The Leading Cloud Services Platform for Cloud Providers

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 Kubernetes, lifecycle management and VMs within the same virtual infrastructure environment.

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.

Policy-driven Approach to Cloud Management: VMware Cloud Director ensures enterprises have secure, isolated virtual resources, 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 scale seamlessly across thousands of sites.

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 connectivity and cold or warm migrations. The integration with VMware Cloud Availability makes it easy for cloud providers to run data protection offerings compatible with enterprise environments.

AT A GLANCE
VMware 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 bears a suite of native cloud services, 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.
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 integrate ISV-provided backup, DR, security, migration, and other leading cloud services that are tenant and site-aware. 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 K8 infrastructures and 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. 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 K8 native cluster services from the Container Service Extension supporting VMware PKS or native Kubernetes that can be consumed by enterprise developers as code. Equally now Cloud Providers can offer Platform as a Service Bitnami 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 10.1?

VMware Cloud Director (VCD) has new branding, losing the small ‘v’ in VMware Cloud, coming more in line with VMware branding direction. This release has two main core updates to VCD and a bunch of ancillary updates and new product to work with VCD.

From a core update perspective, support for NSX-T is improved and there is a free migration tool from NSX-V to NSX-T. To help Cloud Providers secure their customer clouds and increase there offering diversity there is a new encryption feature available to utilize vSphere encryption services now in VCD. Also, there is an update to the Object Storage Extension (OSE 1.5) that now enables Cloud Providers to offer support for S3 storage on Dell hardware.

From an ancillary perspective there are many updates that can be grouped into the application domain. These include integrating the Bitnami community catalog to VCD via the new ‘App Launchpad’ providing tenants access to Bitnami secured and tested applications in a simple to consume interface. Also, there is a new release of the Tenant App (2.4) which has improved metering and metric coverage.

The next ancillary items are far more in the Cloud Dev-Ready domain; with an update to the Container Service Extension (CSE 2.6) providing enhanced K8 cluster management and lifecycle improvements and an update to the vCD Terraform Provider (2.7 update) to expose many more VCD objects for Cloud Provider Admins and Tenants to provision and manage infrastructure as code.

Core 1.0 Updates

NSX Migration Tool

VMware Cloud Director Cloud Providers need to transition from NSX-V to NSX-T within the supported life of NSX-V, and Cloud Providers need a migration solution that migrates tenant by tenant with minimal downtime.

The manual approach includes creating a new cluster / PVDC backed by NSX-T, create a replicate target org VDC and migrating the source workloads. This is now fully automated in a script that;

- Automates migration of vCD metadata and workloads from NSX-V to NSX-T
- Migrate per Org VDC migration to reduce maintenance window to single tenant
- Minimize network downtime with bridged networks during migration
- Live migrate with vMotion to ensure non-disruption to user workloads
- Keep source VDC configuration and V environment as-is to allow rollback

Prior to execution of the script, for each existing Provider VDC a new provider VDC within NSX-T must be created as a networking provider. This may require adding vCenters and hosts to the VCD instance and could result in failure if the VDC does not meet migration criteria, please check the supported provider VDC configurations. Then for each Org VDC the migration script can be executed.

In consideration of migration impact on workloads; NSX-T provides capability enabling the NSX-T edge node to connect to NSX-V and NSX-T v-switch and maintains East-West connectivity when workload is migrated from the NSX-V to NSX-T v-switch. The downtime should be limited to network disruption when N/S is switched from NSX-V edge to NSX-T edge.

The NSX-V to NSX-T migration script supports many NSX features in VCD 10.1, but not all, please check the documentation first, also the script only supports VCD 10.1.0, NSX-V 6.3.7, 6.4.4 and 6.4.5 and NSX-T 2.5.
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Encryption Services

Encryption has existed for vSphere since version 6.5 and now can be executed from VMware Cloud Director as a native service to offer your tenants.

When encryption is turned on the VM is protected for not only Data At Rest protection but also for Data “In Flight” as data that is being actively processed by a VM is also encrypted.

The offering can be presented in a number of ways, but typically is curtailed by the inherent limitation of a single Key Management Server (KMS) per vCenter and the resulting lack of ability for Tenant to own and manage their own encryption keys for VMs that they are consuming via vCD IaaS;

- **Provider ‘secure cloud’** – the Cloud Provider uses the encryption capability to satisfy their own internal security compliance requirements as a Cloud Service Provider.
- **Provider Managed Encryption Service** – the Cloud Provider allows tenants to enable and disable encryption on their VM, but the Cloud Provider manages their certificates and keys in their own KMS as the service uses a shared vCenter infrastructure.
- **Tenant Managed Dedicated vCenter VM Encryption** – in this case the tenant has access to enable and disable encryption on their VM, but they are on a non-shared environment with their own vCenter and hence can supply, own and manage their own encryption certificates and KMS that is associated with their dedicated vCenter.

VMware Cloud Director Appliance Enhancements

It is now simpler than ever to monitor OVA health status of the databases and VCD application for each cell with a database, via the REST API health status can be obtained. Automatic failover and recovery is now catered for where a cluster consists of one primary and one or more standby application nodes, but it is not enabled by default. Other enhancements include appliance cluster management from the UI and API, HA status reporting and improved failover resiliency and stability.

Object Storage Extension (OSE 1.5)

The Object Storage extension provides Cloud Providers the option to use S3 compatible providers as a storage destination for tenants. In this release support for Dell ECS 3.4 has been provided as another object storage vendor that Cloud Providers can configure to use. OSE now supports Cloudian and Dell ECS.

This service can be enabled for tenants and would rely on external Dell ECS storage to be available and configured. Tenants can create, list and delete their own buckets, manage ACL and metadata for their objects.

NSX-T Improvements

Some core NSX-T workflow enhancements included in the VMware Cloud Director 10.1 update include items like simplifying IPSec management, whereby IPSec Services will be automatically be created if IPSec is enabled on a specific Edge. VCD does this by aggregating all the necessary data tunnel, local endpoint, any associated compliance suite, associated profiles in a single screen. Then VCD makes all the necessary NSX-T API calls. Further security enhancements are delivered in security groups where subnets can now be grouped for easy configuration.

To assist with providers that need to enable data center extensibility in NSX-T data centers, the Provider can now dedicate a one-to-one specific external network to a specific Edge Gateway. The External Network is part of the network routing domain allowing for additional services. These include the ability to specify which subnets will be advertise, and the ability to configure BGP for Dedicated Routing Domains. BGP configuration can now be applied on the uplink of Tier-0 router backing the dedicated external network and now in the UI and API you can configure IP prefix lists and BGP neighbors.
Ancillary updates

App Launchpad
VMware Cloud Director App Launchpad is a free new feature that integrates with the VMware Cloud Marketplace. App Launchpad enables Cloud Providers to offer VMware Cloud Marketplace and in house single VM apps to their tenants, also the Bitnami Community Catalog is available to App Launchpad (MSP contract required). This makes it easy for Cloud Providers' tenants to find, deploy and manage software – across any physical or virtual environment, in any format (VM, container, and public cloud images), and for any cloud platform.

With VMware Cloud Director integration and App Launchpad UI plug-in (and API extension for VMware Cloud Director (VCD)), Cloud Providers are now able to offer application portfolios to developers within a simple-to-use portal. Developers and other customer personas then just point, click and deploy the necessary framework applications they need, without requiring knowledge of the underlying infrastructure.

We are really pleased to now provide a PAAS functionality to VMware Cloud Director!
The Bitnami catalog includes over 180 secure, tested cloud-ready applications, components and frameworks, enabling developers to build cloud native apps with using a huge range of integration-ready resources. The VMware Cloud Marketplace also offers a range of ISV applications that can be added to VCD and made available in App Launchpad. Cloud Provider admins can manage VCD catalogs that connect to App Launchpad and assign catalogs to Organizations to grant access in App Launchpad.

Container Service Extension (CSE 2.6)
VMware Enterprise Container Service Extension (CSE) is fully integrated with VMware Cloud Director, enabling tenants to create and work with Kubernetes clusters in order to orchestrate the resources required by containerized applications.

Version 2.6 brings a number of enhancements to CSE:
- Firstly, security of installation. Previous versions left authorization credentials in clear text from the CSE installation in the configuration files for AMQP, VCD and vCenter. Now these can be encrypted and decrypted at installation and command line.
- Secondly CSE 2.6 now supports in place Kubernetes cluster template updates addressing patch version upgrades and minor version updates, negating the need to flush nodes, redeploy and migrate anymore.
- Lastly CSE 2.6 includes a UI plugin for VMware Cloud Director that provides a UI for Kubernetes management. Enabled by a new top-level menu item tenants can drop down into Kubernetes management screens to view, create, and manage clusters. The existing methods of CLI and API continue to exist.

vCD Terraform Provider (2.7)
Terraform Provider enables Cloud Providers' and/or their customers to access “Infrastructure-as-code” e.g. virtual infrastructure that be built, modified and retired entirely by executing code and using the configuration file as the input.

Providing infrastructure-as-code using Terraform Provider in VMware Cloud Director enables management, provisioning and orchestration of infrastructure resources. Cloud Providers can create and configure this capability then use it for automating deployment of infrastructure and services to customers or offer it directly to tenants. Equally customer admins and DevOps engineers can define infrastructure-as-code inside Terraform configuration files, making it an efficient automation and integration tool.

In this update of Terraform vCD Provider prioritization has been given to user requests from public usage and forum feedback, also there has been focus on more completeness of existing workflows and extending the vCD objects supported. Support has been enhanced for many new items including Organization lease time policies and Flex allocation model for Org VDC (API >= vCD 9.7).

NOTE: vCD Terraform Provider is now version 2.8 adding support for VMware Cloud Director 10.1
vRealize Operations Tenant App 2.4

vRealize Operations Tenant App (TA) meters infrastructure and provides options to configure different models for pricing metered infrastructure and services. It also provides tenant specific views that help tenants validate their charges by looking at usage via the VCD UI Plugin.

New capabilities in Tenant App focus around new monitoring and metering capabilities providing more network metrics from NSX, coverage for usage metrics for PAYG Org VDCs and independent disk metrics. New pricing and billing capabilities include 95th percentile network bandwidth, volume discounts, and VM level storage billing for PAYG. Finally, there are some general product enhancements with scheduling and exporting bills, UX/UI enhancements for scale deployments and a whitepaper providing guidance on accurate metering setups

VMware Cloud Director Tenant and Admin User experience improvements

The user experience in 10.1 is now enhanced covering the following areas that were previous gaps in the Flex UI - for the tenant.

- Ability to; change the catalog owner, to edit the OVF properties of a vAPP and VM, to import a VM, vAPP or vAPP template from vSphere, to delete Shadow VMs and to connect / create a vAPP network while creating a VM within a vAP
- Option to power on a vApp after vApp deployment
- vAPP templates are differentiated from unexpired templates with a new grid column
- External IP is showing on the vAPP details page
- Consolidate view of all vAPP / VMs in your organization
- Batch operations for the most frequent vAPPs / VMs operations

The user experience in 10.1 is now enhanced covering the following gap Flex areas for the Provider

- Ability to set per-disk IOPS through the HTML5 UI
- Ability to delete Stranded Items
- Ability to consolidate VM

In addition to these Flex gaps a number of performance and navigational improvements in the vAPP / VM objects have also been made.

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:

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