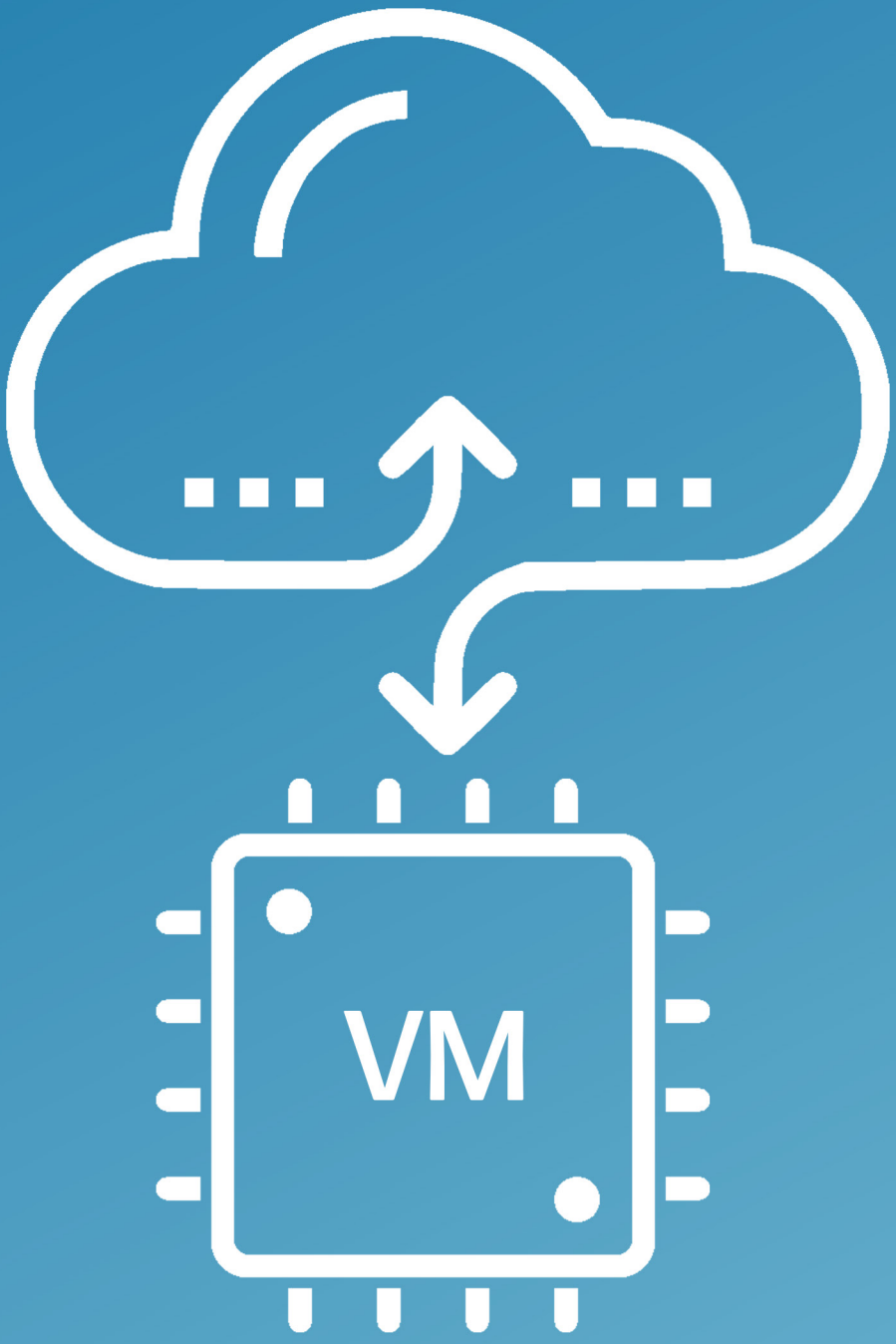
Licensing your VMs in Windows Server 2019



MetrixData 360

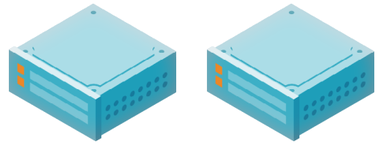
Windows Server Licensing Rules

Before We Start:

Before diving into the following Windows Server Licensing scenarios, it's crucial to understand Microsoft's rules for licensing their server products compliantly. In this PDF, we are examining the licensing rules for Windows Server 2019 and the occaisional Datacenter edition. Below is a handy outline regarding the guidlines you must follow when licensing these products for your organization.
If you have any questions, feel free to reach out at info@metrixdata360.com.

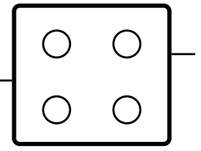
Licensing VMs:

For every 2 VMs, you must have a minumum of 16 core licenses (8 x 2-core license packs) on your Windows Server.



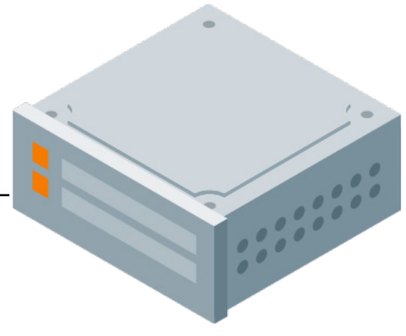
Licensing Processors

At a minimum, Microsoft requires each **processor** in a server to be licensed with atleast 16 core licenses (8 x 2-packs). **Even if there are less than 8 cores in a processor, you still will be held to follow the minimum core licensing requirment.**



Licensing the Host Server:

Each **server** itself is required to have a minimum of 16 core licenses (8 x 2-packs) to be compliant regardless if it's running on less than 16 cores.



Windows Server 2019 Standard Edition

VM Scenario 1.

The Scenario:

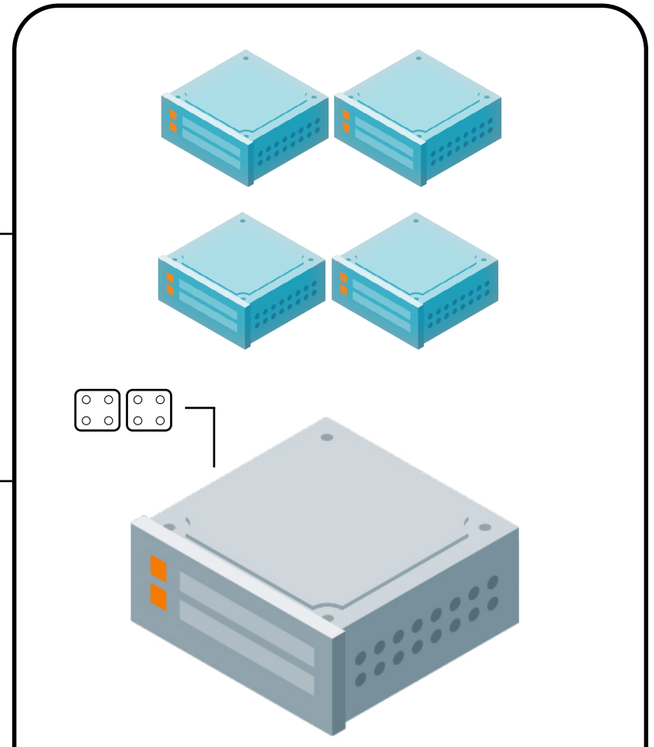
- Your boss needs 4 VMs for the development team to test out their new software. How many licenses do you need to buy to be fully compliant in this scenario?

VMs:

- 4 VMs

Host Server:

- Windows Server 2019 Standard Edition
- 2 x 4-Core CPUs
- 8 Cores total



Licenses Needed:

In this scenario, you may think you'll only need to buy 16 licenses (8 x 2-core packs) to compliantly run Windows Server on this configuration. However, since you need 4 VMs, you'll have to stack licenses twice to legally access those 4 VMs. This means you'll be required to use purchase a total of 32 core licenses (16 x 2-core packs) to be compliant.

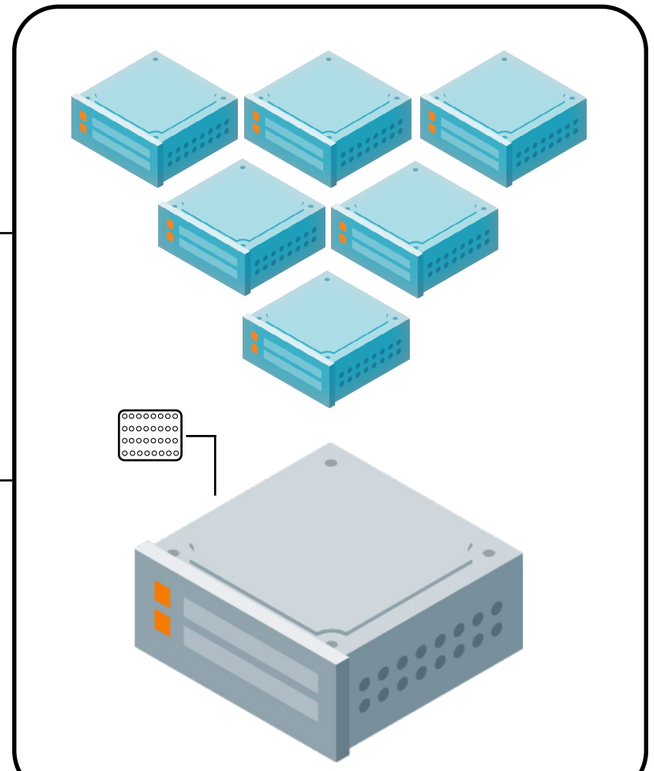
Explanation:

This boils down to you requiring a minimum of 16 cores, however since in this case there are an additional 2 VMs, you'll be required to stack an additional license to cover that extra VM requirement.

VM Scenario 2.

The Scenario:

- You need to set up an email server, database server and web server but only have one physical server to work with. You want to virtualize, however you are not sure how many licenses you need for 6 VMs.



VMs:

- 6 VMs

Host Server:

- Windows Server 2019 Standard Edition
- 1 x 32-Core Processor

Licenses Needed:

In this scenario, you would need to buy 48 2-core license packs (96 core licenses in total) to compliantly run and access 6 VMs on this setup.

Explanation:

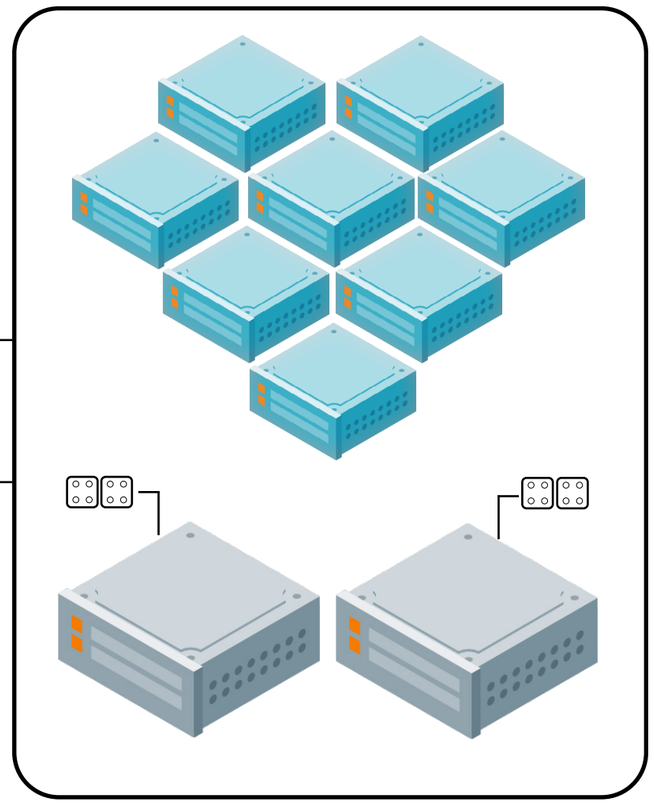
This server has a large number of cores which makes it pricier to license but comes with added performance. At a minimum the 32 cores licenses would cover 2 VMs and since, you'll require 6 VMs, you will have to stack your windows server licenses to cover the remaining VMs.
This means it requires 48 2-core license packs, which brings us to 96 licenses in total.

Since Standard Edition only allows for 2 vOSE (Virtual Operating System Environments) you would have to re-purchase it 3 times to be fully compliant running 6 VMs on this processor.

VM Scenario 3.

The Scenario:

- Your boss needs 8 VMs to support your organization's new SaaS app. To ensure redundancy in a disaster situation they want 4 VMs attatched to each physical server that are clustered together. VMotion is turned on and there is VM movement between hosts. How should you license this scenario?



VMs:

- 8 VMs

Host Servers:

- Windows Server 2019 Standard Edition
- 2 x Physical Server
- Each has 2 processors x 4-Cores each
- 8 cores per server

Licenses Needed:

For this scenario you would be legally required to purchase 32 x 2-core packs for each server bringing you to a total of 128 core licenses for both servers.

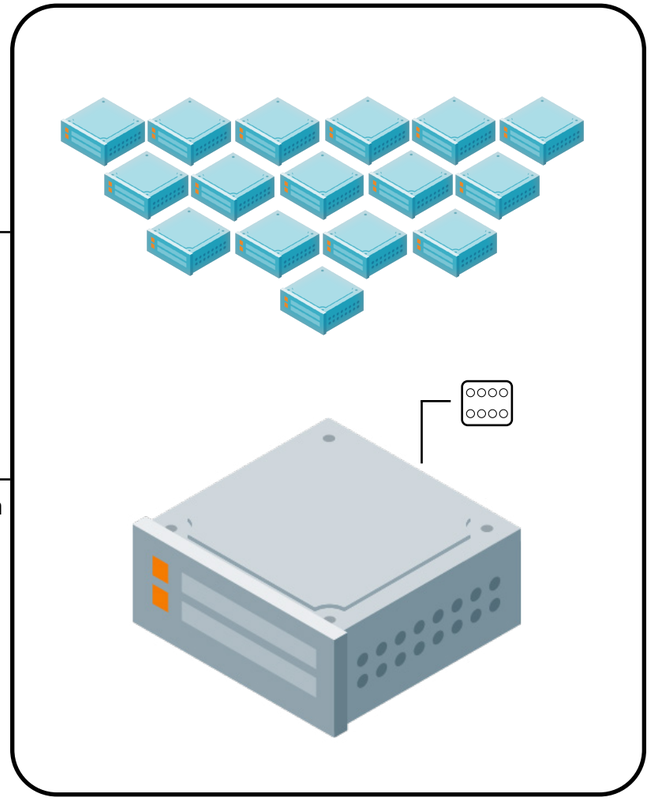
Explanation:

Since this is a cluster environment with **VM movement**, we must license to account for the worst case scenario. To do this, we must license each host to handle the maximum number of VMs that would move over to one server incase the other server fails. In this case, since we are required to run 8 VMs, we would need to stack licenses on each server 4 times with Windows Server Standard. This would bring us to 64 x 2-core packs or 128 core licenses for both servers in total and would also grant us access to all 8 VMs in case of a failure.

VM Scenario 4.

The Scenario:

- You're starting a pen-testing agency and you need 16 VMs for your employees to use. You're looking for the most cost effective way to license your heavy VM usage.



VMs:

- 16 VMs

Host Server:

- Windows Server 2019 Datacenter Edition
- 1 x 8-Core CPU

Licenses Needed:

In this scenario, you would need to purchase 8 Datacenter 2-core license packs to compliantly run 16 VMs on this server. This accounts for Microsoft's minimum of all physical cores being licensed and having at least 16 core-based licenses per server.

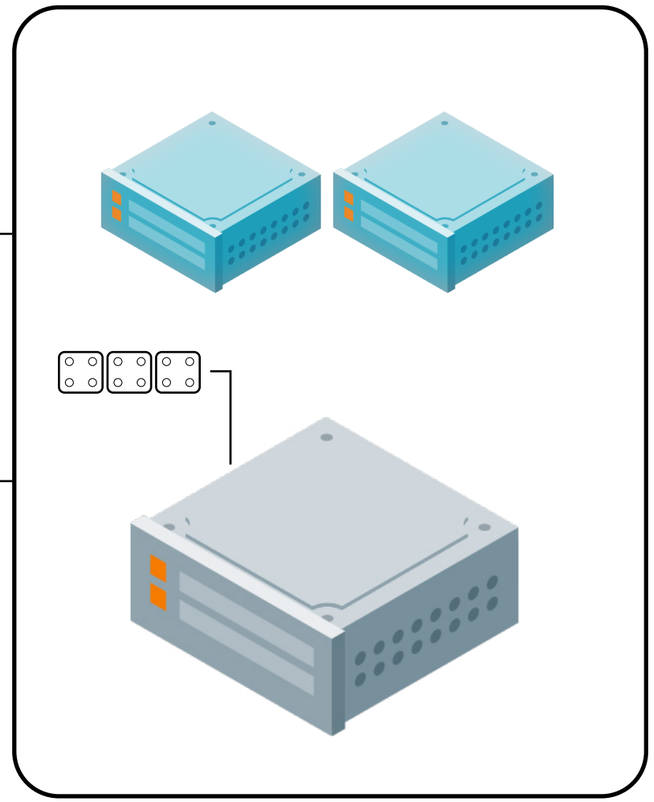
Explanation:

When you require a lot of virtual machines, continually stacking Windows Server Standard licenses becomes an increasingly worsening financial investment. In a scenario like this, biting the bullet and buying the pricier Datacenter edition would be cheaper than license stacking as Datacenter comes with unlimited VM capabilities. It is often said that the price breakpoint between when it becomes cheaper to buy Datacenter vs Standard is after purchasing 5 Standard editions. However, this may not be possible in all situations.

VM Scenario 5.

The Scenario:

- You need to spin up 2 VMs to test out some programs in a Linux operating environment from your main Windows machine. You are looking for a way to to do this without breaking compliance.



VMs:

- 2 VMs

Host Server:

- Windows Server 2019 Standard Edition
- 3 x 4-Core Processors

Remember the Minimums:

- 8 core licenses per processor
- 16 core licenses per physical server

Licenses Needed:

In this situation you would need to buy 16 x 2-core packs (32 core licenses) to be compliant running this setup on Windows Server Standard.

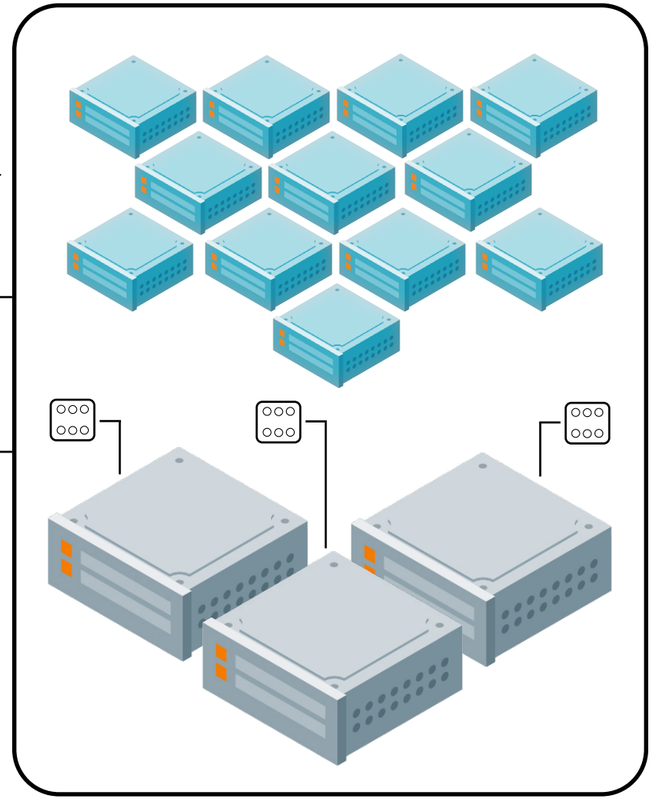
Explanation:

The trick with multi-processor servers is making sure you have accounted for the licensing minimums on **every processor**. In this case, we have 3 quad-core processors that each require a minimum of 8 core licenses each to be within Microsoft's licensing minimums. However, an even 16 licenses would cover only the two processors **and** the physical server minimums required by Microsoft. To be fully compliant in this situation you would have to purchasing another 16 licenses to cover the last remaining processor as well. At this point, you would also have the right to add an additional 2 VMs.

VM Scenario 6.1 (VM's Move Between Hosts)

The Scenario:

- You're in charge of setting up a server cluster to take care of all the patient records at your hospital's corporate office. You have 3 servers and are required to run 4 VMs on each them. In the event of the failure of the other 2 servers, these VMs can move from one server to another (VMotion is turned on).



VMs:

- 12 VMs

Host Servers:

- 3 x Servers
- Each server has 1 x 6-core processor

Remember the Minimums:

- 8 core licenses per processor
- 16 core licenses per physical server

Licenses Needed:

In this situation you would need to buy 288 licenses or 144 x 2-core packs of licenses to be compliant.

Explanation:

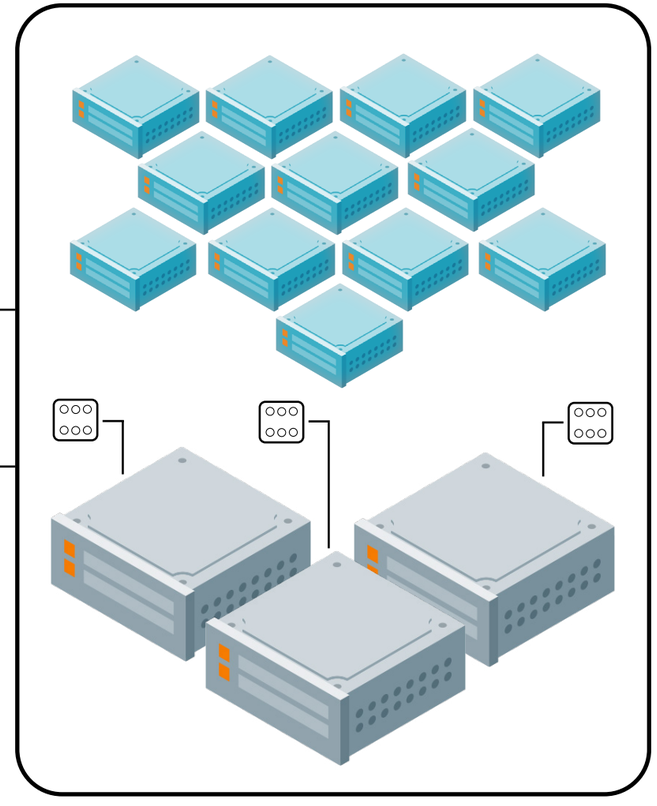
The tricky part when working with a cluster is to ensure each server is licensed fully for the maximum amount of VMs that could fall upon it incase of a server failure. In this case, you would be required to license each server with 96 cores (48 x 2-core packs) to compliantly operate all 12 VMs on one incase of a failure. To do that, you'll have to stack your Windows Server licenses on each server. In this case you would stack them 6 times, which would give you to a total license count of 288 core licenses or 144 x 2-core packs and access to 12 VMs on each server.

At this point, it could be more cost effective to purchase three Windows Server Datacenter editions.

VM Scenario 6.2 (No VM Movement)

The Scenario:

- You're in charge of setting up that same server cluster to handle all of the patient records at your hospital's corporate office. You have 3 servers and are required to run 4 VMs on each them. However, the IT Admin made sure these VM's can't move to different servers.



VMs:

- 12 VMs

Host Servers:

- 3 x Servers
- Each server has 1 x 6-core processor
- 4 VMs per Server

Remember the Minimums:

- 8 core licenses per processor
- 16 core licenses per physical server

Licenses Needed:

In this situation you would need to buy 96 licenses or 48 x 2-core packs of licenses to be compliant.

Explanation:

Now that there is no VM movement, you only have to ensure your server has the minimum amount of licenses required to be compliant to host 4 VMs. That means you would only be required to stack your licensing **twice** for each server to grant you access to those 4 VMs. Since each server would require 16 cores to be compliant at minimum, we would multiply this by 2 to cover the VMs, then, you would multiply that by 3 to account for the rest of your servers in this situation. Bringing you to a total of 96 licenses or 48 x 2-core packs to be compliant in this non-movement VM scenario.
(There is no failover redundancy in this scenario).