

# Seamless workload migration to Cloud for Cloud providers

VMware vCenter® to VMware Cloud Director™ migrations

A Natural Partnership



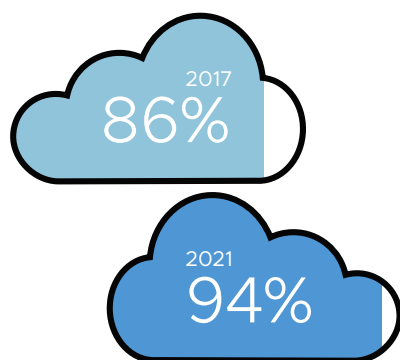
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## WORKLOAD MIGRATION MARKET

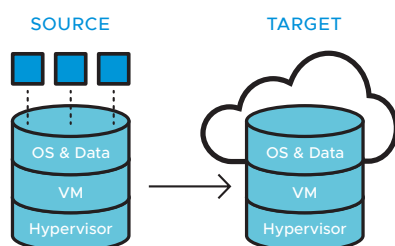
- 28% of organizations currently run the majority of their workloads in off-premises cloud environments (IaaS/PaaS, SaaS, hosted private cloud), expanding to 38% of organizations by 2020.
- Private cloud (on-premises, hosted) as the deployment venue for the majority of workloads: 28% of organizations in 2018; 38% by 2020<sup>1</sup>.
- Public cloud (IaaS/PaaS, SaaS) as the deployment venue for the majority of workloads: 17% of organizations in 2018; 30% by 2020<sup>2</sup>.

## CLOUD WORKLOADS AS A PERCENTAGE OF ALL DATA CENTER WORKLOADS<sup>3</sup>

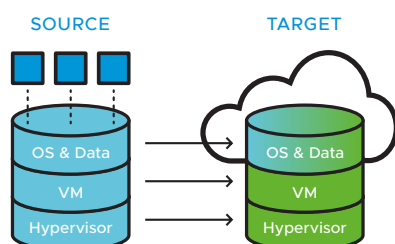


## MIGRATION VS TRANSFORMATION

Migration is a move where the target runs the same compute, network, storage and security models.



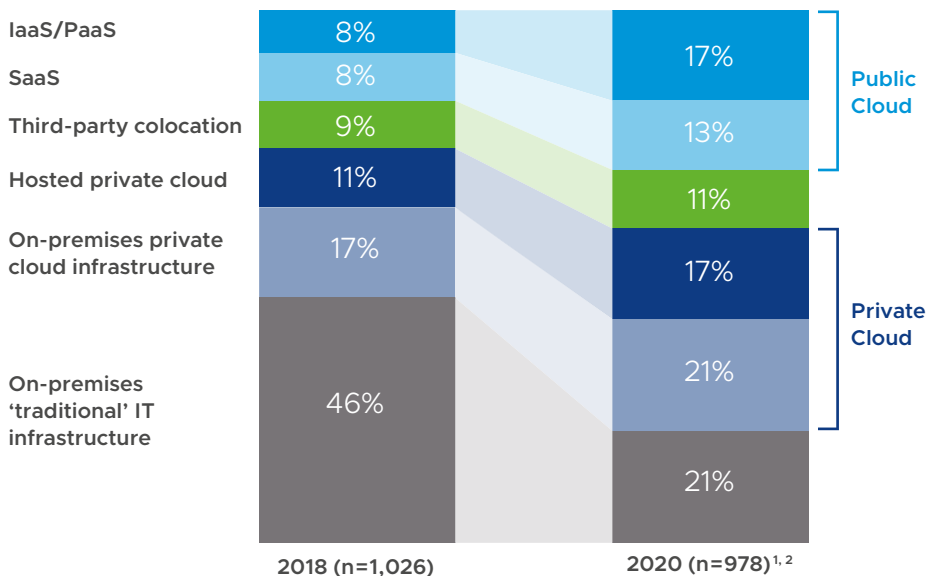
Transformation is a change whereby the target is different in all aspects and the source needs to be modified to exist in the target. This presents risk and downtime.



## Executive summary

Over the past few years, we have noticed a steady trend of Cloud being favoured as the primary workload deployment location over on-premises deployments. COVID-19 also became an additional accelerator for many enterprise organizations who had already started transforming their core applications.

Cloud is therefore an important journey for many. However, public cloud is only one of the possible destinations. Workloads are also growing in Service Provider managed Private and Public clouds, making this the perfect opportunity to include workload migration as a must-have service for every cloud provider. But critically, migration needs to be simple, robust in features, reliable, and attractive in terms of price.



Around one thousand cloud providers depend on VMware Cloud Director to be their service delivery platform, and their number is continuously growing. With the support of VMware Cloud Director Availability (VCDA), they can offer a standard, flexible, seamless, and cost-effective solution for migrating their client workloads.

## Workload migration and main risks

Migration to Cloud is literally the process of moving resources such as virtual machines (VMs) or virtual applications (vApps) from one place (an on-premises site or a cloud site) to a cloud computing environment. This might seem like an easy thing to do but, in reality, it could turn out to be more complicated than expected.

Some of the main technical risks faced by the majority of organizations are:

- **Re-platforming** – is the cloud environment compatible with the on-premises infrastructure? Are security, networking, and the data disk format the same?
- **Right-sizing** – is the Cloud offering flexible enough? VMware Cloud Director clouds can accommodate any size VM: you are not forced down a particular route.
- **Security** – is the migration process secure enough?
- **Size** – are the migrated workloads too big, and will this slow down the process significantly?

1. Report: Voice of the Enterprise: Digital Pulse, Workloads and Key Projects – Quarterly Advisory Report

2. Source: 451 Research's Voice of the Enterprise: Digital Pulse, Workloads and Key Projects 2018

3. Source: <https://www.statista.com/statistics/227284/share-of-global-cloud-data-center-workloads-development/>

“The VCDX part of the VMware Software-Defined Data Center, or SDDC, is almost too easy. It takes the complexity, and more importantly, the risk out of migrating business critical applications from on-premise servers to a VMware cloud. There is no need for months of design and planning for your migration, costly consultancy time, or to undertake several test runs before performing the migration.

Using Cloud Director Availability for migration takes 80% less time and is a fraction of the cost of previous methods. It also almost eliminates the risk of data loss or migration failure. What's more, it's all available through a portal that gives our customers full access, so they can see and be involved at every step of the process, making changes as and when required.”

TIM MURPHY  
CEO  
STRENCOM

- **Stability** – is there a guarantee that the migration will be successful?
- **Downtime** – how long can companies afford to have their critical applications powered off?
- **Level of customization** – are there many dependencies between the different elements of the vApp?

### VMware Cloud Director Availability overview

VMware Cloud Director Availability is a powerful solution used by VMware Cloud Providers to offer simple, secure, and cost-effective onboarding, migration, and disaster recovery as a service to, or between, multi-tenant VMware clouds.

The main use cases it covers are:

- On-Premises to Cloud migration
- Cloud-to-Cloud migration
- On-Premises to Cloud Disaster Recovery (DR)
- Cloud-to-Cloud Disaster Recovery (DR)

VMware Cloud Director Availability is fully integrated with VMware Cloud Director and vCenter, which makes it very easy for providers and tenants to operate with it.

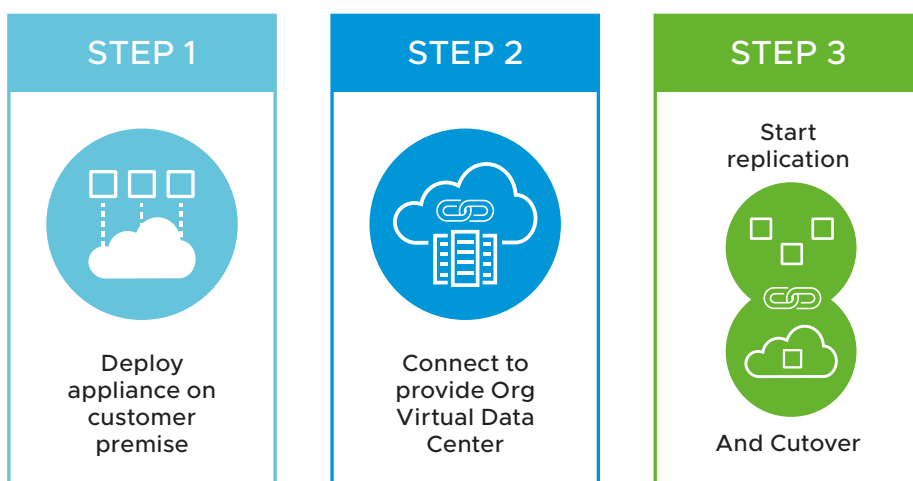
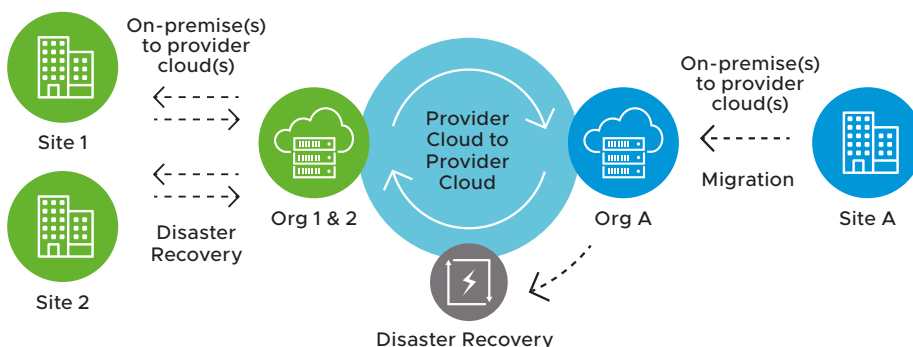


FIGURE 1: VMware Cloud Director Availability overview

### VMware Cloud Director Availability value proposition

The most fundamental benefit of using VMware Cloud Director Availability for migrations to Cloud is that they are actual workload migrations – there is no transformation or refactoring. It is a significant advantage to the clients as they don't need to re-platform their workloads or applications.



With capabilities like cold (offline) and warm (continuous file synchronization) migration, network reconfiguration, simple appliance setup, vCenter plugin for management of the migrations, and more, VMware Cloud Director Availability is fully qualified to address the main challenges of workload migrations to Cloud.

It automates the vCenter plugin deployment enabling the tenants to have control over their migrations and protections. It guarantees a secure connection to the Cloud to prevent any concerns about the process. In the meantime, using the appliance saves time and effort as there is no need to make complex network configurations or define lots of firewall rules.

The warm migration is a highly optimized process that significantly reduces downtime, so it is similar to a graceful restart.

VMware Cloud Director Availability can handle up to 15,000 workloads selected for migration and perform up to 200 concurrent workload switchovers.

## vCenter to VMware Cloud Director migration flow

Not all workloads are mission critical. Utilizing both cold and warm data migration services will help customers reduce the expense of moving to Cloud.

Thanks to the native integration of VMware Cloud Director Availability with both vCenter and VMware Cloud Director the migration process is easy to plan and accomplish. It consists of only a few simple steps.

### Cold migrations

Cold migration is the migration of powered off or suspended virtual machines between hosts across clusters, data centers, and vCenter Server instances.

This is why this approach is considered to be suitable for non-business critical workloads. The simplicity of doing such migrations makes them ideal for self-service, where the tenants execute all the operations by themselves.

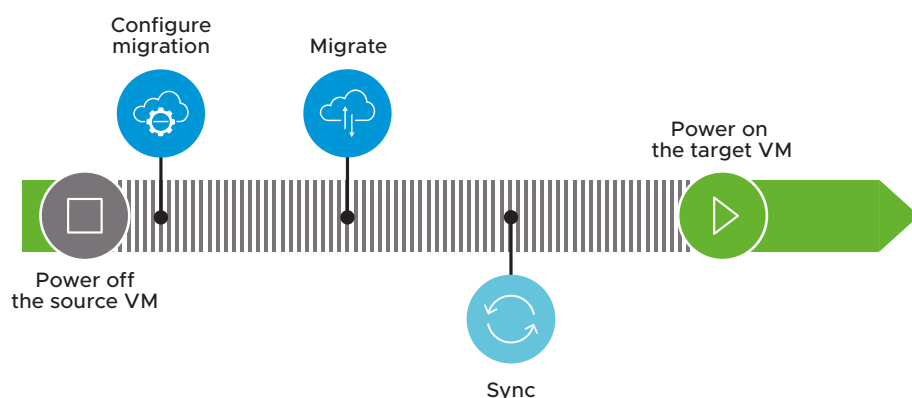


FIGURE 2: Cold migration of a VM/vApp using VMware Cloud Director Availability

### Warm migrations

The main difference between cold and warm migrations is that the VM doesn't have to be powered off with warm migrations when it happens. This reduces downtime significantly and is one of the main reasons it is ideal for non-mission-critical workloads. However, the migrated VM typically has new network settings that might require additional actions on the target side once the process is complete.

This method is still suitable for self-service, even though providers who have access to their tenants' on-premises environments can offer it as a managed service.

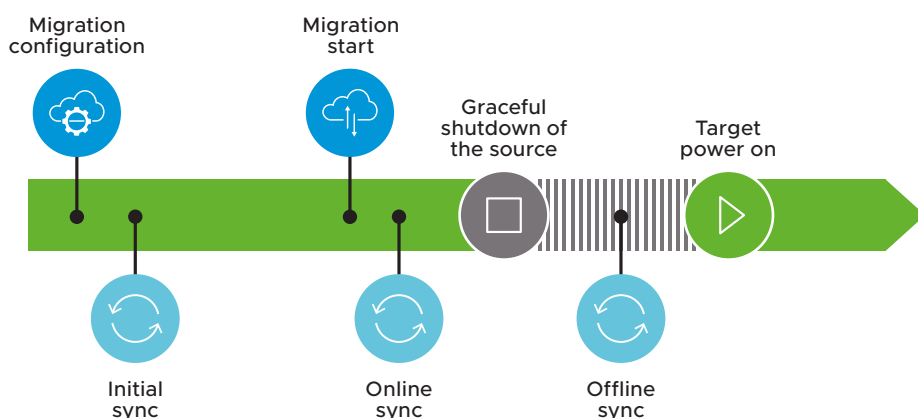


FIGURE 3: Warm migration of a VM/vApp using VMware Cloud Director Availability

A warm migration consists of the following steps:

### Step 1 – Migration configuration

Once the migration is configured in VMware Cloud Director Availability through the vCenter plugin, or directly, in the VMware Cloud Director Availability UI, the initial data sync will be complete. It has no impact on the source workloads, and they continue running without any interruptions. When the initial sync is complete, the workloads are ready to be switched to the destination site. During this ‘wait period’, changes are synchronized once every 24h.

### Step 2 – Migration start

After the preparation for the migration is done, it can be started by the user. At the time of switchover, online sync is executed first, followed by a graceful shutdown. If the graceful shutdown fails with a timeout, a forced power off will be triggered. When the machine is offline, a rapid sync is performed to capture any changes since the previous one.

### Step 3 – Start the migrated VM

The final step is to compose the VM and power it on at the destination site.

This sequence of actions minimizes the VM/vApp downtime to almost that of a graceful restart.

## Warm migrations with L2 stretch

The warm migration with Layer 2 network stretching is a little more demanding in terms of requirements, but still the most commonly used process for migrations using VMware Cloud Director Availability.

Extending the on-premises network to Cloud is a popular approach, and in this case, it removes the necessity to reconfigure the VM, resulting in a shorter downtime period.

In terms of flow, it is the same as a warm migration but with an extra prerequisite – to set up Layer 2 network stretch. You can see how to do that in this [video](#).

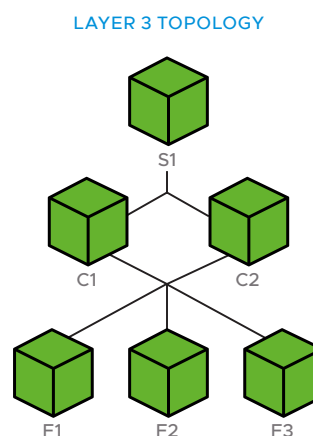
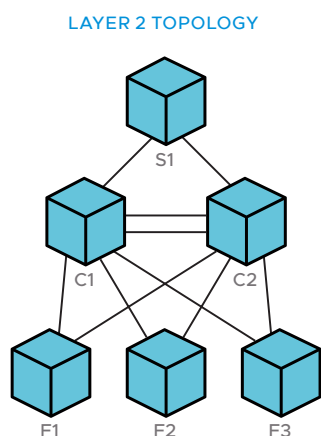
This method is suitable for providers to offer as a service to their tenants due to the additional requirements.

All the steps, with details, can be found in the technical demo.

### Layer 2 topology

This topology displays a network configuration by using physical connection lines.

To check the connection lines between switches and terminals at the ends of a network, use a Layer 2 topology. By using it together with a Layer 3 topology, you can intuitively check the situation when a failure occurs, and understand the range affected by the failure.



### Layer 3 topology

This topology displays a logical network configuration by using IP addresses.

To check the logical configuration of a core network, use a Layer 3 topology.

Layer 2 and Layer 3 are the terms that are used in the OSI seven-layer model.

Layer 2 (data link layer): Controls data transfer between physical links by using MAC addresses.

Layer 3 (network layer): Controls selection of routes in a network by using IP addresses.





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