

Behind the Report:

Intel vs. AMD Virtual Machine Migration

Methodology: VMware vSphere® vMotion® and VAMT

This document describes the methodology used to compare VMware® vMotion® migrations without encryption, with encryption on the CPU, or with encryption assisted by Intel® QuickAssist Technology (Intel® QAT), in addition to cross-architecture migrations with VMware® Architecture Migration Tool (VAMT).

Testing Summary

For this testing, Prowess Consulting analyzed hosts in VMware vCenter® using virtual machines (VMs) running Windows Server® 2025 and Microsoft® SQL Server® 2022 as they migrated between hosts, while a separate driver VM ran a DVD Store 3.5 workload against the SQL Server VM. We tested migrations with local storage for compute and storage moves, in addition to testing migrations with drives backed by network-attached storage (NAS) using Network File System (NFS) 4.1 for a compute-only migration.

During migration, if the workload encountered a disconnection, which has a 5-second timeout and a 1-second logging frequency, this was considered downtime. If downtime was detected, we measured the length of the downtime from the last successful connection prior to the disconnect through to when connections resumed. This measurement includes the time needed for the operating system (OS) to start and for SQL Server to start accepting connections. We determined the migration time metric using the timestamps in the vCenter task view between the Start Time of shutdown and the Completion Time of the power-on of the VM, or between the Start and Completion times for the Relocate Virtual Machine tasks. For testing using Intel® QuickAssist Technology (Intel® QAT) offload, VMware vSphere® 9.1 and Intel QAT compatibility are required on the underlying systems.

Table 1 | System configuration; testing conducted June 26–July 1, 2026

Server	Current-generation Intel-based server (Host A)	Current-generation Intel-based server (Host B)	Previous-generation Intel-based server	Current-generation AMD-based server
Server model	QuantaGrid® D55Q-2U	QuantaGrid D55Q-2U	SYS-220U-TNR	AS-2126HS-TN
Sockets	2	2	2	2
Microcode	0x1000405	0x1000405	0xd000421	0xb00215a
Processor	Intel® Xeon® 6767P	Intel Xeon 6767P	Intel Xeon Platinum 8380 CPU	AMD EPYC™ 9555

Server	Server Current-generation Intel-based server (Host A)	Current-generation Intel-based server (Host B)	Previous-generation Intel-based server	Current-generation AMD-based server
Cores	64	64	40	64
Total memory	1 TB	1 TB	1 TB	1.5 TiB
DIMM count	16	16	16	24
DIMM	64 GB Micron® MTC40F2046S1RC64BDY QSFF/ MTC40F2046S1RC64BDY USFF	64 GB Micron MTC40F2046S1RC64BDY QSFF/ MTC40F2046S1RC64BDY USFF	64 GB Samsung® M393A8G40AB2-CWE	64 GB Micron MTC40F2046S1RC64 BD2QSFF
Memory speed	3,900 MHz	3,900 MHz	3,200 MHz	3,200 MHz
Solid-state drive (SSD)/NVM Express® (NVMe®) model	1.7 TB Samsung MZWLR1T9HBJR-00007	1.7 TB Samsung MZWLJ1T9HBJR-0000	3.5 TB Samsung MZ7LH3T8	1.5 TB Intel® SSDPE2KE016T8
Disk	1.75 TiB NVMeSSD_0	1.75 TiB NVMeSSD_0	1,920 GB NVMe device 0	1,600 GB NVMe device 0
Number of disks	1	1	1	1
RAID configuration	Not applicable (N/A)	N/A	N/A	N/A
OS	VMware ESXi™ 9.1	VMware ESXi 9.1	VMware ESXi 9.1	VMware ESXi 9.1
Network interface controller (NIC) model	Broadcom® BCM957416N4160C	Broadcom BCM957416N4160C	Supermicro® AOC-S100GC-i2C	Supermicro AOC-STG-b2T
Link speed	100 gigabit Ethernet (GbE)	100 GbE	100 GbE	100 GbE
Port count	Dual-port (1 wired) Intel® Ethernet Network Adapter E810-C	Dual-port (1 wired) Intel Ethernet Network Adapter E810-C	Dual-port (1 wired) Intel Ethernet Network Adapter E810-C	Dual-port (1 wired) Intel Ethernet Network Adapter E810-C
VMware ESXi driver version	ESXi-9.1.0-25370933-standard	ESXi-9.1.0-25370933-standard	ESXi-9.1.0-25370933-standard	ESXi-9.1.0-25370933-standard
Maximum transmission unit (MTU) settings	9,000	9,000	9,000	9,000
Firmware/BIOS	Quanta Cloud Technology Inc 3A16.QCT001	Quanta Cloud Technology Inc 3A17.QCT302	Supermicro 2.5	Supermicro 1.7a
Power policy	Balanced performance	Balanced performance	Performance	Auto
Turbo state	Enabled	Enabled	Enabled	AMD Frequency Boost enabled
Simultaneous Multithreading (SMT) state	Enabled	Enabled	Enabled	Enabled
Any non-default BIOS settings	Optimized power mode	Latency-optimized mode	Latency-optimized mode	Latency-optimized mode

Tables 2–4 outline the scenarios we tested. We tested each scenario three times, with the median value taken as the result. If a run landed more than 10% out from the median value, it was considered an outlier.

Table 2 | Homogeneous-environment, Intel-to-Intel migration test matrix

Microsoft® SQL Server® VM Source Host	SQL Server VM Destination Host	Compute Only/ Compute and Storage	VMware® vMotion® Encryption	Driver VM Host
Intel® Xeon® Platinum 8380	Intel Xeon 6767P (Host A)	Compute only	AES-256-GCM (CPU)	Intel Xeon 6767P (Host B)
Intel Xeon Platinum 8380	Intel Xeon 6767P (Host A)	Compute and storage	AES-256-GCM (CPU)	Intel Xeon 6767P (Host B)

Table 3 | Heterogeneous-environment, Intel-to-AMD migration test matrix

Microsoft® SQL Server® VM Source Host	SQL Server VM Destination Host	Compute Only/ Compute and Storage	Migration Type	Driver VM Host
Intel® Xeon® 6767P (Host A)	AMD EPYC™ 9555	Compute only	VAMT/cold migration	Intel Xeon 6767P (Host B)
Intel Xeon 6767P (Host B)	AMD EPYC 9555	Compute and storage	VAMT/cold migration	Intel Xeon 6767P (Host B)

Table 4 | Homogeneous-environment, Intel-to-Intel encryption test matrix

Microsoft® SQL Server® VM Source Host	SQL Server VM Destination Host	Compute Only/ Compute and Storage	VMware® vMotion® Encryption	Driver VM Host
Intel® Xeon® 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute only	AES-256-GCM (Intel® QAT)	Intel Xeon Platinum 8380 CPU
Intel Xeon 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute and storage	AES-256-GCM (Intel QAT)	Intel Xeon Platinum 8380 CPU
Intel Xeon 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute only	AES-256-GCM (CPU)	Intel Xeon Platinum 8380 CPU
Intel Xeon 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute and storage	AES-256-GCM (CPU)	Intel Xeon Platinum 8380 CPU
Intel Xeon 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute only	None	Intel Xeon Platinum 8380 CPU
Intel Xeon 6767P (Host A)	Intel Xeon 6767P (Host B)	Compute and storage	None	Intel Xeon Platinum 8380 CPU

Note: The Intel Xeon Platinum 8380 processor–based host cannot be used for Intel QAT offload.

NFS Server Setup

This section contains the steps taken to set up the NFS server.

1. Open a Secure Shell (SSH) terminal to the NFS server.
2. To stripe all eight data drives into a RAID 0 array, run:

```
mdadm --create /dev/md0 --level=0 --raid-devices=8 \  
    /dev/nvme1n1 /dev/nvme2n1 /dev/nvme3n1 /dev/nvme4n1 \  
    /dev/nvme5n1 /dev/nvme6n1 /dev/nvme7n1 /dev/nvme8n1
```

3. To persist the array across reboots, run: :

```
mdadm --detail --scan | tee -a /etc/mdadm/mdadm.conf  
update-initramfs -u
```

4. To create the file system, run:

```
mkfs.xfs -f /dev/md0
```

5. To create the mount point and mount the array, run:

```
mkdir -p /export/datastore1  
echo "/dev/md0 /export/datastore1 xfs defaults,noatime 0 0" >> /etc/fstab  
systemctl daemon-reload  
mount -a
```

6. To install the NFS server, run:

```
apt update && apt install -y nfs-kernel-server
```

7. To export the datastore to the storage/vMotion subnet, run:

```
echo "/export/datastore1 172.16.0.0/16(rw,sync,no_root_squash,no_subtree_check)" >> /etc/exports  
exportfs -ra  
exportfs -v
```

Note: no_root_squash was only used in the isolated test network.

8. Note the IP address, used later as *\$NFS_HOST*.

VMware vSphere® Hosts Setup

This section contains the steps taken to configure the host hardware.

1. Log in to the VMware vSphere client.
2. To add the first host, right-click the vCenter root, then select **New Datacenter**.
 - a. Name the new data center **Migration-Test-DC**, then click **OK**.
 - b. Right-click **Migration-Test-DC**, select **New Cluster**, then enter the following configuration details:
 - i. **Name: Migration-Test-Cluster**
 - ii. **vSphere DRS: Off**
 - iii. **vSphere HA: Off**
 - iv. **vSAN: Off**
 - v. **Manage configuration at cluster level:** Unselected
 - vi. **Extract image from new host:** Selected

- c. Click **Next**.
 - d. Specify the **IP**, **username**, and **password** for the first host, then click **Find Host**.
 - e. Click **Extract Image**, then click **Yes** to confirm.
 - f. Click **Next**.
 - g. Click **Finish**.
3. To add the remaining Intel-based hosts, right-click **Migration-Test-Cluster**, then select **Add Hosts**.
 - a. Specify the **IP**, **username**, and **password**, then click **Add Host**.
 - b. Repeat the previous step for the remaining hosts.
 - c. Click **Next**.
 - d. Leave **Keep existing image** selected, then click **Next**.
 - e. Click **Finish**.
4. To add the AMD EPYC processor-based host, right-click **Migration-Test-DC**, then click **Add Host**.
 - a. Specify the **IP**, **username**, and **password**, then click **Add Host**.
 - b. Review the host, then click **Next**.
 - c. Review the certificate, then click **Yes**.
 - d. Select **Extract Image**, then click **Next**.
 - e. Review the image, then click **Next**.
 - f. Review the license, then click **Next**.
 - g. Leave **Lockdown** unselected, then click **Next**.
 - h. Leave the default data center selection, then click **Next**.
 - i. Click **Finish**.
5. To configure NFS-backed storage, right-click **Migration-Test-DC > Storage > New Datastore**.
 - a. Select **NFS**, then click **Next**.
 - b. Select **NFS 4.1**, then click **Next**.
 - c. Specify the name, folder, and NFS server IP.
 - d. Click **Add**.
 - e. Click **Next**.
 - f. Select all four hosts, then click **Next**.
 - g. Click **Finish**.
6. To configure VMkernel adapters, open an SSH terminal to each host, then run the following. The shared uplink was in line with the constraints of the testing lab hardware configuration.

```
esxcli network vswitch standard portgroup add -p vMotion-PG -v vSwitch0

esxcli network ip interface add -i vmk1 -p vMotion-PG

esxcli network ip interface ipv4 set -i vmk1 -I <VMOTION_IP> -N 255.255.255.0 -t static

esxcli network ip interface tag add -i vmk1 -t VMotion

esxcli network ip interface tag add -i vmk1 -t vSphereProvisioning

esxcli network ip interface set -i vmk1 -m 9000

esxcli network vswitch standard set -v vSwitch0 -m 9000

esxcli network vswitch standard portgroup add -p Workload-PG -v vSwitch0
```

Microsoft® SQL Server® VM Setup

This section contains the steps for building DS3-SQL-VM, the SQL Server workload target.

1. To create the VM, navigate to **vSphere > Migration-Test-Cluster**, right-click on the host, then select **New Virtual Machine**.
 - a. Select **Create a new virtual machine**, then click **Next**.
 - b. Specify the **VM name** (DS3-SQL-VM), then click **Next**.
 - c. Select the host to be used for compute resources, then click **Next**.
 - d. Select the **vmotion-shared** datastore, then click **Next**.
 - e. Leave the default compatibility of **ESXi 9.0 and later**, then click **Next**.
 - f. As the guest OS version, select **Windows Server 2025**, then click **Next**.
 - g. From the **Customize hardware dialog**, set the following:
 - i. **CPU: 8**
 - ii. **Memory: 64 GB**
 - iii. **Disk 1: 80 GB**
 - iv. Click **Add New Device > Hard Disk** twice.
 - v. **Disk 2: 200 GB**
 - vi. **Disk 3: 60 GB**
 - vii. **Network Adapter: Workload-PG**
 - viii. **CD/DVD drive: Datastore ISO File**, browse to the **Windows Server 2025** ISO, then select **Connect At Power On**.
 - h. Click **Next**.
 - i. Leave **Tag** blank, then click **Next**.
 - j. Click **Finish**.
2. To install Windows, navigate to **vSphere > Migration-Test-Cluster > DS3-SQL-VM**.
 - a. Click **Power On**.
 - b. Click **Launch Web Console**.
 - c. Press any key to boot to the installer.
 - d. Leave the default language and time selection, then click **Next**.
 - e. Leave the default keyboard selection, then click **Next**.
 - f. Leave **Install Windows Server** selected, select the **I agree everything will be deleted** checkbox, then click **Next**.
 - g. Select **Windows Server 2025 Datacenter Evaluation (Desktop Experience)**, then click **Next**.
 - h. Click **Accept** to accept the license agreement.
 - i. Select the 80 GB volume as the install location, then click **Next**.
 - j. Click **Install** and wait for the installation to complete.
 - k. Specify and confirm the administrator password.
 - l. Click **Finish**.
3. To bring the data disks online, log in to Windows, select **Required Only**, click **Accept**, then open **Disk Management**. For each unallocated disk:
 - a. Right-click, then select **Online**.
 - b. Right-click, select **Initialize Disk**, leave the defaults, then click **OK**.
 - c. Right-click, then select **New Simple Volume**.
 - d. Click **Next**, leave the defaults, then click **Next**.
 - e. Assign the drive letter (**D** for the 200 GB data disk, **L** for the 60 GB log disk), then click **Next**.
 - f. Leave **NTFS** selected, specify a volume label, then click **Next**.
 - g. Click **Finish**.
4. To install VMware tools, from vSphere, right-click **VM**, select **Guest OS**, then select **Install VMware Tools**.
 - a. Use Remote Desktop Protocol (RDP) to connect to the VM and run setup from the mounted ISO.
 - i. Click **Next**.
 - ii. Leave **Typical** selected, then click **Next**.
 - iii. Click **Install**.
 - iv. Click **Finish**.
 - v. Click **Yes** to reboot.
5. To install SQL Server 2022, download the installer from the SQL Server 2022 Evaluation Center, open it, then select **Download Media**.

6. Mount the resulting ISO and run **setup.exe**.
 - a. Select **Evaluation edition**, then click **Next**.
 - b. Accept the license terms, then click **Next**.
 - c. Click **Next**.
 - d. Select **Database Engine Services** and **Full-Text and Semantic Extractions for Search**, then click **Next**.
 - e. Leave the default instance name, then click **Next**.
 - f. Leave the default server configuration values, then click **Next**.
 - g. On the **Database Engine Configuration** tab, specify **Mixed Mode authentication**, set the **password** to **password (isolated test network only)**, then click **Add Current User**.
 - h. On the **Data Directories** tab, set the **Data root directory** to **D:\Data**.
 - i. On the **TempDB** tab, set the **Log directory** to **L:\Log**.
 - j. Click **Next**, then click **Install**.
 - k. Wait for the installation to complete, then click **Close**.
7. To install SQL Server Management Studio (SSMS), download and open the SSMS installer, click **Install**, then wait for completion.
8. To fetch the DS3 codebase, used to generate the database, download the **DS3.5 Zip** from <https://github.com/dvdstore/ds35>, then extract it to **D:\ds35**.
9. Open an administrator PowerShell® console at **D:\ds35\ds35-main**, then run:

```
perl .\Install_DVDStore.pl
```

- a. Respond to the prompts with the following:
 - i. **DB size: 50**
 - ii. **Unit: GB**
 - iii. **Type: MSSQL**
 - iv. **System: WIN**
 - v. **Paths: D:\Data;D:\Data;D:\Data;D:\Data;D:\Data;D:\Data;D:\Data;D:\Data;D:\Data;L:\Log**
10. Wait for “Completed creating and writing build scripts” to appear, then run:

```
cd D:\ds35\ds35-main\sqlserverds35  
  
.\sqlserverds35_create_all_concurrent_50GB.bat localhost 1
```

11. To take a pristine backup, run:

```
sqlcmd -C -S localhost -U sa -P 'password' -Q "BACKUP DATABASE [DS3] TO DISK = N'D:\Backups\DS3_baseline.bak' WITH FORMAT, INIT, COMPRESSION, NAME = N'DS3 pristine baseline'"
```

12. To open the SQL port, run:

```
New-NetFirewallRule -DisplayName "SQL Server 1433" -Protocol TCP -LocalPort 1433 -Direction Inbound  
-Action Allow
```

Driver VM Setup

This section contains the steps for building DS3-Driver, the benchmark driver VM, including the source patches required for cold-migration resilience.

1. To create the VM, navigate to **vCenter**, right-click **Host**, then select **New Virtual Machine**.
 - a. Leave **Create a new virtual machine** selected, then click **Next**.
 - b. Specify the name (**DS3-Driver**), then click **Next**.
 - c. Select the host, then click **Next**.
 - d. Select the **vmotion-shared** datastore, then click **Next**.
 - e. Leave the default compatibility of **ESXi 9.0 and later**, then click **Next**.
 - f. As the guest OS version, select **Windows Server 2025**, then click **Next**.

- g. From the **Customize hardware** dialog, set:
 - i. **CPU: 8**
 - ii. **Memory: 8 GB**
 - iii. **Disk 1: 60 GB**
 - iv. **Network Adapter: Workload-PG**
 - v. **CD/DVD drive: Datastore ISO File**, browse to the **Windows Server 2025 ISO**, then select **Connect At Power On**.
 - h. Click **Next**.
 - i. Leave **Tag** blank, then click **Next**.
 - j. Click **Finish**.
2. To install Windows, power on the VM and open the web console.
 - a. Click **Power On**.
 - b. Click **Launch Web Console**.
 - c. Press any key to boot to the installer.
 - d. Leave the default language and time selection, then click **Next**.
 - e. Leave the default keyboard selection, then click **Next**.
 - f. Leave **Install Windows Server** selected, select the **I agree everything will be deleted** checkbox, then click **Next**.
 - g. Select **Windows Server 2025 Datacenter Evaluation (Desktop Experience)**, then click **Next**.
 - h. Click **Accept** to accept the license agreement.
 - i. Select the 60 GB volume as the install location, then click **Next**.
 - j. Click **Install** and wait for the installation to complete.
 - k. Specify and confirm the administrator password.
 - l. Click **Finish**.
 3. To install VMware tools, from vSphere, right-click the VM, select **Guest OS**, then select **Install VMware Tools**.
 - a. Use RDP to connect to the VM, then run setup from the mounted ISO.
 - i. Click **Next**.
 - ii. Leave **Typical** selected, then click **Next**.
 - iii. Click **Install**.
 - iv. Click **Finish**.
 - v. Click **Yes** to reboot.
 4. To install the ODBC Driver 18, download it from the [Microsoft Open Database Connectivity \(ODBC\) download page](#), then install it.
 5. To fetch the DS3 code base, download the **DS3.5 Zip** from <https://github.com/dvdstore/ds35>, then extract it to **C:\ds35**.
 6. To apply source patches for the lowered connection timeout, increased MAX_FAILURES, the EnsureConnection() reconnect calls, and SetCommandTimeouts()/EnsureConnection(), run:

```
powershell$ $f = 'C:\ds35\ds35-main\sqlserver\ds35\ds35sqlserverfns.cs'

$X = 'C:\ds35\ds35-main\drivers\ds35xdriver.cs'

$src = Get-Content $f -Raw

$oldConn = 'User ID=ds3user;Initial Catalog=DS3;Connection Timeout=120;Data Source=" + target_server'
$newConn = 'User ID=ds3user;Initial Catalog=DS3;Connection Timeout=5;Data Source=tcp:" + target_server +
",1433"'

if ($src.Contains($oldConn)) {
    $src = $src.Replace($oldConn, $newConn)

    Write-Host "Connection string patched (timeout 5s + TCP:1433)."- } else {
    Write-Host "WARN: connection string not found; stop and inspect line 109."
- }

```

```

(Get-Content $x -Raw) -replace 'public const int MAX_FAILURES = 10;', 'public const int MAX_FAILURES = 600;' | Set-Content $x -NoNewline

$pairs = @(
    'Console.WriteLine("Thread {0}: Error in Login: {1}", Thread.CurrentThread.Name, e.Message);',
    'Console.WriteLine("Thread {0}: Error in Browse: {1}", Thread.CurrentThread.Name, e.Message);',
    'Console.WriteLine("Thread {0}: Sql Server Error in Browse Product Reviews: {1}", Thread.CurrentThread.Name, e.Message);',
    'Console.WriteLine("Thread {0}: Sql Server Error in Get Product Reviews: {1}", Thread.CurrentThread.Name, e.Message);'
)

foreach ($logline in $pairs) {
    if ($src.Contains($logline)) {
        $src = $src.Replace($logline, $logline + "`r`n        EnsureConnection();" )
    } else {
        Write-Host "WARN: did not find -> $logline"
    }
}

$anchor = 'objConn = new SqlConnection(sConnectionString);' + "`r`n        objConn.Open();"
if ($src.Contains($anchor)) {
    $src = $src.Replace($anchor, $anchor + "`r`n        SetCommandTimeouts();" )
} else {
    Write-Host "WARN: connection-open anchor not found; CommandTimeout setter NOT wired"
}

Set-Content $f $src -NoNewline

$src = Get-Content $f -Raw
$anchor2 = '}' // end ds2close()
$methods = @'

private void SetCommandTimeouts()
{
    SqlCommand[] cmds = new SqlCommand[] {
        Login, New_Customer, Browse_By_Category, Browse_By_Actor, Browse_By_Title, Purchase,

```

```

        Get_Prod_Reviews, Get_Prod_Reviews_By_Actor, Get_Prod_Reviews_By_Title,
        Get_Prod_Reviews_By_Date, Get_Prod_Reviews_By_Stars,
        New_Member, New_Prod_Review, New_Review_Helpfulness };

foreach (SqlCommand c in cmds)
{
    if (c != null) c.CommandTimeout = 300;
}

} // end SetCommandTimeouts()

private void EnsureConnection()
{
    if (objConn == null) return;
    if (objConn.State == System.Data.ConnectionState.Open) return;
    try
    {
        try { objConn.Close(); } catch { /* swallow - was already bad */ }

        Thread.Sleep(500);

        objConn.Open();
    }
    catch (System.Exception e)
    {
        Console.WriteLine("Thread {0}: Reconnect attempt failed: {1}",
            Thread.CurrentThread.Name, e.Message);

        Thread.Sleep(2000);
    }
} // end EnsureConnection()

'@
if ($src.Contains($anchor2)) {
    $idx = $src.IndexOf($anchor2)
    $src = $src.Substring(0, $idx) + $methods + $src.Substring($idx + $anchor2.Length)
    Set-Content $f $src -NoNewline
    Write-Host "Helper methods inserted."
} else {
    Write-Host "WARN: ds2close anchor not found; methods NOT inserted."
}

```

- a. **Note:** These instrumentation changes impact the default timeout and reconnection logic. This prevents the workload from ending early in the case of extended downtime, but it does not otherwise impact the downtime measurement methodology.
7. To recompile the patched binary, run:

```
$csc = 'C:\Windows\Microsoft.NET\Framework64\v4.0.30319\csc.exe'

& $csc /target:exe /out:C:\ds35\ds35-main\sqlserverds35\ds35sqlserverdriver_patched.exe C:\ds35\ds35-
main\drivers\ds35xdriver.cs C:\ds35\ds35-main\sqlserverds35\ds35sqlserverfns.cs
```

VAMT Setup

This section outlines the steps taken on the local system to configure the VAMT tool:

1. To install VMware Cloud Foundation® PowerCLI, open PowerShell and run:

```
Install-PackageProvider -Name NuGet -MinimumVersion 2.8.5.201 -Force -Scope CurrentUser

Set-PSRepository -Name PSGallery -InstallationPolicy Trusted

Install-Module -Name VCF.PowerCLI -Scope CurrentUser -Force -AllowClobber -SkipPublisherCheck

Set-ExecutionPolicy -Scope CurrentUser -ExecutionPolicy RemoteSigned -Force
```

2. To configure PowerCLI and connect, run:

```
Set-PowerCLIConfiguration -Scope User -ParticipateInCeip $false -InvalidCertificateAction Ignore
-Confirm:$false

Set-PowerCLIConfiguration -Scope User -DisplayDeprecationWarnings:$false -Confirm:$false

Connect-VIServer -Server 172.16.4.33
```

- a. At the credential prompt, enter a username and password.

3. To create the VAMT tag category and tags, run:

```
New-TagCategory -Name "VAMT" -Cardinality Single -EntityType VirtualMachine

$vamTags =
"readyToMigrate","inProgress","complete","completeWithErrors","failed","readyToRollback","rolledBack"

foreach ($t in $vamTags) { New-Tag -Name $t -Category "VAMT" }

Get-Tag -Category "VAMT" | Select Name, Category
```

4. To get the VAMT tool, browse to <https://github.com/vmware-samples/vmware-architecture-migration-tool>, click **Code** > **Download ZIP**, then extract the download to **C:\VAMT**.

5. To unblock the downloaded module files, run:

```
Unblock-File C:\VAMT\vmware-architecture-migration-tool-main\VMwareArchitectureMigrationTool.ps1

Unblock-File C:\VAMT\vmware-architecture-migration-tool-main\*.psml
```

6. To craft the migration comma-separated value files (CSVs), run the following, replacing *\$vSphere_HostIP* (the IP of the vCenter interface), *\$Turin_HostIP* (the IP of the AMD-based host), *\$GNR_A_HostIP* (the IP of the Intel-based Host A), and *\$Datastore_Name* (the literal name of the data store on the relevant host or NAS-based storage) with their true values:

```
# Set Host IPs used across the VAMT CSVs to their actual values

$vSphere_HostIP = ''

$Turin_HostIP = ''

$GNR_A_HostIP = ''

$Datastore_Name = ''

# target_vc is the IP of the vSphere host
```

```
# target_hostpoolcluster is the instance of the virtual machine

# GNR-A -> Turin, compute only (disks stay on shared NFS)

@"

vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore

DS3-SQL-VM,$vSphere_HostIP,$Turin_HostIP,Workload-PG, $Datastore_Name

"@ | Set-Content -Path C:\VAMT\gnr2turin-list.csv -NoNewline


# Turin -> GNR-A, compute only (disks stay on shared NFS)

@"

vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore

DS3-SQL-VM,$vSphere_HostIP,$GNR_A_HostIP,Workload-PG, $Datastore_Name

"@ | Set-Content -Path C:\VAMT\turin2gnr-list.csv -NoNewline


# GNR-A -> Turin, compute and storage (disks land on Turin local datastore)

@"

vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore

DS3-SQL-VM,$vSphere_HostIP,$Turin_HostIP,Workload-PG,$Datastore_Name

"@ | Set-Content -Path C:\VAMT\gnr2turin-storage-list.csv -NoNewline


# Turin -> GNR-A, compute and storage (disks land on GNR-A local datastore)

@"

vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore

DS3-SQL-VM,$vSphere_HostIP,$GNR_A_HostIP,Workload-PG, $Datastore_Name

"@ | Set-Content -Path C:\VAMT\turin2gnr-storage-list.csv -NoNewline
```

Testing Procedures

This section outlines the specifics of the testing process.

Test Scenario Prerequisites

This section outlines the prerequisites for each family of tests.

General Prerequisites

Table 5 outlines the vSphere settings based on the encryption state.

Table 5 | VMware vSphere® settings

Encryption State	VM Encrypted with VMware® vMotion®	Migrate.vMotionEncryptionOffload (1 = Intel QAT offload; 0 = CPU encryption or no encryption)
Intel® QuickAssist Technology (Intel® QAT) enabled	Enabled	1
Encryption enabled on CPU, Intel QAT disabled	Enabled	0
No encryption	Disabled	0

1. To ensure the driver VM is on the correct host for the current testing setup, reference Tables 2–4.
 - a. To migrate the driver VM:
 - i. Right-click the driver VM, then select **Migrate**.
 - ii. Change compute resource only.
 - iii. Select the correct host.
 - iv. Select **Workload-PG**.
 - v. Schedule with high priority.
 - vi. Click **Finish**.
2. To ensure the SQL Server VM is on the correct host for the current testing setup, reference Table 2.
 - i. Right-click the SQL Server VM, then select **Migrate**.
 - ii. Change compute resources or compute and storage.
 - iii. Select the correct host.
 - iv. For compute-only migrations, ensure data is on the NFS shared volume (or the local storage if a compute and storage migration).
 - v. Select **Workload-PG**.
 - vi. Schedule with high priority.
 - vii. Click **Finish**.
3. To ensure proper vSphere settings, reference Table 5.
 - a. To set **Migrate.vMotionEncryptionOffload** on the source host:
 - i. In the vSphere client, select the host, select **Configure**, then select **Advanced System Settings**.
 - ii. Click **Edit**.
 - iii. Search for **Migrate.vMotionEncryptionOffload**.
 - iv. Set the desired value.
 - v. **Note:** There is no reboot required for this process.
 - b. To set the VM encryption state:
 - i. Right-click the VM, select **Edit Settings > VM Options**, expand **Encryption**, then set **Encrypted vMotion** to the target value.
 - c. Repeat steps 3a and 3b the destination hosts.

VAMT Scenario Prerequisites

This section outlines the specific values to confirm prior to the cross-architecture VAMT migrations. Prowess Consulting did not attempt vMotion across unsupported processor generations or between Intel and AMD processor-based hosts.

1. To ensure no Enhanced vMotion Compatibility (EVC) constraints are set, which would interfere with the heterogeneous architecture migrations, from the local system, run:

```
$vm = Get-VM DS3-SQL-VM  
  
$vmView = Get-View $vm  
  
$emptyMask = @()  
  
$vmView.ApplyEvcModeVM($emptyMask, $false)
```

Test Preparation

This section outlines the steps that should be taken prior to each test run within a given family of tests.

1. To reset the database state for all test types, from the SQL-VM PowerShell console, run:

```
sqlcmd -C -S localhost -U sa -P 'password' -Q "ALTER DATABASE [DS3] SET SINGLE_USER WITH ROLLBACK  
IMMEDIATE; RESTORE DATABASE [DS3] FROM DISK = N'D:\Backups\DS3_baseline.bak' WITH REPLACE; ALTER DATABASE  
[DS3] SET MULTI_USER"
```

2. To ensure proper tagging for the VAMT tests, from the local system, run:

```
Connect-VIServer -Server $vSphere_HostIP  
  
Get-VM DS3-SQL-VM | Get-TagAssignment -Category VAMT | Remove-TagAssignment -Confirm:$false  
  
Get-VM DS3-SQL-VM | New-TagAssignment -Tag readyToMigrate
```

3. To ensure no extraneous snapshots remain for the VAMT tests, from the local system, run:

```
Get-VM DS3-SQL-VM | Get-Snapshot | Remove-Snapshot -Confirm:$false  
  
Get-VM DS3-SQL-VM | Get-Snapshot
```

Test Initialization

This section contains the steps to trigger the testing workflow.

vMotion Tests

1. Ensure any necessary scenario and test run preparation steps have been completed.
2. To start the workload, from the driver VM, run the following, updating *\$RunLabel* and the run number based on the scenario and run number being run:

```
$runID = '$RUN_LABEL-run<N>'  
  
New-Item -ItemType Directory -Force -Path "C:\runstats\$runID" | Out-Null  
  
.ds35sqlserverdriver_patched.exe --target=172.16.60.10 --n_threads=8 --warmup_time=4 --run_time=20 --db_  
size=50GB --log_freq=1 --log_timestamp=LOCAL --out_filename="C:\runstats\$runID\$runID.csv" *>&1 | Tee-  
Object -FilePath " C:\runstats\$runID\$runID.log"
```

3. Wait five minutes: four minutes for the warmup to complete as scripted and an additional minute for the main run to have data captured before the migration starts.

4. To start the migration, from the vSphere client:
 - a. Right-click the SQL Server VM, then select **Migrate**.
 - b. Select the migration type from Table 2 or Table 4 (compute-only or compute-and-storage, current-generation or previous-generation homogeneous environment migration), then click **Next**.
 - c. Select the destination compute resource from Table 2 or Table 4, then click **Next**.
 - d. For a compute-and-storage migration, select the destination datastore, then click **Next**.
 - e. Select the destination network **Workload-PG**, then click **Next**.
 - f. Select **Schedule vMotion with high priority**, then click **Next**.
 - g. Click **Finish**.
5. To capture the task details from vSphere after the migration is completed, navigate to **Migration > Test-Cluster > Monitor > Tasks**, then note the details.

VAMT Test Steps

1. Ensure any necessary scenario and test run preparation steps have been completed.
2. To start the workload, from the driver VM, run the following, updating *\$RunLabel* and the run number based on the scenario and run number being run:

```
$runID = '$RUN_LABEL-run<N>'

New-Item -ItemType Directory -Force -Path "C:\runstats\$runID" | Out-Null

.\ds35sqlserverdriver_patched.exe --target=172.16.60.10 --n_threads=8 --warmup_time=4 --run_time=20 --db_size=50GB --log_freq=1 --log_timestamp=LOCAL --out_filename="C:\runstats\$runID\$runID.csv" *>&1 | Tee-Object -FilePath " C:\runstats\$runID\$runID.log"
```

3. To start the migration, after the workload warmup has completed and has had a minute of main run data gathering from the local system, run the following, replacing <CSV> with the appropriate file name created in the VAMT setup.

```
Start-Sleep -Seconds 300; .\VMwareArchitectureMigrationTool.ps1 -action migrate -inputFilePath <CSV> -vCenters $vSphere_HostIP
```

4. After the migration completes:
 - a. Note the log location displayed as the last line of the migration output.
 - b. From vSphere, navigate to **Migration-Test-Cluster > Monitor > Tasks**, and note the details to capture the details of the four tasks (power off, snapshot, relocate, and power on).



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