What is Desktop Virtualization?

Virtualization has become a key component of any modern data-center, offering such advantages as easier deployment, resource pooling, server consolidation, application compatibility, high-availability, reduced costs and centralized management

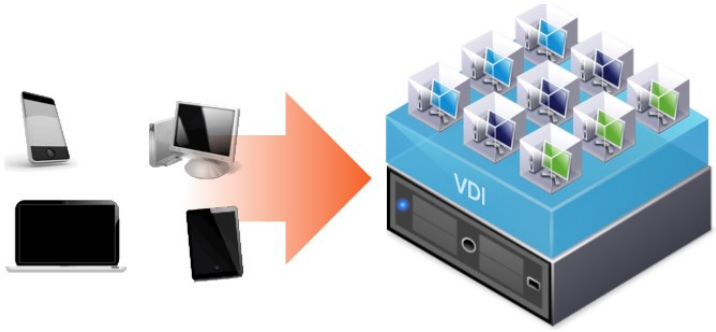
Virtual desktop infrastructure (VDI) is the practice of hosting a desktop operating system within a virtual machine (VM) running on a centralized server.

Desktop Virtualization solutions help users access virtually any application and Windows environment anywhere, while keeping their personalized experience even when they change their devices. It enables organizations to give employees the flexibility to work everywhere, while simplifying compliance and management through a centralized & unified infrastructure on a more comprehensive platform.

Rich user experience and efficient management at a great value

With VDI, even organizations with tight resources now have a solution to embrace the bring-your-own-device (BYOD) trend without compromise. VDI provides:

- **Rich Windows experience** available on a variety of devices and platforms, including Windows, Windows RT, iOS, Mac OS X, and Android
- **Great value** with capabilities such as storage-tiering and online data deduplication to improve performance, scale, and solution economics
- **Efficient management** with the deployment wizard consolidated within Server Manager



Desktop Virtualization Aligning options with user and business requirements

The challenges

- *People want consistent access to corporate services wherever they are, on any device*
- *Organizations need to effectively manage the influx of consumer devices while continuing to deliver on operating efficiency without compromising compliance*

Benefits and Challanges

Virtual Desktop Infrastructure – it is a concept not a product

- Leverage the advantages of the data center for the desktop
- End users connect to a remote desktop, but have a local experience
- Enables a scalable highly available, highly accessible user environment
    - Server Virtualization High Availability Features
    - Rapid Provisioning (linked clones, storage cloning technologies)
    - Remote secure access via SSL or VPN technologies
    - Brokered Virtual Desktops, PC's, Blades, Terminal Sessions
    - Many connection options: thin clients, zero clients, PC's

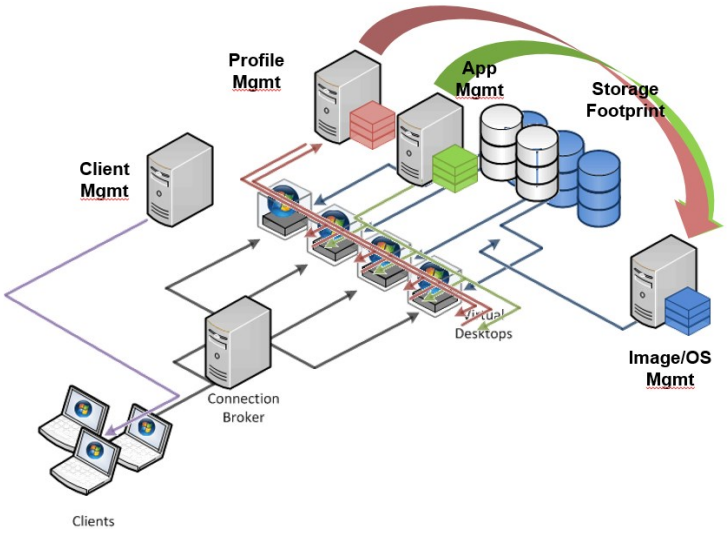
Security *– IP stays in the data-center*

Manageability *– device proliferation, OS image management & disaster recovery*

Resource Utilization *– keep shared resources busy for better ROI*

Data Centralization *– keep compute&storage resources closer in the data-center*

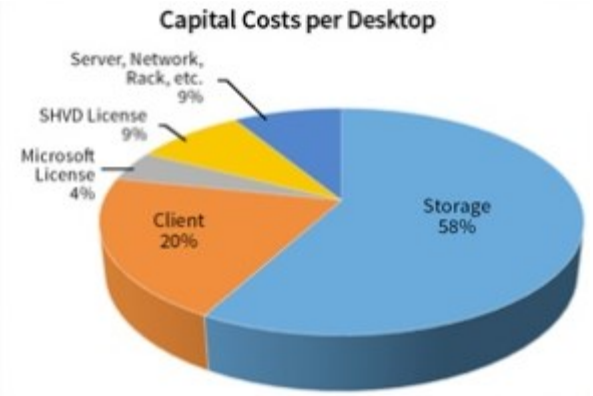
User Flexibility/Productivity *– any device, anywhere, anytime*



Efficient management

Unified administration	Provides one, integrated console for roles, servers, collections, users, and VMs. Simplifies management of pooled and personal VMs
Quick Deployment	Sets up a basic VM, a session-based VDI, a single server pilot, or a highly-available enterprise deployment in just a few clicks. The set-up wizard also easily enables the configuration of additional settings
RemoteApp	In addition to full desktops, publishes RemoteApp programs that run side by side with local applications.
Session Shadowing	Allows administrators to view and remotely control active user sessions on RD Session Host servers

Service Models



The term 'Virtual Desktop Infrastructure' (VDI), is generally used to describe infrastructure which allows the desktop OS to run on the server. In reality, however, it encompasses three different models:

- Session-based VDI.
- VM-based VDI (shared image).
- VM-based VDI (personal image).

Session-based VDI

This model has its roots in the 'terminal services' architecture that gained popularity in the 90s. Multiple users log onto a single 'multi-user' instance of the operating system executing on the server.

Pretty much all server resources are shared between users dynamically, but a 'session' is created for each user to keep their activity separate from everyone else's (very similar to traditional multi-user operating systems such as Unix).

The client can be 'thin' because it only needs to handle the display and the input; indeed 'zero clients' can contain just a network port and graphics card. However, session-based VDI can also be implemented using software-based thin clients, which, being relatively undemanding, can run on low spec equipment (an approach often used to extend the life of old PCs).

VM-based VDI (shared image)

Desktops are again executed on the server side of the network, but rather than multiple users sharing the same operating system instance (as they do in the session-based model), each one has their own dedicated OS instance, which we might refer to in this context as a discrete virtual machine or VM. Resources such as memory and CPU are dedicated to the VM while it is running (which has performance benefits), though most modern systems allow on-demand memory allocation so VMs only take control of what they actually need when they need it. In this shared image model, users with the same or similar OS-related requirements are grouped into 'pools', and all of their desktops are booted from the same OS image, sometimes referred to as a 'golden image'. Where requirements vary significantly between groups, a separate golden image is created for each.

VM-based VDI (personal image)

From a runtime execution perspective, this model is identical to the one we have just been discussing, i.e. each user has a discrete OS instance running on the server with dedicated resources. The difference, however, is that every user's desktop is booted from a separate OS image. This provides more user flexibility as each desktop can be uniquely set up and even tailored by the user (subject to policy). However, with each user's image being stored separately on disk, a lot more storage is required to implement this model, and management overhead is likely to be higher.

Hyperconvergence

Hyper-convergence is a type of infrastructure system with a software-centric architecture that tightly integrates compute, storage, networking and virtualization resources and other technologies from scratch in a commodity hardware box supported by a single vendor.

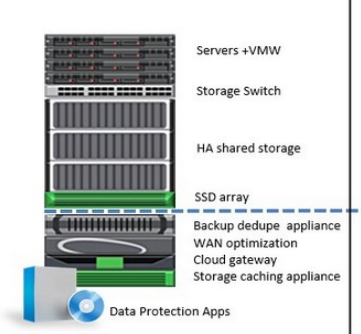
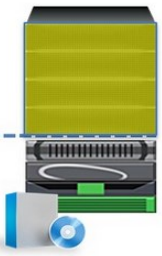
A hyper-converged system allows the integrated technologies to be managed as a single system through a common toolset. Hyper-converged systems can be expanded through the addition of nodes to the base unit. Common use cases include virtualized workloads. The "third wave" of converged infrastructure delivers the most value. Hyperconvergence is characterized by:

- A software-centric design;
- Commodity x86 hardware components that combine compute, storage, and network switching functionality in a single shared resource pool with hypervisor technology;
- A scalable "building block" approach that expands by adding additional units;
- A high degree of automation;
- The ability to manage aggregated resources across nodes as a single federated system;
- Integrated data protection with policies and control at the virtual machine level;
- A single vendor design, delivery and support.

Seven Ways to Apply Hyperconvergence

- *Consolidating servers and data center.*
- *Modernizing technology smoothly*
- *Deploying new tier-1 applications*
- *Deploying VDI.*
- *Managing sites remotely*
- *Performing testing and development*
- *Modernizing backup and implementing disaster recovery*

Path To Hyperconvergence and SDDC

Legacy Infrastructure Stack	Integrated Systems 1.0	Converged Systems 2.0	Hyper- Convergence 3.0
			
✓ Leverages Best of breed	✓ Limited Innovation	✓ Incremental Innovation	✓✓ Revolutionary Innovation
✗ TCO: High CAPEX, High OPEX	✗ TCO: High CAPEX, High OPEX	✓ Partial Savings	✓✓ Cost savings: 3x Lower TCO
✗ Islands, No pooling, Poor Resource utilization	✗ No pooling, no sharing of resources, limited scale-out	✓ Partial pooling, sharing of x86, storage resources	✓✓ Full pooling, sharing of all resources, scale-out
✗ Global Management: Very Complex	✓ Global Management: Limited improvements	✓ Global Management: Limited Improvement	✓✓ Unified Global Management & Automation
✗ Data Efficiency: Not integrated	✗ Data Efficiency: Not integrated	✗ No Data Efficiency, Data Protection Policy, DR	✓✓ Fully Integrated Data Efficiency, Policy-based Data Protection, DR
✗ Complex deployment	✓ Deployment time: Limited improvements	✓ Deployment time: small improvements	✓✓ Deployment time: Radical improvements, Simple

Hyperconvergence Benefits

Hyperconverged infrastructure addresses the performance, capacity, mobility, and management issues prevalent in previous waves of converged infrastructure. It achieves VM-centricity by tracking what data belongs to which virtual machine, enabling VM-mobility. By eliminating redundant read and write operations, hyperconverged infrastructure achieves performance efficiency. It achieves capacity efficiency by reducing the "footprint" of data on production and backup storage via deduplication, compression and optimization of data at inception. Hyperconverged infrastructure dramatically reduces total cost of ownership. It eliminates siloed technology, enables rapid application deployment, reduces labor-intensive activities, prevents over-purchasing and over-provisioning, and maximizes the infrastructure investment. The data efficiency introduced with deduplication, compression and optimization also improves performance.

So, at the highest level, hyperconvergence is a way to enable cloudlike economics and scale without compromising the performance, reliability, and availability you expect in your own data center. Hyperconverged infrastructure provides significant benefits:

Data efficiency: *Hyperconverged infrastructure reduces storage, bandwidth, and IOPS requirements.*

Elasticity: *Hyperconvergence makes it easy to scale out/in resources as required by business demands.*

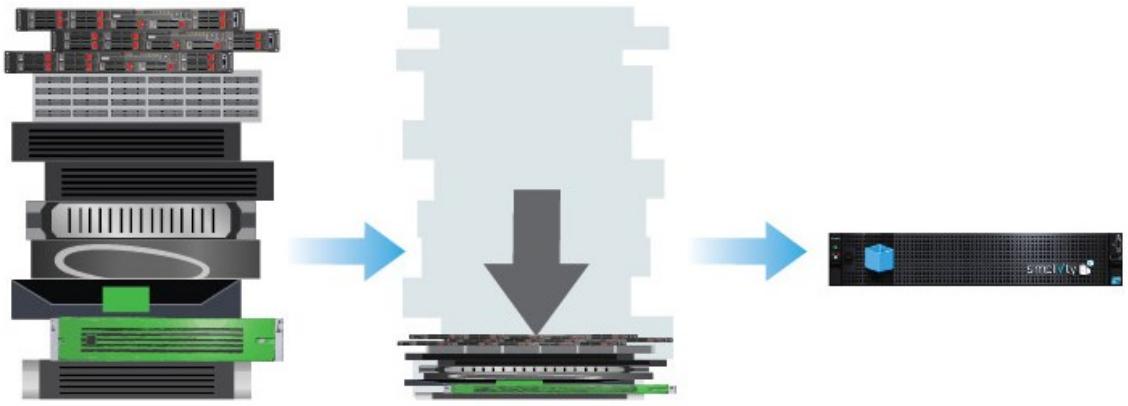
VM-centricity: *A focus on the virtual machine (VM) or workload as the cornerstone of enterprise IT, with all supporting constructs revolving around individual VMs.*

Data protection: *Ensuring that data can be restored in the event of loss or corruption is a key IT requirement, made far easier by hyperconverged infrastructure.*

VM mobility: *Hyperconvergence enables greater application/workload mobility.*

High availability*: Hyperconvergence enables higher levels of availability than possible in legacy systems.*

Cost efficiency: *Hyperconverged infrastructure brings to IT a sustainable step-based economic model that eliminates waste.*



Conclusion

Agility is a big deal in modern IT. Business expects IT to respond quickly as new needs arise, yet legacy environments force IT to employ myriad resources to meet those needs. VDI enables IT to achieve positive outcomes much faster.

Part of being agile is being able to move workloads as necessary. In a hyperconverged world, all resources in all physical data centers reside under a single administrative umbrella. Workload migration in such environments is a breeze, particularly in a solution that enables consistent deduplication as a core part of its offering. Reduced data is far easier to work with than fully expanded data and helps IT get things done faster.

Agility and speed are two mantras that every IT person should adopt. It's critical to ensure that the infrastructure is agile so that IT can quickly and easily deploy new applications and services in response to business demands.

VDI offers benefits for organizations and individuals. There are also privacy and security concerns. The VDI infrastructure not only lowers costs, but it also helps the IT team work proactively, employees can also access their virtual desktops regardless of location using a range of devices, including iOS and Android handsets. Turkiye Finans improves business agility with desktop virtualization.

References : Gartner, Oracle, Vmware, Microsoft, Cisco, HP and other several technology vendors and research companies.