



KRATOS
READY FOR WHAT'S NEXT™

Microsoft Licensing

Windows Server Licensing

Basic Concepts:

- When you buy Windows Server licenses, you buy them by core. The minimum number of cores to license is: 8 cores per CPU and 16 cores per server
  - For example: If your machine has 1 CPU with 4 cores –> You still need to buy a 16-core license
- If you want to run a Windows VM –> You need to license **ALL** the available physical cores on the Hypervisor. Even if you VM is not using all of them
  - For example: if you have an Hypervisor with 64 cores (physical cores) and you are running a Windows Server VM with 8 cores –> You need to buy a license for all the 64 core

Windows Server Licensing

Basic Concepts:

- If you have a cluster with serveral hypervisors and you have a Windows VM on any of them –> You need to license all the cores on all the hypervisors on the cluster
  - For example: if you have a cluster with 4 Hypervisors with 64 cores each and you have 1 Windows Server VM on one of the hypervisors –> You need to buy 4 x 64 core Windows Server licenses.

Windows Server Licensing

Basic Concepts:

- The licenses are bough on 2 cores or 16 cores packages, but we need at least one 16 cores Licence per set of 2 VM (for Standard Edition) or one 16 cores licence per VM Host (for Datacenter Edition).
  - For example: If your server has 28 cores, either you buy [(16x1) + (2x6)] core licenses or 2x16 core license and don’t use 4 of them.

Windows Server Licensing

Type of Windows Server licenses:

	Standard	Datacenter
Use case	Mostly used for Physical server without VMs	Used to license the Hypervisor
License core + CAL	At least 8 cores per CPU and 16 cores per server CAL licenses must be purchased in addition to Windows licenses	At least 8 cores per CPU and 16 cores per server No need to purchase CAL licenses
VMs	You can only run up to 2 VMs in the same Hypervisor with this license	Unlimited number of VMs on the Hypervisor
Cluster	You need to license all the Hypervisors on the cluster	You need to license all the Hypervisors on the cluster

Windows Server Licensing

Software Assurance:

- The Software Assurance license allows Windows Server version upgrades.
- If Software Assurance has not been purchased with the Windows Server licenses, the moment we want to upgrade Windows Server, all licenses must be purchased again. Same applies to the CAL licenses. If Software Assurance has not been purchased, all CAL licenses must be purchased again.
- If Windows Server is purchased on Open Value licensing mode, Software Assurance is included.

Windows Server Licensing

Buying the Licenses:

- The Open Value licenses **have to be purchased** on the region the system will be delivered. This means a company on the region must purchase on that region. Kratos France can’t purchase a license in Japan (Kratos Japan needs to do it)
- Regions: https://www.microsoft.com/en-us/licensing/licensing-programs/open-regional

Windows Server Licensing

Real Life example 1 (MIC):

Cluster Name	Physical Host	Number of CPUs	Total CPU cores in Server	VM Name	VM CPU Cores
CLUSTER 1	Server1	2	64	VM1	8
				VM2	24
	Server2	2	64	VM3	8
				VM4	16
				VM5	8
	Server3	2	64	VM6	8
				VM7	8

Windows Server Licensing

If we use Windows Server Standard licensing

- There are 7 VMs in total on the cluster
- There is no technical reason why all the 7 VMs could not run on the same physical server
- Each Windows Server Standard license allows to run up to 2 VMs in the same server, this means for 7 VMs we need to buy 4 licenses (and we would have 1 spare for an extra VM if needed)
- Each physical server has 64 CPU cores, and we need to license all of them (even if the VM is not using all of them)

This means: 4 Windows Server Standard licenses x 64 cores x 3 servers on the cluster = **768 Windows Server Standard licenses**

Windows Server Licensing

If we use Windows Server Datacenter licensing

- There are 7 VMs in total on the cluster, but we don't care because Windows Server Datacenter allows unlimited VMs
- Each physical server has 64 CPU cores, and we need to license all of them (even if the VM is not using all of them)

This means: 64 cores x 3 servers on the cluster = **256 Windows Server Datacenter licenses**

Windows Server Licensing

Real Life example 2 (CRA):

Cluster Name	Physical Host	Number of CPUs	Total CPU cores in Server	VM Name	VM CPU Cores
CLUSTER 1	Server1	2	32	VM1	8
	Server2	2	32		
	Server3	2	32	VM2	8
				VM3	8
	Server4	2	24	VM4	10
				VM5	6
	Server5	2	24	VM6	8
				VM7	8
	Server6	2	24	VM8	8
				VM9	8
	Server7	2	36	VM10	16
				VM11	8
				VM12	8
	Server8	2	64	VM13	32
	Server9	2	32	VM14	12
				VM15	12

Windows Server Licensing

If we use Windows Server Standard licensing

- There are 15 VMs in total on the cluster
- There is no technical reason why all the 15 VMs could not run on the same physical server
- Each Windows Server Standard license allows to run up to 2 VMs in the same server, this means for 15 servers we need to buy 8 licenses (and we would have 1 spare for an extra VM if needed)
- We need to calculate the number of licenses needed to run all the VMs in each server
- In this case we have 4 servers with 32 cores, 3 servers with 24 cores, 1 server with 36 cores and 1 server with 64 cores:

This means: 8 License Windows Server Standard (for 15 VMs) x 4 servers x 32 cores + 8 License Windows Server Standard (for 15 VMs) x 3 servers x 24 cores + 8 License Windows Server Standard (for 15 VMs) x 1 servers x 36 cores + 8 License Windows Server Standard (for 15 VMs) x 1 servers x 64 cores = **2400 cores Windows Server Standard**

Windows Server Licensing

If we use Windows Server Datacenter licensing

- There are 15 VMs in total on the cluster, but we don't care because Windows Server Datacenter allows unlimited VMs
- In this case we have 4 servers with 32 cores, 3 servers with 24 cores, 1 server with 36 cores and 1 server with 64 cores:

This means: 4 servers x 32 cores + 3 servers x 24 cores + 1 servers x 36 cores 1 servers x 64 cores = **300 cores Windows Server Datacenter**

Windows Server CAL Licensing

Basic Concepts:

- Once the Windows Server licenses are purchased, you still need to buy CAL licenses
- If you want to Remote Desktop to the Windows Server you need to buy RDS CAL licenses

Windows Server CAL Licensing

Basic Concepts:

- The CAL can be bough in User or Device mode:
  - User CAL: You need to have 1 user CAL for each **physical person** using the system (not user accounts)
  - Device CAL: You need to have 1 device CAL for each machine accessing the system, it doesn't matter how many users share the machine.
- On our case as we don't know the number of physical people operating the system, it's much easier to buy device CALs. This means having 1 Device CAL for each access point to a Windows VM

Windows Server CAL Licensing

Basic Concepts:

- You only need to pay for a CAL once. What this means is:
  - If you have 1 workstations accessing several Windows VM, you only need to buy 1 Device CAL.
- Any type of CAL license (user/device) can be reattributed every 90 days.

Windows Server CAL Licensing

Basic Concepts (RDS CAL):

- By default, when a Windows server license is purchased 2 RDS CAL licenses are included for administrator management. We can assume we keep both these licenses for Kratos support connections.
- This means that for each machine that can RDP to your Windows server, you need to buy 1 RDS CAL Device license. As stated before, you only need to license these once (even if they access several Windows Server machines)

MSQL Licensing

Basic Concepts:

- It’s possible to buy the Microsoft SQL license in 2 formats:
- **Standard Core** Model: it’s bought per core. For Microsoft SQL you need to license the number of cores on your VM (not in the physical machine running the VM).
  - For example: If your physical server has 64 cores and your VM running MSQL has 16 cores –> You need to buy a license for 16 cores.
  - When buying per core licenses, the minimum number of cores to license is 4 (even if your machine/VM has less cores).
  - The per core licenses are sold on packages of 2 cores.
  - Standard Core doesn’t need any extra CAL license

MSQL Licensing

Basic Concepts:

- **Standard Server**: it's bough per server (doesn't matter the number of cores in the server/VM).
  - In this mode it's mandatory to buy CAL licenses. Client access licenses (CALs) are required for every user or device accessing a server in the Server
- On our case, only Standard Server Licensing model is applicable, because the Standard Core Licensing model starts being cheaper only when you have hundreds of CAL licenses to buy for the Standard one.
- If the Hypervisor running your Microsoft SQL VM is part of a cluster –> You need to buy the **Software Assurance** license for your VM.

MSQL Licensing

License Types:

Enterprise	Standard	Express	Developper	Web
Licensing per core	Licensing per core	Free license	Free license	Service Provider License Agreement (SPLA)
	Server + CAL license needed			
High Performance use case	Medium size application use	Small applications	Non production use case	Publicly accessible web page
Strategic Functions		Up to 10GB Database	Non production use case	

MSQL Licensing

Software Assurance:

- The Software Assurance license allows Microsoft SQL version upgrades.
- It is also **mandatory** to purchase this license if the VM running Microsoft SQL is part of a cluster.
- If Software Assurance has not been purchased with the Microsoft SQL licenses, the moment we want to upgrade Microsoft SQL, all licenses must be purchased again. Same applies to the CAL licenses. If Software Assurance has not been purchased, all CAL licenses must be purchased again.
- If Microsoft SQL is purchased on Open Value licensing mode, Software Assurance is included.

MSQL Licensing

Buying the Licenses:

- The Open Value licenses **have to be purchased** on the region the system will be delivered. This means a company on the region must purchase on that region. Kratos France can’t purchase a license in Japan (Kratos Japan needs to do it)
- Regions: https://www.microsoft.com/en-us/licensing/licensing-programs/open-regional

MSQL CAL Licensing

Basic Concepts:

- If the Standard Core license has been purchased, you **don’t** need to buy CAL licenses
- The CAL can be bough in User or Device mode:
  - User CAL: You need to have 1 user CAL for each **physical person** using the system (not user accounts)
  - Device CAL: You need to have 1 device CAL for each machine accessing the system, it doesn’t matter how many users share the machine.
- On our case as we don’t know the number of physical people operating the system, it’s much easier to buy device CALs. This means having 1 Device CAL for each access point to the database.

MSQL CAL Licensing

Basic Concepts:

- There are 2 types or connections to the MSQL database:
  - Direct connections: These are the direct connections to the MSQL database.
  - Indirect connections: These are the clients running a software that will exploit the MSQL database in any way.
- You only need to pay for a CAL once. What this means is:
  - If you have 1 workstations accessing several MSQL servers, you only need to buy 1 Device CAL.

MSQL CAL Licensing

Example: 1 LNS + 1 CDS System

- Direct connections:
  - Monics LNS to MSQL
  - CDS replication
- Indirect connections:
  - Each workstation using the Monics client.