Executive summary

Reap the full potential of workload mobility within the cloud and data center by using consistent processor architecture

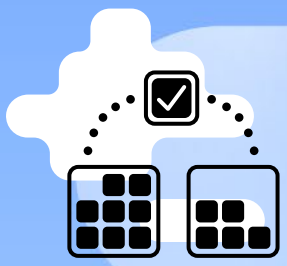
You can migrate live VMs between Intel Xeon processor-based servers but migration in a mixed CPU environment requires downtime and administrative hassle

A study commissioned by Intel Corp.

If your enterprise uses hybrid or multi-cloud environments, workload portability is key to achieving maximum business agility. Routine hardware maintenance, data center expansion, server hardware upgrades, VM consolidation, and other events all require your IT staff to migrate virtual machines. If all of your servers share the same underlying processor architecture, you can use VMware vSphere® vMotion® to live migrate VMs from one host to another with zero downtime. The EVC (Enhanced vMotion Compatibility) feature of vMotion lets you live migrate VMs even between different generations of CPUs within a given architecture.[1]

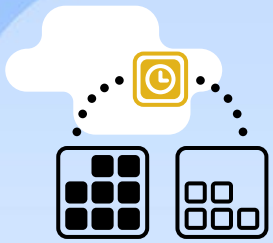
However, if you were to deploy a heterogeneous, or mixed CPU, environment, you'd have to shut down VMs before migrating them, causing users to experience downtime before applications resume on the new host. To minimize the impact of the disruption, IT staff would likely schedule migrations outside of production hours.

In our hands-on testing, we live migrated 60GB VMs in a homogeneous environment of only Intel Xeon processor-based servers with zero downtime. However, in a heterogeneous environment, our only option to move a VM from an Intel Xeon processor-based server to one powered by AMD EPYC processors was first shutting down the VM for a cold migration, a process that caused the workload without shared storage to be to be unavailable for as long as 18 minutes.



No downtime during live migration

between legacy and current servers powered by Intel® Xeon® processors



42 seconds of downtime for a cold migration (with shared storage)

Intel processor-powered server to AMD EPYC™ processor-powered server

18 minutes of downtime for a cold migration (without shared storage)

from an Intel processor-powered server to an AMD EPYC processor-powered server

What we learned about migrating workloads in homogeneous and mixed CPU environments

Imagine a data center with an installed base of servers powered by different Intel Xeon processors. The time has come to add new servers, and the team researching the purchase is debating between servers powered by Intel Xeon Scalable processors and servers powered by AMD EPYC processors.

To study the migration options that would be available with each choice, we performed three scenarios. For all of them, we used VMware vSphere 6.7 to create a VM running Microsoft Windows Server 2016 Datacenter on each server. We installed Microsoft SQL Server 2016 onto the VM and tested availability with a database workload.

Scenario 1: Migrating an active VM between two servers powered by Intel Xeon Platinum 8160 processors

Because live migration is supported between Intel Xeon processors, the database connection stayed up and continued servicing requests throughout the migration period. An end user accessing this database would experience no interruption, and would never know that the server hosting the database had changed.

Outcome: Zero downtime

Scenario 2: Migrating an active VM from a legacy server powered by Intel Xeon E5-2680 v2 processors to a current-generation server powered by Intel Xeon Platinum 8160 processors using EVC

We placed both servers in a VMware EVC Cluster and used EVC mode, which allows the servers to match processor features across hosts in the cluster so that VMs can be migrated back and forth smoothly. In our testing, the VM stayed online and achieved a true live migration with zero downtime and no interruption to service.

Outcome: Zero downtime

Scenario 3: Migrating a VM from a server powered by Intel Xeon Platinum 8160 processors to a server powered by AMD EPYC 7601 processors

Because live migration is not an option when migrating between a server powered by Intel Xeon processors and one powered by AMD EPYC processors, we had to shut down the active VM running on the Intel Xeon Platinum 8160 processor-powered server before we could migrate it. In an enterprise environment, this cold migration would require users to pause during the migration period.

Outcome:

- 42 seconds downtime with shared storage (moving compute only)
- 18 minutes, 31 seconds downtime without shared storage (moving compute and storage)

What these findings could mean for your company

If your company has an installed base of servers powered by Intel Xeon processors and is shopping for additional servers, selecting ones powered by Intel Xeon Scalable processors would let you migrate VMs seamlessly—not only among the new servers, but also between legacy servers and new servers.

If you selected servers powered by the AMD EPYC processor, moving VMs between existing servers powered by Intel processors and the AMD processor-based servers would require cold migrations, which create downtime.

Downtime can be expensive for businesses to plan around, so you should factor this added expense into your calculations when selecting servers to expand your data centers on premises or in the cloud.

1 EVC and CPU Compatibility FAQ, accessed January 10, 2019, https://kb.vmware.com/s/article/1005764

Read the report at http://facts.pt/8zysd88 ▶

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