



Virtualization

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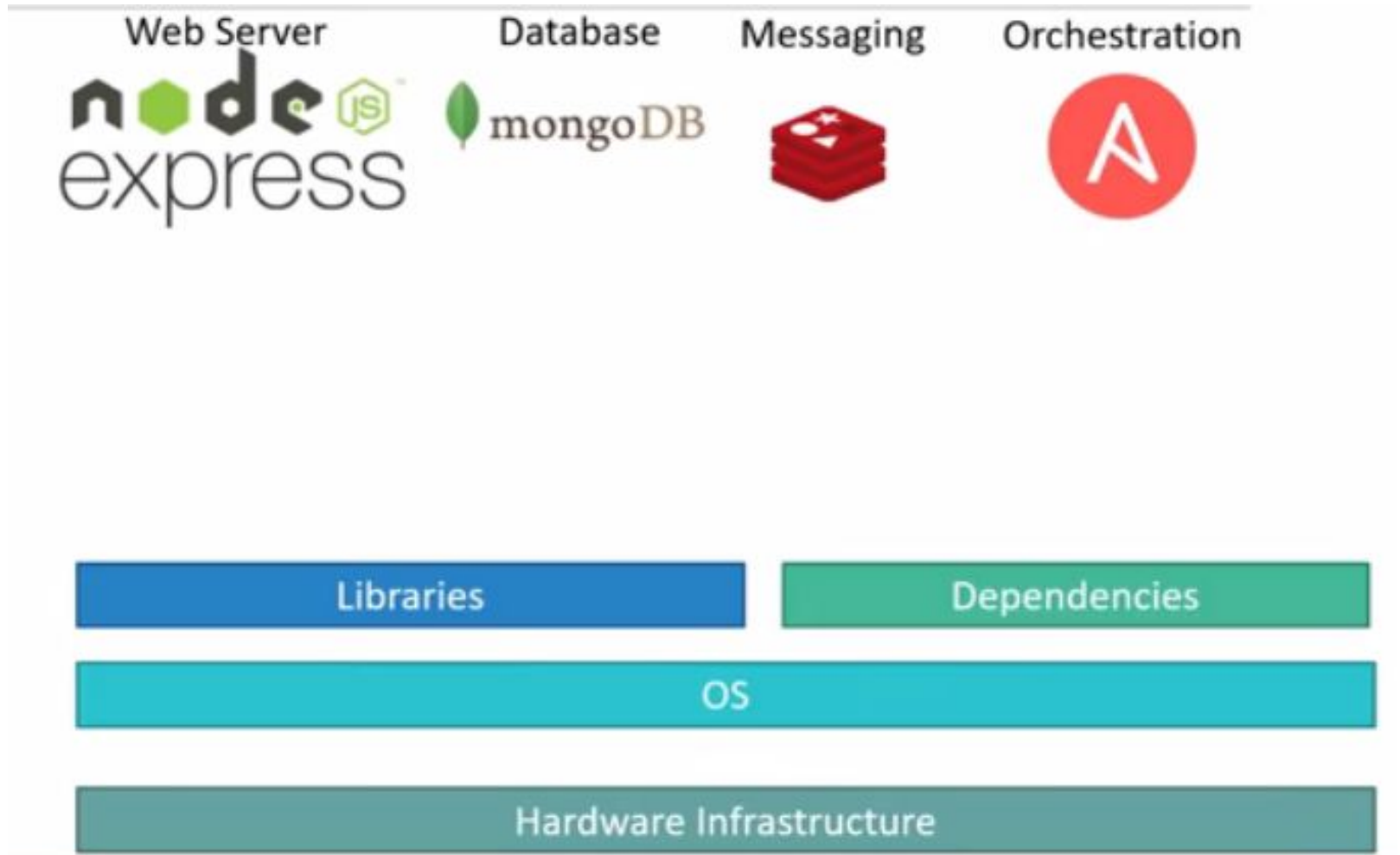
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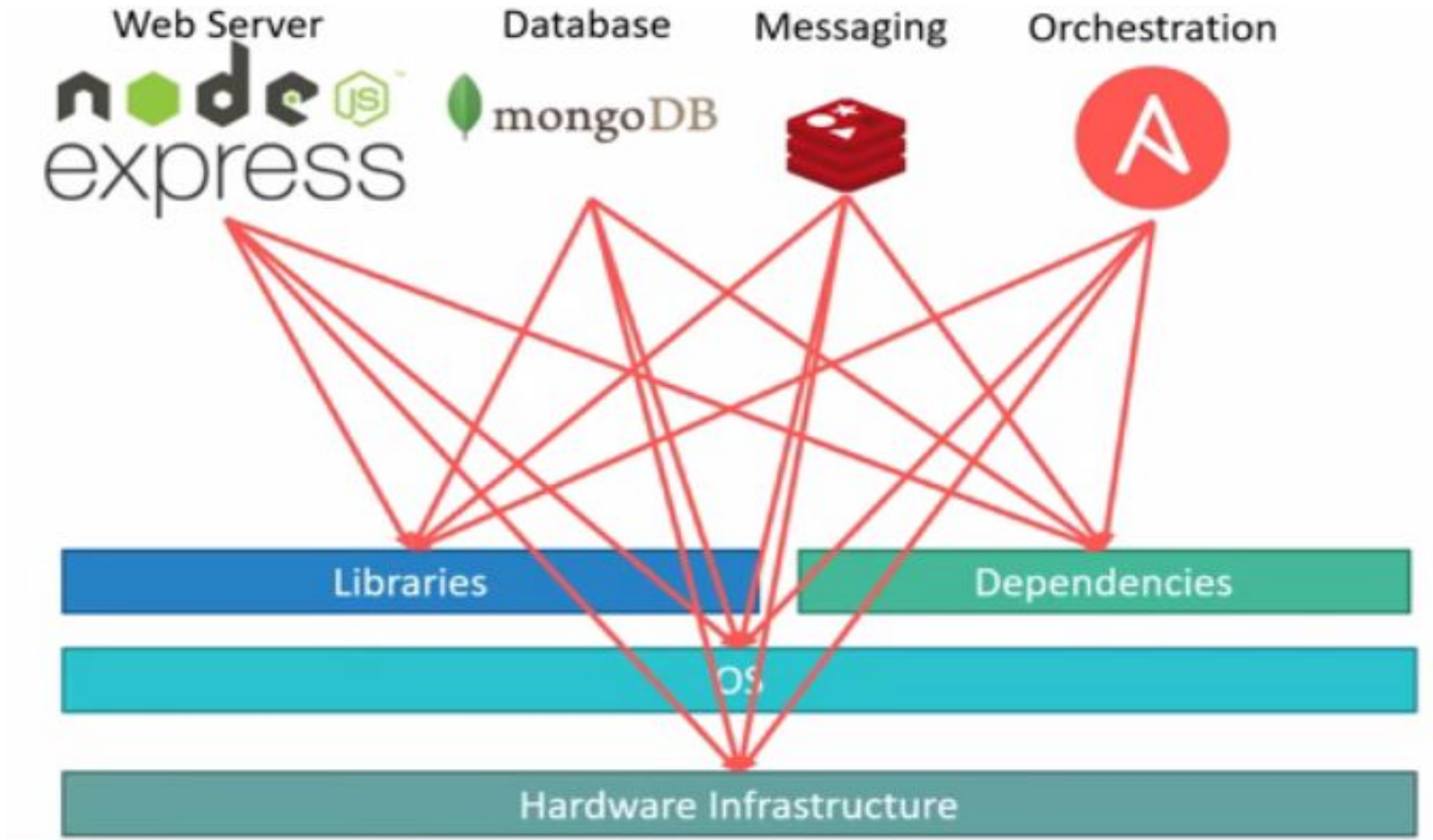
Types of Virtualization

- Server Virtualization.
- Desktop Virtualization.
- Application Virtualization.
- OS Virtualization.
- Network Virtualization.
- Storage Virtualization.

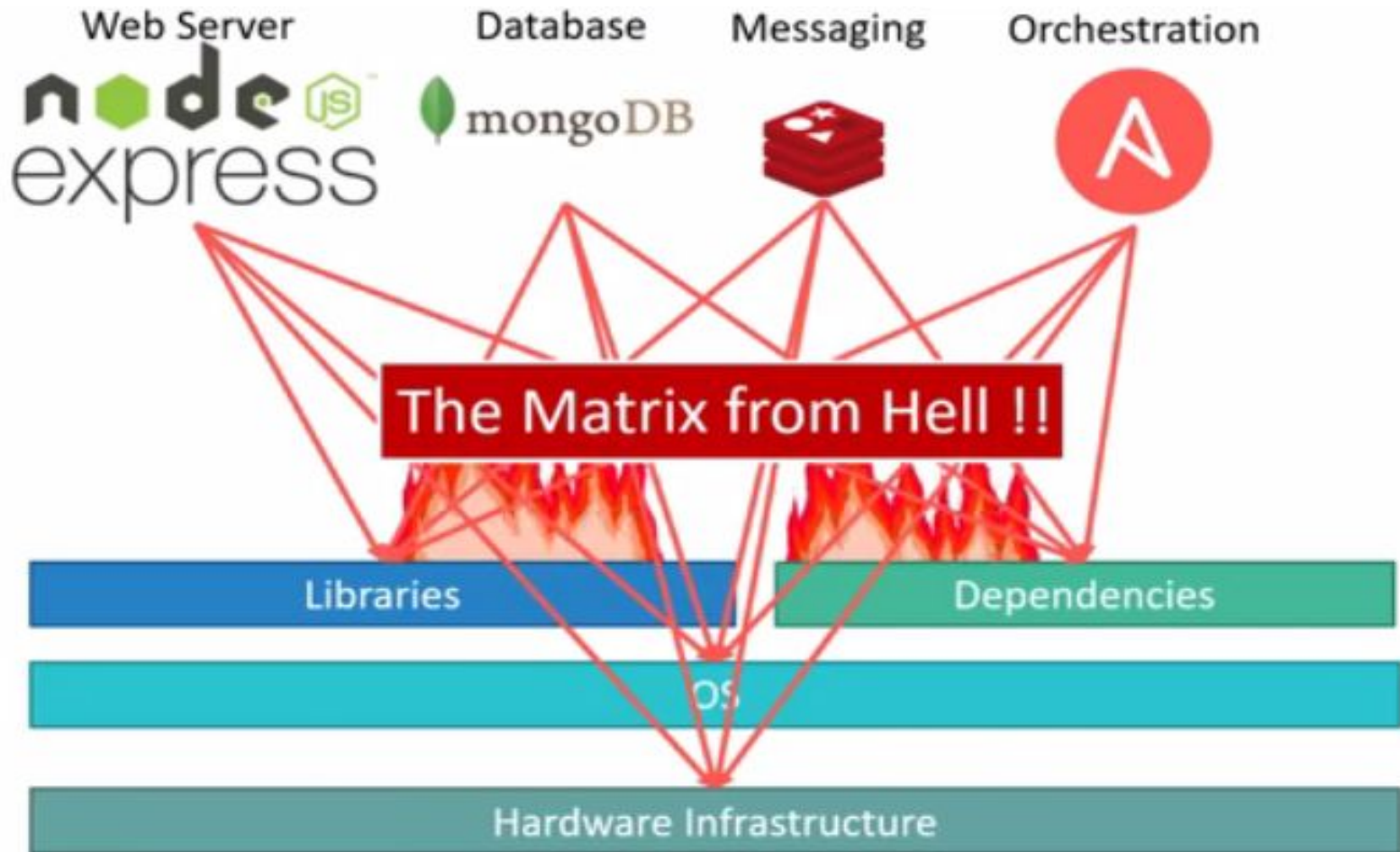
OS Virtualization



OS Virtualization



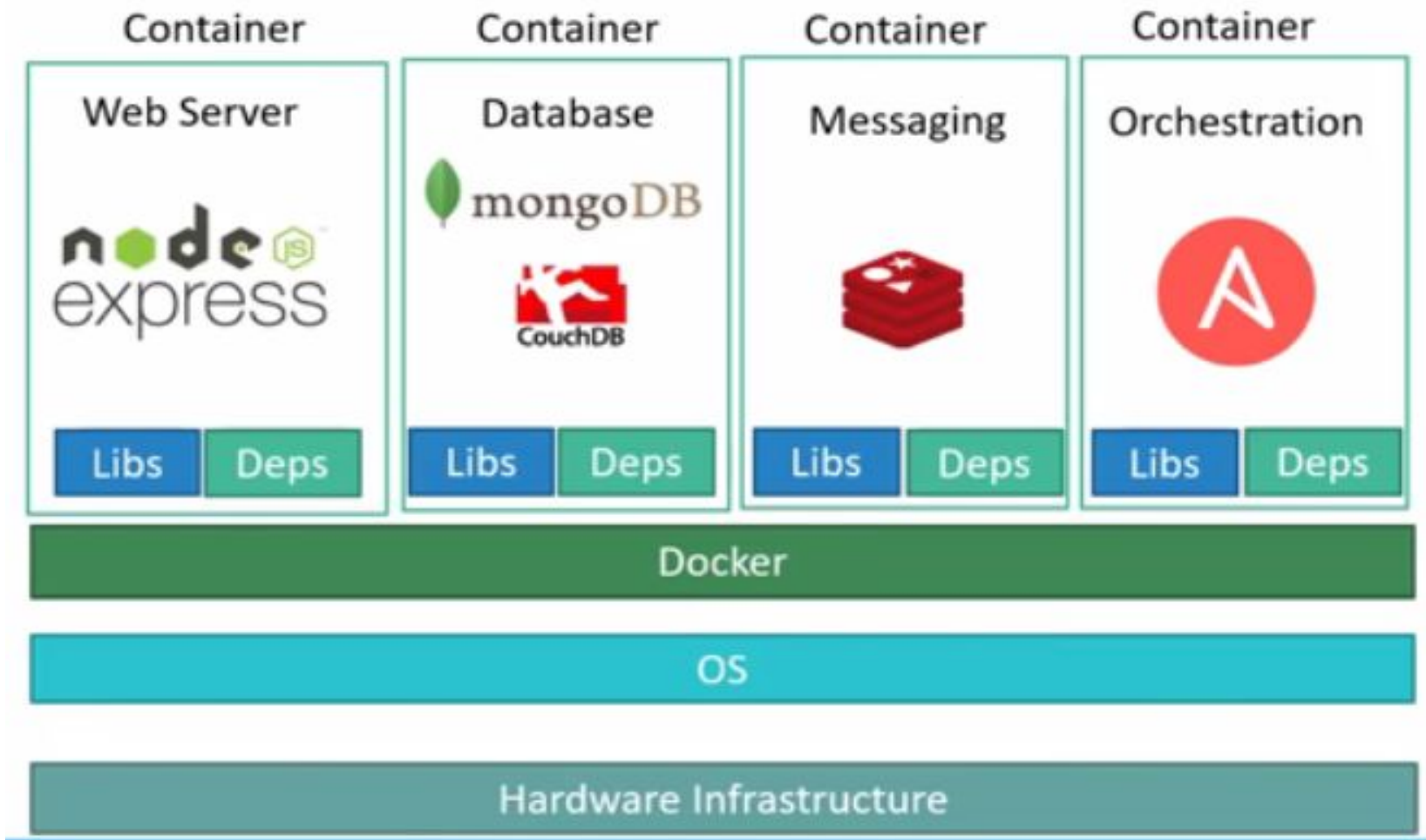
OS Virtualization



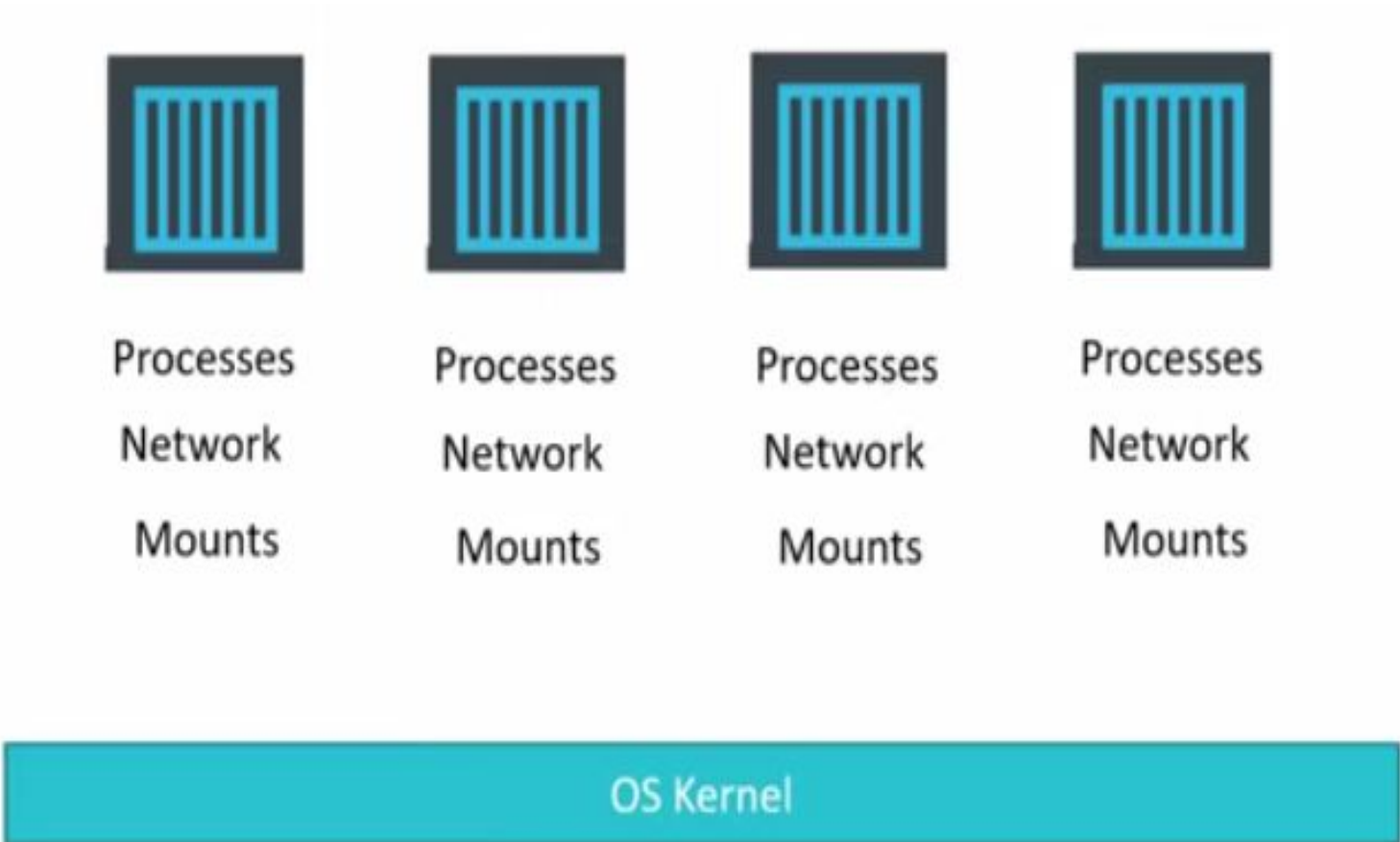
OS Virtualization

- Compatibility/ Dependency.
- Long Setup Time.
- Different Dev/ Test/ Prod environments.

OS Virtualization

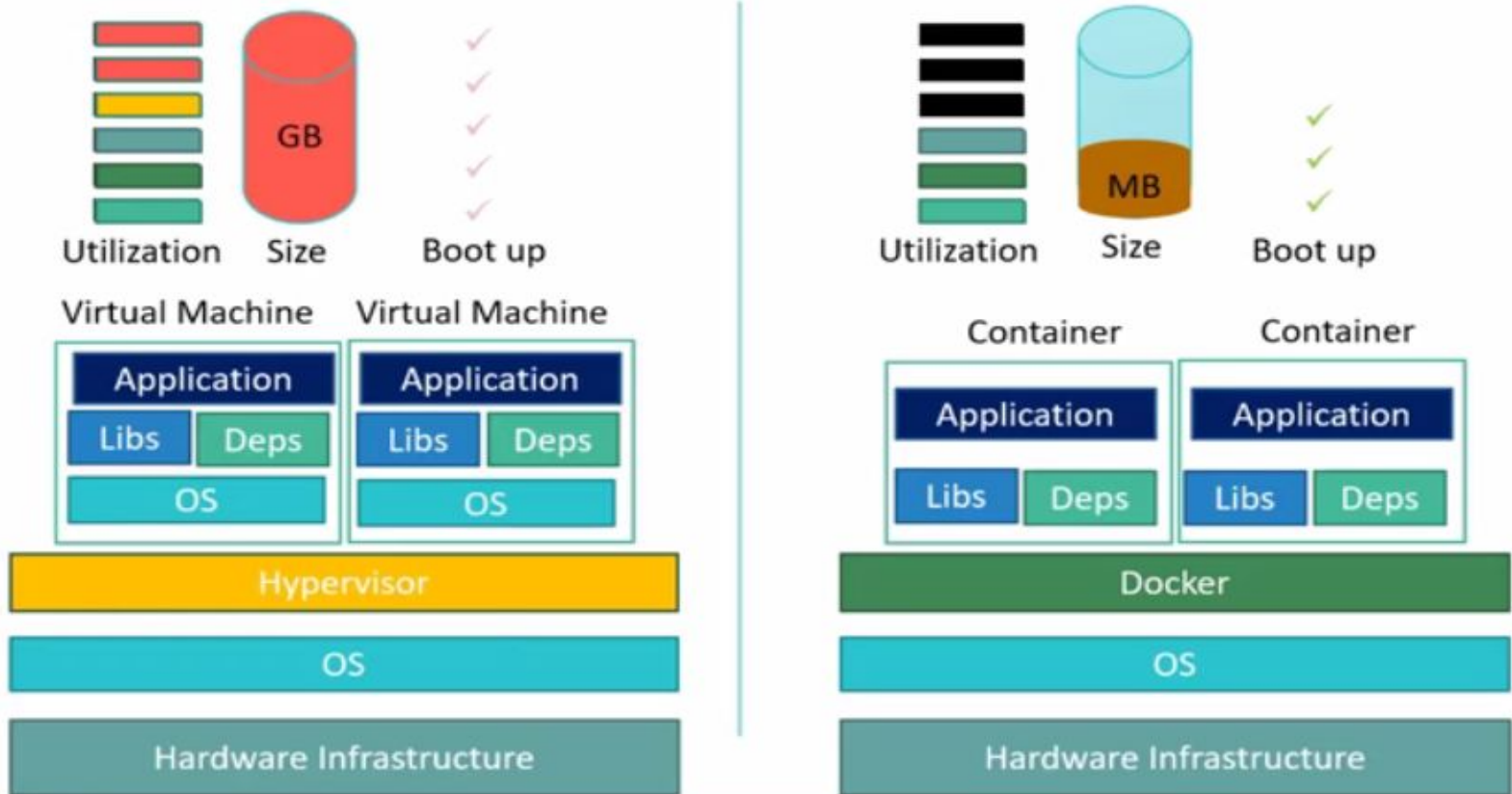


OS Virtualization



OS Virtualization

Containers vs Virtual Machines



OS Virtualization

VMs	Containers
Heavyweight	Lightweight
Limited performance	Native performance
Each VM runs in its own OS	All containers share the host OS
Hardware-level virtualization	OS virtualization
Startup time in minutes	Startup time in milliseconds
Allocates required memory	Requires less memory space
Fully isolated and hence more secure	Process-level isolation, possibly less secure

OS Virtualization

Benefits of Containers

- Reduced IT management resources
- Reduced size of snapshots
- Quicker spinning up apps
- Reduced & simplified security updates
- Less code to transfer, migrate, upload workloads.
- LXC, LXD, Docker, Windows Server Containers.

Desktop Virtualization

How Desktops Are Used Today

- All processing and most storage is done on the local PC
- OS and apps installed individually, imaging software is used, or remote install is done
- Windows roaming profiles are used for user customizations
- File shares are used for storage
- Applications and OS are updated with software deployment tool



Desktop Virtualization

Desktop PC Nightmare

- Too many PCs
- Too much time on administration
- Too many app updates
- PC replacements
- Issues with roaming and remote access
- Frustrated end users
- Exhausted desktop admins



Desktop Virtualization

VDI Solves Desktop Problems

- App patching resolved with application virtualization
- Deployment resolved with thin clients and linked clone golden images
- Backup and recovery resolved by separation of user data from apps/OS
- Users creating problems resolved by separation of user data from work image

Desktop Virtualization

Desktop Virtualization Saves Us All

Add new desktops FAST
(both for end users and admins)

Reduce maintenance time

Application upgrades and
patches are now FAST & EASY



Reduce time (and money)
administering &
troubleshooting desktops

Allow access to the same
desktop wherever the
user goes

Datacenter features for
desktops (backup/DR/HA)

Desktop Virtualization

IT Benefits of Using VDI

- Centralized control of end user data, apps, and devices
- Greater security for end user data
- Fast deployment of new desktops
- Built-in remote access for end users
- Fast OS and app upgrades

Desktop Virtualization

How Desktop and Server Virtualization are Different

- **Server**

- Virtualizing physical servers in the datacenter



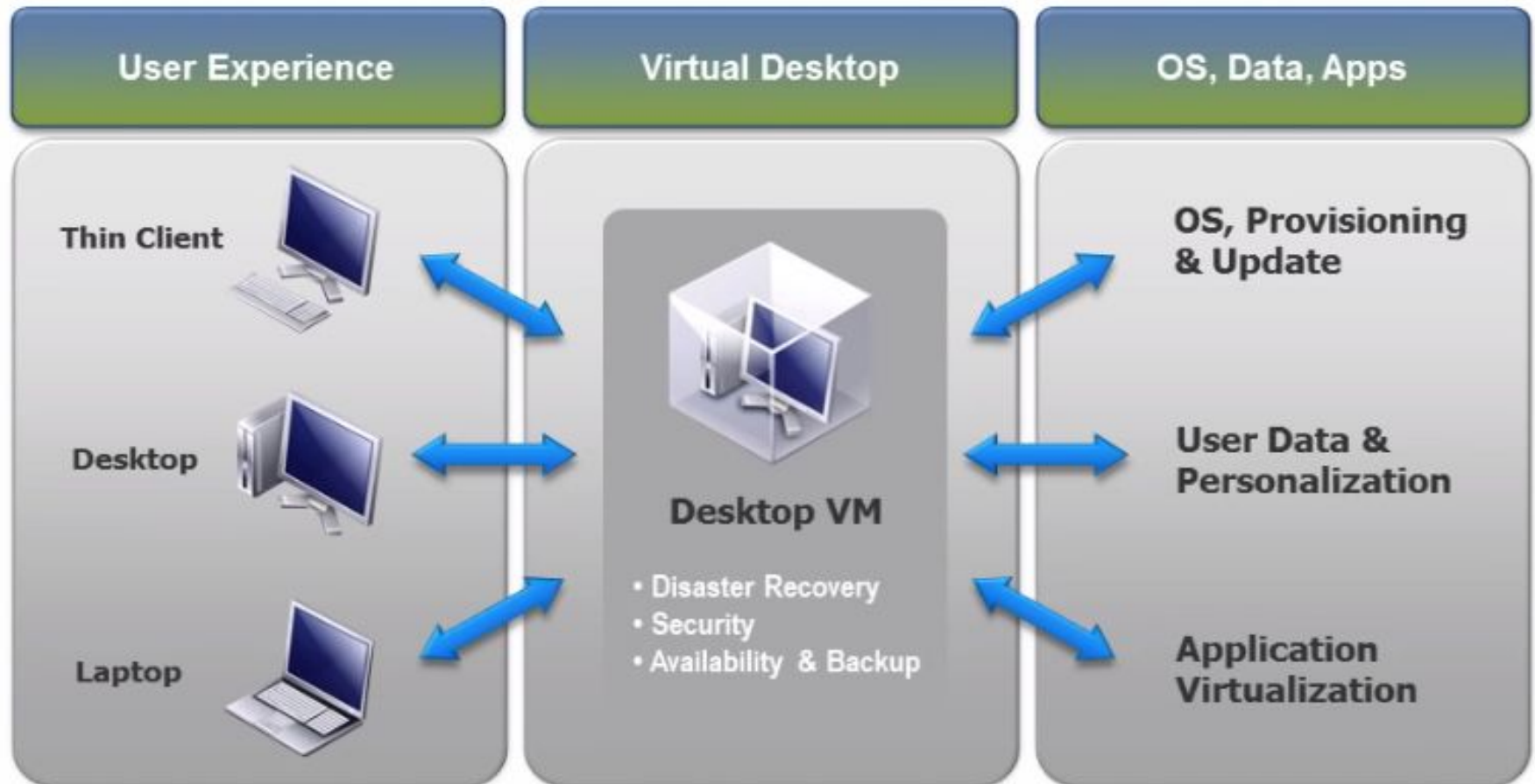
- **Desktop**

- Virtualizing end user desktops into the datacenter
- Virtual desktops are connected via a broker
- Virtual desktops are usually “linked clones” from a single image

- They are the same because they all end up running on a hypervisor, on virtual hosts, and in the datacenter
- Server and Desktop virtualization are more similar than other forms of virtualization

Desktop Virtualization

How Desktop Virtualization Works



Desktop Virtualization

Desktop and Application Virtualization Working Together

- Application virtualization decouples applications from the OS so they don't require install, are more easily managed, and are independent of the OS
- Most VDI implementations use application virtualization with desktop virtualization to manage end user applications easier
- In fact, in some cases, application virtualization is managed from the same interface as desktop virtualization and end users (or their devices) can be assigned virtualized apps
- Examples:
 - VMware ThinApp and View
 - Citrix XenApp and XenDesktop

Desktop Virtualization

Advantages of VDI

- Data center capabilities for virtual desktops – DR/BU/HA
- Low cost of rolling out new apps and OS to end users
- Imaging & linked clones for end user desktops
- Separate between user data, programs, and OS
- Refresh cycle for end user devices is much longer
- Easy remote access for end users to their desktop, through various devices
- Tremendously quicker provisioning of new desktops

Desktop Virtualization

Limitations of VDI

- Initial design and setup can be complex
- Certain apps can cause issues or not perform well
- Remote users are dependent on connection to central datacenter
- Datacenter and network downtime can cause all users to be down
- May have higher upfront costs (which are returned in the long run with lower support costs)
- Central datacenter and network must be properly designed and understood

Application Virtualization

- Encapsulates computer programs from the underlying operating system on which they are executed.
- A fully virtualized application is not installed in the traditional sense.
- The application behaves at runtime like it is directly interfacing with the original operating system and all the resources managed by it, but can be isolated or sandboxed to varying degrees.

Application Virtualization

- The layer intercepts all disk operations of virtualized applications and transparently redirects them to a virtualized location, often a single file.
- The application remains unaware that it accesses a virtual resource instead of a physical one.

Application Virtualization

- Since the application is now working with one file instead of many files spread throughout the system, it becomes easy to run the application on a different computer and previously incompatible applications can be run side by side.
- Cameyo, Ceedo, Citrix XenApp, Microsoft App-V, VMWare ThinApp.

Application Virtualization Benefits

- Allows applications to run in environments that do not suit the native application.
- Reduces system integration and administration costs by maintaining a common software baseline across multiple diverse computers in an organization.
- Lesser integration protects the operating system and other applications from poorly written or buggy code.

Application Virtualization Benefits

- It allows incompatible applications to run side by side.
- Isolating applications from the operating system has security benefits as well, as the exposure of the application does automatically entail the exposure of the entire OS.
- Application virtualization uses fewer resources than a separate virtual machine.

Application Virtualization Limitations

- Not all computer programs can be virtualized. Some examples include applications that require a device driver .
- Anti-virus programs and applications that require heavy OS integration, such as WindowBlinds or StyleXP are difficult to virtualize.

Application

Virtualization Implementation

- Application streaming: Pieces of the application's code, data, and settings are delivered when they're first needed, instead of the entire application being delivered before startup. Running the packaged application may require the installation of a lightweight client application. Packages are usually delivered over a protocol such as HTTP, CIFS

Application

Virtualization Implementation

- Remote Desktop Services (formerly called Terminal Services) is a server-based computing/presentation virtualization component of Microsoft Windows that allows a user to access applications and data hosted on a remote computer over a network. Remote Desktop Services sessions run in a single shared-server operating system (e.g. Windows Server 2008 R2 and later) and are accessed using the Remote Desktop Protocol.

Application

Virtualization Implementation

- Desktop virtualization software technologies improve portability, manageability and compatibility of a personal computer's desktop environment by separating part or all of the desktop environment and associated applications from the physical client device that is used to access it. A common implementation of this approach is to host multiple desktop operating system instances on a server hardware platform running a hypervisor. This is generally referred to as "virtual desktop infrastructure" (VDI).