

# **Enterprise Standards and Best Practices for IT Infrastructure**

## **Lab Report**

VMware vMotion

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## **VMware VMotion**

### **What is VMotion??**

VMware VMotion enables the live migration of running virtual machines from one physical server to another with zero downtime, continuous service availability, and complete transaction integrity. It is transparent to users.

### **How Does VMotion work??**

First, the entire state of a virtual machine is encapsulated by a set of files stored on shared storage. VMware's clustered Virtual Machine File System (VMFS) allows multiple installations of ESX Server to access the same virtual machine files concurrently.

Second, the active memory and precise execution state of the virtual machine is rapidly transferred over a high speed network. This allows the virtual machine to instantaneously switch from running on the source ESX Server to the destination ESX Server. VMotion keeps the transfer period imperceptible to users by keeping track of on-going memory transactions in a bitmap. Once the entire memory and system state has been copied over to the target ESX Server, VMotion suspends the source virtual machine, copies the bitmap to the target ESX Server, and resumes the virtual machine on the target ESX Server. This entire process takes less than two seconds on a Gigabit Ethernet network.

Third, the networks used by the virtual machine are also virtualized by the underlying ESX Server. This ensures that even after the migration, the virtual machine network identity and network connections are preserved. VMotion manages the virtual MAC address as part of the process. Once the destination machine is activated, VMotion pings the network router to ensure that it is aware of the new physical location of the virtual MAC address. Since the migration of a virtual machine with VMotion preserves the precise execution state, the network identity, and the active network connections, the result is zero downtime and no disruption to users.

## **Pre Requisites for vMotion**

- The hosts must be licensed for vMotion (at least one vSphere Essentials Plus license on the corresponding ESXi host).
- At least one vMotion interface (minimum 1GB adapter)
- Same naming for virtual port groups
- Same VLAN and VLAN label.
- Sufficient resources on the target hosts
- All hosts should have access to the same datastores and networks.
- Virtual machine should be running on one of the supported operating systems.

## **Software Requirements for vMotion**

- The hosts must be running ESXi 5.1 or later.
- VMware tools should be installed.

## **Hardware Requirements for vMotion**

- CPU compatibility
- Processor compatibility
- No CD ROM attached
- Shared central mass storage
- GigaBit Ethernet network between hosts

## **Advantages and Disadvantages of vMotion**

### **Advantages**

- Perform hardware maintenance without any scheduled downtime
- Automatically optimize and allocate entire pools of resources for maximum hardware utilization and availability.
- Proactively migrate virtual machines away from failing or underperforming servers
- Load balancing
- Useful when performing maintenance on the ESXi host

### **Disadvantages**

- Does not allow migration with vMotion between Intel and AMD processors.
- BIOS settings of the hosts need to enable hardware virtualization and execute protection.

## Steps of doing vMotion on VMware

1. Power on the ESXi hosts and connect using VMware vSphere client software.
  2. Create a virtual machine on the host and power on it.
  3. Select the host and go to 'Configuration' tab.
  4. Go to 'Networking' and click on 'Add Networking' to create the vSwitch.
  5. Choose 'VMkernel' on ADD Network Wizard and click on Next.
  6. Choose 'Create a vSphere standard switch' and click on Next.
  7. Provide a network label and set 'Use this port group for vMotion'.
  8. Set the IP settings (IP address and subnet mask) and click on Next.
  9. Click on Finish.
  10. Go to 'Networking' tab and click on 'Add Networking'.
  11. Perform the same steps from step 4 to step 8. (When providing an IP in IP settings provide a different IP than the earlier one)
  12. Click on Next and Finish.
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1. Right click on a virtual machine and click on Migrate.
  2. Select 'Change host' and click on Next.
  3. Select the target server where to move the virtual machine and click on Next.
  4. Select the vMotion priority as 'High priority' and click on Next.
  5. Click on Next from the 'Ready to Complete' tab.
  6. Click on Finish to start the migration. It will take 60 seconds (approx.) to complete the migration process.
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(Screenshots of the demonstration cannot be provided at this time due to the lack of hardware requirements of the Laptop.)

