

Welcome to Module 8

Sharing Resources and vCenter Clustering

Migrating VM



ESXi1

vMotion Network



ESXi2

Will cover COLD migration

- Without vMotion
- Without VMWare cluster
- Without HA feature enabled.

vMotion



ESXi1

vMotion Network



ESXi2

vMotion (Live Migration)

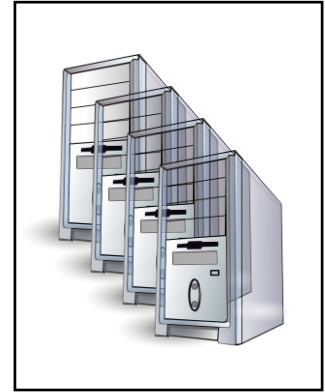
- VMware vSphere vMotion or live migration allows you to move an entire running virtual machine from one physical server to another, with no downtime.
- The virtual machine retains its network identity and connections, ensuring a seamless migration process.
- Transfer the virtual machine's active memory and precise execution state over a high-speed network, allowing the virtual machine to switch from running on the source vSphere host to the destination vSphere host. This entire process takes less than two seconds on a gigabit Ethernet network.

Live migration allows you to:

- Automatically optimize virtual machines within resource pools
- Perform hardware maintenance without scheduling downtime or disrupting business operations
- Move virtual machines away from failing or underperforming servers.

VMWare Cluster

- A cluster is a group of hosts. When a host is added to a cluster, the resources of the host become part of the resources of the cluster.
- The cluster manages the resources of all hosts
- Clusters enable, vSphere High Availability (HA), vSphere Distributed Resource Scheduler (DRS), and the VMware vSAN features
- A cluster is useless if HA or DRS features are not used



VMWare vSphere High Availability (HA)

- vSphere HA clusters allow ESXi hosts to work together as a group and provide performance assurance and higher levels of availability for hosted virtual machines
- High Availability provides uniform, cost-effective failover protection against hardware and operating system outages within your virtualized IT environment.
- High Availability allows you to:
 - Monitor VMware vSphere hosts and virtual machines to detect hardware and guest operating system failures.
 - Restart virtual machines on other vSphere hosts in the cluster without manual intervention when a server outage is detected.
 - Reduce application downtime by automatically restarting virtual machines upon detection of an operating system failure



VMWare vSphere High Availability (HA)

- When you add a new host to a vSphere HA cluster, an agent is uploaded to the host and configured to communicate with other agents in the cluster
- Every cluster has one master host, and all other hosts in the cluster act as subordinate hosts. The host roles are automatically determined through an election process, and the master host is responsible for detecting and appropriately resolving failures in the cluster.



Migration of VMs with HA



ESXi1

LIVE



ESXi2

HA Cluster Requirement

- All ESX/ESXi hosts must be same version and same patch level.
 - All hosts must be licensed for vSphere HA
 - A minimum of 2 ESXi servers in a cluster is required
 - Each host must have a vMotion NIC configured
-
- There must be at least 2 shared HA heartbeat datastores attached to each host (NFS or NAS)
 - All VMs must be on shared storage
 - All hosts must have access to a shared datastore (NFS or NAS)
 - VMware HA must be enabled on the cluster.



Shared Storage for HA

1

- ✓ Create a new VM on VMWare workstation player
- ✓ Install CentOS

2

- ✓ Add 2 new hard disks
- ✓ Create partition
- ✓ Setup and share NFS

3

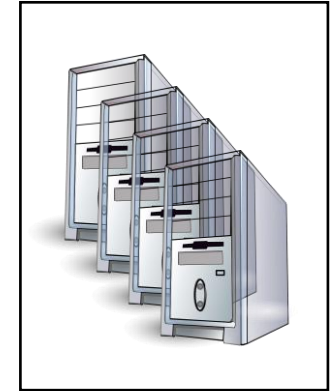
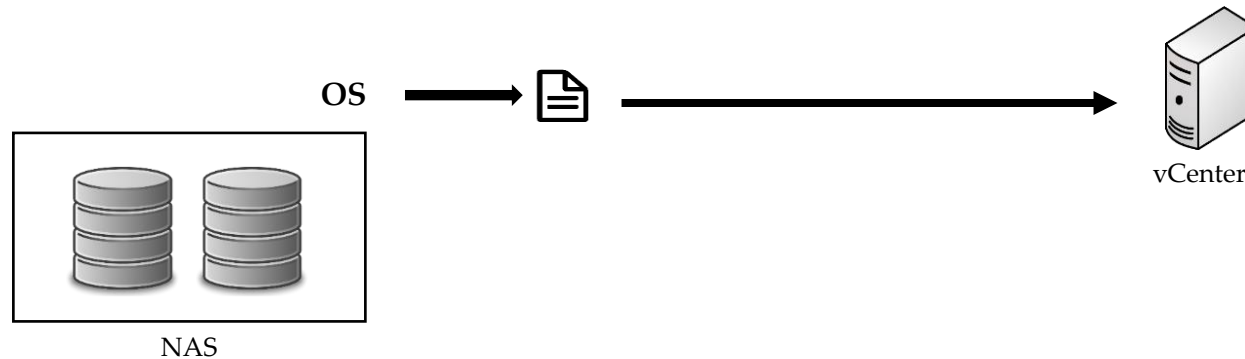
- ✓ Mount NFS on vCenter
- ✓ Move VM storage from local to shared
- ✓ Setup and configure HA



Please note...

Shared Storage for HA

- NFS service can be setup through a dedicated NAS device



**Skip the next 2 videos and go straight to
"Setup NFS from NAS device"**

Install Linux

1



- Install Linux CentOS version 7 on VMWare Workstation Player
- Specification
 - 1G RAM
 - 1 CPU
 - 20G HDD

Setup and Share NFS

- Install NFS
 - `# yum install nfs-utils libnfsidmap -y`
- Enable NFS on start
 - `# systemctl enable rpcbind`
 - `# systemctl enable nfs-server`
 - `# systemctl start rpcbind`
 - `# systemctl start rpc-statd`
 - `# systemctl start nfs-idmapd`
- Add 2 disks from workstation player (100G and 5G)
- Reboot Linux VM
- Create xfs partitions on Linux
 - 100G share = VMs
 - 5G share = vCenter heartbeat
 - `# fdisk /dev/sdb`
 - `n → p → enter → enter → w`
 - `# mkfs.xfs /dev/sdb1`



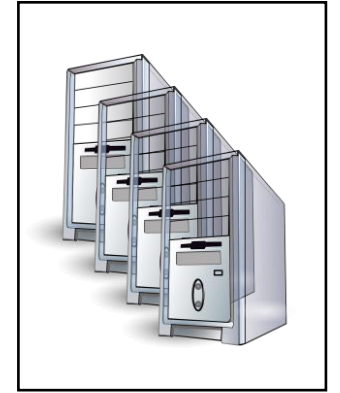
Setup and Share NFS

- Create NFS mount points and mount
 - `# mkdir /shared`
 - `# mkdir /qoram`
 - `# mount /dev/sdb1 /shared`
 - `# mount /dev/sdc1 /qoram`
- Add NFS mounts to /etc/fstab for auto-mount
 - `# /dev/sdb1 /shared xfs defaults 0 0`
 - `# /dev/sdc1 /qoram xfs defaults 0 0`
- Add the entry to /etc/exports
 - `# /shared *(rw,sync,no_root_squash)`
 - `# /qoram *(rw,sync,no_root_squash)`
- Export the NFS share
 - `# exportfs -rv`
- Stop and disable firewall
 - `# systemctl stop firewalld`
 - `# systemctl disable firewalld`



Setup and Share NFS from NAS Device

- In this video we will learn...
 - Physical layout of a NAS device
 - Setup storage RAID, pool and 2 volumes (100G and 10G)
 - Create shared folders (shared = 100G and qoram = 10G) over NFS service which will be mounted on vCenter



Please note...

If you have setup NFS on Linux VM then you can simply skip this video, however I would highly recommend that you watch it to understand how NFS can be setup over a NAS device

NAS Device for Filesystem Sharing

- In this video we will learn...
 - Physical layout of a NAS device
 - Setup, configure and manage NAS device
 - Create shared filesystem (NFS and Samba)
 - Mount shared folder from the NAS device to Linux and Windows

Mount NFS and Migrate VM

3

- Mount NFS on hosts
 - 192.168.19.5 and 192.168.19.6
- Move VMs storage from local to shared

4

- Create vSphere cluster, Setup and configure HA

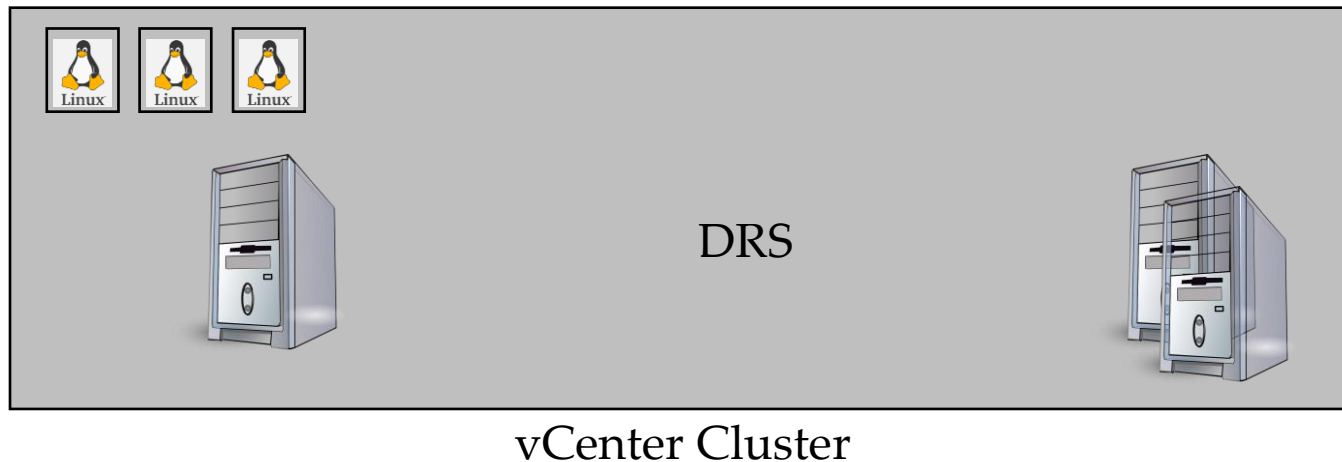
Setup and Configure HA

4

- Create vSphere cluster without HA/DRS
- Move hosts into cluster
- Setup and configure HA
- Test HA.

Distributed Resource Scheduler (DRS)

- VMware vSphere Distributed Resource Scheduler (DRS) is a feature included in the vSphere Enterprise Plus.
- Using DRS, you can: Improve service levels by guaranteeing appropriate resources to virtual machines
- Provide highly available resources to your workloads.
- Balance workloads for optimal performance.
- Scale and manage computing resources without service disruption.



Sequence of Starting and Shutting VMWare vSphere Environment

Starting order:

1. NFS Server (Linux VM)
2. ESXi running vCenter
3. Other ESXi
4. vCenter VM (appliance) (5-10m)

Shutdown order:

1. vCenter VM (wait until complete shutdown)
2. ESXi running vCenter
3. Other ESXi
4. NFS Server (Linux VM)

Datastore Cluster

- A datastore cluster is a collection of datastores with shared resources and a shared management interface. Datastore clusters are to datastores what clusters are to ESXi hosts. After you create a datastore cluster, you can use vSphere Storage DRS to manage storage resources.
- When vSphere Storage DRS is enabled on a datastore cluster, vSphere automates the process of initial virtual machine file placement and balances storage resources across the cluster to avoid bottlenecks. vSphere Storage DRS considers datastore space usage and I/O load when making migration recommendations.

