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Physical Hosting vs Virtual Hosting

When selecting server hosting, the first question many organisations face is whether to opt for physical or virtual hosting. Both have their unique advantages and trade-offs.



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Everything ultimately relies on physical servers. Virtual servers run on physical servers, as does cloud and so-called serverless architectures. The choice between physical and virtual hosting is primarily a trade-off between control and flexibility.

Virtualisation allows one physical server to run multiple virtual operating systems. Think of virtual servers as subdivisions of a physical server. They look and behave the same, but multiple virtual servers can run on a single physical host.

Benefits of Virtual Hosting

There are several benefits to virtual hosting, compared to traditional physical servers:

Cost

It is more cost-effect to purchase and operate a single large physical server to host multiple virtual servers, than to buy multiple smaller physical servers of equivalent specification. Virtual servers tend to be cheaper than equivalent physical servers as result.

Resilience & Scalability

Virtual servers are not bound to specific physical equipment. They can be moved, duplicated, created, destroyed, and resized at will. If the physical host fails, virtual servers can switch to another; significantly reducing the risk of an outage due to hardware problems.

To achieve similar availability with physical servers you would need to double-up your equipment. You will also be constrained by physical limitations. With virtual servers you can add a bit more resource if needed, but with physical servers you may need to purchase additional hardware or upgrade to a different category of machine.

Benefits of Physical Hosting

Virtual hosting might be more flexible; but physical hosting has its advantages as well:

Performance

The performance overhead of layering virtual servers on top of physical is usually negligible, but not all virtual hosting is equal. Virtual servers are often overprovisioned, meaning the total resources assigned to virtual servers exceeds the capacity of the physical host. Most servers rarely run at maximum capacity, so there's enough to go around. The more heavily overprovisioned, the better the pricing, but the greater the risk of a performance impact should multiple virtual servers ramp up demand simultaneously.

For applications that are particularly performance-sensitive it may be wise to avoid overprovisioning and insist on dedicated resources. The ultimate form of dedicated resource is a physical server where none of its resources are shared with another virtual server or customer.

Security

Whoever controls the physical host that virtual servers run on has the potential to gain access to the contents of those servers. A lot of trust must be placed in your hosting provider, and this is especially the case with virtual hosting where the physical host is managed by a third party.

A cornerstone of virtual server security is that servers should be logically isolated, making it impossible to jump from one to another unless they are connected by a network. This technology works very well; but no software is perfect. Several "virtual machine escape" bugs have been documented that could allow an attacker to jump from one virtual server to another, on the same host.

In a virtual hosting scenario this could theoretically allow another hosting customer sharing the same physical hardware to gain access to your systems. Such vulnerabilities are difficult to exploit, nearly impossible to target at a specific organisation, and rely on the hosting provider not to have patched it.

In practical terms, the likelihood of this happening to you is extremely low, but never zero. For highly sensitive workloads, dedicated physical servers may be appropriate to mitigate the risk.

The Best of Both Worlds

If you opt for physical hosting, there is no reason you can't host your own virtual servers on top of the physical ones provided to you. Essentially, running your own virtual hosting service on top of a third party's physical hosting service. This gives you many of the benefits of virtual hosting, with full control over the underlying infrastructure.

The downside is it moves a lot of the administrative burden of managing the infrastructure to you; and you will need to commit to several physical servers to mitigate hardware-related risks and give your virtual servers somewhere else to run when performing maintenance.

To learn more about how we can support your company via hosting, both physically and virtually, email Andrew Quinn at andrew.quinn@waterstons.com or visit our managed services page here.