VMware Cloud Director service

VMware Cloud Director service allows Cloud Providers to partition and organize VMware Cloud on AWS, Google Cloud VMware as well as Azure VMware Solution Engine, resources into resource pools, facilitating multi-tenant service delivery for organizations' virtual data centers, users, and networks. VMware Cloud Director service can also partition and organize Oracle Cloud VMware Solution in enterprise multi-tenancy SDDC endpoints. VMware Cloud Director service enables connections to existing on-premises Cloud Director instances and existing vCenter instances to deliver Cloud Director services into remote data centers.

Cloud Providers can offer organizations, application services and Virtual Data Center services in VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution and Oracle Cloud VMware Solution, sized appropriately to their needs, removing the physical node footprint requirements for a single customer. Customers can choose a right-sized footprint, as small as a VM or as large as a resource pool spanning multiple hosts. This is a differentiator for Cloud Providers to right size VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution for mid-market customer segments. Typically, these segments of customers don't warrant an entire VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution private cloud or fixed terms.

Please note: As of Initial Availability, Azure VMware Solution and Oracle Cloud VMware Solution only supports Enterprise customers.

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Doesn't vSphere already do this?

Yes, vSphere can pool resources, but Cloud Director service provides securely isolated multi-tenanted self-service and additional/extensible services like networking, security, VMware Cloud Marketplace (inc. Bitnami), Kubernetes and many more without impacting other customers.

Cloud Director service is a truly multi-cloud platform

Previously Cloud Director service could only manage VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution and (through site association) other Cloud Director instances on-premises in the provider data center. Now with the addition of Oracle Cloud VMware Solution and the ability to manage a vCenter environment on-premises in the provider data center, Cloud Director service provides a hybrid control plane across multiple clouds.
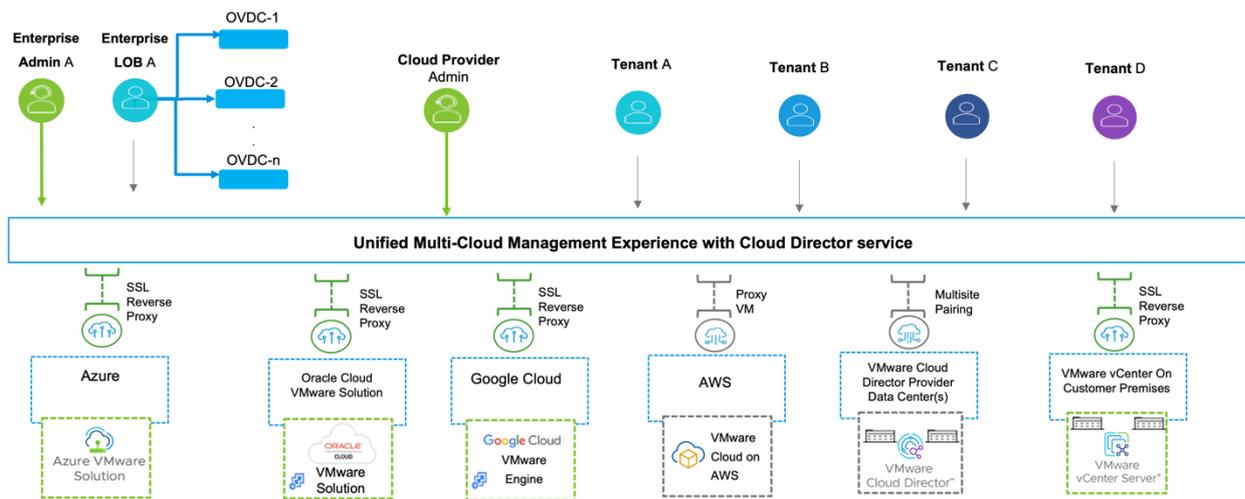
As the diagram depicts, Cloud Director service utilizes various communication capabilities for existing endpoints, but new endpoints going forward are using a consistent model with an SSL reverse proxy to securely connect to the cloud platform from on-premises and other cloud endpoints. Support for vCenter on-premises is a new capability that enables Cloud Providers to deliver Cloud Director services into on-premises without needing Cloud Director to be installed on premise.

What about availability of the Cloud Director service platform?

VMware Cloud Director service instances are deployed across multiple Availability Zones in the chosen region. If one of the availability zones experiences an outage, new nodes are automatically deployed in another availability zone to replace the nodes that were impacted by the outage, ensuring that the VMware Cloud Director instance remains operational. Even without access to VMware Cloud Director service, however temporary, customers are still able to access their resources in the target cloud.

What is VMware Cloud on AWS?

VMware Cloud on AWS delivers VMware's enterprise-class Software-Defined Data Center software to the AWS Cloud and enables customers to run production applications across VMware vSphere®-based private, public, and hybrid cloud environments, with optimized access to adjacent AWS services. The service is an integrated cloud offering jointly developed by Amazon Web Services (AWS) and VMware. It is supported by VMware and providers need only to have an MSP contract to consume the service. Providers can deliver a highly scalable and secure service and extensible VMware vSphere-based environments to the AWS Cloud running on Amazon Elastic Compute Cloud (Amazon EC2). VMware Cloud on AWS is available to VMware Cloud Partners through the Cloud Partner Navigator and sold by both VMware and AWS.

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What is Google Cloud VMware Engine?

Google Cloud VMware Engine is a native Google service that combines the best of VMware compute, storage, network virtualization, and management technologies with Google Cloud's next-gen infrastructure and networking. This VMware Cloud verified, Google-managed and supported cloud service provides a fast, easy, and integrated way for customers to adopt Google Cloud without changes to applications, tools, or processes and leverage adjacent Google Cloud services. With Google Cloud VMware Engine, you can take advantage of Google Cloud's highly performant, scalable infrastructure with fully redundant and dedicated 100 Gbps networking, providing 99.99% availability to meet the needs of the most demanding workloads at very low costs. Once in the cloud, you can take advantage of other Google Cloud services such as BigQuery and Cloud Operations to gain data-driven insights and unify operations.

What is Azure VMware Solution?

Azure VMware Solution is an Azure service, jointly engineered by VMware and Microsoft, that provides fully consistent VMware infrastructure in the Azure cloud. Customers can capitalize on their existing VMware skills and tools while leveraging the global Microsoft Azure infrastructure. Azure VMware Solution enables a fast path to the cloud, seamlessly migrating or extending existing VMware workloads from on-premises environments to Azure without the cost, effort, or risk of re-architecting applications or retooling operations. Build, run, manage, and secure applications across VMware environments and Microsoft Azure while leveraging familiar and established VMware tools, skills, and processes

What is Oracle Cloud VMware Solution?

Oracle Cloud VMware Solution is an Oracle service, jointly engineered by VMware and Oracle, that provides fully consistent VMware infrastructure in the Oracle cloud. Oracle Cloud VMware Solution integrates VMware on-premises tools, skillsets and processes with public Oracle Cloud services. The Solution is a fully customer-managed, customer-operated native VMware cloud environment based on VMware Validated Design for use with the public Oracle Cloud Infrastructure

How does it work?

VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution vSphere infrastructure provide the foundation for Cloud Director service architecture, delivering a consumable set of resources into a Cloud Director Provider Virtual Data Center. These are directly mapped to vSphere clusters or to resource pools within a vSphere cluster. As the diagram below shows, each customer Organization Virtual Data Center uses resources from a Provider Virtual Data Center. The Provider Virtual Data Center associates the Organization Virtual Data Center and vSphere resources. To control how much an Organization's Virtual Data Center can consume, an allocation model is applied to the Organization's Virtual Data Center restricting the vSphere resources, and help balance the needs of other Organization Virtual Data Centers sharing the same Provider Virtual Data Center.

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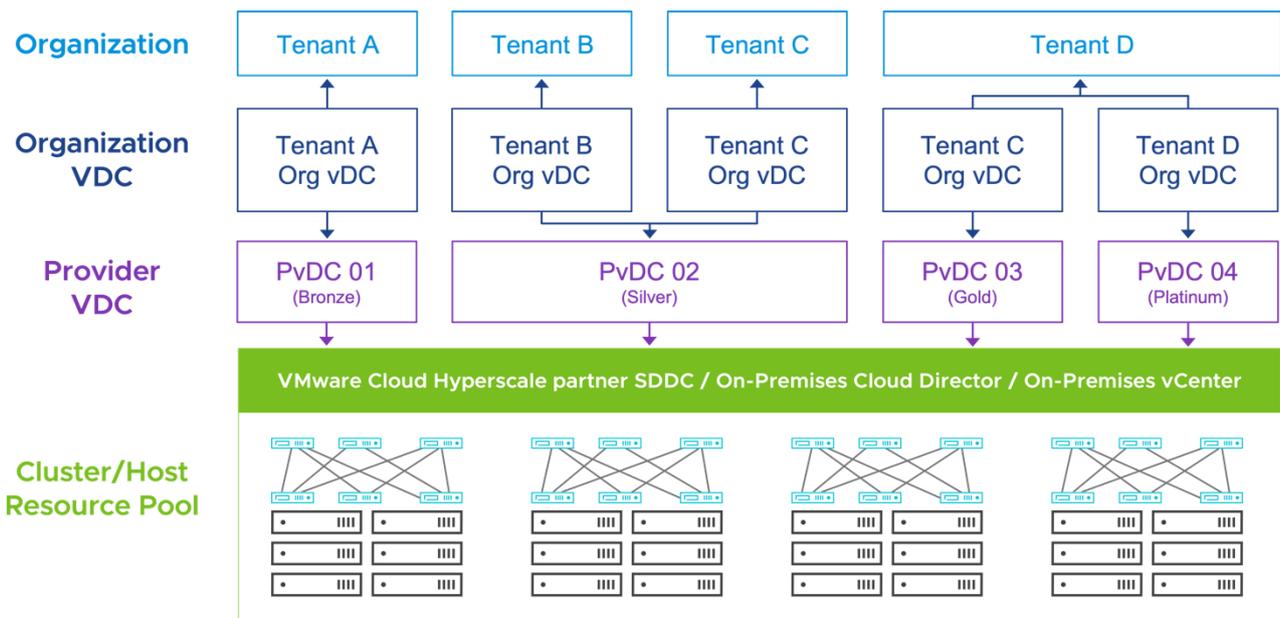
Fundamentally, Cloud Providers can partition resources to different organizations based on resource pools as the basic construct of boundary. This allows different classes of service to be associated to performance, availability, and cost characteristics (derived from allocation models) to be sold to your customers and differing SLAs used to guarantee service.

How does Cloud Director service connect to Azure VMware Solution, Google Cloud VMware Engine and Oracle Cloud VMware Solution?

Cloud Director service is a multi-cloud platform and as such needs to connect to other cloud endpoints, using a **simple reverse proxy service** allowing hundreds / thousands of individual connections. This Reverse Proxy function is composed of 2 parts: a cloud part and a remote part. The cloud portion of the service is highly available and scalable, and intended to be able to volume connections. The remote portion of the service is delivered as a single Java process, deployable as a container, OVA, or RPM, as required by the installation. The cloud server side of the reverse proxy server exposes a single external IP address. Remote clients connect using HTTPS (and secure web sockets) to register endpoints that they can service. To connect, authorization (using OAuth tokens with adequate privileges) is required.

How does the Cloud Director service connect to VMware Cloud on AWS?

Cloud Director service runs in native AWS and has always done so, so it has an immediate adjacency to VMware Cloud on AWS, communications with VMware Cloud on AWS SDDC components is the default use case for Cloud Director service. To configure, a Cloud Provider must associate a VMware Cloud Director service instance with a VMware Cloud on AWS SDDC by creating a proxy VM through which to route all network traffic to your underlying VMware Cloud on AWS SDDC resources. By associating a proxied SDDC, you provide tenants with access to underlying SDDC infrastructure without making the VMware Cloud on AWS SDDC that backs VMware Cloud Director service publicly accessible.

How does Cloud Director service connect to on-premises Cloud Director?

Cloud Director service is the same Cloud Director code base and as such permits site association between Cloud Director instances. This is called the Cloud Director Multisite feature, and it enables a Cloud Provider or a tenant of multiple, geographically

distributed Cloud Director installations to manage and monitor those installations and their organizations as single entities. You associate Cloud Director service with other Cloud Director sites, enabling administration of all sites as a single multi-cloud entity.

What are the allocation models I can use in the Cloud Director service?

There are 4 types of allocation models you can use in Cloud Director service (exactly like Cloud Director on-premises):

1. **Pay as you go** – provides no up-front resource allocation in the Org VDC. Resources are committed as users power up VM/ vApp in an Org VDC. Resources are committed at the VM level in terms of percentage vCPU and vGB RAM — a provider can use these commitments to specify an SLA.
2. **Allocation Pool** – each organization's VDC gets an allocated pool of resources and only a percentage of resources are committed or reserved to the Org VDC. The provider can construct an SLA and pricing around the volume of reserved resources.
3. **Reservation Pool** – the organization is committed to 100% of the resources, whether needed or not — there is no sharing of resources with other Org VDCs. This ensures resources are available when needed and tenants can adjust their own reservations and limits per VM.
4. **Flex** – simplifies and provides the best of allocation pools and Pay-Go models, by controlling CPU and RAM consumption, both at the Org VDC and individual VM levels, through sizing policies, not to be confused with Compute policies. The provider VDC (PVDC), can define VM to host affinity for tenant workload placement and define Org VDC compute policies to control the compute characteristics of VMs.

What sort of services could I offer?

The opportunity for services extends far beyond the base IaaS service derived from the SDDC infrastructure. Cloud Director service supports (via the plugin extensibility framework) Object Storage services, Tanzu Kubernetes Cluster services, App Launchpad for VMware Marketplace or 3rd-party, Data Service Extension, and custom services. The solutions can be fully managed, or self-service based and revolve around the type of allocation models the Cloud Provider offers. In addition, catalogs can be used to support Cloud Providers and/or customer images. Networking NSX services such as Edge and distributed firewalls, NAT and dual-stack IP are available for customers' Virtual Data Center services, all of these are supported by the VMware Cloud on AWS or Google Cloud VMware Engine, or Azure VMware Solution or Oracle Cloud VMware Solution software defined data center footprint and exposed within Cloud Director service. Customers (tenants) will not have access to the SDDC systems such as NSX, vCenter or vSAN, they will access all their cloud services via the extensible Cloud Director service user interface.

With the addition of VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution and Oracle Cloud VMware Solution adjacency, you can complement your Cloud Director installation with additional cloud native services from AWS and/or Google and/or Microsoft Azure and/or Oracle Cloud, depending on what you are connected to.

Adjacency - A key differentiator

AWS Native Services

One of the key pieces of functionality is adjacency and the Cloud Provider can upsell AWS Native Services. There are many services Cloud Providers can deliver in addition to any size infrastructure such as common integrations, including using AWS Cloud storage from the VMware Cloud on AWS SDDC, securing VM workloads using AWS networking services, and using AWS databases and analytics services with workloads running in the SDDC. All the AWS native services are accessed and made available using a Cloud Provider-owned Elastic Network Interface (ENI) and Amazon Virtual Private Cloud (VPC). VPC connectivity allows the provider to expose services leveraging Amazon Native EC2, RDS, S3, EFS, traditional VMs and much more.

With Cloud Director service current deployments deliver multi-tenant services to key VMware Cloud on AWS regions; US West, US East, London, Frankfurt, and Tokyo with support (latency permitting) to other VMware Cloud on AWS regions.

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Google Native Services

One of the key pieces of functionality is adjacency and the Cloud Provider can upsell Google Native Services empowering a modernization journey. This requires connectivity of the customer Tenant (Org VDCs) with **Google Virtual Private Cloud (VPC),** to allow seamless access to the services. Cloud Providers can offer than additional Google Native Services such as Cloud Storage, BigQuery, Cloud SQL (Requires VPC Peer), NetApp (Requires VPC Peer), Marketplace solution that runs IBM Power (MPS Networking), Backup / DR - Actifio all seamlessly connected to the tenant environment and google organization account.

With Cloud Director service current deployments VMware delivers multi-tenant services to 11 regions of availability (depending on latency between regions):

- US West Cloud Director service covers GCVE locations; Los Angeles, Iowa, N.Virginia (& Montreal and Toronto subject to latency).

- Frankfurt Cloud Director service covers GCVE locations, in Frankfurt, Netherlands, and London.

- Tokyo Cloud Director service covers Google Cloud VMware Engine locations, in Tokyo, and Singapore.

- Sydney Cloud Director service covers Google Cloud VMware Engine locations; Sydney (& Singapore subject to latency).

Microsoft Azure Native Services

One of the key pieces of functionality is adjacency and the Cloud Provider can upsell Microsoft Azure Native Services empowering a modernization journey. This requires connectivity of the customer Tenant (Org VDC's) with **Microsoft Azure Virtual Network (VNet)**, to allow seamless access to the services. Cloud Providers can offer then additional Microsoft Azure Native Services such as Azure Blob Storage, Azure File Storage, Azure Synapse Analytics, Azure SQL Database, etc.

This offering will be supported in all the Azure regions Azure VMware Solution is available.

Note: Before making any design considerations, please ensure that the region you wish to connect to Cloud Director service is within the 150 milliseconds round trip time latency rule for Cloud Director service.

Oracle Cloud Native Services

One of the key pieces of functionality is adjacency and the Cloud Provider can upsell Oracle Cloud Native Services empowering a modernization journey. This requires connectivity of the customer Tenant (Org VDCs) with **Oracle Cloud Virtual Cloud Network (VCN),** to allow seamless access to the services. Cloud Providers can offer than additional Oracle Cloud Native Services such as Oracle file Storage, Oracle block Storage, Oracle Cloud Database, etc.

This offering will be supported in all the Oracle Cloud regions Oracle Cloud VMware Solution is available.

Note: Before making any design considerations, please ensure that between your chosen Oracle Cloud Region and the nearest

Cloud Director service location that the round-trip latency time is within the 150 milliseconds rule.

How do I migrate customers to Cloud Director service?

Cloud Director service does not restrict you from running any of the native VMware Cloud capabilities, such as HCX or VMware Cloud Director Availability for example. However, HCX operates outside of the Cloud Director service scope. To onboard customers using HCX which is included in VMware Cloud on AWS and Google Cloud VMware Engine, HCX must be used for migration and then VMs must be imported into Cloud Director service using the Cloud Director API import function.

Cloud Providers can use VMware Cloud Director Availability 4.3 (or later versions) Disaster Recovery and Migration as a Service to manage cold or warm migration jobs with Google Cloud VMware Engine and Oracle Cloud VMware Solution as an endpoint.

Cloud Providers can use VMware Cloud Director Availability 4.2 (or later versions) Migration only to manage cold or warm migration jobs with VMware Cloud on AWS and Azure VMware Solution as an endpoint.

Business Results and Benefits

This will depend on your use case. Many providers look at Cloud Director service as a driver to get their customers ultimately onto a full VMware Cloud on AWS or Google Cloud VMware Engine or Azure VMware Solution or Oracle Cloud VMware Solution SDDC instance, by offering the service to them in smaller start-up chunks, perhaps at the VM level, to upsell at a later stage. Equally, many providers are interested in taking on lots of smaller clients and providing the same solutions they provide today, by just using VMware Cloud on AWS or Google Cloud VMware Engine or Azure VMware Solution or Oracle Cloud VMware Solution as an endpoint. In this way, providers can move from the VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution hardware-based analog of sale (SDDC minimum node footprint) to a t-shirt sized virtual machine or small resource pool.

Many providers over the years, have become tied up in processes, particularly in the data center. These processes often impact service delivery and the agility of the organization to deliver new services to their customers. In this respect, VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution with Cloud Director service offer agility and the ability to innovate, providing more intangible (rather than raw dollar comparison) benefits back to the provider and the customers. Agility and differentiation are key attributes for Cloud Provider's growth, being able to respond to customer demand and spin up new hosts in less than one hour, vs weeks and months in the data center. Let VMware do the hard lifting and manage Cloud Director service for you!

Expanding footprint and addressing interoperable multi-cloud is a key requirement for many end customer businesses. Customers who have geo location requirements and sovereignty needs, will rely on providers managing their clouds in their nations, but also wish to take advantage of VMware Cloud on AWS and Google Cloud VMware Engine and Azure VMware Solution and Oracle Cloud VMware Solution when their data sensitivity permits it. Customers need to be able to move in and out of these environments and have adjacency business values derived from native services in AWS, Google Cloud, Microsoft Azure, and Oracle Cloud

USE CASES

- ### Asset-Light Geo Expansion

  Cloud Providers are looking for a way to expand their customer reach and offer managed services on VMware powered hyper-scale clouds like VMware Cloud on AWS or Google Cloud VMware Engine, in an asset-light manner. However, even with the smallest configurations, the host building block is still too large for the needs of their wide target customer base of mid-market enterprises. Therefore, Cloud Providers are unable to fully achieve the economies of scale that are needed to expand globally. Cloud Director service enables Cloud Providers to add new lines of business, new customer segments and expand to new geographies quicker.

- ### Multi-Tenancy

  - #### Multi-Tenancy on VMware Cloud on AWS and Google Cloud VMware Engine

    VMware Cloud Director service introduces multi-tenancy to VMware Cloud on AWS and Google Cloud VMware Engine, allowing MSPs to offer custom-sized, tenant-based cloud resources to better align with the needs of small to mid-size enterprises, by sharing the costs of physical node instances across multiple tenants. This allows customers of all sizes to enjoy agile cloud expansion with consistent operations.

  - #### Enterprise Multi-Tenancy on Azure VMware Solution

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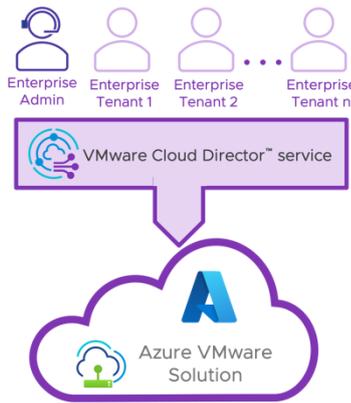
Self-Managed Enterprise Cloud

- Enterprise wants self-service multi-tenancy
- Tenants have secure isolation & resource allocations
- Enterprise purchases Cloud Director service
- Enterprise purchases AVS
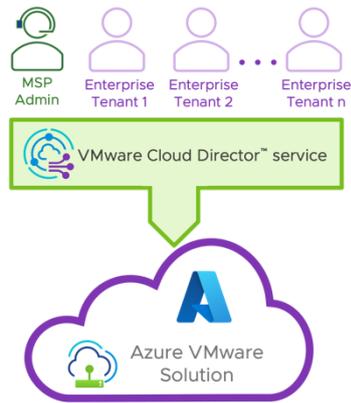
Outsourced Enterprise Cloud Management

- Managed Service Provider administers enterprise's cloud tenants
- Tenants have secure isolation & resource allocations
- MSP purchases Cloud Director service
- Enterprise purchases AVS

Use Case 1: Enterprises with self-service capabilities that want multi-tenancy

In this use case, the Enterprise customer purchases the Azure VMware Solution service offered by Microsoft, which provides a private cloud that contains VMware vSphere clusters built from dedicated bare-metal Azure infrastructure. Additionally, the Enterprise customer purchases the Cloud Director service offering from VMware. Thereafter, the Enterprise customer in this case can onboard their internal tenants separated using multi-tenancy.

For example:

An Enterprise customer, Acme Corp, that wants to own all the SDDC endpoint resources without sharing them with any other Enterprise customer, has purchased Azure VMware Solution and onboarded their different internal tenants. Each tenant will have access to the Cloud Director service to provide them with self-service capabilities. Thereafter, Acme Corp can multi-tenant and manage the resources within the organization into multiple departments. For example, they can have one tenant within their organization for all the production applications and can have another tenant within the same organization for all the staging applications.

Use Case2: Cloud Director service for Managed Service Providers with Enterprise Customers

In this use case, the Enterprise customer purchases the Azure VMware Solution service offered by Microsoft, which provides private clouds that contain VMware vSphere clusters built from dedicated bare-metal Azure infrastructure. The Managed Service Provider (MSP) will buy the Cloud Director service offering available from VMware. Thereafter, the MSP in this case can onboard the Enterprise customer and enable multi-tenancy like the 1st use case.

For example:

An Enterprise customer, Acme Corp, that wants to own all the SDDC endpoint resources without sharing them with any other Enterprise customer, has purchased Azure VMware Solution. A Managed Service Provider would onboard Acme Corp onto Cloud Director service, thereafter Acme Corp and the MSP can multi-tenant and manage the resources within their organization into multiple departments. For example, they can have one tenant within their organization for all the production

applications owned by the IT department and can have another tenant within the same organization for all the applications owned by the DevOps department.

Note: Currently, the MSP is not able to buy Azure VMware Solution and resell it to their customers.

- ### Enterprise Multi-Tenancy on Oracle Cloud VMware Solution

Like Azure VMware solution, VMware Cloud Director service introduces multi-tenancy to Oracle Cloud VMware Solution, allowing Enterprise customers to offer custom-sized, tenant-based cloud resources to better align with the needs of internal enterprise users, by sharing the costs of physical node instances across multiple internal tenants. This allows Enterprise customers of all sizes to enjoy agile cloud expansion with consistent operations. These are some of the primary uses cases with the Initial Availability of Cloud Director service on Oracle Cloud VMware Solution.

Use Case 1: Enterprises with Self-Service Capabilities that want Dedicated/Multi-Tenancy

In this use case, the **Enterprise customer will buy the Oracle Cloud VMware Solution service** offered by Oracle, which provides a private cloud that contains VMware vSphere clusters built from dedicated bare metal Oracle Cloud compute instances. Additionally, the Enterprise customer will buy the Cloud Director service offering from VMware. Thereafter, the Enterprise customer can onboard their internal tenants separated using multi-tenancy.

For Example:

An Enterprise customer, Acme Corp, that wants to own all the SDDC endpoint resources without sharing them with any other Enterprise customer, has purchased Oracle Cloud VMware Solution and onboarded their different internal tenants. Each tenant will have access to the Cloud Director service to provide them with self-service capabilities. Thereafter Acme Corp can multi-tenant and manage the resources within the organization into multiple departments. For example, they can have one tenant within their organization for all the production applications and can have another tenant within the same organization for all the staging applications.

Use case 2: Cloud Director service for Managed Service Providers with Enterprise customers for Multi-Tenancy

In this use case, the **Enterprise customer will buy the Oracle Cloud VMware Solution** service offered by Oracle, which provides private clouds that contain VMware vSphere clusters built from dedicated bare-metal Oracle infrastructure. The **Managed Service Provider (MSP) will buy the Cloud Director service** offering available from VMware. Thereafter, the MSP in this case can onboard the Enterprise customer and enable multi-tenancy like the 1st use case.

For Example:

An Enterprise customer, Acme Corp, that wants to own all the SDDC endpoint resources without sharing them with any other Enterprise customer, has purchased Oracle Cloud VMware Solution. A Managed Service Provider would onboard Acme Corp onto Cloud Director service, thereafter Acme Corp and the MSP can multi-tenant and manage the resources within their organization into multiple

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departments. For example, they can have one tenant within their organization for all the production applications owned by the IT department and can have another tenant within the same organization for all the applications owned by the DevOps department.

- ## Data Center Extension

VMware Cloud Director service also eases the burden of expansion, doing away with the need to purchase hardware, rent data center capacity and meet local compliance and governance requirements. It opens an all-new market for providers—without requiring any capital investment or data center expansion, allowing provisioning and consumption of virtual data center tenant-based VMware Cloud resources and cloud expansion with consistent operations. The asset-light, pay-as-you-go model is delivered as-a-service with out-of-the-box integration.

- ## Hybrid Operations

Cloud Providers can offer simple data center extension associating different Cloud Director instances into a single pane of glass access to geographically disperse data centers, on-premises vCenter(s) and in VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution. If the target data center resources are less than 150 ms latency, they can easily be managed from a single VMware Cloud Director service instance, allowing global regional expansion and hybrid operations.

- ## On-Demand Capacity

In our multi-cloud world, Cloud Providers can use Cloud Director service to leverage cloud resources, like VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution, Oracle Cloud VMware Solution, or existing on-premises vCenter data centers to provision and consume custom-sized, tenant-based Cloud resources on demand. They can monetize 'Pay-as-you-Go' on-demand virtual servers, allocation, or reservation pool virtual data centers, depending on customer requirements.

- ## Security and Compliance

VMware Cloud Director service provides network isolation for each tenant with Firewall, NAT, and Public IP services within the target SDDC infrastructure. It enables providers to deliver efficient, secure, cloud infrastructure with native multi-tenancy made possible with enhanced NSX integration. For communication to the target SDDC infrastructure, SSL is used to encrypt all traffic between the reverse proxy (client) in the SDDC and Cloud Director service in AWS.

For communication to the target SDDC infrastructure, SSL Reverse Proxy is used to encrypt all traffic between the SDDC and Cloud Director service on Google Cloud VMware Engine, Azure VMware Solution and Oracle Cloud VMware Solution.

Now available in Cloud Director service

VMware Cloud Director service provides as much feature parity to Cloud Director on-premises capability as possible if the underlying Cloud SDDC supports the feature.

- **App Services with App Launchpad:** Ability to deliver a curated catalog of VMware Cloud Marketplace (inc. Bitnami) and custom or 3rd party applications to tenants and 1-click app deployment to any infrastructure endpoint (vm/vapp/container). No knowledge of the underlying infrastructure is required to provision and access apps. App Launchpad 2.x brings enhanced endpoint support from Container Service Extension managed Tanzu Kubernetes on vSphere for App Launchpad so that tenant user, can launch apps into the relevant infrastructure (Org VDC or K8s cluster) automatically. As a part of the developer-ready cloud App Launchpad offers a developer-ready platform, backed by enterprise-grade K8s, vCloud Director Terraform infrastructure as code, and NSX multi-cloud fabric to build apps anywhere.

- **S3 Object Storage with Object Storage Extension:** VMware Cloud Director Object Storage Extension is an integrated storage solution that is provisioned and managed within the VMware Cloud Director framework.

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VMware Cloud Director Object Storage Extension is a standalone middleware service that runs atop of a storage cluster or AWS S3 and provides object storage capabilities to the users of VMware Cloud Director.

VMware Cloud Director Object Storage Extension supports Cloudian Hyperstore, DELL ECS, and Amazon native S3 platforms. You can also integrate any S3-compliant object storage platform using an extension point called Object Storage Interoperability Service (OSIS). OSIS defines a set of management API specifications for VMware Cloud Director Object Storage Extension to communicate with third-party object storage platforms and exchange tenant and user information. For more information, check the VMware Object Storage Interoperability Service Development Guide.

In Google Cloud VMware Engine customers can use Object Storage services via their own Google Cloud Platform interfaces, outside of Cloud Director service automation.

- **S3 Efficiency Gains:** Further efficiency gains are provided in improved usability for providers and tenants. VMware Cloud Director continues to improve the usability with new features in the provider and tenant portal. Guided Tours help new users to find their way through the UI, and providers to highlight offered services and features. With 'Advisories', providers can notify tenants, for instance about planned maintenance, and a new Quick Search simplifies the navigation through many objects.

- **Kubernetes Cluster services with Container Service Extension:** Kubernetes is a first-class entity for VMware Cloud Director. Cloud Providers can enable the orchestration of Tanzu K8s cluster resources and layer solutions on top, e.g., Developer readiness solutions. Customers can deploy K8s clusters using VMware Cloud Director cluster via Container Service Extension and can perform Life Cycle Management of all types of clusters via Container Service Extension-CLI, and UI-Plugin. Please note that K8s support and usage of Container Service Extension is not supported in all endpoints, please check the Cloud Director service documentation.

- **Migration as a Service:** Cloud Migration can be offered to customers as a self-service or managed service from on-premises vSphere client or VMware Cloud Director Availability Cloud Director instances to VMware Cloud on AWS (Cloud Director Availability 4.2 onwards) or Google Cloud VMware Engine (Cloud Director Availability 4.3 onwards) or Azure VMware Solution (Cloud Director Availability 4.3 onwards) or Oracle Cloud VMware Solution (Cloud Director Availability 4.3 onwards).

- **Disaster Recovery as a Service:** DRaaS, either self-service or managed service can be provided to customers within the Cloud Director service user interface to provide disaster recovery replication at a maximum of 1 min RPO between Google Cloud VMware Engine instances or at a 5 min RPO between on-premises of Google Cloud VMware Engine and vice versa.

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How do Cloud Providers benefit?	How do end customers benefit?
Expansion: Cloud Providers can leverage new VMware Cloud on AWS and/or Google Cloud VMware Engine and/or on-premises vCenter SDDC in a multi-tenant modality or can leverage Azure VMware Solution or Oracle Cloud VMware Solution in enterprise multi-tenancy SDDC endpoints modality, providing right sized customer resources, enabling agile cloud expansion with constant Cloud Director operations. Cloud Providers can quickly add new customer segments and gain better economies of scale in an asset-light, pay-as-you-grow model.	**Expansion:** Customers can rapidly expand their cloud footprint to new geographies and lines of the business whilst minimizing CapEx costs and enjoying faster time to market. With VMware Cloud Director service customers can launch new software-defined data center resources in new VMware Cloud on AWS and/or Google Cloud VMware Engine and/or Azure VMware Solution and/or Oracle Cloud VMware Solution and/or on-premises vCenter SDDC locations and manage this constantly from the same Cloud Director service instance (subject to 150ms latency).
Agility: Cloud Provider maintain control of their customers contracted support and lifecycle, whilst VMware components and operational systems are managed by VMware.	**Agility:** VMware Cloud Director service significantly reduces the operational overhead from the ongoing maintenance of siloed multi-cloud environments. With automated workflows and rapidly delivered updates, it increases business agility.
Fragmented offerings: Cloud Providers and their customers needn't re-skill and re-tool when utilizing services from Cloud Director service. With uniform endpoints, the tenant experience is consistent no matter what the underlying endpoint cloud.	**Fragmented offerings:** End customers get a consistent, customizable, and simplified self-service cloud user experience, irrespective of whether they are familiar with VMware technologies or not and irrespective of the target endpoint infrastructure.
Adaptability: VMware Cloud Director service offers mixed-asset infrastructure management, able to connect to existing on-premises Cloud Director instances, on-premises vCenters and other hyper-scale VMware endpoints in a hybrid operational structure.	**Unified management:** Reduces operational overheads and delivers a consistent experience to customers in a single Ui for applications, resources, and Dev Ready Cloud infrastructure.
Subscription Based Model: Cloud Providers can consume Cloud Director service on a subscription-based model via an MSP contract with VMware and manage instances from Cloud Partner Navigator.	**Right Sized Solutions:** Now that Cloud Providers can offer Virtual Data Center resource services of all sizes, the sizing and commercial subscription benefits can be passed onto tenants.
Flexible resource pools: Cloud Provider can abstract the hardware host-based analog of VMware Cloud on AWS, Google Cloud VMware Engine, Azure VMware Solution and Oracle Cloud VMware Solution to provide flexible resource pools of compute, memory, and storage in multiple global regions/availability zones.	**Predictable Costs:** Cloud Providers can offer an allocation pool to each customer organization Virtual Data Center where only a percentage of resources allocated can be committed it required. This makes a predictable cost model for customers and lowers risk of VM not being able to start due to resource constraints.

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Continuity: Cloud Providers can quickly provision and scale high availability instances for tenants and use vMotion to manage live moving VM without application downtime. Cloud Director service automates failover to other AWS availability zones to maintain a 99.9% uptime for the service.	**Continuity and Security:** Tenants receive network edge firewalls, distributed L4 and L7 application firewalls, NAT and automatic upgrades of new features and releases with no downtime.
Upsell Protection: Cloud Providers can easily and simply provide DR replications and testing to Google Cloud VMware Engine and Oracle Cloud VMware Solution.	**Simple Protection:** With self-service or managed service Disaster Recovery as a Service workflows and testing customers can rest assured that their workloads are protected in and from Google Cloud VMware Engine and/or Oracle Cloud VMware Solution.
Upsell Migration: Cloud Providers can offer customers the ability to migrate from their on-premises environments directly to VMware Cloud on AWS or Google Cloud VMware Engine or Azure VMware Solution or Oracle Cloud VMware Solution.	**Simple Migration:** Migration as a Service, either self-service or managed service means customers can move workloads to VMware Cloud on AWS resource pools or Google Cloud VMware Engine or Azure VMware Solution or Oracle Cloud VMware Solution to achieve their cloud onboarding.

Cloud Partner Navigator Platform

The Managed Service Provider (MSP) route to market gives partners the option to use VMware software-as-a-service offerings without investment in their own data center infrastructure, delivering managed services on top. Cloud Director service will be offered to our Cloud Providers through our centralized service provisioning portal, the VMware Cloud Partner Navigator which helps Cloud Providers transact, deploy and provision SaaS offerings from a single pane of glass.

The following use cases are applicable for Cloud Director service on Cloud Partner Navigator:

- The provider is an MSP for VMware Cloud on AWS and/or an MSP for Google Cloud VMware Engine and/or an MSP for Azure VMware Solution or MSP for Oracle Cloud VMware Solution

- The provider is an MSP for the Cloud Director service

- The provider is an MSP of VMware Cloud Marketplace Bitnami

How to Get Started

Below is an overview of the VMware Cloud Provider's Managed Service Provider (MSP) lifecycle:

- **Commit Contract** – Partner signs a VMware Cloud Director service Managed Service Provider commit contract with a VMware Aggregator. The partner then commits to VMware an MSRP (list price) spend to obtain a volume discount for their purchases.

- **Cloud Provider builds MSP Pipeline** – Partner initiates go-to-market activities and starts building their business for Managed Services.

- **Deliver Managed Services and Own the Terms of Service** – Once the opportunity has been identified, partners can order Cloud Director service from VMware and provide Managed Services as part of the offering to their customers. Partners must provide their own terms of service and managed services as part of the offering to the end customer. At a minimum, this must include technical support for the service and all functions associated with service configuration, add-ons, renewals, and anything pertaining to billing.

- **On-Board and Provide Support to their Customers** – Partner will onboard Cloud Director services for their customers. Subsequently, they may obtain technical support from VMware as needed, with the following provisions. In turn, partners

are responsible for all customer support, which may include but may not be limited to customer communication, managed services, and answering installation, configuration, and usage questions.

- **Complete Monthly End Customer Reports and Pay Invoices** – On the 10th of every month, the partner will log into the Commercial Portal and review the prior month's usage. Partner will review the report and submit it to their Aggregator by the 15th day of the month. Following that, the Aggregator will send the partner an invoice for the month. VMware Cloud Provider Commerce Portal Documentation.