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Methodology

Behind the Report—Prowess Puts Cold Migration to the Test

How VMs Were Migrated from Intel to AMD

This document provides the methodology used by Prowess Consulting to test how virtual machines (VMs) running on legacy Intel® architecture fare when migrating to new AMD® architecture.

Test Plan

Prowess Labs set out to discover whether IT staff can cleanly migrate virtual machines (VMs) between Intel® and AMD® hardware architectures using the VMware® Architecture Migration Tool (VAMT). This document describes the cluster environments, system-configuration details, and step-by-step procedures that we used to collect data. Testing concluded in September 2022.

Table 1 | Cluster environments used in migration testing

	Dell™ PowerEdge™ R7525	3 x Dell™ PowerEdge™ R320
Processor	AMD EPYC™ 75F3 processor	Intel® Xeon® processor E5-2640 v3
Number of CPUs	1	1
Cores per CPU	32	8
Cores/threads total	64/128	8/16
Installed memory	1 TB	128 GB
Test server quantity	1	3
Shared storage	Synology® network-attached storage (NAS)	
VMware vSphere® 7.0.3*		

*VMware NSX-T Data Center™ and VMware HCX™ were not used for the purposes of this test.

Prowess engineers used the hardware shown in Table 1 and VAMT, which is a Microsoft® PowerShell® script written for migration. We chose this tool because it is <u>open-source</u> and extensible, so it can be tailored for specific customer needs, such as this use case. We tested migration of VMs from legacy Intel hardware to new AMD hardware with both environments connected to shared storage. In this migration project, our engineers were also able to consolidate VMs across three legacy Intel servers to a single new AMD server.

Process

Prowess engineers stood up a single cluster containing one AMD processor–based server and three Intel processor–based servers, and we then migrated VMs between the two environments while documenting the experience. For this testing, we used an on-premises shared-storage model.

Although a VMware vSAN™–to–VMware vSAN migration is possible if the vSAN clusters are connected to the same VMware vCenter Server®, Prowess did not address that scenario. We documented any impediments that arose during the migration process.

We identified older Intel hardware and newer AMD hardware for use for shared storage in our VMware VM migration. Using that hardware and a PowerShell migration script, the Prowess engineers conducted the testing, determined and captured best practices, and documented the entire testing process.

Note: There are <u>vCenter limits</u> for tasks running at the same time. Limits that apply to an entire vCenter server are as follows:

- vCenter can execute approximately 640 concurrent operations before incoming requests are queued.
- vCenter can support up to 2,000 concurrent sessions (authenticated logins via user interface [UI] or API, and also including remote consoles) before it rejects them.

Test Process
The Prowess engineers performed the following high-level test process steps:

VM Migration
1. Review the prerequisites of the VAMT tool and install the required PowerShell modules:
   o <u>VMware vSphere® PowerCLI™</u>
2. Verify administrative credentials on the vCenter server holding the clusters.
3. Verify that the client system has connectivity to the vCenter server.
4. Verify that the VMware vSphere® Distributed Resource Scheduler™ service is enabled on the cluster.
5. Configure the following tags in vCenter to enable migration and rollback:
   o **Category Tag Name: VAMT**
   o **Ready to migrate Tag Name: readyToMigrate**
   o **In Progress Tag Name: inProgress**
   o **Complete Tag Name: complete**
   o **Complete with errors Tag Name: completeWithErrors**
   o **Failed Tag Name: failed**
   o **Ready to rollback Tag Name: readyToRollback**
   o **Rollback Tag Name: rolledBack**
6. Create a CSV with a list of VMs to migrate, the target host pool cluster name, the target port group, and the target datastore. For example:

```
vmname,target_hostpoolcluster,target_portgroup,target_datastore
Svr-1,NewPool,NewPortGroup,NewDatastore
Svr-2,NewPool,NewPortGroup,NewDatastore
Svr-3 NewPool,NewPortGroup,NewDatastore
Svr-4,NewPool,NewPortGroup,NewDatastore
Svr-5,NewPool,NewPortGroup,NewDatastore
```
7. Connect to the provided VMware vCenter server.
8. Create VM workloads on each cluster.
9. After installing the VM tools, confirm that the VMs cannot be migrated without preparation and while they are running.
10. Shut down the VMs, and then go through a cold-migration checklist.
11. Migrate the VMs to the AMD processor–based cluster with VMware® solutions.
12. Confirm that the VMs launch without issue.

Test Steps

For this testing, we completed the following processes:

1. Using VMware vCenter Server, create 40 VMs named "workload" and hosted on the legacy Intel compute cluster (see Figure 1). Configure each VM with:
   - o vCPU: 2
   - o RAM: 4 GB
   - o Storage: 48 GB
   - o Operating system: Windows 10
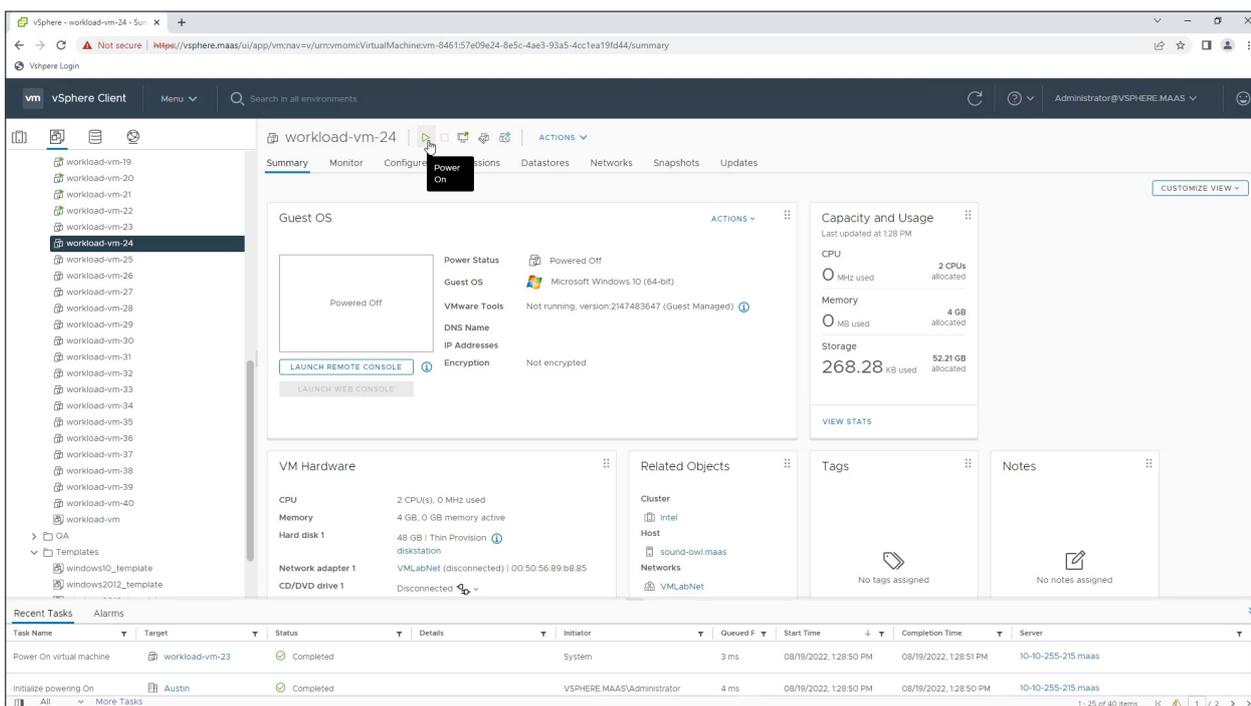   - o VMware Tools™ v.2147483647

Figure 1 | One of the VMs created for migration testing

2. Install VMware vSphere PowerCLI on the administrator machine.
3. Attempt live migration. The native VMware vCenter migration tool will warn that the source (Intel) and target (AMD) compute nodes are not compatible (see Figure 2).
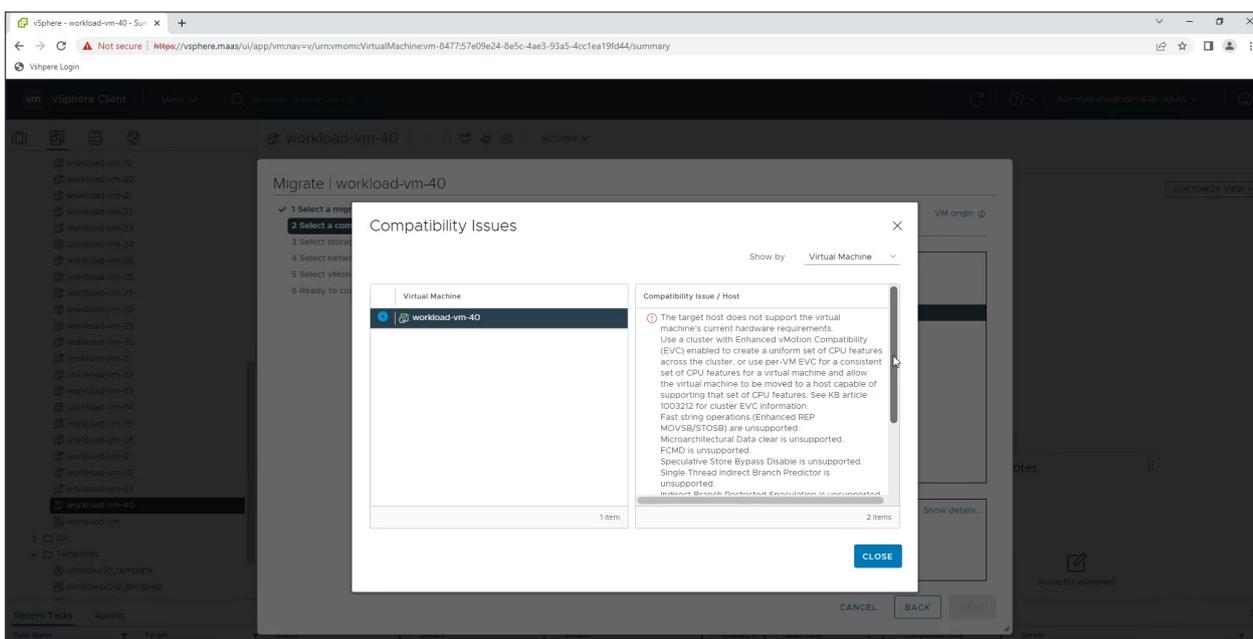

Figure 2 | VMware vCenter® generates a warning that the source and target clusters are incompatible

The analysis in this document was done by Prowess Consulting and commissioned by AMD.

4. Add the required single-cardinality VAMT tags manually to the vCenter Tags & Custom Attributes page.
5. Create a CSV file containing all "workload" VMs with the following formatting (see Figure 3):

   vmname,target_hostpoolcluster,target_portgroup,target_datastore
   - *vmname*: **VM name to migrate**
   - t*arget_hostpoolcluster*: **Target host pool cluster to migrate the VMs to**
   - *target_portgroup*: **Target VM port group network to connect the VMs to**
   - *target_datastore*: **Target host pool cluster datastore to migrate the VM files to**
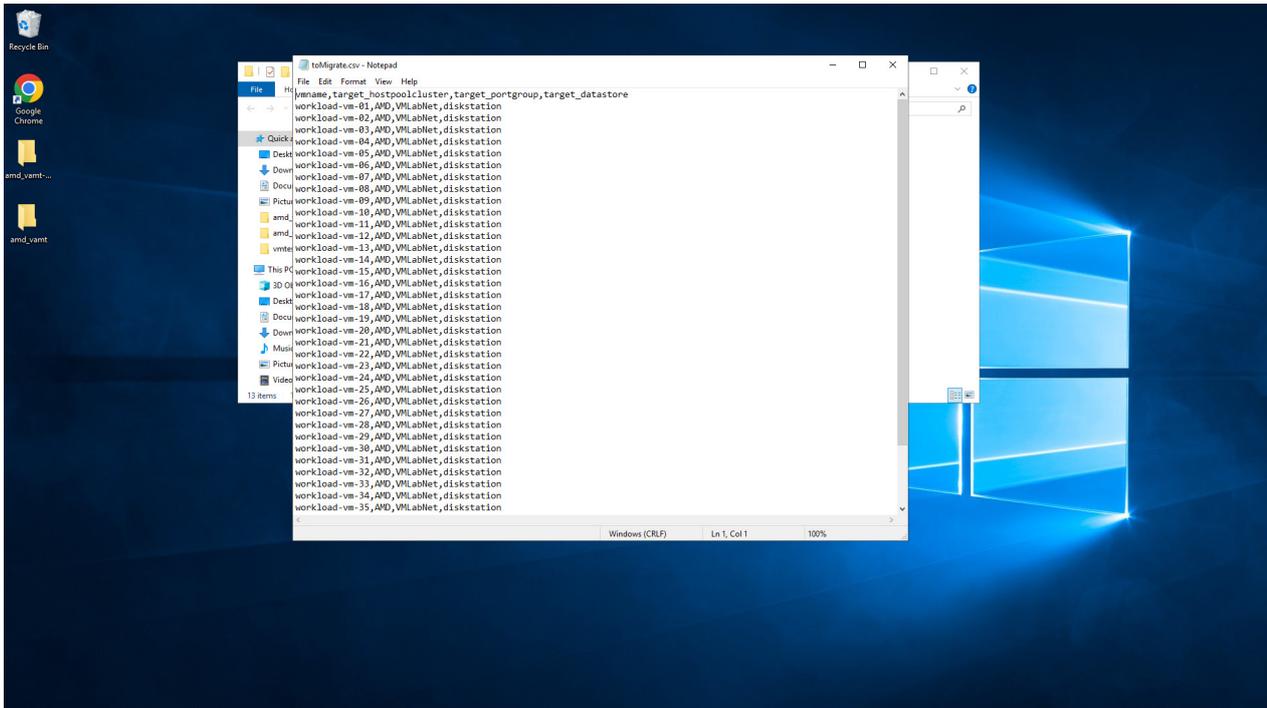

Figure 3 | A CSV file containing VM attributes read by the migration tool

6. Prior to applying any tags to the VMs, run the VAMT tool in vSphere PowerCLI to confirm authentication with vCenter.
7. Assign the **readyToMigrate** tag to the workload VMs (see Figure 4).
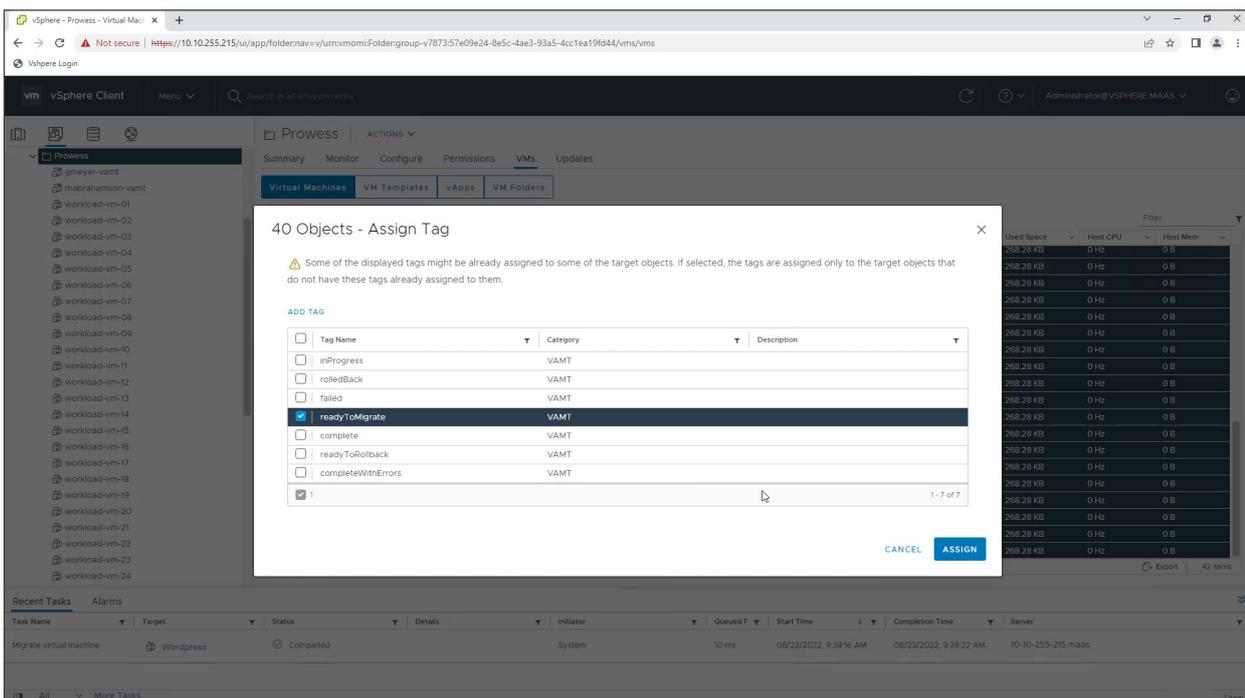

Figure 4 | The readyToMigrate tag applied to objects

8.   Run the migration command in VAMT. Certain warning messages might appear, depending on which vSphere version you are running. These are only warning messages and will not affect the migration.

9.   Once finished, the tool will display a summary output.

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