

Virtualization Concepts

What virtual machines are, why companies use them, and the terms you must know.

01 What it is

Virtualization lets one physical computer, called the host, run several isolated virtual computers, called virtual machines or VMs. Each VM has its own virtual CPU, memory, disk and network card, and runs its own operating system.

02 Why it matters in a UAE IT job

Most UAE companies run servers as VMs on Hyper-V, VMware or cloud platforms. Virtualization saves hardware, power and space, and makes backup, testing and recovery faster.

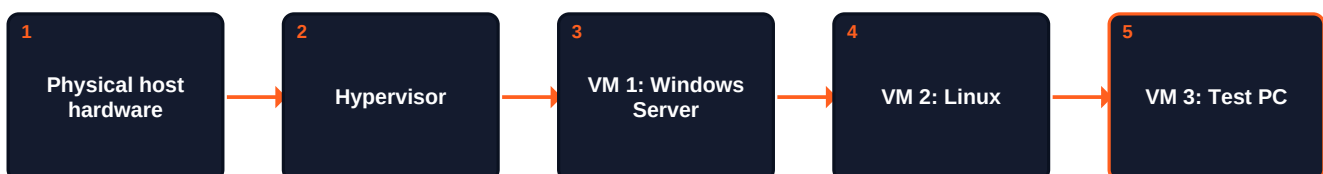
Almost every infrastructure job description mentions it, so you need the vocabulary on day one.

03 Key terms

Term	Meaning
Host	The physical machine that runs the hypervisor.
Guest	A virtual machine running on the host.
Hypervisor	Software that creates and manages virtual machines.
vCPU / vRAM	Virtual processors and memory assigned to a VM from the host's resources.
Snapshot / checkpoint	A saved point-in-time state of a VM that you can return to.
Virtual disk	A file on the host that appears as a disk inside the VM, such as VHDX or VMDK.
Overcommit	Assigning more virtual resources in total than the host physically has, relying on VMs not all peaking together.

04 How it works

The hypervisor sits between hardware and virtual machines. It divides CPU time, memory, storage and network access among the guests and keeps them isolated, so a crash in one VM does not take down the others. Guests see standard virtual hardware, so a VM can often be moved from one host to another.



One host, many isolated guests.

05 Hands-on lab

Goal: see virtualization in action on your own PC. Use Hyper-V (Windows Pro) or VMware Workstation Player with any free evaluation ISO. Use only fictional names.

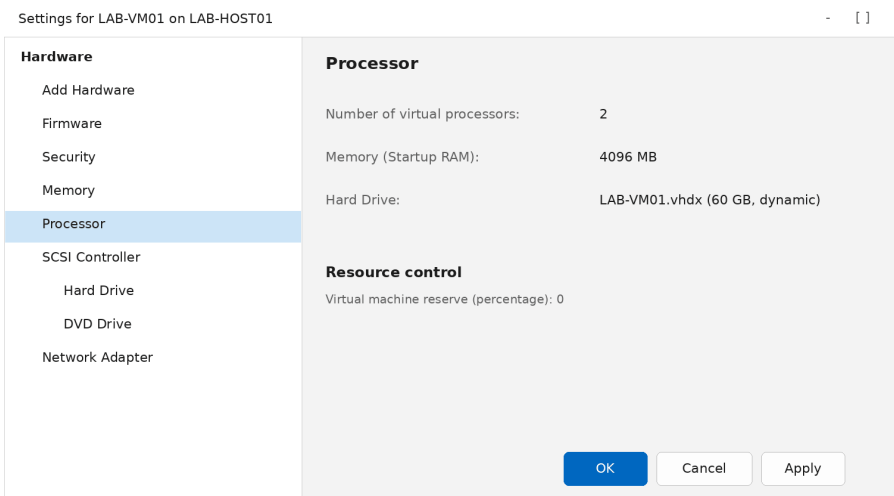
Step 1. Check that your CPU supports virtualization and it is enabled.

```
systeminfo | findstr /i "Hyper-V"
```

```
Administrator: Windows PowerShell
PS C:\Users\LabAdmin> systeminfo | findstr /i "Hyper-V"
Hyper-V Requirements:      A hypervisor has been detected. Features required for Hyper-V will not be displayed.
PS C:\Users\LabAdmin> _
```

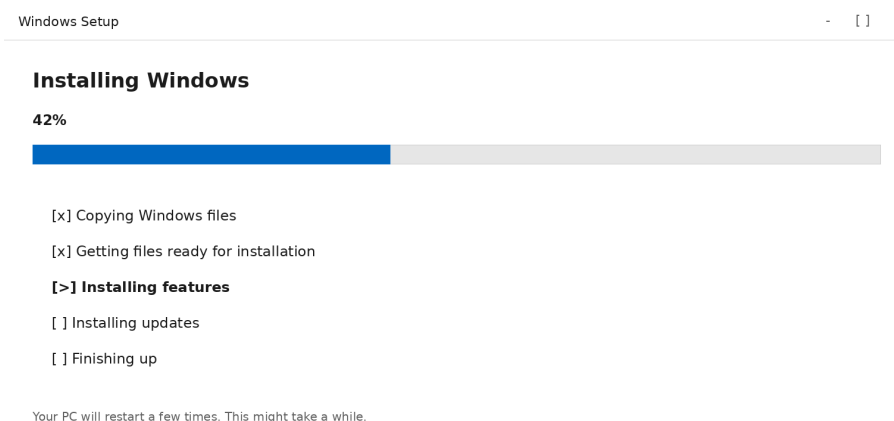
Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 2. Create a new VM named LAB-VM01 with 2 vCPUs, 4 GB RAM and a 60 GB disk.



Illustrative mockup of this screen (fictional names). Your screen may look slightly different.

Step 3. Attach an evaluation ISO and install the operating system.



Illustrative mockup of this screen (fictional names). Your screen may look slightly different.

Step 4. Inside the VM, check the CPU and memory that the guest sees.

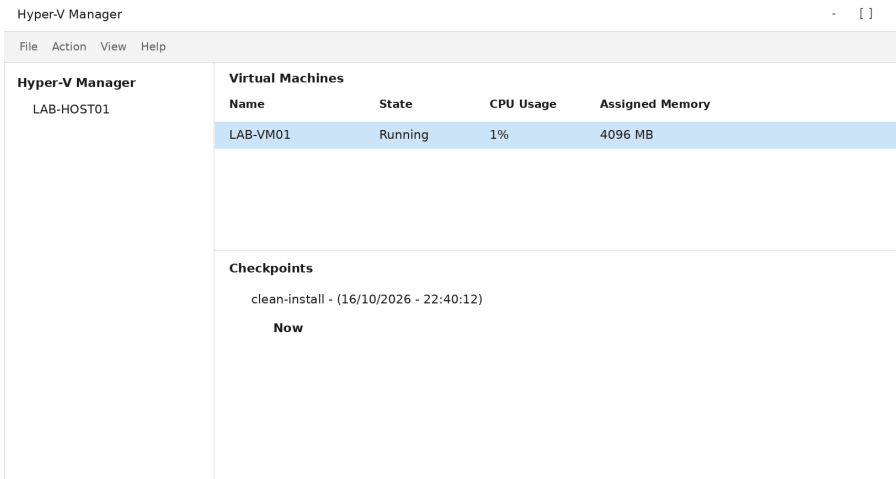
```
Get-ComputerInfo | Select CsProcessors, CsTotalPhysicalMemory
```

```
Administrator: Windows PowerShell

PS C:\Users\LabAdmin> Get-ComputerInfo | Select CsProcessors, CsTotalPhysicalMemory
CsProcessors                                CsTotalPhysicalMemory
-----
{Intel(R) Core(TM) i7-1185G7 @ 3.00GHz}      4294406144
PS C:\Users\LabAdmin> _
```

Example output from the fictional lab (names and IPs are made up). Yours should look similar.

Step 5. Take a checkpoint called clean-install, create a file, then restore the checkpoint and confirm the file is gone.



Illustrative mockup of this screen (fictional names). Your screen may look slightly different.

Step 6. Write three advantages and two risks of virtualization in your own words.

- Write them in your own words, not copied from this guide.
- Give one real-world example for each advantage, such as a quick test machine.
- For each risk, add one way to reduce it.

06 Common mistakes

- Giving a VM too many vCPUs, which can slow it down and other VMs too.
- Treating checkpoints as backups. They are not.
- Overcommitting memory without monitoring.
- Forgetting that one host failure takes down every VM on it unless there is high availability.
- Leaving old VMs powered on and unpatched.

07 Five interview questions

1. What is virtualization?

Running multiple isolated virtual machines on one physical host through a hypervisor, sharing the host's CPU, memory, storage and network.

2. What are three benefits?

Better hardware use, easier backup and recovery, and quick creation of test environments.

3. What is the difference between a host and a guest?

The host is the physical server running the hypervisor. A guest is a virtual machine running on it.

4. Is a checkpoint a backup?

No. It lives on the same storage as the VM and is meant for short-term rollback, not for recovery from disk failure.

5. What is overcommitment?

Allocating more virtual CPU or memory in total than the host physically has, which works only if the VMs do not all demand it at once.

08 Check yourself

1. What runs virtual machines?

- a) A router
- b) A hypervisor
- c) A printer

2. The physical machine is called the?

- a) Guest
- b) Client
- c) Host

3. Is a checkpoint a backup?

- a) No
- b) Yes
- c) Only on Linux

4. A VHDX is?

- a) A monitor
- b) A cable
- c) A virtual disk file

5. One risk of virtualization?

- a) VMs cannot be copied
- b) Host failure affects all VMs
- c) No isolation

Answer key: 1-b, 2-c, 3-a, 4-c, 5-b

Take the full free skill quiz at uaeitguy.com/quiz. Next lesson: Type 1 vs Type 2 hypervisors.