

Hyper-V VM Quick Migration

Hyper-V Quick Migration is high-availability feature introduced with first version of Windows Server 2008 RTM. With Quick migration, VM will be moved from running state to saved state (hibernated) on a shared storage location and then transfer VM ownership to destination host to resume the virtual machine to running state.

You use 'Hyper-V 'Quick Migration'' technology when...

- Moving Virtual Workloads in off-business hours
- Hardware Servicing of the Hyper-V Host
- Hyper-V Host maintenance Activity

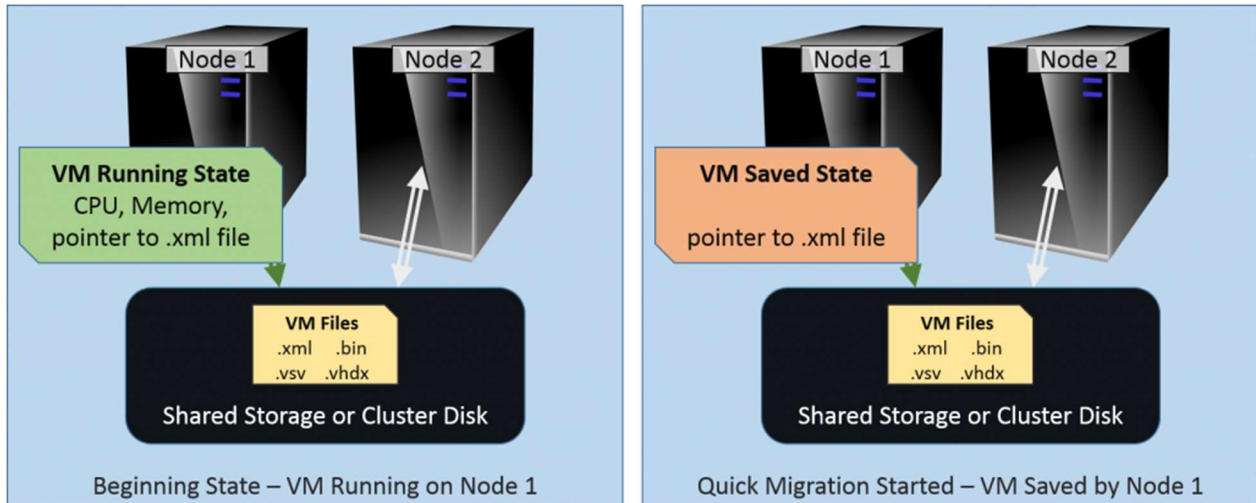
The 'Quick Migration' technology works with 'Windows Failover Cluster' or SCVMM to move the virtual machines from one node to another node. Quick Migration has the following characteristics:

- Noticeable downtime for the virtual machine
- Requires the source and target hosts to be in the same failover cluster
- Requires the source and target hosts to be able to access the same storage, although not necessarily simultaneously
- Can be used by virtual machines on Cluster Disks, Cluster Shared Volumes, and SMB 3 shares
- The virtual machine can be in any state
- Only virtual machine ownership changes hands; files do not move
- Often succeeds where other migration techniques fail, especially when pass-through disks and questionable security policies are involved
- The virtual machine does not know that anything changed (unless something is monitoring the Hyper-V Data Exchange KVP registry section). If the Hyper-V Time Synchronization service is disabled or non-functional, the virtual machine will lose time until its next synchronization.
- Used by a failover cluster to move low priority virtual machines during a Drain operation
- Used by a failover cluster to move virtual machines in response to a host crash. If the host suffered some sort of physical failure that did not allow it to save its virtual machines first, they will behave as though they had lost power

The primary reason that you will continue to use Quick Migration is that a virtual machine ***that is not in some active state cannot be Live Migrated***. More simply, Quick Migration is how you move virtual machines that are turned off.

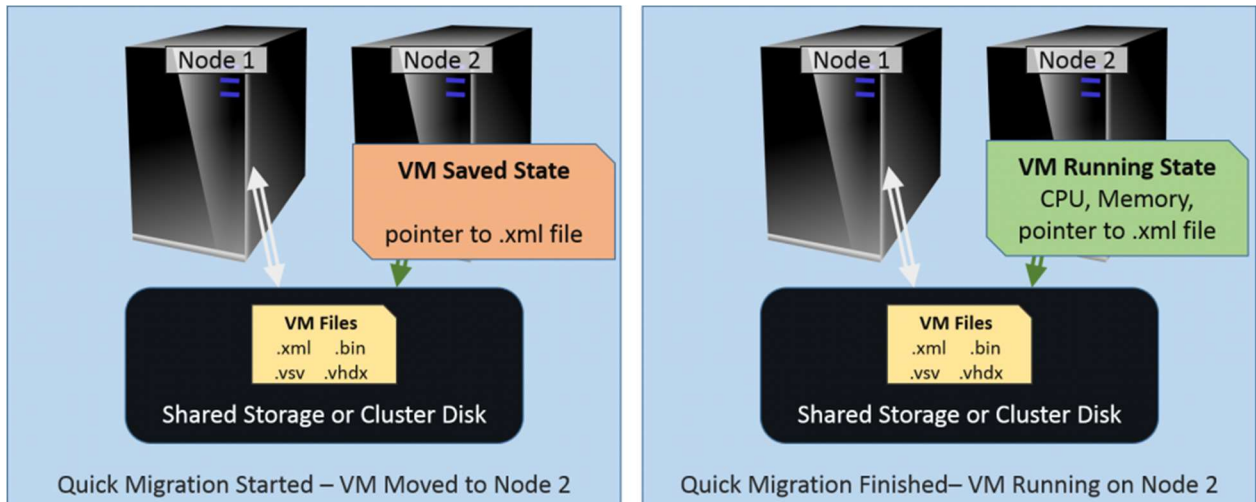
Analysis of a Quick Migration

The beginning operations of a Quick Migration vary based on whether or not the virtual machine is on. If it is, then it is placed into a *Saved State*. I/O and CPU operations are suspended and they, along with all the contents of memory, are saved to disk. The saved location must be on a shared location, such as a CSV, or on a Cluster Disk. Once this is completed, the only thing that remains on the source host is a *symbolic link* that points to the actual location of virtual machine's XML file:



Quick Migration Phase 1

Next, the cluster makes a copy of that symbolic link on the target node and, if the virtual machine's files are on a Cluster Disk, transfers ownership of that disk to the target node. The symbolic link is removed from the source host so that it only exists on the target. Finally, the virtual machine is *resumed* from its Saved State, if it was running when the process started:



Quick Migrations Phase 2

If the virtual machine was running when the migration occurred, the amount of time required for the operation to complete will be determined by how much time is necessary for all the contents of memory to be written to disk on the source and then copied back to memory on the destination. Therefore, the total time necessary is a function of the size of the virtual machine's memory and the speed of the disk subsystem. The networking speed between the two nodes is almost completely irrelevant, because only information about the symbolic link is transferred.

If the virtual machine wasn't running to begin with, then the symbolic link is just moved. This process is effectively instantaneous. These symbolic links exist in C:\ProgramData\Microsoft\Windows\Hyper-V\Virtual Machines on every system that runs Hyper-V. Although it is rare anymore, the system drive

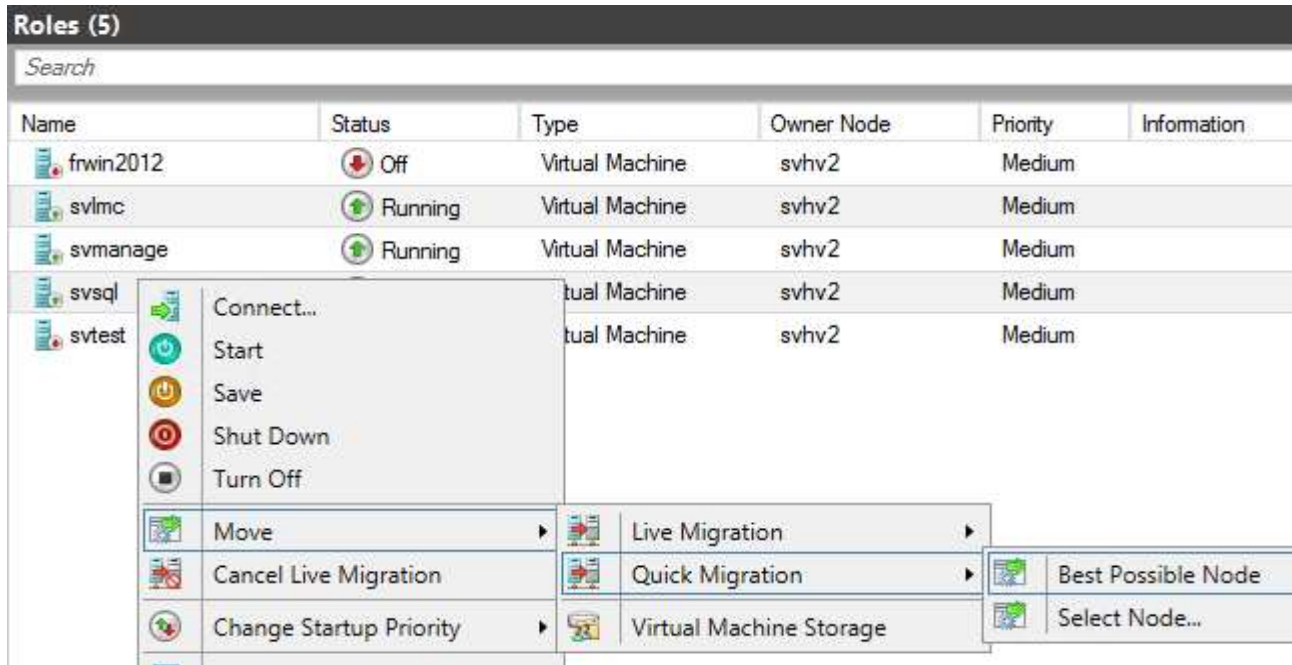
might not be C: .You can always find the root folder by using the ProgramData global environment variable. In the command-line environment and Windows, that variable is %PROGRAMDATA%. In PowerShell, it is \$env:ProgramData.

The cluster keeps track of a virtual machine’s whereabouts by creating a *resource* that it permanently assigns to the virtual machine. The nodes communicate with each other about protected items by referring to them according to their resource. They can be viewed at HKEY_LOCAL_MACHINE\Cluster\Resources on any cluster node. Do **not** modify the contents of this registry key!

Quick Migration Steps - GUI & PowerShell

Failover Cluster Manager is the native GUI tool that can perform a Quick Migration.

1. Switch to the **Roles** tree node.
2. To move multiple VMs, use CTRL+ Click to select them.
3. Right-click the VM(s) to be moved.
4. In the context menu, go to **Move** and **Quick Migration**.
 1. To allow the cluster to select the destination, click **Best Possible Node**.
 2. To manually choose the destination, click **Select Node...** This will cause a dialog to appear with all cluster nodes displayed. Double-click one or highlight it and click **OK**.



Quick Migration in Failover Cluster Manager

PowerShell command to do Quick Migration

Open PowerShell with "Run As Administrator"

```
Move-ClusterVirtualMachineRole -Name <VM Name> -Node <Hyper-V Host Name> -MigrationType  
Quick -Wait 0
```

Note: *If you do not specify -Node, the cluster decides where to place the virtual machine(s)*