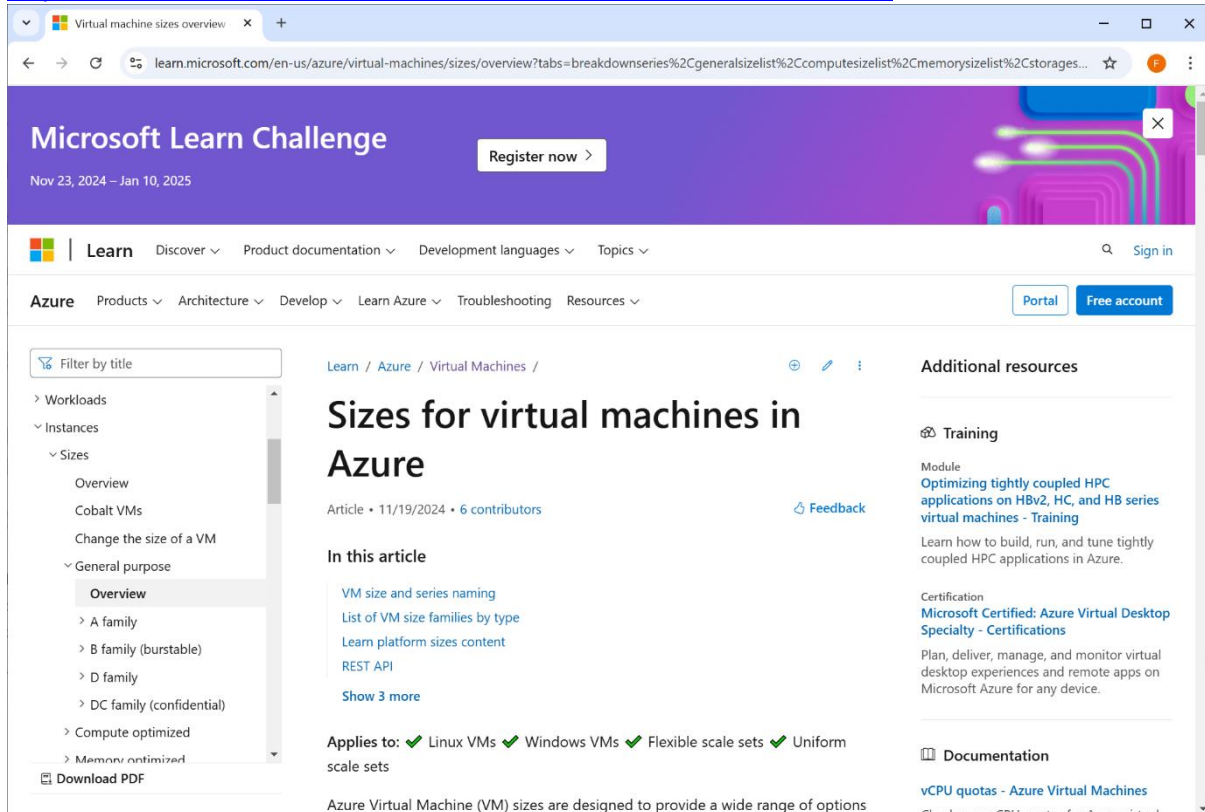


Tarif d'une VM sur Azure vs Tarif sur Hetzner/TIMi

Version v1.01 – 2024-12-2

Nous démarrons avec la documentation Azure disponible ici:

<https://learn.microsoft.com/en-us/azure/virtual-machines/sizes/overview>



The screenshot shows the Microsoft Learn page for 'Sizes for virtual machines in Azure'. The page includes a navigation sidebar with categories like Workloads, Instances, and Sizes. The main content area features the title 'Sizes for virtual machines in Azure', a sub-header 'Article • 11/19/2024 • 6 contributors', and a section 'In this article' with links to 'VM size and series naming', 'List of VM size families by type', 'Learn platform sizes content', and 'REST API'. There is also a section 'Applies to' with checkmarks for Linux VMs, Windows VMs, Flexible scale sets, and Uniform scale sets. The page footer mentions 'Azure Virtual Machine (VM) sizes are designed to provide a wide range of options'.

... les machines virtuelles disponibles dans Azure sont classées en 9 "séries" différentes :

VM Series	vCPU Range	Memory (GB)	Purpose
A-series	1 - 8	2 - 64	Entry-level, dev/test, small apps
B-series	2 - 32	1 - 128	Burstable, cost-efficient workloads
D-series	2 - 96	8 - 384	General-purpose, business apps
E-series	2 - 128	16 - 672	Memory-intensive apps
F-series	2 - 64	4 - 256	Compute-intensive workloads
L-series	4 - 80	32 - 512	Storage-intensive workloads
M-series	8 - 416	192 - 11,400	Extremely high-memory workloads
N-series	6 - 96	56 - 672	GPU-based tasks (AI, ML, graphics)
H-series	2 - 120	8 - 1200	High-performance computing (HPC)

Voici les processeurs/CPU's disponibles dans chacune de ces séries:

VM Series	Processor	vCPU Range	Memory Range (GB)	Key Features
A-series	Intel Xeon E5 family (E5-2673 v3 and v4), Intel Xeon Platinum 8370C and 8272CL, Intel Xeon 8171M (Ice Lake)	1-8	2 - 64	Budget-friendly, entry-level, consistent CPU performance
B-series	AMD EPYC 7763v (Genoa) and 7452, Intel Xeon Platinum 8473C (Sapphire Rapids) or 8370C (Ice Lake)	2 - 32	1 - 128	Burstable, credit-based CPU performance model
D-series	Intel Xeon Platinum 8573C (Emerald Rapids) and 8272CL (Cascade Lake), AMD EPYC 7763 (Milan), AMD's 4th Generation EPYC™ 9004	2 - 96	8 - 384	High CPU-to-memory ratio for general-purpose workloads
E-series	Intel Xeon Platinum 8370C (Ice Lake), AMD EPYC 7763 (Milan), AMD's fourth Generation EPYC™ 9004	2 - 128	16 - 672	Memory-optimized, great for relational databases and in-memory analytics
F-series	Intel Xeon Platinum 8272CL (Cascade Lake)	2 - 64	4 - 256	Compute-intensive workloads with a high CPU-to-memory ratio
L-series	Intel Xeon Platinum 8370C (Ice Lake), AMD EPYC 7763v (Milan).	4 - 80	32 - 512	Optimized for storage-intensive workloads with high IOPS
H-series	Intel Xeon Platinum 8168, 4th Gen AMD EPYC 7551 (Naples), AMD EPYC 7V12 (Genoa) , AMD EPYC 9V33X (Genoa-X), AMD EPYC™ 7V73X (Milan-X), AMD EPYC 7V12	2 - 120	8 - 1200	High-performance computing (HPC), with enhanced interconnects for fast data

Si nous recherchons les performances de chacun de ces processeurs sur [cpubenchmark.net](https://www.cpubenchmark.net), nous obtenons (plus le "Single thread rating" est élevé, meilleur est le processeur) :

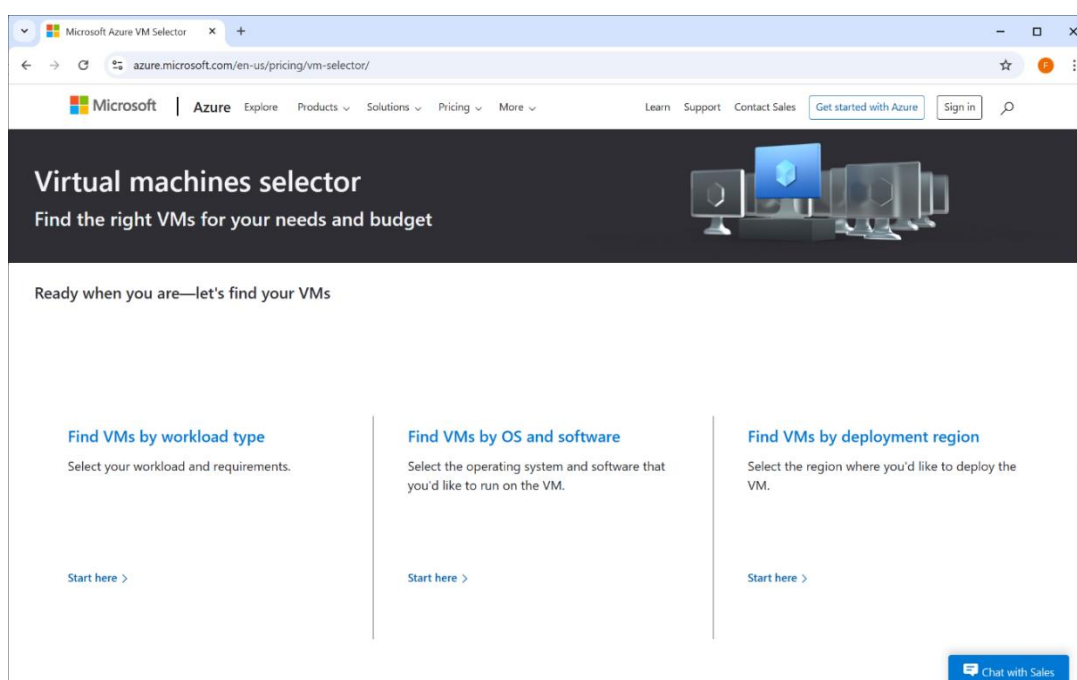
Processor	Single Thread Rating	Clock Speed [GHz]	URL
Intel Xeon E5-2673 v3	1,738	2.4	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+E5-2673+v3+%40+2.40GHz&id=2606
Intel Xeon E5-2673 v4	2,107	2.3	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+E5-2673+v4+%40+2.30GHz&id=2888
Intel Xeon Platinum 8575C	2,593	4.0	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8575C&id=6173
Intel Xeon Platinum 8370C (Ice Lake)	2,474	3.5	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8375C+%40+2.90GHz&id=4486

Intel Xeon Platinum 8272CL (Cascade Lake)	2,386	3.0	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8275CL+%40+3.00GHz&id=3624
Intel Xeon 8171M (Ice Lake)	2,222	2.6	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8171M+%40+2.60GHz&id=3220
AMD EPYC 7763v (Genoa)	2,517	2.45	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+7763&id=4207
AMD EPYC 7452	1,995	2.35	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+7452&id=3600
Intel Xeon Platinum 8280L	2,029	2.7	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8280+%40+2.70GHz&id=3662
AMD EPYC 7551	1,766	2.0	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+7551&id=3089
AMD EPYC 7V12 (7443)	2,907	2.9	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+7443&id=4708
Intel Xeon Platinum 8168	2,092	2.7	https://www.cpubenchmark.net/cpu.php?cpu=Intel+Xeon+Platinum+8168+%40+2.70GHz&id=3111
4th Gen AMD EPYC 7Hx (HBv4)	2022	2.6	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+7H12&id=3618&cpuCount=2
AMD EPYC 9V33X (Genoa-X) (9334)	2,367	2.7	https://www.cpubenchmark.net/cpu.php?cpu=AMD+EPYC+9334&id=5519

Dans Azure, le processeur ayant la vitesse la plus élevée est donc **AMD EPYC 7V12 (7443)** avec un score de 2907 : Ces processeurs ne sont disponibles que dans la série **HBv2-series**.

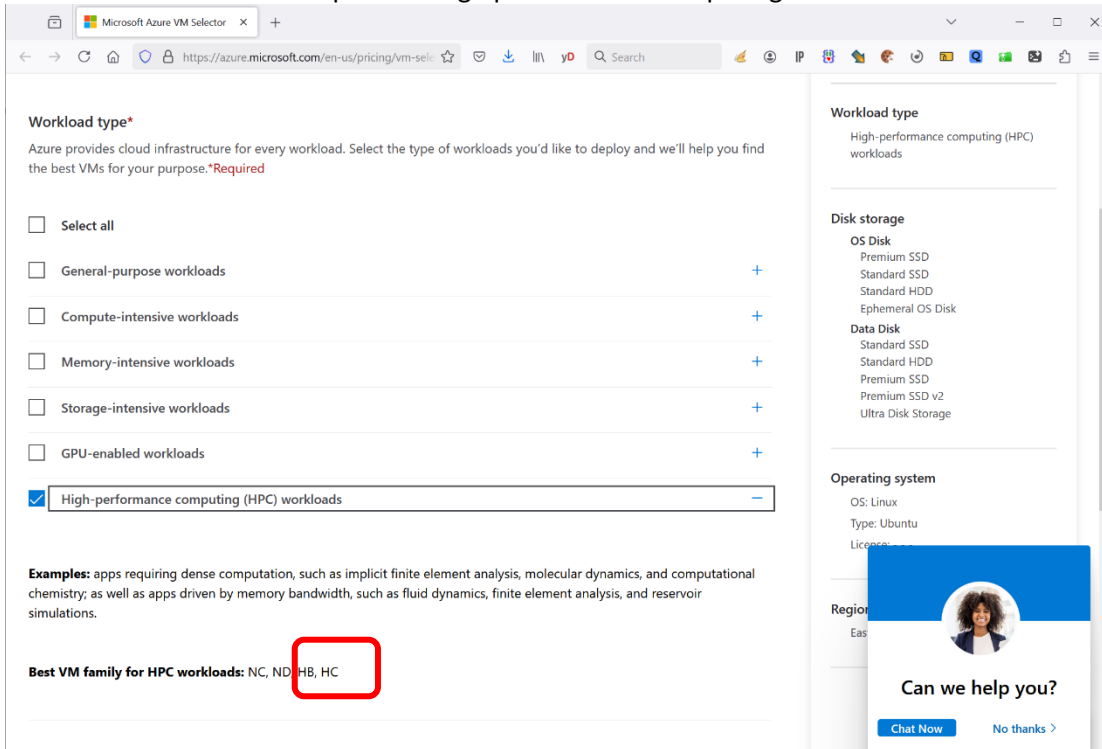
Nous démarrons ici :

<https://azure.microsoft.com/en-us/pricing/vm-selector/>



Voici les étapes de configuration du wizard sur Azure :

1. Sélectionnez la "série H" pour le "high performance computing load":



Workload type*
Azure provides cloud infrastructure for every workload. Select the type of workloads you'd like to deploy and we'll help you find the best VMs for your purpose.*Required

☐ Select all

☐ General-purpose workloads +

☐ Compute-intensive workloads +

☐ Memory-intensive workloads +

☐ Storage-intensive workloads +

☐ GPU-enabled workloads +

☒ High-performance computing (HPC) workloads -

Examples: apps requiring dense computation, such as implicit finite element analysis, molecular dynamics, and computational chemistry; as well as apps driven by memory bandwidth, such as fluid dynamics, finite element analysis, and reservoir simulations.

Best VM family for HPC workloads: NC, ND, HB, HC

Workload type
High-performance computing (HPC) workloads

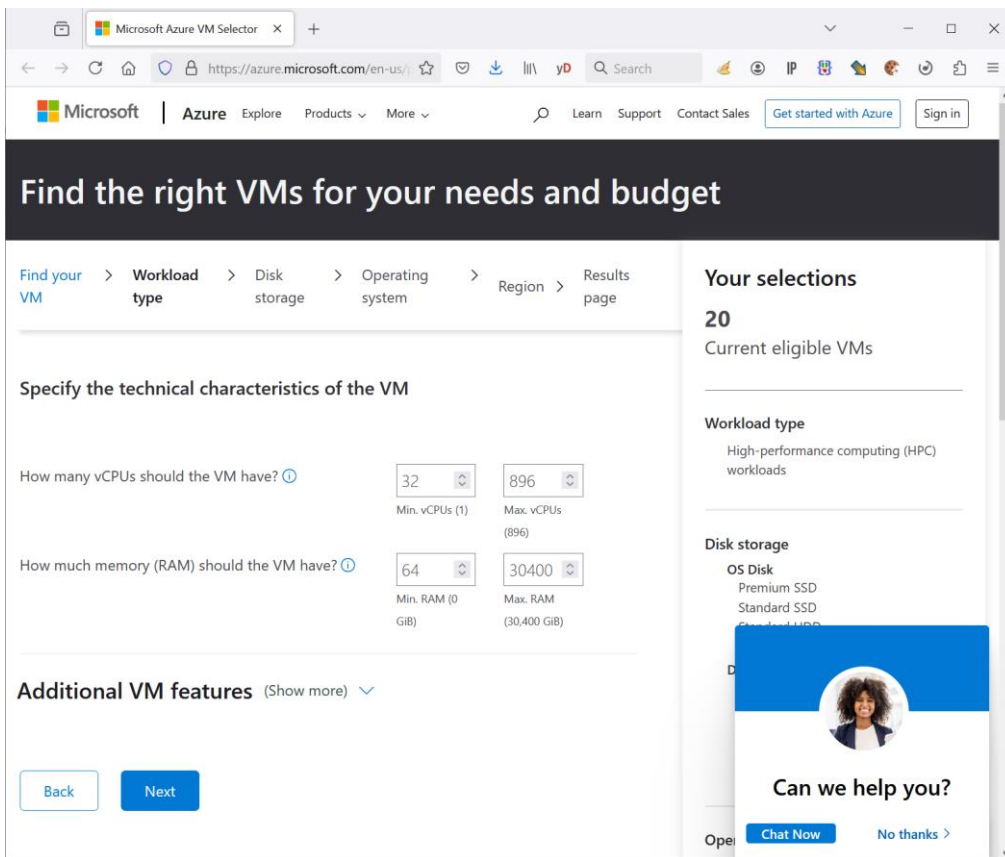
Disk storage
OS Disk
Premium SSD
Standard SSD
Standard HDD
Ephemeral OS Disk
Data Disk
Standard SSD
Standard HDD
Premium SSD
Premium SSD v2
Ultra Disk Storage

Operating system
OS: Linux
Type: Ubuntu
License: Pay as you go

Region
East US

Can we help you?
[Chat Now](#) [No thanks >](#)

2. Nous voulons une machine avec au moins 32 cœurs et 64 GB de RAM :



Find the right VMs for your needs and budget

[Find your VM](#) > [Workload type](#) > [Disk storage](#) > [Operating system](#) > [Region](#) > [Results page](#)

Specify the technical characteristics of the VM

How many vCPUs should the VM have? ⓘ

32 (Min. vCPUs (1)) 896 (Max. vCPUs (896))

How much memory (RAM) should the VM have? ⓘ

64 (Min. RAM (0) GiB) 30400 (Max. RAM (30,400 GiB))

Additional VM features (Show more) ▾

[Back](#) [Next](#)

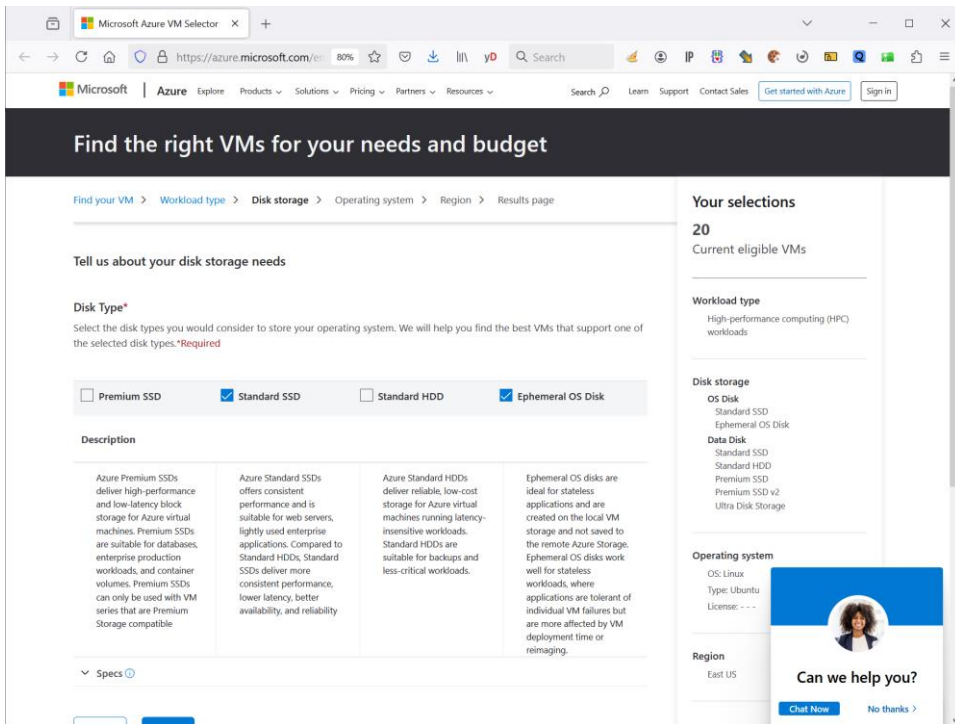
Your selections
20
Current eligible VMs

Workload type
High-performance computing (HPC) workloads

Disk storage
OS Disk
Premium SSD
Standard SSD
Standard HDD
Ephemeral OS Disk
Data Disk
Standard SSD
Standard HDD
Premium SSD
Premium SSD v2
Ultra Disk Storage

Can we help you?
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3. Nous voulons une machine avec un SSD rapide pour l'OS:



Find the right VMs for your needs and budget

Find your VM > Workload type > **Disk storage** > Operating system > Region > Results page

Tell us about your disk storage needs

Disk Type*
Select the disk types you would consider to store your operating system. We will help you find the best VMs that support one of the selected disk types.*Required

☐ Premium SSD ☒ Standard SSD ☐ Standard HDD ☒ Ephemeral OS Disk

Description

Azure Premium SSDs deliver high-performance and low-latency block storage for Azure virtual machines. Premium SSDs are suitable for databases, enterprise production workloads, and container volumes. Premium SSDs can only be used with VM series that are Premium Storage compatible.	Azure Standard SSDs offers consistent performance and is suitable for web servers, lightly used enterprise applications. Compared to Standard HDDs, Standard SSDs deliver more consistent performance, lower latency, better availability, and reliability.	Azure Standard HDDs deliver reliable, low-cost storage for Azure virtual machines running latency-insensitive workloads. Standard HDDs are suitable for backups and less-critical workloads.	Ephemeral OS disks are ideal for stateless applications and are created on the local VM storage and not saved to the remote Azure Storage. Ephemeral OS disks work well for stateless workloads, where applications are tolerant of individual VM failures but are more affected by VM deployment time or reimaging.
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▼ Specs

Your selections
20 Current eligible VMs

Workload type
High-performance computing (HPC) workloads

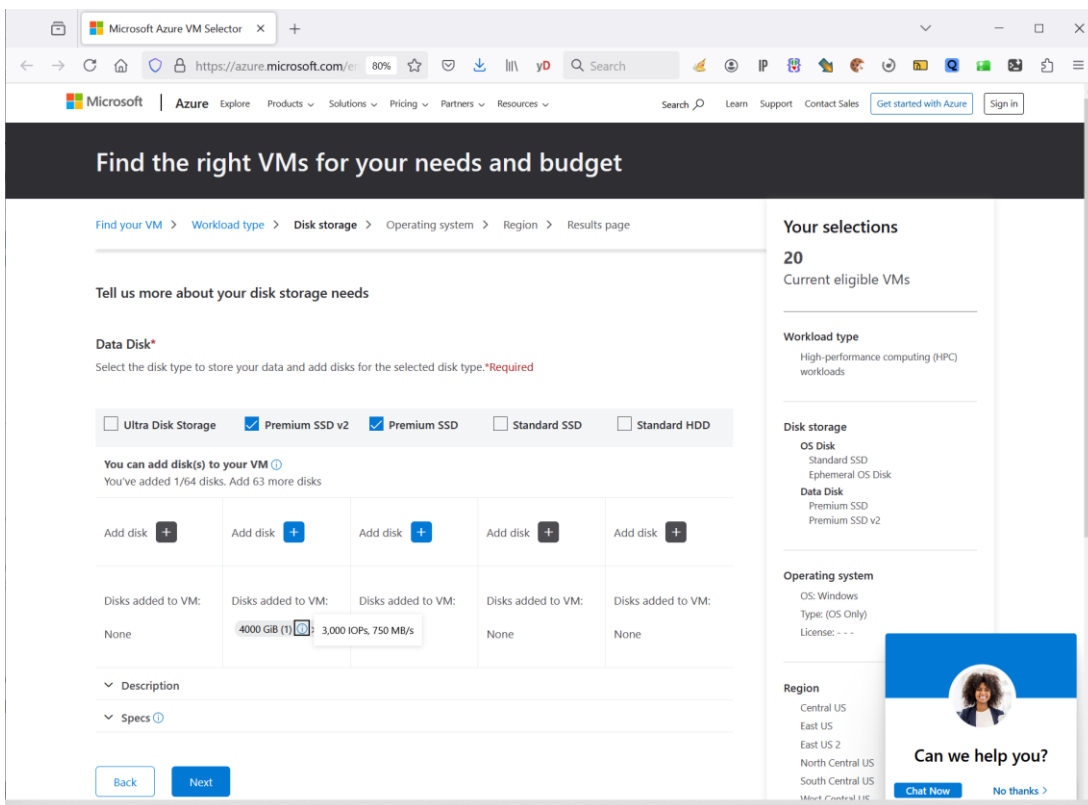
Disk storage
OS Disk: Standard SSD, Ephemeral OS Disk
Data Disk: Standard HDD, Premium SSD, Premium SSD v2, Ultra Disk Storage

Operating system
OS: Linux
Type: Ubuntu
License: ---

Region
East US

Can we help you?
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4. Nous voulons stocker environ 4 TB de données (la même capacité que les machines sur Hetzner) : Lorsque nous choisissons cette taille, nous n'obtenons qu'un SSD avec une vitesse d'accès de 750 Mbyte/sec (c'est-à-dire assez lent). Pas moyen d'obtenir une meilleure vitesse sans faire exploser le budget.



Find the right VMs for your needs and budget

Find your VM > Workload type > **Disk storage** > Operating system > Region > Results page

Tell us more about your disk storage needs

Data Disk*
Select the disk type to store your data and add disks for the selected disk type.*Required

☐ Ultra Disk Storage ☒ Premium SSD v2 ☒ Premium SSD ☐ Standard SSD ☐ Standard HDD

You can add disk(s) to your VM
You've added 1/64 disks. Add 63 more disks

Add disk	Add disk	Add disk	Add disk	Add disk
Disks added to VM: None	Disks added to VM: 4000 GiB (1) 3,000 IOPs, 750 MB/s	Disks added to VM: None	Disks added to VM: None	Disks added to VM: None
▼ Description	▼ Description	▼ Description	▼ Description	▼ Description
▼ Specs	▼ Specs	▼ Specs	▼ Specs	▼ Specs

[Back](#) [Next](#)

Your selections
20 Current eligible VMs

Workload type
High-performance computing (HPC) workloads

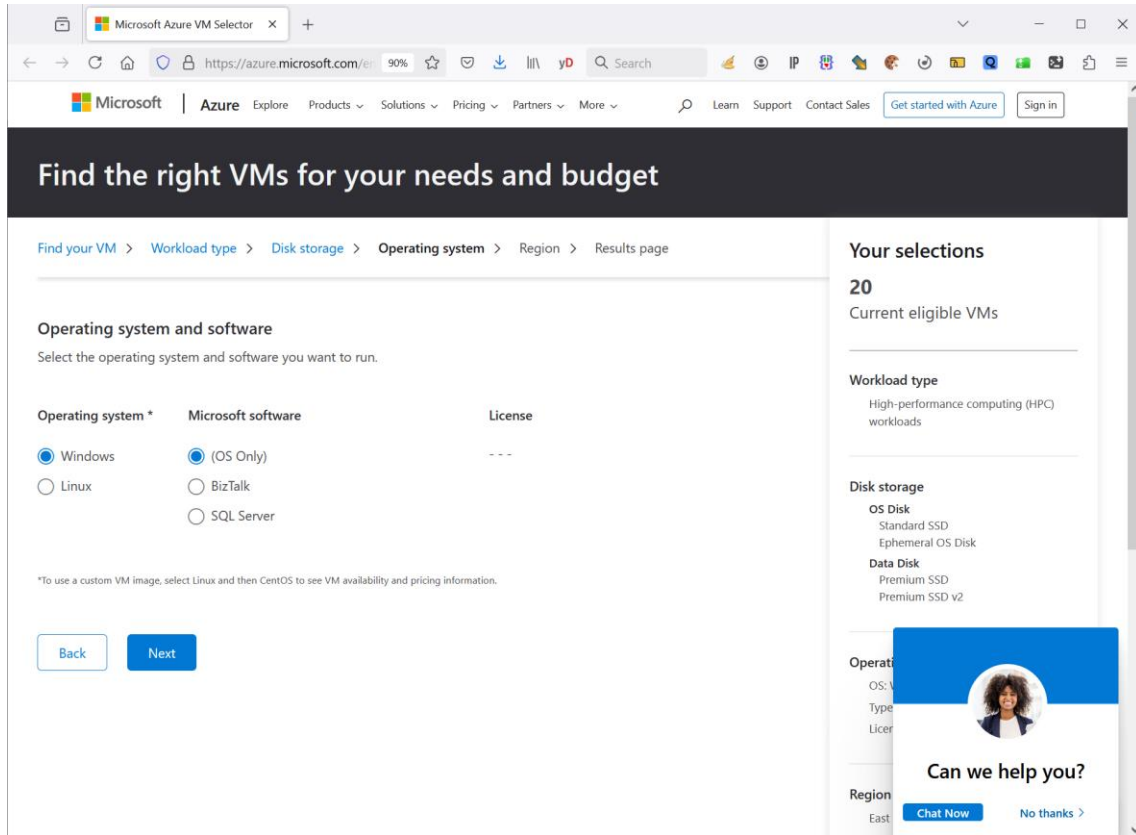
Disk storage
OS Disk: Standard SSD, Ephemeral OS Disk
Data Disk: Premium SSD, Premium SSD v2

Operating system
OS: Windows
Type: (OS Only)
License: ---

Region
Central US, East US, East US 2, North Central US, South Central US, West Central US

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5. L'OS de la machine doit être Windows:



Find the right VMs for your needs and budget

Find your VM > Workload type > Disk storage > Operating system > Region > Results page

Operating system and software

Select the operating system and software you want to run.

Operating system *	Microsoft software	License
☒ Windows	☒ (OS Only)	---
☐ Linux	☐ BizTalk	---
	☐ SQL Server	---

*To use a custom VM image, select Linux and then CentOS to see VM availability and pricing information.

[Back](#) [Next](#)

Your selections

20
Current eligible VMs

Workload type
High-performance computing (HPC) workloads

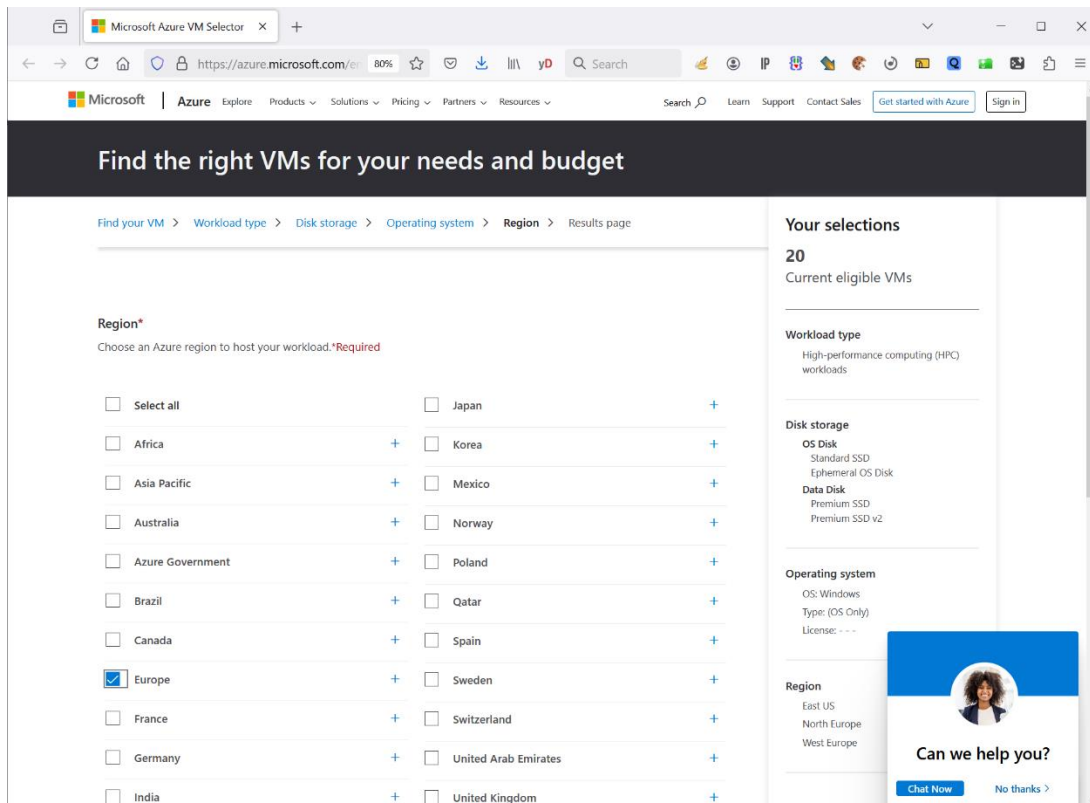
Disk storage
OS Disk: Standard SSD, Ephemeral OS Disk
Data Disk: Premium SSD, Premium SSD v2

Operating system
OS: Windows
Type: (OS Only)
License: ---

Region
East US

Can we help you?
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6. Nous voulons notre machine en Europe:



Find the right VMs for your needs and budget

Find your VM > Workload type > Disk storage > Operating system > Region > Results page

Region*

Choose an Azure region to host your workload.*Required

☐ Select all	☐ Japan
☐ Africa	☐ Korea
☐ Asia Pacific	☐ Mexico
☐ Australia	☐ Norway
☐ Azure Government	☐ Poland
☐ Brazil	☐ Qatar
☐ Canada	☐ Spain
☒ Europe	☐ Sweden
☐ France	☐ Switzerland
☐ Germany	☐ United Arab Emirates
☐ India	☐ United Kingdom

Your selections

20
Current eligible VMs

Workload type
High-performance computing (HPC) workloads

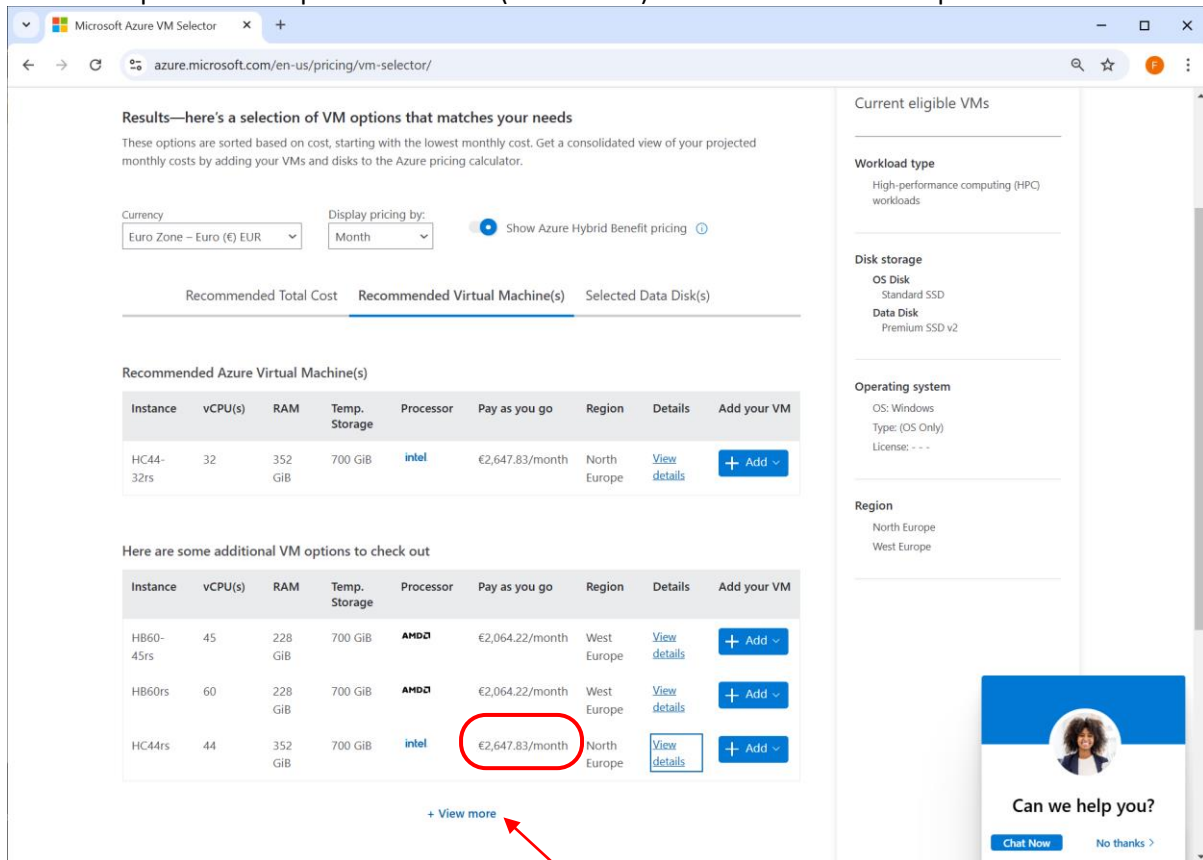
Disk storage
OS Disk: Standard SSD, Ephemeral OS Disk
Data Disk: Premium SSD, Premium SSD v2

Operating system
OS: Windows
Type: (OS Only)
License: ---

Region
East US
North Europe
West Europe

Can we help you?
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Nous arrivons finalement à une proposition du wizard de Azure pour une machine basée sur la série HC44rs. Le prix mensuel pour la machine (sans le SSD) est de 2647 €: voir la capture d'écran:



Results—here's a selection of VM options that matches your needs

These options are sorted based on cost, starting with the lowest monthly cost. Get a consolidated view of your projected monthly costs by adding your VMs and disks to the Azure pricing calculator.

Currency: Euro Zone – Euro (€) EUR | Display pricing by: Month | Show Azure Hybrid Benefit pricing

Recommended Total Cost | **Recommended Virtual Machine(s)** | Selected Data Disk(s)

Recommended Azure Virtual Machine(s)

Instance	vCPU(s)	RAM	Temp. Storage	Processor	Pay as you go	Region	Details	Add your VM
HC44rs	32	352 GiB	700 GiB	intel	€2,647.83/month	North Europe	View details	+ Add

Here are some additional VM options to check out

Instance	vCPU(s)	RAM	Temp. Storage	Processor	Pay as you go	Region	Details	Add your VM
HB60-45rs	45	228 GiB	700 GiB	AMD	€2,064.22/month	West Europe	View details	+ Add
HB60rs	60	228 GiB	700 GiB	AMD	€2,064.22/month	West Europe	View details	+ Add
HC44rs	44	352 GiB	700 GiB	intel	€2,647.83/month	North Europe	View details	+ Add

[+ View more](#)

Current eligible VMs

Workload type
High-performance computing (HPC) workloads

Disk storage
OS Disk: Standard SSD
Data Disk: Premium SSD v2

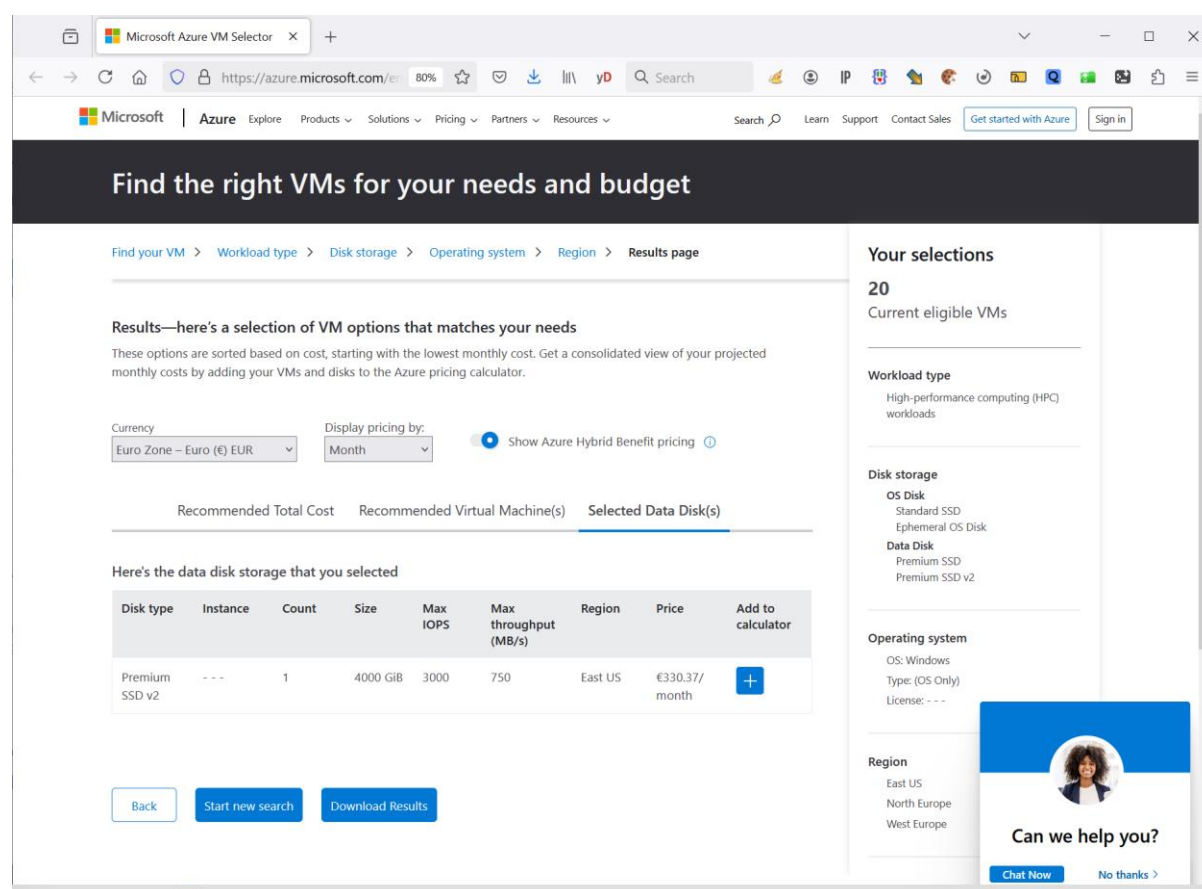
Operating system
OS: Windows
Type: (OS Only)
License: - - -

Region
North Europe
West Europe

Can we help you?
[Chat Now](#) [No thanks](#)

Nous avons essayé de faire beaucoup d'autres simulations pour obtenir d'autres types d'instances avec d'autres processeurs. En fait, si vous cliquez ici : [+ View more](#), vous pouvez voir d'autres machines avec de très mauvais CPU (AMD EPYC 7002 et 7003). La seule instance qui est légèrement meilleure que les autres est celle de la série HC44rs qui a un processeur Intel Xeon 8168 avec un score de performance de 2092 (vous pouvez voir les processeurs exacts en cliquant sur le bouton bleu « View details »).

En plus du coût de la machine, le coût mensuel du stockage SSD est d'environ 330 € :



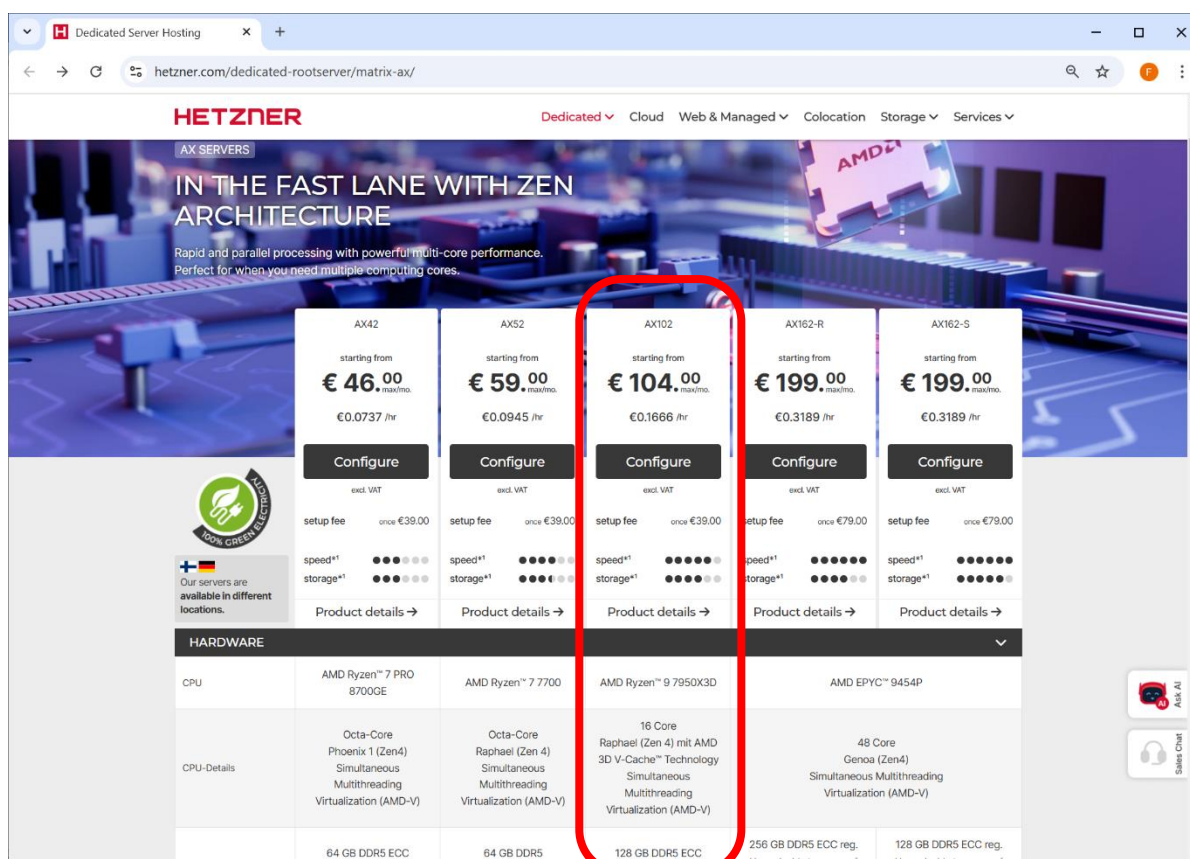
Ainsi, le coût mensuel total pour la meilleure machine Azure est de $2647 + 330 = 2977$ €/mois.

Comparons maintenant la machine la plus performante d'Azure à 2 machines disponibles sur Hetzner : AX102 et EX101. Etant donné que nous utilisons déjà la machine AX101 (une version plus ancienne de l'AX102), nous l'ajouterons également à la comparaison.

Voici un tableau avec les 3 processeurs de Hetzner :

Processor	Single Thread Rating	Clock Speed	URL
AX101 AMD Ryzen 9 5950X	3469	3.4	https://www.cpubenchmark.net/cpu.php?cpu=AMD+Ryzen+9+5950X&id=3862
AX102 AMD Ryzen 9 7950X3D	4150	4.2	https://www.cpubenchmark.net/cpu.php?id=5234&cpu=AMD+Ryzen+9+7950X3D
EX101 Intel Core i9-13900	4330	5	https://www.cpubenchmark.net/cpu.php?id=5176&cpu=Intel+Core+i9-13900

Voici les spécifications de l'AX102: <https://www.hetzner.com/dedicated-rootserver/matrix-ax/>



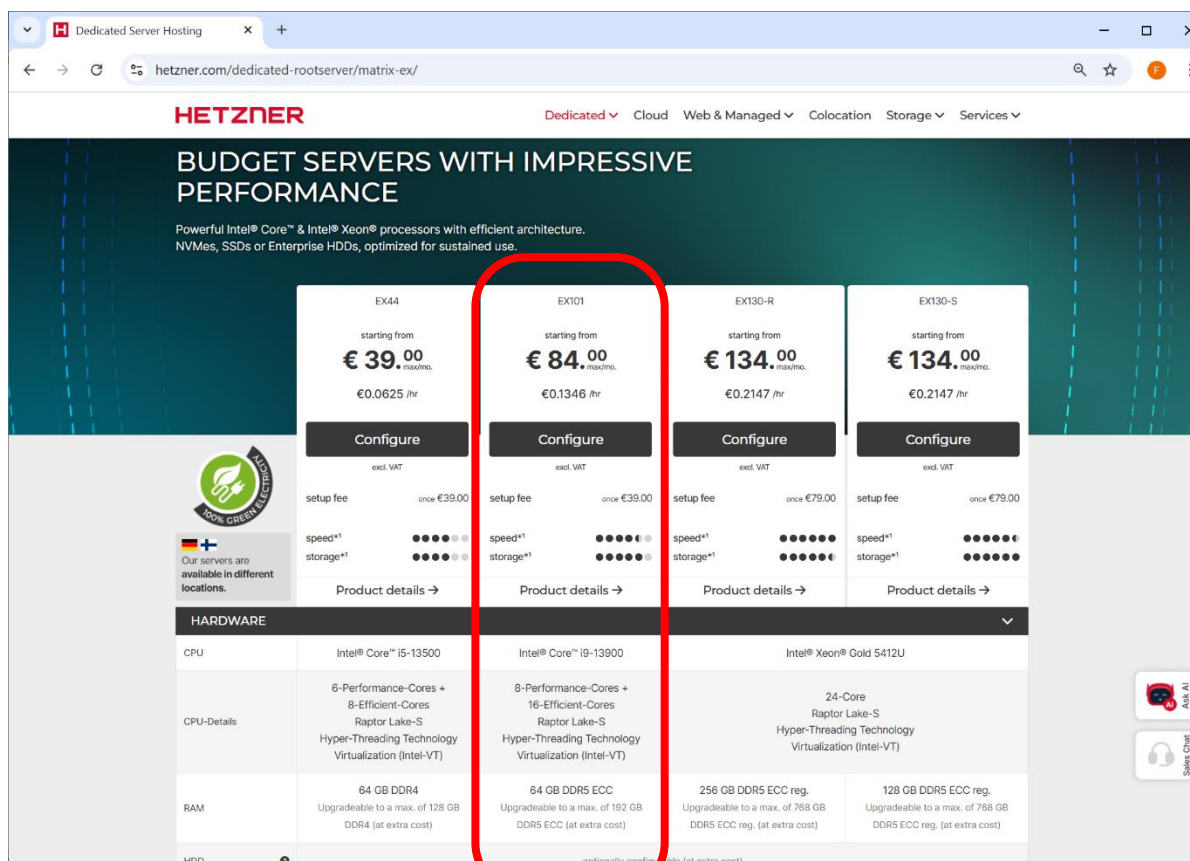
HETZNER Dedicated Cloud Web & Managed Colocation Storage Services

AX SERVERS

IN THE FAST LANE WITH ZEN ARCHITECTURE
Rapid and parallel processing with powerful multi-core performance. Perfect for when you need multiple computing cores.

Model	AX42	AX52	AX102	AX162-R	AX162-S
starting from	€ 46.00	€ 59.00	€ 104.00	€ 199.00	€ 199.00
per month	€0.0737 /hr	€0.0945 /hr	€0.1666 /hr	€0.3189 /hr	€0.3189 /hr
Setup fee	once €39.00	once €39.00	once €39.00	once €79.00	once €79.00
Speed	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
Storage	●●●●●	●●●●●	●●●●●	●●●●●	●●●●●
CPU	AMD Ryzen™ 7 PRO 8700GE	AMD Ryzen™ 7 7700	AMD Ryzen™ 9 7950X3D	AMD EPYC™ 9454P	AMD EPYC™ 9454P
CPU-Details	Octa-Core Phoenix 1 (Zen4) Simultaneous Multithreading Virtualization (AMD-V)	Octa-Core Raphael (Zen 4) Simultaneous Multithreading Virtualization (AMD-V)	16 Core Raphael (Zen 4) mit AMD 3D V-Cache™ Technology Simultaneous Multithreading Virtualization (AMD-V)	48 Core Genoa (Zen4) Simultaneous Multithreading Virtualization (AMD-V)	48 Core Genoa (Zen4) Simultaneous Multithreading Virtualization (AMD-V)
RAM	64 GB DDR5 ECC	64 GB DDR5	128 GB DDR5 ECC	256 GB DDR5 ECC reg. Upgradable to a max. of	128 GB DDR5 ECC reg. Upgradable to a max. of

Voici les spécifications de l'EX101: <https://www.hetzner.com/dedicated-rootserver/matrix-ex/>



HETZNER Dedicated Cloud Web & Managed Colocation Storage Services

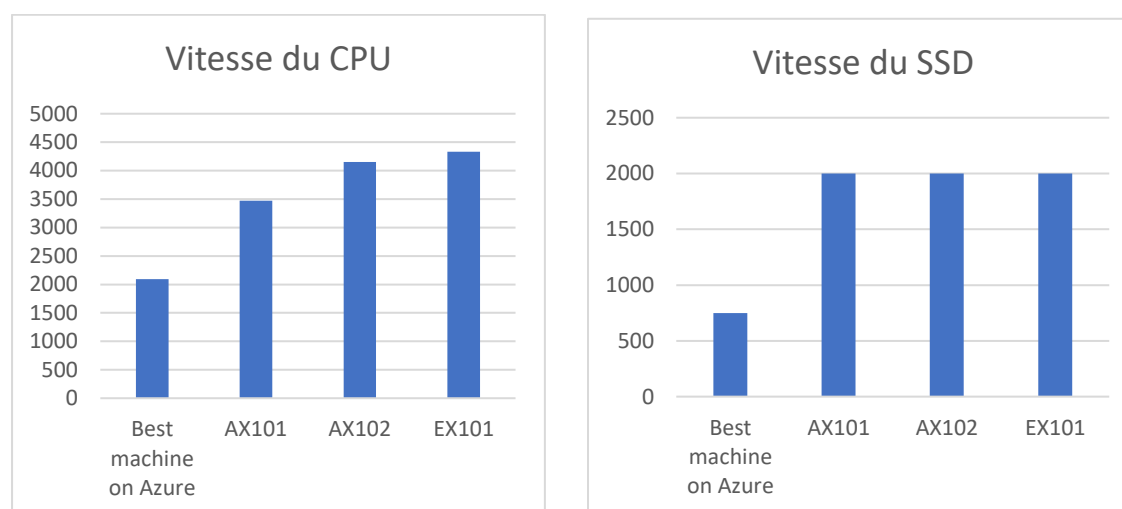
BUDGET SERVERS WITH IMPRESSIVE PERFORMANCE
Powerful Intel® Core™ & Intel® Xeon® processors with efficient architecture. NVMe, SSDs or Enterprise HDDs, optimized for sustained use.

Model	EX44	EX101	EX130-R	EX130-S
starting from	€ 39.00	€ 84.00	€ 134.00	€ 134.00
per month	€0.0625 /hr	€0.1346 /hr	€0.2147 /hr	€0.2147 /hr
Setup fee	once €39.00	once €39.00	once €79.00	once €79.00
Speed	●●●●●	●●●●●	●●●●●	●●●●●
Storage	●●●●●	●●●●●	●●●●●	●●●●●
CPU	Intel® Core™ i5-13500	Intel® Core™ i9-13900	Intel® Xeon® Gold 5412U	Intel® Xeon® Gold 5412U
CPU-Details	6-Performance-Cores + 8-Efficient-Cores Raptor Lake-S Hyper-Threading Technology Virtualization (Intel-VT)	8-Performance-Cores + 16-Efficient-Cores Raptor Lake-S Hyper-Threading Technology Virtualization (Intel-VT)	24-Core Raptor Lake-S Hyper-Threading Technology Virtualization (Intel-VT)	24-Core Raptor Lake-S Hyper-Threading Technology Virtualization (Intel-VT)
RAM	64 GB DDR4 Upgradable to a max. of 128 GB DDR4 (at extra cost)	64 GB DDR5 ECC Upgradable to a max. of 192 GB DDR5 ECC (at extra cost)	256 GB DDR5 ECC reg. Upgradable to a max. of 768 GB DDR5 ECC reg. (at extra cost)	128 GB DDR5 ECC reg. Upgradable to a max. of 768 GB DDR5 ECC reg. (at extra cost)
HDD		optionally configurable (at extra cost)		

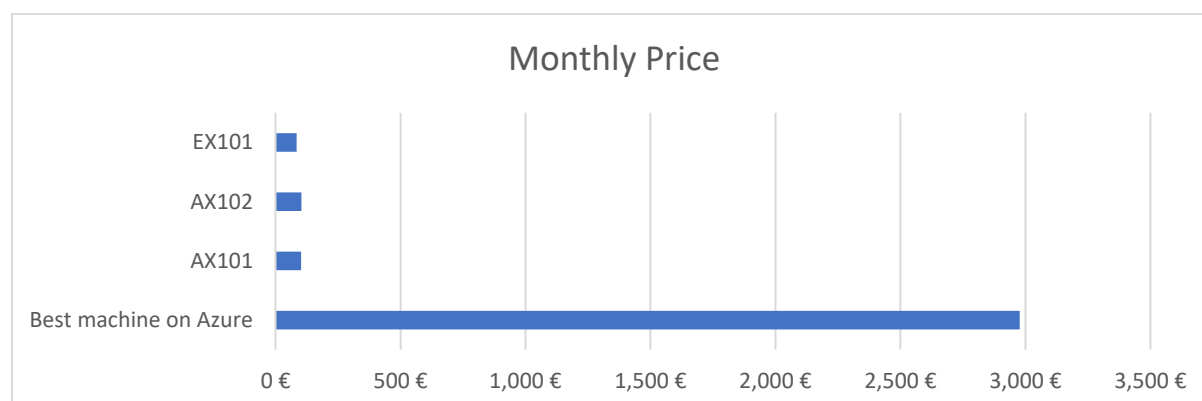
Voici le tableau comparatif final entre Hetzner et Azure:

	Best machine on Azure	AX101	AX102	EX101
CPU name	AMD EPYC 7551	AMD Ryzen 9 5950X	AMD Ryzen 9 7950X3D	Intel Core i9-13900
CPU Speed	2092	3469	4150	4330
RAM	200 GB	128 GB	128 GB	64 GB
Storage capacity	4 TB	4 TB	4 TB	4 TB
Storage Speed	750 MB/sec	2000 MB/sec	2000 MB/sec	2000 MB/sec
Monthly Price	2977 €	102 €	104 €	84 €

Graphiquement:



Prix mensuel:



Nous recommandons d'utiliser le serveur EX101 sur Hetzner car il est:

- 35.4 fois moins cher que le Meilleur serveur disponible sur Azure
- 2.07 fois plus rapide en termes de CPU que le Meilleur serveur disponible sur Azure
- 2.66 fois plus rapide en termes de vitesse d'accès au stockage (pour lire & écrire sur des SSD) que le Meilleur serveur disponible sur Azure
- De plus, le serveur TIMi/Hetzner dispose bien sûr de suffisamment de RAM pour résoudre tout problème data avec TIMi.