



Cloud Director™

The Leading Cloud Services Platform for Cloud Providers

AT A GLANCE

VMware Cloud Director® (VCD) is a leading cloud service-delivery platform used by some of the world's most popular cloud providers to operate and manage successful cloud-service businesses. VMware Cloud Director helps cloud providers derive maximum efficiency from their cloud infrastructure and enables the creation and provisioning of differentiated and value-added cloud services. VMware Cloud Director is available globally through the VMware Cloud Provider Program.

KEY BENEFITS

- » VMware Cloud Director delivers a hyperscale-class cloud platform in and across Cloud Provider's datacenters helping save operational cost and capital expenditure.
- » VMware Cloud Director is highly automated, extremely operationally efficient, and scale-tested for global cloud environments
- » VMware Cloud Director delivers a suite of native cloud services and Kubernetes Native & Tanzu clusters, along with custom self service capabilities. Hundreds of cloud providers across the world have used VMware Cloud Director to up-level from pure IaaS / hosting to a full-fledged portfolio of profitable cloud services
- » VMware Cloud Director delivers a unified platform to manage applications, VMs as well as containers. VCD offers several ways to code and extend its functions in a developer environment such as python and REST API as well as Terraform Provider support to drive infrastructure as code.
- » VMware Cloud Director has proven cost saves and revenue generation for Cloud Providers, enabling business growth with minimal operational headcount increase

What is VMware VMware Cloud Director?

VMware VMware Cloud Director is VMware's flagship cloud services platform for Cloud Providers. It is a pervasive cloud infrastructure control plane for cloud providers' service-delivery needs, and the management entity for a global VMware cloud estate. VMware Cloud Director allows seamless provisioning and consumption of cloud computing resources and services to geographically distributed lines of business and IT teams in an API-driven approach.

What are the key features of VMware VMware Cloud Director?

Multi-tenant Resource Pooling: VMware Cloud Director helps create virtual datacenters from common or distributed infrastructure to cater to heterogeneous enterprise customer needs. With VMware Cloud Director, a Cloud Provider can host and serve multiple customers from a single vCenter that may be stretched across distributed physical servers.

Cloud-native Offerings: VMware Cloud Director provides an easy on-ramp to cloud-native application development for enterprise DevOps by delivering enterprise-grade native and Tanzu based Kubernetes runtime, lifecycle management of K8 clusters managed by any K8 provider (CSE/WCP/Tanzu/Ent-PKS). With Kubernetes delivered by self-service, tenants can deploy k8s clusters with or without the VMware Cloud Director Container Services Extension, they can upgrade custom or VMware templates, spin up, scale in/out, one or more standards compliant vSphere Kubernetes k8s clusters via native GUI or API and CLI.

Deep Automation: VMware Cloud Director delivers unparalleled infrastructure efficiencies with context-aware automation across workflows. Terraform Provider for VMware Cloud Director enables complete provisioning of compute and network resources as code, and integration with Cloud Provider Pod enables simple architecture design of a service-ready cloud stack.

Service Suite and Service Stitching: VMware Cloud Director has an open extensible form-factor that is leveraged by leading data protection, storage, network, security, and other cloud software vendors to natively integrate their offerings VMware Cloud Director UI. Moreover, cloud providers can offer each of their customers bespoke user experiences by publishing their own custom services and user-views in App Launchpad with automatic delivery on both containers (Helm charts) and VM.

Policy-driven Cloud Management: VMware Cloud Director ensures enterprises have secure, isolated virtual resources and intelligent dynamic distributed firewalling for integral malware spread prevention. Cloud Director provides independent role-based authentication at the levels of cloud providers and their customers, and fine-grained access control across datacenters, sites, virtual machines, and applications. Moreover, intelligent workload-placement allows cloud providers to drive higher efficiency from their cloud infrastructure licensing and utilization while delivering outstanding performance and exceeding SLAs.

Global Hybrid Cloud Management: VMware Cloud Director helps cloud providers manage and gain deep visibility into datacenters across sites and geographies, and monitor cloud resources across sites from a single pane of glass. VMware Cloud Director is proven to connect and scale seamlessly across thousands of sites. Multi-site is a core requirement for hybrid customers and is supported by Cloud Director and Cloud Director service bi-directionally.



Cloud Migration and Availability: VMware Cloud Director helps enable simple, secure VM migration and data center extension with VMware Cloud Availability. This allows for secure hybridity, simple Layer 2 connectivity and cold or warm migrations to Cloud Director and Cloud Director service on VMware Cloud on AWS. The integration with VMware Cloud Availability makes it easy for cloud providers to run data protection offerings compatible with on-premises vSphere enterprise environments.

Networking and Security as an inclusive offering: VMware Cloud Director supports NSX-T with dynamic distributed firewalling, cross VDC networking, vAPP Edge Networking services, overlapping IP support for tenants using VRF-lite, IPv4 and v6 coverage and layer 2 VPN services natively. NSX Advanced Load Balancer brings application intelligence to load balancing services for customers and combined with basic Load Balancing self-service from VMware Cloud Director, fully covers the services that used to be provided by NSX-V.

Operational Visibility and Insights: Leveraging integration with VMware vRealize Operations' Tenant App for VMware Cloud Director, cloud providers can use multi-layer analytics and predictive remediation to better serve their enterprise customers. The integration also provides visibility into virtual machine costs and accountability to understand granular costs of virtual infrastructure required to support business services.

What are the key benefits of VMware Cloud Director for the Cloud Provider?

Operational Efficiency: VMware Cloud Director enables cloud providers to obtain extreme operational efficiencies out of their cloud infrastructure, and also reduces operational overheads that come with maintaining silo'd private and multi-cloud environments. VMware Cloud Director significantly reduces time-to-market for cloud providers' services and scales these services globally without external dependencies and ballooning costs.

Service-expansion and Monetization: VMware Cloud Director enables cloud providers to spin up new cloud services on Day 1. Cloud providers can drive more revenue by publishing their own service suite, or 3rd party ISV-provided backup, DR, security, migration, and other leading cloud services that are tenant and site-aware. Services can also be launched by App Launchpad, negating customer knowledge of infrastructure and security to any end point; containers and VMs. VMware Cloud Director forms a unified management plane for the entire service portfolio of a cloud provider. VMware Cloud Director is also a key element to getting the '[Cloud Verified](#)' certification, a mark of the most capable and differentiated VMware Cloud Providers in the world.

Developer-Readiness: VMware Cloud Director provides an open platform for cloud providers and customer developers to build on. Using the programmatic interfaces, automation tools, and extensibility frameworks of VMware Cloud Director, cloud providers can not only differentiate themselves by providing unique experiences to their customers but also help them get to application-building faster. Using VMware Cloud Director, providers are able to offer tenants various tiers of cloud native services, secure K8s cluster infrastructures (now including Tanzu Kubernetes Grid for vSphere and Multi-Cloud) and marketplace application portfolios / interfaces to meet developer needs.

What are the key benefits of VMware Cloud Director to the end-customer?

VMware Cloud-as-a-Service: Consume turnkey cloud services, including the full VMware Software-Defined Datacenter, as a service from a trusted VMware Cloud Provider, with full self-service controls or delivered as part of a managed service.

Easy-to-Provision and Easy-to-Consume VMware Cloud: Experience a single access point for all your virtual datacenters via an intuitive UI or APIs. Enjoy easy, self-service consumption and provisioning of cloud services, including 3rd-party services and cloud provider-built services through a single pane of glass to any target platform. Leverage simplified workflows and container services to build better and faster.

Easy Workload Migration Across Virtual Datacenters: Backup, evacuate, or replicate VMs or entire datacenters in a few clicks to a resilient VCD-powered cloud

Fast Path to Hybrid Services: VMware Cloud Director provides a feature-rich, self-service and modern cloud environment with on-demand elasticity, streamlined on-boarding and hybrid cloud operations across multiple clouds.

Developer Ready Clouds: VMware Cloud Director provides Terraform Provider infrastructure-as-Code a range of API capabilities and Kubernetes K8s native & Tanzu cluster services from the Container Service Extension supporting VMware PKS, Tanzu Kubernetes Grid (TKGs & TGKm) or native Kubernetes that can be consumed by enterprise developers as code. Tenants can deploy and manage any type of K8s cluster (native/Tanzu/Ent-PKS) using VMware Cloud Director cluster API/CLI/UI (with or without Container Service Extension). Equally now Cloud Providers can offer Platform as a Service VMware Marketplace or custom applications to consumers via the App Launchpad, essentially negating the need for customers to understand underlying infrastructure.

What is new in VMware Cloud Director 10.3?

vAPP Edge networking services with NSX-T

vApps are a core feature in VMware Cloud Director and are very useful for grouping together VM's for an application needs. Although vApp gateways and edge services were available in NSX-V, they were never previously available in NSX-T with VMware Cloud Director. Without vApp Gateways and Networking services there was no capability for interface between the customer vApp networks and organisation networks.

Starting with version 10.3, VMware Cloud Director supports vApp network services both for data centers that are backed by NSX-T Data Center and by NSX Data Center for vSphere (NSX-V). Now VMware Cloud Director customers can use vApps and networking services on vApp Gateways such as Routing, DHCP as well as Edge Firewall services, and NAT.

	Direct	Routed	Isolated
DHCP		✓	✓
Firewall		✓	
NAT		✓	
Static Routing		✓	

As the chart above shows, isolated networks can provide DHCP only, but for Routed vApp networks you can configure network services, such as a firewall and static routing and NAT to work around the support for Fencing a vAPP that is not present in NSX-T. VMware Cloud Director 10.3 vApp gateway functions are delivered with an entity referred to as a Standalone T1 (SO T1). It is a distributed services entity that does not peer with a T0. Instead the Standalone T1 is intended to anchor distributed services like routing, firewall, NAT, and DHCP. The SO T1 is also able to connect to overlay networks within a tenant Organisation. It was originally conceived as a means to attach a Load Balancer to an org-vdc network by virtue of its Centralized Service Port (CSP). The SO T1 has been repurposed in VCD 10.3 to provide a routed interface to the vApp network while adding services through its CSP.

Distributed Firewall Dynamic Membership

Starting with VMware Cloud Director 10.3, tenants can now create security groups with a dynamic membership that is based on VM characteristics, such as VM names and VM tags. This extremely powerful feature enables tenants to use dynamic groups and create distributed firewall rules or edge gateway firewall rules that are applied on a per-VM basis in a data center group networking context. By using dynamic security groups in distributed firewall rules, you can micro-segment network traffic and effectively secure the workloads in your tenant organization.

Using NSX-T Distributed Firewall grouping means that customers are able to define security policies based upon tags assigned to the VCD objects. Groups can be added to statically using a combination of virtual machines, IP sets, MAC sets, segment ports, segments, AD user groups, and other groups and dynamically using tag, machine name, OS name, or computer name.

This is a huge advantage for both customers and Cloud Provider security services. Customers can now have much better security for more fluid and hybrid environments, where tagging will ensure machines are protected without further intervention saving huge time and cost for both provider and tenant alike. This also helps prevent malware spreading within the datacenter, having VMs automatically protected with East West and North South firewalling means it is simple to block malware from spreading laterally in data centers.

NSX-T Data Center Groups

Starting with VMware Cloud Director 10.2.2, Tanzu Kubernetes clusters were by default only reachable from IP subnets of networks within the same organization virtual data center in which a cluster is created. If necessary, you can manually configure external access to specific services in a Tanzu Kubernetes cluster.

Now in VMware Cloud Director 10.3, Tanzu Kubernetes clusters support NSX-T Data Center group networking and detection of membership of a virtual data center to a group and automatically updating firewall rules to that Data Center group accordingly. Data center group networks backed by NSX-T Data Center provide level-2 network sharing, single active egress point configuration, and distributed firewall rules that are applied across a data center group. Basically, a data center group acts as a cross Virtual Data Center router that provides centralized networking administration, egress point configuration, and east-west traffic between all networks within the group.

Tanzu integration now supports sharing of networks between different Virtual Data Centers in a Virtual Data Center Group such that Virtual Machines in a Virtual Data Center called 'VDC1' for example can access Kubernetes workloads running in another Virtual Data Center called 'VDC2' if VDC1 and VDC2 are part of the same Virtual Data Center Group. Naturally a shared gateway must exist between VDC1 and VDC 2. Once a Virtual Data Center Group with a shared gateway between VDC 1 and VDC 2 are created there is network access between workloads running in VDC1 and VDC2 whether they are regular virtual machines or Tanzu runtime containers.

This feature helps lower the cost of administration of Kubernetes and allows customers to develop applications in differing Virtual Data Center, for example a customer line of Business organization Virtual Data Center may need to use resources from other Line of Business organization Virtual Data Center.

Improved Kubernetes Tanzu support

Cloud Providers can now support the growth in modern applications on VMware Cloud Director by supporting Tanzu Basic with Tanzu Kubernetes Grid for vSphere and multi-cloud.

Tanzu Basic is now available to all Cloud Providers and can be found in the latest Product User Guide covering Tanzu Kubernetes Grid vSphere (TKGs) and multi-cloud. Please note - TKGm supports only on premises VMware Cloud Director clouds today.

The latest updates in VMware Cloud Director 10.3 make it simpler to use with public APIs, UI based upgrade and sharing of Kubernetes clusters and access to sync VMware or custom templates with latest Kubernetes or custom versions. 10.3 also critically provides Multi-Tenant value with strong network isolation of tenant k8s clusters, a feature previously not present. Lastly VMware Cloud Director can now with 10.3 participate in multi-cloud growth as an endpoint, becoming a first class cloud target for Tanzu Mission Control management.

Fundamentally 10.3 improves Day 2 operations for the tenant admins with the ability to upgrade both native Kubernetes runtime and Tanzu Kubernetes clusters using the Container Service Extension 3.1 UI with no downtime for running applications.

Lastly the most important feature for multi-tenant environments such as VMware Cloud Director is tenant cluster isolation. In 10.3 this is provided with network isolation improvements exposed in VMware Cloud Director and provided by vSphere for Tanzu. Additional cross-tenant network isolation is available as previously discussed using DC groups and must be done manually by Org admins. The Network isolation automates SNAT rules for each gateway to control outgoing source traffic and allow only to the supervisor ingress CIDR.

Provisioning of a specific gateway firewall policy on the Workload Control Plane (WCP) gateway is also automated, meaning the supervisor cluster namespace only allows edge gateway traffic from the corresponding virtual data center or guest clusters in supervisor namespaces in the same VDC.

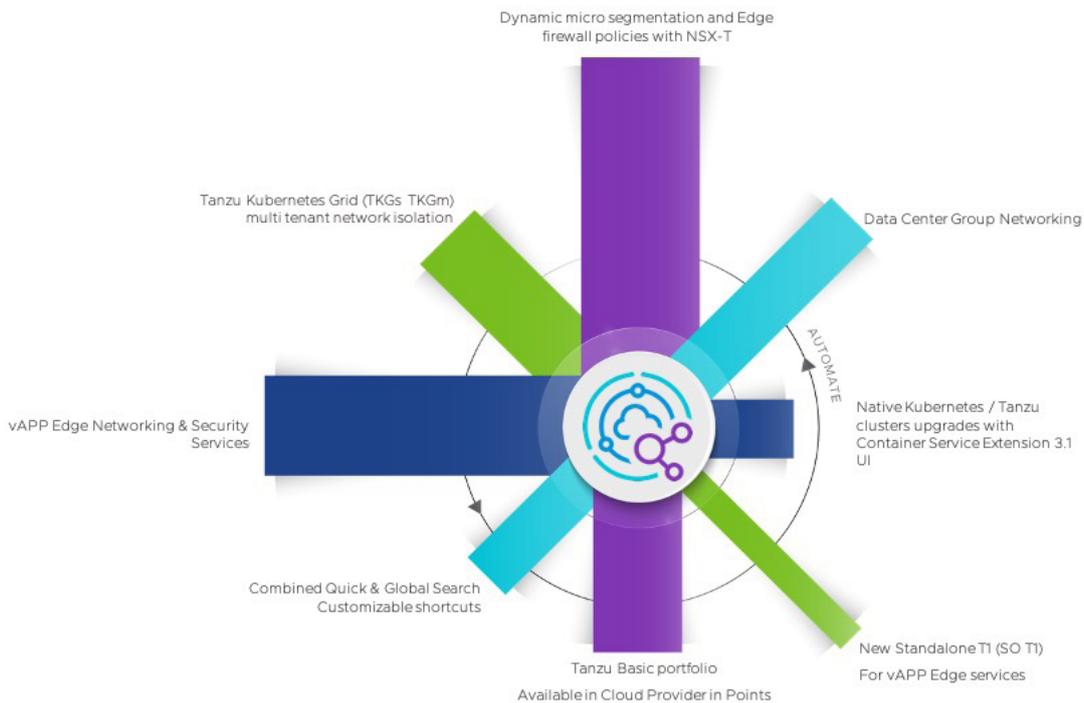
This is a great feature for service providers to ensure tenant Kubernetes clusters are isolated, protected but still reachable for their organization and Data Center Groups. The automation of this means there is nothing that needs to be done for the creation or removal of clusters and if policies are accidentally changed they are automatically re-provisioned, ensuring a consistent secure state is always maintained.

Other VMware Cloud Director usability enhancements

For 10.3 there has been some improvement in the usability of VMware Cloud Director, specifically focused on shortcuts and searches.

Keyboard shortcuts are now customizable, stored locally for the user and allow unlimited combination keys in sequential order. This makes usability for key conscious customers much easier, fitting to their preferences for shortcuts.

In 10.3 also the Quick Search & Global Search functions are now combined so that there is broader entity coverage for searching. If you are a provider admin you can now search across all customer organizations and provider objects for example external networks and network pools. This will help customers and providers find the items they need faster and more efficiently.



To Learn more about how VMware Cloud Director works, please visit cloudsolutions.vmware.com or please watch and subscribe to our YouTube Channel or any of the resources below:

- [HTTP://BIT.LY/VCPP_TWITTER](http://bit.ly/vcpp_twitter)
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