Sri Lanka Institute of Information Technology

ESBPII - LAB 6

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Vmotion group assignment

What is v motion?

V-Motion allows move virtual servers and desktops from one physical server to another without having to shut down the virtual desktop or server. All of this is done in real time without the user of the virtual machine even knowing they have been moved. V-Motion is the first step among many VMware software solutions that are incorporated to make sure that downtime is kept to a minimum, which include Fault Tolerance, High Availability, and Digital Resource Scheduler.

Requirement

•CPU compatibility

•V-Motion interface (minimum 1 Gb adapter)

•shared central mass storage

•same naming for virtual port groups

•sufficient resources on the target host

•at least one vSphere Essentials Plus license on the corresponding ESX host

vmotion compatibility

V Motion has quite a few requirements that need to be in place before it will work correctly. Here is a list of the key requirements for V Motion to work.

- Each host must be correctly licensed
- Each host must meet shared storage requirements
- Each host must meet the networking requirements
- Each compatible CPU must be from the same family

When configuring vMotion between hosts I would recommend keeping to one brand of server per cluster, i.e. Dell, HP, IBM. Also always ensure that these servers are compatible with each other. You can confirm this by speaking to the server manufacturer.

A very important item to consider is to always ensure you are using the latest BIOS version on each of your hosts. Ensuring that the CPU's are compatible with each other is essential for vMotion to work successfully, this is because the host that the virtual machine migrates to has to be capable of carrying on any instructions that the first host was running.

If a virtual machine is successfully running an application on one host and you migrate it to another host without these capabilities the application would most likely crash, possibly even the whole server would crash, hence why vMotion compatibility is required between hosts before you can migrate a running virtual machine.

It is user-level instructions that bypass the virtualisation layer such as Streaming SIMD Extensions (SSE), SSE2 SSSE3, SSE4.1 and Advanced

Encryption Standard (AES) Instruction Sets that can differ greatly between CPU models and families of processors, and so can cause application instability after the migration.

What are the benefits?

The main benefit is that you can add servers with the latest processors to your existing cluster(s) seamlessly and without incurring any downtime. More importantly, EVC (Enhanced vmotion compatibility) provides you with the flexibility required to scale your infrastructure, lessening the need to decommission older servers prematurely, thus maximizing ROI. It also paves the way for seamless cluster upgrades once the decision to retire old hardware is taken.

• Automatically optimize and allocate entire pools of resources

By having all server and/or desktops virtualized we can move VM's from one physical host to another, which is done rapidly over a high speed network connection, the original host and destination host stay in sync until the transfer it complete leaving the user unaware of the move. This allows network administrators to easily select resource pools to assign to the different VMs.

• Move VM's from failing or underperforming priorities

If there looks like a server is about to fail or is reaching its capacity, administrators can manually move VMs to another physical host, this allows us data center to be more dynamic in nature. Instead of having to upgrade hardware, we can move VM to another host to allow each VM to be more flexible in nature. If 2 VM's are putting a physical host to capacity then we could move one to another server that isn't being used as much.

• Minimizes scheduled Downtime

90% of downtime is scheduled, before V-Motion administrators had to do server maintenance late at night in order to avoid disrupting users. Having all the servers as virtual machines, we only have to move the VM to another physical host, creating zero downtime for the users and allowing administrators to perform maintenance at any time. With DRS (Digital Resource Manager), all we have to do is put a server in maintenance mode and V-Motion will automatically move all VM's to another server.

what are the disadvantages?

When a new family of processors is released to market, innovative microprocessor features and instruction sets are often included. These features include performance enhancements in areas such as multimedia, graphics or encryption. With this in mind try to determine in advance the type of applications you'll be running in your vSphere environment. This gives you a rough idea of the type of processors you'll be needing. This, in turn, allows you to predetermine the applicable EVC modes when mixing servers with processors from different generations. EVC modes are also dependent on the version of vCenter Server. This is shown in Figure below.

	EVC Cluster Baseline						
vCenter Server Release	Intel® "Merom" Generation	Intel® "Penryn" Generation	Intel® "Nehalem" Generation	Intel® "Westmere" Generation	Intel® "Sandy Bridge" Generation	Intel® "Ivy Bridge" Generation	Intel® "Haswell" Generation
VirtualCenter 2.5 U2 and later updates	Yes	No	No	No	No	No	No
vCenter Server 4.0	Yes	Yes	Yes	No	No	No	No
vCenter Server 4.0 U1 and later updates	Yes	Yes	Yes	Yes	No	No	No
vCenter Server 4.1	Yes	Yes	Yes	Yes	No	No	No
vCenter Server 5.0	Yes	Yes	Yes	Yes	Yes	No	No
vCenter Server 5.1	Yes	Yes	Yes	Yes	Yes	Yes	No
vCenter Server 5.5	Yes	Yes	Yes	Yes	Yes	Yes	No
vCenter Server 6.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes

When weighing in the disadvantages, application performance springs first to mind. For instance, if SSL intensive applications are your thing, you should avoid at all costs the inclusion of servers equipped with pre-Westmere generation processors. Why? Westmere improves AES performance by a factor of 3 in part due to its AES-NI instruction set. Now let's imagine that you have a cluster of 4 servers equipped with Westmere CPUs and you urgently need to add a 5th node which happens to be an "old" server with pre-Westmere generation processors. What happens is that once this server is added to the cluster, the "best" available EVC mode is determined by the "oldest" processor. Put simply, you lose all the benefits AES-NI brings with it and in doing so drastically slow down any SSL intensive applications that are hosted on the cluster.

Pros of V-Motion

• Dynamic allocation services of the software allow you to allocate resources and memory while the processes are running.

• Security service of the software is flexible and allows you to implement user defined policy enforcement.

• The software supports all major operating systems as well as wide range of hardware.

• V-Motion allows to precisely identify the optimal placement for virtual machine.

• Virtual machines can be optimized within resource pools automatically.

Cons of V-Motion

• There is no module for performance management on the software.

• Unlike its competitors, the software does not offer any reporting capabilities.

• Configuration features of the software do not include auto recovery, configuration history, and NIC teaming capabilities.

• There are no performance management features of adaptive analysis, memory compression, and continuous resource allocation on the software.

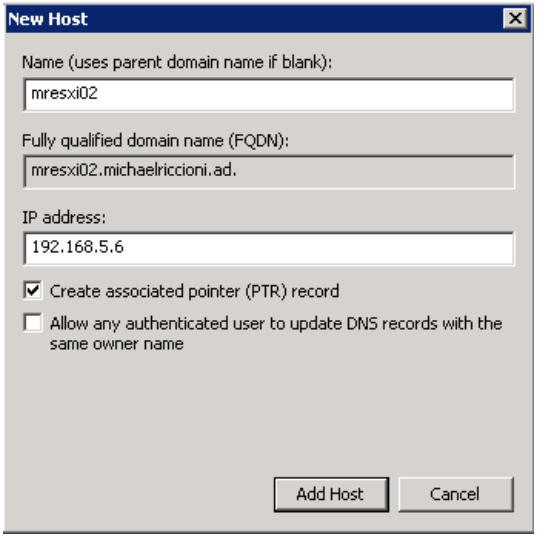
How does it work?

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.

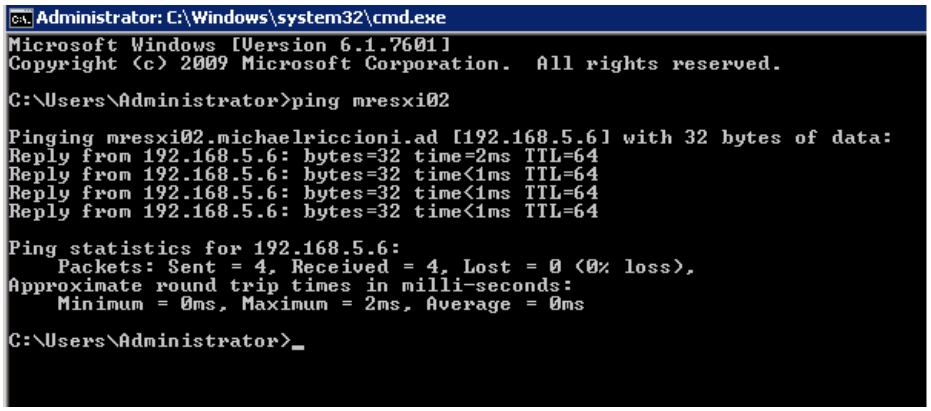
Second, the active memory and precise execution state of the virtual machine is rapidly transferred over a high speed network. This allows the virtual machine to instantaneously switch from running on the source ESX Server to the destination ESX Server. V-Motion keeps the transfer period imperceptible 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, V-Motion 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. V-Motion manages the virtual MAC address as part of the process. Once the destination machine is activated, V-Motion 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 V-Motion preserves the precise execution state, the network identity, and the active network connections, the result is zero downtime and no disruption to users.

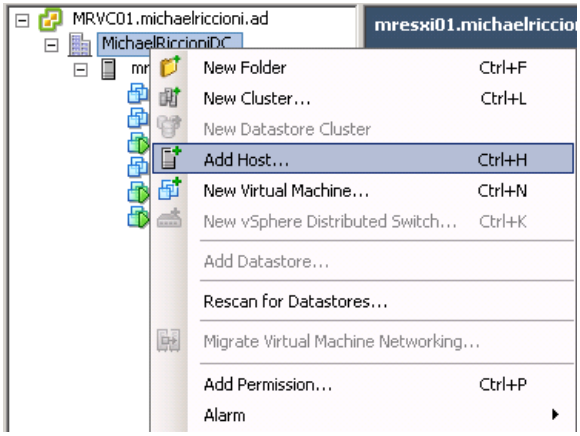
We will being by adding a new ESXi host in to our existing environment.Assume for this part that we have installed ESXi on to the new Server and we are managing this via the Vcenter Server.



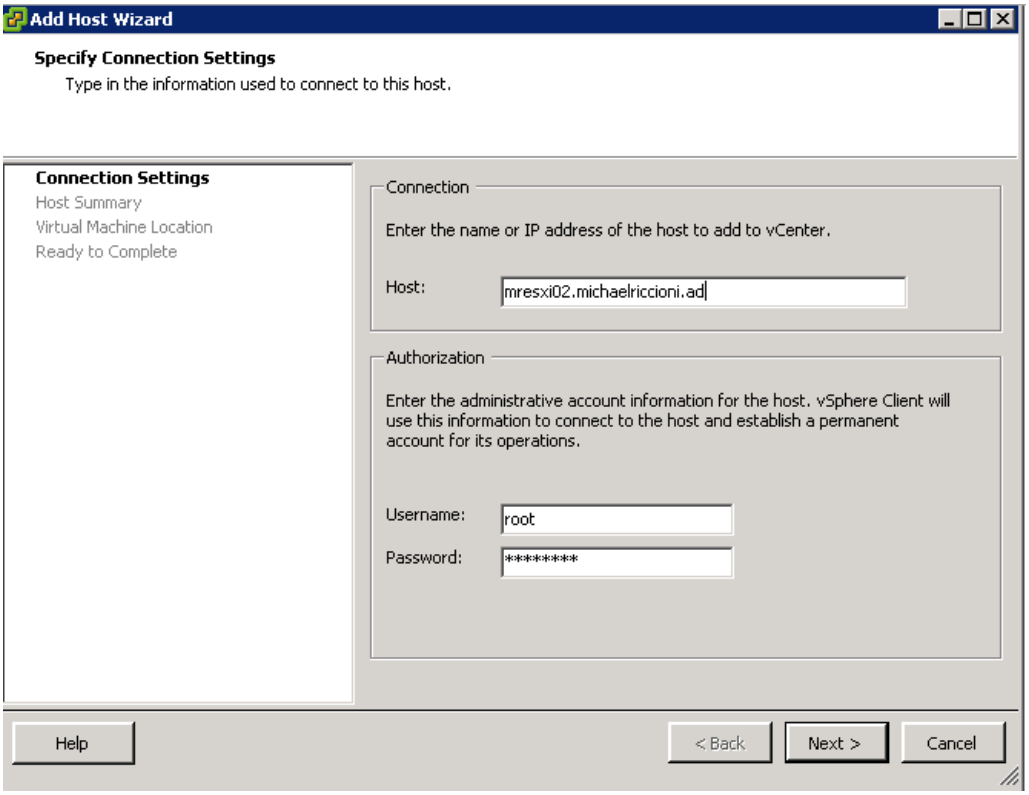
Finally make sure we can ping it by name



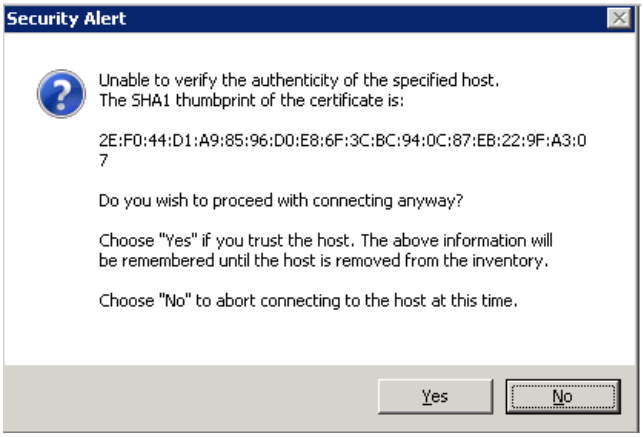
Now can communicate with new host lets add it in to datacentre. Select Datacentre, and select “add host”

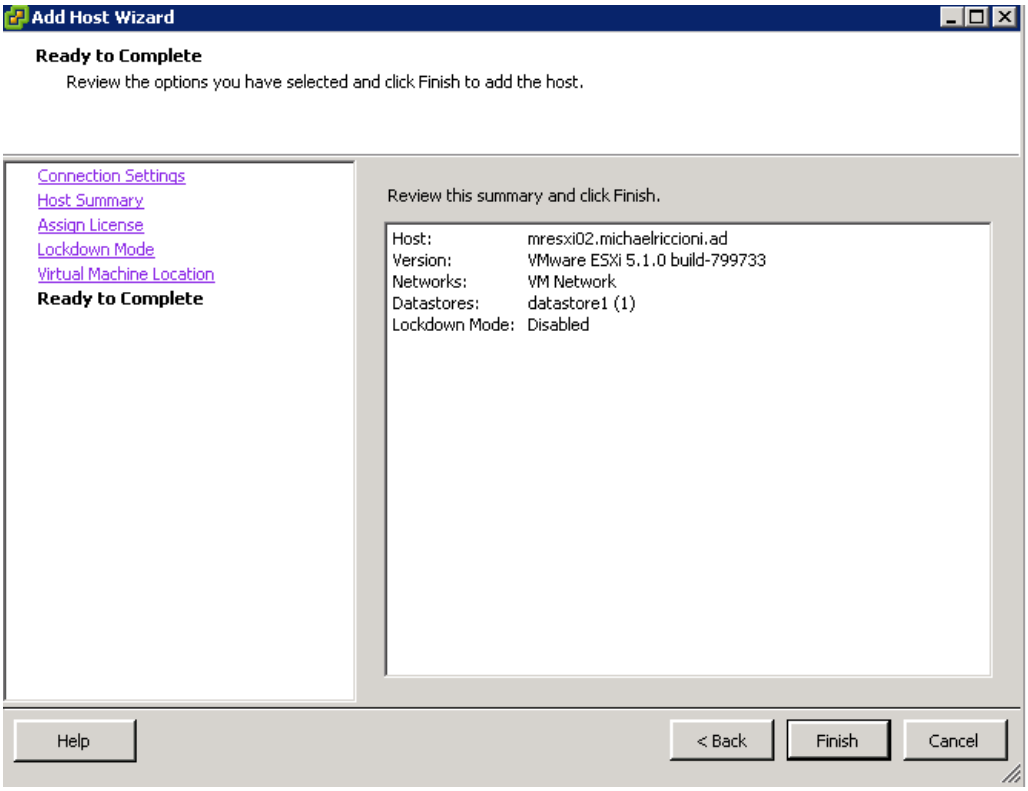


then next step same as baremetal

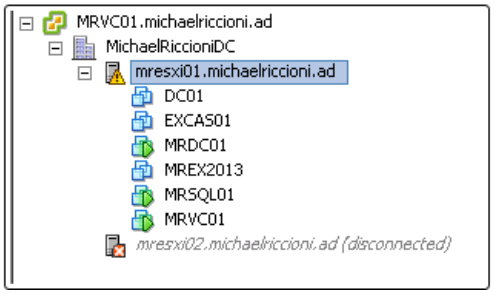


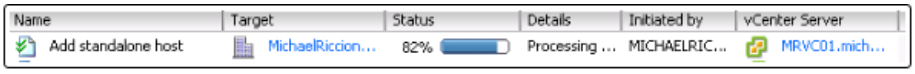
Once again when you are prompted for the thumbprint make sure the ESXi host you are adding match’s that of the ESXi host THINK you are adding…

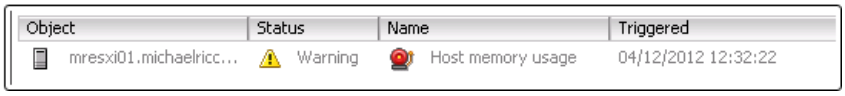




Now see your new host presented, and once finished it should be active and manageable.



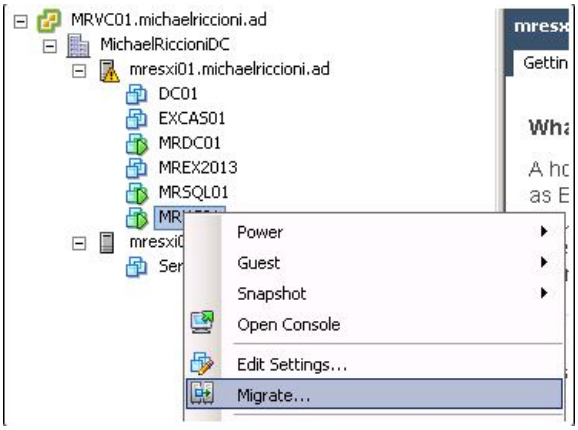




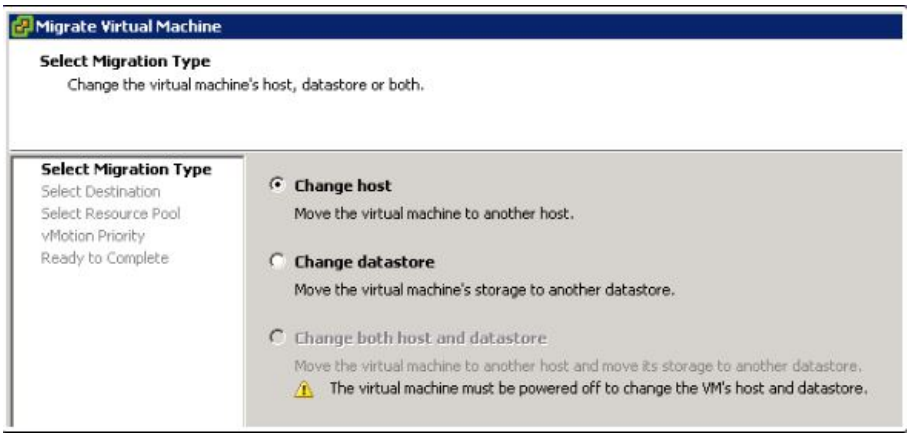
As you can see from the screen shot we have a warning regarding the host memory usage, this is because got all these VM's running on the one host and memory is starting to get a tad thin on the ground.

As we have this nice new ESXi host to use, to migrate the MRVC01 (Vcenter Server) over to this host.

If you just jump straight in and try to migrate the VM it won't work as first we need to configure VMotion. (as shown below) you can see the only option you can pick when right clicking a VM and selecting Migrate is to move it to a different Datastore



Now if we right click on the VM and select Migrate you can see we are given additional options, and what we wish to do is to "change host".



Select your new ESXi host (in this case MRESXI02).