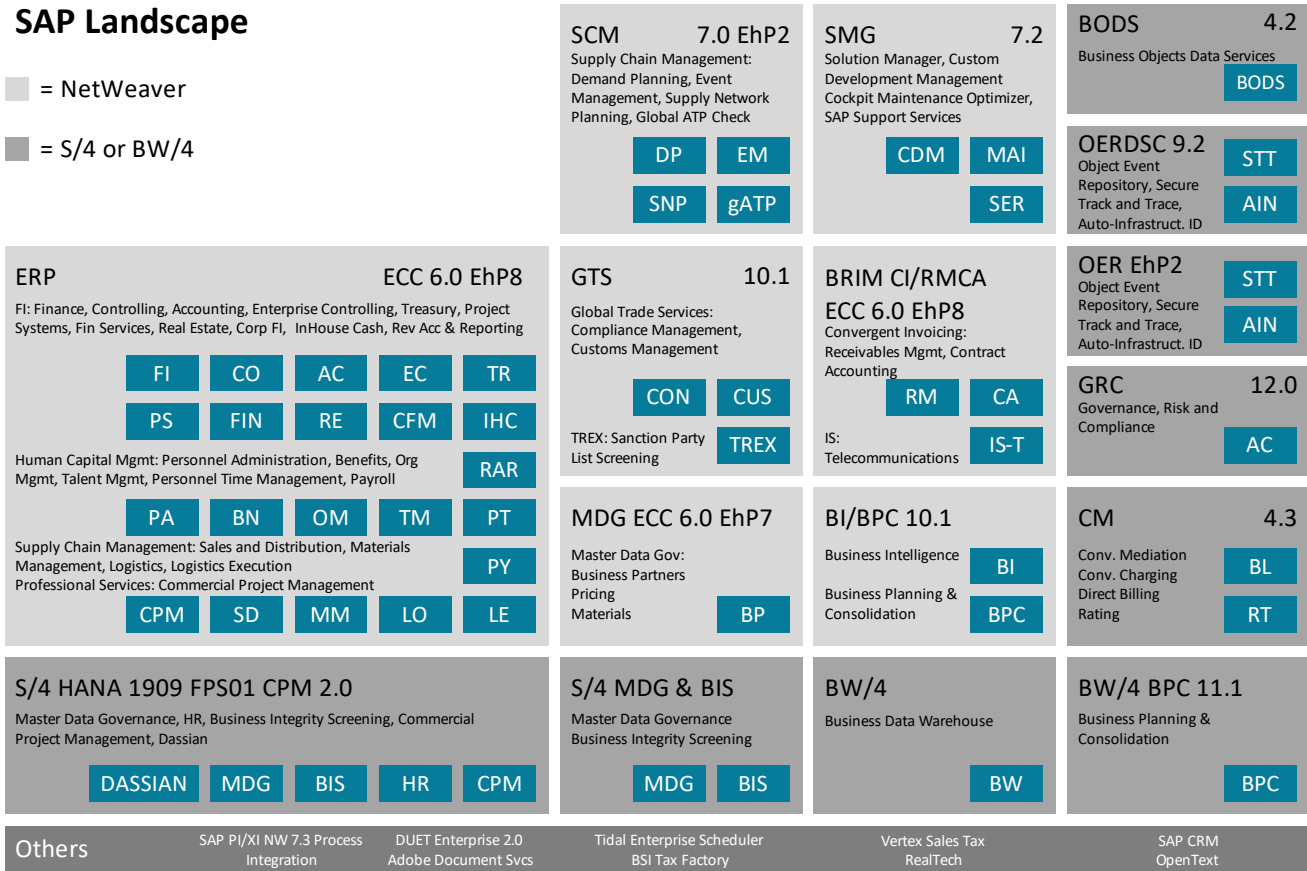


Figure 1: SAP applications landscape

HOW SAP CUSTOMERS ARE USING AWS

SAP customers use AWS in many different ways and phases. Some of the leading use cases include:

- All-in development, QA staging, and production migration.
- Hybrid architecture and usage.
 - SAP development and QA migration to AWS.
 - New solution implementation.
 - BW on HANA.
 - Trial, training, or POC systems.
- Disaster recovery on AWS.
- Implementing and hosting a new SAP environment on AWS.

- Archive SAP data and documents and help secure content delivery using Amazon CloudFront.⁶
- Replicate SAP data, including across different geographic regions.
- On-demand infrastructure for:
 - Proof of concepts.
 - Trial SAP solutions.
 - Upgrades and OS or database migrations.

AWS has several SAP software and licensing options. The primary option is called Bring-Your-Own-Software and License, which entails customers bringing their existing SAP licenses to AWS. Customers can opt to self-migrate and self-manage SAP on AWS, or they can use either AWS managed services or a SAP-AWS partner.

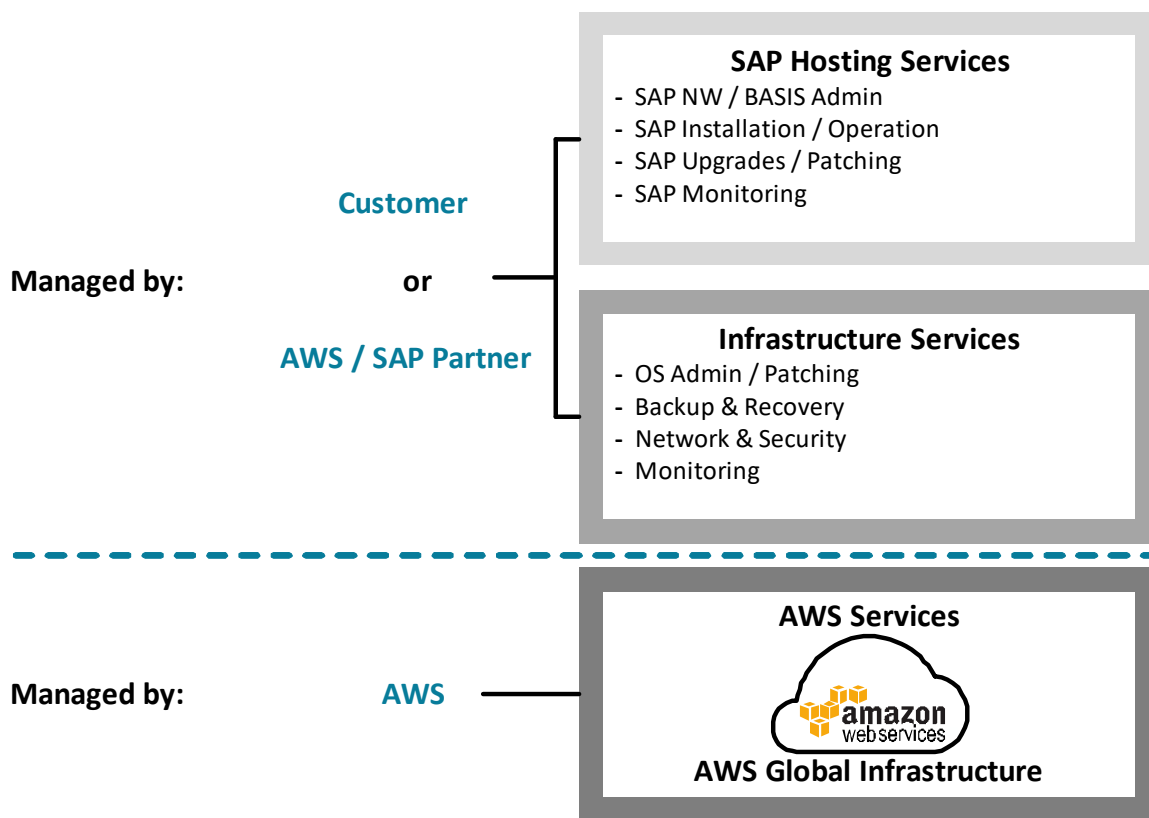


Figure 2: Managing SAP application deployment and operations on AWS

SAP APPLICATION PERFORMANCE STANDARD (SAPS)

SAP Application Performance Standard (SAPS) is the standard SAP benchmark used for measuring the performance of SAP deployments. SAPS uses a hardware-independent unit of measurement that describes the performance of a system operating in the SAP environment. It is derived from the Sales and Distribution (SD) benchmark.

Hardware vendors conduct SAP benchmark testing using their normal testing methodology to determine the number of SD users the system can support. Each module has a weightage that converts the number of users in each module to a Normalized SD (NSD) number from which a SAPS can be obtained.

SAPS PERFORMANCE ON AMD EPYC POWERED AMAZON EC2 INSTANCES

Selecting the right EC2 Instances for your AWS SAP hosting deployment is extremely important. You have multiple Amazon EC2 instances types powered by AMD EPYC processors to choose from:

- Compute-optimized Amazon EC2 C5a series instances powered by 2nd Gen AMD EPYC processors.
- General-purpose Amazon EC2 M6a series instances powered by 3rd Gen AMD EPYC processors.

The following sections provide SAPS performance information for both Amazon EC2 C5a and Amazon EC2 M6a instances.

AMAZON EC2 C5A INSTANCE SAPS PERFORMANCE

SAP certified the SAP Sales and Distribution (SD) Standard Application Benchmark performed on April 15, 2020, in a cloud environment by Amazon Web Services in Region us-east, USA, on behalf of the SAP Benchmark Council on April 27, 2020, with the following data:

| | |
|---|--|
| NUMBER OF SAP SD BENCHMARK USERS | 23,600 |
| AVERAGE DIALOG RESPONSE TIME | 0.74 seconds |
| THROUGHPUT | <ul style="list-style-type: none"> • Fully processed order line items per hour: 2,636,670 • Dialog steps per hour: 7,910,000 |
| SAPS | 131,830 |
| AVERAGE DATABASE REQUEST TIME (DIALOG/UPDATE) | 0.011 sec / 0.024 sec |
| CPU UTILIZATION OF CENTRAL SERVER | 96% |
| OPERATING SYSTEM, CENTRAL SERVER | Microsoft® Windows® Server 2016 Datacenter on KVM |
| RDBMS | SQL Server 2012 |
| SAP BUSINESS SUITE SOFTWARE | SAP enhancement package 5 for SAP ERP 6.0 |
| # OF SERVERS | 1 |
| USAGE | Central Server |
| HARDWARE | <ul style="list-style-type: none"> • Instance: Amazon EC2 c5a.24xlarge • Processor: 1x AMD EPYC 7R32 • Cores/Threads: 48 / 96 • Frequency: 2.80 GHz • Cache per core: 64 KB L1; 512 KB L2 • Cache per processor: 192 MB L3 • Main memory: 192 GB |
| SEGMENTATION | One VM with 96 vCPUs and 192 GB RAM |

Table 2: SAPS performance certification data^{7,9}

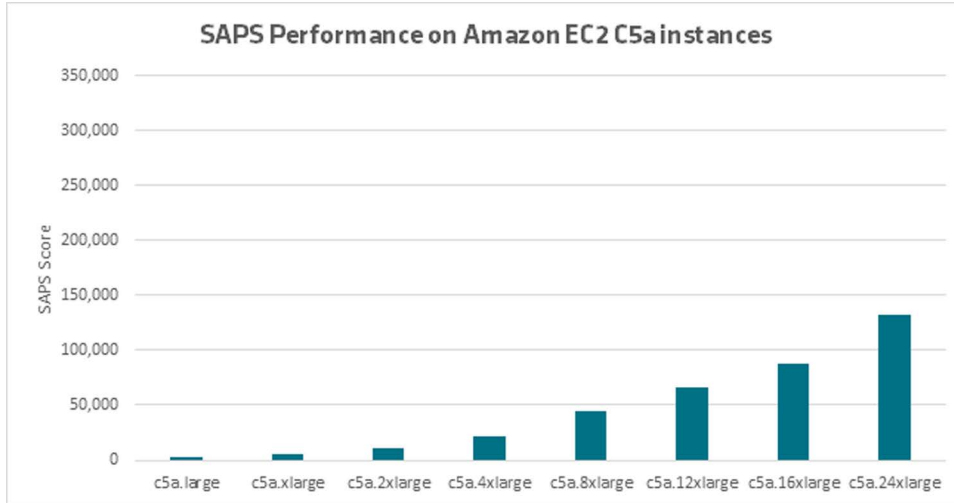


Figure 3: SAPS performance on Amazon EC2 C5a instances powered by 2nd Gen AMD EPYC processors^{7,9}

AMAZON EC2 M6A INSTANCE SAPS PERFORMANCE

SAP certified the SAP Sales and Distribution (SD) Standard Application Benchmark performed on September 27, 2021, in a cloud environment by Amazon Web Services in Region us-east, USA, on behalf of the SAP Benchmark Council on January 24, 2022, with the following data:

| | |
|---|--|
| NUMBER OF SAP SD BENCHMARK USERS | 52,300 |
| AVERAGE DIALOG RESPONSE TIME | 0.81 seconds |
| THROUGHPUT | <ul style="list-style-type: none"> • Fully processed order line items per hour: 5,804,330 • Dialog steps per hour: 17,413,000 |
| SAPS | 290,220 |
| AVERAGE DATABASE REQUEST TIME (DIALOG/UPDATE) | 0.017 sec / 0.023 sec |
| CPU UTILIZATION OF CENTRAL SERVER | 99% |
| OPERATING SYSTEM, CENTRAL SERVER | Microsoft Windows Server 2016 on AWS Nitro |
| RDBMS | SQL Server 2012 |
| SAP BUSINESS SUITE SOFTWARE | SAP enhancement package 5 for SAP ERP 6.0 |
| # OF SERVERS | 1 |
| USAGE | Central Server |
| HARDWARE | <ul style="list-style-type: none"> • Instance: Amazon EC2 m6a.48xlarge • Processor: 2 x AMD EPYC 7R13 • Cores/Threads: 96 / 192 • Frequency: 2.65 GHz • Cache per core: 64 KB L1; 512 KB L2 • Cache per processor: 192 MB L3 • Main memory: 768 GB |
| SEGMENTATION | One VM with 192 vCPUs and 752 GB RAM |

Table 3: SAPS performance certification data^{7,9}

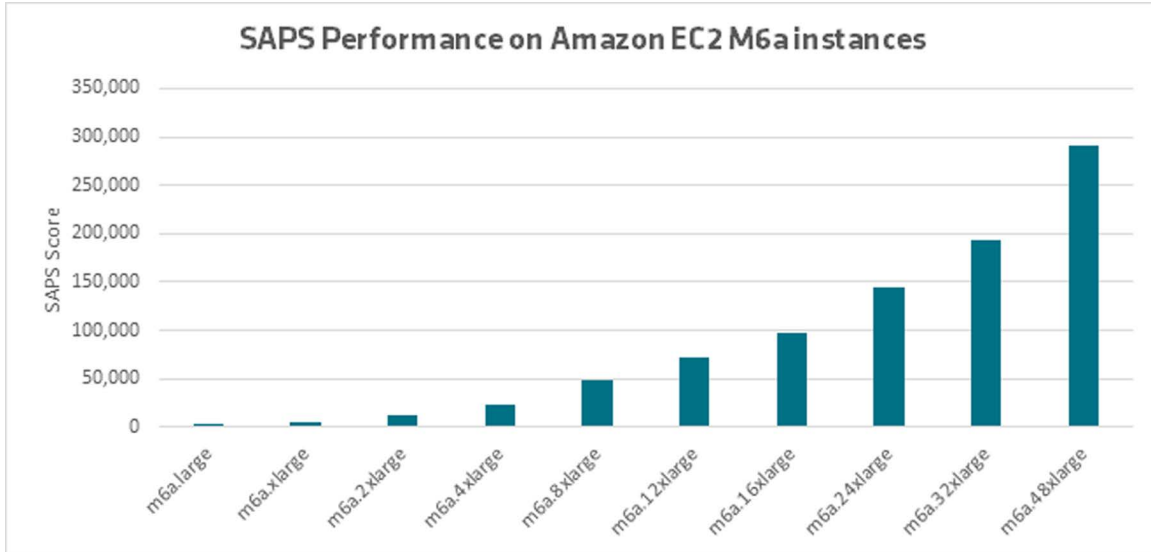


Figure 4: SAPS performance on Amazon EC2 M6a instances powered by 3rd Gen AMD EPYC processors^{7,9}

CONCLUSION

Many of the world's largest enterprises are replacing traditional on-premises SAP environments with SAP applications running in the AWS cloud using Amazon EC2 and other Amazon services, such as S3. AWS significantly reduces SAP infrastructure and support costs, simplifies operations, and contributes directly to the bottom line while simultaneously increasing business agility and scalability.

Amazon EC2 M6a instances powered by 3rd Gen AMD EPYC processors help customers optimize cloud cost and workload performance for various web hosting deployments. Performance scales predictably when scaling up instance sizes and when scaling out across multiple-node clusters. Amazon EC2 M6a instances powered by 3rd Gen AMD EPYC processors are your ideal choice for high-performance web hosting solutions priced up to 10% less than comparable x86 Amazon EC2 instances.^{2,10}

REFERENCES

1. Maximum boost for AMD EPYC processors is the maximum frequency achievable by any single core on the processor under normal operating conditions for server systems. EPYC-18
2. AMD-powered Amazon EC2 instances offer up to 10% lower cost compared to comparable x86 based instances, and up to 45% lower cost compared to comparable x86 based instances in Asia Pacific Region (Mumbai). See <https://aws.amazon.com/ec2/amd/> and <https://aws.amazon.com/about-aws/whats-new/2022/01/amazon-ec2-m6a-instances-asia-pacific-mumbai-aws-region/>.
3. AMD Infinity Guard features vary by EPYC™ Processor generations. 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>. GD-183
4. Please see <https://aws.amazon.com/about-aws/global-infrastructure/#>.
5. Please see https://pages.awscloud.com/rs/112-TZM-766/images/PTNR_sap-sapphire-whitepaper_May-2021.pdf.
6. Please see <https://docs.aws.amazon.com/whitepapers/latest/secure-content-delivery-amazon-cloudfront/secure-content-delivery-with-amazon-cloudfront.html>.
7. Please see <https://www.sap.com/dmc/exp/2018-benchmark-directory/#/sd?filters=v:4a9e824336e2837bf9081e423d576dba:v:4a9e824336e2837bf9081e423d58f740&id=bm:ceaaa24e-cf93-46b1-88ed-0642473be273> for additional M6a SAPS information.
8. Please see <https://www.sap.com/dmc/exp/2018-benchmark-directory/#/sd?filters=v:4a9e824336e2837bf9081e423d576dba:v:4a9e824336e2837bf9081e423d58f740&id=bm:cfa5b161-e98a-41e1-a677-6cd4c640e4d2> for additional C5a SAPS information.
9. Please see <https://aws.amazon.com/sap/instance-types/> for additional information about Amazon EC2 M6a and C5a AWS instances for SAP.
10. Cloud performance results presented are based on the test date in the configuration and are in alignment with AMD internal bare-metal testing factoring in cloud service provider overhead. Results may vary due to changes to the underlying configuration, and other conditions such as the placement of the VM and its resources, optimizations by the cloud service provider, accessed cloud regions, co-tenants, and the types of other workloads exercised at the same time on the system. The performance information included in this document is not specially optimized for AMD to represent a typical customer experience and therefore is not recommended to be used for any competitive analysis.

RELATED LINKS

- [AMD EPYC™ Processors](#)
- [AMD EPYC™ and Amazon EC2 Instances](#)
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