Desktop virtualization creates a software-based (or virtual) version of an end user's desktop environment and operating system (OS) that is decoupled from the end user's computing device or client. This enables the user to access his or her desktop from any computing device.

Desktop virtualization deployment models

Virtual desktop infrastructure (VDI)

In VDI deployment model, the operating system runs on a virtual machine (VM) hosted on a server in a data center. The desktop image travels over the network to the end user's device, where the end user can interact with the desktop (and the underlying applications and operating system) as if they were local.

VDI gives each user his or her own dedicated VM running its own operating system. The operating system resources—drivers, CPUs, memory, etc.—operate from a software layer called a hypervisor that mimics their output, manages the resource allocation to multiple VMs, and allows them to run side by side on the same server.

A key benefit of VDI is that it can deliver the Windows 10 desktop and operating system to the end user's devices. However, because VDI supports only one user per Windows 10 instance, it requires a separate VM for each Windows 10 user.

Remote desktop services (RDS)

In RDS—also known as Remote Desktop Session Host (RDSH)—users remotely access desktops and Windows applications through the Microsoft Windows Server operating system. Applications and desktop images are served via Microsoft Remote Desktop Protocol (RDP). Formerly known as Microsoft Terminal Server, this product has remained largely unchanged since its initial release.

From the end user's perspective, RDS and VDI are identical. But because one instance of Windows Server can support as many simultaneous users as the server hardware can handle, RDS can be a more cost-effective desktop virtualization option. It's also worth noting applications tested or certified to run on Windows 10 may not be tested or certified to run on the Windows Server OS.

Desktop-as-a-Service (DaaS)

In DaaS, VMs are hosted on a cloud-based backend by a third-party provider. DaaS is readily scalable, can be more flexible than on-premise solutions, and generally deploys faster than many other desktop virtualization options.

Like other types of cloud desktop virtualization, DaaS shares many of the general benefits of cloud computing, including support for fluctuating workloads and changing storage demands,

usage-based pricing, and the ability to make applications and data accessible from almost any internet-connected device. The chief drawback to DaaS is that features and configurations are not always as customizable as required.

Choosing a model

VDI is a popular choice because it offers a virtualized version of a familiar computing model—physical desktop computing. But implementing VDI requires you to manage all aspects of the infrastructure yourself, including the hardware, operating systems and applications, and hypervisor and associated software. This can be challenging if your VDI experience and expertise is limited. Purchasing all infrastructure components can require a larger upfront investment.

RDS/RDSH can be a solid choice if it supports the specific applications you need to run and your end users only need access to those applications, not full Windows desktops. RDS offers greater end-user density per server than VDI, and systems are usually cheaper and more scalable than full VDI environments. Your staff does need the requisite skill set and experience to administer and manage RDS/RDSH technology, however.

DaaS is currently gaining in popularity as IT teams grow more comfortable with shared desktops and shared applications. Overall, it tends to be the most cost-effective option. It's also the easiest to administer, requiring little in-house expertise in managing infrastructure or VDI. It's readily scalable and involves operating expenditures rather than capital expenditures, a more affordable cost structure for many businesses.

Benefits of desktop virtualization

Virtualizing desktops provides many potential benefits that can vary depending upon the deployment model you choose.

Simpler administration. Desktop virtualization can make it easier for IT teams to manage employee computing needs. Your business can maintain a single VM template for employees within similar roles or functions instead of maintaining individual computers that must be reconfigured, updated, or patched whenever software changes need to be made. This saves time and IT resources.

Cost savings. Many virtual desktop solutions allow you to shift more of your IT budget from capital expenditures to operating expenditures. Because compute-intensive applications require less processing power when they're delivered via VMs hosted on a data center server, desktop virtualization can extend the life of older or less powerful end-user devices. On-premise virtual desktop solutions may require a significant initial investment in server hardware, hypervisor software, and other infrastructure, making cloud-based DaaS—wherein you simply pay a regular usage-based charge—a more attractive option.

Improved productivity. Desktop virtualization makes it easier for employees to access enterprise computing resources. They can work anytime, anywhere, from any supported device with an Internet connection.

Support for a broad variety of device types. Virtual desktops can support remote desktop access from a wide variety of devices, including laptop and desktop computers, thin clients, zero clients, tablets, and even some mobile phones. You can use virtual desktops to deliver workstation-like experiences and access to the full desktop anywhere, anytime, regardless of the operating system native to the end user device.

Stronger security. In desktop virtualization, the desktop image is abstracted and separated from the physical hardware used to access it, and the VM used to deliver the desktop image can be a tightly controlled environment managed by the enterprise IT department.

Agility and scalability. It's quick and easy to deploy new VMs or serve new applications whenever necessary, and it is just as easy to delete them when they're no longer needed.

Better end-user experiences. When you implement desktop virtualization, your end users will enjoy a feature-rich experience without sacrificing functionality they've come to rely on, like printing or access to USB ports.
Desktop virtualization software

The software required for delivering virtual desktops depends on the virtualization method you chose.

With virtual desktop infrastructure (VDI), the desktop operating system (most commonly Microsoft Windows) runs and is managed in the data center. Hypervisor software runs on the host server, delivering access to a VM to each end user over the network. Connection broker software is required to authenticate users, connect each to a virtual machine, monitor activity levels, and reassign the VM when the connection is terminated. Connection brokers may be bundled with, or purchased separately from, the hypervisor.

Remote desktop services (RDS/RDSH) can be implemented using utilities that are bundled with the Microsoft Windows Server operating system.

If you choose a Desktop-as-a-Service (DaaS) solution, all software installation, configuration, and maintenance will be handled by the DaaS cloud-hosted service provider. This includes applications, operating systems, files, and user preferences.

etwork virtualization represents the administration and monitoring of an entire computer network as a single administrative entity from a single software-based administrator's console.

Network virtualization can include storage virtualization, which contains managing all storage as an individual resource. Network virtualization is created to enable network optimization of data transfer rates, flexibility, scalability, reliability, and security. It automates many network management functions, which disguise a network's true complexity. All network servers and

services are considered as one pool of resources, which can be used independently of the physical elements.

Virtualization can be defined as making a computer that runs within another computer. The virtual computer, or guest device, is a fully functional computer that can manage the same processes your physical device can. The processes performed by the guest device are separated from the basic processes of your host device. You can run several guest devices on your host device and each one will identify the others as an independent computer.

Advantages of Network Virtualization

The advantages of network virtualization are as follows −

- **Lower hardware costs** − With network virtualization, entire hardware costs are reduced, while providing a bandwidth that is more efficient.
- **Dynamic network control** − Network virtualization provides centralized control over network resources, and allows for dynamic provisions and reconfiguration. Also, computer resources and applications can connect with virtual network resources precisely. This also enables for optimization of application support and resource utilization.
- **Rapid scalability** − Network virtualization generated an ability to scale the network rapidly either up or down to handle and make new networks on-demand. This is a valuable device as enterprises transform their IT resources to the cloud and shift their model to an 'as a service'.

Types of Network Virtualization

The types of network virtualization are as follows −

- **Network Virtualization** − Network virtualization is a technique of combining the available resources in a network by splitting up the available bandwidth into different channels, each being separate and distinguished.
  - **Server Virtualization** − This technique is the masking of server resources. It simulates physical servers by transforming their identity, numbers, processors, and operating frameworks. This spares the user from continuously managing complex server resources. It also makes a lot of resources available for sharing and utilizing, while maintaining the capacity to expand them when needed.
  - **Data Virtualization** − This type of cloud computing virtualization technique is abstracting the technical details generally used in data management, including location, performance, or format, in favor of broader access and more resiliency that are directly related to business required.
  - **Application Virtualization** − Software virtualization in cloud computing abstracts the application layer, separating it from the operating framework.