The science behind the report:

Preserve workload integrity during cross-architecture migration

This document describes what we tested, how we tested, and what we found. To learn how these facts translate into real-world benefits, read the report Preserve workload integrity during cross-architecture migration.

We concluded our hands-on testing on January 14, 2026. During testing, we determined the appropriate hardware and software configurations and applied updates as they became available. The results in this report reflect configurations that we finalized on January 7, 2026 or earlier. Unavoidably, these configurations may not represent the latest versions available when this report appears.

Our results

To learn more about how we have calculated the wins in this report, go to https://facts.pt/calculating-and-highlighting-wins. Unless we state otherwise, we have followed the rules and principles we outline in that document.

Table 1: Timings in minutes and seconds from our single and batch migrations. Source: PT.

	Windows 2022 VM	Ubuntu 22.04 LTS VM	SQL Server 2022 VM	All VMs (batch of 3 VMs)
Shutdown	0:16	0:18	0:17	0:18
Migration	7:00	1:29	8:42	13:06
Post-migration check	0:31	0:30	0:33	0:40
Total	**7:47**	**2:17**	**9:32**	**14:04**

System configuration information

Table 2: Detailed information on the systems we tested.

System configuration information	HP DL380 Gen10	Dell PowerEdge R7725
BIOS name and version	U30 v3.50	1.3.3
Non-default BIOS settings	N/A	N/A
Operating system name and version/build number	VMware ESXi™ 8.0.3 (Build 24022510)	VMware ESXi 9.0.0 (Build 24755229)
Date of last OS updates/patches applied	06/26/2025	06/26/2025
Power management policy	Performance	Performance
Processor		
Number of processors	2	2
Vendor and model	Intel® Xeon® Gold 6242	AMD EPYC™ 9655
Core count (per processor)	16	96
Core frequency (GHz)	2.80	2.60
Stepping	6	1
Memory module(s)		
Total memory in system (GB)	384	1536
Number of memory modules	12	24
Vendor and model	Samsung M393A4K40CB2-CVF	Hynix HMCG94AHBRA480N
Size (GB)	32	64
Type	DDR-4 2933MHz Dual-Rank	DDR-5 6400MHz Dual-Rank
Speed (MHz)	2,933	6,400
Speed running in the server (MHz)	2,933	6,400
Storage controller		
Vendor and model	HPE Smart Array P408i-a SR Gen10	Dell PERC H965i Front
Cache size (GB)	2	8
Firmware version	7.43	8.8.0.0.18-26
Driver version	80.4700.0.5000-2vmw.803.0.0.24022510	8.11.6.0.0.0-1vmw.900.0.24755229
Local storage (type A)		
Number of drives	1	1
Drive vendor and model	Dell Ent NVMe™ AGN MU U.2 3.2TB	Micron® MTFDKBA480TF
Drive size	3.2 TB	480 GB
Drive information (speed, interface, type)	NVMe SSD	NVMe M.2 SSD

System configuration information	HP DL380 Gen10	Dell PowerEdge R7725
Local storage (type B)		
Number of drives	8	2
Drive vendor and model	Toshiba® PX05SVB096Y	Micron MTFDDAK480TGA-1B
Drive size (GB)	960	480
Drive information (speed, interface, type)	12Gbps SAS SSD	6Gbps SATA SSD
Network adapter (type A)		
Vendor and model	HPE Ethernet 1Gb 4P 331i	Broadcom Adv Quad 25Gb Ethernet
Number and type of ports	4x 1GbE	4x 25GbE
Driver version	4.1.14.0	232.0.154.0
Network adapter (type B)		
Vendor and model	Intel Ethernet E810-XXVDA2	Broadcom BCM57508 100G 2P
Number and type of ports	2x 25GbE	2x 100GbE
Driver version	1.11.1.9	232.0.154.0
Cooling fans		
Number of cooling fans	6	12
Power supplies		
Vendor and model	HPE 865414-B21	Dell 01PKMHA00
Number of power supplies	2	2
Wattage of each (W)	800	1,500

How we tested

We deployed two servers in our data center: an Intel Xeon processor-based HP ProLiant DL380 Gen10, and an AMD EPYC processor-based Dell PowerEdge R7725. We installed VMware ESXi version 8.0.3 on the HP server and ESX version 9.0.0 on the Dell server. We deployed a VMware vCenter® 9.0.0 appliance to the Dell server and connected it to both servers. Once connected, we deployed three VMs onto the HP server: an Ubuntu 22.04 LTS VM, a Windows Server 2022 VM, and a Windows Server 2022 VM with SQL Server 2022. We populated a small TPROC-H database on the SQL VM and created a backup of the database.

We then created a VMware Architecture Migration Tool (VAMT) controller VM on the Dell system to act as a harness for our migration tests. From this controller VM, we created and executed the VAMT scripts that migrated our VMs across servers. We timed the migrations, gathering data for both individual VM migrations and a batched migration of all three VMs. We then verified that the VMs powered on correctly and retained universally unique identifiers (UUIDs), database backup file hashes, and database integrity.

Installing VMware vSphere version 8.0.3 on the HP ProLiant DL380 Gen10

1. Download ESXi Version 8.0.3 from the VMware website.
2. Open a new browser tab, and connect to the IP address of the DL380 iLO.
3. Log in with the iLO credentials.
4. In the main screen, click Launch Virtual Console.
5. In the console menu bar, select Virtual Media and Virtual Storage.
6. In the Virtual Storage popup window, select ISO from the dropdown menu, click Open Image to browse local computers, and select the image you downloaded in step 1.
7. To mount the ISO image, click Plug In, and click OK.
8. On the console menu bar, click the Power Control, and select Power Reset.
9. The system will boot to the mounted image, and the Loading ESXi installer screen will appear. When prompted, press Enter to continue.
10. To Accept the EULA and Continue, press F11.
11. Select the storage device to target for installation. We selected the internal M.2 card. To continue, press Enter.
12. To confirm the storage target, press Enter.
13. Select the keyboard layout, and press Enter.
14. Provide and confirm a root password. To continue, press Enter.
15. To install, press F11.
16. Upon completion, reboot the server by pressing Enter.

Installing VMware vSphere version 9.0.0 on the Dell PowerEdge R7725

1. Download ESXi Version 9.0.0 from the VMware website.
2. Open a new browser tab, and connect to the IP address of the R7725 iDRAC.
3. Log in with the iDRAC credentials.
4. In the bottom left of the main screen, click the virtual console window to launch it.
5. In the console menu bar, click the disc symbol, and navigate to CD/DVD -> Local *.iso file.
6. In the popup window, select the image ISO you downloaded in step 1, and click Open.
7. On the console menu bar, click the Power Control, and select Power Reset.
8. When prompted, press F11 to open the boot menu.
9. Select Virtual Optical Drive.
10. The system will boot to the mounted image, and the Loading ESXi installer screen will appear. When prompted, press Enter to continue.
11. To accept the EULA and continue, press F11.
12. Select the storage device to target for installation. We selected the internal M.2 card. To continue, press Enter.
13. To confirm the storage target, press Enter.
14. Select the keyboard layout, and press Enter.
15. Provide and confirm a root password. To continue, press Enter.
16. To install, press F11.
17. Upon completion, reboot the server by pressing Enter.

Installing VMware vCenter Server Appliance version 9.0.0

Note: To manage the vSphere environment, we deployed the vCenter appliance on one of the client hosts.

1. Download VMware vCenter version 9.0.0 from the VMware support portal at https://my.vmware.com.
2. Mount the image on your local system, and navigate to the vcsa-ui-installer folder. Expand the folder for your OS, and launch the installer if it doesn't automatically begin.
3. When the vCenter Server Installer wizard opens, click Install.
4. To begin installation of the new vCenter server appliance, click Next.
5. Check the box to accept the license agreement, and click Next.
6. Enter the IP address of the server with VMware ESX version 9.0.0. Provide the root password, and click Next.
7. To accept the SHA1 thumbprint of the server's certificate, click Yes.
8. Accept the VM name, and provide and confirm the root password for the VCSA. Click Next.
9. Set the size of the environment you're planning to deploy. We selected Tiny. Click Next.
10. Select the datastore on which to install vCenter. Accept the datastore defaults, and click Next.
11. Enter the FQDN, IP address information, and DNS servers you want to use for the vCenter server appliance. Click Next.
12. To begin deployment, click Finish.
13. When Stage 1 completes, click Close. To confirm, click Yes.
14. On the Getting Started - vCenter Server page, click Next.
15. Enable SSH access, and click Next.
16. To confirm the changes, click OK.
17. Type `vsphere.local` for the Single Sign-On domain name. Enter a password for the administrator account, confirm it, and click Next.
18. Click Next.
19. Click Finish.

Creating a vSphere cluster in vCenter

1. Open a browser, and enter the address of the vCenter server you deployed. For example: `https://[vcenter.FQDN]/ui`
2. In the left panel, select the vCenter server, right-click, and select New Datacenter.
3. Provide a name for the new data center, and click OK.
4. Select the data center you just created, right-click, and select New Cluster.
5. Give a name to the cluster, and click OK.
6. In the cluster configuration panel, under Add hosts, click Add.
7. Check the box for Use the same credentials for all hosts. Enter the IP address and root credentials for the first host, and enter the IP addresses of all remaining hosts. Click Next.
8. Check the box beside Hostname/IP Address to select all hosts. Click OK.
9. Click Next.
10. Click Finish.

Creating a VMware datastore

1. Open a browser, and enter the address of the first ESXi host.
2. Enter the hosts credentials, and click Login.
3. Click the Storage tab.
4. Click New datastore.
5. Select Create new VMFS datastore, and click Next.
6. Name the datastore, select a device on which to create a VMFS partition, and click Next.
7. Click Next.
8. Click Finish.
9. Complete steps 1 through 8 on the remaining hosts.

Creating the Ubuntu and Windows test VMs

1. In vCenter, select a host on which to create a VM.
2. Right-click and select New Virtual Machine.
3. Click Create a new virtual machine, and click Next.
4. Enter an appropriate VM name, select Datacenter, and click Next.
5. Select the HP ESXi 8.0.3 host, and click Next.
6. Choose an appropriate datastore, and click Next.
7. Select an appropriate compatibility mode (ESXi 8.0 U2 and later), and click Next.
8. Select {Linux;Windows} for the Guest OS Family and {Ubuntu Linux (64-bit);Microsoft Windows Server 2022 (64-bit)} for the Guest OS Version. Click next.
9. In Customize hardware, select the following:

   - 4 vCPU
   - 8GB memory fully reserved
   - {30;90}GB OS hard drive
   - Choose the appropriate VM Network
   - Point the DVD drive to the installation media ISO in your datastore
   - Click Next

10. Review, and click Finish.

Installing Ubuntu 22.04 LTS on the Linux test VM

1. In vCenter, right click the Ubuntu VM and power it on.
2. At the Grub screen, select Try or Install Ubuntu Server, and press enter.
3. Select English for the installation, and press enter.
4. Choose English (US) for the keyboard layout, and click Done.
5. Select Ubuntu Server for the base installation, and click Done.
6. On the network connections screen, select the system's management NIC, and enter its IP address. Click Done.
7. On the Configure Proxy screen, click Done.
8. On the Configure Ubuntu archive mirror screen, click Done.
9. On the Guide storage configuration screen, select Use an entire disk, select the system's OS volume, select Set up the disk as an LVM group, and click Done.
10. On the Storage configuration screen, assign all free space to the default volume group, and click Done.
11. On the Confirm destructive action pop-up screen, click Continue.
12. On the profile setup screen, enter your name, your server's name, and a username. Enter a password, and click Done.
13. On the SSH Setup screen, select Install OpenSSH server, and click Done.
14. On the Featured Server Snaps screen, select Done to start the installation.
15. When the installation completes, click Reboot Now.
16. After the system reboots, log in with the credentials you selected.
17. Update the system packages:

```
sudo apt update
sudo apt upgrade
```

Installing Windows Server 2022 on the Windows test VM

1. Attach the Windows Server 2022 ISO to the VM.
2. Open the VM console, and start the VM.
3. When the system prompts you to boot from DVD, press any key.
4. When the installation screen appears, leave language, time/currency format, and input method as default, and click Next.
5. Click Install now.
6. When the installation prompts you, enter the product key.
7. Select Windows Server 2022 Datacenter Edition (Server with a GUI), and click Next.
8. Check I accept the license terms, and click Next.
9. Click Custom: Install Windows only (advanced).
10. Select Drive 0 Unallocated Space, and click Next. This starts Windows automatically, and Windows will restart automatically after completing.
11. When the Settings page appears, fill in the Password and Reenter Password fields with the same password. Log in with the password you set up previously.
12. Install VMware Tools in the VMs hosted on the ESXi servers.
13. From Server Manager, disable Windows Firewall.
14. Run Windows Updates.
15. Shut down the VM for cloning.

Cloning the Windows VM to create the SQL test VM

1. In vCenter, right-click the Windows VM, and select Clone→Clone to Virtual Machine.
2. Enter a name for the new VM, and click Next.
3. Select the HP ESXi 8.0.3 host as your compute resource, and click Next.
4. Choose an appropriate datastore, and click Next.
5. Click the checkbox for Customize this virtual machine's hardware, and click Next.
6. Click add new device and select Hard Disk, and complete this step two more times so that the VM has a total of three disks.
7. Configure Hard Disk 2 with 50 GB and Hard Disk 3 with 30 GB, and click Next.
8. Review the details, and click Finish.
9. Once the cloning process completes, click the virtual console to access the OS.
10. Log into the SQL VM.
11. Click start, and type `diskmgmt` to open Disk Management.
12. Set the new disks to Online, initialize them, and create new Windows volumes on each. Name the 50GB volume `data` and the 30GB volume `log`.

Installing Microsoft SQL Server 2022 on the SQL test VM

1. Attach the installation media ISO for SQL Server 2022 to the VM.
2. Click Run SETUP.EXE. If Autoplay does not begin the installation, navigate to the SQL Server 2022 ISO, and double-click it.
3. In the left pane, click Installation.
4. Click New SQL Server stand-alone installation or add features to an existing installation.
5. Specify Evaluation as the edition you are installing, and click Next.
6. To accept the license terms, click the checkbox, and click Next.
7. Click Use Microsoft Update to check for updates, and click Next.
8. At the Feature Selection screen, select Database Engine Services, Full-Text and Semantic Extractions for Search, Client Tools Connectivity, and Client Tools Backwards Compatibility.
9. Click Next.
10. At the Instance configuration screen, leave the default selection of default instance, and click Next.
11. At the Server Configuration screen, accept defaults, and click Next.
12. At the Database Engine Configuration screen, select the authentication method you prefer. For our testing purposes, we selected Mixed Mode.
13. Enter and confirm a password for the system administrator account.
14. Click Add Current user. This may take several seconds.
15. Click Next.
16. At the Ready to Install screen, click Install.
17. Close the installation window.
18. In the SQL Server Installation Center, click Install SQL Server Management Tools.

19. Click Download SQL Server Management Studio.
20. Click Run.
21. When the Microsoft SQL Server Management Studio screen appears, click Install.
22. When the installation completes, click Close.

Creating a sample database and backup

We used HammerDB to generate a 10-scale TPROC-H database as a sample database in our migration, and then we created a backup.

Installing HammerDB 5.0

1. Download the latest version of HammerDB from www.hammerdb.com/download.html. We used 5.0.
2. Double-click the .EXE file, choose English, and click OK.
3. Click Yes.
4. Click Next.
5. Choose a destination location, and click Next.
6. Click Next.
7. Click Finish.

Populating the database

1. Open HammerDB, and click Options→Benchmark.
2. Choose MSSQL Server and TPROC-H.
3. Expand SQL Server→TPROC-H→Schema Build.
4. Double-click Options.
5. Choose 10 scale, and set the number of virtual users corresponding to the number of vCPUs.
6. Check the box for clustered column store, and click Ok.
7. Double-click Build. This build could take a few hours.

Backing up the database

1. Open SQL Server Management Studio.
2. Right-click the TPROC-H database, and click Tasks→Back up….
3. Choose a location to store the backup, and click OK.

Creating the VAMT tag category and tags in vCenter

1. Log into the vCenter appliance.
2. Click the hamburger menu in the top left, and select Tags & Custom Attributes.
3. Click Categories.
4. Click New.
5. Name the category `VAMT`, ensure Tags Per Object is set to One tag, and unselect all object types except for Virtual Machine.
6. Click Create.
7. Click the Tags tab.
8. Click New.
9. Name the tag `complete`, and give the tag a description (if desired).
10. Set the category to VAMT.
11. Click Create.
12. Complete steps 8 through 11 for the following tag names:
    - `completeWithErrors`
    - `failed`
    - `inProgress`
    - `readyToMigrate`
    - `readyToRollback`
    - `rolledBack`

Deploying and configuring the VAMT controller VM

1. Create a Windows Server 2022 VM using the same steps in the Windows section of Creating the Ubuntu and Windows Test VMs.
2. Install the latest version of VMware Tools:
    a. In vCenter, click the VM, look for the VMware tools mount prompt, and click Actions and Install VMware Tools.
    b. In the VM OS, follow the VMware Tools prompts to install.

3. Install the latest VMware Cloud Foundation (VCF) PowerCLI package:
    a. Open a PowerShell prompt as administrator.
    b. Run the following command:

```
Install-Module VCF.PowerCLI -Scope CurrentUser
```

4. Install the latest version of git:
    a. In your PowerShell prompt, run the following command:

```
winget install -id Git.Git -e -source winget
```

5. Create an SSH key pair, and upload the public key to your GitHub account:
    a. In a command line prompt, run the following command:

```
ssh-keygen -t rsa -b 4096 -C "[your email]"
```

    b. Navigate to your default SSH folder (typically C:\Users\Administrator\.ssh)
    c. Copy the contents of id_rsa.pub to your clipboard.
    d. In a web browser, navigate to github.com.
    e. Log into your GitHub account.
    f. In the top right corner, click your avatar, and select Settings.
    g. In the left panel, click SSH and GPG keys.
    h. Click New SSH key.
    i. Enter a title for the key, and paste the contents of id_rsa.pub into the Key field.
    j. Click Add SSH key.

6. Pull down the VAMT repo from GitHub:
    a. Open a PowerShell prompt as administrator.
    b. Run the following command:

```
git clone git@github.com:vmware-samples/vmware-architecture-migration-tool.git
```

7. Connect to the vCenter using PowerCLI:
    a. In your PowerShell prompt, run the following command:

```
Connect-VIServer -Server [vCenter IP] -Protocol https -User \ 'administrator@vsphere.local'
-Password [vCenter password]
```

8. Set up one-time session settings:
    a. In your Powershell prompt, run the following commands:

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

9. Create the toMigrate.csv VM list:
   a. Open a new file in Notepad.
   b. Fill out the top line as follows:

   ```
   vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore
   ```

   c. Fill out the next line with VM information as follows:

   ```
   [name of VM as it appears in vCenter],[vCenter IP],[destination cluster name],[destination
   network name],[destination datastore name]
   ```

   d. Complete the previous bullet point for all migrating VMs. (For an example, see the section Scripts We Used.)
   e. Save the file to the root directory of the VAMT git repo.
10. Create the TestMigrate.ps1 execution script:
    a. See the section Scripts We Used for an example.
    b. See the GitHub VAMT guide for additional script commands.
    c. Once you have finished editing the script, save it to the root folder of the VAMT git repo.

Deploying and configuring the syslog VM

1. Create an Ubuntu 22.04 LTS VM using the same steps in the Ubuntu section of Creating the Ubuntu and Windows Test VMs.
2. Run the following commands to update and upgrade:

   ```
   sudo apt update -y && sudo apt upgrade -y
   ```

3. Install rsyslog:

   ```
   sudo apt install rsyslog -y
   ```

4. Check the status of rsyslog to make sure it is running:

   ```
   sudo systemctl status rsyslog
   ```

5. Edit the rsyslog.conf file:

   ```
   sudo vim /etc/rsyslogconf
   ```

6. Uncomment the modules and input for imudp and imtcp, and save the file.
7. Configure the firewall:

   ```
   sudo ufw allow 514/tcp
   sudo ufw allow 514/udp
   sudo ufw enable
   ```

8. Restart rsyslog:

   ```
   sudo systemctl restart rsyslog
   ```

9. Verify listening on port 514:

   ```
   sudo ss -tulnp | grep 514
   ```

Executing the migration

1. In vCenter, right-click your migrating Ubuntu VM, and select Tags & Custom Attributes -> Assign Tag.
2. Select the readyToMigrate tag.
3. Complete steps 1 and 2 for all migrating VMs.
4. Log into the VAMT controller VM.
5. Open a PowerShell prompt as administrator.
6. Navigate to the root directory of the VAMT git repo.
7. Execute the TestMigrate.ps1 script with the following command:

```
.\TestMigrate.ps1
```

8. If prompted, input your vCenter credentials.
9. Allow the migration to progress. Once finished, the PowerShell window will show summary text.

Scripts we used

toMigrate.csv

```
vmname,target_vc,target_hostpoolcluster,target_portgroup,target_datastore
SQLTest,10.218.100.100,AMD,VM Network,data
ubuntuTest,10.218.100.100,AMD,VM Network,data
windowsTest,10.218.100.100,AMD,VM Network,data
```

TestMigrate.ps1

```
[string]$userName = 'administrator@vsphere.local'
[string]$userPassword = '[vcenter_password]'
[securestring]$secStringPassword = ConvertTo-SecureString $userPassword -AsPlainText -Force
      [pscredential]$credObject = New-Object
      System.Management.Automation.PSCredential($userName, $secStringPassword)

$options = @{
      action = "migrate"
      vcenters = "10.218.100.100"
      inputFilePath = "C:\vmtest\vmware-architecture-migration-tool\toMigrate.csv"
      parallelTaskCount = 5
      syslogHost = "10.222.1.97:514"
      Debug = $false
      debugLogging = $true
}
.\VMwareArchitectureMigrationTool.ps1 @options
```

checkdb.sql

```
DBCC CHECKDB ('tpch')
WITH NO_INFOMSGS,
```

checkalldb.sql

```
-- Run DBCC CHECKDB on all databases
EXEC sp_MSforeachdb 'PRINT "Checking: ?"; DBCC CHECKDB ("?") WITH NO_INFOMSGS, PHYSICAL_ONLY'
```

rowcount.sql

```
SELECT COUNT(*) AS 'RowCountCustomer' FROM customer
SELECT COUNT(*) AS 'RowCountLineitem' FROM lineitem
SELECT COUNT(*) AS 'RowCountNation' FROM nation
SELECT COUNT(*) AS 'RowCountOrders' FROM orders
SELECT COUNT(*) AS 'RowCountPart' FROM part
SELECT COUNT(*) AS 'RowCountPartsupp''ROM partsupp
SELECT COUNT(*) AS 'RowCountRegion' FROM region
SELECT COUNT(*) AS 'RowCountSupplier' FROM supplier
```

This project was commissioned by Dell Technologies.

Read the report ▶

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How we created this report

A PT team, which includes the contributors we've listed and others, created this report and performed the technical work behind it. We used AI to help create an outline for the report content and to edit some report text.

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