



VIR1

- CPNV – ES
- Software development orientation
- 4th quarter - 2022-2023



➤ Glassey Nicolas

What is Virtualization ?

What is Virtualization ?

Create a **software-based**-or **virtual-representation** of applications, servers, storage and network to reduce IT expenses while boosting efficiency and agility.



What is Virtualization ?

- Virtual software **mimics** the functions of physical hardware to run **multiple virtual machines simultaneously on a single physical machine**.
- **Businesses** use virtualization to use their hardware resources efficiently and get greater **returns from their investment**.
- It also **powers cloud computing services** that help organizations **manage infrastructure more efficiently**.



Characteristics of hypervisors ?



Characteristics of hypervisors ?

- **Performance:**

- ✓ Directly access to the hardware resources
- ✓ In a bare-metal situation, the guest OS performance should close to native speeds



Characteristics of hypervisors ?

- **Ecosystem:**

- ✓ Documentation and technical support to implement and manage hypervisor (in case of scale across multiples physical servers).
- ✓ Look for a healthy community that can provide support with agent, plugins that offer capabilities (backup/restore, fail-over)

Characteristics of hypervisors ?

- **Management tools:**
 - ✓ Launching and Running VM's is only the start point...
 - ✓ VM's need to be:
 - ✓ Provisioned
 - ✓ Maintained
 - ✓ Audited
 - ✓ Clean up (to prevent "VM sprawl" (proliferation in French))
 - ✓ Ensured that the vendor supports the hypervisor architecture with comprehensive management tools.

Characteristics of hypervisors ?

- **Live migration:**

- ✓ Enable you to move VMs between hypervisors.
- ✓ Fail-over solution.
- ✓ Workload balancing.

Characteristics of hypervisors ?

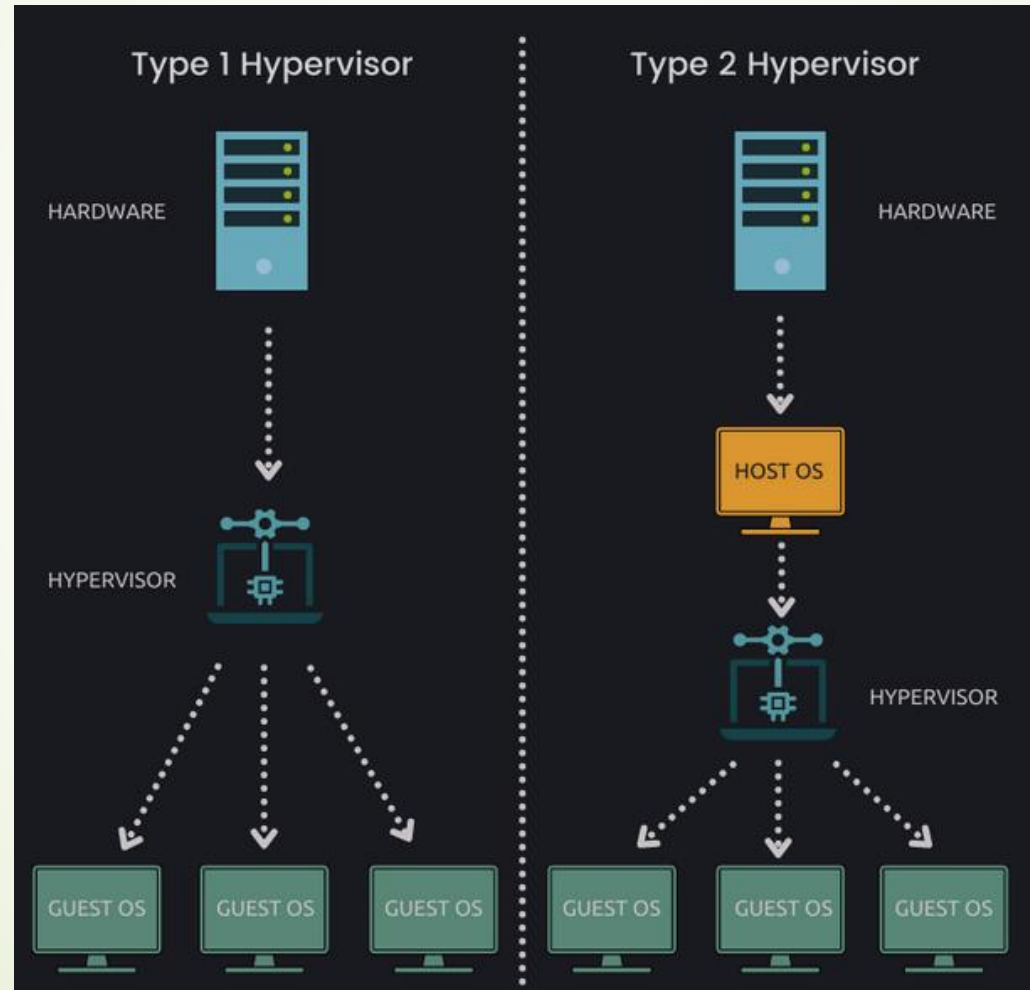
- **Cost:**

- ✓ Do not consider only the cost of the Hypervisor.
- ✓ Saving of human resources (less maintenance load).
- ✓ Reduces the number of physical machines to be maintained, replaced and replicated.

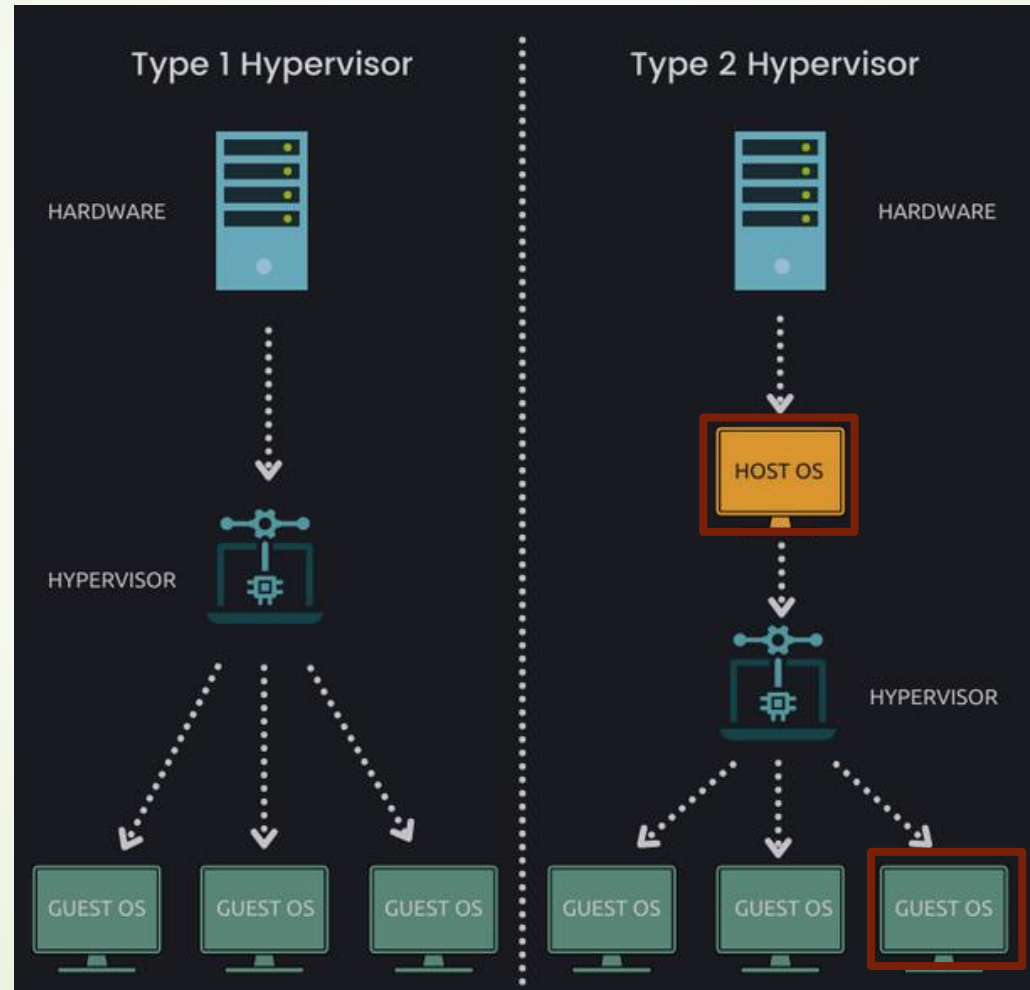
Type of Virtualization ?



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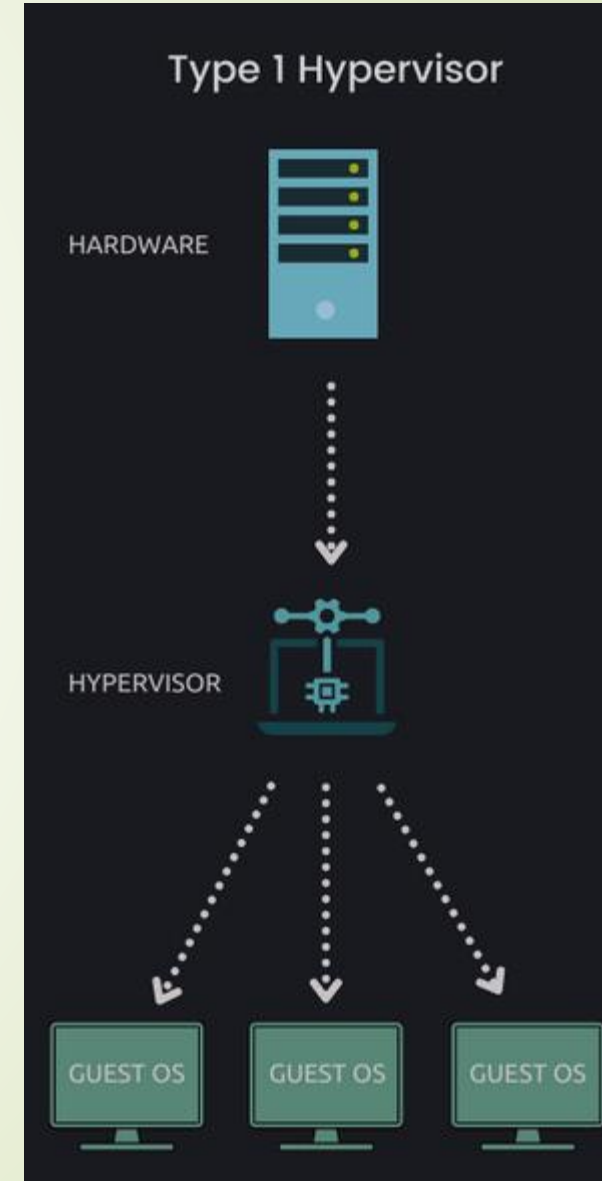
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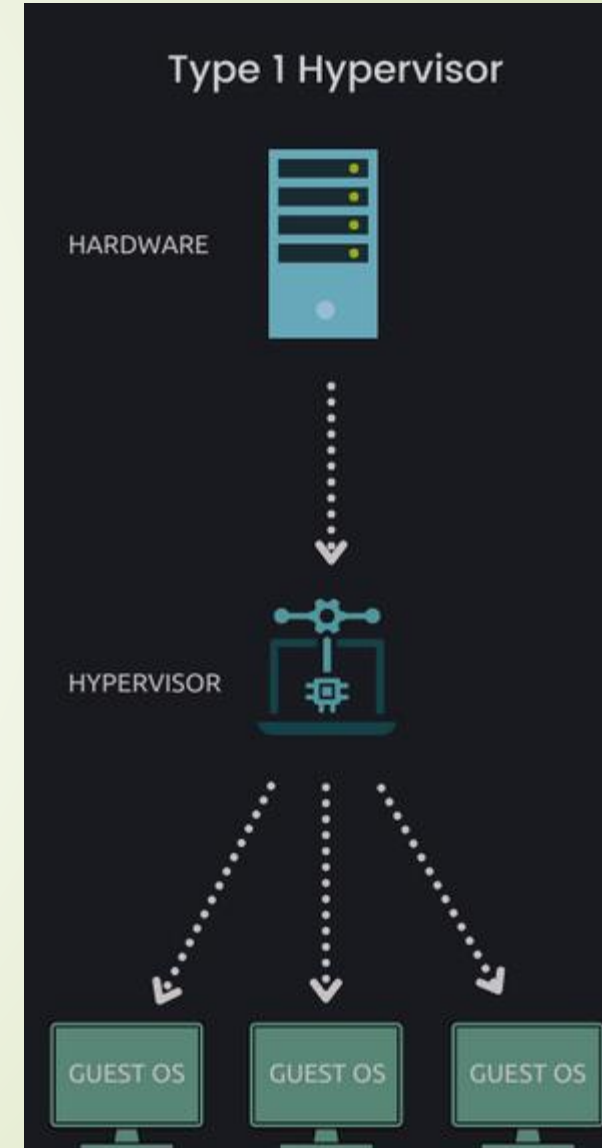
❖ Hypervisor - Type I

- ✓ ESXi (VMware vSphere)
- ✓ Hyper-V (Microsoft)
- ✓ Open source alternatives (KVM, Xen hypervisor)
- ✓ Oracle Vm (based on Xen)
- ✓ Citrix Hypervisor (based on Xen)



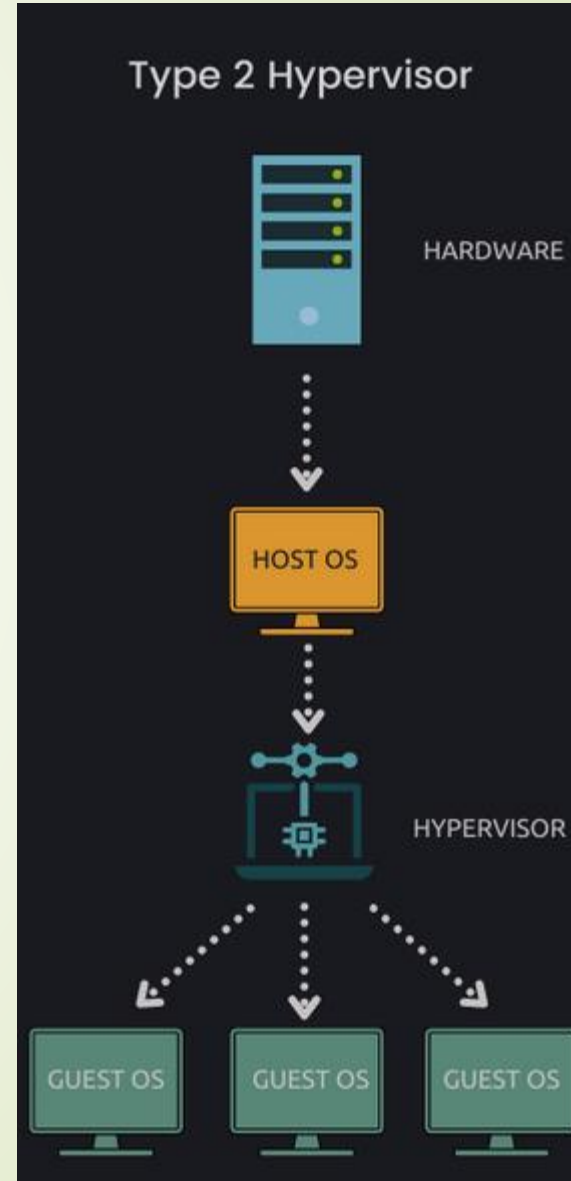
Type of Virtualization ?

- ❖ Hypervisor - Type I – Key pointers
 - ✓ Directly installed on a bare-metal system or physical host.
 - ✓ OS installation is not a requirement before installing the Hypervisor itself.
 - ✓ Direct access to hardware (CPU, RAM, Network).
 - ✓ Better security (absence of any extra layer).
 - ✓ 1 Hypervisor = 1 Dedicated physical machine.



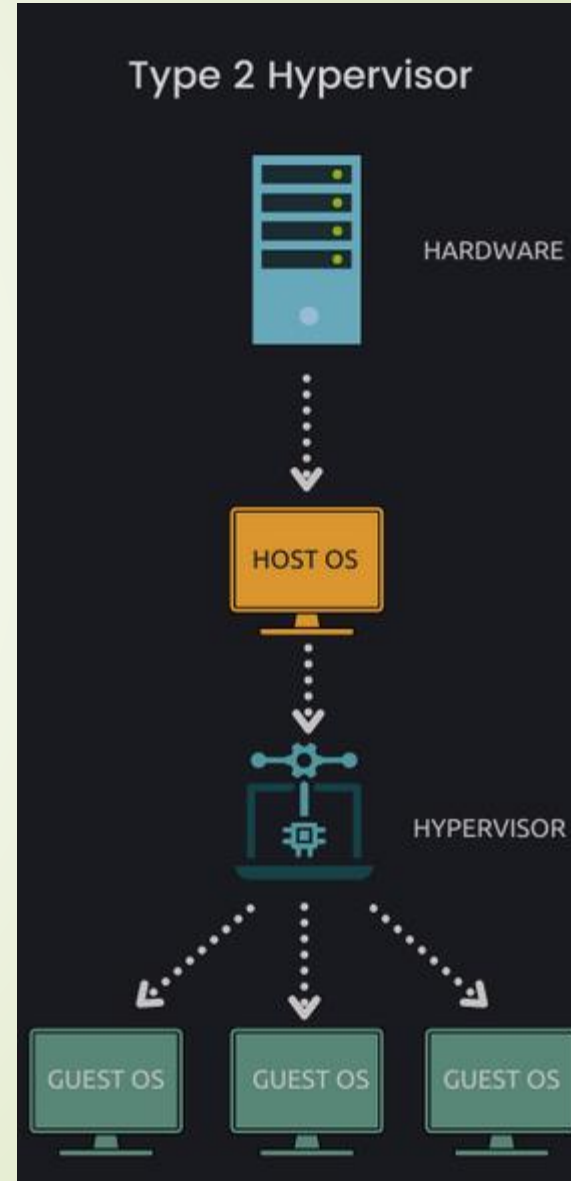
Type of Virtualization ?

- ❖ Hypervisor - Type II
 - ✓ Virtual Box (Oracle) – Open Source
 - ✓ Workstation and Fusion (VMware)
 - ✓ QEMU
 - ✓ Parallels Desktop



Type of Virtualization ?

- ❖ Hypervisor - Type II – Key pointers
 - ✓ Not Directly installed on a bare-metal system or physical host.
 - ✓ OS installation is a requirement before installing the Hypervisor itself.
 - ✓ Indirect access to hardware (CPU, RAM, Network).
 - ✓ Can cost less and suitable more small business solutions.
 - ✓ N Hypervisors on 1 Dedicated physical machine.



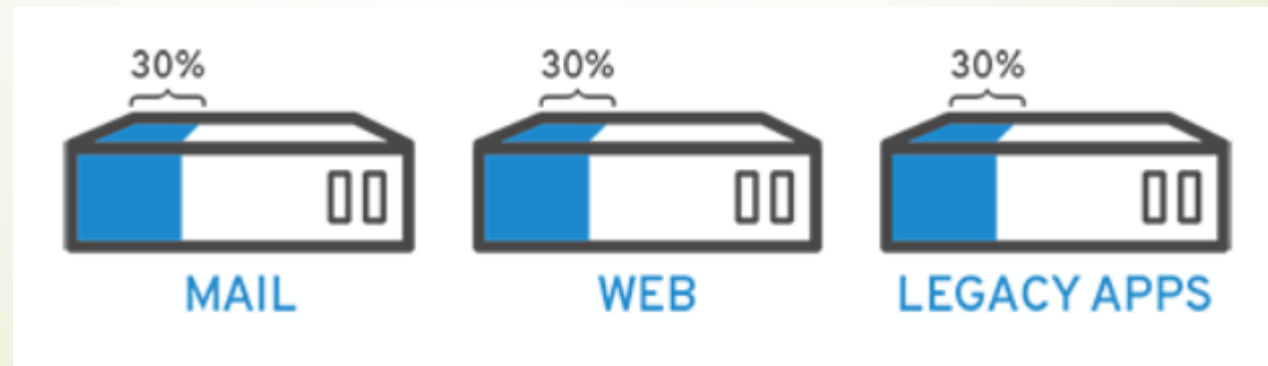
Benefits of virtualization ?

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- ❖ Virtualization offers substantial benefits for just **about any business or development environment**.
 - ❖ It has become a **core strategy** for improving IT efficiency (agility).

Benefits of virtualization ?

❖ Reduced expenses

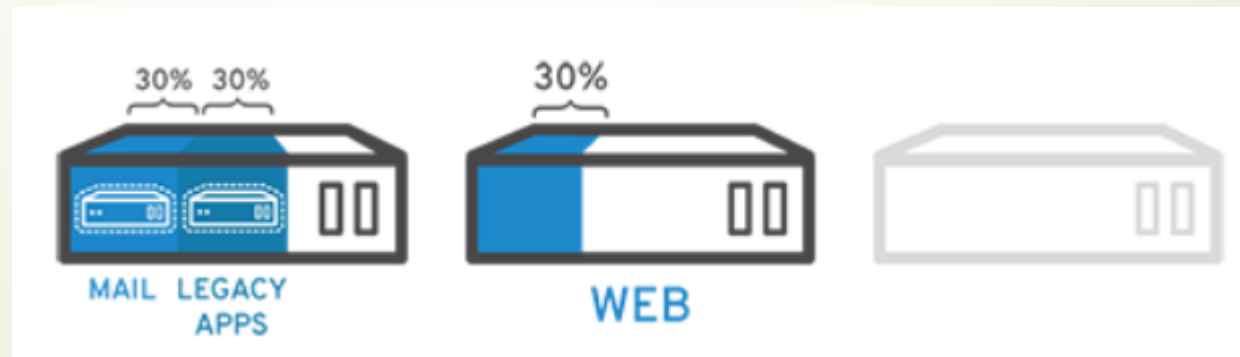
- ✓ If the only way to get more resources is to purchase new hardware, that price becomes hefty.



Benefits of virtualization ?

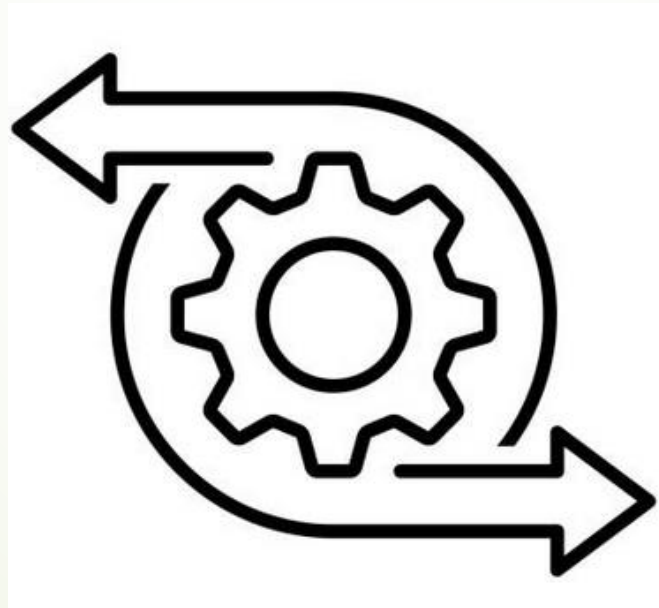
❖ Reduced expenses

- ✓ With virtualization tactics, you can take a hard look at your existing infrastructure and **identify wasted or idle computing resources**.



Benefits of virtualization ?

❖ Resiliency

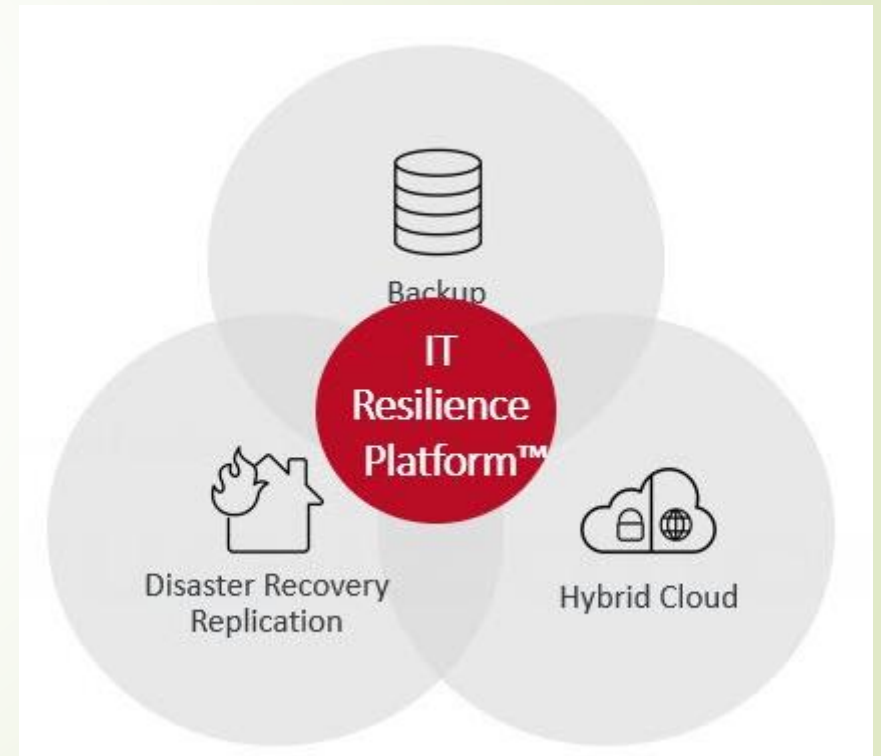


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Benefits of virtualization ?

❖ Resiliency – IT Approach

- ✓ IT resilience is this ability of an organization **to maintain acceptable service levels** when there is a disruption of business operations, critical process, or IT ecosystem.



<https://ivision.com/blog/modern-disaster-recovery-it-resiliency/>

Benefits of virtualization ?

- ❖ High availability



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Benefits of virtualization ?

❖ High availability

- ✓ Since **you can clone** a VM almost effortlessly, **you can easily set up redundant virtualized environment**.
- ✓ Virtualization provides an extremely reliable system with **no single point of failure in hardware or software** (Failover).
- ✓ Virtualization provides developers constant access (**no downtime**).

Benefits of virtualization ?

- ❖ Increased efficiency



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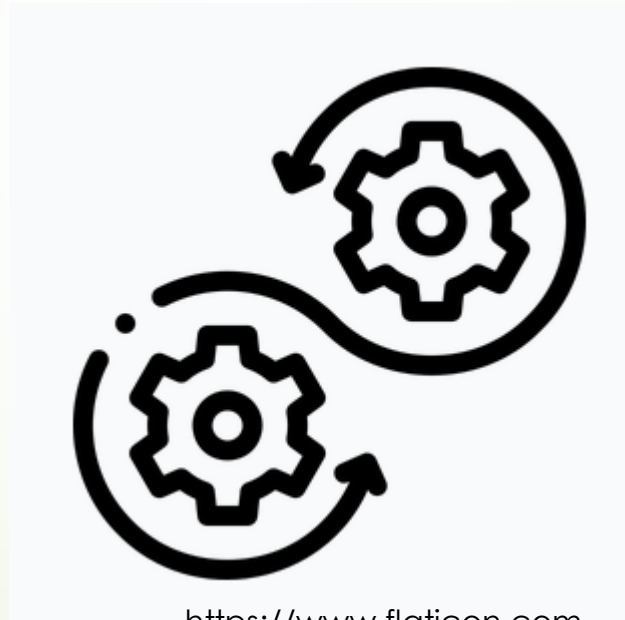
Benefits of virtualization ?

❖ Increased efficiency

- ✓ Virtual environments **are much easier to maintain** (than physical).
- ✓ With less hardware to worry about... more time to spend on improving the solution.
- ✓ **By nature, virtual environments are inherently scalable.**

Benefits of virtualization ?

❖ Easy DevOps



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Benefits of virtualization ?

❖ Easy DevOps

- ✓ You can test features and squash bugs without affecting your live product.
- ✓ Facilitates pipeline usage for development, testing and deployment.
- ✓ Virtualization provides on-demand access to an infinite number of perfectly replicated virtual machines for developers to play with.

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