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About This User's Guide


This guide provides information about using Virtual Private Cloud OnDemand for vCloud Air (formerly known as vCloud Hybrid Service) to manage virtual machines deployed in your public cloud.

Intended Audience

This guide documents the tasks for users of Virtual Private Cloud OnDemand who are responsible for deploying virtual machines to the public cloud and for administrators who are responsible for managing the Virtual Private Cloud OnDemand environment. This guide documents the capabilities and tasks that you do in Virtual Private Cloud OnDemand.

Related Documentation

In addition to this guide, see the following documentation for Virtual Private Cloud OnDemand:

- vCloud Air – Virtual Private Cloud OnDemand Getting Started
- vCloud Air – Virtual Private Cloud OnDemand Networking Guide
- vCloud Director Administrator’s Guide

VMware Technical Publications Glossary

VMware Technical Publications provides a glossary of terms that might be unfamiliar to you. For definitions of terms as they are used in VMware technical documentation, go to http://www.vmware.com/support/pubs.
Introducing Virtual Private Cloud OnDemand

Virtual Private Cloud OnDemand is an infrastructure-as-a-service (IaaS) platform that allows customers to consume specific compute, storage, and networking resources as incremental pay-as-you-go services.

This chapter includes the following topics:

- “What Is Hybrid Cloud Computing?,” on page 7
- “About Virtual Private Cloud OnDemand,” on page 9
- “What Can I Do with Virtual Private Cloud OnDemand?,” on page 11
- “Comparison Between Offerings from vCloud Air,” on page 12

What Is Hybrid Cloud Computing?

In a hybrid cloud computing environment, an organization provides and manages in-house resources and accesses resources in a public cloud. One or several touch points exist between the private cloud and public cloud environments. The services and data from both clouds combine to create a unified and well-managed computing environment.

Figure 1-1 shows how customers can utilize hybrid cloud computing using Virtual Private Cloud OnDemand.

Figure 1-1. Components of a Hybrid Cloud

In their private clouds, customers manage their business workloads using virtualized, pooled compute resources. Virtual Private Cloud OnDemand, managed by VMware, exists in the public cloud and exposes infrastructure capabilities through a Web UI and publically available APIs. Together, customers’ on-premises private clouds and the VMware public cloud provide hybrid cloud functionality—the ability to extend private cloud resources to the public cloud. In a hybrid cloud environment, computing resources and business processes are designed to connect customers’ private clouds and the public cloud as though they are a single environment for each customer.
Hybrid Cloud Characteristics

Not all companies that use some public and some private cloud services have a hybrid cloud. A hybrid cloud environment is not an environment where a few developers in a company use a public cloud service to prototype a new application that is completely disconnected from their private cloud or on-premises data center.

A hybrid cloud is an environment where the private and public cloud services are used together to create value. Hybrid cloud computing began as a way to take advantage of the ability to move workloads between private and public clouds. At different times of the month or year, certain workload requirements might need extra capacity. In many cases, it was the idea that customers owned the applications and rented the capacity spikes.

Customers built virtual private clouds for numerous reasons; for example, to handle dynamic scaling requirements, to run workloads at lower costs, or to run workloads for limited time periods. The resources ran in the public cloud but linked back to resources in their private clouds through VPN or other private connections. Their workloads ran where it made the most sense but required visibility back to resources in their private clouds, for example, to allow for authentication of users or archive data at set intervals into secure storage.

Over time, the characteristics of hybrid clouds have evolved. Today, hybrid cloud computing exists as a private cloud and multi-public clouds. A customer leverages resources whether they are public and public, multi-public, private and public, or any combination, and has a single way to orchestrate and provide services to their business based on a multitude of criteria (cost, location, performance, or availability).

For example, a customer might need to keep legacy applications private but look to moving new applications public to take advantage of geography, time zone, or for legal reasons. For example, in Figure 1-3, public cloud “Public - West” might be in a required geographical location.

Customers approach their hybrid cloud strategy by looking at all resources across all clouds. They want a dashboard way of managing cloud resources whether they are private or public. In this environment, customers do not think in terms of moving resources between public and private clouds, but rather as operating them in environments that best solve their business needs to give them business advantages.
About Virtual Private Cloud OnDemand

Virtual Private Cloud OnDemand leverages a resource pool-based delivery model. Customers deploy and pay for only the resources they consume. They can increase or decrease capacity based on demands and budget.

The delivery model for Virtual Private Cloud OnDemand allows customers to pay for only services actually used, on a metered, charge-back basis, under flexible service agreements, as opposed to fixed-term contracts. The pay-as-you-go model enables paying only for the capacity in use, eliminating capital equipment expenses, over-purchasing, and underutilization.

Customers consume Virtual Private Cloud OnDemand like any software-defined data center. Because Virtual Private Cloud OnDemand is built on the vSphere and vCloud platforms, customers consume it the same way that they consume their existing on-premises vSphere environments.

Figure 1-4. Consumption of Virtual Private Cloud OnDemand

- Existing and New Applications: Virtual Private Cloud OnDemand supports moving on-premises workloads and templates to the public cloud, allowing customers to use the same images that they have in their environments. Virtual Private Cloud OnDemand supports moving workloads because virtual machines in the public cloud are based on the same Hypervisor technology and use the same virtual machine (OVF) format as on-premises workloads.

- Seamless Networking: Because Virtual Private Cloud OnDemand is built on vCloud Networking and Security software, customers can use the same networking schema in the public cloud. Virtual Private Cloud OnDemand supports full software-defined networks at layer 2 and layer 3 without the need for manual configuration changes.

  Additionally, customers can extend their on-premises security and compliance policies on virtualized networks to the public cloud. Network virtualization allows for integrated L4-7 services for firewall and NAT rules, load balancing, and secure connectivity with IPsec VPN.

  For information, see the vCloud Air – Virtual Private Cloud OnDemand Networking Guide.

- Common Management: Virtual Private Cloud OnDemand supports the suite of vSphere management tools (such as vCloud Connector, vCloud Automation Center, and vCenter Operations Management Suite) because it is architected on the same platform as vSphere. Support for common management tools makes it possible for customers to migrate virtual machines and workloads to and from the public cloud.

  For information about the ways to use vCloud Connector with Virtual Private Cloud OnDemand, see About vCloud Connector for vCloud Air.
Virtual Private Cloud OnDemand includes access to the VMware Public Catalog and support for private catalogs allowing customers to deploy new applications in the public cloud as necessary. See “Catalogs and Templates Overview,” on page 54.

Ways to Consume Virtual Private Cloud OnDemand

The following components of Virtual Private Cloud OnDemand facilitate managing cloud resources purchased from VMware.

Figure 1-5. Components of Virtual Private Cloud OnDemand

- Compute, Storage, Networking and Security: Commonly referred to as infrastructure-as-a-service (IaaS), Virtual Private Cloud OnDemand standardizes compute resources, complemented by storage infrastructure and networking capabilities, and offers these IaaS resources to customers on-demand. Customers are able to self-provision these resources independently based on their resource needs.


- Application and OS Catalogs: Virtual Private Cloud OnDemand includes access to the VMware Public Catalog—an operating system and application catalog of commonly-used, pre-configured workloads for Virtual Private Cloud OnDemand. Customers can deploy workloads from the public catalog into their environments on a pay-as-you-go basis.

  See “Catalogs and Templates Overview,” on page 54 for information.

- Bring Your Own Licenses: VMware provides guidance on how to use existing third-party software licenses with Virtual Private Cloud OnDemand. VMware works with leading operating system and application vendors to determine licensing requirements so that customers understand their options for license mobility into Virtual Private Cloud OnDemand.

  https://solutionexchange.vmware.com/store/products/bring-your-microsoft-license-to-the-cloud

- Bring Your Own Virtual Machines: Virtual Private Cloud OnDemand enables workload migration to the public cloud with fewer compatibility boundaries between onsite and offsite services. Customers can move workloads without needing to re-architect them to work with cloud networking.
Bring Your Own Tools: Typically, customers make large investments in custom and third-party tools outside the traditional VMware toolset to manage their private cloud resources. Virtual Private Cloud OnDemand provides support for customers’ tools without requiring tool re-architecture to work in the public cloud.

**Note** While customers do not have the ability to monitor the management stack directly, you can use any technology that leverages the vCloud API such as vCloud Automation Center, Cloud Foundry and vFabric Applications. You can deploy agent-based tools, such as HypericHQ, to report back to the local data center.

Web UI and vCloud API: Customers manage and consume hybrid cloud resources through a Web UI and public APIs. The Web UI and the public APIs provide management of cloud resources including virtual data center management, configuration of network services, and virtual machine instance lifecycle management.

The Web UI also provides single sign-on access to vCloud Director. In vCloud Director, administrators can perform advanced management of virtual data centers, and end users can perform advanced management of virtual machines.


**What Can I Do with Virtual Private Cloud OnDemand?**

When registering for Virtual Private Cloud OnDemand, a customer can access the following resources within a logically-isolated Virtual Private Cloud environment on the VMware multi-tenant infrastructure.

- vCPUs
- vRAM (GB)
- Storage (GB)
- Allocated and burstable network bandwidth
- Public IP addresses allocatable to virtual data centers

Selecting a Virtual Private Cloud OnDemand service for the first time provisions your first virtual data center (with 2.6vGHz vCPUs), a gateway, and routed network automatically. When you log into Virtual Private Cloud OnDemand the first time, the Web UI provides quick access to creating your first virtual machine.

Using Virtual Private Cloud OnDemand, you can create or import collections of virtual machines into your environment. You can add virtual data centers to your public cloud and allocate public IP addresses to those data centers. You can scale resources to your virtual machines on demand.

You pay for compute and memory resources allocated to your virtual machines only after they are powered on. You pay for only the amount of storage you allocate to your virtual machines. Resources are metered by the minute, and billed monthly as fractions of hours, without requiring a long-term contract. See “Data Collection Explained,” on page 64 for information.

**Cost Savings**

- Start projects sooner because the usage-based billing for Virtual Private Cloud OnDemand allows for lower, incremental operating expenses instead of higher, upfront capital expenses.

- Avoid over-purchasing and underutilization of infrastructure resources with depreciating assets in your private cloud through access to on demand public cloud capacity.
Workloads

- Acquire self-service resources needed for testing new services or deploying against highly elastic business demands.
- Operate across hybrid onsite and offsite infrastructure as you move workloads to production.
- Replicate test environments in the public cloud that immediately meet production standards.
- Transition workloads developed in self-procured environments into core IT infrastructure with no additional investment of time and effort.

Centralization

- Ensure site-to-site consistency and untethered workload portability by using a centrally managed resource pool.
- Replicate network configuration and context between onsite and offsite clouds with a synchronized service catalog. (The Content Sync feature of vCloud Connector allows customers to synchronize the Catalog for Virtual Private Cloud OnDemand with any existing vSphere folders or vCloud Director catalogs.)
- Utilize pre-built logical templates, services, and application components to assemble application blueprints. (Using the same templates across different clouds ensures greater simplicity of processes between onsite and offsite cloud infrastructures.)
- Standardize on one platform for all applications. The broad operating system and application support, combined with the uniform performance across virtualized applications that VMware provides make it possible to standardize on one platform on-premises and off-premises. Virtual Private Cloud OnDemand supports the legacy applications you are running today as well as your future applications.

Comparison Between Offerings from vCloud Air

In addition to Virtual Private Cloud OnDemand, VMware provides other vCloud Air offerings.

VMware provides the following subscription-based services that require resource commitments via the standard IT procurement process:

- vCloud Air – Dedicated Cloud
- vCloud Air – Virtual Private Cloud
- vCloud Air – Disaster Recovery

Dedicated Cloud and Virtual Private Cloud

- Dedicated Cloud: provides a single tenant private cloud with dedicated computing servers, layer-2 network isolation for workload traffic, persistent storage volumes, and a dedicated cloud management instance. Infrastructure capacity can be allocated to a single virtual data center or multiple virtual data centers.
- Virtual Private Cloud: provides a multi-tenant virtual private cloud with logically isolated resources on a shared physical infrastructure, configured as a single virtual data center with networking resources. A customer cannot have multiple virtual data centers with a Virtual Private Cloud service because the Virtual Private Cloud service is provided as a single virtual data center.

For information about Dedicated Cloud and Virtual Private Cloud, see the vCloud Air User's Guide.
vCloud Air – Disaster Recovery

vCloud Air – Disaster Recovery is a recovery-as-a-service (RaaS) offering intended to protect virtual workloads managed by VMware vSphere that are either deployed in a private cloud or data center.

Subscribing to Disaster Recovery is a separate enrollment process whether you already are a vCloud Air customer. If you are not a Disaster Recovery customer, you will not see the Disaster Recovery functionality in your vCloud Air Web UI.

To implement and consume vCloud Air – Disaster Recovery, you require vSphere Replication. vSphere Replication copies a virtual machine to another location, within or between clusters, and makes that copy available for recovery through the VMware vSphere Web Client or through the orchestration of a full disaster recovery product such as VMware vCenter Site Recovery Manager.

With Disaster Recovery, you can use vCloud Air to monitor and manage the virtual machines you are replicating to the cloud. In the event of a disruption at the source site, you use the vCloud Air Web UI to recover your on-premises virtual machines from placeholder virtual machines replicated to the public cloud.

For information about Disaster Recovery, see the vCloud Air – Disaster Recovery User’s Guide.

Differences Between the Offerings

The services have the following billing and registration differences:

- For Dedicated Cloud, Virtual Private Cloud, and Disaster Recovery, you are billed monthly for a fixed amount of resource capacity regardless of your usage.
  
  See How to Buy Cloud Computing for information about registering for these services.

- For Virtual Private Cloud OnDemand, you register online and provide credit card information.
  

- Virtual Private Cloud OnDemand does not require a time commitment or upfront payment.

- With Virtual Private Cloud OnDemand, you are billed for per-minute metered usage of compute capacity. Some months, you might not incur any charges. Usage costs are provided in pricing tiers.
  

The vCloud Air offerings have the following functional differences:

- Like the subscription-based Virtual Private Cloud service, Virtual Private Cloud OnDemand is delivered within a logically isolated virtual private cloud environment on the vCloud Air multi-tenant infrastructure. However, unlike the subscription-based Virtual Private Cloud, customers can create virtual data centers to sub-allocate computing resources in Virtual Private Cloud OnDemand.

- In Virtual Private Cloud OnDemand, virtual data centers are created based on a standard resource template. Customers can contact VMware Support to increase template resource limits as needed. In the Dedicated Cloud service, customers can create virtual data centers with customized allocations for compute and storage. Additionally, in the Dedicated Cloud service, customers can lock their virtual data centers to prevent users from changing virtual machine states and customers can set virtual machine quotas for virtual data centers.

- In Virtual Private Cloud OnDemand, customers can create virtual machines in any location where Virtual Private Cloud OnDemand is supported. In the subscription-based offerings, customers purchase compute services based on location.
  
  See “Geographical Locations,” on page 49 and vCloud Air Data Center Locations for information.

- Virtual Private Cloud OnDemand does not support activity logs, locking virtual data centers, the Data Protection Service, and Direct Connect at this time.
Navigating Virtual Private Cloud OnDemand

Virtual Private Cloud OnDemand is designed based on the following themes.
- Simplicity; especially for virtual machine creation
- Visibility into resource usage
- On demand usage and billing report access

Depending on your access rights, Virtual Private Cloud OnDemand provides access to functionality in four areas: Resource Usage, Virtual Machines, Gateways (administrators only), and Networks. How you navigate these areas of the interface varies depending on your access rights.
- Administrators: administrators have access to four global tabs: Resource Usage, Virtual Machines, Gateways, and Networks.
- End users: users who are part of the End User role, have access to the Virtual Machines tab. Selecting a virtual machine displays a Resource Usage tab, Settings tab, and Networks tab for that virtual machine.

See “Role-based User Account Management,” on page 55 for information about the access roles in Virtual Private Cloud OnDemand.

This chapter includes the following topics:
- “Service Initialization and Home Page,” on page 15
- “Virtual Machines Tab,” on page 17
- “End User View of Virtual Private Cloud OnDemand,” on page 19
- “Environment Setup and Catalog Access,” on page 20
- “Resource Usage Tab and Billing,” on page 24

Service Initialization and Home Page

After logging in, you land on Home page. Here you find tiles for your services registered with vCloud Air (formerly known as vCloud Hybrid Service).

Selecting Virtual Private Cloud OnDemand for the first time provisions your first virtual data center (with 2.6vGHz vCPUs), a gateway, and a routed network automatically. You can use the default configuration to gain immediate access to your public cloud and deploy your first virtual machine.
As your public cloud environment grows and capacity needs increase, you can add instances of the service to your account.

**Note** Service IDs appear in the Home page only when you have more than one service for Virtual Private Cloud OnDemand.
See Create Your Account in vCloud Air – Virtual Private Cloud OnDemand Getting Started for information about registering for and purchasing services.

Your Home page provides a central location to access and manage the resources from different services.

Virtual Machines Tab

After clicking the tile for Virtual Private Cloud OnDemand on the Home page, the Virtual Machines tab appears.

If you are new to the service or have not created any virtual machines, Virtual Private Cloud OnDemand for vCloud Air provides quick access to creating your first virtual machine.

Clicking Create your first virtual machine opens a wizard to create a virtual machine:

1. Select a template

2. Configure resources

Access vCloud Director multi-step wizard for customized VM

For information about creating virtual machines, see “Create a Virtual Machine from a Template,” on page 33 and “Create a Virtual Machine Without Using a Template,” on page 35.
About the Virtual Machines List

For each virtual machine in the list, you have instant access to powering on and off the virtual machine.

Selecting a virtual machine and opening the Actions menu provides a quick way to manage the virtual machine by selecting enabled options based on the state of the virtual machine.

### Actions Menu Options

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
</table>
| **Power Options**: control the behavior of the various power options that can be performed on a virtual machine.  
For information about power operations, see “Virtual Machine Power Operations,” on page 35. |
| **Edit Options**: change the name, description, and owner of a virtual machine, as well as adjust resources (vCPU, vRAM, storage) for a virtual machine.  
| **Snapshots**: capture a reproduction of the virtual machine, including the state of the data on all of the virtual machine’s disks and power state.  
For information about snapshots, see “Work with Virtual Machine Snapshots,” on page 45. |
| **Console**: access a remote console to view virtual machine information and perform activities, such as configuring OS settings or running applications  
For information about using the console, see “Log Into a Virtual Machine Guest OS with the Console,” on page 43. |
| **vCloud Director**: set advanced options for a virtual machine.  
For information, see “Manage Virtual Machine Properties in vCloud Director,” on page 40. |

About Settings and Resources for a Virtual Machine

From the virtual machine list, you can click a virtual machine name to view and edit resources for that virtual machine:
For information, see “Sort and View Virtual Machines,” on page 31.

Clicking Manage in vCloud Director allows you to set advanced properties for that virtual machine in vCloud Director:

For information, see “Manage Virtual Machine Properties in vCloud Director,” on page 40.

**End User View of Virtual Private Cloud OnDemand**

Virtual Private Cloud OnDemand for vCloud Air (formerly known as vCloud Hybrid Service) provides role-based access that controls which features and resources users can manage.

The roles are divided into five administrative roles and an End User role. As a member of the End User role, you have the permission to manage the virtual machines you own in Virtual Private Cloud OnDemand and in vCloud Director.

As an End User, you do not have access to the Gateways tab, global Networks tab, or the global Resource Usage tab (displays resource usage for all virtual machines in the account).

As a member of the End User role, the Virtual Machines tab appears as follows:
As a member of the End User role, the **Networks** tab for a virtual machine appears as follows:

For more information about End User access, see “End User Virtual Machine Access,” on page 30. For information about administrative access to Virtual Private Cloud OnDemand, see “Role-based User Account Management,” on page 55.

**Environment Setup and Catalog Access**

In vCloud Air (formerly known as vCloud Hybrid Service), selecting a Virtual Private Cloud OnDemand service for the first time provisions your first virtual data center (with 2.6vGHz vCPUs), a gateway, and routed network automatically.

Users assigned to the administrative roles have access to the following areas of Virtual Private Cloud OnDemand needed for setting up your public cloud environment:

- Virtual data center management
- Gateways and networks
- Catalog management by using vCloud Director
Virtual Data Centers

Virtual Infrastructure Administrators can get started managing the environment by modifying the default virtual data center (VDC1) or adding virtual data centers to segment their environment. See “Virtual Data Center Overview,” on page 49 for information.

Expand the Virtual Data Centers pane to view and manage the virtual data centers in your environment:

Gateways and Networks

Networking in the Virtual Private Cloud OnDemand replicates traditional network technologies and design. Users who are members of the Network Administrators role manage gateways and networks in Virtual Private Cloud OnDemand to configure network architectures that compliment or replicate the network configuration of their on-premises environments.

For information about gateway and network management, see vCloud Air – Virtual Private Cloud OnDemand Networking Guide.

Select the Gateways tab to view the gateways available in your environment:
Clicking any gateway provides quick access to configuring the following gateway properties in Virtual Private Cloud OnDemand:

- NAT Rules
- Firewall Rules
- Networks
- Public IP Addresses


Clicking Manage in vCloud Director for a gateway (Home > Gateways) opens vCloud Director so that you can set advanced properties for the selected gateway:
Clicking the **Networks** tab, displays the networks in the selected virtual data center:

**Catalog Access**

Virtual Private Cloud OnDemand includes access to the VMware Public Catalog—an operating system and application catalog of commonly-used, pre-configured workloads for Virtual Private Cloud OnDemand. You can deploy workloads from the public catalog into your environment on a pay-as-you-go basis.

To gain quick access to the catalog to view and deploy virtual machines utilizing the available templates, click **New Virtual Machine**. Step one of the wizard provides the list of VMware catalogs and your catalogs uploaded by your administrator for your organization.
Users assigned to the Virtual Infrastructure Administrator role can manage the catalogs available for a virtual data center by using vCloud Director.

For information about catalog and template management, see “Catalogs and Templates Overview,” on page 54.

Resource Usage Tab and Billing

Virtual Private Cloud OnDemand for vCloud Air (formerly known as vCloud Hybrid Service) allows you to pay for only the resources you use on a per-minute, metered basis.

Resource Usage Tab

Selecting the Resource Usage tab provides you access to usage data for all resources deployed in Virtual Private Cloud OnDemand. You can view usage data for specified time periods to get a clear picture of usage trends:

Clicking View detailed report allows you to view usage data for past months:
For information about resource usage in Virtual Private Cloud OnDemand, see “View Resource Usage,” on page 66.

**Billing Access from the Tools Menu**

Access the **Tools** menu in Virtual Private Cloud OnDemand to accomplish the following tasks:

<table>
<thead>
<tr>
<th>Tools Menu Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Name &amp; Sign Out</strong></td>
<td>Clicking <strong>Sign Out</strong> returns you to the log in page for Virtual Private Cloud OnDemand.</td>
</tr>
<tr>
<td><strong>Users</strong></td>
<td>Allows Account Administrators to manage users for Virtual Private Cloud OnDemand. For information, see “Role-based User Account Management,” on page 55.</td>
</tr>
<tr>
<td><strong>Billing</strong></td>
<td>For information about billing and service credits, see “About Resource Billing,” on page 67. For information about <strong>Buying Offline Data Transfer Service</strong>, see Installing vCloud Connector for Virtual Private Cloud OnDemand.</td>
</tr>
<tr>
<td><strong>Help &amp; Support</strong></td>
<td>Select <strong>Help</strong> to go to the online documentation center for vCloud Air, which includes the documentation for Virtual Private Cloud OnDemand and other service offerings for vCloud Air. Select <strong>File a Service Request</strong> to open My VMware and manage your service requests. See the My VMware Help (1) for information. For information about accessing support and filing service requests, see vCloud Air – Virtual Private Cloud OnDemand Getting Started.</td>
</tr>
</tbody>
</table>
Virtual machines are first-class objects in Virtual Private Cloud OnDemand interactions. You can add a virtual machine, view its status, and manage basic operations in Virtual Private Cloud OnDemand. You can manage them in groups and individually.

This chapter includes the following topics:

- “Virtual Machine Overview,” on page 28
- “Overview of Storage Tiers,” on page 29
- “vApp Overview,” on page 30
- “End User Virtual Machine Access,” on page 30
- “Sort and View Virtual Machines,” on page 31
- “Create a Virtual Machine from a Template,” on page 33
- “Create a Virtual Machine Without Using a Template,” on page 35
- “Virtual Machine Power Operations,” on page 35
- “Edit Virtual Machine Properties,” on page 36
- “Adjust Virtual Machine Resources,” on page 37
- “Add a Disk to a Virtual Machine,” on page 38
- “Set Storage and Runtime Leases for a vApp,” on page 39
- “Manage Virtual Machine Properties in vCloud Director,” on page 40
- “Connect a Virtual Machine to a Network,” on page 41
- “Change Network Assignments for a Virtual Machine,” on page 42
- “Connect a Virtual Machine to the Internet,” on page 43
- “Log Into a Virtual Machine Guest OS with the Console,” on page 43
- “Virtual Machine Monitoring,” on page 44
- “Work with Virtual Machine Snapshots,” on page 45
Virtual Machine Overview

A virtual machine is a software computer that, like a physical computer, runs an operating system and applications.

The virtual machine consists of a set of specification and configuration files and is backed by the physical resources of a host. Every virtual machine has virtual devices that provide the same functionality as physical hardware, while being more portable, more secure, and easier to manage.

Virtual machines have a guest operating system on which you can install and run any software supported by that operating system. A guest operating system is an operating system that runs inside a virtual machine. You can install a guest operating system in a virtual machine and control guest operating system customization for virtual machines created from templates.

For more information about virtual machines in the vSphere platform, see Introduction to VMware vSphere Virtual Machines in the vSphere Virtual Machine Administration Guide.

Virtual Machines in Virtual Private Cloud OnDemand

VMware built Virtual Private Cloud OnDemand on the vSphere and vCloud platforms. Therefore, you consume it the same way that you consume your existing on-premises vSphere environments. If you are running an on-premises vSphere environment, you can connect your private clouds to Virtual Private Cloud OnDemand seamlessly.

**Note** For information about the capacity maximums for virtual machines in Virtual Private Cloud OnDemand, see “Capacity for Virtual Private Cloud OnDemand,” on page 48.

An existing VMware vSphere infrastructure is not required to use Virtual Private Cloud OnDemand. Virtual Private Cloud OnDemand includes the following features to deploy new virtual machines to the public cloud:

- A two-step wizard to deploy virtual machines using the VMware Public Catalog
- Access to vCloud Director to create your own virtual machine templates and customize virtual machine configuration
- The ability to upload your own media and manage your private catalog by using vCloud Director

**Note** Virtual Private Cloud OnDemand provides single-sign on access to vCloud Director; installing vCloud Director locally is not required to use Virtual Private Cloud OnDemand.

The following technical details apply to virtual machines deployed to the public cloud with Virtual Private Cloud OnDemand:

- Virtual machines have a guest operating system on which you can install and run any software supported by that operating system. In vCloud Director, you can install VMware Tools, insert DVDs and floppy disks, and remotely connect to virtual machines.

- In the vSphere ESXi architecture, the console’s operating system has been removed and all of the VMware agents run directly on the VMkernel.

  Infrastructure services are provided natively through modules included with the VMkernel. Other authorized third-party modules, such as hardware drivers and hardware monitoring components, can run in the VMkernel.

  Only modules that have been digitally signed by VMware are allowed on the system.
Overview of Storage Tiers

Tiered storage is the assignment of different categories of data to different types of storage media in order to reduce total storage cost. Virtual Private Cloud OnDemand offers two storage tiers for virtual machines.

- **Standard Storage**

  Standard storage provides traditional block storage for virtual machines. Standard storage is lower cost and appropriate for storage of tier 2 and tier 3 data. Tier 2 and tier 3 include data that is seldom-used or event driven.

  Examples of tier 2 and tier 3 data include large data sets, such as log file storage and archival of large sets of static data.

- **SSD-Accelerated Storage**

  SSD-Accelerated storage provides higher performance block storage for virtual machines. SSD-Accelerated storage is appropriate for all tiers (1, 2, and 3); though, it is most recommended for tier 1 data. Tier 1 includes data that is mission-critical, frequently accessed, or requires a high degree of security.

  Examples of tier 1 data include a high-access database, which is part of a three-tier application, a host cache, or a virtual machine boot (primary) disk.

Storage Features in Virtual Private Cloud OnDemand

- Migrating virtual machine disks between tiers has no impact on virtual machine uptime or availability; for example, when moving a virtual machine disk to the other storage tier, the virtual machine can remain powered on and accessible.

- You can allocate storage to a virtual machine on a per-disk basis; for example, a virtual machine with two disks could have one disk utilizing SSD-Accelerated storage and the other disk utilizing Standard storage.

- Adjusting storage allocation for a virtual machine does not impact existing snapshots for the virtual machine; for example, when expanding disk storage for a virtual machine, you do not need to snapshot the virtual machine before expanding the storage.

Storage Management in Virtual Private Cloud OnDemand

Virtual Private Cloud OnDemand lets you direct storage for your virtual machines to either higher performance or lower cost storage tiers.

You can allocate virtual machine storage when creating virtual machines or by adjusting their storage after you create them.

- To allocate storage to a specific tier when creating a virtual machine using a template, see “Create a Virtual Machine from a Template,” on page 33.

- To allocate storage to a specific tier when creating a virtual machine from scratch, see “Create a Virtual Machine Without Using a Template,” on page 35.

- To add storage from the designated storage tiers to an existing virtual machine, see “Add a Disk to a Virtual Machine,” on page 38.
vApp Overview

A vApp is a preconfigured virtual machine that packages applications and parameters that define operational details. A vApp packages applications with their required operating systems.

A vApp allows disparate virtual machines to work together in a stack as an application, and supports cloud-computing architectures. You can nest vApps within vApps, set up VMware resource pools, and deploy new vApps based on existing ones. VMware vApps operate on the Open Virtualization Format (OVF) standard and vApps are exported in OVF format.

Virtual Private Cloud OnDemand displays information about the vApp that contains each virtual machine; however, you do not select or manage vApps when you create a virtual machine in Virtual Private Cloud OnDemand. You manage vApps by using vCloud Director.

See Working with vApps in the vCloud Director User’s Guide for information.

Managing vApps in vCloud Director allows you to save a vApp as a vApp template in your catalog. See Working with vAppTemplates in the vCloud Director User’s Guide for information.

See also “Create a Virtual Machine from a Template,” on page 33. In Virtual Private Cloud OnDemand, you use templates when creating virtual machines. A VMware template (also called a golden image) is a model copy of a virtual machine from which you can clone or deploy more virtual machines.

Details: Differences Between vApps and Virtual Appliances

A virtual appliance is a generic term for an application delivered as a prebuilt unit. More specifically, a virtual appliance is a virtual machine image file consisting of a pre-configured operating system environment and a single application. The purpose of a virtual appliance is to simplify delivery and operation of an application. To this end, only necessary operating system components are included.

A virtual appliance can be deployed as a virtual machine or a subset of a virtual machine running on virtualization technology, such as VMware Workstation. Deploying an application as a virtual appliance can eliminate problems with installation and configuration, such as software or driver compatibility issues.

“vApp” is a VMware specific term for an application encapsulated within a vApp pool (which works in a hosted environment and on hypervisors). A vApp can define a number of specific things about an appliance, such as performance and resource pools, IP address allocation policies, or firewall requirements.

End User Virtual Machine Access

Virtual Private Cloud OnDemand for vCloud Air provides role-based access that controls which features and resources users can manage.

The roles are divided into five administrative roles and an End User role. The administrative roles and the End User role are mutually exclusive; meaning, you cannot be assigned the End User role and any administrative roles concurrently.

For information about the administrative roles see “Role-based User Account Management,” on page 55.

As a member of the End User role, you have permission to perform the following tasks in Virtual Private Cloud OnDemand and vCloud Director:

- Add virtual machines to the public cloud.
- View and sort the list of virtual machines for which you are the owner.
  You own a virtual machine when you created that virtual machine or an administrative user transferred ownership of that virtual machine to you.
- Edit properties and settings in Virtual Private Cloud OnDemand and in vCloud Director, including power operations, for virtual machines you own.
- Manage snapshots for the virtual machines you own.
- View resource usage for the virtual machines you own.
- Change your password for Virtual Private Cloud OnDemand.

As an end user, you can select which location and virtual data center to view and the page refreshes to display the virtual machine you own in that location or virtual data center, respectively.

For a member of the End User role, Virtual Private Cloud OnDemand displays only the **Virtual Machines** tab:

As an end user, you do not have access to the **Gateways** tab, global **Networks** tab, or the global **Resource Usage** tab (displays resource usage for all virtual machines in the account).

As an end user, you have access to a **Networks** tab for each virtual machine that you own:

### Sort and View Virtual Machines

You can view information and edit details about virtual machines in Virtual Private Cloud OnDemand.

The virtual machines you can view depends on your access role in Virtual Private Cloud OnDemand. An administrators can view all virtual machines for your account; while, an End User can view only the virtual machine which the user owns.
**Prerequisites**
Verify that you have End User or Virtual Infrastructure Administrator privileges.

**Procedure**

1. From the Home page, select the service for which you want to view virtual machines.

   **Note** Perform this step only if you have more than one service for Virtual Private Cloud OnDemand. See “Service Initialization and Home Page,” on page 15 for information.

   The Virtual Machines tab appears.

2. If necessary, from the drop-down menu above the tabs, select the location for which you want to view virtual machines.

   The virtual machines list refreshes for that location.

3. If necessary, click the expand icon (.expand_icon) to display the Virtual Data Centers pane and select the virtual data center for which you want to view virtual machines.

   The virtual machines list refreshes for that virtual data center. The list provides the following information for each virtual machine:

<table>
<thead>
<tr>
<th>Status</th>
<th>Name</th>
<th>Owner</th>
<th>CPU</th>
<th>Memory</th>
<th>OS</th>
<th>vApp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test-VM</td>
<td><a href="mailto:user@example.com">user@example.com</a></td>
<td>vCPU</td>
<td>6.0 GB</td>
<td>CentOS 4/5/6 (32-bit)</td>
<td>Test-VM-VApp</td>
</tr>
</tbody>
</table>

   **Note**
   - The virtual machine name (a label in Virtual Private Cloud OnDemand) is distinct from the computer or host name, which is set in the guest operating system of the virtual machine and identifies it on a network.
   - The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.
   - The number of vCPUs and amount of vRAM that a virtual machine supports depends on its virtual hardware version.
   - When you create a virtual machine by using Virtual Private Cloud OnDemand, Virtual Private Cloud OnDemand creates a vApp (named VM_name-VApp) and assigns the virtual machine to it. You can manage vApps only in vCloud Director. See “vApp Overview,” on page 30 for information.

4. To search for virtual machines, click in the search field and type the text to be searched for. You can perform a wildcard search using asterisks.

5. Click the virtual machine name to display the virtual machine settings, connected networks, and resource usage.

**What to do next**
For information about changing virtual machine properties, adjusting resources, reassigning networks, or viewing resource consumption for the virtual machine, see the following topics:

- “Edit Virtual Machine Properties,” on page 36
- “Adjust Virtual Machine Resources,” on page 37
- “Add a Disk to a Virtual Machine,” on page 38
Create a Virtual Machine from a Template

Virtual Private Cloud OnDemand makes it easy to deploy a new virtual machine to your public cloud by providing a two-step new virtual machine wizard, a public VMware Catalog of templates, and default resource configuration for the new virtual machine appropriate for the selected template.

A template is an image that is loaded with an operating system, applications, and data.

**NOTE** For information about the capacity maximums for virtual machines in Virtual Private Cloud OnDemand, see “Capacity for Virtual Private Cloud OnDemand,” on page 48.

**Procedure**

1. Navigate to the location where you want to create the virtual machine:

   - **Service:** From the Home page, select the service where you want to create the virtual machine.

     **NOTE** Perform this step only if you have more than one service for Virtual Private Cloud OnDemand. See “Service Initialization and Home Page,” on page 15 for information.

   - **Location:** From the drop-down menu above the tabs, select the location where you want to create the virtual machine.

   - **Virtual Data Center:** If necessary, click the expand icon ( ) to display the Virtual Data Centers pane and select the virtual data center where you want to add the virtual machine.

     **NOTE** If you have selected all virtual data centers, you are prompted to select a specific virtual data center before you start the wizard.

   A virtual machine cannot span services, locations, or virtual data centers.

2. From the **Virtual Machines** tab, click **New Virtual Machine**.

   The New Virtual Machine two-step wizard appears.

3. Select a template on which to base the virtual machine.

   - **VMware Catalog:** The virtual machine templates that VMware has validated and prepared for you to use inside your cloud service. This list changes frequently as new templates become available. For more information about how to use templates, see the Terms of Service.

     **NOTE** If you select a template that is a paid template ( ), you are prompted to confirm the purchase and notified that charges will appear on your Virtual Private Cloud OnDemand billing statement.

   - **My Catalog:** A private catalog created for your organization; your catalog contains vApp templates and media uploaded for your organization. See “Manage Catalogs in vCloud Director,” on page 54 for information.

4. Click **Continue**.

   The configurable resources for the virtual machine appear.
5 Type a unique name for the virtual machine (by default, the service generates a name for the virtual machine) and add a description. In the **Name** field, enter up to 80 alphanumeric characters (including hyphens and underscores). In the **Description** field, enter up to 255 alphanumeric characters (including hyphens and underscores).

The virtual machine name (a label in Virtual Private Cloud OnDemand) is distinct from the computer or host name, which is set in the guest operating system of the virtual machine and identifies it on a network.

6 Adjust the resources for the virtual machine. (By default, the service allocates resources to the virtual machine based on the template selected.)

- **CPU:** The number of vCPUs for the virtual machine
- **Memory:** The total amount of vRAM for the virtual machine

**Note** CPU and memory resources are linked; the memory is constrained by the number of CPUs specified. Click the link icon (🔗) to adjust the number of vCPUs and amount of memory individually.

![CPU and Memory Settings](image)

When the CPU and memory settings are linked, the resource allocation predefines a ratio of vCPUs to a minimum and maximum memory range. The predefined ratio provides the best performance for the virtual machine in the Virtual Private Cloud OnDemand environment.

- **Storage:** The storage for the virtual machine and the tier of storage to use

By default, Virtual Private Cloud OnDemand allocates the amount of storage based on the template, but you must select the storage tier from the drop-down menu. See “Overview of Storage Tiers,” on page 29 for information.

7 Connect the virtual machine to a network.

See “Connect a Virtual Machine to a Network,” on page 41 for information.

8 Click **Create Virtual Machine**.

The virtual machine list appears with a status message indicating progress for creating your virtual machine.

**What to do next**

After creating a virtual machine, you can perform the following actions:

- “Virtual Machine Power Operations,” on page 35
- “Add a Disk to a Virtual Machine,” on page 38
- “Manage Virtual Machine Properties in vCloud Director,” on page 40
- “Log Into a Virtual Machine Guest OS with the Console,” on page 43
Create a Virtual Machine Without Using a Template

If you do not want to create a virtual machine based on a template in Virtual Private Cloud OnDemand, you can create an original virtual machine in vCloud Director. You must first create a new vApp.

Procedure

1. Navigate to the location where you want to create the virtual machine:
   - Service: From the Home page, select the service where you want to create the virtual machine.
   - Location: From the drop-down menu above the tabs, select the location where you want to create the virtual machine.
   - Virtual Data Center: If necessary, click the expand icon to display the Virtual Data Centers pane and select the virtual data center where you want to create the virtual machine.

   A virtual machine cannot span services, locations, or virtual data centers.

2. From the Virtual Machines tab, click New Virtual Machine.
   The New Virtual Machine two-step wizard appears.

3. Click Create My Virtual Machine from Scratch.
   You are taken directly to the vApp Quick Access page in vCloud Director.

4. Click the Build New vApp icon and follow the steps to configure the vApp and its virtual machines.
   For information see Create a New vApp in the vCloud Director documentation.

   When creating a vApp using the New vApp wizard (Configure Resources step) in vCloud Director, you select a default storage policy (SSD-Accelerated, Standard, or both) for the vApp. However, this default storage policy does not impact the storage tier utilized by the new virtual machine in Virtual Private Cloud OnDemand. To allocate storage for the new virtual machine, see “Adjust Virtual Machine Resources,” on page 37 and “Add a Disk to a Virtual Machine,” on page 38.

What to do next

Manage your new virtual machine as required in Virtual Private Cloud OnDemand.

Virtual Machine Power Operations

The power options for virtual machines work with VMware Tools to control the behavior of the various power options that can be performed on a virtual machine.

The following power states are available from the virtual machines list for your virtual machines.

<table>
<thead>
<tr>
<th>Power State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power On</td>
<td>Equal to powering on a physical machine.</td>
</tr>
<tr>
<td>Power Off</td>
<td>Equal to powering off a physical machine</td>
</tr>
</tbody>
</table>
Table 3-1. Description of Power Options for Virtual Machines (Continued)

<table>
<thead>
<tr>
<th>Power State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspend</td>
<td>Resumes</td>
</tr>
<tr>
<td>Reset</td>
<td>Power cycles the virtual machine. Resetting a virtual machine clears the state of memory, cache, and so on, but the virtual machine continues to run.</td>
</tr>
</tbody>
</table>

Change the Power State of a Virtual Machine

- To power on or power off a group of virtual machines, from the virtual machines list, select the check boxes for the virtual machines you want to change and click the Power On or Power Off button.
- To change the power state for a virtual machine, select the virtual machine and right-click to display the available power options.

Edit Virtual Machine Properties

You can change the name, description, and owner of a virtual machine in Virtual Private Cloud OnDemand.

Prerequisites

You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.

Procedure

1. Select the virtual machine for which you want to edit the properties.
2. To change the name or description of the virtual machine, select Edit Name and Description from the Actions menu and type a new name and description.
   - The virtual machine name (a label in Virtual Private Cloud OnDemand) is distinct from the computer or host name, which is set in the guest operating system of the virtual machine and identifies it on a network.
3. To change the owner of the virtual machine, select Change Owner from the Actions menu and select the new owner from the list of users who can have access to the virtual machine.
   - **Note** You must be a member of an administrative role in Virtual Private Cloud OnDemand to change the ownership of a virtual machine. End users cannot change the ownership of a virtual machine.
4. Click Save.
Adjust Virtual Machine Resources

You can adjust the resources—CPU, memory, and storage—of a virtual machine in Virtual Private Cloud OnDemand.

You can hot-add resources (CPUs, memory, and storage) to a powered on virtual machine in Virtual Private Cloud OnDemand without having to re-provision the virtual machine. However, the following caveats apply:

- Depending on the guest OS of the virtual machine, you might need to reboot the instance for the change to be recognized.
- Some guest operating systems (such as Ubuntu templates) do not support hot-adding resources. When a guest OS does not support resource hot-add, the Edit Resources option is disabled for the powered on virtual machine. For these operating systems, power off the virtual machine before adjusting resources.

For information about the capacity maximums for virtual machines in Virtual Private Cloud OnDemand, see “Capacity for Virtual Private Cloud OnDemand,” on page 48.

Prerequisites

You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.

Procedure

1. Select the virtual machine for which you want to adjust resources.
2. From the Actions menu, select Edit Resources.
   
   The Edit Resources dialog appears.
3. Adjust the resources for the virtual machine. (By default, the service allocates resources to the virtual machine based on the template selected.)
   - CPU: The number of vCPUs for the virtual machine
   - Memory: The total amount of vRAM for the virtual machine

   **Note** CPU and memory resources are linked. Click the link icon ( ) to adjust the number of vCPUs and amount of memory individually.

   ![CPU and Memory Link Icon]

   When the CPU and memory settings are linked, the resource allocation predefines a ratio of vCPUs to a minimum and maximum memory range. The predefined ratio provides the best performance for the virtual machine in the Virtual Private Cloud OnDemand environment.

   - Storage: For the disk you want to modify, enter a new allocation value and select the storage tier from the drop-down menu.

   See “Overview of Storage Tiers,” on page 29 for information.
4. Click Save.
Add a Disk to a Virtual Machine

When creating a virtual machine by using the two-step New Virtual Machine wizard, by default one disk is added for the virtual machine. To add additional disks for a virtual machine, edit the virtual machines resources.

For information about the storage tier options for virtual machine disks, see “Overview of Storage Tiers,” on page 29.

For information about the capacity maximums for virtual machines in Virtual Private Cloud OnDemand, see “Capacity for Virtual Private Cloud OnDemand,” on page 48.

You can hot-add storage to a powered on virtual machine in Virtual Private Cloud OnDemand without having to re-provision the virtual machine. However, the following caveats apply:

- Depending on the guest OS of the virtual machine, you might need to reboot the instance for the added storage to be recognized.
- Some guest operating systems (such as Ubuntu templates) do not support hot-adding storage. When a guest OS does not support storage hot-add, the Edit Resources option is disabled for the powered on virtual machine. For these operating systems, power off the virtual machine before adjusting resources.

Prerequisites

- You have created the virtual machine for which you want to add a disk.
- You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.

Procedure

1. Select the virtual machine for which you want to add a disk.
2. From the Actions menu, select Edit Resources.
   The Edit Resources dialog appears.
3. Click Add another disk.
   The dialog refreshes with a row for the additional disk.
4. Specify the storage tier and size.
   
   **Note** Virtual Private Cloud OnDemand supports adding up to 8 disks (VMDKs) per virtual machine. If a virtual machine requires more than 8 disks, add disks by using vCloud Director. See Add a Virtual Machine Hard Disk in the vCloud Director User’s Guide.

   **Note** To delete a disk from the virtual machine, click the delete icon to the right of the hard disk you want to delete. Virtual Private Cloud OnDemand supports deleting only the last disk for a virtual machine. You can use vCloud Director to delete an intermediate disk for a virtual machine; however, after deleting the disk in vCloud Director, you cannot manage the disks in Virtual Private Cloud OnDemand.

5. Click Save.
Set Storage and Runtime Leases for a vApp

Leases provide a level of control over the storage and compute resources allocated to the virtual machines in your virtual data centers. You configure lease times at the vApp level.

Virtual Private Cloud OnDemand displays information about the vApp that contains each virtual machine; however, you do not select or manage vApps in Virtual Private Cloud OnDemand. You manage vApps by using vCloud Director. A vApp consists of one or more virtual machines that communicate over a network and use resources and services in a deployed environment. A vApp can contain multiple virtual machines.

By configuring a lease for a vApp, you can specify the maximum amount of time that the virtual machines contained in the vApp can run and the amount of time that Virtual Private Cloud OnDemand stores the template for that vApp.

For more information about managing leases using vCloud Director, see Understanding Leases in the vCloud Director User’s Guide.

For more information about vApps, see “vApp Overview,” on page 30.

Prerequisites

You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.

Procedure

1. From the Virtual Machines tab, click the link for the virtual machine for which you want to configure leases.

   The Settings tab for the virtual machine appears.

2. Click Manage in vCloud Director.

   vCloud Director opens in a new browser tab and the Virtual Machines tab in the My Cloud page appears.
3  From the My Cloud panel, select the vApp containing the virtual machine, right click and select Properties.

The Properties dialog box appears with the General tab displayed.

4  Select the Reset leases check box.

5  Adjust the runtime and storage leases as required and click OK.

Manage Virtual Machine Properties in vCloud Director

You can review and modify the name, description, and other properties of a virtual machine by using vCloud Director.

If you are installing VMware Tools, familiarize yourself with its features. See the following topics:

- Installing VMware Tools in the vCloud Director User's Guide
- Installing and Configuring VMware Tools in the VMware Tools Installation and Configuration Guide

Prerequisites

You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.
Procedure

1. From the Virtual Machines tab, click the link for the virtual machine that you want to manage by using vCloud Director.
   The Settings tab for the virtual machine appears.

2. Click Manage in vCloud Director.
   vCloud Director opens in a new browser tab and the vApp Quick Access page for the virtual machine appears. The virtual machine name and vApp name are displayed.

3. Click Open in the virtual machine name and vApp name area.
   The diagram, virtual machines, and networking tabs appear.

4. Click the Virtual Machines tab.

5. Right-click the virtual machine to access details and properties.
   Some of these tasks are the same tasks you can perform in Virtual Private Cloud OnDemand.
   To perform the following tasks in vCloud Director, see the following topics in the vCloud Director documentation:

<table>
<thead>
<tr>
<th>Option</th>
<th>See this topic...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Popout Console</td>
<td>Open a Virtual Machine Console</td>
</tr>
<tr>
<td>Suspend</td>
<td>Suspend a Virtual Machine</td>
</tr>
<tr>
<td>Power Off</td>
<td>Power Off a Virtual Machine</td>
</tr>
<tr>
<td>Power On</td>
<td>Power On a Virtual Machine</td>
</tr>
<tr>
<td>Reset</td>
<td>Reset a vApp or Virtual Machine</td>
</tr>
<tr>
<td>Insert CD/DVD from Catalog</td>
<td>Insert a CD/DVD</td>
</tr>
<tr>
<td>Eject CD/DVD</td>
<td>Eject a CD/DVD</td>
</tr>
<tr>
<td>Insert Floppy from Catalog</td>
<td>Insert a Floppy</td>
</tr>
<tr>
<td>Eject Floppy</td>
<td>Eject a Floppy</td>
</tr>
<tr>
<td>Install VMware Tools</td>
<td>Installing VMware Tools</td>
</tr>
<tr>
<td>Create Snapshot</td>
<td>Create a Snapshot of a Virtual Machine</td>
</tr>
<tr>
<td>Properties</td>
<td>Editing Virtual Machine Properties</td>
</tr>
</tbody>
</table>

What to do next

In vCloud Director, review other details about the virtual machine. See Working with Virtual Machines in the vCloud Director User’s Guide.

Connect a Virtual Machine to a Network

You can connect virtual machines to isolated networks or routed networks in your virtual data center. To get connectivity to the Internet and to use networking services such as NAT, firewall, or load balancing, connect virtual machines to a routed network.

When you connect a virtual machine to a network, it is assigned an IP address from the network’s predefined private IP address range.

Prerequisites

You have the required permission to manage the virtual machine. Administrators can connect all virtual machines in their Virtual Private Cloud OnDemand environment to networks; while an end user can connect only the virtual machines that the user owns to networks. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.
Procedure

1. Select the virtual machine to be connected to a network.
2. If the virtual machine is powered on, select it and click **Power Off**.
3. From the virtual machines list, click the virtual machine name.
4. Click the **Networks** tab.
5. Click **Add a Network**.
6. Select a network from the list of networks.

**Note** You can select more than one network to which to connect the virtual machine.

7. When selecting more than one network for the virtual machine, specify the virtual machine's primary network by clicking the **Primary NIC** option for that network. By default, the primary network is set to the first network you selected for the virtual machine.

8. Click **Save**.

Change Network Assignments for a Virtual Machine

You can change the network assignment of a virtual machine or connect it to more networks.

**Prerequisites**

You have the required permission to manage the virtual machine. Administrators can change network assignments of all virtual machines in their Virtual Private Cloud OnDemand environment; while an end user can change network assignments of only the virtual machines that the user owns. The owner of the virtual machine is the user who created the virtual machine or who was transferred ownership of the virtual machine.

**Procedure**

1. Select the virtual machine for which you want to change the network assignment.
2. If the virtual machine is powered on, select it and click **Power Off**.
3. Click the virtual machine name.
4. Click the **Networks** tab.
5. Click **Edit Network Assignment**.

The Edit Networks dialog appears.

6. Set the new network assignments:
   - Select a new network for the virtual machine.
   - Deselect a network to disconnect the virtual machine from it.

7. When selecting more than one network for the virtual machine, specify the virtual machine's primary network by clicking the **Primary NIC** option for that network. By default, the primary network is set to the first network you selected for the virtual machine.

8. Click **Save**.
Connect a Virtual Machine to the Internet

You can connect virtual machines to routed networks in your virtual data center so that the virtual machines have access to the Internet.

When you connect a virtual machine to a network, it is assigned an IP address from the network’s predefined private IP address range.

**IMPORTANT** By default, gateways are deployed with firewall rules configured to deny all network traffic to and from the virtual machines on the routed networks. Also, NAT is disabled by default so that gateways are unable to translate the IP addresses of the incoming and outgoing traffic. You must configure both firewall and NAT rules on a gateway for the virtual machines on a routed network to be accessible. Attempting to ping a virtual machine on a network after configuring a NAT rule will fail without adding a firewall rule to allow the corresponding traffic.

**Prerequisites**
Verify that you have network administrator privileges.

**Procedure**
1. Select the virtual machine for which you want Internet access.
2. If the virtual machine is powered on, select it and click **Power Off**.
3. Click the virtual machine name.
4. Click the **Networks** tab.
5. If the virtual machine is not connected to a network, click **Add a Network**. Otherwise, click **Edit Network Assignments**.
6. Select a routed network from the list of networks.
7. When selecting more than one network for the virtual machine, specify the virtual machine’s primary network by clicking the **Primary NIC** option for that network. By default, the primary network is set to the first network you selected for the virtual machine.
8. Click **Save**.
9. Create a NAT rule to translate the external network address and isolated network address of the virtual machine so that it can receive network traffic from the Internet.
   
   See “Add a NAT Rule” in the *vCloud Air – Virtual Private Cloud OnDemand Networking Guide* for the steps to create a NAT rule for the virtual machine.
10. Create a firewall rule to allow the gateway to send and receive Internet traffic for the virtual machine.
   
   See “Add a Firewall Rule” in the *vCloud Air – Virtual Private Cloud OnDemand Networking Guide* for the steps to create a firewall rule allowing Internet access for the virtual machine.

Log Into a Virtual Machine Guest OS with the Console

Logging in to a virtual machine by using the virtual machine remote console (VMRC) allows you to view information about a virtual machine and perform activities such as configuring operating system settings or running applications.

Even when you do not have Internet connectivity to the virtual machine, you can access the virtual machine through the VMRC Console.
Virtual Machine Console Support for Mac Operating Systems:

- Console support is based on WebMKS technology and HTML5.
- On a Mac OS, the Console is supported for Firefox and Chrome Web browsers.

**Prerequisites**

- If you are a member of the End User role, you are the virtual machine owner or you are a virtual infrastructure administrator.
- You are using a 32-bit browser that meets the vCloud Director browser requirements to display the VMRC Console. See Browsers That vCloud Director Supports for information.
- You have set a guest OS password (displayed in the virtual machines Settings tab) for the virtual machine. See Reset Your Virtual Machine’s Password in the vCloud Director User’s Guide for information.

**Note**

- If you reset the guest OS password by using the guest operating system (rather than vCloud Director), the guest OS password and the password displayed on the virtual machine Settings tab can become out of sync. VMware recommends you set the guest OS password by using vCloud Director.

- Firewall rules restricting network traffic allow outbound traffic on port 443 for VMRC connections.

**Procedure**

1. Select the virtual machine for which you want to access the VMRC console.
3. From the Actions menu, select Open in Console.
   
   If this is the first time you are accessing the Console, you are prompted to download and install the VMware Remote Console Plug-In. Click OK in the dialog that appears and follow the instructions to install the plug-in.
4. When prompted, log into the virtual machine with the Guest OS password. (On Unix systems, log in as root.)
   
   If you close or refresh a virtual machine console while you have one or more client devices connected, those devices are disconnected.

**Virtual Machine Monitoring**

Monitoring provides resource and performance visibility so that you can make sure your virtual machines support your applications. When there are issues with application performance, you have extra visibility to increase or decrease virtual machine resources to optimize performance.

You need to know whether a virtual machine is suffering from resource crunch (high utilization), storage resource crunch, or other potential issues. Virtual Private Cloud OnDemand retains virtual machine CPU and memory usage and disk capacity and performance data for the previous 14 days.

Displaying virtual machine details and statistics meets several goals:

- Reports usage trends
- Analyses trends for discrete time periods
- Monitors performance
- Provides troubleshooting

To view monitoring information for a virtual machine, click the virtual machine name in the list on the **Virtual Machines** tab; then, select the **Monitoring** tab.

Click the refresh icon to make sure that the most recent data is displayed. View the past 24 hours, 7 days, or 14 days’ usage. The left-hand Y axis for percentage data is fixed between 0-100%, while the right-hand Y axis for raw usage scales with the historical usage data of the individual virtual machine.

**Table 3-2. Monitoring Graphs**

<table>
<thead>
<tr>
<th>Graph</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Usage</td>
<td>View by percentage or by raw data as MHz units by clicking the controls. The displays toggle on and off.</td>
</tr>
<tr>
<td>Memory Usage</td>
<td>View by percentage or by raw data as GB units.</td>
</tr>
</tbody>
</table>

Additionally, you can obtain virtual machine monitoring data programmatically by using the vCloud API. See **About Virtual Machine Metrics** in the **vCloud API Programming Guide for vCloud Air Tenants Guide**.

**Work with Virtual Machine Snapshots**

In Virtual Private Cloud OnDemand, a snapshot captures a reproduction of a virtual machine, including the state of the data on all of the virtual machine’s disks and whether the virtual machine is powered on, powered off, or suspended.

You can take a snapshot when a virtual machine is powered on, powered off, or suspended. When you revert a virtual machine to a snapshot, the virtual machine is reverted to the state it was in when the snapshot was created.

Snapshots are useful when you must revert repeatedly to the same virtual machine state, but you do not want to create multiple virtual machines. VMware recommends that you do not use snapshots as your only backup solution or as a long-term backup solution.

Snapshots have the following limitations:

- They do not capture NIC configurations.
- They cannot be created if any virtual machine in the vApp is connected to an independent disk.

**Prerequisites**

You have the required permission to manage the virtual machine. If you are a member of the End User role, you are the virtual machine owner or you are a Virtual Infrastructure Administrator.
Procedure

1. Select the virtual machine for which you want to manage snapshots.

2. To create a snapshot, select Create Snapshot from the Actions menu.

3. To revert a virtual machine to a snapshot, select Revert Snapshot (enabled when a snapshot exists for the virtual machine) from the Actions menu.
   
   A dialog appears prompting you to confirm that you want to revert the virtual machine to the snapshot. Click OK.

4. To delete a snapshot, select Delete Snapshot (enabled when a snapshot exists for the virtual machine) from the Actions menu.

   A dialog appears prompting you to confirm that you want to delete the snapshot. Click OK.
Though not required to get started right away and create your first virtual machine, Virtual Private Cloud OnDemand provides features to manage your public cloud environment, such as the ability to create additional virtual data centers, configure additional networks and gateways, create and manage central templates and catalogs, and set up role-based user access accounts.

To get started right away and create your first virtual machine, see “Create a Virtual Machine from a Template,” on page 33.

To understand and customize your public cloud environment for Virtual Private Cloud OnDemand, see the following topics.

This chapter includes the following topics:

- “Capacity for Virtual Private Cloud OnDemand,” on page 48
- “Geographical Locations,” on page 49
- “About Gateways and Networks,” on page 49
- “Virtual Data Center Overview,” on page 49
- “Create a Virtual Data Center,” on page 51
- “Edit or Delete a Virtual Data Center,” on page 52
- “Virtual Data Center Permissions,” on page 52
- “Catalogs and Templates Overview,” on page 54
- “Manage Catalogs in vCloud Director,” on page 54
- “Role-based User Account Management,” on page 55
- “Add a User to Your Service,” on page 56
- “Edit User Details,” on page 57
- “Delete a User from Your Service,” on page 57
- “Reset a User’s Password,” on page 58
- “Managing User Groups,” on page 58
Capacity for Virtual Private Cloud OnDemand

Capacity is the amount of pooled resources available for allocation to your virtual machines in your Virtual Private Cloud OnDemand environment. You do not allocate resources to your virtual data centers. However, each virtual data center is implemented with initial capacity limitations. Adding multiple virtual data centers expands your capacity limits exponentially.

Capacity Limits for Your Account

When you create a virtual data center in Virtual Private Cloud OnDemand, it is created in your environment based on the virtual data center template vdc-template, which allows for the following capacity:

Table 4-1. Limits for Virtual Private Cloud OnDemand

<table>
<thead>
<tr>
<th>Resource</th>
<th>Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VIRTUAL DATA CENTERS</strong></td>
<td></td>
</tr>
<tr>
<td>Virtual Data Centers/Customer</td>
<td>4 Virtual Data Centers</td>
</tr>
<tr>
<td>vCPUs/Virtual Data Center</td>
<td>20 vCPUs (130GHz / 2.6GHz per vCPU)</td>
</tr>
<tr>
<td>vCPU Speed/Virtual Data Center</td>
<td>130GHz</td>
</tr>
<tr>
<td>Memory/Virtual Data Center</td>
<td>40GB</td>
</tr>
<tr>
<td>Storage/Virtual Data Center</td>
<td>4TB Standard Storage</td>
</tr>
<tr>
<td><strong>VIRTUAL MACHINES</strong></td>
<td></td>
</tr>
<tr>
<td>vCPU/Virtual Machine</td>
<td>20</td>
</tr>
<tr>
<td>Memory/Virtual Machine</td>
<td>40GB vRAM</td>
</tr>
<tr>
<td>Storage/Disk</td>
<td>4TB Standard Storage</td>
</tr>
<tr>
<td>Disks/Virtual Machine</td>
<td>16 (however, Virtual Private Cloud OnDemand supports adding 8 disks/virtual machine—use vCloud Director to add more than 8 disks to a virtual machine)</td>
</tr>
<tr>
<td>Powered on Virtual Machines/Virtual Data Center</td>
<td>20</td>
</tr>
<tr>
<td>Total Virtual Machines/Virtual Data Center</td>
<td>20 Powered On + Powered Off Virtual Machines = 4TB (Storage/Virtual Data Center)</td>
</tr>
<tr>
<td><strong>GATEWAYS AND NETWORKS</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum gateways/Virtual Data Center</td>
<td>1</td>
</tr>
<tr>
<td>Routed Networks/Gateway</td>
<td>9</td>
</tr>
<tr>
<td>Isolated Networks/Gateway</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Networks/Virtual Data Center</td>
<td>20</td>
</tr>
<tr>
<td>Virtual NICs/Virtual Data Center</td>
<td>100</td>
</tr>
<tr>
<td>Network Objects/Virtual Data Center</td>
<td>100</td>
</tr>
<tr>
<td>Public IP Addresses/Virtual Data Center</td>
<td>5</td>
</tr>
<tr>
<td>Public IP Addresses/Customer</td>
<td>20</td>
</tr>
</tbody>
</table>
Geographical Locations

Today, hybrid cloud computing has grown to encompass stretching resources from a private cloud to multi-public clouds to run workloads in different public clouds to take advantage of geography, time zone, or for legal reasons.

The availability of different geographical locations enables running your workloads closer to your business-specific customers or allowing you to comply with various regulations and other legal requirements. Multiple locations can also enable redundancy of your data or workloads.

When you become a customer of Virtual Private Cloud OnDemand, you have the ability to deploy virtual machines to different geographical locations. (See Data Center Locations for the locations where VMware supports Virtual Private Cloud OnDemand.)

When you log into Virtual Private Cloud OnDemand the first time, you are prompted to specify the location where you want to deploy your first virtual machine. As you grow your public cloud environment, you can select the location where you want to add each new virtual machine or create new virtual data centers.

Selecting a location from the drop-down menu refreshes the Virtual Private Cloud OnDemand page and returns you to the Virtual Machines tab, where you can view your virtual machines deployed for that location.

Each location contains a separate resource pool; meaning you cannot treat two geographic locations as one logical pool of resources.

About Gateways and Networks

Networking in Virtual Private Cloud OnDemand replicates traditional network technologies and design. Networking in Virtual Private Cloud OnDemand is based on the software-defined networking (SDN) technologies used by VMware products, including VMware vSphere, VXLAN, vCloud Networking and Security, and vCloud Director.

For information about configuring networking and gateways for Virtual Private Cloud OnDemand, see the vCloud Air – Virtual Private Cloud OnDemand Networking Guide.

Virtual Data Center Overview

Virtual data centers provide an environment where virtual machines can be stored, deployed, and operated. Selecting a Virtual Private Cloud OnDemand service for the first time provisions your first virtual data center (with 2.6vGHz vCPUs), a gateway, and routed network automatically. Virtual Infrastructure Administrators can create additional virtual data centers in Virtual Private Cloud OnDemand.

Expand the Virtual Data Centers pane to view and manage the virtual data centers in your environment.
The Virtual Data Centers pane displays the status of each virtual data center deployed for the selected location:

- **Ready and usable:** the virtual data center was created successfully; it is available for use, such as creating and managing virtual machines.
- **Busy and usable:** an operation is running for the virtual data center; for example, it is being renamed. However, users can still access it to perform tasks, such as creating and managing virtual machines.
- **Busy and unusable:** the virtual data center is busy completing an operation and cannot be used until that operation finishes; for example, it is being created or deleted.
- **Unavailable:** an error has occurred affecting the virtual data center and it cannot be used.

For assistance with an unavailable virtual data center, file a support request. See Account Support in vCloud Air – Virtual Private Cloud OnDemand Getting Started for information.

### Why Create Additional Virtual Data Centers?

Because a virtual data center creates artificial limits on operational abilities, customers question why they should create multiple virtual data centers in Virtual Private Cloud OnDemand.

Virtual data centers function as logical containers for resources that you want to create limits around or group together. Virtual Private Cloud OnDemand is designed to allow for flexible and scalable capacity for your public cloud. You scale capacity by deploying additional virtual machines or by increasing resources for existing virtual machines. You do not allocate set resources to your virtual data centers. However, each virtual data center is implemented with capacity limitations. Adding multiple virtual data centers expands your capacity limits exponentially. See “Capacity for Virtual Private Cloud OnDemand,” on page 48 for information.

Using multiple virtual data centers allows you to organize resources into more manageable chunks, making them easier to find and manage. You can implement monitoring at the virtual data center level with associated alarms; set events to trigger different responses depending on their location within your virtual data center structure.

Creating a virtual data center creates a gateway automatically, through which you can configure security boundaries. Using virtual data centers, you can define where your network and storage boundaries are (and by association, host boundaries as well).
Adding virtual data centers provides the ability to group virtual machines into customer-defined network segments. Virtual Private Cloud OnDemand leverages the organization network scheme from vCloud Director for L2 network segmentation and network extension. The organization networks use VxLANs as network resource pools. You can create multiple organization networks per virtual data center to segment workloads as needed. See Network Virtualization in Virtual Private Cloud OnDemand in the vCloud Air – Virtual Private Cloud OnDemand Networking Guide.

You can create virtual data centers to group virtual machines so that they can work together; for example, by setting up virtual machine load balancing using the gateway services within the virtual data center. See Load Balancer in the vCloud Air – Virtual Private Cloud OnDemand Networking Guide.

In sum, having multiple virtual data centers allows you to achieve the following goals:

- Group your resources into one or more virtual data centers depending upon your requirements; for example, you can create one virtual data center for your entire company or you can create different virtual data centers for different departments, project teams, or geographic sites.
- Isolate particular applications or groups of applications; for example, you can isolate your production applications from development and testing.
- Monitor resource usage at the virtual data center level and add more resources if necessary.

Create a Virtual Data Center

When you create a virtual data center, it has access to compute, storage, and network resources.

Prerequisites

Verify that you have Virtual Infrastructure Administrator privileges in the service where you will create the virtual data center.

Procedure

1. From the drop-down menu above the tabs, select the location in which you want to create the virtual data center.
   The page refreshes and displays the Virtual Machines tab for that region.

2. If necessary, click the expand icon ( ) to display the Virtual Data Centers pane.

3. At the top of the Virtual Data Centers pane, click the add icon ( ) .
   The New Virtual Data Center dialog appears.

4. Type a unique name for the virtual data center (by default, Virtual Private Cloud OnDemand generates a name for the virtual data center).

   In the Details field, Virtual Private Cloud OnDemand displays the name of the resource template that is used to create the virtual data center. The virtual data center template vdc-template provides the following capacity:

   - 50 virtual machines powered on
   - The total number of virtual machines you can deploy in a virtual data center (50 powered on virtual machines plus powered off virtual machines) is determined by the available storage in the virtual data center. See “Capacity for Virtual Private Cloud OnDemand,” on page 48 for information.
   - 130GHz CPU
   - 100GB vRAM
   - 2TB Storage
5 Click Create Virtual Data Center.

The page refreshes and a notification message appears indicating Virtual Private Cloud OnDemand is creating a gateway for the virtual data center. Then, a notification message appears that Virtual Private Cloud OnDemand is creating the virtual data center. When successfully created, the virtual data center appears in the Virtual Data Centers pane.

**Edit or Delete a Virtual Data Center**

You can change the name of a virtual data center and delete it. When you delete a virtual data center, all of its virtual machines and the snapshots associated with them are deleted.

**Prerequisites**

Verify that you have Virtual Infrastructure Administrator privileges in Virtual Private Cloud OnDemand.

**Procedure**

1. From the drop-down menu above the tabs, select the location where you want to edit or delete the virtual data center.

   The page refreshes and displays the Virtual Machines tab for that location.

2. If necessary, click the expand icon ( ) to display the Virtual Data Centers pane.

3. Select the virtual data center you want to edit or delete and right-click.

   The virtual data center menu appears.

4. To edit the virtual data center, select **Edit Name**, type a unique name in the dialog that appears and click **Save**.

5. To delete the virtual data center, select **Delete**.

   A confirmation message appears verifying that you want to delete the virtual data center. Click **Yes**.

**Virtual Data Center Permissions**

Setting virtual data center permissions is useful when you want to restrict access to a virtual data center. Every user does not need to have access to each virtual data center that is created. For example, if a virtual data center has only production virtual machines, you want only a specific set of users (custom permission) to have access to this virtual data center. Or if you create a virtual data center and add a few virtual machines for a Proof of Concept (PoC), in which case, you do not want any other user except yourself (only me permission) to access that virtual data center.

After creating a virtual data center, Virtual Private Cloud OnDemand Account Administrators can enable or disable a specific set of users from accessing the environment via the UI or programmatically via the API.

In the UI, right-click on the virtual data center name and select **Edit** to choose one of the following permissions:

<table>
<thead>
<tr>
<th>Permission</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>All users</td>
<td>All users can fully access the environment. This is the default permission setting.</td>
</tr>
<tr>
<td>Only me</td>
<td>Only the account administrator can access the environment.</td>
</tr>
<tr>
<td>Custom</td>
<td>A specific set of users can access the environment. Selecting this option opens a new window from where a specific group of users can be selected to access the environment.</td>
</tr>
</tbody>
</table>

**Note** If a user is added to a virtual data center, then another user will not get access to it unless an Account Administrator adds the second user to that virtual data center.
Figure 4-1. Selecting Virtual Data Center Permissions

Figure 4-2. Setting Custom Permission

Customize permissions for the new virtual data center.
Note: All users have access to all the virtual data centers by default.

<table>
<thead>
<tr>
<th>Name</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ananth V</td>
<td>Account Admin</td>
</tr>
<tr>
<td>Al Zhu</td>
<td>Virtual Infra</td>
</tr>
<tr>
<td>Alexander Kolev</td>
<td>Account Admin</td>
</tr>
<tr>
<td>C P</td>
<td>Read-Only Adm</td>
</tr>
<tr>
<td>Chris</td>
<td>End User</td>
</tr>
</tbody>
</table>

Contact VMware Support if you require additional capacity
Catalogs and Templates Overview

Virtual Private Cloud OnDemand includes a catalog that is populated with CentOS, Linux, and Windows templates that you can use to create virtual machines. Your organization also has its own catalog, My Catalog, that can contain your own customized templates and media.

A VMware template (also called a golden image) is a model copy of a virtual machine from which you can clone or deploy more virtual machines. Templates save time and avoid errors when configuring settings and other choices to create new Windows or Unix-based server virtual machines. They can also be used as long-term in-place backups of virtual machines, and to ensure consistent virtual machines are created and deployed across a company. A VMware template cannot be operated without reverting it to a virtual machine.

A template contains the following content:

- A specified OS and a configuration that provides virtual counterparts to hardware components
- Optionally, an installed guest OS and a set of applications
- A virtual machine's virtual disks and settings from its .vmx configuration file, managed with permissions

In Virtual Private Cloud OnDemand, end users select from catalogs to add new virtual machines. See “Create a Virtual Machine from a Template,” on page 33.

In vCloud Director, administrators manage your private catalogs. See “Manage Catalogs in vCloud Director,” on page 54 for information.

Manage Catalogs in vCloud Director

VMware provides a public catalog that you can use to create virtual machines. Your organization also has its own catalog, My Catalog, that can contain your own customized templates and media. You use vCloud Director to manage the templates in your private My Catalog.

See “Catalogs and Templates Overview,” on page 54 for information.

Prerequisites

You are a Virtual Infrastructure Administrator.

Procedure

1. If necessary, click the expand icon ( ) to display the Virtual Data Centers pane.
2. Select any virtual data center in the pane and right-click.
3. From the pop-up menu, select Manage Catalogs in vCloud Director.
   
   You are automatically logged into vCloud Director and the My Catalog page appears.
4. Complete any of the following tasks in vCloud Director to manage your private catalog:
   - Add a new catalog and share a catalog
   - Add a vApp template to My Cloud
   - Upload an OVF package as a vApp template
   - Save a vApp as a vApp template
   - Copy a vApp template from a public catalog to an your private catalog
   - Upload media files and copy media files to a catalog
Role-based User Account Management

Administrators add new users in Virtual Private Cloud OnDemand and assign one or more roles to them. User roles have a default group of privileges.

A user in Virtual Private Cloud OnDemand can either have administrator privileges or end user privileges, but not both. The roles are mutually exclusive with the exception of the Network Administrator and Virtual Infrastructure Administrator roles; meaning, you can assign a user to the Network Administrator and Virtual Infrastructure Administrator roles, or the Account Administrator, Read-Only Administrator, or End User role.

Specialized Administrative Roles

Specialized administrator roles allow you to assign one or multiple individuals to perform these tasks.

<table>
<thead>
<tr>
<th>Administrative Role</th>
<th>Description and Privileges</th>
<th>Cannot Do</th>
<th>Ideal For</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Administrators</td>
<td>Account Administrators can perform all actions in Virtual Private Cloud OnDemand, including manage users, virtual data centers, networking resources, and access My VMware to manage the Virtual Private Cloud OnDemand account.</td>
<td>—</td>
<td>Managing all aspects of your Virtual Private Cloud OnDemand environment and account management, including logging into My VMware to manage your VMware account and view Virtual Private Cloud OnDemand billing statements.</td>
</tr>
<tr>
<td>Virtual Infrastructure Administrators</td>
<td>Virtual Infrastructure Administrators can add and modify virtual data centers in Virtual Private Cloud OnDemand. Virtual Infrastructure Administrators can manage virtual machines. They can also view gateways, networks, and users.</td>
<td>Manage users, networks, or gateways.</td>
<td>Manage the environment, including virtual machines across users, add vApps and media to your company’s catalog, and create virtual data centers.</td>
</tr>
<tr>
<td>Network Administrators</td>
<td>Network Administrators can manage networks and gateways. Network Administrators can also view virtual data centers, virtual machines, and users.</td>
<td>Manage users, virtual data centers, or add vApps and media to your company’s catalog.</td>
<td>Network administration.</td>
</tr>
<tr>
<td>Read-only Administrators</td>
<td>Read-only Administrators can view but not alter settings in administration areas. Read-only Administrators can view virtual data centers, virtual machines, gateways, networks, and users.</td>
<td>Add or edit virtual data centers, networks, gateways, users, or vApps and media in your company’s catalog.</td>
<td>All personnel with purchasing and support responsibilities.</td>
</tr>
</tbody>
</table>

End User Role

End users create and manage virtual machines within virtual data centers. As a member of the End User role, you can perform the following tasks:

- Add virtual machines based on a template from the VMware Public Catalog and from My Catalog, your organization’s custom templates.
- Create a virtual machine in Virtual Private Cloud OnDemand and vCloud Director.
- Power on, power off, reset, and suspend virtual machines in a virtual data center.
Use snapshots of virtual machines.
Delete virtual machines from a virtual data center.

**Note** End users can create virtual machines but they cannot configure network security policies to grant Internet access to the virtual machines they create. End users must contact their Network Administrator to set up firewall rules and NAT to allow external (Internet) access to their virtual machines. End Users can use the VMRC console to manage their virtual machines that do not have Internet access. “Log Into a Virtual Machine Guest OS with the Console,” on page 43.

For more information about end user access to Virtual Private Cloud OnDemand, see “End User Virtual Machine Access,” on page 30. See also “Environment Setup and Catalog Access,” on page 20 for an overview of administrator access and tasks in Virtual Private Cloud OnDemand.

**User Access and Roles for vCloud Director**

Virtual Private Cloud OnDemand provides single sign-on access to the vCloud Director portal. In vCloud Director, administrators can perform advanced management of virtual data centers, and end users can perform advanced management of virtual machines.

For a detailed mapping of the roles in Virtual Private Cloud OnDemand (and other vCloud Air offerings from VMware) to the roles in vCloud Director, see Understanding user roles within VMware vCloud Air (2053484).

**User Roles for My VMware**

In My VMware, your Virtual Private Cloud OnDemand account is managed by three roles:

- **Super User**
- **Procurement Contact**
- **Administrators with Subscription Services permissions**

See Understanding user permissions in My VMware (2006977) and Roles in My VMware (2016898) for information.

As an Account Administrator, you can access My VMware from Virtual Private Cloud OnDemand without needing to log into My VMware. From the **Tools** menu, select **Billing and Payments**. My VMware opens in a new browser tab and displays your account information. See the My VMware Help (?) for information.

**Add a User to Your Service**

You can add users and assign privileges to them in Virtual Private Cloud OnDemand.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1. From the **Tools** menu, select **Users**.
   The Users page appears.
2. Click **Add User**.
   The Add User dialog appears.
3. Type a first and last name.
4. Type and confirm the user's email address.
   Virtual Private Cloud OnDemand uses the email address as the user name.
5. Under Overall Access Control, assign roles for the user.
   See “Role-based User Account Management,” on page 55 for information.

   The user you added receives an invitation email about accessing the service and can create a password. Users can contact their Account Administrator if the invitation expires or if they forget their password and need to reset it.

**Edit User Details**

You can change a user’s name, enable or disable the user, or change the user’s role assignments.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1. From the **Tools** menu, select **Users**.
   
   The Users page appears.

2. Click the check box of the user you want to modify.

   **NOTE** You can change the status for a group of users by using the **Select** menu and choosing **All**, **Disabled** (inactive users), or **Enabled** (active users).

3. Edit the user details.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Type a new first or last name.</td>
</tr>
<tr>
<td>Status</td>
<td>Change the status to enabled or disabled.</td>
</tr>
<tr>
<td>Roles</td>
<td>Assign new roles.</td>
</tr>
</tbody>
</table>

   **NOTE** You cannot edit a user’s email address. To change the email address, delete the user, then add the user with the new email address.

4. Click **Save**.

**Delete a User from Your Service**

You can delete users from Virtual Private Cloud OnDemand to revoke their access to the service. In this way, you can recover any resources that were assigned to this user.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1. From the **Tools** menu, select **Users**.
   
   The Users page appears.

2. Click the check box of the user you want to delete.

   **NOTE** You can select all users, all inactive users (disabled), or all active users (enabled) by using the **Select** menu.
3 From the **More** menu, select **Delete** and confirm the deletion.

If you delete users who are signed in at the time, their sessions will be forcibly terminated and they will be signed out.

The user is deleted and does not appear in the user list. The user’s resources are moved to the administrator who deleted the user.

**Reset a User's Password**

Account Administrators can reset a user’s password. After you reset the password, the user receives a notification and must enter a new password.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1 From the **Tools** menu, select **Users**.

   The Users page appears.

2 Click the check box of the user who needs a password reset.

3 Click **Reset User Password** and confirm that you want to reset the password.

   A notice appears indicating that Virtual Private Cloud OnDemand sent the user an email about the password.

4 To reset your own password, from the **Tools** menu, select **Account Settings**.

   The User Details page appears.

5 Click **Change Password**.

   The Change Password dialog appears.

6 Enter your current password, a new password and confirm the new password.

7 Click **Change**.

   A message is displayed indicating that your password is updated.

When you change another user's password, the existing password is deleted and the user receives an email with a link to create a new password.

**Managing User Groups**

Administrators can add user groups in Virtual Private Cloud OnDemand and assign a role to them.

Administrators create and manage groups, manage membership and add users to the groups. The group-based access control simplifies management of user privileges and eliminates the need to assign roles and permissions on a per-user basis.

Creating local user groups within the service does not require any additional configuration and can be done easily through the UI. A user can belong to multiple groups. A user can have more than one role if they belong to one or more groups because they would have a role assigned directly to them and they would also inherit roles assigned to their groups. If a user has more than one role through a group membership, the user’s access level is the superset of all the roles.
Add a Group

You can add user groups and assign privileges to the group in Virtual Private Cloud OnDemand.

Prerequisites

Verify that you are a member of the Account Administrator role.

Procedure

1. From the Tools menu, select Users.
   The Users page appears.
2. Click the User Groups tab.
   The User Groups page appears.
3. Click Add Group.
   The Add Group dialog appears.
4. Type a Name for the user group.
5. Type a Description.
   Adding a description for the group will help you identify the type of the group.
6. Under Role Assignment, assign a role for the users belonging to the group.
   See “Role-based User Account Management,” on page 55 for information.
7. Click Add Group.
   The user group is created and you can add users to the group.

Edit Group Details

You can change a user group's name, description, or change the role assignments of users belonging to the group.

Prerequisites

Verify that you are a member of the Account Administrator role.

Procedure

1. From the Tools menu, select Users.
   The Users page appears.
2. Click the User Groups tab.
   The User Groups page appears.
3. Click the check box of the user group you want to modify and then click Edit Group.
4. Or you can right-click on the user group row and click Edit from the dropdown menu.
   The Edit Group dialog appears.
Modify the user group.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Type a new group name.</td>
</tr>
<tr>
<td>Description</td>
<td>Change the group description.</td>
</tr>
<tr>
<td>Role Assignment</td>
<td>Assign a new role to users belonging to the group.</td>
</tr>
</tbody>
</table>

Click **Save Group**.

The user group’s details are updated.

**Edit Group Membership**

You can add or remove users from a user group that you have created.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1. From the **Tools** menu, select **Users**.
   
   The Users page appears.
2. Click the **User Groups** tab.
   
   The User Groups page appears.
3. Click the check box of the User Group you want to edit the membership and then click **Edit Membership**.
4. Or you can right-click on the user group row and click **Edit Membership** from the dropdown menu.
   
   The Edit Membership dialog appears. The dialog displays all the users and you can select which users to add to the group.
5. To view the users who currently belong to the user group, click the **Only Show Members** check box.
   
   The list will show users who belong to the user group.
6. You can enter a user’s name or email in the **Search** field.
   
   The list will show users with matching names and/or email.
7. You can select all the users by clicking the First Name check box.
8. After you have selected the users, click **Save**.

The selected the users are added to the user group.

**Delete a Group**

You can delete user groups from Virtual Private Cloud OnDemand to revoke their access to the service.

**Prerequisites**

Verify that you are a member of the Account Administrator role.

**Procedure**

1. From the **Tools** menu, select **Users**.
   
   The Users page appears.
2 Click the **User Groups** tab.

   The User Groups page appears.

3 Click the check box of the User Group you want to delete.
   
   **Note** You can select all user groups by using the **Select** menu or by clicking the **Name** check box.

4 Click **Delete Group** and confirm the deletion.

   When you delete a user group, the users who belong to this group will no longer have user group’s permissions assigned to them. However, they will still retain the permissions they were assigned directly (as a user).

   The user group is deleted and does not appear in the user groups list.
Metering Resource Usage

With Virtual Private Cloud OnDemand, customers pay nothing up front. They pay for only the services they actually used, on a metered, charge-back basis, under flexible service agreements, as opposed to fixed-term contracts.

The pay-as-you-go model enables paying for only the capacity in use, eliminating capital equipment expenses, over-purchasing, and underutilization. Customers incur charges only when they start to utilize Virtual Private Cloud OnDemand and deploy virtual machines into their environments. If a customer does not use a resource, the customer does not incur costs.

This chapter includes the following topics:

- “Resource Usage Overview,” on page 63
- “Ways To View Resource Usage,” on page 65
- “View Resource Usage,” on page 66
- “About Resource Billing,” on page 67
- “About Service Credits,” on page 68
- “About Billing Alerts,” on page 68

Resource Usage Overview

Virtual Private Cloud OnDemand offers resource pool-based pay-as-you-go service (versus a virtual machine instance-based service). Specifically, you have flexibility to define virtual machine deployment without being required to use pre-defined billable package sizes. You can create virtual machines of arbitrary sizes and expand them as needed.

Figure 5-1. Flexible Virtual Machine Resource Deployment
Your ability to define resource allocation to your virtual machines combined with the metering approach VMware employs means you are charged only for the resources you consume.

Data Collection Explained

To calculate resource usage and generate your billing statements, Virtual Private Cloud OnDemand monitors your environment for changes to your virtual machines; such as, creating or deleting a virtual machine, changing a virtual machine’s power state (powering on or off, suspending, or resuming), or adjusting resources allocated to a virtual machine. Additionally, Virtual Private Cloud OnDemand monitors your gateways to determine when you allocate or de-allocate public IP addresses to them.

Virtual Private Cloud OnDemand aggregates the data from environment changes and displays summary information in the Resource Usage tab based on the time range you select. See “Ways To View Resource Usage,” on page 65 for information.

Every hour, Virtual Private Cloud OnDemand sends metering data to My VMware so that VMware can apply this resource usage to your account for billing. See the My VMware Help for information.

VMware meters usage of the following resources for your Virtual Private Cloud OnDemand account:

<table>
<thead>
<tr>
<th>Table 5-1. Virtual Private Cloud OnDemand Metered Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resource</strong></td>
</tr>
<tr>
<td>vCPU</td>
</tr>
<tr>
<td>vRAM</td>
</tr>
<tr>
<td>Storage</td>
</tr>
<tr>
<td>OS and application licenses</td>
</tr>
<tr>
<td>Public IP addresses</td>
</tr>
</tbody>
</table>

Third-Party OS and Application Licenses

You can create virtual machines based on the third-party operating system and application templates in the VMware Public Catalog. See “Catalogs and Templates Overview,” on page 54 for information.

As indicated in the VMware Public Catalog, some templates are paid templates. These paid templates correspond to license SKUs in My VMware. See the My VMware Help for information.

Virtual Private Cloud OnDemand meters license usage hourly and charges accrue when the virtual machines running the licensed software are powered on. To calculate your billing statement, VMware applies the following metrics to determine charges for licensed software:

- Charges per hour
- Time: minutes the virtual machine is powered on
- vCPU Support Rating: a usage multiplier for third-party licensed templates to calculate license charges for your billing statement
  
  When you configure a virtual machine to run more or less vCPUs than specified by the vCPU Support Rating, VMware applies the usage multiplier.

  **Note** The vCPU Support Rating is not a guideline to recommend virtual machine resource configuration.

The following example shows how the metrics apply to determine licensing charges:

Licensing charges are $1.00 per hour (in this example).
During the monthly billing cycle, the virtual machine is powered on for 120 minutes.
The vCPU Support Rating for the template is 2 vCPUs.
You configure the virtual machine to run 4 vCPUs.

Licensing charge calculation:

<table>
<thead>
<tr>
<th>Per Minute Usage Charge</th>
<th>Time Powered On</th>
<th>Support Rating Multiplier</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(((1/60) * 120)</td>
<td>* (4/2))</td>
<td>(Actual # vCPUs/Support Rated # vCPUs)</td>
<td>= $ 4.00</td>
</tr>
</tbody>
</table>

Ways To View Resource Usage

By using a combination of Virtual Private Cloud OnDemand and My VMware, you can view usage data for your resources in a variety of ways.

- Virtual Private Cloud OnDemand: View resource usage data for all virtual machines in a virtual data center and for specific virtual machines. The Resource Usage tab displays current, unbilled usage. Virtual Private Cloud OnDemand aggregates data to display hourly totals for vCPU, vRAM, public IP addresses, and license usage, and monthly totals for storage usage.

- My VMware: View daily and monthly usage and associated cost per resource, as well as view billing statements. See the My VMware Help for information.

**Note** To view the Resource Usage tab and access billing information in My VMware, you must be a member of an administrative role for Virtual Private Cloud OnDemand. See “Role-based User Account Management,” on page 55 for information.

Using Virtual Private Cloud OnDemand, you can choose several ways to view resource usage and access billing information.

Figure 5-2. Virtual Private Cloud OnDemand Resource Usage Tab for vCloud Air

![Virtual Private Cloud OnDemand Resource Usage Tab for vCloud Air](image)
### Table 5.2. Ways to View Resource Usage in Virtual Private Cloud OnDemand

<table>
<thead>
<tr>
<th>Select...</th>
<th>To View...</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 A virtual data center</td>
<td>Aggregate usage data for all virtual machines deployed in the selected virtual data center and all public IP addresses allocated to the gateway for that virtual data center. Select All to view aggregate usage data for all virtual machines deployed for your service. See “Service Initialization and Home Page,” on page 15 for information about how you can have more than one service for your account. <strong>Note</strong> To view resource usage for a specific virtual machine, select the Virtual Machines tab &gt; virtual machine link &gt; Resource Usage tab.</td>
</tr>
<tr>
<td>2 Resource allocation</td>
<td>The amount of resources (vCPU, vRAM, and storage) allocated to virtual machines in a specific virtual data center versus the amount of capacity available for the virtual data center. See “Capacity for Virtual Private Cloud OnDemand,” on page 48 for information. <strong>Note</strong> The resource allocation tile appears when you select a specific (not All) virtual data center.</td>
</tr>
<tr>
<td>3 Time range</td>
<td>Unbilled resource usage for different time periods. By default, the Resource Usage tab displays usage for month-to-date. The number of days indicates the days since your last bill was calculated for a specific virtual data center or all virtual data centers. Select different time periods (past hour, past 24 hours, or month-to-date) to get a clear picture of usage trends.</td>
</tr>
<tr>
<td>4 Location</td>
<td>Resource usage for the virtual machines deployed in a specific location. See “Geographical Locations,” on page 49 for more information. <strong>Note</strong> Each location contains a separate resource pool; you cannot treat two geographic locations as one logical pool of resources.</td>
</tr>
<tr>
<td>5 Billing and Payments</td>
<td>Your monthly billing statements in My VMware. Access My VMware to export billing reports (.cvs and .xlsx) and view resource consumption versus cost graphs. Resource consumption graphs are useful to determine which virtual machines cost the most money per month. In My VMware, you can manage your credit card profile and account information. See the My VMware Help ( ) for information.</td>
</tr>
<tr>
<td>6 View detailed report</td>
<td>A Resource Usage Report, which provides billed usage as of the your last bill. To view reports, select a month (Date Range drop-down menu) and a virtual data center (Scope drop-down menu). A report displays resource usage on a monthly basis to the virtual machine level. Resource Usage Reports in Virtual Private Cloud OnDemand are available after your first month of utilization.</td>
</tr>
</tbody>
</table>

### View Resource Usage

You can view resource usage for virtual data centers and for individual virtual machines.

**Prerequisites**

Verify you have the appropriate privileges to access the resources. Administrators can view resource usage at the virtual data center level and for all virtual machines in the environment, while End Users can view resource usage only for the virtual machines that the user owns.
Procedure

1. Navigate to the location where you want to view resource usage:
   - Service: From the Home page, select the service where you want to view resource usage.
     
     **Note** Perform this step only if you have more than one service for Virtual Private Cloud OnDemand. See “Service Initialization and Home Page,” on page 15 for information.
   - Location: From the drop-down menu above the tabs, select the location where you want to view resource usage.
   - Virtual Data Center: If necessary, click the expand icon ( ) to display the Virtual Data Centers pane and select the virtual data center for which you want to view resource usage.

2. To view resource usage for a virtual data center or all your virtual data centers, click the **Resource Usage** tab.

   **Note** The global **Resource Usage** tab is available only if you are a member of an administrative role for Virtual Private Cloud OnDemand. See “Role-based User Account Management,” on page 55 for information.

    See “Ways To View Resource Usage,” on page 65 for information about the resource usage information available in Virtual Private Cloud OnDemand.

3. To view resource usage for a specific virtual machine, click the **Virtual Machines** tab > virtual machine link > **Resource Usage** tab.

   The resource usage (vCPU, vRAM, storage, licensing, and total cost) appear. By default, month-to-date is selected as the time range. See “Ways To View Resource Usage,” on page 65 for information about the resource usage information available in Virtual Private Cloud OnDemand.

4. To view resource consumption versus cost graphs, select **Billing and Payments** from the **Tools** menu.
   My VMware opens in another browser tab. If necessary log into My VMware with your account user name and password. Navigate to your Virtual Private Cloud OnDemand account (**Accounts > Services** > **All Services**). See the My VMware Help ( ) for information.

About Resource Billing

The pay-as-you-go model enables paying only for capacity in use. Customers pay nothing up front and incur charges only when they deploy virtual machines into their environments. If a customer does not use any resources, no cost is incurred.

Virtual Private Cloud OnDemand meters your per-minute resource usage per environment to calculate your monthly bill. See “Data Collection Explained,” on page 64 for information.

Your bill displays the monthly cost of all the virtual machines deployed in your environment. When your monthly billing statement is generated and available, the **Resource Usage** tabs (virtual data centers and virtual machines) reset all metered resource usage and estimated costs to zero because the tabs provide data for current, unbilled usage.

Usage costs are provided in pricing tiers. For information about pricing for Virtual Private Cloud OnDemand, see VMware vCloud Air Pricing.

View Your Billing Statement in My VMware

To view your billing statements, you must be a member of the Account Administrator role. See “Role-based User Account Management,” on page 55 for information.
You manage billing aspects of your Virtual Private Cloud OnDemand account in My VMware.

2. If necessary, log into My VMware with your account user name and password.
3. Navigate to your Virtual Private Cloud OnDemand account (**Accounts > Services > All Services > service name link**). See the My VMware Help (2) for information.
4. From the **Manage Service** drop-down menu, select the option for your billing statement.

**View Your Billing Date**

To locate your service start date, navigate to your account information in My VMware (**Accounts > Services > All Services > service name link**).

Your first billing statement is available 30 days from the **Start Date** displayed in your My VMware account. For example, if your start date is November 11, 2014, your first billing date is December 10, 2014. Your billing cycle repeats every 30 days.

**About Service Credits**

By using a combination of Virtual Private Cloud OnDemand and My VMware, you can view usage service credits and configure usage spend notification for your account.

To view service credits and configure usage spend notices, you must be a member of an administrative role in Virtual Private Cloud OnDemand. See "Role-based User Account Management," on page 55 for information.

**Service Credits**

As a Virtual Private Cloud OnDemand customer, VMware can apply service credits against your future Virtual Private Cloud OnDemand payments for reasons described in the Service Level Agreement (SLA) for Virtual Private Cloud OnDemand. See the SLA by selecting **Tools > About > Terms of Service & Legal Disclaimers**. Access the SLA from the VMware Legal page.

To view your service credit balance, select **Tools > Service Credits**. The Service Credits page appears. Service credits are applied to a service registered for your Virtual Private Cloud OnDemand account. If you have more than one service, the Service Credits page displays information per service. Selecting a different region does not change the information displayed in the Service Credits page.

See "Service Initialization and Home Page," on page 15 for information about services.

You can view applied service credits on your billing statement by viewing your statement in My VMware. See the My VMware Help (2) for information about accessing billing statements.

VMware provides service credits for Virtual Private Cloud OnDemand as time-bound dollar values. VMware applies awarded service credits automatically toward the aggregated total of your current month-to-date bill. If you do not use all service credits during the credit window, unused credits are forfeit.

**Usage Spend Notices**

**About Billing Alerts**

You can set alerts for your Virtual Private Cloud OnDemand account that indicate current usage levels. In My VMware, you can set two spending thresholds for your account that will trigger VMware to email you when your charges reach those amounts.

Configuring spending thresholds does not suspend your account when your charges reach the dollar amounts.
To set billing alerts, perform the following steps:

1. Log in to your My VMware account.
2. Click the Manage Services link.
3. Click the name of your Virtual Private Cloud OnDemand service.
4. Click the Manage Service drop-down menu.
5. From the drop-down list, select the option to edit your usage spend notification.
   
   The page refreshes and includes the field **Usage Spend Notification**, which has one of two values:
   
   - No value entered
   - Amounts previously entered

6. Click the value to add or edit up to two amounts.

See Viewing VMware vCloud Air OnDemand Service details in My VMware (2078719) for more information.
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