

This support document is intended for users with an active VMware vSphere license. If you do not have a VMware vSphere license, you will need to purchase one to operate NETLAB+ until our team releases a version utilizing Proxmox.



Remote PC Guide Series – Volume 2

Installing and Configuring VMware vSphere 8.0

Document Version: 2023-10-17





This guide will lead you through the process of adding remotely accessible PC or servers into your NETLAB+ equipment pods using the <u>VMware</u> ESXi and vCenter virtualization products.

This guide is part of a multi-volume series, designed to provide you with the guidance needed to implement remote PCs on your NETLAB+ system. Learn more about the Remote PC Guide Series. See the Documentation Library for a list of all NETLAB+ guides.



The details of this guide are specific to **vSphere version 8.0 with vCenter.**

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1 Background

NETLAB+ pod remote PCs and servers can be implemented using virtual machines running on VMware vSphere 8.0. This guide is designed to help you set up your virtual machine infrastructure for use with NETLAB+.

- This guide assumes you are familiar with the Remote PC concept behind NETLAB+. Please review the <u>NETLAB+ Designated Operating Environment Guide</u> for information on the components required to configure a NETLAB+ system.
- This guide is designed to help you install and configure vSphere 8.0 for use with NETLAB+. You will be installing VMware ESXi 8.0 and a VMware vCenter 8.0 Server Appliance.
- This guide also assumes that you have configured the NDG supported servers, as recommended.

The basics of a NETLAB+ infrastructure consist of a NETLAB+ VE Appliance, Management Server, vCenter Appliance, and ESXi Host Server. The images that follow show two configuration options that illustrate how these all work together.

The following network topology is an overview of the Designated Operating Environment for NETLAB+ VE when configured behind a firewall DMZ (demilitarized zone).



NETLAB+ VE Behind Firewall DMZ (demilitarized zone)



Management Host

The following network topology is an overview of the Designated Operating Environment for NETLAB+ VE when configured through a campus LAN.



User Hosts

NETLAB+ VE Through Campus LAN



2 VMware Infrastructure Planning

There are two components to the VMware Infrastructure: (1) Physical VMware ESXi servers to host the virtual machines in your pods (2) VMware vCenter Server, which enables you to manage the resources of multiple ESXi hosts and allows you to monitor and manage your physical and virtual infrastructure.

Virtualization using ESXi is performed on separate physical servers, not included with NETLAB+ VE. You can interface with multiple ESXi servers for larger deployments. NETLAB+ VE integrates with VMware vCenter Server to assist the administrator with installing, replicating, and configuring virtual machine pods.



NETLAB+ VE is compatible with VMware ESXi version 8.0 and vCenter Server version 8.0.



2.1 VMware ESXi Host Requirements

Please refer to our host server specifications page for the latest information on recommended ESXi Host servers. Use the following link to get detailed requirements: <u>https://www.netdevgroup.com/support/documentation/netlabve/lenovo_for_netlabve_.pdf</u>

Please search the VMware Compatibility Guide to ensure your ESXi host hardware is compatible with the VMware version you wish to use: <u>http://www.vmware.com/resources/compatibility/search.php</u>

NDG Equipment Selection Disclaimer

NDG offers no warranties (expressed or implied) or performance guarantees (current or future) for third-party products, including those products NDG recommends. Due to the dynamic nature of the IT industry, our recommended specifications are subject to change at any time.

NDG recommended equipment specifications are based on actual testing performed by NDG. To achieve comparable compatibility and performance, we strongly encourage you to utilize the same equipment, exactly as specified and configure the equipment as directed in our setup documentation. Choosing other hardware with similar specifications may or may not result in the same compatibility and performance. The customer is responsible for compatibility testing and performance validation of any hardware that deviates from NDG recommendations. NDG has no obligation to provide support for any hardware that deviates from our recommendations, or for configurations that deviate from our standard setup documentation.

Hardware-assisted virtualization (Intel VT-x) is **REQUIRED** on any host you use.

Virtualization courses, such as the VMware IT Academy labs, have not been tested on server platforms using AMD processors and are not supported on server platforms using AMD processors. VMs available from CSSIA were created on the Intel platform. As such, they may not work as intended on a server platform utilizing AMD processors.



2.2 VMware vCenter Server Requirements

As of vSphere 5.1, NDG only supports the VMware vCenter Server Appliance. The physical server where the vCenter Server Appliance resides should be a dedicated "management server" to provide ample resources. It is strongly recommended you follow our server recommendations listed below to provide ample resources now and in the future.

https://www.netdevgroup.com/support/documentation/netlabve/lenovo_for_netlabve_ .pdf

> NDG does not support configurations where vCenter is running on a heavily loaded ESXi host and/or an ESXi host that is also used to host virtual machines for NETLAB+ pods. Such configurations have exhibited poor performance, API timeouts, and sporadic errors in NETLAB+ VE operations.

The vCenter server must have network access to your ESXi servers. Use any web browser to access the vCenter Server after it is deployed.



3 VMware Infrastructure Software and Licenses

To continue this process, you must have a VMware Customer Connect and VMware DL2 Brightspace account. Optionally, you may use licenses provided by your organization.

3.1 Downloading ESXi Software for the Lenovo Think System

If you are not using the Lenovo Think System, please skip to section 3.2.

It is very important that you download the software from Dell, as they have customized the installer ISO with drivers for the server platform, including networking and storage adapters.

The following procedure assumes you are using a Lenovo Think System:

- Download the Custom VMware ESXi for Lenovo by going to: <u>https://vmware.lenovo.com/content/custom_iso/8.0/8.0u2/</u>
- 2. Click on VMware-ESXi-8.0.2-22380479-LNV-S01-20230907.iso.
- 3. The ISO file should begin downloading.

3.2 Gaining Access to VMware Licenses for Your Infrastructure

Licensing considerations will vary, depending on your school's participation in the <u>VMware IT Academy Program (VITA)</u> and/or <u>VMware Academic Software Licensing</u> <u>Program</u>.

3.3 Obtaining VMware vCenter and ESXi Licenses

When downloading VMware vCenter and ESXi, it is important to select a version that is compatible with NETLAB+. NETLAB+ is compatible with VMware vCenter and ESXi versions 8.0.

- 1. Navigate to the <u>VMware Academic Software Licensing Program</u>.
- 2. Log in as an Academy Admin or Instructor.
- You must be a registered Academy Admin or Instructor user. If you have questions or need additional support, please contact <u>itacademy@vmware.com</u>. If you need help on how to apply to the program, please follow these steps: <u>D2L</u> <u># 1 How to Apply to the Program YouTube</u>.
- 4. Obtain licenses for <u>VMware vCenter Server 8.x Standard</u> and <u>VMware vSphere</u> <u>8.x Enterprise Plus</u>.



3.4 Obtaining VMware vCenter 8.0 Software

You must have a VMware Customer Connect account to continue this process. You can create one by going to <u>https://customerconnect.vmware.com/</u>.

- 1. Log in to the <u>VMware Customer Connect Portal</u>.
- 2. Click on Downloads.

Ŧ	Q .,		0	3
Downloads	License Management	Knowledge Base	Get Support	Success Home

3. Click on **All Products** and then **View Download Components** for VMware vSphere.

My Products AI Products A-Z End of Life Products Datacenter & Cloud Infrastructure	ALL PRODUCTS V
Products	
VMware vCloud Suite Platinum	View Download Components Drivers & Tools Buy
VMware vCloud Suite	View Download Components Drivers & Tools
VMware vSphere	View Download Components Drivers & Tools Try Get Training
VMware vCenter Cloud Gateway for vSphere+	View Download Components Drivers & Tools
VMware vSphere Bitfusion	View Download Components Drivers & Tools Try

4. Click on the **GO TO DOWNLOADS** link for VMware vCenter Server 8.0U2 or equivalent.

Product Downloads Drivers & Tools Open Source	Custom ISOs OEM Addons	
Product	Release Date	
✓ Essentials		
VMware vSphere Hypervisor (ESXi) 8.0U2	2023-09-21	GO TO DOWNLOADS
VMware vCenter Server 8.0U2	2023-09-21	GO TO DOWNLOADS
VMware NSX 4.1.1.0 For vShield Endpoint	2023-08-15	GO TO DOWNLOADS



5. Click on the **Download Now** button for VMware vCenter Server Appliance.

Product Downloads Drivers & Tools Open Source Custom ISOs OEM Addons	0
File Information	
VMware vCenter Server and modules	
VMware vCenter Server Appliance File size: 10.27 GB File size: 10.27 File size: 10.3 File Size	DOWNLOAD NOW
VMware vCenter Server Appliance Update Bundle File size: 7.57 GB File type: #0 Read More	DOWNLOAD NOW



4 VMware Infrastructure Setup

This section describes the software installation on a VMware ESXi host server.



All tasks in this section are performed on **separate dedicated physical servers** that you provide. Do not perform any of the tasks in this section on the NETLAB+ VE server appliance.

There should be a minimum of two (2) ESXi servers. One will be used for management, referred to as the Management Server, and the other will be your ESXi Host Server, which will hold the virtual machines for the pods. You may have one or more ESXi Host servers, depending on the courses you plan to teach.

NDG supports the Lenovo Think System for use as a Management Server or as an ESXi Host Server. Please refer to the NDG requirements website for the latest supported server configurations:

https://www.netdevgroup.com/support/documentation/netlabve/netlab_server_sp_ecifications_lenovo.pdf

4.1 Preparing the ESXi Server

NDG recommends the Lenovo Think System server platforms. If you are using nonsupported servers, please contact your vendor for assistance in configuring the BIOS and RAID options.

The management server recommended by NDG should have physical hard drives installed. These may or may not have been configured as a RAID 5 array. This article will explain how to create a RAID array using Lenovo XClarity Provisioning Manager:

<u>https://datacentersupport.lenovo.com/us/en/products/solutions-and-</u> <u>software/software/lenovo-xclarity-provisioning-manager/lxpm/solutions/ht507499-</u> <u>how-to-create-a-raid-array-within-lxpm</u>



4.2 Installing ESXi on a Host Server

Depending on how the Lenovo Think System was ordered, VMware ESXi 8.0.X may have come preinstalled. NDG recommends using ESXi customized for Lenovo servers. The latest versions of ESXi 8.0 customized for Lenovo can be found here:

https://vmware.lenovo.com/content/custom_iso/8.0/8.0u2

If ESXi is not installed, please use the link below to find the installation instructions on the VMware website.

https://support.lenovo.com/us/en/solutions/ht514417-installation-instructions-forvmware-esxi-8x-on-lenovo-thinksystem-servers

4.3 Basic Network Configuration

This section will refer you to the appropriate documentation on VMware's Website to configure the network settings on your servers. This will need to be performed on the Management Server and on each ESXi Host Server. The installation document can be found at the following link: <u>vSphere Installation and Setup</u>.



Please let us know if the above links to documentation do not work so that we can update our documentation accordingly.

At a minimum, the following must be set up on each server:

- Administrator password.
- Network settings, including a static IP address, subnet mask, and default gateway.
- If the network only requires an IPv4 address, it is strongly recommended that you disable IPv6 to prevent possible networking issues in a production environment DNS server address.
- A hostname is optional and only needed if local policy requires it.

All other settings are optional and only necessary if local policy requires them.



5 Management Console

The VMware vCenter Server Appliance can be managed through any web browser by simply navigating to the assigned IP addresses. This configuration requires a "management console" in order to configure the vCenter Server Appliance, ESXi Host Servers, and virtual machines. The management console can be either a virtual machine or a physical host like a workstation or laptop. The management console will need to be on the same network as the ESXi hosts and vCenter Server Appliance.

The management console is also used to download and deploy virtual machine images. As such, NDG strongly recommends this machine has a significant amount of storage, memory, and CPU power to successfully perform this task.



6 vCenter Server Appliance Deployment

NDG recommends deploying the vCenter Server Appliance by using the GUI. Full deployment options can be found in the <u>vCenter Server Installation and Setup document</u>.

The examples that follow are using a Microsoft Windows operating system. It is also possible to complete this process using Linux or Mac OS.



Please let us know if the above link to VMware's documentation does not work, so that we can update it accordingly.



NDG does not support configurations where vCenter is running on a heavily loaded ESXi host and/or an ESXi host that is also used to host virtual machines for NETLAB+ pods. Such configurations have exhibited poor performance, API timeouts, and sporadic errors in NETLAB+ operations.

6.1 Deploy and Install vCenter

- Last week (1) VMware-VCSA Disc Image File 7.808.906 KB Mount Earlier this mo Burn disc image 📄 rpviewer ٩M 7-7in 🐻 ChromeSetup Application CRC SHA Edit with Notepad++ R Share Open with... Give access to Restore previous versions Send to Cut Сору Create shortcut Delete Rename Properties
- 1. From the Management Console, mount the vCenter ISO.



2. Open the ISO mount folder and navigate to /vcsa-ui-installer/win32/.

Name	✓ Date modified	Туре	Size
📕 dbschema	4/20/2021 1:54 PM	File folder	
🔄 migration-assistant	4/20/2021 1:54 PM	File folder	
🔄 umds	4/20/2021 1:54 PM	File folder	
🔄 vcsa	4/20/2021 1:56 PM	File folder	
🔜 vcsa-cli-installer	4/20/2021 1:55 PM	File folder	
🔜 vcsa-ui-installer	4/20/2021 1:54 PM	File folder	
📝 readme	4/20/2021 1:54 PM	TXT File	5 KB
📝 readme-de	4/20/2021 1:54 PM	TXT File	7 KB
🥁 readme-es	4/20/2021 1:54 PM	TXT File	6 KB
📝 readme-fr	4/20/2021 1:54 PM	TXT File	7 KB
📝 readme-ja	4/20/2021 1:54 PM	TXT File	7 KB
📝 readme-ko	4/20/2021 1:54 PM	TXT File	6 KB
📝 readme-zh-CN	4/20/2021 1:54 PM	TXT File	5 KB
📝 readme-zh-TW	4/20/2021 1:54 PM	TXT File	5 KB
~			(0) (0)

Name ^	Date modified	Туре	Size	
📙 lin64	4/20/2021 1:55 PM	File folder		
nac 🔤	4/20/2021 1:55 PM	File folder		
🔄 🛃 win32	4/20/2021 1:54 PM			

3. Run the installer file as administrator to start Stage 1 of the deployment.

icudtl.dat			12/29/2020 2:1	12 AM	DAT File	10,272 KB
🛃 installer 👘			10 (00 (0000 0.5	12 AM	Application	104,283 KB
🔄 libEGL.dll		Open		2 AM	Application exten	366 KB
S libGLESv2.d		Run as administrator		2 AM	Application exten	8,17 0 KB
LICENSE		Troubleshoot compatibility	/	1 AM	File	2 KB
夏 LICENSES.cl		Pin to Start		1 AM	Firefox HTML Doc	4,503 KB
📄 resources.p		7-Zip	>	1 AM	PAK File	4,229 KB
📄 snapshot_b		CRC SHA	>	2 AM	BIN File	50 KB
v8_context_	2	Edit with Notepad++		2 AM	BIN File	168 KB
version	ß	Share		2 AM	File	1 KB
📓 vk_swiftsha		Send to	>	2 AM	Application exten	3,686 KB
📄 vk_swiftsha				1 AM	JSON File	1 KB
🗟 vulkan-1.dll		Сору		2 AM	Application exten	622 KB
		Create shortcut				
		Properties				





4. Click NEXT.



5. Accept the terms of the license agreement and click **NEXT**.





 Enter the *IP address, user name (root),* and *password* assigned to the Management Server and click **NEXT**. The *HTTPS port* should already be populated with **443**. Click **YES** to the Certificate Warning window.

vmw Install - Stage 1: Deploy vCenter	Server							
	vCenter Server depl	loyment target						
2 End user license agreement	er license agreement Specify the vCenter Server deployment target settings. The target is the ESXi h Server instance on which the vCenter Server will be deployed.							
3 vCenter Server deployment target								
4 Set up vCenter Server VM	ESXi host or vCenter Server name		1					
5 Select deployment size	HTTPS port	443						
6 Select datastore	User name	root	()					
7 Configure network settings	Password							
8 Ready to complete stage 1								
		CANCEL	CK NEXT					

7. Enter **VCSA** as the *VM name* and set a password for the *root* user. Confirm the *password* and click **NEXT**.

1 Introduction	Set up vCenter Ser	rver VM he vCenter Server to be deployed.	
 2 End user license agreement 3 vCenter Server deployment target 	VM name	VCSA	(1)
4 Set up vCenter Server VM	Set root password		(j)
5 Select deployment size	Confirm root password		
6 Select datastore			
7 Configure network settings			
8 Ready to complete stage 1			
		с	ANCEL BACK NEXT



8. Select **Medium** as the *Deployment size*. Leave the *Storage size* set to default. Click **NEXT**.

1 Introduction Select deployment size								
2 End user license agreement	Select the deployment size	lect the deployment size for this vCenter Server.						
3 vCenter Server deployment target	For more information on	r more information on deployment sizes, refer to the vSphere 8.0 documentation.						
4 Set up vCenter Server VM	Deployment size	eployment size Medium ~						
5 Select deployment size	Storage size	Storage size Default						
6 Select datastore	-							
7 Configure network settings	Resources required for d	lifferent dep	loyment sizes					
	Deployment Size	vC PUs	Memory (GB)	Storage (GB)	Hests (up to)	VMs (up to)		
	Tiny	2	14	579	10	100		
	Small	4	21	694	100	1000		
	Medium	в	30	908	400	4000		
	Large	16	39	1358	1000	10000		
	X-Large	24	58	2283	2000	35000		
						CANCEL	BACK	

- 9. Click **Install** on an existing datastore accessible from the target host. Choose the datastore with the largest capacity on the management server.
- 10. Click the **Enable Thin Disk Mode** box and then click **NEXT**.

vmw Install - Stage 1: Deploy vCenter Server									
Introduction End user license agreement vcenter Server deployment target	Select datastore Select the storage location for this vCenter Server et Show only compatible datastores								
4 Set up vCenter Server VM 5 Select deployment size	Name T	Type T VMFS-6	Capacity 1.75 TB	Ŧ	Free 1.71 TB	T Provisioned 37.17 GB	Ŧ	Thin Provisioning Supported	τ
6 Select datastore	local-nvme1	VMFS-6	1.75 TB		655.38 GB	1.11 TB		Supported	
7 Configure network settings 8 Ready to complete stage 1	Enable Thin Disk	Mode 👔							2 items



11. Configure the network settings for vCenter as follows and then click **NEXT**:

- Network: VM Network
- IP version: IPv4
- IP assignment: static
- FQDN: Enter the IP address to be assigned to vCenter
- IP address: Enter the same IP address entered in the previous step
- Subnet mask or prefix length: Enter the subnet mask
- Default gateway: Enter the default gateway used for the subnet vCenter is assigned to
- DNS servers: Enter the IP address for the DNS servers. Separate multiple server addresses by commas.
- HTTP: **80**
- HTTPS: 443



Please be certain to configure all the network settings listed above, including both HTTP: 80 and HTTPS: 443 (which is not visible in the screenshot below, due to screen size constraints).

1 Introduction	Configure network	settings		
2 End user license agreement	Configure network settings for	this vCenter Server		
3 vCenter Server deployment target	Network	VM Network	~	í
4 Set up vCenter Server VM	IP version	IPv4	~	_
5 Select deployment size	IP assignment	static	~	
6 Select datastore	FQDN	172.20.0.101		(j)
7 Configure network settings	IP address	172.20.0.101		_
8 Ready to complete stage 1	Subnet mask or prefix length	255.255.255.0		í
	Default gateway DNS servers Common Ports HTTP	172.20.0.1 8.8.8.8,8.8.4.4 80		-
	nur.			
			CANCEL	BACK



12. Verify the information entered is correct and click **FINISH**. Stage 1 deployment will begin. This process may take up to 10 minutes.



13. Click **CONTINUE** to begin Stage 2.





14. Click NEXT.

Setup Wizard	Introduction	
1 Introduction	vCenter Server installation overview	
2 vCenter Server Configuration	Stage 1	Stage 2
4 Configure CEIP		E C E
5 Ready to complete		
		enter.
	Deploy new vCenter Server	Set up vCenter Server
	Installing the vCenter Server is a two stage process. Next, to proceed with Stage 2, setting up the vCente	The first stage has been completed. Click r Server.
		CANCEL NEXT

15. Ensure **Synchronize time with the Esxi host** is selected and *SSH access* is set to **Enabled**. Click **NEXT**.

Setup Wizard	vCenter Server Confi	guration	
1 Introduction	Time synchronization mode	Synchronize time with the ESXi host	~
2 vCenter Server Configuration	SSH access	Enabled	
3 SSO Configuration			
4 Configure CEIP			
5 Ready to complete			
		CANCEL	BACK



16. Click **Create a new SSO domain**. Enter **vsphere.local** for the *Single Sign-On domain name*. Enter and confirm a *Single Sign-On password*. Click **NEXT**.

Setup Wizard	SSO Configuration				
1 Introduction	💿 Create a new SSO domain				
2 vCenter Server Configuration	Single Sign-On domain name ①	vsphere.local			
3 SSO Configuration	Single Sign-On username	administrator			
4 Configure CEIP	Single Sign-On password			0	
5 Ready to complete	 (i) 				
	Confirm password			٥	_
	Join an existing SSO domain				
		vCenter Server			
			0.00051		UENE
			CANCEL	BACK	NEXT

17. Uncheck the *CEIP* option box and click **NEXT**.





18. Verify that all of the information displayed is correct, and then click **FINISH**.

Setup Wizard	Ready to complete	
1 Introduction	Review your settings before finishing th	ne wizard.
2 vCenter Server Configuration	✓ Network Details	
2 Venter server comguration	Network configuration	Assign static IP address
3 SSO Configuration	IP version	IPv4
4 Configure CEIP	IP address	172.20.0.101
5 Ready to complete	Subnet mask	24
	Host name	localhost
	Gateway	172.20.0.1
	DNS servers	8.8.8,8.8.4.4
	✓ vCenter Server Details	
	Time synchronization mode	Synchronize time with the ESXi host
	SSH access	Enabled
	✓ SSO Details	
	SSO Details	vsphere.local
	Username	administrator
		CANCEL BACK FINISH

19. When Stage 2 is finished, the vCenter deployment is complete. This process may take up to 15 minutes.



7 vCenter Server Appliance Configuration

The subsections below provide instructions on performing the following tasks:

- Setting up and configuring a NETLAB+ datacenter
- Adding your ESXi Host Servers to the datacenter
- Configure automatic startup for vCenter
- Configure Network Time Protocol servers
- Allowing Remote PC Viewer sessions in the ESXi firewall
- Modifying Password Policies

7.1 Create NETLAB+ Datacenter in vCenter

In this section, we will be creating datacenters on the vCenter.

1. Using the vSphere Web Client, log in to the vCSA using the IP address of the vCenter.

🔴 🔍 Login - VMware ESXi 🛛 🗙 🕂	
← → C ▲ Not Secure https	
NDG	
vm ware [.] ESXi Host Client™	
User name	
Password	
LOGIN	

2. Click on Hosts and Clusters.



3. Right-click on your vCSA and select New Datacenter.



- 4. Set the datacenter name to **MANAGEMENT** and click **OK**.
- 5. Create a second datacenter, name it NETLAB, and then click OK.

	New Datacenter			×
	Name	NETLAB		. [
out	Location:	172.20.0.101		- 1
l				
			CANCEL	EN
			- Conton For	

7.2 Adding ESXi Hosts to the NETLAB+ Datacenter

In this section, you will be adding ESXi Host Servers to the NETLAB datacenter so that they may be managed by vCenter.

1. Right-click on the datacenter **MANAGEMENT** and select **Add Host**. The *Add Host* wizard appears.





2. First, you are going to add the Management server to the datacenter. Enter the *IP address* for the Management server. Click **NEXT**.

Name and location	Name and location	
Connection settings	Enter the name or IP address of the hos	at to add to vCenter Server.
Host summary		
Assign license	Host name or IP address:	172.20.0.102
Lockdown mode	Location:	I NETLAB
VM location		

3. Enter the *username* and the *password* for ESXi, and then click **NEXT**.

Name and location	Connection settings	
Connection settings	Enter the host connection details	
Host summary		
Assign license	User name:	root
Lockdown mode	Password:	
(M location	Password:	

4. When prompted with a *Security Alert* window, click **YES** to add the host.



5. On the *Host summary* page, review the information and click **NEXT**.

3 Host summary		
4 Assign license	Name	172.20.0.102
5 Lockdown mode	Vendor	Lenovo
7 Ready to complete	Model	ThinkSystem SR630 -[7X02CT01WW]-
	Version	VMware ESXI 7.0.2 build-17867351
	Virtual Machines	VCSA



6. On the Assign license page, click on the Create New Licenses icon (green plus).

Add Host	Assign license Assign an existing license to this host	×
1 Name and location	License Y License Key Y Product	
2 Connection settings	● ≫ ④ Evaluation License	
3 Host summary		
4 Host lifecycle		
5 Assign license		
6 Lockdown mode		

- 7. In the *New Licenses* window, on the *Enter license keys* page, enter the key you received from VMware in section 3.3. Click **NEXT**.
- 8. On the *Edit license names* page, enter any desired name for your records and click **NEXT**.

1 Enter license keys 2 Edit license names	Each license key	<pre>immes y is placed in a separate license. Review the licenses a </pre>	nd name them as appropriate.
3 Ready to complete	License name:	Active ESXi License	
	License key:	Medica, Arriva's advance uptions with pre-	Expires:

9. On the *Ready to complete* page, review the information and click **Finish**. You will be redirected to the *Add Host* window.

If brought back to the *Connection settings* page, enter the username and the password once more and click Next. Click Yes on the Security Alert dialog. Review the information on the Host summary page and click Next. On the Assign license page, select the radio button to the newly added license key and click Next.

- 10. On the *Lockdown mode* page, leave lockdown mode **disabled** and click **NEXT**.
- 11. On the VM location page, make sure MANAGEMENT is selected and click NEXT.
- 12. On the Ready to complete page, review the information and click FINISH.
- 13. Expand the **MANAGEMENT** datacenter on the left pane and wait for the IP address of the Management server to be added.
- 14. Repeat steps 1-13 to add the remaining ESXi host servers to the **NETLAB** datacenter. Start the process by right-clicking on the **NETLAB** datacenter instead of the MANAGEMENT datacenter.



Please be certain to add the remaining ESXi host servers to the **NETLAB** datacenter; do not add them to the MANAGEMENT datacenter.



7.3 Creating Datastores in ESXi

In this section, datastores will be created. VMFS datastores serve as repositories for virtual machines. This will help organize and manage the VMs and other data stored on the ESXi hosts. See the subsections below for guidance on creating a datastore on the management and host server(s).

The detailed steps and screenshots below may differ from your system, depending on your hardware and software selections.

7.3.1 Create Datastores on the Management Server

- 1. In the vSphere Client object navigator, browse to a host, a cluster, or a data center.
- Right-click on the first host server that will store VMs, select Storage > New Datastore.



3. Select VMFS as the datastore type. Click NEXT.





4. Name the new datastore **DATA** and select a local disk as the placement location for the datastore. Click **NEXT**.

New Datastore 1 Type 2 Name and device selection	Name al Specify datas Name:	nd device sele tore name and a disk/LI DATA	Ction UN for provisio	ning the datastore				>
3 VMFS version	Name	т	LUN T	Capacity T	Hardware T	Drive Ty 🔻	Sector F 🔻	Clustere
4 Partition configuration	💽 Local	VMware Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
	O Local	VMware Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
5 Ready to complete	O Local	VMware Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
	O Local	VMware Disk (mpx.v	0	20.00 GB	Not suppo	HDD	512n	No
						CANC	EL BACK	NEXT

5. Select VMFS 6 as the datastore version. Click NEXT.

New Datastore	VMFS version Specify the VMFS version for the datastore.	×
1 Type	 VMFS 6 VMFS 6 enables advanced format (512e) and automatic space reclamation support. 	
3 VMFSVersion	○ VMFS 5 VMFS 5 enables 2+TB LUN support.	
4 Partition configuration		
5 Ready to complete	CANCEL BACK	NEXT

- 6. In the *Partition Configuration* dropdown box, select **Use all available partitions**.
- 7. Use the maximum available Datastore Size. Click NEXT.

New Datastore	Partition configuration	
1	Review the disk layout and specify partiti	on configuration details.
1 Type	Partition Configuration	Use all available partitions \checkmark
3 VMFS version	Datastore Size	40 © GB
4 Partition configuration	Block size	1MB ¥
5 Ready to complete	Space Reclamation Granularity	<u>1MB ×</u>
	Space Reclamation Priority	Low ~
		Empty: 40.0 GB
		CANCEL BACK NEXT



8. Review the configuration settings for the new datastore and click **FINISH**.

١	New Datastore	Ready to comple	te ×
		Review your settings selection	ons before finishing the wizard.
	1 Туре	∽ General	
	2 Name and device selection	Name:	DATA
	С С С.	Type:	VMFS
	3 VMFS version	Datastore size:	40.00 GB
	4 Partition configuration	\checkmark Device and Formatting	
1		Disk/LUN:	Local VMware Disk (mpx.vmhba0:C0:T3:L0)
	5 Ready to complete	Partition Format:	GPT
		VMFS Version:	VMFS 6
		Block Size:	1 MB
		Space Reclamation Granularity:	1 MB
		Space Reclamation Priority	Low: Deleted or unmapped blocks are reclaimed on the LUN at low priority
			CANCEL BACK FINISH

7.3.2 Create Datastores on the Host Server(s)

- 1. In the vSphere Client object navigator, browse to a host, a cluster, or a data center.
- Right-click on the first host server that will store VMs, select Storage > New Datastore.





3. Select VMFS as the datastore type. Click NEXT.

Datastore	Type Specify datastore type.
1 Type	Create a VMFS datastore on a disk/LUN.
3 VMFS version	 NFS Create an NFS datastore on an NFS share over the network.
Partition configuration	 vVol Create a Virtual Volumes datastore on a storage container connected to a storage provider.
Ready to complete	CANCEL BACK NEXT

4. Name the new datastore **MASTERS** and select a local disk as the placement location for the datastore. Click **NEXT**.

New Datastore 1 Type 2 Name and device selection	Name and d Specify datastore no Name:	AMASTERS	Ction IN for provisi	ioning the datastore				×
3 VMFS version	Name	т	LUN T	Capacity T	Hardware 🔻	Drive Ty 🛛 🕆	Sector F T	Clustere
4 Partition configuration	Local VMwa	re Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
	O Local VMwa	re Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
5 Ready to complete	O Local VMwa	re Disk (mpx.v	0	40.00 GB	Not suppo	HDD	512n	No
	O Local VMwa	re Disk (mpx.v	0	20.00 GB	Not suppo	HDD	512n	No
						CANCEL	ВАСК	NEXT

5. Select VMFS 6 as the datastore version. Click NEXT.





- 6. In the *Partition Configuration* dropdown box, select **Use all available partitions**.
- 7. Use the maximum available Datastore Size. Click NEXT.

New Datastore	Partition configuration Review the disk layout and specify part	tion configuration details.
1 Type 2 Name and device selection	Partition Configuration Datastore Size	Use all available partitions ~
3 VMFS version 4 Partition configuration	Block size Space Reclamation Granularity	1 MB ~ 1 MB ~
5 Ready to complete	Space Reclamation Priority	Low ~
		Empty: 40.0 GB
		CANCEL BACK NEXT

8. Review the configuration settings for the new datastore and click **FINISH**.

New Datastore	Ready to comple	ete
	Review your settings select	ions before finishing the wizard.
1 Type	✓ General	
2 Name and device selection	Name:	MASTERS
	Type:	VMFS
3 VMFS version	Datastore size:	40.00 GB
4 Partition configuration	✓ Device and Formatting	
	Disk/LUN:	Local VMware Disk (mpx.vmhba0:C0:T3:L0)
5 Ready to complete	Partition Format:	GPT
	VMFS Version:	VMFS 6
	Block Size:	1 MB
	Space Reclamation Granularity:	1 MB
	Space Reclamation Priority	Low: Deleted or unmapped blocks are reclaimed on the LUN at low priority
		CANCEL DACK FINISH

9. Repeat these steps for a second datastore. Name the second datastore **CLONES**.

V 🛃 1	Summary Monitor	Configure	Permissions	VMs	Resource Pools	Datastores	Networks	Up	dates						
✓ ➡ netlab															
													Filte	r	T
•	Name ↑	1				~	Status	~ т	ype	v Data	store Clu V	Capacity	~	Free	~
							✓ Normal	V	MFS 6			39.75 GB		38.34 GB	
	MASTERS						 Normal 	V	MFS 6			39.75 GB		38.34 GB	

10. Repeat this process for any other host server that will be used to store VMs.



7.4 Configure Automatic Startup for vCenter

For this section, you will configure ESXi Management Server to start the vCenter Appliance. This is important because if it is not set up and the ESXi Management Server powers off or is rebooted, the vCenter Appliance will not start up, causing NETLAB+ communication failure.

- 1. Using the *vSphere Web Client*, navigate to **Hosts and Clusters**.
- 2. Click on your **MANAGEMENT SERVER** in the inventory pane where the vCSA resides.
- 3. With the host selected, select **Configure** from the top pane.

vm vSphere Client Menu	Q Search in all environments	C 🧷 Adminis	strator@VSPHERE.LOCAL V
□ 0 0 0 000 • 0 172200.101 • 172200.102 • 172200.102	In 172.20.0.102 ACTIONS > Summary Monitor Configure Permissions VMs Resource Pools Hyperviser Hyperviser Transformer ES0, 70.2, 17697351 Model: Processor Type: Logical Processors Unterviser Note (C)	Datastores Networks Upda	PU Free 80 0 Mz Marky Capacity 80.2 0 Mz Manay Free 74.0 Mz Marky Capacity 80.2 0 Mz Marky Free 74.0 Mz Marky Capacity 707.00 0 Mz Marky Free 74.0 Mz Marky Capacity 707.00 0 Mz Marky Free 3.4 Mz Marky Capacity 70.0 Mz Marky Capacity 7.0 Mz
	Hardware V Co	onfiguration	~
	Tags	elated Objects	^

- 4. Scroll to VM Startup/Shutdown and click Edit.
- 5. On the *Edit VM Startup and Shutdown* window, click the checkbox for **Automatically start and stop the virtual machines with the system**.

Default VM Settings	
System influence	Automatically start and stop the virtual machines with the system
Startup de lay	120 Continue if VMware Tools is started
Shutdown delay	120
Shutdown action	Power off V



6. Select your vCenter VM in the list and click the **Move Up** icon until it is directly under **Automatic Startup**.

artup delay 120 Continue if VMware Tools is started 120 120 120 Power off ▼ More Up ↓ More Down Edst tartup Order VM Name Startup Delay (i) VMware Tools Shutdown Beha Shutdown Delay urdomatic Or 1 VCSA Enabled 120 Weit for startu Power off 120	ystem influence	e 🗹 Au	tomatically start a	nd stop the virtual n	nachines with the	system	
Izo Izo Inutdown action Power off Wore Up More Down Ø Edt Ianup Order VM Name Startup Startup Delsy (i) VMware Tools Shutdown Beha Itomatic Or VCSA Enabled 120 Wat for startu Power off 120	tartup de lay	120		Continue if VMware	Tools is started		
uutdown action Power off → More Up → More Down Edt tartup Order VM Name Startup Eelsy (i) VMware Toolis Shutdown Beha Shutdown Delay urtomatic Or 1 VCSA Enabled 120 Wait for startu Power off 120	hutdown delay	120					
Move Up ↓ Move Down ⊘ Edt tartup Order VM Name Startup Elsy (s) VMware Tools Shutdown Beha Shutdown Delsy urtomatic Or 1 VCSA Enabled 120 Wait for startu Power df 120	nutdown action	Powe	er off 🗸 🗸				
			Enablad	120	Mait for ctartu	Power off	120
	a atomatic Or	VCCA	CIIGDIEG		Walt for starta	roweron	120
	1	VCSA					
	1	VCSA					
	1	VCSA					
	1	VCSA					

7. Click **OK**.

7.5 Configure Network Time Protocol Servers

1. From the *Configure* menu, click on **Time Configuration**.

Summary	Monitor	Configure	e Permissions	VMs	Resource Pools	Datastores	Networks	Updates	
Physical add TCP/IP conf	apters liguration		Current Time	e Con	figuration				
Virtual Machi	nes	~	Date & Time		08/31/2021, 33	01:46 PM			
VM Startup, Agent VM S	/Shutdown Settings		Time Synchronizatio	n	Manual				
Swap File L	ocation		Manual Time	e Con	figuration				EDIT
System		~	Status			Active			
Licensing									
Host Profile			Network Tin	ne Pro	otocol				EDIT
Time Config	guration	- 1	NTP Client			Disabled			
Authenticat Certificate	tion Services	- 1	NTP Service Sta	atus		Stopped			
Power Man	agement		NTP Servers						
System Res	iource Reserv	ation	Precision Tir	ne Pro	otocol				EDIT
Services			PTP Client			Disabled			
Security Pro	ofile		PTP Service Sta	tus		Stopped			
System Swi Packages	ap		> Network Interfa	ice					

- 2. Click **EDIT** in the *Network Time Protocol* section.
- 3. Type in the IP address or FQDN of the NTP Server(s).
- 4. Check the box to **Start NTP Service**.



5. From the dropdown box, choose Start and stop with host and click OK.

dit Network Time Protocol	172.20.0.102	
Enable (j)		
NTP Servers	time.google.com	
	Separate servers with commas, e.g. 10.31.21.2, fe00::2800	
NTP Service Status:	Stopped Start NTP Service	
NTP Service Startup Policy:	Start and stop with host	
	CANCEL	ок

7.6 Modifying Password Policies

The subsections below provide details on modifying the password policies for SSO configuration and root configuration.

7.6.1 Modify the SSO Password Policy

In this section, you will be modifying the SSO password policy.

1. Using the *vSphere Web Client*, right-click on the **MANAGEMENT** server. Navigate to **Administration**.

vm vSphere Client	Menu ~ Q Search in all environmen
	☐ Home ctrl + alt + home ♣ Shortcuts ctrl + alt + 1
 ▶ 172.200.001 ▶ NETLAB > ☐ 172.20.0.102 	Image: Hosts and Clusters ctrl + alt + 2 Image: WMs and Templates ctrl + alt + 3 Image: Storage ctrl + alt + 4 Image: WMs and Templates ctrl + alt + 4 Image: WMs and Templates ctrl + alt + 4 Image: WMs and Templates ctrl + alt + 5 Image: Content Libraries ctrl + alt + 6 Image: WMs and Management ctrl + alt + 7 Image: Global Inventory Lists ctrl + alt + 8 Image: Policies and Profiles X Image: Auto Deploy Hybrid Cloud Services Image: Polycine Center pergloper Center
	 Administration Tasks Events Tags & Custom Attributes Lifecycle Manager Q DRaaS ⊕ vRealize Operations



2. In the *Navigator* pane located to the left, click on **Configuration** underneath the *Single Sign-On* header. Click on **Local Accounts**. Click **EDIT**.

Administration			
Access Control	~	Configuration	
Roles		Identity Provider Local Accounts Login Message	
Global Permissions			
Licensing	~	> Domain	
Licenses		✓ Password Policy EDI	π
Solutions	~	Description	
Client Plugins		Maximum lifetime Password must be changed every 90 days	
Deployment	~	Restrict reuse Users cannot reuse any previous 5 passwords	
System Configuration		Maximum length 20	
Customer Experience Improvem		Minimum length 8	
Client Configuration		Character requirements At least 1 special characters	
support	~	At least 2 alphabetic characters	- 1
Upload File to Service Request		At least 1 uppercase characters	- 1
Certificates	~	At least 1 lowercase characters	- 1
Certificate Management		At least 1 numeric character	- 1
Single Sign On	~	Identical adjacent characters: 3	_
Users and Groups		v Lockout Policy ED	π
Configuration		Description	
		Maximum number of failed login attempts 5	

3. In the *Edit Password Policies* window, change the value to reflect **0 days** for *Maximum lifetime*.

Edit Password Policies	×
Description	
Maximum lifetime	Password must be changed every 0 days
Restrict reuse *	Users cannot reuse any previous 5 passwordspasswords
Password format requirements	
Maximum length	20
Minimum length	8
Character requirements	At least 1 special characters
	At least 2 alphabetic characters
	At least uppercase characters
	At least 1 lowercase characters
	At least 1 numeric characters
	Identical adjacent characters 3
	CANCEL

- 4. The remaining password policy options can be modified if desired.
- 5. When finished, click **OK**. Repeat for each ESXi host.



7.6.2 Modifying the root Password Policy

In this section, you will be modifying the password policy for root configuration.

- 1. Using the *vSphere Client*, navigate to **https://your_vcenter_ip:5480**.
- 2. Log in with **root** as the *username* and its corresponding *password*, which was configured when *vCenter* was first deployed.
- 3. In the *Navigator* pane located to the left, click on **Administration**.

Summary		Hostname:	localhost	
		Product:	VMware vCer	nter Server
		Version	7.0.2.00100	
Ionitor	60	Duild sure has	47000460	
		Bulla number	1/920108	
ccess				
letworking				
	Health Status			Sing
irewall	Overall Health	Good (Last cher	cked Aug 31, 2021	
	Overall Pleaker	0 0000 (Cast cite)	ukeu Mug 31, 2021,	
		07:20:27 PM)		
me	CPU	Good		
		0		
ervices	Memory	🕗 Good		
pdate	Database	🕑 Good		
	Storage	O Good		
dministration	storage	0 0000		
	Swap	Good		
		0		
sysiog				
ackup				
Backup				

- 4. Click on **EDIT** in the *Single Sign-On Domain* section.
- 5. Click **EDIT** in the *Password expiration settings*.

Paraward requirements	1 Should not be any of your previous five passwords	
Password requirements	 Should not be any of your previous rive passwords. 	
	Must have at least six characters.	
	Contain at least one upper case letter.	
	Contain at least one lower case letter.	
	5. Contain at least one number.	
	6. Contain at least one non-alphanumeric character.	
sword expiration settings	7. No dictionary words are allowed.	
sword expiration settings	7. No dictionary words are allowed. Yes	
sword expiration settings Password expires Password validity (days)	7. No dictionary words are allowed. Yes 90	
Sword expiration settings Password expires Password validity (days) Email for expiration warning ①	7. No dictionary words are allowed. Yes 90 Unset	

6. Change the *Password expires* option to **No**. Click **SAVE**.

Password Expiration Sett	ings
Password expires:	🔿 Yes 🧿 No
	CANCEL

7. Log out of the *vSphere Client* as *root* and close the tab.



7.6.3 Verifying vSwitch0 Configuration

vSwitch0 is automatically created during the ESXi software installation. Using the vSphere Client, confirm that networking on vSwitch0 is properly configured.

- 1. *vSwitch0* is bound to the correct physical NIC (vmnic).
- 2. The physical NIC is connected and with the correct speed/duplex. (Refer to the red boxes in the graphic below.)

Summary Monitor	Config	re Permissions VMs Resource Pools Datastores Networks Updates
Storage Storage Adapters Storage Devices	~	Virtual switches Add Networking Refres
Host Cache Configuration Protocol Endpoints I/O Filters		Management Network ···· VLAN ID: ·· VVMkernel Ports (1)
Networking Virtual switches	Ť	vmk0:172.20.0.102 •••
VMkernel adapters Physical adapters TCP/IP configuration		VM Network ··· VLAN ID: > > Virtual Machines (1) ···
Virtual Machines VM Startup/Shutdown	~	
Agent VM Settings Default VM Compatibility Swap File Location		

7.6.4 Create a Safe Staging Network

In this section, you will be creating a Safe Staging Network called "Safety Net" to connect the virtual machines temporarily. The Safe Staging Network consists of a virtual switch and a port group that is not connected to any other networks (virtual or real). Should the virtual machine be powered on, its traffic will be confined to the Safety Net. This ensures that the virtual machine will not pose a security risk to your campus LAN or interfere with other pods until it is relocated to its final network via automatic or manual networking.

- 1. Using the vSphere Web Client, navigate to Hosts and Clusters.
- 2. Select your first ESXi host in the Inventory pane on the left.



3. Click on the **Configure** tab.

vm vSphere Client Menu	Q Search in all environments	C ⑦ v Administrator@VSPHERE.	LOCAL V 😳
[]]	IT22.20.0.102 ACTIONS ✓ Summary Monitor Configure Permissions VMs Resource Pools Hyperviser Model: ThinkSystem SR830-(7X02CT0WW)- Intel(9) Xeen(%) 6oid 5218F.CPU @ 210GHz NCr 9 Virtual Machines: 1 Uptime: 73 minutes	Datastores Networks Updates	Free: 03 OHz Capacity: 03.0 OHz Free: 741.42.00 Capacity: 777.00.00 Free: 3.4 T0 Capacity: 3.40 T0
	Hardware 🗸 Co	onfiguration	~
	Tags	elated Objects	^

4. In the *Networking* section, click on **Virtual Switches** and then click **ADD NETWORKING**.

Summary Monitor	Configu	re Permissions VMs Resource Pools Datastores Networks Updates	
Storage Storage Adapters Storage Devices	*	Virtual switches (v Standard Switch: vSwitch0 add Networking edit Manage Physical adap	ADD NETWORKING REFRES
Host Cache Configuration	- 1		
Protocol Endpoints	- 1	S Management Network ···· Physical Adag	oters
VO Filters	- 1	VLAN ID:	Full ····
Networking	~	vmk0:172.20.0.102	
Virtual switches			
VMkernel adapters		Ø VM Network ····	
Physical adapters		VLAN ID:	
TCP/IP configuration		> Virtual Machines (1)	
Virtual Machines	~		
VM Startup/Shutdown			
Agent VM Settings			
Default VM Compatibility			
Swap File Location			

5. Select the *connection type* **Virtual Machine Port Group for a Standard Switch**. Click **NEXT**.





6. Select New Standard Switch as the *target device*. Click NEXT.

1 Select connection type 2 Select target device 3 Create a Standard Switch	Select target device Select a target device for the new connection.					
4 Connection settings 5 Ready to complete	 Select an existing 	standard switch				
	New standard swi	tch				
	MTU (Bytes)	1500	_			

7. Click **NEXT** on the *Create a Standard Switch* page without assigning an adapter.

2 Select target device	Create a Standard Switch Assign free physical network adapters to the new switch.					
3 Create a Standard Switch 4 Connection settings 5 Ready to complete	Assigned adapters + Image: Constraint of the second seco	Select a physical network adapter from the list to view its details.				

8. Click **OK** on the warning that appears.

1 Select connection type 2 Select target device	Create a Standard Switch Assign free physical network adapters to the new switch.		
3 Create a Standard Switch 4 Connection settings 5 Ready to complete	Assigned adapters + 😂 🕆 +		
Physi ^ T c	ical Network Adapters Warning × 'here are no active physical network adapters for the switch. Lick OK to continue or Cancel to review your changes.		
	CANCEL		



9. Type **SAFETY NET** on the *Network ID* line. Click **NEXT**.

3 Create a Standard Switch hose	Connection settings Use network labels to identify migration-compatible connections common to two or more hosts.				
4 Connection settings	twork label	SAFETY NET			
5 Ready to complete	AN ID	None (0)	~		

10. Click **FINISH** to complete the process. There should now be two virtual switches displayed, *vSwitch0* and *vSwitch1*.

 1 Select connection type 2 Select target device 	Ready to complete Review your settings selections before finishing the wizard.						
 3 Create a Standard Switch 4 Connection settings 5 Ready to complete 	New standard switch Virtual machine port group Assigned adapters Switch MTU VLAN ID	vSwitch1 SAFETY NET 1500 None (0)					
			CANCEL	ВАСК	FINIS		

SAFETY NET is now available for use as a safe temporary network location for new virtual machines.

The safety network is an ideal place to bind the network interface(s) of master virtual machines. Automatic networking will bind network interfaces of cloned VMs to their runtime networks when their respective pods are started.