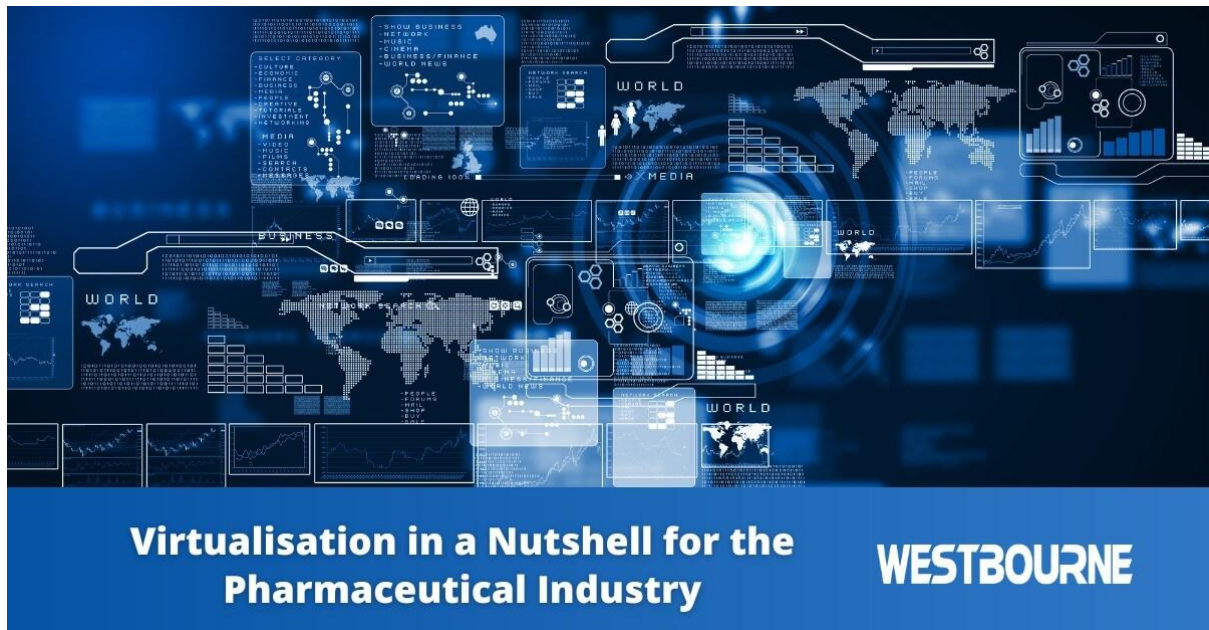# Virtualisation in a Nutshell – for the Pharma Industry

Traditionally, IT infrastructure was physical, i.e., physical servers in an on-site server room, physical desktops on each lab technician's desk/workstation, etc. Virtualisation technologies create virtual representations of these previously physical IT infrastructure elements. In other words, virtualisation technologies mimic the functionality of physical hardware. The result is one physical machine running multiple virtual instances.

So, in essence, virtualisation involves replacing physical hardware with software representations.

We can use an example of a workstation in a pharmaceutical lab environment. The traditional approach would involve having a physical computer that could have an operating system, LIMS application and/or Chromatography Data System (CDS) application, Microsoft Office, and other apps. With a virtualisation approach (such as VDI – virtual desktop infrastructure), the workstation would instead have a virtual desktop with the operating system and applications served to the user from a server or the cloud.

In other words, there is no longer a need for the physical computer at the workstation. Furthermore, the server or cloud-based solution can run multiple virtual desktops at the same time.

The Different Types of Virtualisation

- Server virtualisation – where a single physical server is partitioned into multiple virtual servers, each running its own operating system and applications.
- Storage virtualisation – where multiple physical storage devices, such as hard drives, are combined into a single virtual storage pool.

- Network virtualisation – where multiple virtual networks operate on a single physical network infrastructure.
- Data virtualisation – where data from multiple sources is combined into a single, logical view, without physically moving the data.
- Application virtualisation – where applications run in a virtual environment isolated from the underlying operating system and other applications on the same system.
- Desktop virtualisation – also known as VDI, desktop virtualisation allows a desktop operating system to run in a virtual environment, hosted on a server or data centre, and accessed remotely by users on their devices.

The Benefits of Virtualisation for the Pharmaceutical Industry

Consolidation

Virtualisation reduces the amount of physical hardware that you need to own, maintain, and manage. This reduces IT infrastructure complexity, minimises wasted resources, and reduces hardware repair and operating costs. Another benefit is centralised administration, where you can automate day-to-day management tasks, freeing up IT resources to focus on other tasks and projects.

Redundancy/High Availability

Creating redundant virtual servers on multiple physical machines can allow for multiple copies of the same application to run simultaneously. If one fails, the other will continue operating, eliminating downtime and increasing productivity. There is also no downtime required for server maintenance as applications will continue to run on the second server while patching.

Disaster Recovery

Virtualisation allows for simple on or off-site, full or partial duplication and backup of data and systems. Disaster recovery testing can be non-disruptive to your production environment, and restoration processes are simplified.

Testing

New applications can be installed and tested in a virtual environment without risk to your existing network.

Legacy Hardware

All hardware will eventually become outdated. Expensive maintenance contracts, sourcing dated parts, hardware failures, and system slowness can all be massive pain points for companies working with legacy systems. Virtualising these systems removes the pain points while also increasing performance and providing peace of mind and long-term savings.

Migration

It is possible to move a virtual server from one physical machine to another on a different network while it's still running. Migration allows for load balancing when a host is overloaded. It also allows maintenance to be performed on the host with zero downtime. All this is done without disruption to production.

Shared Resources

Resources such as network bandwidth, CPUs, hard drives, and memory are shared by the virtual machines and can be easily increased or decreased as needed. Your whole environment is truly scalable and efficient.

Images

An image of your server can be taken at any time and restored very quickly. This is especially good when you want to make a minor change to a virtual machine, or if you need to create a baseline image for building and deploying new virtual desktops.

Remote Access

Users can access their desktops and data remotely, improving collaboration, productivity, and efficiency.

Improved Cybersecurity

Cybersecurity becomes more centralised with virtualisation, giving your IT team greater control and reducing risks. [Security updates and patches](#), for example, can be centrally deployed to all end users.

Fast Provisioning of New Desktops

With physical hardware, provisioning new desktops can take days or weeks. With virtualisation technologies, this is reduced to hours – and sometimes shorter.

Improved User Experience

The user experience can be enhanced and optimised with virtualisation. Security is a good example, particularly given the importance of data integrity for compliance in the pharmaceutical sector. Traditionally, enhancing security meant a trade-off, where the user experience got a bit worse. Virtualisation makes it possible to get a better balance between good cybersecurity and [optimised user experience](#).

Difference Between Virtualisation and Cloud Computing

Virtualisation and cloud computing are related technologies, but they are not the same thing.

Virtualisation is a technology that allows multiple virtual machines to run on a single physical server. It provides a way to divide the physical resources of a server into multiple virtual environments, each with its own operating system and applications. As mentioned above, virtualisation can be used to improve resource utilisation, reduce costs, and simplify the management of IT infrastructure.

Cloud computing, on the other hand, is a service delivery model that provides on-demand access to a shared pool of computing resources, including servers, storage, applications, and services, over the internet. Cloud computing can be thought of as a way to consume IT resources as a service, rather than building and managing them in-house.

We can use a popular CDS application as an example – Waters Empower. It is available as a traditional application that you can deploy on a single machine or on multiple machines using virtualisation technologies. There is also a cloud version of Empower, however, eliminating the need for physical hardware. With Empower Cloud, you access the application over the internet.

The Right Solution for Your Facility

There are multiple ways to utilise and deploy virtualisation and cloud computing technologies in modern pharmaceutical facilities and lab environments. The right solution for your facility will depend on your requirements and operational needs.

At Westbourne IT, we have the experience and expertise to help you benefit from virtualisation and cloud computing technologies. This includes technical experience and expertise, as well as pharmaceutical industry expertise. Our pharma industry experience covers everything from compliance and GAMP 5 to patient safety and product quality.

Please contact us today to discuss your IT infrastructure and the opportunities that virtualisation presents.