Virtual Desktop Infrastructure (VDI)

VDI combines all of the benefits and flexibility of server Virtualisation with the power and personalization of traditional desktop computing.

VDI virtualises a desktop image that is deployed from a centralized server. The solution delivers an organisation reduced operating costs, improved security, and consistent familiar end-user experience with little to no learning curve.

VDI replaces traditional desktop architectures by eliminating the overhead of setting up and supporting individual user workplaces with their operating systems, client SW and applications. Instead, these workplaces are managed and maintained from the Data Centre running on servers configured as virtual workplaces (also called containers, logical partitions or virtual machines) presented to the user via a secure network connection. VDI makes it possible to roll out, recover and restore the most complex Desktop image to a user within minutes.

While cost savings are being realised with server virtualisation, it is the desktop environment where organisations are now in search of additional savings. VDI delivers the model under which these desktop savings can be realised.

The success of any virtualisation project starts with selecting the ***right virtualisation solution.*** mbits has extensive experience in virtualisation technology and deep solutions expertise in developing, deploying and supporting numerous virtualisation technologies under a VDI model.

Before diving into VDI, let's quickly review the various types of virtualisation, their key characteristics and how they can be applied.

Put simply:

By virtualising a software application**,** you eliminate its direct hooks into its host operating system (OS) to easily install, remove and modify that software installation without affecting the host OS.

By virtualising an entire computer system**,** you encapsulate its configuration into a data structure that is more portable, easier to manage, and has more capability for being backed up and restored.

Types of Virtualisation

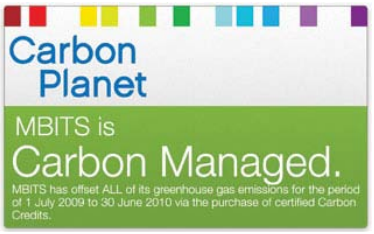
There are basically 4 types of virtualisation available today. These are *Hardware Virtualisation, OS Virtualisation*, *ParaVirtualisation*, a lesser-known offshoot of hardware virtualisation and *Application Virtualisation* that wraps applications rather than entire machines.

Hardware Virtualisation

Hardware Virtualisation involves the concept of incorporating virtualisation at a layer below the OS. With Hardware Virtualisation, this virtualisation layer (often called a *hypervisor)* acts as a proxy between individual virtual systems that sit above it and the physical resources that sit below it.
In the case of virtual machines, each of the individual virtual machines is completely segregated from each other. Each virtual machine has no knowledge of the existence of other virtual machines. Each machine makes a request for system resources (CPU, disk, memory, or network) and the hypervisor proxy's these requests between code in the virtual environment and its physical resources.

With Hardware Virtualisation, each individual virtual machine includes all the resources it needs to run itself within its Virtualisation environment. So for ten instances of an OS, ten copies of that OS' files and other configurations are needed. However, because calls to physical resources are done through a hypervisor, it is possible to run machines of disparate OS's on the same host.

The following vendor solutions feature Hardware Virtualisation architecture:
• Microsoft Virtual Server
• VMware Server
• VMware ESX



OS Virtualisation

With OS Virtualisation, the virtualisation layer delivers dramatic improvements in terms of performance but loses the ability to be agnostic regarding its hosted virtual machines. As with Hardware Virtualisation, OS Virtualisation includes a host OS and residing virtual machines are completely segregated from each other. What's different is that the host's OS becomes the base OS from which all its hosted virtual machines start their existence. Each hosted virtual machine is a virtual "snapshot" of the software that makes up the host. Automation components within the OS Virtualisation layer can be incorporated to rapidly deploy additional servers or applications within each virtual machine.

With OS Virtualisation, the point of commonality, the base OS, becomes a point of central control for all hosted virtual machines. If an OS patch or service pack is needed for that OS, installing that update to the base OS automatically updates each of the residing virtual machines.

As the physical hardware is not virtualized as with Hardware Virtualisation, overall performance is increased because there is no need to emulate a complete set of hardware resources for each virtual machine. The additional overhead required to emulate these resources in the Hardware Virtualisation model consumes additional resources. This is possible because with OS Virtualisation, there is no proxying hypervisor.

Because there is no virtualised hardware and no overhead of translating requests between virtual machines and the host systems, OS Virtualisation environments typically show substantially higher performance than those that incorporate Hardware Virtualisation. This translates into a much higher consolidation and user density for OS Virtualisation environments than in typical Hardware Virtualisation environments.

But all this enhanced performance and optimized resource utilisation does involve a tradeoff. Each hosted virtual machine must be the same OS as the host. With OS Virtualisation, you can't, for example, run a Red Hat Enterprise Linux virtual machine on top of a Windows Server 2008 host.

The following vendor solution features OS Virtualisation architecture:
• Parallels Virtuozzo Containers

ParaVirtualisation

ParaVirtualisation works similarly to virtual machines in that it enables the hosting of numerous machines on top of an existing host. Where ParaVirtualisation differs is that it does not simulate hardware resources but instead offers an Application Programming Interface (API) to hosted virtual machines. In order to use that API, the OS must be coded to support it.

ParaVirtualisation benefits from performance improvements over other virtualisation solutions, but the special coding requirement can limit its usefulness when OS vendors choose not to provide support for the required modifications.

The following vendor solutions feature ParaVirtualisation architecture.
• Citrix XenSource

Application Virtualisation

Moving away from the concept of entire-system virtualisation is Application Virtualisation. Application Virtualisation encapsulates the files, registry keys, and other configurations of an individual application into a construct (often a single file) that can be easily installed to computers, removed from computers, and updated as necessary.

By encapsulating applications in this manner, the application itself has no hooks into the system, which means that its installation does not impact the configuration of the host system. Application Virtualisation solutions are typically coupled with tools that enable the "streaming" of the application down to the client. This streaming process copies the necessary components to the client system in a just-in-time manner as the user needs them.

Because software installation is unnecessary, and only necessary bits are downloaded users can utilise automatic request systems to check out the software when needed and check it back in when no longer in use. Depending on license restrictions, this can provide a saving on licensing costs.

The following vendor solutions feature Application Virtualisation architecture:
• Microsoft SoftGrid
• Citrix Streaming Server
• Thinstall Virtualisation Suite
• Altiris Software Virtualisation Solution

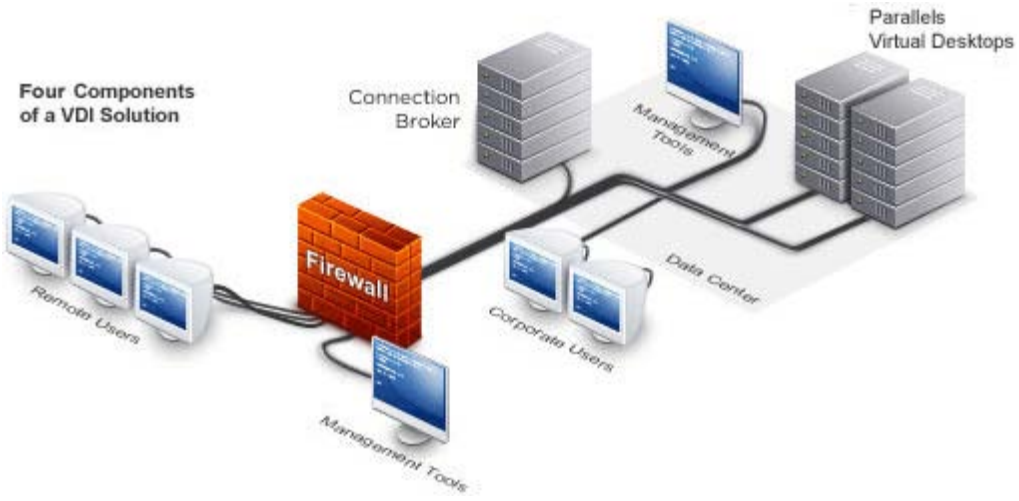
Picking the right VDI solution

The centralisation of desktops was first pioneered through remote application tools such as Microsoft Terminal Services and Citrix Presentation Server. These tools, still commonly used today, provide an appropriate mechanism for aggregating users and their applications onto server based hardware. However, in some situations these tools cannot provide the necessary level of user separation and application interoperability required. Most importantly, users may want or need their own individual desktop that is not shared with other users. In these cases, it may be necessary to “host” the user’s desktop as a virtual machine.

The process of hosting a desktop is, in concept, relatively simple. The desktop is virtualised and hosted on a virtualisation host. Users access their desktops through a network interface (for Microsoft Windows environments, this is most commonly Microsoft’s RDP protocol or Citrix’s ICA protocol). Desktop hardware can be replaced with longer-depreciating thin client equipment. Users gain the ability to use their desktops from anywhere via a secured network connection.

There are four components that comprise a VDI solution. Starting with the end user and moving towards the centralized server these are:

- end user access and interface
- a connection broker that manages end user to server connections
- a virtualised desktop instance and virtualisation engine to create the desktops
- management tools to manage the virtualised environment



All virtualisation solutions provide some capability in regards to virtualising desktops. Some also add management components and easy user interfaces for connecting to those desktops. One important difference, however, between the various architectures is horizontal scaling of resources. With *ParaVirtualisation* and *Hardware Virtualisation* solutions such as Citrix XenSource and VMware Virtual Infrastructure, all files and other resources that make up the individual desktop machine must be replicated for each machine to be hosted. To explain this point: if an example desktop consumes 20GB of disk space, hosting 100 desktops will require at least 2TB of online storage to support the environment.

A major benefit associated with the architecture of *OS Virtualisation* is that individual virtual machine files can be shared across multiple virtual machines. Consider the case in which 20GB of disk space is required per desktop to support its hosting, but only 1GB directly relates to information that is different between desktops. Under *OS Virtualisation* if we virtualise 100 desktops, the total disk space necessary is only 120GB, a difference and saving in storage of nearly an order of magnitude. This is made up of the 20GB that is shared amongst the virtual machines plus the gigabyte of different data on each of the 100 desktops. This reduction in required storage can generate a significant cost saving ongoing.

Another benefit with *OS Virtualisation* relates to the hosting of desktops and the ongoing management of their security profile and configuration. With *OS Virtualisation*, patching all hosted desktops means simply patching only the host. This reduces the total number of potential security breach areas on a network and significantly eases the management burden and delivers a reduction in operating costs ongoing.

Under a VDI solution, sensitive data never leaves the Data Centre. Users are not able to store local copies of the information on their terminal devices. At the same time VDI also offers the flexibility to provide suitably customised desktop environments to individual users.

VDI represents the next generation of terminal services, with improved performance, ease of use and higher efficiency delivered at a substantially lower cost. The challenge here is to counter the increasing pressure on operating costs while also provisioning new types of applications to end users on a wide array of devices as quickly as possible.

Meeting these requirements is complicated further by the fact that many mobile employees nowadays also require their applications and data on their respective mobile devices. Besides Notebooks and Netbooks, several Smartphones such as Blackberries and iPhones have become part of the corporate IT landscape.

So Which One?

As to which VDI solution is best, the answer ultimately comes down to which one is the right solution to meet the needs of the individual end user, required outcomes, budget and organisational IT goals.

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This is where mbits works with clients to identify the right solution. Delivery of benefit under a VDI solution starts with selecting the right technology, setting organisational expectations and outcomes and detailed implementation planning. mbits take the client through a structured process to confirm outcomes including risk assessment with mitigation and detailed implementation planning as the foundation for successful deployment.

The result for the client is successful deployment of the right solution with mbits commitment to delivery of agreed outcomes and solution performance. This commitment is delivered through packaging of the solution as a managed service which mbits deploy, administer, support and manage ongoing under Service Level Agreement with the client.