

Getting Started with Oracle Cloud VMware Solution

GET STARTED



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Connecting to an on-premises environment

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Introduction

Oracle Cloud VMware Solution was made generally available on August 6th, 2020, in all oracle regions and *Oracle's dedicated region cloud@customer* service offering. The Oracle Cloud VMware Solution is a customer-managed, VMware Cloud Verified environment consisting of vCenter Server, ESXi hosts, vSAN, and NSX. Also included is VMware HCX to provide services such as seamless migrations and network extension from on-premises to Oracle Cloud VMware Solution and between Oracle VMware Solution Software-Defined Data Centers (SDDC).

Please see Figure 1 for a high-level architecture view the interconnectivity of the VMware SDDC, Oracle Cloud VMware Solution, and Oracle Cloud Infrastructure.

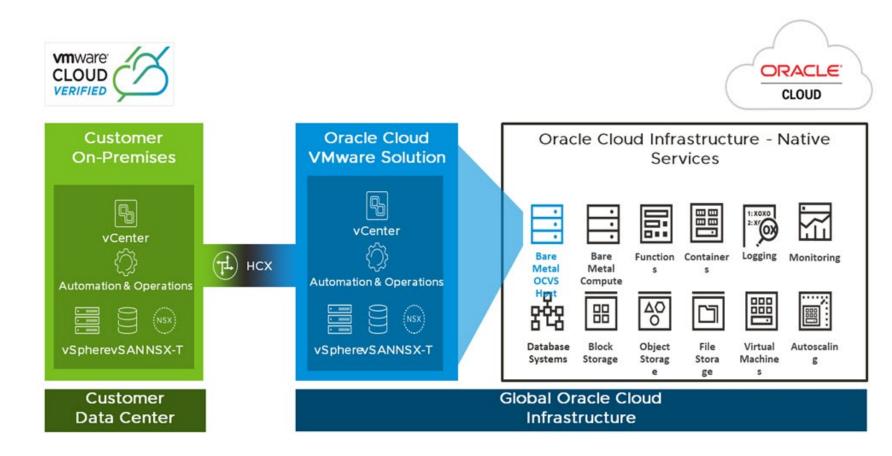


FIGURE 1: Oracle Cloud VMware Solution Architecture Diagram

This eBook will provide an overview of the Oracle Cloud VMware Solution running vSphere 7.0 Update 2 and guide through deploying a VMware Cloud SDDC on Oracle Cloud Infrastructure (OCI), network connectivity, workload migration, and leveraging native Oracle Cloud services. Throughout this eBook, there are additional resources, examples, and implementation details as reference.



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Before getting started, we will level set with the following concepts and terminology mentioned throughout this eBook and when using Oracle Cloud Infrastructure and Oracle Cloud VMware Solution. Here is a complete list of *Oracle Cloud Infrastructure key concepts and terminology*. The descriptions of the terms below are written in a way to describe how they are used in relationship to Oracle Cloud VMware Solution.

Bare-metal host – The Oracle Cloud VMware Solution's ESXi hosts are provisioned on bare-metal servers. Since the hosts are bare-metal, they can consume all CPU, memory, and networking resources available.

Compartment –A tenancy, which can also be known as the "root compartment," can be sub-divided into additional compartments. Resources that are provisioned must be assigned to a compartment. Administrators can limit access to the resources by compartments.

Console – GUI (Graphical User Interface) is accessed through a web browser. Oracle Cloud VMware Cloud Solution is deployed through the console.

Image – An image is a copy or template that new instances are deployed from. Customized configurations can be saved as an image for reuse. A Bastion Host's image type is selected during installation.

Instance – There are Oracle physical and virtual instances. A physical instance describes a physical compute Server. Virtual machines running in the Oracle Cloud VMware Solution are virtual instances.

Key pair – Using a key pair is a classic way of establishing a secure shell (SSH) connection to a server or device that allows SSH. A key pair includes a public and private key, making up a pair of keys. The public key is stored on the device and the private key locally on the connecting computer. Keys pairs are required to access Oracle Infrastructure via SSH.

Regions and availability domains – When deploying an Oracle Cloud VMware Solution instance, the bare-metal host belong to a single availability domain. The hosts are spread across fault domains in the availability domain. Regions are a geographical grouping of one or more availability domains.

Realms – Realms are a grouping of regions that are isolated from each other. Oracle Cloud Infrastructure currently offers a commercial realm and two realms for government cloud regions: FedRAMP and IL5 authorized.

Shape – A shape describes how much CPU and memory is assigned to an instance.

Tenancy – A tenancy is a logical divider in the Oracle cloud that separates users and resources from each other. Resources allocated for Oracle Cloud VMware Solution will have to be assigned to a

tenancy.

Virtual Cloud Network (VCN) – A Virtual Cloud Network defines a network in the Oracle Cloud from an IP and routing perspective. The Virtual Cloud network can span availability domains in a region, but not across multiple regions.



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User account and permissions

A user account must be obtained with the appropriate permissions to log in to the Oracle Cloud to deploy Oracle Cloud Infrastructure. In a brand-new organization, the tenancy owner is the first administrator assigned to the tenancy. An Oracle Cloud administrator must create and grant users the proper permissions to access and deploy tenancy resources. The permissions to deploy Oracle Cloud Infrastructure is not the same as managing the VMware suite of software that makes up the Oracle Cloud VMware Solution. The VMware SDDC roles and responsibilities are handled the same as an on-premises VMware SDDC.

A user's account must be able to do the following to deploy an Oracle Cloud VMware Solution SDDC:

Service	Required Permission
Oracle Cloud Infrastructure Identity and Access Management	Manage dynamic groups and policies.
Oracle Cloud Infrastructure Networking	Manage VCNs, subnets, internet gateways, NAT gateways, service gateways, route tables, and security lists.

 TABLE 1: User account and permissions

Visit adding users to learn more about account administration.

Logging into the Oracle Cloud

To get started, log into the *Oracle Cloud Sign-in page*. Once you have logged in with the proper permissions, you can deploy Oracle Cloud Infrastructure (OCI), including Oracle Cloud VMware Solution (OCVS).

A Cloud Account Name is required. This account name is not an email address or username but your tenancy name. If the Cloud Account Name is unknown, it can be found by using the "Forgot your cloud account name?" Get Help link.

Suppose the account has been configured to use Single Sign-On. In that case, the user will be prompted for their Identify Provider, then select continue, where they will then be prompted for a username/email address and password. If Single Sign-On is not configured, use the Oracle Cloud Infrastructure Direct Sign-In, requiring a username/ email address and password.

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Next					
Forgot y	our cloud acco	ount name?	Get help		
Do you ł	ave a Traditio	nal Cloud A	ccount? Sig	n In	

If all fails, reach out to the Oracle Cloud administrator of the account for assistance.

FIGURE 2: Oracle Cloud Sign-in



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Limits, quotas, and usage

Along with using proper permissions, appropriate *Limits, Quotas, and Usage* settings for the Compartment where the Oracle VMware Solution will reside must be configured. The settings cannot be so restrictive that the ESXi host required for vSphere provisioning becomes unavailable as one example.

There are "Service Limits and Usage" settings controlled by Oracle and "Compartment Quotas" set by the Oracle Administrator; both must be configured appropriately to provision resources. Please contact *Oracle Support* for more specific usage limits in accordance with your Oracle agreement.

In the environment shown in Figure 3, a limit on how many SDDCs and ESXi host that can be provisioned has been set.

TO VIEW THE SERVICE LIMITS, QUOTAS, AND USAGE

- 1. Log in to the Oracle Cloud Dashboard
- 2. Select the region that the Limits, Quotas, and Usage is to be check.
- 3. Click on the **burger icon** at the top left of the screen to display the Menu
- 4. Select Governance & Administration.
- 5. Under Governance, click **Quota Policies**
- On the left-hand side menu and select Limits, Quotes and Usage
- In the main Menu under Service select
 VMware Solution

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FIGURE 3. Limits, quotas and usage

SSH keys

Oracle recommends using SSH keys for SSH access instead of passwords. When deploying a Linux Bastion Host instance, the wizard will ask for a public SSH key rather than a root password. For more information, visit *How to Generate SSH Keys*.



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Deploying Oracle Cloud Infrastructure

IP address space is a prerequisite to deploying Oracle Cloud Infrastructure. Oracle refers to the overarching IP space, which will be broken up into smaller subnets, as a *Virtual Cloud Network*. Defining a **Virtual Cloud Network** in the Oracle Cloud is equivalent to determining an on-premises data center's IP space. Be mindful not to select an IP address space that will conflict with existing networks in the on-premises or cloud environments. The various subnets provisioned in the Oracle Cloud for the Oracle Cloud Infrastructure will draw from this IP space.

When a Virtual Cloud Network is created, a **Default Security List** and a **Default Route Table** are also produced.

- A Security List is a virtual firewall that accepts or denies traffic. By default, the Default Security List allows the following traffic and blocks everything else:
 - Ingress TCP Port 22 (used for SSH) and ICMP
 - Egress All traffic
- The Default Route Table is created without any rules.

There are two types of subnets: **public subnets** and **private subnets**. A public subnet is the entry point from the Internet or outside the Oracle Cloud Infrastructure utilizing a **Bastion Host** (more details will be discussed later).

Public subnets can use an **internet gateway** as an optional virtual router to enable both ingress (incoming) and egress (outgoing) connectivity to the Internet. During the provisioning of the public subnet, the default routing table will point to an internet gateway.

Using the **Start VCN Wizard i**s the easiest way to deploy the Virtual Cloud Network and other components to support the Oracle Cloud VMware Solution.

Creating a Virtual Cloud Network

- 1. Log in to the Oracle Cloud Dashboard
- 2. Select the correct region to deploy the Oracle Cloud VMware Solution
- 3. Click on the **burger** icon at the top left of the screen to display the Menu
- 4. Select Network > Virtual Cloud Networks
 - a. Click Start VCN Wizard. This selection will open the Create a Virtual Cloud Network wizard
 - b. Select VCN with Internet Connectivity
 - c. Click Start VCN Wizard
 - d. Enter a **Name** (e.g., McoE-OCVS-USW01-VCN)

- e. Select the **Compartment**
- f. Enter the VCN CIDR block (e.g., 10.200.0.0/16 providing 65534 available IP addresses)
- g. Enter the CIDR block that will be used for the public subnet (e.g., 10.200.0.0/24)
- h. Enter the CIDR block that will be used for the private subnet (e.g., 10.200.1.0/24)
- i. Click Next



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FIGURE 4. Creating a Virtual Cloud Network

Deploying a Bastion Host

When deploying in the Oracle Cloud, there needs to be a way to access instances and environments that do not have access to the Internet. What is needed is a **Bastion Host**, sometimes referred to as a Jumpbox. A Bastion Host is used to bridge connectivity between environment(s) where an end-user does not have direct network access. A Bastion Host has one virtual interface (vnic) deployed in a subnet classified as a public subnet. The vnic is assigned a private IP address. Still, because the subnet is classified as public, the same vnic can also be given a public IP address through the Oracle GUI, creating a bridge between the Internet and the private subnets in the Oracle Cloud.

Windows or Linux Bastion Host are available. A Windows server with Remote Desktop Protocol (RDP) works well too, but the steps below provide the deployment process of a Linux virtual machine (preferred method), which can then be used to provide an SSH Tunnel or install Apache Guacamole.

Required – Deployment of a Windows Bastion Host requires adding the Remote Desktop Protocol to the security list of the public subnet where the Bastion Host resides.

Deploy a Linux Bastion Host

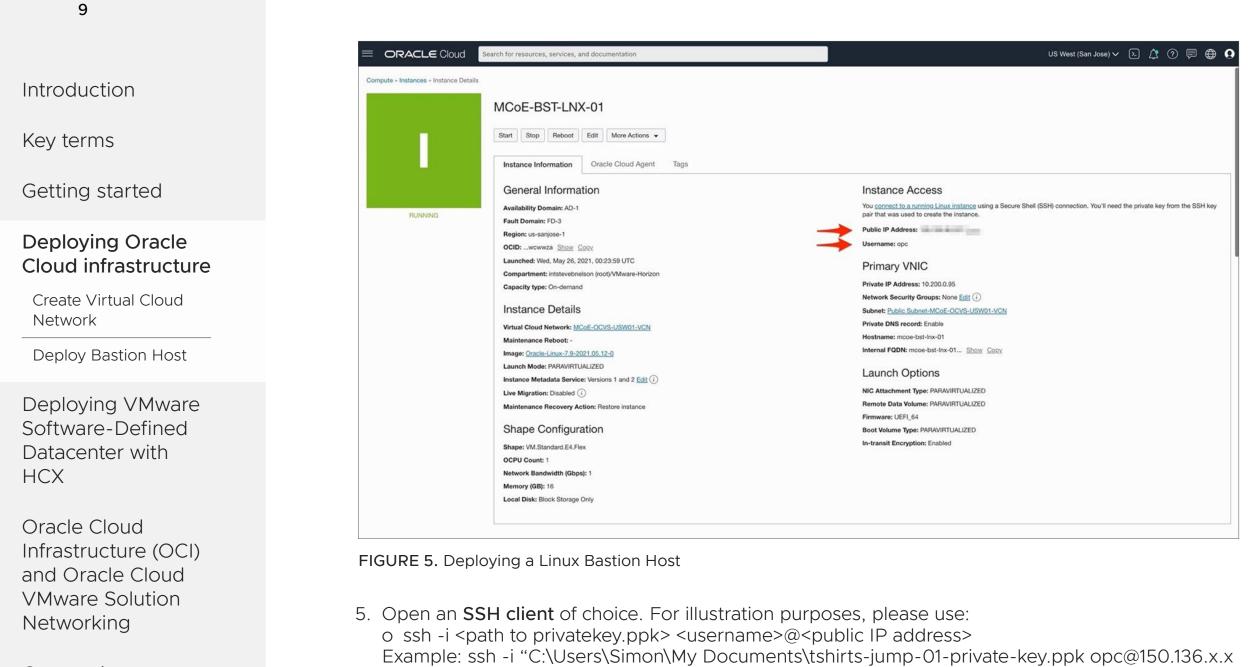
- 1. Log in to the Oracle Cloud Dashboard

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- 2. Select the correct **region** to deploy the **Oracle Cloud VMware Solution**
- 3. Click on the **burger** icon at the top left of the screen to display the Menu
- 4. Select Compute > Instances
 - a. Click Create Instance
 - b. Name the instance (e.g., MCoE-BST-LNX-01)
 - c. Make sure the correct Compartment is selected
 - d. Select the Availability Domain where the instance will be deployed
 - e. Select Change Image and select the image to deploy
 - f. Select Change Shape and select the shape to deploy
 - g. Select the Virtual Cloud Network from the dropdown
 - h. Select the Public Subnet from the dropdown
 - i. Select Paste Public Key and paste in the Public Key
 - j. Click Create to complete the instance configuration

Once the instance has been provisioned, the instance configuration information will be available. Make a note of the **Username and Public IP address** to connect to the Bastion Host (Figure 5).





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Deploying VMware Software-Defined Datacenter with HCX

With the **Oracle Cloud Infrastructure** prerequisites completed, deploying a VMware Software-Defined Data Center (SDDC) in the Oracle Cloud is next. The Oracle Cloud VMware Solution deployment process is straightforward, but there is one prerequisite that needs to be addressed.

• **SSH Keys:** During the deployment of the Bastion Host, a set of keys (public and private) to access the Bastion Host via SSH was required. The same approach is used to access the ESXi hosts in the SDDC. Instead of providing a root password, a public key will need to be provided.

Deploy an Oracle Cloud VMware Solution instance

- 1. Log in to the Oracle Cloud Dashboard
- 2. Select the correct **region** to deploy the Oracle Cloud VMware Solution (This should be the same region where the **Bastion Host** resides)
- 3. Click on the **burger icon** at the top left of the screen to display the Menu
- 4. Select Hybrid > VMware Solution
- 5. Click Create SDDC
 - a. Name the SDDC (e.g., MCoE-OCVS-USW01)
 - b. Select the correct Compartment
 - c. Uncheck the box next to **VMware HCX i**f it is not to be deployed as part of the Oracle Cloud VMware Solution
 - d. Select the **VMware software version** to be deployed. The current options are vSphere v6.5 U3, v6.7 U3, or 7.0 update 2
 - e. Select the Pricing Interval Commitment of Hourly, Monthly, One year or Three year
 - f. Select the **Number of ESXi Hosts** to deploy in the software-defined datacenter (Additional ESXi Hosts can be added after the deployment)
 - g. Enter a **Prefix** for the ESXi hosts. (ESXi hosts get named beginning with the <prefix> and incremented by -1,-2, -3,etc.)
- h. Upload or Paste in the public key
- i. Select the **Availability Domain** from the dropdown (Make sure to deploy the software-defined datacenter on the same Availability Domain as the Bastion Host)
- j. Click Next
- k. Select the Virtual Cloud Network to be used from the dropdown
- I. If VMware HCX is to be deployed, name the **NAT Gateway** (The NAT Gateway is required by HCX for license activation, updates, and VMware enhanced support)

- m. Select the correct **Compartment** from the dropdown
- n. Ensure **Create New Subnets** and **VLANs** is selected (All of the Networking required to support the SDDC will be automatically created and configured)
- o. Enter a **software-defined datacenter CIDR** (e.g., 10.230.8.0/21, this CIDR block will be carved up into smaller subnets, each used for different parts of the deployment)
- p. Click Check Availability to make sure the CIDR entered can be used
- q. Enter a software-defined datacenter Workload CIDR (e.g.192.168.1.0/24, which will be used for workload virtual machines)
- r. Click Next
- s. Review and amend if needed
- t. Click Create SDDC





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FIGURE 6. Deploying an Oracle Cloud VMware Solution Instance

The Oracle Cloud VMware Solution build process will now begin. During this time, the provisioning process can be observed via the Oracle Cloud console.

Once the Oracle Cloud VMware Solution deployment is complete, it's time to take inventory of what was deployed.

Deployment overview

After deploying an Oracle Cloud VMware Solution instance, validating that everything is deployed correctly and accessible should be prioritized. This section will review the software-defined datacenter's deployed components and make sure vCenter, HCX Manager, and NSX-T Manager are healthy and accessible.

The following steps describe how to:

- Locate login information for the deployed Oracle Cloud VMware Solution components.
- Validate access to the vCenter Server, HCX Manager, and NSX-T Manager.
- Identify where Oracle Cloud VMware Solutions cloud infrastructure components are deployed.

Find Oracle Cloud VMware Solution information page

- 1. Log in to the Oracle Cloud Dashboard
- 2. Select the correct **region** where the Oracle Cloud VMware Solution is deployed.
- 3. Click on the **burger** icon at the top left of the screen to display the Menu
- 4. Select Hybrid > VMware Solution
 - a. Select the name of the SDDC



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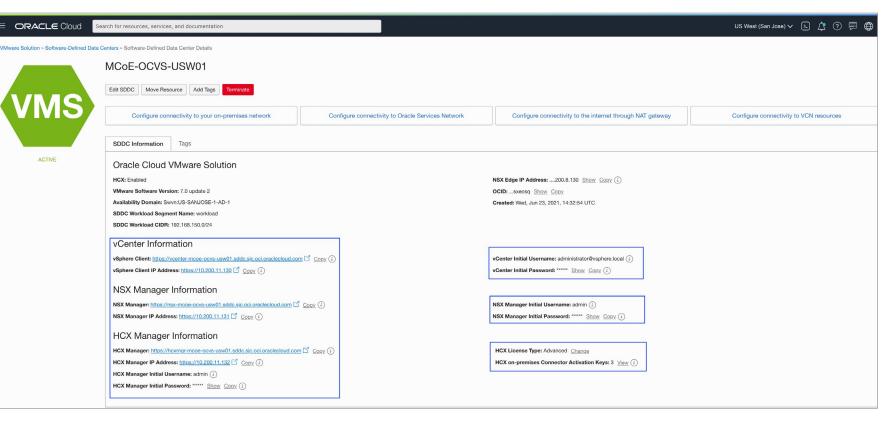


FIGURE 7. The SDDC details screen presents you with the Oracle Cloud VMware Solution information, including all the essential URLs, IP Addresses, Usernames, and passwords needed to access and manage an environment.

View ESXi hosts

Scroll down to the ESXi Hosts section of the screen (bottom of the page) to see the ESXi Hosts that have been deployed. This Menu is also where additional ESXi Hosts can be added to the softwaredefined datacenter if required. Supplementary information about the ESXi Hosts can be found when viewing Compute Instances.

- 1. Click on the **burger** icon at the top left of the screen to display the Menu
- 2. Scroll down on the left-hand side menu and select Compute > Instances

When viewing Compute Instances, both ESXi Hosts deployed as a part of the software-defined datacenter and any available Bastion Host are listed in one place. Additionally, the Oracle VMware Cloud Solution service is wholly integrated within Oracle Cloud, making management easier due to having a single screen to view everything.

HELPFUL NOTES

- Virtual Machines running in vSphere are not visible in this view.
- The Fault Domain column shows that each ESXi host is in a different Fault Domain within an Availability Domain. Oracle will spread the ESXi hosts between multiple Fault Domains so that the instances are not on the same physical hardware within a single Availability Domain.

ORACLE Cloud
 Search for resources, services, a

Compute

Instances in VMware-Horizon Compartment

US West (San Jose) 🗸 🖒 🌔 💭

Instances Dedicated Virtual Machine Hosts	Create Instance									
Instance Configurations	Name	State	Public IP	Shape	OCPU Count	Memory (GB)	Availability Domain	Fault Domain	Created	•
Instance Pools	MCoE-OCVS-USW01-3	Running	-	BM.DenselO2.52	52	768	AD-1	FD-3	Wed, Jun 23, 2021, 14:33:10 UTC	:
Cluster Networks	MCoE-OCVS-USW01-2	Running	-	BM.DenselO2.52	52	768	AD-1	FD-2	Wed, Jun 23, 2021, 14:33:08 UTC	:
Autoscaling Configurations Capacity Reservations	MCoE-OCVS-USW01-1	Running	-	BM.DenselO2.52	52	768	AD-1	FD-1	Wed, Jun 23, 2021, 14:33:06 UTC	:
Custom Images	MCoE-BST-LNX-01	Running	129.159.47.162	VM.Standard.E4.Flex	1	16	AD-1	FD-2	Wed, Jun 23, 2021, 14:26:28 UTC	;

FIGURE 8. Instances in VMware-Horizon compartment

Availability domains

Each Oracle Cloud Region has at least one Availability Domain. An Availability Domain is a physical data center within a geographical region. Availability Domains within the same region are connected by a low latency, high bandwidth network. Each Availability Domain contains three Fault Domains. A Fault Domain is a grouping of hardware and infrastructure. Fault Domains provide anti-affinity, allowing the distribution of instances across Fault domains so that the instances are not on the same physical hardware within a single Availability Domain.

Figure 9 illustrates an Oracle Cloud VMware Solution deployment within the US East (Ashburn) Oracle Cloud Region. Here we are only using AD-1, and the ESXi Hosts are distributed across all three Fault Domains.



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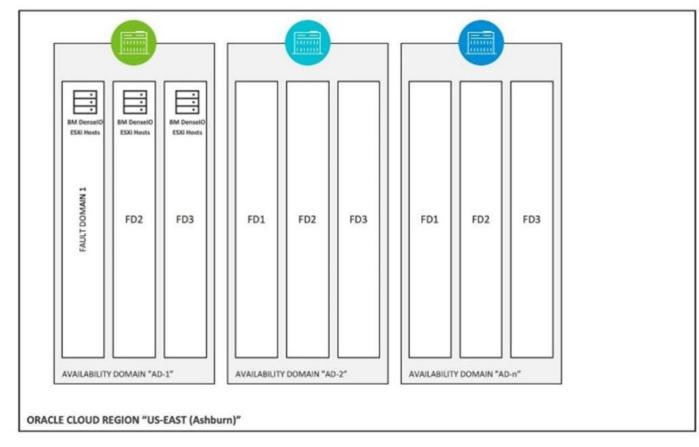
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Accessing management components

When a Oracle Cloud VMware Solution instance is fully deployed, ensuring access to the vCenter Server, NSX-T, and HCX should be a priority.

Test vCenter access

Access to the vCenter Server, which provides the management plane for the deployed ESXi host, will be reviewed first.

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select Hybrid > VMware Solution
 - a. Select the name of the software-defined datacenter
 - b. In the Software-Defined Datacenter Information section, copy the **vSphere Client URL**
 - c. Open a browser window, either on the Bastion Host or on a machine that has access to the Bastion Host via an SSL Tunnel
 - d. Paste the vSphere Client URL into a new browser tab
 - e. Copy/Paste the vCenter Initial Username and vCenter Initial

HELPFUL NOTES

Log in with the Administrator account. After deploying the environment, Oracle removes its access and gives the customer **FULL ACCESS** to the whole vSphere environment. This access is entirely private, as Oracle has **ZERO ACCESS** to softwaredefined datacenter after the initial deployment.

password to log in to vCenter

vm vSphere Client Menu v Q Search in all envi		C (?) ~ Administrator@VSPHERELOCAL ~ (
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FIGURE 10. VMware HCX, NSX-Edge Nodes, VMware-NSX-T nodes, and vCenter Server



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In the vCenter, the ESXi Hosts and virtual machines are available. The virtual machines that are deployed include the following:

- vcenter = vCenter Appliance
- hcx-01 = HCX Management Appliance
- NSX-T-01,02,03 = NSX-T Manager Appliances (Three are deployed for high availability)
- nsx-edge-01,02 = NSX-T Edge Appliances (Two are deployed for high availability)

View vSAN datastore

The Oracle Cloud VMware Solution host utilizes vSAN storage. The vSAN Database will show how much storage is available for workloads.

- 1. Click Menu in the vSphere client and select storage from the dropdown menu
 - a. Click Monitor
 - b. Expand the vCenter> datacenter exposing the vsanDatastore
 - c. Click VSAN > Capacity

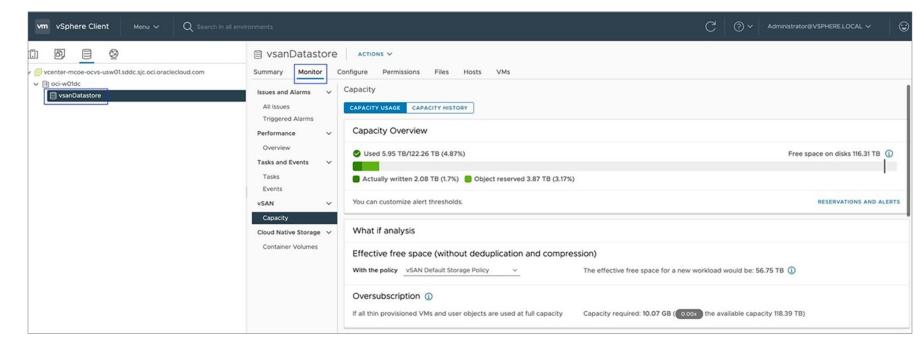


FIGURE 11. The screenshot displays the vSAN Datastore information that is deployed as part of the SDDC environment. The size of the vSAN Datastore may vary in the future as Oracle introduces additional physical server shapes.

Test VMware HCX access

The Oracle Cloud VMware Solution deployment includes VMware HCX unless it was decided not to be deployed during the deployment process. VMware HCX can be used to migrate workloads from or to Oracle Cloud VMware Solution.

1. Click Menu in the vSphere client and select **HCX** from the dropdown menu (Figure 12). VMware HCX is deployed, integrated into vCenter, and ready for Site Pairing.

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C Site Pairing C Interconnect	Ŷ	Cloud Overview					
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	~				Site Pairings		
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					NEW SITE PAIRING		

FIGURE 12. VMware HCX access



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Test VMware NSX-T access

NSX-T is the core of the software-defined datacenter for software-defined networking. To log in, complete the following:

- 1. In the Oracle Cloud Console, click on the burger icon at the top left of the screen to display the menu
- 2. Select Hybrid > VMware Solution
 - a. Select the name of the deployed software-defined datacenter
 - b. In the Software-Defined Datacenter Information section, copy the NSX Manager URL
 - c. Open a browser window either on the Bastion Host or on a machine that has access to the Bastion Host via an SSL Tunnel
 - d. Paste the NSX Manager URL into a new browser tab
 - e. Copy/Paste the NSX Manager Initial Username and NSX Manager password to log in to NSX-T Manager

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Overview Alarms Monitoring Dashboards ~			Documentation
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			記 2 Gateway Policies
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물중 0 Groups	♦ 409 Services	↔ 5 Transport Zones	3 of 3 Hosts Configured
බ් 10 Virtual Machines	👩 63 Context Profiles	🔀 2 Edge Transport Nodes	[]] 1 Host Cluster
		[] 1 Edge Cluster	😚 3 NSX Management Nodes
		음 4 Users	榕 11 Roles

FIGURE 13. VMware NSX-T access

At the bottom right of the Overview page, there is a section titled System. Listed here are the NSX-T components that are automatically deployed:

- 3 x NSX-T Manager Nodes (VMs nsxt-01,02,03)
- 2 x NSX-T Edge Transport Nodes (VMs nsx-edge-01,02)
- 3 x VMware ESXi Hosts have been enabled as Transport Nodes

For additional information on NSX-T, visit the VMware NSX-T Data Center Documentation.



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Oracle Cloud Infrastructure (OCI) and Oracle Cloud VMware Solution Networking

This chapter will review the overall networking configuration that supports deploying a VMware software-defined datacenter, including NSX-T. The deployment of infrastructure in the Oracle Cloud is simple. However, understanding how the logical and physical devices communicate with each other can be challenging without a deep knowledge of the Network.

The following steps describe how to:

- Understand where to find the VLANs and subnet that are provisioned as part of an Oracle Cloud VMware Solution
- Get a brief overview of network security

Configuration review

Address space

The address space allocated for a VMware software-defined datacenter consist of a contiguous range of IPv4 addresses that do not overlap with other address space in the Virtual Cloud Network. A different CIDR block would have to be specified if a second software-defined datacenter using the same Virtual Cloud Network is deployed. If another software-defined datacenter uses the same CIDR block, an error will occur.

Create SDDC	
Basic Information Networking Review and Create	Networking The workflow creates ESXi hosts in a VCN subnet of your choice. 10 VLANs are required to run different VMware components in the SDDC (vSphere, vSAN, vMotion, NSX, and HCX). You can choose to have the workflow create the subnet and VLANs, or use ones you've already set up in your VCN.
	Virtual Cloud Network (VCN) Your Oracle VCN contains the subnet and VLANs required to provision the SDDC. Choose a VCN in vmware ① (Change Compartment)
	MCoE-OCVS-USW01 (CIDR: 10.200.0.0/16)
	Create New Subnet and VLANs Uses a CIDR block of your choice to create a subnet and VLANs, along with basic security rules and route tables.
	SDDC Networks The SDDC CIDR is used to provision the required subnet and VLANs. Enter a CIDR block contained in the VCN and click Check Availability. The CIDR must meet the workflow requirements for size and availability, and it cannot overlap with any other subnet or VLAN CIDR in the VCN. SDDC CIDR ① 10.200.0.0/16
	Example: 10.0.0.21 Minimum size /21 Minimum size /21 This CIDR block is already in use by Subnet-MCoE-OCVS-USW01 (10.200.8.0/25). Enter another CIDR block.

FIGURE 14. Overlap address space

ESXi host VMware Software Defined-Networking connectivity

The following steps show how to view how ESXi Hosts are connected to the Oracle Cloud infrastructure.

- 1. Log in to the Oracle Cloud Dashboard
- 2. Select the correct region that the **Oracle Cloud VMware Solution** is deployed.
- 3. Click on the burger icon at the top left of the screen to display the Menu
- 4. Select Compute>Instance
 - a. Select one of the ESXi Hosts
 - b. Scroll down to Select Attached VNICs on the Resources menu (Located on the left-hand side of the page)

Figure 15 illustrates ESXi Host connectivity to the various VLANs deployed as part of a softwaredefined datacenter configuration. All VLANs are trunked to both physical NICs available on the baremetal host.



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	A virtual	network interface card (VNIC) lets an i	nstance connect to a virtual cloud ne	work (VCN) and deter	rmines how the insta	nce connects with end	points inside and outsi	de the VCN.	
Metrics Attached Block Volumes	Creat	te VNIC							
Attached VNICs	Name		Subnet or VLAN (i)					State	
Boot Volume	oci-pro	v-vnic (Primary VNIC)	Subnet - Subnet-MCo	E-OCVS-USW01				Attached	
Console Connection	vspher	e-net-vnic.nic0	VLAN - VLAN-MCoE-	OCVS-USW01-vSpher	re			Attached	
Run Command Work Requests	vspher	e-net-vnic.nic1	VLAN - <u>VLAN-MCoE-</u>	DCVS-USW01-vSpher	<u>re</u>			 Attached 	
OS Management	vmotio	n-net-vnic.nic0	VLAN - <u>VLAN-MCoE-(</u>	DCVS-USW01-vMotio	n			Attached	
Custom Logs	vmotio	n-net-vnic.nic1	VLAN - <u>VLAN-MCoE-(</u>	OCVS-USW01-vMotio	<u>n</u>			Attached	
	<u>vsan-n</u>	et-vnic.nic0	VLAN - <u>VLAN-MCoE-(</u>	DCVS-USW01-vSAN				Attached	
	vsan-n	et-vnic.nic1	VLAN - <u>VLAN-MCoE-(</u>	DCVS-USW01-vSAN				 Attached 	
	<u>nsx-vte</u>	ep-vnic.nic0	VLAN - <u>VLAN-MCoE-</u>	VLAN - <u>VLAN-MCoE-OCVS-USW01-NSX VTEP</u>					
	<u>nsx-vte</u>	ep-vnic.nic1	VLAN - <u>VLAN-MCoE-(</u>	VLAN - VLAN-MCoE-OCVS-USW01-NSX VTEP VLAN - VLAN-MCoE-OCVS-USW01-NSX Edge VTEP VLAN - VLAN-MCoE-OCVS-USW01-NSX Edge VTEP					
	<u>nsx-ed</u>	ge-vtep-vnic.nic0	VLAN - <u>VLAN-MCoE-</u>						
	<u>nsx-ed</u>	<u>ge-vtep-vnic.nic1</u>	VLAN - <u>VLAN-MCoE-</u>						
	<u>nsx-ed</u>	<u>ge-up1-vnic.nic0</u>	VLAN - <u>VLAN-MCoE-</u>	DCVS-USW01-NSX E	<u>dge Uplink 1</u>			Attached	
	nsx-ed	<u>ge-up1-vnic.nic1</u>	VLAN - <u>VLAN-MCoE-(</u>	DCVS-USW01-NSX E	dge Uplink 1			Attached	
	<u>nsx-ed</u>	ge-up2-vnic.nic0	VLAN - <u>VLAN-MCoE-(</u>	DCVS-USW01-NSX E	dge Uplink 2			Attached	
Metrics		lets an instance connect to a virtual cloud network (VCN) and	d determines how the instance connects with endpoints insi	de and outside the VCN.					
Attached Block Volumes Attached VNICs	Name	Subnet or VLAN (i)		State	FQDN (i)	VLAN Tag	MAC Address		
Boot Volume Console Connection	nox-vnic.nic1	VLAN - VLAN-MCoE-OCVS-USW01-HCX		Attached		2156	02:00:17:00:77:31	Showing 1 Item 🔇	

FIGURE 15. Virtual network interfaces and VLANs attached to the ESXi Host

VLANs

A VLAN is an object within a Virtual Cloud Network. VLANs are used to partition the Virtual Cloud Networks into Layer 2 broadcast domains. Each VLAN has a Route-Table associated with it. The Route-Table is responsible for the traffic forwarding to a specific destination. In addition to the Route-Table, each VLAN has a Network Security Group or Security Rules (firewall rules) associated with it. These Network Security Groups function in the same way as a firewall, allowing and denying traffic in and out of the VLAN.

HELPFUL NOTES

When manually creating a new VLAN or subnet, all traffic is denied by default. Rules will need to be added to allow traffic.

Each VLAN within the Virtual Cloud Network is automatically assigned a VLAN ID. These VLAN IDs are local to the Virtual Cloud Network, so there might be cases where the same VLAN ID is used in an SDDC in another Availability Domain or Region. Even though they might share the same VLAN ID, it's essential to understand that they are not the same VLAN.

This VLAN is used for communication between the VMware software-defined datacenter and Oracle Cloud Infrastructure.
This VLAN is used for communication between the VMware software-defined datacenter and Oracle Cloud Infrastructure.
This VLAN is used for data-plane traffic between the ESXi host and NSX Edge.
This VLAN is used for data-plane traffic between ESXi hosts.
This VLAN is used for vMotion (VMware migration tool) management and workload.
This VLAN is used for vSAN (VMware storage) data traffic.
This VLAN is used to manage the software-defined datacenter components (ESXi, vCenter, NSX-T, and NSX Edge).
This VLAN is used for HCX traffic.
This VLAN is used for the management of the vSphere Replication component.
This VLAN is used for Provisioning activities

.

 TABLE 2. VLANs connected to each ESXi Host



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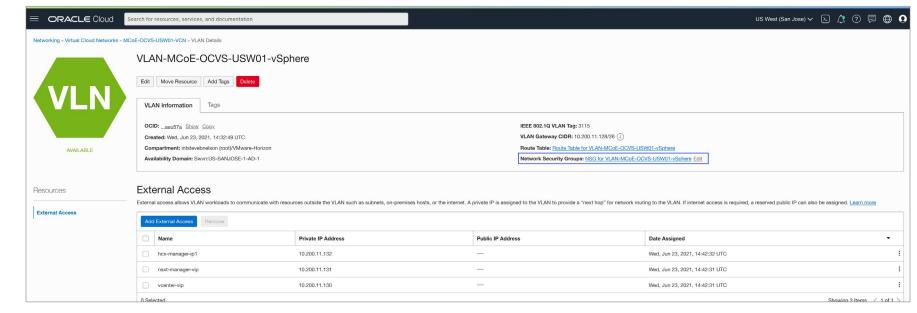


FIGURE 16. VLAN details

To take a closer look at the vSphere VLAN:

1. Click VLAN-<SDDC NAME>-vSphere in the attached VNICs section under Subnet or VLAN (Figure 16).

Here we can see some additional information about the VLAN (Figure 17). By default, the vSphere VLAN has External Access configured for:

- The vCenter (vcenter-vip)
- The NSX-T Management Cluster Virtual IP (nsxt-manager-vip)
- The HCX Manager (hcx-manager-ip1)

		te with resources outside the VLAN suc	h as subnets, on-premises h
Add External Access	s Remove		
Name		Private IP Address	
- Italiic			
hcx-manager-i	ip1	10.200.11.132	
		10.200.11.132	

FIGURE 17. VLAN External Access configuration

The external access type for all these components is **Route Target Only**. This setting assigns an IP address that can be used as a route target on the VLAN so that other Oracle Cloud Infrastructure VLANs can access these IP addresses. In addition to the External Access information, the Route Table and Network Security Group (Firewall) associated with the VLAN can be found here.

2. Click Route Table tor <SDDC NAME>-vSphere (Figure 18).

The Route table for the vSphere VLAN specifies the NAT Gateway as the default gateway for all traffic on this VLAN. This setting allows the virtual machines on this VLAN to access the Internet if permitted in the Security Rules.

IEEE 802.1Q VLAN Tag: 3115
VLAN Gateway CIDR: 10.200.11.128/26 (i)
Route Table: Route Table for VLAN-MCoE-OCVS-USW01-vSphere
Network Security Groups: NSG for VLAN-MCoE-OCVS-USW01-vSphere Edit

The Route table for the vSphere VLAN specifies the NAT Gateway as the default gateway for all traffic on this VLAN (Figure 19). This setting allows the virtual machines on this VLAN to access the Internet if permitted in the Security Rules.

aned to the VLAN to provide a "next hop" for network routi	d to the VLAN to provide a "next hop" for network routing to the VLAN. If internet access is required, a reserved public								
ress	Date Assigned								
	Wed, Jun 23, 2021, 14:42:32 UTC								

FIGURE 18. VLAN Route Table

	earch for resources, services, and documentation			US West (San Jose) 🗸 🛛 📐) 🗘 🕐 📮					
Networking » Virtual Cloud Networks » MCc	E-OCVS-USW01-VCN = Route Table Details									
	Route Table for VLAN-MCoE-OCVS-USW01	-vSphere								
DT	Move Resource Add Tags Terminate									
RT	Route Table Information Tags									
AVAILABLE	OCID:ejnb6a <u>Show Coov</u> Compartment: VMware-Horizon Created: Wed, Jun 23, 2021, 14:32:05 UTC									
Resources	Route Rules									
Route Rules (1)	Add Route Rules Edit Remove									
	Destination	Target Type	Target	Description						
	0.0.0.0/0	NAT Gateway	NAT Gateway-MCoE-OCVS-USW01-VCN	Allow NAT gateway traffic	:					
	0 Selected				Showing 1 ltem $\ <$ 1 of 1 $>$					

FIGURE 19. VLAN Route Table configuration



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3. Return to the previous window and click NSG For <SDDC NAME>-vSphere (Figure 20).

Security Rules are added to the Network Security Group (Firewall), as shown in Figure 21. Security rules are automatically configured to allow components of the software-defined datacenter and VMware HCX to communicate with each other and access the Internet. The screenshot only shows a few of the many rules that are added to the Network Security Group. Also, each individual rule can be clicked and explored to gain a deeper understanding of what traffic flows are occurring.

IEEE 802.1Q VLAN Tag: 3115	
VLAN Gateway CIDR: 10.200	.11.128/26 (i)
Route Table: Route Table for V	VLAN-MCoE-OCVS-USW01-vSphere
Network Security Groups: N	SG for VLAN-MCoE-OCVS-USW01-vSphere Edit
signed to the VLAN to provide a "ne»	xt hop" for network routing to the VLAN. If internet access is required, a reserve
signed to the VLAN to provide a "nex	xt hop" for network routing to the VLAN. If internet access is required, a reserve
signed to the VLAN to provide a "nex	xt hop" for network routing to the VLAN. If internet access is required, a reserve
signed to the VLAN to provide a "nex	xt hop" for network routing to the VLAN. If internet access is required, a reserve

FIGURE 20. VLAN Network Security Groups

ORACLE Cloud	Search for resources, services, and documentation				JS West (San Jose) 🗸 🕟 📮 🖨 🧿
	NSG for VLAN-MCoE-OCVS-US	W01-vSphere			
	Edit Move Resource Add Tags Terminate				
NSG	Network Security Group Information Tags				
AVAILABLE	OCID:yiq2nq <u>Show Coex</u> Created: Wed, Jun 23, 2021, 14:32:16 UTC		Compartment: VMwa	ze-Horizon	
Resources	Security Rules These security rules apply to all VNICs in this network security gro	up. You can filter the list by ingress or egress. There can be other se	curity rules that apply to a given VNIC in this group: from	m any other network security groups the VNIC is in, and any security lists associ	ated with the VNIC's subnet. Learn more about security rules.
VNICs	Add Rules Edit Remove				
Filters	Direction (i)	Source or Destination (i)	Protocol (i)	Details (i)	Description (i)
DIRECTION	Direction: Egress Stateless: No	Destination Type: CIDR Destination: 0.0.0.0/0	All Protocols	Allow: All tra Show	Allow all egress traffic :
	Direction: Ingress Stateless: No	Source Type: CIDR Source: 10.200.8.0/21	All Protocols	Allow: All tra Show	Allow ingress traffic for VMware inter-process communi cation
	Direction: Ingress Stateless: No	Source Type: CIDR Source: 10.200.8.0/21	ТСР	Source Port Range: All Destination Port Range: 22 Allow: TCP tra <u>Show</u>	Allow SSH traffic :
	Direction: Ingress Stateless: No	Source Type: CIDR Source: 10.200.8.0/21	ТСР	Source Port Range: All Destination Port Range: 1234 Allow: TCP tra <u>Show</u>	Allow traffic for NSX messaging channel to NSX Manag : or

FIGURE 21. VLAN Network Security Group Information

Virtual port groups

Another way of viewing the ESXi Host connectivity is from a vSphere Client. So far, ESXi Host connectivity has been explored within the Oracle Cloud interface. It might help clarify things by looking at it from the vSphere Client

To view the virtual networking configuration inside the vSphere client:

1. In the Oracle Cloud Interface, click on the burger icon at the top left of the screen to display the

0011010101011

- Menu
- a. Select Hybrid > VMware Solution
- b. Select the name of your newly deployed software-defined datacenter
- c. Copy the vSphere Client URL
- d. Open a **browser window** either on the Bastion Host or on a machine that has access to the Bastion Host via an SSL Tunnel
- e. Paste the vSphere Client URL into a new browser tab
- f. Copy/Paste the vCenter Initial Username and vCenter Initial password to log in to vCenter

Once you are logged into vCenter:

- 1. Click Menu in the vSphere client
- 2. Select Networking on the dropdown menu
 - a. Expand the tree on in the left pane until the "DSwitch" is visible (Figure 22)



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1) ē, e Ø	🕑 vcenter-mcoe-ocv	vs-usw01.sddc.sjc.oci.oracle	cloud.com		
	Summary Monitor Config	igure Permissions Datacenters	Hosts & Clusters VMs Datastores	Networks Linked vCenter Server Sy	stems Extensions U
© VM Network	issues and Alaritis	llIssues			
✓					Status
ြို့ edge-transport ကို Management Network ကို vds01-hcx ကို vds01-provisioning ကို vds01-replication ကို vds01-vMotion ကို vds01-vSAN ကို vds01-vSphere		kyline Health has detected issues in your vS cl01-w01-consolidated01: vSAN online health	Triggered Alarm Triggered Alarm	06/23/2021, 12:39 PM 06/23/2021, 11:35 AM	▲ Warning
(ﷺ) workload	Container Volumes Skyline Health				

FIGURE 22. Distributed Virtual Switch (vDS) port-groups

Visible in the Figure 22 is the virtual distributed switch (vDS) port-groups. You should notice that these port groups names are similar to our software-defined datacenter VLANs reviewed earlier.

edge-ns	NSX Edge Uplink 1 VLAN				
edge-transport	NSX Transport				
Management network	ESXi Management VLAN(ESXi Host vmk0 lives here)				
vds01-HCX	HCX VLAN				
vds01-provisioning	(ESXi Host vmk4 lives here)				
vds01-replication	(ESXi Host vmk3 lives here)				
vds01-vMotion	vMotion VLAN (ESXi Host vmk1 lives here)				
vds01-vSAN	vSAN VLAN (ESXi Host vmk2 lives here)				
vds01-vSphere	ESXi management (ESXi vmk0 lives here)				
workload The NSX-T segment for our virtual machines that we specified during the configuration of the software-defined datacenter					

TABLE 3. Virtual Distributed Switch (vDS) port groups

ESXi Host connectivity

- 1. Click Menu in the vSphere client and select Hosts and Clusters on the dropdown menu
- 2. Select a hostname <hostprefix>-1
 - a. Select the Configure tab
 - b. Select Physical adapters

vm vSphere Client Menu ∨ Q Search in all envi	ronments	C	?~	Administrator@VSPHERE.LOCAL V	
(<u>)</u> B, E Ø	mcoe-ocvs-usw01-1.sub06231429341.mcoeocvsusw01vc.oraclevcn.com				
✓	Summary Monitor Configure Permissions VMs Datastores Networks Updates				
× ⊞ oci-w01dc					

✓ III oci-w01ac ✓ III oci01-w01-consolidated01	Storage	~	Physical ada	pters							
Content in the second s	Storage Adapters	. 1	Stadd Networking	🔊 Refresh \mid 🖉 Edit							
🖺 mcoe-ocvs-usw01-2.sub06231429341.mcoeocvsusw01vc.ora	Storage Devices	- 1	Device	T Actual Speed T	Configured Speed 🛛 🔻	Switch T	MAC Address	τ 0	Observed IP Ranges 😙	Wake on LAN Sup 🔻	SR-IOV Statu
🖺 mcoe-ocvs-usw01-3.sub06231429341.mcoeocvsusw01vc.ora	Host Cache Configuration	- 1	🖭 vmnic0	25 Gbit/s	Auto negotiate	DSwitch	bc:97:e1:d2:cf:20	1	No networks	No	Enabled
✓ ⊘ Management	Protocol Endpoints	- 1	m vmnic1	25 Gbit/s	Auto negotiate	DSwitch	bc:97:e1:d2:cf:28	1	No networks	No	Enabled
🔂 hcx-01	I/O Filters	- 1									
🔂 nsx-edge-01	Networking	~									
🔂 nsx-edge-02											
🔁 nsxt-01	Virtual switches	- 1									
🔂 nsxt-02	VMkernel adapters										
🕒 nsxt-03	Physical adapters										
🔂 vcenter	TCP/IP configuration										
> 🕢 Workload	Virtual Machines	~									
	VM Startup/Shutdown										
	Agent VM Settings					No items s	selected				

FIGURE 23. Physical adapters

The current hardware configuration of the physical ESXi hosts (BM.DenselO2.52) used for the Oracle Cloud VMware Solution software-defined datacenter has 2 x 25Gbit/s physical network cards.

vmnic0	Assigned to the Distributed Virtual Switch (DSwitch)
vmnic1	Assigned to the Distributed Virtual Switch (DSwitch)

TABLE 4. Physical adapters configuration



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View VMkernel adapters

1. Select VMkernel adapters

vm vSphere Client Menu v Q Search in all envi								C 0	✓ Administrator@VSPHERE.LOCAL ✓	
	🗿 mcoe-ocvs-us	mcoe-ocvs-usw01-1.sub06231429341.mcoeocvsusw01vc.oraclevcn.com								
✓	Summary Monitor	Summary Monitor Configure Permissions VMs Datastores Networks Updates								
✓ ☐ oci-w01dc ✓ (① oci01-w01-consolidated01	Storage	~ [VMke	rnel ad	apters					
mcoe-ocvs-usw01-1.sub06231429341.mcoeocvsusw01vc.ora mcoe-ocvs-usw01-2.sub06231429341.mcoeocvsusw01vc.ora	Storage Adapters Storage Devices		ADD N	ETWORKIN	G REFRESH					
mcoe-ocvs-usw01-3.sub06231429341.mcoeocvsusw01vc.ora	Host Cache Configuration	1		Device	Network Label	T Switch	IP Address	TCP/IP	Stack T Enabled Services	
✓ ⊘ Management	Protocol Endpoints	- 1	: >	> vmk0	Management Network	DSwitch	10.200.8.97	Defau		
🔂 hcx-01	I/O Filters			> vmk1	vds01-vMotion	DSwitch	10.200.10.130	Defau	It vMotion	
🔂 nsx-edge-01	Networking	~	: >	> VMKI	Vasui-vMotion	DSwitch	10.200.10.130	Detau	It vMotion	
🔂 nsx-edge-02	-		: >	> vmk2	vds01-vSAN	DSwitch	10.200.11.2	Defau	lt vSAN	
🔁 nsxt-01	Virtual switches		: >	vmk3	vds01-replication	DSwitch	10.200.12.2	Defau	It vSphere Replication	
凸 nsxt-02	VMkernel adapters		: ,	> vmk4	vds01-provisioning	DSwitch	10.200.12.130	Defau	It Provisioning	
급 nsxt-03	Physical adapters									
C vcenter	TCP/IP configuration		: >	> vmk10		DSwitch	10.200.10.4	nsx-ov	verlay	
> 🕢 Workload	Virtual Machines	\sim	: >	> vmk11		DSwitch	10.200.10.5	nsx-ov	verlay	
	VM Startup/Shutdown		: >	> vmk50	-	DSwitch	169.254.1.1	nsx-hy	yperbus	
	Agent VM Settings									

FIGURE 24. VMkernel adapters

There are five VMkernel adapters configured by default when deploying a VMware software-defined datacenter with HCX.

vmk0	Added to the Management Network vDS and configured to be used for ESXi management traffic
vmk1	Added to the vds01-vMotion vDS and configured to be used for ESXi vMotion traffic
vmk2	Added to the vds01-vSAN vDS and configured to be used for ESXi vSAN traffic
vmk3	Added to the vds01-replication and configured to be used for HCX
vmk4	Added to the vds01-provisioning and configured to be used VM provisioning

 TABLE 5. VMkernel adapters

View virtual switches

- 2. Select Virtual switches
- 3. Click the down arrow next to **Distributed Switch: DSwitch** to display all Virtual Switches. There are two virtual switches configured on the ESXi Host identified earlier.
 - a. Distributed Switch: DSwitch
 - b. Standard Switch: vSwitch0 (unused)

vm vSphere Client Menu v Q Search in all envi		C	? ×	Administrator@VSPHERE.LOCAL ✓	
	mcoe-ocvs-usw01-1.sub06231429341.mcoeocvsusw01vc.oraclevcn.com				
✓	Summary Monitor Configure Permissions VMs Datastores Networks Updates				
 ✓ (m) oci-w01dc ✓ (m) oci01-w01-consolidated01 	storage v Virtual switches			ADD NETWORKING	REFRESH
Among the second	Storage Adapters > NSX Switch: DSwitch				
mcoe-ocvs-usw01-2.sub06231429341.mcoeocvsusw01vc.ora	. Storage Devices > Standard Switch: vSwitch0				
🐪 mcoe-ocvs-usw01-3.sub06231429341.mcoeocvsusw01vc.ora	Host Cache Configuration				
✓ ⊘ Management	Protocol Endpoints				
計 hcx-01	I/O Filters				
🔂 nsx-edge-01	Networking V				
🔂 nsx-edge-02	Virtual switches				
🔂 nsxt-01					
🗄 nsxt-02	VMkernel adapters				
🔂 nsxt-03	Physical adapters				

CP/IP configuration
 Vorkload
 Virtual Machines

FIGURE 25. Virtual switches

3. Click the **chevron icon (>)** next to Distributed Switch: DSwitch to expand the switch. The portgroups are configured within the vDS and the uplinks used for the vDS. In this case, dual uplink ports are configured for redundancy (Figure 26).

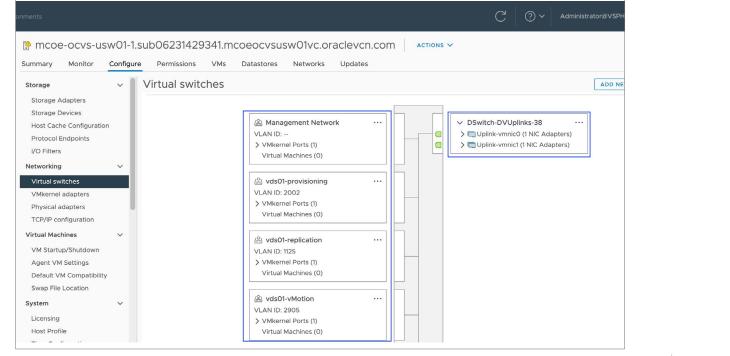


FIGURE 26. Distributed switch details

vmware[®]



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NSX configuration

NSX-T is automatically deployed and configured as a part of the Oracle Cloud VMware Solution. However, ongoing management and configuration of NSX-T will be required if additional workload segments in the future are required.

View NSX configuration

- 1. In the **Oracle Cloud Interface**, click on the burger icon at the top left of the screen to display the Menu
 - a. Select Hybrid > VMware Solution
 - b. Select the name for the software-defined datacenter
 - c. In the Software-Defined Datacenter Information section, Copy the NSX Manager URL
 - d. Paste the vSphere Client URL into a new browser tab
 - e. Copy/Paste the NSX Manager Initial Username and NSX Manager Initial password to log in to NSX Manager

NSX-T segments

6. Click on Segments

VM NSX-T) (? × 🔆	admin ~
Home Networking Se	Home Networking Security Inventory Plan & Troubleshoot System							
*	Segments ⑦							
Network Overview	Segments S	egment Profiles Edge Bridge Pro	ofiles Metadata Proxies					
🔞 Network Topology	Image: Network Topology EXPAND ALL Filter by Name, Path and more							
Connectivity Tier-0 Gateways		Segment Name	Connected Gateway	Transport Zone	Subnets	Ports	Status ①	Alarms
 Tier-1 Gateways 	: > Q	NSX-Edge-VCN-Segment	None	VLAN-TZ-2 VLAN	Not Set	0	🔵 Success C	0
👼 Segments	: > জ	workload	Tier-1	Overlay-TZ Overlay	192.168.150.1/24	0	🔵 Success 🔿	0
Network Services								

FIGURE 27. NSX-T segments

There are two segments created by default. When creating additional segments, use the workload segment as a template.

NSX-Edge-VCN-Segment	This segment is used for connectivity between the two Edge nodes				
workload	This segment is used for the workload network (192.168.150.1/24) that was specified during the deployment of the software-defined datacenter (If you did not choose to deploy a workload network, you might not have this segment)				

TABLE 6. Default NSX-T segments

NSX-T logical routers

There are two logical routers, Tier-O and Tier-1.

Tier-0	Connected to the NSX Edge VTEP VLAN, it allows Geneve-encapsulated traffic to flow between the Edge nodes and ESXi Host. The NSX Edge Uplink VLANs allow traffic in and out of the environment
Tier-1	Connected to the workload segment where the virtual machines will live. As you add additional segments, these will be connected to the Tier-1

TABLE 7. NSX-T logical routers

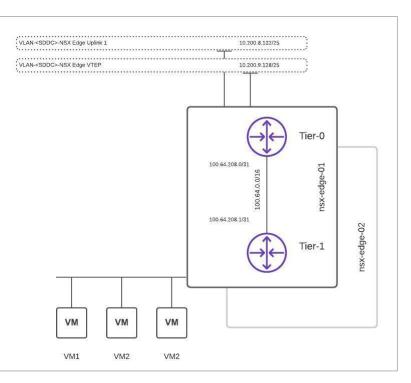


FIGURE 28. NSX-T logical routers



NSX-T Transport Zones

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There are three Transport Zones configured by default.

Overlay-TZ	An Overlay Transport Zone includes all ESXi Hosts and both NSX-T Edges and is used by the workload segments. This Transport Zone should be used when deploying additional segments.
VLAN-TZ	A VLAN Transport Zone which includes all ESXi Hosts and both NSX-T Edges and is used by the edge-ns and edge-transport logical switches
VLAN-TZ-2	A VLAN Transport Zone which only includes both NSX-T Edges and is used for Edge-to- Edge Geneve encapsulated traffic over the NSX-Edge-VCN-Segment segment

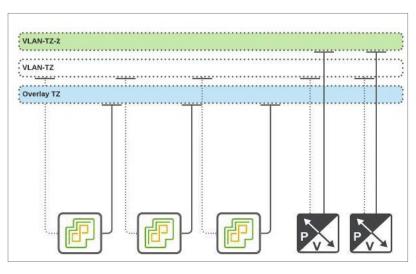


FIGURE 29. NSX-T Transport Zones

TABLE 8. NSX-T Transport Zones

Networking summary

Figure 30 illustrates how all the components that make up the Oracle Cloud VMware Solution software-defined datacenter environment are connected.

Provision Subnet <your name="" sddc=""></your>	•••••••••••••••••				 	10.200.8.0/25
VLAN- <your name="" sddc="">-NSX Edge Uplink</your>	1		•••••		 	10.200.8.128/25
VLAN- <your name="" sddc=""></your> -NSX Edge Uplink	2	•••••			 	10.200.9.0/25
VLAN- <your name="" sddc="">-NSX Edge VTEP</your>	l				 	10.200.9.128/25
VLAN- <your name="" sddc="">-NSX VTEP</your>	l 	·····	·····		 	10.200.10.0/25
VLAN- <your name="" sddc="">-vMotion</your>	il r			••••••	 	10.200.10.128/25
VLAN- <your name="" sddc="">-vSAN</your>	ll	l 		••••••	 	10.200.11.0/25
VLAN- <your name="" sddc="">-vSphere</your>	ll	l	l 		 	10.200.11.128/26
VLAN- <your name="" sddc="">-HCX</your>	ll	l	l		 .]	10.200.11.192/26
VLAN- <your name="" sddc="">-Replication Net</your>	l	l	l		 	

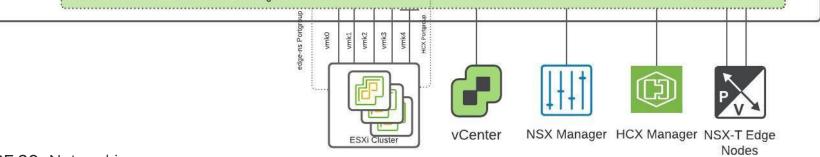


FIGURE 30. Networking summary



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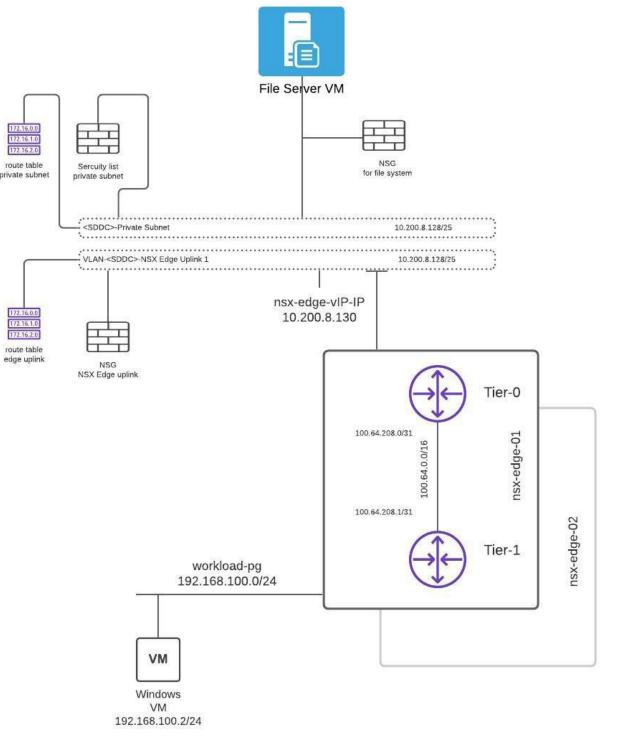
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Connecting to Oracle Cloud Infrastructure Services

This chapter will discuss deploying a Windows Server into an Oracle Cloud VMware Solution software-defined datacenter and connecting it to an Oracle Cloud Infrastructure Network File System (NFS) used to store files and folders for users. This example will show how easy it is to connect Oracle VMware Cloud Solution workloads to Oracle Cloud Infrastructure services. Figure 31 diagrams this configuration at a high level.



Deploying a virtual machine in an Oracle Cloud VMware Solution SDDC

The process of creating virtual machines within the Oracle Cloud VMware Solution is the same as it is in an on-premises environment. Once a virtual machine is created in vCenter, a Windows ISO can be uploaded onto the vSAN datastore and the virtual machine booted from the ISO to install Windows Server. Next, the Windows Server virtual machine is connected to the Network. The workload network is an NSX overlay network that was created during the deployment of the software-defined datacenter.

Add a route to a route table

During the Virtual Cloud Network provisioning process, a private subnet was provisioned. That private subnet in this example will also be used for the File System.

The Windows Server is on a network that is not part of the Virtual Cloud Network. In that case, a route needs to be created so that traffic that needs to go from the private subnet to the Windows Server knows that to get to the Server. It needs to send the traffic to the NSX Edge uplink virtual IP

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(VIP). Once the traffic reaches the NSX Tier-O router via the Edge VIP, it is routed to the Windows server through the Tier-1 router.

For the creation of the Route Table Rules, the following information is needed.

- The workload (overlay) network CIDR block (e.g., 192.168.150.0/24)
- The NSX Edge virtual IP Address (e.g., 10.200.8.130)

The fastest way to find the Edge VIP is the following:

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select Networking > Virtual Cloud Networks
 - a. Click on the Virtual Cloud Network (e.g., MCoE-OCVS-USW01-VCN)
 - b. Select VLANs in the Resources section on the bottom left of the screen
 - c. Select VLAN-<SDDC name>-NSX Edge Uplink 1
 - d. Make a note of the Private IP Address of the nsx-edge-up1-vip (e.g., 10.200.8.130)

	arch for resources, services, and documentation			US West (San Jose) 🗸 🕗 🗦 🖨 🧕					
Networking » Virtual Cloud Networks » MCc	E-OCVS-USW01-VCN » VLAN Details								
	VLAN-MCoE-OCVS-USW01-NSX I	Edge Uplink 1							
	Edit Move Resource Add Tags Delete	it Move Resource Add Tags Delete							
VLN	VLAN Information Tags								
	OCID:4j33za Show Copy		IEEE 802.1Q VLAN Tag: 1963						
	Created: Wed, Jun 23, 2021, 14:32:28 UTC		VLAN Gateway CIDR: 10.200.8.128/25 ()						
AVAILABLE	Compartment: intstevebnelson (root)/VMware-Horizon		Route Table: Route Table for VLAN-MCoE-OCVS-USW01-NSX Edge Uplink 1						
	Availability Domain: Swvn:US-SANJOSE-1-AD-1		Network Security Groups: NSG for NSX Edge Uplink VLANs in MCoE-OCVS-USW01 Edit						
	External Access			ting to the VLAN. If internet access is required, a reserved public IP can also be assigned. Learn more					
External Access	External access allows VLAN workloads to communicate with resource	ces outside the VLAN such as subnets, on-premises hosts, or the internet. A	private IP is assigned to the VLAN to provide a "next hop" for network rou	ting to the VLAIN. If internet access is required, a reserved public IP can also be assigned. Learn more					
External Access	Add External Access Remove								
	Name	Private IP Address	Public IP Address	Date Assigned					
	nsx-edge-up1-vip	10.200.8.130	—	Wed, Jun 23, 2021, 14:42:32 UTC					
	0 Selected			Showing 1 ltem 2 1 of 1 5					

FIGURE 32. Edge vIP

With the information gathered, it is time to update the route table of the private subnet:

- 3. Click on the burger icon at the top left of the screen to display the Menu
- 4. Select Networking > Virtual Cloud Networks
- 5. Click on Virtual Cloud Networks (e.g., MCoE-OCVS-USW01-VCN)
 - a. Click Route Tables
 - b. Select Route Table for <Private Subnet-<SDDC>-VCN
 - c. Click Add Route Rules
 - Select Private IP as the Target Type
 - Enter the CIDR Block for the workload (overlay) network (e.g., 192.168.150.0/24)
 - Enter the NSX Edge vIP Address in Target Selection (e.g 10.200.8.130)
 - Click Add Route Rules

= ORACLE Cloud	ORACLE Cloud Search for resources, services, and documentation								
Networking » Virtual Cloud Netwo	Networking = Virtual Cloud Networks = MCoE-OCVS-USW01-VCN = Route Table Details								
RT	Route Table for Private Subnet-MCoE-	OCVS-USW01-VCN							
AVAILABLE	OCID:77ohjq Show Coov Created: Wed, Jun 23, 2021, 14:20:21 UTC								
Resources	Route Rules								
Route Rules (3)	Add Route Rules Edit Remove								
	Destination	▲ Target Type	Target	Description					
	0.0.0/0	NAT Gateway	NAT Gateway-MCoE-OCVS-USW01-VCN	:					
	192.168.150.0/24	Private IP	10.200.8.130	Route to VIP. Created during File System mapping step					
	All SJC Services In Oracle Services Network	Service Gateway	Service Gateway-MCoE-OCVS-USW01-VCN	:					
	0 Selected			Showing 3 Items 🛛 < 1 of 1 🗦					

FIGURE 33. Route Rule

The Route Rule should look like Figure 33. This rule directs any traffic that to go to the workload network to the NSX Edge vIP address.



Network security groups

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Network Security Groups (NSG) will allow traffic to flow from the NSX Edge Uplink 1 VLAN to the File System. In addition, Security Lists can also be used to allow traffic to flow.

Create a network security group

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select Networking > Virtual Cloud Networks
 - a. Click the Virtual Cloud Network (e.g., MCoE-OCVS-USW01-VCN)
 - b. Select Network Security Groups
 - c. Click Create Network Security Groups
 - Name the NSG (e.g. 'NSG for File System (NFS)' is used)
 - Click Next
 - Click Create

WHY USE NETWORK SECURITY GROUPS INSTEAD OF SECURITY LISTS?

Security lists are associated with subnets. If a security list is used to set up your security rules, those rules will apply to all vNICs in the subnet. Unlike security list rules, NSGs apply only to resource vNICs you add to the NSG and allow more granularity.

ORACLE Cloud	Search for resources, services, and documentation		US West (San Jose) 🗸 😥 🗇 🖨 \\ Q						
Create Network S	Security Group		Heip						
Basic Info Security Rules	Add Security Rules Optionally add one or more rules to the network security group. Learn mo	Add Security Rules Optionally add one or more rules to the network security group. Learn more about security rules.							
	Rule	Rule							
	STATELESS (
	DIRECTION	SOURCE TYPE (i)							
	1191635	CIDR	\$ 192.168.150.0/24 Specified IP addresses: 192.168.150.0-162.168.150.255 (256 IP addresses)						
	IP PROTOCOL (i)	SOURCE PORT RANGE OPTIONAL	DESTINATION PORT RANGE OPTIONAL						
	ТСР		111,2048,2049,2050						
	Allows: Allows TCP traffic 111,2048,2049,2050								
	Maximum 255 characters	Maximum 256 characters							
	Rule		×						
		SOURCE TYPE (1)	Source odr (i)						
	Ingress		suume suum (7) 192.168.150.0/24						
	L		Specified IP addresses: 192.168.150.0-192.168.150.255 (256 IP addresses)						
	IP PROTOCOL (i)	SOURCE PORT RANGE OPTIONAL	DESTINATION PORT RANGE OPTIONAL						
	UDP	All	111,2048						
	Allows: Allows UDP traffic 111,2048								
	Maximum 255 characters	Maximum 255 characters							
	- Rule	Rule							
	Egress								
	r Alcoo	CIDR	\$ 192.168.150.0/24 Specified IP addresses: 192.168.150.0-192.168.150.256 (256 IP addresses)						
		SOURCE PORT RANGE OPTIONAL	DESTINATION PORT RANGE OPPTOMAL ()						
	TCP	\$ 111,2048,2049,2050	All						
	Allows: Allows TCP traffic								
	DESCRIPTION OPTIONAL								
	Maximum 255 characters		8						
	Rule		×						
	DIRECTION		DESTINATION CIDR (\overline{t})						
	Egress	CIDR							
			Specified IP addresses: 192.168.150.0-192.168.150.255 (256 IP addresses)						
	IP PROTOCOL ()		DESTINATION FORT RAINGE OPTIONAL ()						
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	Allows: Allows UDP traffic DESCRIPTION OPTIONAL								
	Maximum 255 characters								
			+ Another Rule						
			T Allottel Hule						

FIGURE 34. Creating a Network Security Group

Use the following *Security Rules for File Storage* to enable NFS communication. Different OCI service(s) may require different ports.

NOTE: The Source CIDR specified in the screenshots is the CIDR for the workload (overlay) network here in this environment.

See Table 9 for a summary of Security Rules for File Storage.



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Direction	Source or Destination	Protocol	Ports
Ingress	Source Type: CIDR Source: 192.168.150.0/24	ТСР	Source Port Range: ALL Destination Port Range: 111,2048-2050
Ingress	Source Type: CIDR Source: 192.168.150.0/24	UDP	Source Port Range: ALL Destination Port Range: 111,2048
Egress	Destination Type: CIDR Source: 192.168.150.0/24	ТСР	Source Port Range: 111,2048-2050 Destination Port Range: All
Egress	Destination Type: CIDR Source: 192.168.150.0/24	UDP	Source Port Range:111 Destination Port Range: All

 TABLE 9. Security Rules for File Storage

File systems

Up next is creating a **File System** that will be mounted to the Windows Server virtual machine and used to store users' files and folders.

Create a file system

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select File Storage > File Systems
- 3. Click Create File System
 - a. Click **Edit Details** in the File System Information section (Figure 35)
 - b. **Name** the File System (e.g. MCoE-OCVS-USW01-userdata)
- 3. Click **Edit Details** in the Mount Target Information section (Figure 36)
 - a. Select Create New Mount
 - b. Name the New Mount Target (e.g userdata)
 - c. Select a **private subnet** in the Subnet dropdown
 - d. Check Use network security groups to control traffic
 - e. Select the Network Security Group created earlier
 - f. Click Create

reate File System	Help
Storage provides durable, scalable, and secure file systems.	
File System Information	Hide Details
Name Optional	
MCoE-OCVS-USW01-userdata	
Availability Domain	
Swvn:US-SANJOSE-1-AD-1	\$
Create in Compartment	
VMware-Horizon	\$
intstevebnelson (root)/VMware-Horizon	
Encryption	
 Encrypt using Oracle-managed keys Leaves all encryption-related matters to Oracle. 	
Encrypt using customer-managed keys Requires a valid key from a vault that you have access to. (Learn More)	
Show Tagging Options	

FIGURE 35. File System Information

NFS endpoints used to access your file systems. The following mount target will be created and associated with your new file system npartments for mount target, virtual cloud network or subnet. <u>Click here to enable compartment selections</u> . Ing mount target • Create New Mount Target Name Optional	əm. <u>Learn more</u> .
ng mount target • Create New Mount Target Name Optional	
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k si cur iile	t-MCoE-OCVS-USW01-VCN (Regional) k security groups to control traffic ① curity Groups in VMware-Horizon (Change Compartment) ille System (NFS)' anced Options jing Options

FIGURE 36. Mount Target Information



Mounting the file system

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With the new File System created and the Network Security Group applied to the Target Mount, the File System is ready to be mounted on a Windows Server virtual machine.

There are two pieces of information required to mount the File System: the **Mount Target IP Address** and **Export Path.**

- 7. Click on the burger icon at the top left of the screen to display the Menu
- 8. Select File Storage > File Systems
 - a. Click the File System Name
 - b. Click the Mount Target
 - Note the IP Address (e.g.10.200.1.196)
 - Note the Export Path (e.g. /MCoE-OCVS-USW01-userdata)

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ACTVE Create: Fr, Jun 25, 2021, 30:49:10 UTC Submet: Private Submet: McGE-OCVS-JSW01-VCN Image: CovS-JSW01-VCN							Tags	Mount Target Informati	
ACTIVE Availability Domain: Sww:US-SANJOSE-1-AD-1 IP Address: 10200.1.196 Compartment: instevebnelson (root)//Mware-Horizon Hostname: // Reported Size (GB): 8569934592 // ① Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ① Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ① Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ① Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ② Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Enter a hostname first Reported Indees (GB): 8569934592 // ③ Fully Qualified Domain Name: Ful				Virtual Cloud Network: MCoE-OCVS-USW01-VCN				OCID:aaaaaa Show C	
Notifie Compariment: intstevebnelson (root// VMware-Horizon Hostname: · Reported Size (GiB): 5559934592 / ① Reported Inodes (GiB): 5559934592 / ① Fully Qualified Domain Name: Enter a hostname first Reported Inodes (GiB): 5559934592 / ② Reported Inodes (GiB): 5569934592 / ② Reported Inodes (GiB): 5569934592 / ② Resources Exports Exports Create Export)	Subnet: Private Subnet-MCoE-OCVS-USW01-VCN			9:10 UTC	Created: Fri, Jun 25, 2021	
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Resources Exports Export Cireate Export				Export Set OCID:aaaaaaa Show Copy ()					
Exports Create Export Delete								Network Security droups	
								Exports	Resources
								Create Export Delete	Exports
Metrics Export Path State File System Created		Created	Created		File System	State		Export Path	Metrics
Filters Active McoE-OCVS-USW01-userdata Fri, Jun 25, 2021, 03:49:20 UTC		Fri, Jun 25, 2021, 03:49:20 UTC	Fri, Jun 25, 2021, 03:49:20 UTC	-userdata	MCoE-OCVS-USW	Active	rdata	/MCoE-OCVS-USW0	Filters
State 0 Selected 5	Showing 1 Item < 1 of 1	Showing 1						0 Selected	State
Any state 3								0	Any state

FIGURE 37. Mounting the file system

With this information, *mounting the File System* to a Windows Server can be completed.

MCoE_Test_WIN				Enforce US Ke	eyboard L	Layout View Fulls	creen Send Ctrl+Alt	+Delete
and Administrator: Command Prompt	- 🗆 X		Manage Share View Drive Tools	MCoE-OCVS-USW01-userdata (\\10.200.1.19	16) (X:)	_	□ × ~ 0	
Res C:\Users\Administrator>mount 10.200.1.196:/MCoE-OCVS-USW01-userdata x: x: is now successfully connected to 10.200.1.196:/MCoE-OCVS-USW01-userdata	^		This PC > MCoE-OCVS-USW	01-userdata (\\10.200.1.196) (X:) →	~ Ō	Search MCoE-OCVS-		
The command completed successfully. C:\Users\Administrator>		 ✓ A Quick access Desktop Downloads Documents Pictures 	Name ^	Date modified	Type File folder	Size		
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28

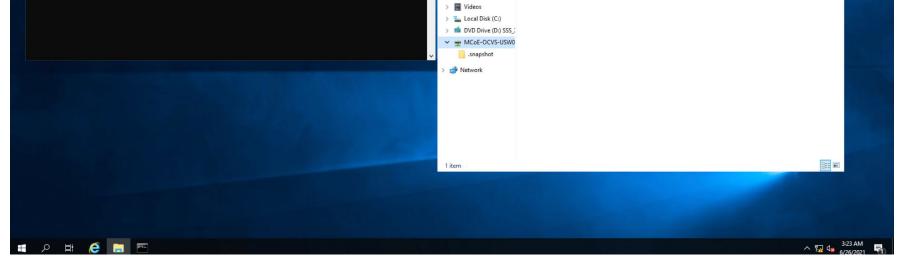


FIGURE 38. Mounting the file system



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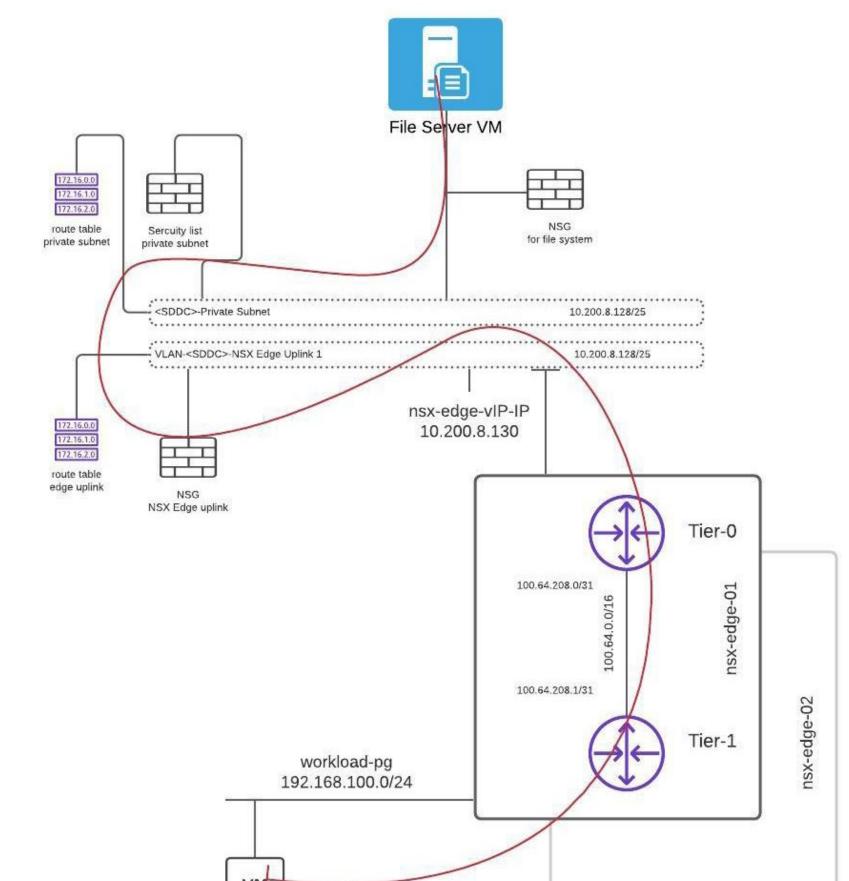
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Figure 39 illustrates the simplicity of how Oracle Cloud VMware Solution workloads can interact with native Oracle Cloud services.

In the high-level diagram, all the components deployed for the Windows server within the SDDC communicate with the File System within OCI. This visual of the traffic flow between the servers will make things a little clearer.



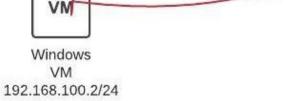




FIGURE 39. File system flow diagram

Starting at the bottom of the graphic and moving to the top, the traffic from the Windows server flows through the Tier-1 router and out through the Tier-O router. The traffic flow is due to the File System resides outside of the software-defined datacenter. The traffic exits the NSX-T Edge using the Uplink 1 VLAN and out through the VLAN default gateway. The traffic arrives on the private subnet and is then checked against the Security List for the Private VLAN and the Network Security Group for the File system before reaching the Mount Target.



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This chapter addresses external connectivity and how to connect an on-premises vSphere environment to Oracle Cloud VMware Solution, achieving hybrid connectivity between an on-premises environment and the Cloud. This configuration will

allow on-premises workloads to communicate with workloads in the Oracle Cloud.

There are two main ways to connect Oracle Cloud VMware Solution to an on-premises environment: *Oracle FastConnect* or *Oracle VPN Connect*. In this chapter, we will use an Oracle FastConnect connection provided by *Megaport*, as demonstrated in Figure 40.

HELPFUL NOTE

There are other ways to set up Oracle FastConnect via thirdparty service providers. This guide references the direct use of Oracle FastConnect or Oracle VPN Connect solutions.

	On-Premises Enviroment
	Internet Network - 172.17.x.0/24 VM Windows VM 172.17.x.2
<sddc>-FastConnect</sddc>	
<sddc>-drg</sddc>	י י
	VCN-Wide Routing
	VLAN- <your name="" sddc="">-NSX Edge Uplink 1 10.200.8.128/25</your>
	VLAN- <your name="" sddc="">-NSX Edge Uplink 2 10.200.9.0/25 VLAN-<your name="" sddc="">-NSX Edge VTEP 10.200.9.128/25</your></your>
1 1	VLAN- <your name="" sddc="">-NSX VTEP 10.200.10.0/25</your>
	ESXi Host 1 Tier-0 ESXi Host 1 ESXi Host 1

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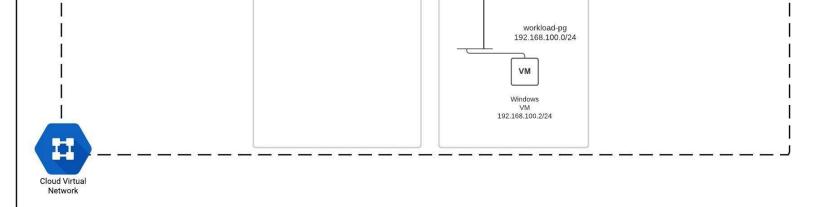


FIGURE 40. Connecting to an On-Premises Environment

The following steps describe how to:

- Create a Dynamic Routing Gateway
- Create a FastConnect instance
- Configure BGP in the Cloud and on-premises
- Verify connectivity



Create a Dynamic Routing Gateway

The first step to enabling hybrid connectivity is to deploy a *Dynamic Routing Gateway (DRG)* within the Oracle Cloud Infrastructure (OCI). Think of a Dynamic Routing Gateway as a virtual router that provides a path for private traffic (that is, traffic that uses private IP v4 addresses) between a Virtual Cloud Network and networks outside the Virtual Cloud Network's region.

- 1. Log in to the Oracle Cloud VMware Solution console
- 2. Select the correct **Region** (This should be the same region that the software-defined datacenter and the Bastion Host are deployed)
- 3. Click on the burger icon at the top left of the screen to display the Menu
- 4. Select Networking > Dynamic Routing Gateways
 - a. Click Create Dynamic Routing Gateway
 - b. Select the correct **Compartment**
 - c. Name the DRG
 - d. Click Create Dynamic Routing Gateway

Once the DRG has been created, attach it to the Virtual Cloud Network.

- 5. Click Virtual Cloud Networks on the Resources section (left-hand side)
 - a. Click Attach to Virtual Cloud Network Attachments
 - b. Name the Attachment
 - c. Select your Virtual Cloud Network in the dropdown
 - d. Click Create Cloud Network Attachment

Create A FastConnect instance

Before a FastConnect connection can be created, you need to collect the information required for this process.

- **BGP IP Addresses**: You will need two IP addresses to use for the BGP connection between the FastConnect and your on-premises or cloud router. Typically, *Link-Local Addresses* are used for this.
- Customer BGP ASN: You will need the Autonomous System Number (ASN). When using a service like Megaport, the ASN can be found in the portal. If you use an on-premises router, you can usually choose an ASN from the private range: 64512 – 65534. If you aren't sure, speak to your networking team.
- 1. Log in to the Oracle Cloud VMware Solution console
- 2. Select the correct **Region** (This should be the same region that the software-defined datacenter and the Bastion Host are deployed)

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- 3. Click on the burger icon at the top left of the screen to display the Menu
- 4. Select Networking > FastConnect
 - a. Click Create FastConnect
 - b. Select your Connection Type (Here Partner is selected because Megaport is being used)
 - c. If you selected FastConnect Partner, select your Partner from the dropdown
 - d. Click Next
 - Name the FastConnect Connection
 - Select Private Virtual Circuit
 - Select your Dynamic Routing Gateway from the dropdown
 - Select the Bandwidth for the connection
 - Enter the Customer BGP IPv4 Address (e.g 169.254.238.49/30)
 - Enter the Oracle BGP IPv4 Address (e.g., 169.254.238.50/30)
 - Enter the Customer BGP ASN (133937)
 - Click Create



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Configuring BGP on-premises

In this step, you configure the on-premises router to establish a BGP session. This step depends on the router or service you are using for your on-premises connectivity. I use a Megaport connection for the example/demo; refer to the *Connecting to Oracle Cloud Infrastructure FastConnect documentation* for more details.

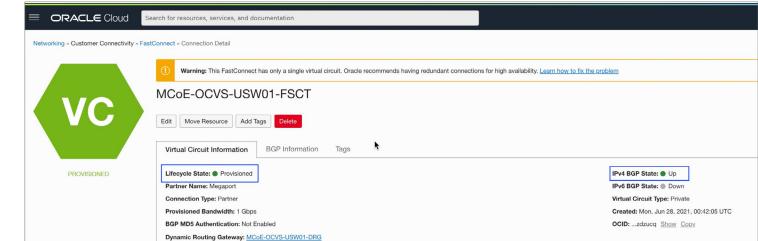
The information needed to complete the configuration can be found in the OCI interface.

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select Networking > FastConnect
 - a. Click the name of the FastConnect Connection you just created
 - b. Click the **BGP Information** tab.

■ ORACLE Cloud	Search for resources, services, and documentation	US West (San Jose) 🗸 🕟 🗐 🌐 🧕
Networking » Customer Connectivity » F	astConnect = Connection Detail	
	Warning: This FastConnect has only a single virtual circuit. Oracle recommends having redundant connections for high availability. Learn how to fix the problem	
	MCoE-OCVS-USW01-FSCT	
VC	Edit Move Resource Add Tags Delete	
	Virtual Circuit Information BGP Information Tags	
PROVISIONED	Customer BGP ASN: 139937 Oracle BGP ASN: 31898	
	Primary	
	Customer BGP IPv4 Address: 169.254.238.49/30	
	Oracle BGP IPv4 Address: 169.254.238.50/30	
	Customer BGP IPv6 Address: No Value	
	Oracle BGP IPv6 Address: No Value	

FIGURE 41. BGP Information

- c. The information you are looking for is as follows:
 - FastConnect OCID (The OCID is often required by services such as Megaport)
 - Oracle BGP ASN
 - Oracle BGP IPv4 Address



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FIGURE 42. FastConnect Provision Status

With this information, configure BGP. Once correctly configured, the OCI console will appear green, Lifecycle State will show as Provisioned, and the IPv4 BGP Status will display as UP.



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With the on-premises connectivity established, the next step is configuring the OCI environment to allow traffic to flow between the on-premises environment and the Windows Server virtual machine running within the Oracle Cloud VMware Solution software-defined datacenter.

Oracle Cloud provides a simple wizard that creates the required configuration automatically.

- 1. Click on the burger icon at the top left of the screen to display the Menu
- 2. Select Hybrid > VMware Solution
 - a. Select the name of the software-defined datacenter
 - b. Click Configure connectivity to your on-premises Network (Figure 43)
 - Enter the CIDR Block of the workload overlay network (In this example, we used 192.168.150.0/24)
 - Enter the CIDR Block of the on-premises Network that you want to connect to (172.17.31.0/24)
 - c. Click Next

Review and Apply Configuration	Basic Information This quick action workflow helps you configure connectivity between your on-premises network and the SDDC. • In this page, you provide CIDR block information about your on-premises network. You can obtain this information from your on-premises network engineer. The workflow automatically enters the SDDC workload CIDR for you. • The workflow determines requirements for enabling routing between the DRG and the NSX Edge Uplink 1, HCX, and vSphere VLANs. If there's no DRG attached to the VCN, the workflow
Review and Apply Configuration T	 This quick action workflow helps you configure connectivity between your on-premises network and the SDDC. In this page, you provide CIDR block information about your on-premises network. You can obtain this information from your on-premises network engineer. The workflow automatically enters the SDDC workload CIDR for you. The workflow determines requirements for enabling routing between the DRG and the NSX Edge Uplink 1, HCX, and vSphere VLANs. If there's no DRG attached to the VCN, the workflow
S E M	helps you create one. • Finally, any missing route tables, rules, or network security groups (NSGs) are created or updated. Learn more. SDDC Workload CIDR ⑦ 192.168.150.0/24 Example: 172.0.0.0/24 Minimum size 700
	On-Premises CIDR (i) 172.17.31.0/24 Example: 10.0.0/16

FIGURE 43. Configure connectivity to your on-premises network

- d. Review the configuration (Figure 44)
- e. Click Apply Configuration

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Migrating workloads		Source \rightarrow Destination	Stateless	Description	
using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP)	No	Allow HCX WAN transport tra	
using viriware nex		172.17.31.0/24 → 0.0.0.0/0:4500 (TCP)	No	Allow HCX WAN transport tra	
Conclusion					
		Network Security Group Name: <u>NSG for VLAN-MCoE-OCVS-USW</u> Updates the security rules in the NSG to enable network traffic to the			
		Add security rules to this network security group.			
		Ingress			
		Source \rightarrow Destination	Stateless	Description	
		172.17.31.0/24 → 0.0.0.0/0:9443 (TCP)	No	Allow HCX REST API traffic	
		172.17.31.0/24 → 0.0.0.0/0:443 (TCP)	No	Allow HCX X-cloud control tr	
		Network Security Group Name: <u>NSG for VLAN-MCoE-OCVS-USW</u> Updates the security rules in the NSG to enable network traffic to the		ation Net VLAN.	
		Add security rules to this network security group.			
		Ingress			
		Source \rightarrow Destination	Stateless	Description	
		$172.17.31.0/24 \rightarrow 0.0.0.0/0:9080 \text{ (TCP)}$	No	vSphere Replication Commu	
		See Show Advanced Options			
	Previous Apply Configuration Cancel				
	FIGURE 44. Review config	guration			
					ORACLE Cloud
		GEIIING S	SIARIED WIT	H ORACLE CLOUD V	MWARE SOLUTION

	Basic Information	Review and Apply Configuration		
Key terms	2 Review and Apply Configuration		ration. The quick action workflow creates or upda	ates any route table and rules required for on-premises connectivity to your SDDC
		resources.	n mandala an ang an ining ang ang ang ang ang ang ang ang ang a	
Getting started		Dynamic Routing Gateway 🕡		
Deploying Oracle		Dynamic Routing Gateway Name: MCoE-OCVS-USV Compartment: intstevebnelson (root)/VMware-Horizon		
Cloud infrastructure		Route Table (i)		
		Route Table Name: Route Table for VLAN-MCoE-OCV		
Deploying VMware		Updates route rules in the VLAN-MCoE-OCVS-USW0	1-NSX Edge Uplink 1 VLAN's route table to targ	et the DRG.
Software-Defined		Destination	Target Type	Target
Datacenter with HCX		172.17.31.0/24	Dynamic Routing Gateway	idnbva <u>Show</u> <u>Copy</u>
		Route Table Name: Route Table for VLAN-MCoE-OCV Updates route rules in the VLAN-MCoE-OCVS-USW0		
Dracle Cloud		Add route rules to this route table.		
nfrastructure (OCI)		Destination	Target Type	Target
and Oracle Cloud /Mware Solution		172.17.31.0/24	Dynamic Routing Gateway	idnbva <u>Show</u> <u>Copy</u>
Networking		Route Table Name: <u>Route Table for VLAN-MCoE-OC</u> Updates route rules in the VLAN-MCoE-OCVS-USW0 Add route rules to this route table.		
		Destination	Target Type	Target
Connecting to Dracle Cloud		172.17.31.0/24	Dynamic Routing Gateway	idnbva <u>Show</u> <u>Copy</u>
nfrastructure		Route Table Name		
Services		Route Table for MCoE-OCVS-USW01-DRG		
		Route Table Compartment VMware-Horizon		\$
Connecting to an		intstevebnelson (root)/VMware-Horizon Creates a new route table and route rules for the MCo	E-OCVS-USW01-DRG DRG. The route rules tarc	the nsx-edue-up1-vip VLAN's private IP address.
on-premises		Create a new route table and add the below route r	IN IN INCOME AND	
environment		Destination 192.168.150.0/24	Target Type Private IP	Target oprxyq <u>Show Copy</u>
Create Dynamic Routing Gateway				
		Network Security Group (i)		
Create FastConnect		Updates the security rules in the NSG to enable netwo		X Edge Uplink 1 VLAN.
instance		Add security rules to this network security group.		
Configuring BGP on-premises		Ingress Egress		Stateless
·		172.17.31.0/24 → 0.0.0.0/0 (All)		No
Configure route tables		Network Security Group Name: <u>NSG for VLAN-MCo</u>		
and network security		Updates the security rules in the NSG to enable netwo		X VLAN.
and network security groups		Add security rules to this network security group.		
-		Ingress		
groups				Description
groups		Source → Destination	Stateless	
groups Testing connectivity		172.17.31.0/24 → 0.0.0.0/0:500 (TCP)	No	Allow HCX WAN transport tra
groups Testing connectivity Migrating workloads using VMware HCX				Allow HCX WAN transport tra Allow HCX WAN transport tra
groups Testing connectivity Migrating workloads		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: <u>NSG for VLAN-MCo</u>	No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network ✓ Add security rules to this network security group.	No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable netwo ✓ Add security rules to this network security group. Ingress	No No E-OCVS-USW01-vSphere 더 rk traffic to the VLAN-MCoE-OCVS-USW01-vSp	Allow HCX WAN transport tra
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network ✓ Add security rules to this network security group. Ingress Source → Destination	No No E-OCVS-USW01-vSphere ☐ rk traffic to the VLAN-MCoE-OCVS-USW01-vSp Stateless	Allow HCX WAN transport tra ohere VLAN. Description
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 \rightarrow 0.0.0.0/0:500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Ingress Source \rightarrow Destination 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP)	No No E-OCVS-USW01-vSphere C1 rk traffic to the VLAN-MCoE-OCVS-USW01-vSphere Stateless No	Allow HCX WAN transport tra ohere VLAN. Description Allow HCX REST API traffic
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network ✓ Add security rules to this network security group. Ingress Source → Destination	No No E-OCVS-USW01-vSphere ☐ rk traffic to the VLAN-MCoE-OCVS-USW01-vSp Stateless	Allow HCX WAN transport tra ohere VLAN. Description
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 \rightarrow 0.0.0.0/0:500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Add security rules to this network security group. Ingress Source \rightarrow Destination 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol	No No E-OCVS-USW01-vSphere Trk traffic to the VLAN-MCoE-OCVS-USW01-vSg Stateless No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra Shere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network ✓ Add security rules to this network security group. Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:443 (TCP)	No No E-OCVS-USW01-vSphere Trk traffic to the VLAN-MCoE-OCVS-USW01-vSg Stateless No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra Shere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 \rightarrow 0.0.0.0/0:500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) Updates the security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Add security rules to this network security group. Ingress Source \rightarrow Destination 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network	No No E-OCVS-USW01-vSphere Trk traffic to the VLAN-MCoE-OCVS-USW01-vSg Stateless No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra Shere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 \rightarrow 0.0.0.0/0:500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Add security rules to this network security group. Ingress Source \rightarrow Destination 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable netwood Add security rules to this network security group. Ingress	No No No E-OCVS-USW01-vSphere rk traffic to the VLAN-MCoE-OCVS-USW01-vSp Stateless No No No E-OCVS-USW01-Replication Net rk traffic to the VLAN-MCoE-OCVS-USW01-Rep	Allow HCX WAN transport tra phere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr plication Net VLAN.
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 \rightarrow 0.0.0.0/0:500 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Ingress Source \rightarrow Destination 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 \rightarrow 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Vector of the security rules in the NSG to enable network Ingress	No No E-OCVS-USW01-vSphere Trk traffic to the VLAN-MCoE-OCVS-USW01-vSg Stateless No No E-OCVS-USW01-vSphere	Allow HCX WAN transport tra Shere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9080 (TCP)	No No No E-OCVS-USW01-vSphere rk traffic to the VLAN-MCOE-OCVS-USW01-vSp Stateless No No E-OCVS-USW01-Replication Net C ² rk traffic to the VLAN-MCOE-OCVS-USW01-Rep Stateless	Allow HCX WAN transport tra phere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr plication Net VLAN. Description
groups Testing connectivity Migrating workloads using VMware HCX		172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Wetwork Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) Updates the security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:9080 (TCP)	No No No E-OCVS-USW01-vSphere rk traffic to the VLAN-MCOE-OCVS-USW01-vSp Stateless No No E-OCVS-USW01-Replication Net C ² rk traffic to the VLAN-MCOE-OCVS-USW01-Rep Stateless	Allow HCX WAN transport tra phere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr plication Net VLAN. Description
groups Testing connectivity Migrating workloads using VMware HCX	Previous Apply Configuration Cance	172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable networ Add security rules to this network security group. Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Add security rules to this network security group. Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9080 (TCP) 3c Show Advanced Options	No No No E-OCVS-USW01-vSphere rk traffic to the VLAN-MCOE-OCVS-USW01-vSp Stateless No No E-OCVS-USW01-Replication Net C ² rk traffic to the VLAN-MCOE-OCVS-USW01-Rep Stateless	Allow HCX WAN transport tra phere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr plication Net VLAN. Description
groups Testing connectivity Migrating workloads using VMware HCX	Previous Apply Configuration Cancer	172.17.31.0/24 → 0.0.0.0/0:500 (TCP) 172.17.31.0/24 → 0.0.0.0/0:4500 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable networ Add security rules to this network security group. Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9443 (TCP) 172.17.31.0/24 → 0.0.0.0/0:443 (TCP) Network Security Group Name: NSG for VLAN-MCol Updates the security rules in the NSG to enable network Add security rules to this network security group. Ingress Source → Destination 172.17.31.0/24 → 0.0.0.0/0:9080 (TCP) 3c Show Advanced Options	No No No E-OCVS-USW01-vSphere rk traffic to the VLAN-MCOE-OCVS-USW01-vSp Stateless No No E-OCVS-USW01-Replication Net C ² rk traffic to the VLAN-MCOE-OCVS-USW01-Rep Stateless	Allow HCX WAN transport tra phere VLAN. Description Allow HCX REST API traffic Allow HCX X-cloud control tr plication Net VLAN. Description

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Configuring BGP on-premises

Configure route tables and network security groups

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The review page displays Route Table and Network Security Group configurations the wizard is going to create. By default, the wizard allows ALL traffic between the on-premises Network and the workload network. If this is not desired, change the rules configured on the following NSG: 'NSG for NSX Edge Uplink VLANs in <your sddc>.'

2 Review and Apply Configuration	Applying Configuration		
	▼ Create Route Tables (1 resolved)	Done 🥑	
	Route Tables (i resolved)	Done 📀	
	Update Route Tables (4 resolved)	Done 🤡	
	Route Table for VLAN-MCoE-OCVS-USW01-HCX	Done 🥝	
	Route Table for VLAN-MCoE-OCVS-USW01-vSphere	Done 🧭	
	Route Table for VLAN-MCoE-OCVS-USW01-NSX Edge Uplink 1	Done 🤡	
	Route Table for VLAN-MCoE-OCVS-USW01-Replication Net	Done 📀	
	▼ Update Network Security Groups (4 resolved)	Done 🧭	
	NSG for VLAN-MCoE-OCVS-USW01-HCX	Done 📀	
	NSG for VLAN-MCoE-OCVS-USW01-vSphere	Done 🔇	
	NSG for VLAN-MCoE-OCVS-USW01-Replication Net	Done 🔇	
	NSG for NSX Edge Uplink VLANs in MCoE-OCVS-USW01	Done 🥑	
	Update Attached DRG (1 resolved)	Done 🥑	
	Update Attached DBG (1 resolved)		
	NSG for NSX Edge Uplink VLANs in MCoE-OCVS-USW01	Done 🥑	

FIGURE 45. Applying configuration

Testing connectivity

The last step is to validate that connectivity works between your on-premises environment and your Windows server running in the Oracle Cloud VMware Solution software-defined datacenter.

- 1. Perform a simple ping from a server running in the on-premises environment to a server running in Oracle Cloud VMware Solution.
- 2. If the ping responds, try pinging from the Windows server from a Remote Desktop. Remote Desktop isn't enabled by default in Windows either, so be sure to enable it first.

HELPFUL NOTE

Windows will block ping by default, so allow ping through the windows firewall if you haven't already.

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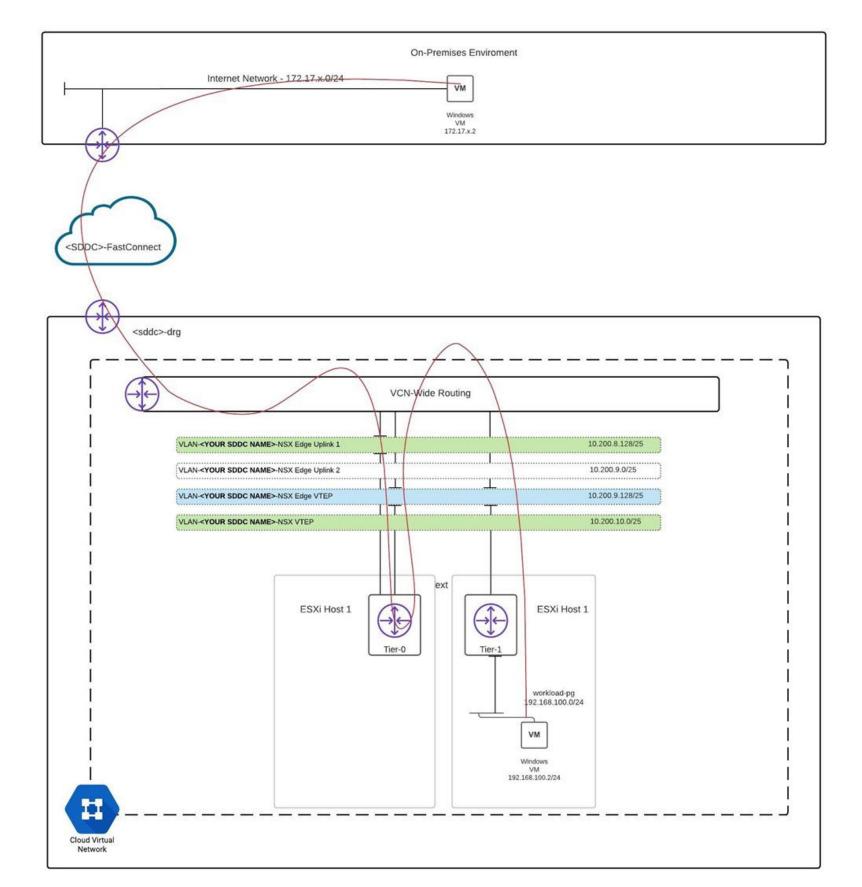


FIGURE 46. Traffic flow from on-premises to cloud

Traffic flowing from your on-premises virtual machine exits the on-premises router via its BGP connection established with the Oracle FastConnect. Traffic then enters the Oracle Cloud infrastructure via the Dynamic Routing Gateway and is sent to the 'VLAN-<sddc>-NSX Edge Uplink 1' VLAN, where it enters the NSX Edge VIP. Finally, the NSX-T Tier-O router forwards the traffic to the Tier-1 router, which sends the traffic to the Windows server connected to the workload Segment.

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Migrating workloads using VMware HCX

This chapter covers the installation of VMware HCX in an on-premises vSphere environment and a site-pairing configuration between the on-premises environment and Oracle Cloud VMware Solution.

Once HCX is configured, connectivity will be tested by migrating a workload between sites. The vMotion of virtual machines between sites requires extending networks allowing virtual machines to move between sites without changing the IP addresses. The process to extend a network will also be covered in this chapter.

Figure 48 is a high-level diagram of an HCX deployment utilizing FastConnect to connect an on-premise SDDC to an Oracle Cloud VMware Solution SDDC.

HELPFUL NOTE

This chapter will not review the details of how to configure your HCX service mesh. More information about the configuration of the HCX service mesh can be found in VMware's official documentation: VMware HCX User Guide.

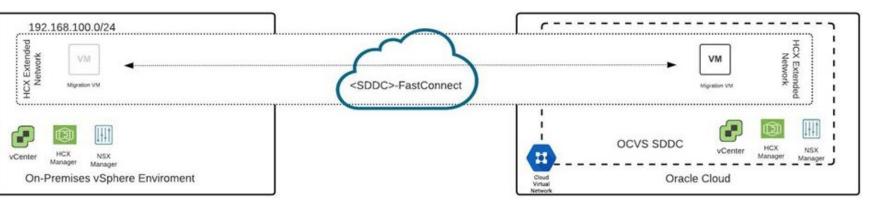


FIGURE 48. HCX deployment

The following steps describe how to:

- Install HCX Connector
- Connect on-premises to Oracle Cloud VMware Solution
- Extend a network from on-premises to Oracle Cloud VMware Solution
- vMotion VMs from on-premises to the Oracle Cloud VMware Solution
- Bulk Migration of a VM from on-premises to Oracle Cloud VMware Solution

Installing the HCX connector

The first step to installing VMware HCX in an on-premises environment is to download the HCX Connector appliance from the HCX instance running in the Oracle Cloud VMware Solution environment. The HCX Connector OVA can also be downloaded from the *HCX Manager*.

1. Log in to the Oracle Cloud VMware Solution console

- 2. Select the correct **region**. This region is where the software-defined datacenter and Bastion Host were deployed.
- 3. Select Hybrid > VMware Solution
 - a. Select the name of the software-defined datacenter
- 4. In the Software-Defined Datacenter Information section, Copy the vSphere Client URL





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Conc	lusion

	arch for resources, services, and documentation			US West (San Jose) 🗸 🕗 📮 🌐
VMware Solution » Software-Defined Data C	Centers » Software-Defined Data Center Details			
	MCoE-OCVS-USW01			
	Edit SDDC Move Resource Add Tags Terminate			
VMS	Configure connectivity to your on-premises network	Configure connectivity to Oracle Services Network	Configure connectivity to the internet through NAT gateway	Configure connectivity to VCN resources
	SDDC Information Tags			
ACTIVE	Oracle Cloud VMware Solution			
	HCX: Enabled		NSX Edge IP Address:200.8.130 Show Copy (i)	
	VMware Software Version: 7.0 update 2		OCID:sxecsq Show Copy	
	Availability Domain: Swvn:US-SANJOSE-1-AD-1		Created: Wed, Jun 23, 2021, 14:32:54 UTC	
	SDDC Workload Segment Name: workload			
	SDDC Workload CIDR: 192.168.150.0/24			
	vCenter Information			
	vSphere Client: https://vcenter-mcoe-ocvs-usw01.sddc.sjc.oci.oraclecloud.co	m 🖾 <u>Copy</u> (i)	vCenter Initial Username: administrator@vsphere.local (i)	
	vSphere Client IP Address: https://10.200.11.130		vCenter Initial Password: ****** Show Copy (i)	
	NSX Manager Information			
	NSX Manager: https://nsx-mcoe-ocvs-usw01.sddc.sjc.oci.oraclecloud.com	Copy (1)	NSX Manager Initial Username: $admin(\hat{i})$	
	NSX Manager IP Address: https://10.200.11.131		NSX Manager Initial Password: "Show Copy (i)	
	HCX Manager Information			
	HCX Manager: https://hcxmgr-mcoe-ocvs-usw01.sddc.sjc.oci.oraclecloud.com	n 🖸 Copy ()	HCX License Type: Advanced Change	
	HCX Manager IP Address: https://10.200.11.132		HCX on-premises Connector Activation Keys: 3 View (i)	
	HCX Manager Initial Username: $admin$ (i)			
	HCX Manager Initial Password: ***** Show Copy (i)			

FIGURE 49. Installing the HCX connector

- 5. Open a browser window either on the **Bastion Host** or on a machine that has access to the Bastion Host via an *SSL Tunnel*
- 6. Paste the vSphere Client URL into a new browser tab
- 7. Copy/Paste the vCenter Initial Username and vCenter Initial password to log in to vCenter

Once logged into vCenter, head into the HCX interface.

- 1. Click Menu in the vSphere client and select HCX from the dropdown menu (Figure 50)
- 2. Click Administration in the left-hand Menu (Figure 51)

vm vSphere Client	Menu 🗸 🛛 🔍 Search in all environmen	s			C ⑦ ~ Administrator@VS	SPHERE.LOCAL V
III IP I IP ✓ IP vcenter-mcoe-ocvs-usw01	G Home ctrl + alt + home ♦ Shortcuts ctrl + alt + 1	1CoE_Test_WIN D 🗆 🚅 ary Monitor Configure Permi		Updates		
 ♥ eci-w01dc ♥ eci01-w01-consolidat ♥ mcoe-ocvs-usw01- ♥ msx-edge-01 ♥ msx-02 ♥ msx-03 	Image: Hosts and Clusters ctrl + alt + 2 Image: WMs and Templates ctrl + alt + 3 Image: Storage ctrl + alt + 4 Image: WMs/King ctrl + alt + 5 Image: Content Libraries ctrl + alt + 5 Image: WMs/Kioad Management ctrl + alt + 7 Image: Global Inventory Lists ctrl + alt + 8 Image: Policies and Profiles Auto Deploy Image: Hybrid Cloud Services we peveloper Center	Guest OS: Compatibility: VMware Tool: VMware Tool: UMWARE TOOL UMWARE TOOL IP Addresses: CH WEB CONSOLE CH REMOTE CONSOLE CH REMOTE CONSOLE	MORE INFO WIN-0.871ADHH8TT 192.168.150.2 VIEW ALL 2. IP ADDRESSES mcoe-octs-usw01-1.sub06231429341.mcoeocvsusw01vc FAULT-DOMAIN-1	.oraclevcn.com		SWITCH TO NEW VIEW CPU USAGE 19 MHZ MEMORY USAGE 204 MB STORAGE USAGE 18.97 GB
☆ Vcenter	C Administration	lardware	~	Notes		^
MCoE_Test_Wit	箇 TasksⅢ Events	ed Objects	^	Edit Notes		
	Tags & Custom Attributes Lifecycle Manager	Cluster	oci01-w01-consolidated01	Custom Attributes		^
	DRaaS		ncoe-ocvs-usw01-1.sub06231429341.mcoeocvsusw01vc	Attribute	Value	
	vRealize Operations		Workload			
	I HCX		workload			
		Storage	vsanDatastore			



FIGURE 50. Installing the HCX connector

- c. Click Request Download Link
- d. Either download the OVA directly or copy the link to the OVA and paste it into a browser to begin the download process.

vm vSphere Client Menu V	Q Search in all enviro		С	?	inistrator@VSPHERE.L0	
HCX C Dashboard Infrastructure Site Pairing Site Pairing	~	Administration < 1/2 > Software Update: A new update is now available System Updates Troubleshooting Audit Logs Activity Logs				
Services Network Extension Migration Disaster Recovery System Administration Support	~	Pair your remote data center with VMware HCX Pair your remote data center with VMware HCX Prequest Download Link Local HCX SELECT SERVICE UPDATE				
		Current Version System Name T Status Info System Type Image: System Version hcx-01-cloud Downloaded Bundle 4.1.0.18180940 Image: System Version Image: System Version Image: System Version hcx-01-cloud Downloaded Bundle 4.1.0.18180940 Image: System Version Image: System Version		5X Version T 2.1.0.17975796	VC Version T 7.0.2.17958471	Copy To Clipboard শ্রি
						Number of Appliances 1

FIGURE 51. VMware HCX administration



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Once the OVA has been downloaded, deploy the OVA in the on-premises vSphere environment. See the VMware HCX documentation *Deploying the Installer OVA in the vSphere Client* for more information.

For the on-premises HCX Connector to connect to the HCX Manager in Oracle Cloud VMware Solution, ensure that the following *Firewall ports* are open on your on-premises environment.

To activate the on-premises HCX Connector, you need the HCX License Key from the OCI console.

- 1. Log in to the Oracle Cloud VMware Solution console
- 2. Select the correct **region** where the software-defined datacenter and Bastion Host were deployed.
- 3. Select the name of your software-defined datacenter
- 4. Copy the HCX On-premises Connector Activation Key

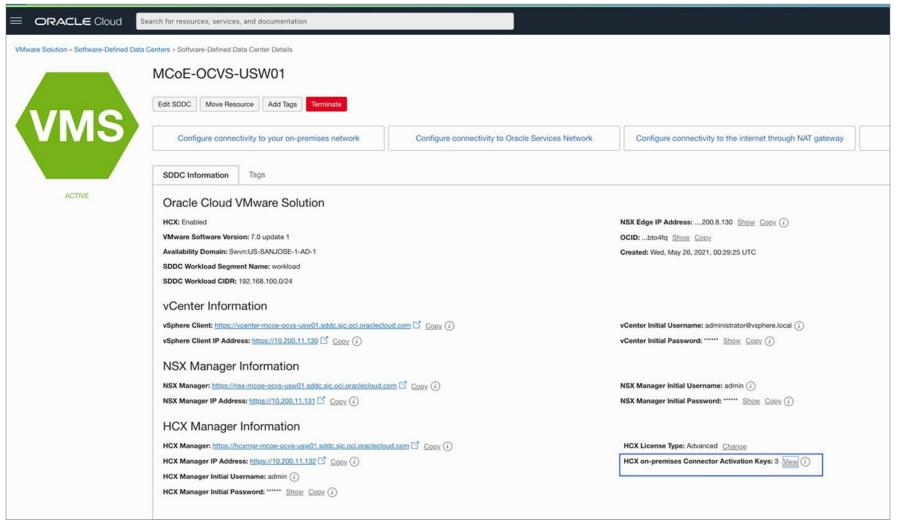


FIGURE 52. HCX license key

To activate the HCX Connector, follow the steps in the following link, using the HCX Activation key you just copied from the Oracle Cloud VMware Solution software-defined datacenter interface. For additional information, visit *Activating and Configuring HCX*

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Create a site pairing to Oracle Cloud VMware Solution

When creating the site pairing between software-defined datacenters, you'll need to specify the HCX Manager FQDN or IP address and then use the vCenter Initial Username and Password. Do not try and use the HCX Manager Initial Username and Password, as you'll end up with an authentication error.

vm vSphere Client Menu v	Q Search in all environments	C	? ~	jason@TSHIRTS.INC ∨	
HCX Dashboard Infrastructure	Site Pairing				
Site Pairing Interconnect Services System Image: Administration Image: Support				C ADD A SITE PA	IRING

FIGURE 53. Creating a site pairing

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Create an HCX service mesh

With the site pairing created, you can now config the service mesh. The service mesh is the deployment of virtual appliances used by HCX at both the source and destination to facilitate the functioning of HCX. If you are not familiar with this process, follow the VMware documentation: *Creating a Service Mesh*

vm vSphere Client Menu V	Q Search in all environments	C	?~	jason@TSHIRTS.INC ∨	
HCX Dashboard Infrastructure Site Pairing Interconnect	Interconnect Multi-Site Service Mesh Compute Profiles Service Mesh Network Profiles Sentinel Management				1
Services Migration Disaster Recovery System Administration Support	V OCVS-Interconnect-1 Site Pairing Image: Site CP San Jose SJC-CP Uplinks (Overridden) Uplinks (Overridden) Image: Site Comp-mgmt Image: Site Comp-mgmt Image: Site Comp-mgmt Image: Site Comp-mgmt Image: Site Comp-mgmt		Q		X

FIGURE 54. Creating a service mesh

Workload migration

Bulk migration

With the site pairing and service mesh configured between your on-premises vSphere environment and Oracle Cloud VMware Solution software-defined datacenter, it's time to start migrating some workloads. This example is a simple bulk migration of a single virtual machine from an on-premises environment to an Oracle Cloud VMware Solution. In a production environment, multiple Virtual machines can be moved at once.

- 1. In the Software-Defined Datacenter Information section, Copy the vCenter Client URL
- 2. **Open a browser window** either on the Bastion Host or on a machine that has access to the Bastion Host via an SSL Tunnel
- 3. Paste the vSphere Client URL into a new browser tab
- 4. Copy/Paste the vCenter Initial Username and vCenter Initial password to log in to vCenter
- 5. Click Menu in the vSphere client and select Host and Cluster
- 6. Right-click the Virtual Machine>HCX Actions> Migrate to HCX Target Site (Figure 55)

	Actions - OCVS_Migration_VM Power						SWITCH TO NEW	
	Guest OS		dows Server 2008 R2 (64-bit) ater (VM version 14)					
	Snapshots •	VMware Tools: Running, versi MORE INFO	on:11297 (Current)				U HZ	DRY USAG
and the second second	💕 Open Remote Console	DNS Name: WIN-AT34Q1S	07AI				122 M	MB
	🚑 Migrate	IP Addresses: 172.17.31.150 VIEW ALL 2 IP	ADDRESSES					AGE USA
	Clone	SOLE Host: sjc-esx-07.tsh	irts.inc				16.24	24 GB
	Fault Tolerance	CONSOLE U 🍂 🦓						
	VM Policies			✓ Not	es			
	Template							
	Compatibility			Edit	Notes			
	Export System Logs	Compute Cluster		Cus	tom Attributes			
	🔯 Edit Settings	sjc-esx-07.tshirts.i			tribute	Value		
	Move to folder							
	Rename	🔓 sjc-mgmt-mgmt-17						
	Edit Notes	comp-vsanDatasto	ore					
	Tags & Custom Attributes							
	Add Permission							
	Alarms	Category	Description	Edit			No items to	to display
Recent Tasks Alarms	Remove from Inventory	Guegory	Description	i i Edit				
Task Name v Target	Delete from Disk	V Details V	Initiator v	Queued For	\checkmark Start Time \downarrow	✓ Completion Time ✓	Server	
Query Sjc-	-esx- vSAN		com.vmware.vsan.health	4 ms	06/29/2021, 8:49:59 PM	06/29/2021, 8:49:59 PM	sjc-vcsa-01.tshirts.in	nc
	VSAN		com.vmware.vsan.health	4 ms	06/29/2021, 8:49:58 PM	06/29/2021, 8:49:59 PM	sjc-vcsa-01.tshirts.in	inc
Query Sjc-			com.vinware.vsan.nealan					
	-esx- 🚯 All Site Recovery actions 🔹			3 ms	06/29/2021, 8:49:57 PM	06/29/2021, 8:49:58 PM	sjc-vcsa-01.tshirts.in	

FIGURE 55. Migrate to HCX Target Site



a. Expand Remote Site Connection and select the remote site (if you only have one site pairing, this step is not required)

 Select Connection 				C' Reland Conner
(there are 2 records found)	w01.sddc.sjc.oci.oraclecloud.com → Destination: (select)			
Source: https://ocadu/ / VC: vcenter-mcoe-ocvs-uks01.sdd/ https://o.230.7.341				
hcx-01-cloud / VC: vcenter-vsphere67update3.sd https://10.230.7.132	dc.lhr.oci.oraclecloud.com			
 Transfer and Placement: 				
	(Mandatory: Storage)	2	(Migration Profile)	
	Same format as source	~	(Optional: Switchover Schedule)	(
Switchover:				
Extended Options:				
Edit Extended Options				
selected				9
	Disk / Memory / vCPU		Migration Info	

FIGURE 56. Remote Site Connection

b. A new window will appear.

- Select the VM to be migrated
- c. Complete Mandatory Transfer and Placement and VM Migration mandatory fields at a minimum and then select **Validate**. If validation is successful, you can proceed with the migration.

Validation is Successful, You can proceed					(
→ 🛃 Destination: hcx-01-cloud / VC https://10.200.11.132	: vcenter-mcoe-	-ocvs-usw01.sddc.sjc.oci.oraclecloud.com			
Transfer and Placement:					
Horkload	-	vsanDatastore (116.1 TB / 122.3 TB)	-	Bulk Migration	~
Discovered virtual machine		Thin Provision	~	(Optional: Switchover Schedule)	O
Switchover:					
Extended Ontioner					
Extended Options:					
Edit Extended Options Retain MAC	\Box				
Extended Options: Edit Extended Options Retain MAC	D				Q
Edit Extended Options Retain MAC	Ð	Disk / Memory / vCPU		Migration Info	Q
Edit Extended Options Retain MAC	<u>ک</u>	-		Migration Info	٩
Edit Extended Options Retain MAC		-	<u> </u>	Migration Info Bulk Migration	Q
Edit Extended Options Retain MAC	Ċ	40 GB / 4 GB / 2 vCPU			
Edit Extended Options Retain MAC A for Migration • • OCVS_Migration_VM • Workload • Discovered virtual machine	ے د آ	40 GB / 4 GB / 2 vCPU	_	Bulk Migration	✓
Edit Extended Options Retain MAC A for Migration • • OCVS_Migration_VM • Workload • Discovered virtual machine • Force Power-off VM	ے د آ	40 GB / 4 GB / 2 vCPU	_	Bulk Migration	~
Edit Extended Options Retain MAC	ڻ ج	40 GB / 4 GB / 2 vCPU	_	Bulk Migration	~

FIGURE 57. Migrate Virtual Machine

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The virtual machine data is copied to the remote site. Once the data transfer is complete, the virtual machine is powered off on the on-premises environment and moved into a folder named 'VMs migrated to cloud.' The virtual machine is then added into the inventory of the Oracle Cloud VMware Solution software-defined datacenter and powered on if it was powered on before the migration has been initiated.

vm vSphere Client Menu ∨	Q	Search in all environments		
HCX ② Dashboard		Migration		
Infrastructure	~			
C Site Pairing				Q
Services	~			
Network Extension				
 Migration Disaster Recovery 		\sim 🗟 sjc-vcsa-01.tshirts.inc \rightarrow 🍙 vcenter-mcoe-ocvs-usw01.sddc.sjc.oci.oraclecloud.c	com	
System	~	OCVS_Migration_VM Em 40 GB / 4 GB / 2 ⊘ Migration Complete jacon@TSHIRTS.INC 40 GB / 4 GB / 2 ⊘ Migration Complete		9:17 PM CDT 9:48 PM CDT 32 min Migration completed Jun 29 Jun 29
🖧 Administration		Destination Resource Pool : 🕢 Workload Datastore : 🗎 vsanDatastore		Migration ID: 85d63e20-ebcd-4cf6-90db-bec4015ab14a
© Support	1	Destination Datacenter : 🗐 oci-w01dc Disk Format : 🕞 Thin Provision		Migration Group ID : e80117ae-0c00-4d1c-84b8-01f683cef116
		Destination Folder : 🗁		Migration Profile : 🗁 Bulk Migration
		Discovered virtual machine		Maintenance Window : 🛄 Not Scheduled
		Migration Options : Retain Mac		C EVENTS (Show previous 34 events)
		\bigcirc sjc-mgmt-mgmt-1731 \rightarrow \bigcirc VM Network	^{35.} 1 min ago	+27m Disabling replication on source VM
			^{36.} 37 sec ago	+28m Removing Replication config on source side IX appliance
			^{37.} 21 sec ago	+28m Clearing up replication transfer source side completed

FIGURE 58. Migration complete



Network extension

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Before attempting a vMotion of an on-premises virtual machine to the Oracle Cloud VMware Solution SDDC, an extension of the on-premises Network the virtual machine is connected should be completed. An HCX Network Extension, also known as a stretched Layer 2 network, allows extending virtual machine networks to a VMware HCX-enabled remote site. Virtual machines migrated or created on the extended segment at the remote site are on the same Layer 2 network as virtual machines placed on the origin network.

Creating the network extension is a straightforward process performed via the HCX interface.

1. Click Menu in the vSphere client and select HCX

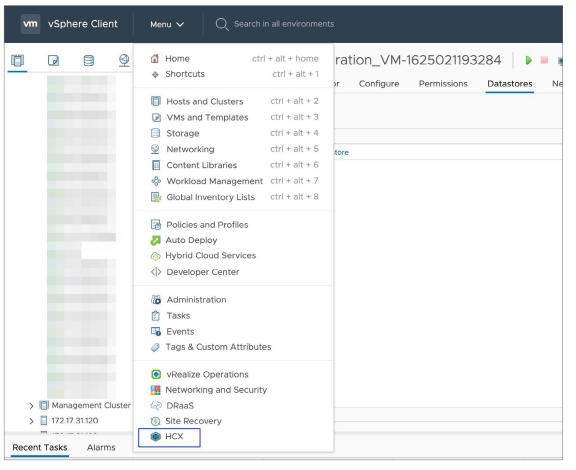


FIGURE 59. Select HCX in vSphere Client

2. In the Services Section on the left, Select Network Extension

3. In the Network Extension Window, Select Extend Networks

vm vSphere Client Me	nu 🗸 🛛 🔍 s	arch in all environments	C	? v	jason@TSHIRTS.INC ∨	6
нсх		Network Extension				
Dashboard		Network Extension				
Infrastructure	~	A R - Real and the second second second				
🗘 Site Pairing		+EXTEND NETWORKS CREFRESH 🗇 UNEXTEND NETWORKS 🗹 OPEN IN TAB				
🗞 Interconnect						
Services	~	\checkmark $\boxed{8}$ sjc-hcxm-01.tshirts.inc \rightarrow $\textcircled{0}$ hcx-01-cloud			Extens	sions: 🗿
Network Extension		Service Mesh: OCVS-Interconnect-1			+EXTEND NETW	ORKS
Migration						
Disaster Recovery						
System	~					
🖧 Administration						
O Support						

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FIGURE 60. Network extension

- a. Select the Network to be extended
- b. Click Next
- c. Enter Gateway IP Address for Network
- d. Click Submit

HCX Dashboard		Network Extension			
Infrastructure	~	and a subscription of the subscription of the			
 ✓ Site Pairing ℅ Interconnect 		+EXTEND NETWORKS C REFRESH D UNEXTEND NETWORKS C OPEN	NIN TAB		
Services	~	\sim 🐻 sjc-hcxm-01.tshirts.inc \rightarrow 🌘 hcx-01-cloud			Extensions
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System	~	Extended Networks	Extension Appliances	Network Container	
🖧 Administration		Source Network T Source VNI/VLAN ID	T Source Network Container T Gateway IP Address	▼ Extension Appliance ▼ Status	
O Support		□ : > Test-Overlay-1 69632	nsx-overlay-transportzone 192.168.2.1/24	OCVS-Interconnect-1-NE-I1 🔮 Exten	sion complete

FIGURE 61. Network extension



Key terms

Getting started

Deploying Oracle Cloud infrastructure

Deploying VMware Software-Defined Datacenter with HCX

Oracle Cloud Infrastructure (OCI) and Oracle Cloud VMware Solution Networking

Connecting to Oracle Cloud Infrastructure Services

Connecting to an on-premises environment

Migrating workloads using VMware HCX

Install HCX connector

Create site pairing

Create HCX service mesh

Workload migration

Conclusion

With the Extended Network in place, the virtual machine to be vMotion to the Oracle Cloud VMware Solution SDDC can be moved. The steps are very similar to Bulk Migration. When selecting the migration profile, select "vMotion," and the destination network for the virtual machine should be the extended Network.

, <u> </u>	Migration		
→ P Destination: hcx-01-cloud / VC: vce https://10.200.11.132	enter-mcoe-ocvs-usw01.sddc.sjc.oci.oraclecloud.com		0
 Transfer and Placement: 			
🔗 Workload	vsanDatastore (116.1 TB / 122.3 TB)	vMotion	~
Discovered virtual machine	🖆 Thin Provision	✓ (Optional: Switchover S	Schedule)
> Switchover:			
Extended Options:			
Extended Options: Edit Extended Options Retain MAC			
			Q
Edit Extended Options Retain MAC	Disk / Memory / vCPU	Migration Info	Q
Edit Extended Options Retain MAC	Disk / Memory / vCPU 40 GB / 4 GB / 2 vCPU	Migration Info	Q
Edit Extended Options Retain MAC M for Migration V OCVS_Migration_VM		Migration Info	
Edit Extended Options Retain MAC M for Migration VOCVS_Migration_VM	40 GB / 4 GB / 2 vCPU		
Edit Extended Options Retain MAC M for Migration • • OCVS_Migration_VM • • Workload • • Discovered virtual machine	40 GB / 4 GB / 2 vCPU Image: state sta	vMotion	
Edit Extended Options Retain MAC M for Migration • OCVS_Migration_VM • Workload • Discovered virtual machine • Force Power-off VM	40 GB / 4 GB / 2 vCPU Image: state sta	vMotion	
Edit Extended Options Retain MAC M for Migration • OCVS_Migration_VM • OCVS_Migration_VM • Workload • Discovered virtual machine	40 GB / 4 GB / 2 vCPU Image: state sta	vMotion	
M for Migration VM for Migration_VM Workload Discovered virtual machine Force Power-off VM Edit Extended Options Retain MAC *	U 40 GB / 4 GB / 2 vCPU Image: State of the state of	vMotion	

FIGURE 62. HCX: Migrate Virtual Machine

vMotion

Once the Migration plan has been validated, you can begin the replication. After some time, you will start to see the virtual machine being vMotioned into our Oracle

Cloud VMware Solution software-defined datacenter.

Now that HCX is configured correctly, you can migrate workloads to and from your Oracle Cloud VMware Solution software-defined datacenter as necessary.

HELPFUL NOTE

Consult the *HCX Configuration Limits* documentation for migration limitations.

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2 Dashboard		Migration										
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🕜 Site Pairing				송 ARCHIV	VE						Q	
oo Interconnect											<u> </u>	
Services	~	OCVS_Migration_VM	40 GB /	4 GB / 2	Migration Complete	7:44 / Jun 30	AM CDT	7:50 AM CDT Jun 30	6 min	Migration completed		
Network Extension		Destination Resource Pool : 🕢 Workload	Datas	tore : 🗎 vsanDa	atastore		Migrat	tion ID: 9c61e474	-ab14-494	1-86a6-06715b7172d5		
Migration		Destination Datacenter : 🛄 oci-w01dc	Disk For	mat : 🖨 Thin Pr	rovision		Migration Gro	oup ID : e1d570d3	-eebe-486	c-8eef-c468893e9db4		
Disaster Recovery		Destination Folder : 🗁 Discovered virtual machi	ne				Migration	Profile : 👉 vMotic	on			
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log Administration			→	1 60600 0-0	10.11				s			
© Support		C Test-Overlay-1	→ ♀ L2E_lest-Ove	nay-1-69632-368	12410	Switchover Events:						
						¹ . 36 sec ago		Start Collecting	source de	tails		

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FIGURE 63. vMotion migration



Key terms

Getting started

Deploying Oracle Cloud infrastructure

Deploying VMware Software-Defined Datacenter with HCX

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Conclusion

Conclusion

Oracle Cloud VMware Solution accelerates and simplifies an organization's move to the Cloud, allowing the organization to embrace improved agility, scalability, and resiliency.

This eBook is the first step in the journey to Oracle Cloud with Oracle VMware Cloud Solution. To learn more about the solution, please visit our Oracle Cloud VMware Solution website or contact one of VMware's Cloud Experts at OCVSsales@vmware.com

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