SRI LANKA INSTITUTE OF INFORMATION TECHNOLOGY

Enterprise Standards and Best Practices for IT Infrastructure

Lab Assignment 07

VMotion

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Date of Submission: 17.09.2016

VMotion (Virtual Machine Migration)

Introduction

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.

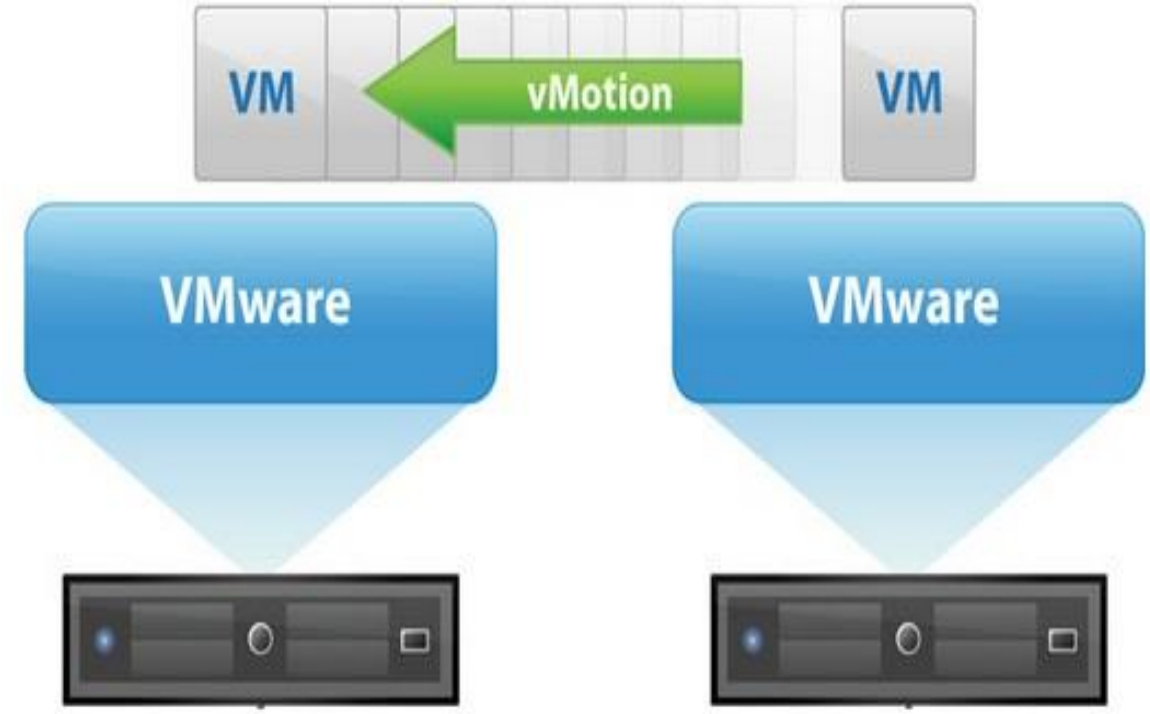
VMotion allows user to:

- Automatically optimize and allocate entire pools of resources for maximum hardware utilization and availability.
- Perform hardware maintenance without any scheduled downtime.
- Proactively migrate virtual machines away from failing or underperforming servers.

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.



VMotion Requirements

VMware VMotion application mobility is based on certain infrastructure requirements:

- An IP network with a minimum bandwidth of 622 Mbps is required.
- The source and destination VMware ESX servers must have a private VMware VMotion network on the same IP subnet and broadcast domain.
- Access from VMware vCenter, the VMware Virtual Infrastructure (VI) management GUI, to both the VMware ESX servers must be available to accomplish the migration.

- The IP subnet on which the virtual machine resides must be accessible from both the source and destination VMware ESX servers. This requirement is very important because a virtual machine retains its IP address when it moves to the destination VMware ESX server to help ensure that its communication with the outside world (for example, with TCP clients) continues smoothly after the move.
- The data storage location including the boot device used by the virtual machine must be active and accessible by both the source and destination VMware ESX servers at all times.

- The maximum latency between the two VMware vSphere servers cannot exceed 5 milliseconds (ms).

The process goes like this:

- It is determined that a running VM needs to be migrated from ESX 1 to ESX 2. (This is called vMotioning).

- The memory bitmap of the VM is copied from ESX 1 to ESX 2, while changes that continue to be made are written out to a bitmap on ESX 1.

- The VM is disabled on ESX 1 and its memory bitmap is copied over to ESX 2.

- The VM is then restarted (within milliseconds) onto ESX 2, and all of its access is now routed to the copy of the VM's memory, which is now running on ESX 2.

- Now, the remainder of the VM's memory is copied over to ESX 2, while the memory is still in the process of being read and written from ESX 1.

- When the live migration goes successfully, the VM is now completely unregistered from ESX 1 and running smoothly on ESX 2.

- The physical switch the ESX is connected to will be informed by the ESX host using reverse ARP.

Actions

- We connect to Virtual Center and gain access to one of the servers 2. We select the tab Configuration-> Network Adapters and we see that we have visibility of the new connections.

- Navigate to Configuration-> Networking

- Create a new network VSwitch

- Choose required VMKernel

- New port group for vMotion is been labeled for the different network if you want (optional) and click on Next. We for example we put Vmotion

- We set Use the following IP settings. IP Address as 50.50.50.1 and Subnet Mask as 255.255.255.252 (We use only 2 ip's).

- The entire system is been tested to check working properly to migrate a VM from one ESXi to the using Vmotion functionality you just configured.

- Select the target server where we will move the virtual machine.

- Completion of VM Migration