VMWARE VSPHERE 8: INSTALL, CONFIGURE, MANAGE

Case Study

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Contents

Introduction

In this case study, you will install and configure the *VMware ESXi operating system* on two hosts. You will install and use *vCenter Server Appliance* to manage these ESXi hosts. You will also configure access to an *iSCSI LUN* and create *VMFS datastore* on it. Finally, you will create and prepare a virtual machine for use.

Additional/optional tasks include enabling v*Sphere HA* and *DRS* and/or any other configuration you deem necessary.

Note: Please reserve enough time to complete this since our Netlab cluster can be a bit slow!

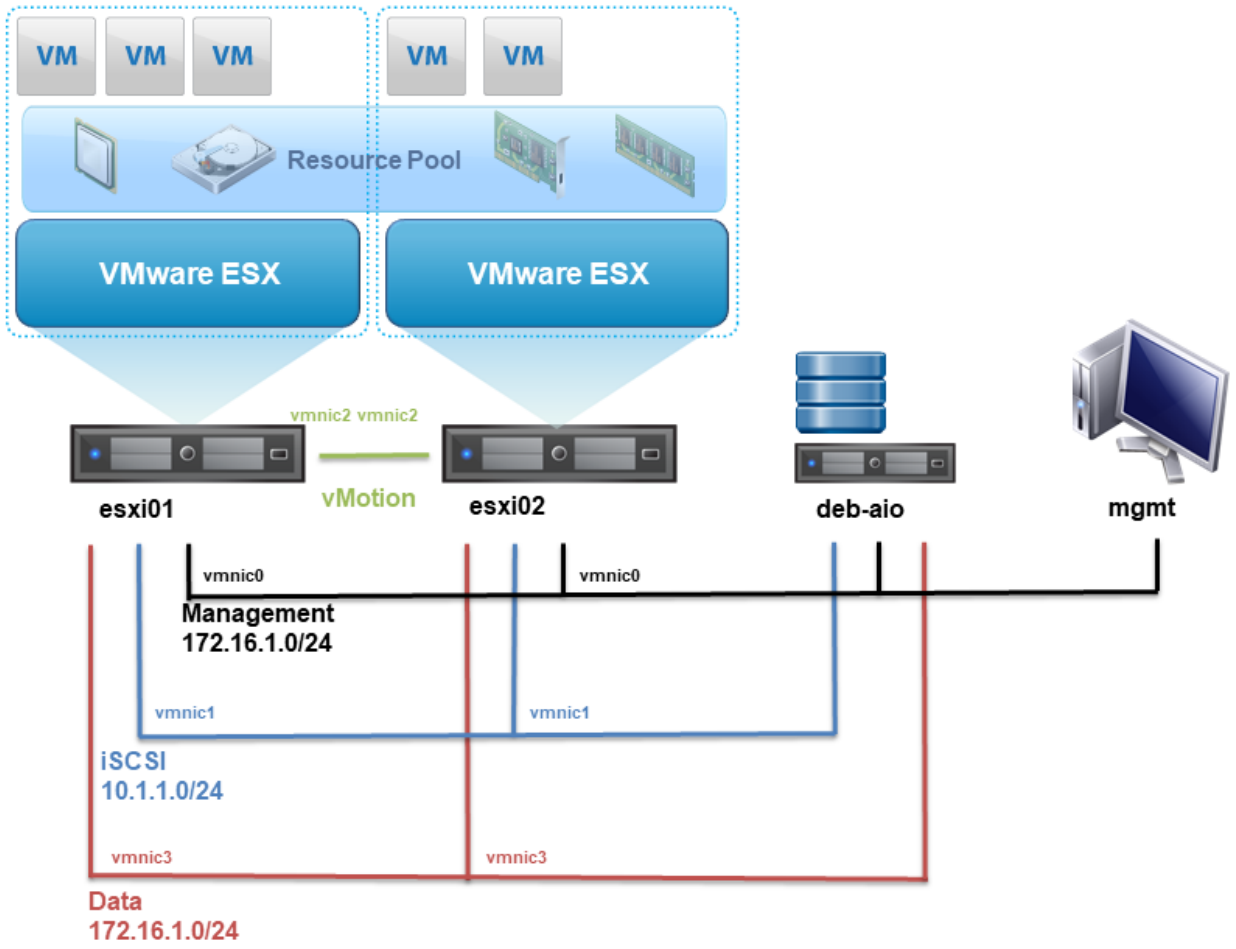
Main Objectives

- Install *ESXi* operating system on hosts esxi01 and esxi02
- Deploy *vCenter Server Appliance*
- Add both esxi01 and esxi02 to vCenter management
- Configure networking on *ESXi* hosts
- Configure the *iSCSI software adapter* and connect it to the iSCSI storage provider, create *VMFS* datastore
- Create a content library
- Create a new virtual machine and take a snapshot

Additional Objectives

- Create a cluster enabled for *vSphere HA* and *DRS*
- Test cluster functionality

Lab Topology



Lab Settings

The information in the table below will be needed to complete the lab. The task sections below provide details on the use of this information.

Virtual Machine	IP Address	Account	Password
esxi01	vmnic0: 172.16.1.11 vmnic1: 10.1.1.11 vmnic2: vMotion vmnic3: VM Data		
esxi02	vmnic0: 172.16.1.12 vmnic1: 10.1.1.12 vmnic2: vMotion vmnic3: VM Data		
deb-aio	ens192: 172.16.1.1 ens224: 10.1.1.1 ens256: 192.168.1.1	sysadmin	vmware123
mgmt	eth0: 172.16.1.100	sysadmin	vmware123
vcsa	eth0: 172.16.1.10		

General Instructions

The virtual machine **mgmt** is the management station in this environment. It is running AlmaLinux OS 8.5 and can be accessed using username `sysadmin` and password `vmware123`. Installation media for the vCenter Service Appliance (`VMware-VCSA-all-8.0.2-22617221.iso`) is in the CD/DVD drive. Installation media for the virtual machine (Ubuntu 21.04 Server amd64) is located on the user's desktop in the folder **ISOs**.

Note: Unfortunately, the keyboard might present problems. All the virtual machines are using en-us keymap. Recommendation is to change your own machine's keyboard layout to en-us. If you need special characters and the keyboard does not function, use **Characters** (Click Applications from the top left corner of the desktop, select Utilities and under that Characters). Inside Character Map you can select "Letters & Symbols" from bottom left and then select the needed character and copy it.

Note 2: Some browsers (especially Firefox) effect the virtual machines input so that one keypress can be interpreted as multiple. If possible, change browser to something else (Chrome seems to work), or if not possible look carefully when writing and erase the extra characters.

Machines **esxi01** and **esxi02** are empty and have the installation media (`VMware-VMvisor-Installer-8.0U2-22380479.x86_64.iso`) in the CD/DVD drive. When configuring the ESXi hosts follow the IP addressing in the Lab Settings –table. The IP addresses for the vMotion network can be freely selected (do not overlap with existing IP networks). ESXi hosts have two hard disks (20GB + 80GB). Install the OS to the smaller disk.

Infrastructure server **deb-aio** should be running all the time. It has been configured as the DNS server for the environment. The domain is **lab.local.** So, for example the FQDN for the **esxi01** should be set as `esxi01.lab.local`**.** DNS records have been configured for the IP addresses shown in the Lab Settings –table. It also provides DHCP services for the Data network.

Storage is provided also by server **deb-aio**. iSCSI target is providing a LUN for the `10.1.1.0/24` network.

You should **have no need** to access **deb-aio** but can do so using the credentials mentioned in the table.

Documentation

To verify correct configuration and completion of the case study, you must provide a documentation of your installation.

In this case the documentation is provided with screenshots and configuration output. After you have completed the Main Objectives detailed in the next section take screenshots in the following places:

1. Host and Clusters view with all trees expanded. Created virtual machine selected.
2. Datastore view with all trees expanded. iSCSI LUN selected. Summary of the iSCSI LUN visible.

Connect to the esxi01 host with SSH. Open terminal in mgmt01 and issue the command:

```
ssh root@esxi01.lab.local
```

After logging in, issue the following commands:

```
esxcli network ip interface ipv4 get
esxcli network ip interface list | egrep "Name|Portset|Portgroup"
esxcli network vswitch standard list | egrep "Name|Uplink|Portgroups"
```

Now take a screenshot of the output of the commands (or two if you cannot fit everything in one).

If you selected Distributed Switch in your networking configuration, use the following command:

```
esxcli network vswitch dvs vmware list | egrep "Name|Uplink|Client"
```

Note: Repeat the previous part for esxi02 host as well (take SSH connection to esxi02.lab.local and give the commands listed above and take a screenshot).

Note: Example screenshots are included at the end of this document.

Additional objectives documentation:

Take screenshot in the following place after completing step 13 of instructions:

1. Host and Clusters view with all trees expanded. Cluster selected with the Summary tab visible, and the vSphere DRS and vSphere HA displays open.

Take screenshot in the following place after completing step 14 of instructions:

2. Host and Clusters view with all trees expanded. Created virtual machine selected after the shutdown of the esxi02 host.

Return screenshots to Oma assignment called Case Study. You should return 4 screenshots for the main objectives (or 6 if you cannot fit the SSH output to one screenshot) and additional two if you completed the additional objectives.

Detailed instructions

Main Objectives

1. Install ESXi on the two hosts (esxi01 and esxi02)
    - Use the smaller disk (20GB) as installation target
        i. You can ignore the warning about CPU compatibility
    - Configure management interface network addressing as static according to the diagram using vmnic0
    - Configure DNS settings
    - Enable SSH access to ESXi hosts (needed for documentation)
    - After installation, create a VMFS datastore on the bigger hard drive using the VMware Host Client
2. Install the VCSA using the media inside management station's CD/DVD Drive (should be: '/run/media/sysadmin/VMware VCSA' or via the graphical file browser)
    - You should start the installer program from the terminal (./installer) found in the DVD under the vcsa-ui-installer/lin64 folder (or the installer-linux.desktop from GUI)
    - Note that in the VCSA UI installer Next button is located at the bottom of the window
        i. You should be able to get the screen large enough by undocking and resizing the VM display
    - Use thin provisioning for the VCSA disk
    - Follow the naming and IP addresses mentioned in the diagram
    - You can use the deb-aio IP address for the default gateway (does not matter since the vcsa does not have to access other networks)
3. Configure the VCSA (Stage 2 install)
    - Recommended SSO domain: lab.local
4. Connect to the VCSA and add the ESXi hosts to vCenter management and configure networking
    - Do not use image
    - Use evaluation licenses
    - vmnic0: management, vmnic1: SAN, vmnic2: vMotion, vmnic3: data
    - Follow the addressing in the diagram
    - Recommendation: Use 1 vSwitch per vmnic (so total of 4 vSwitches)
5. Create the Software iSCSI adapter on the ESXi hosts, bind it to the correct VMkernel Adapter, and discover LUNs from the deb-aio server (10.1.1.1) using dynamic discovery
    - Create VMFS datastore on the LUN 1 (50Gb disk)
6. Create a Content Library on your vCenter Server and upload ISO file to it
    - Local content library is sufficient
    - Place the Content Library on the esxi02 local datastore (this needs to be created first)
    - Upload the ISO file from mgmt desktop's ISOs folder (ubuntu-21.04-live-server-amd64.iso)
        i. If the upload does not work, make sure that you are accessing VCSA through the correct address (vcsa.lab.local) and have accepted the certificates
7. Create a virtual machine on the esxi02 on the VMFS datastore located on the iSCSI LUN 1

- Thin provisioned hard drive recommended
- Connect virtual machine to the Data-network
- Use the installation media from the content library
- You can perform the installation using the default options

8. When VM installation is finished, take a snapshot of the VM

Document your installation according to the instructions in the Documentation section!

Additional Objectives

9. Create a new cluster named Lab Cluster
    - Enable both DRS and vSphere HA
    - Add both hosts to the cluster
        i. Shutdown and delete the Linux VM created on esxi02 first
10. Configure HA to work with the lab environment limitations (link)
    - In cluster configuration -> vSphere Availability -> Advanced options add (select the Edit… button which is located on the row with the vSphere HA is Turned ON text):

Option	Value
das.ignoreInsufficientHbDatastore	true
das.isolationaddress0	172.16.1.1
das.usedefaultisolationaddress	false
das.config.fdm.memReservationMB	100

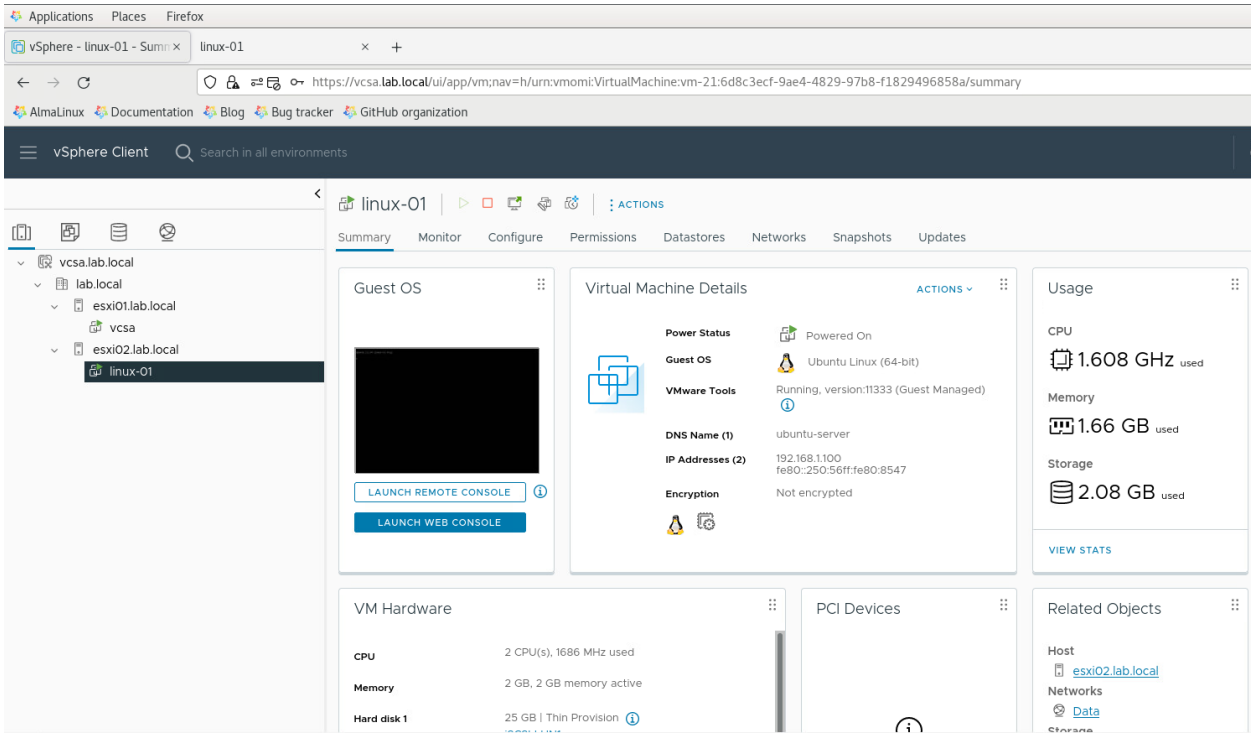
    - Configure management network redundancy by adding management VMkernel Network Adapter with management as enabled service to the Data network (use DHCP for addressing)
    - Re-configure for vSphere HA should remove all the warnings (Right click host -> Reconfigure for vSphere HA)
11. Configure the required settings for Fault Tolerance
    - Add Fault Tolerance logging to VMKernel adapter (for example to the one created in previous step)
12. Enable Fault Tolerance for a virtual machine
    - Create a small virtual machine (otherwise the FT will not work), example:
        i. Other Linux (32-bit), 1 cpu, 128MB memory, 1GB hard drive
    - Enable FT for this new VM
        i. Configure secondary disks at the iSCSI LUN 1 datastore (even if not recommended)
        ii. Configure esxi01 as the secondary host for the VM
13. Test Fault Tolerance
    - Power on virtual machine

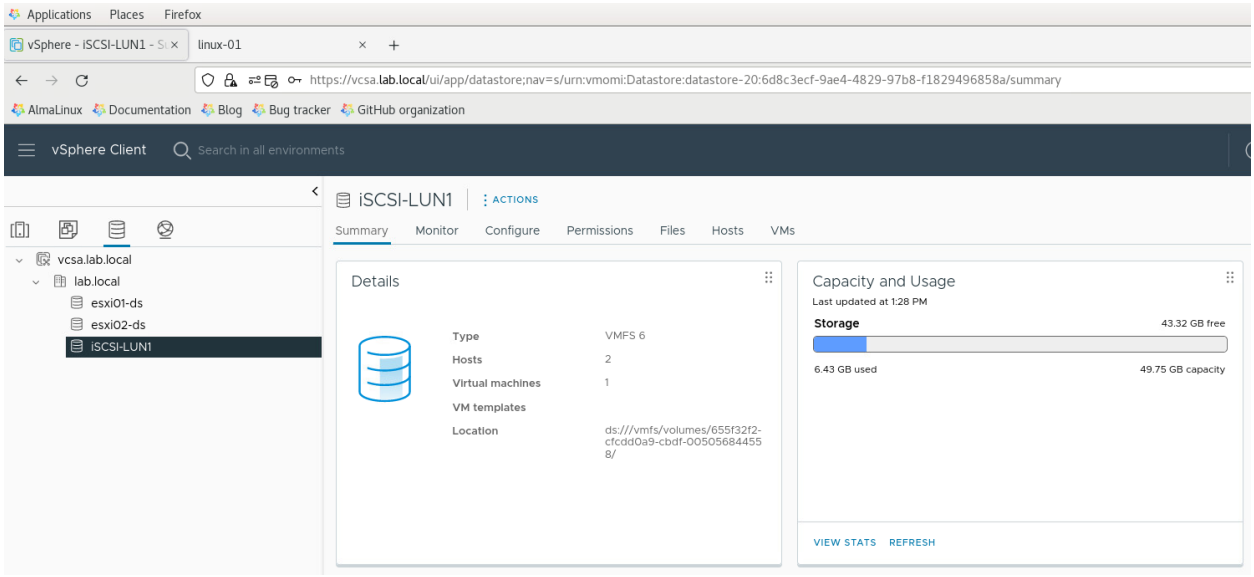
Document your installation according to the instructions in the Documentation section!

14. Introduce a fault
    - Power off esxi02 (Right click host -> Power -> Shutdown)

Document the results according to the instructions in the Documentation section!

Attachments





```
[root@esx01:~] esxcli network ip interface ipv4 get
Name  IPv4 Address  IPv4 Netmask   IPv4 Broadcast  Address Type  Gateway     DHCP DNS
----  ------------  -------------  --------------  ------------  ----------  --------
vmk0  172.16.1.11   255.255.255.0  172.16.1.255    STATIC        172.16.1.1     false
vmk1  10.1.1.11     255.255.255.0  10.1.1.255      STATIC        172.16.1.1     false
vmk2  10.1.2.11     255.255.255.0  10.1.2.255      STATIC        172.16.1.1     false
[root@esx01:~] esxcli network ip interface list | egrep "Name|Portset|Portgroup"
   Name: vmk0
   Portset: vSwitch0
   Portgroup: Management Network
   VDS Name: N/A
   Name: vmk1
   Portset: vSwitch1
   Portgroup: SAN
   VDS Name: N/A
   Name: vmk2
   Portset: vSwitch2
   Portgroup: vMotion
   VDS Name: N/A
[root@esx01:~] esxcli network vswitch standard list | egrep "Name|Uplink|Portgroups"
   Name: vSwitch0
   Uplinks: vmnic0
   Portgroups: VM Network, Management Network
   Name: vSwitch1
   Uplinks: vmnic1
   Portgroups: SAN
   Name: vSwitch2
   Uplinks: vmnic2
   Portgroups: vMotion
   Name: vSwitch3
   Uplinks: vmnic3
   Portgroups: Data
[root@esx01:~]
```

```
[root@esxi02:~] esxcli network ip interface ipv4 get
Name  IPv4 Address  IPv4 Netmask   IPv4 Broadcast  Address Type  Gateway     DHCP DNS
----  ------------  -------------  --------------  ------------  ----------  --------
vmk0  172.16.1.12   255.255.255.0  172.16.1.255    STATIC        172.16.1.1     false
vmk1  10.1.1.12     255.255.255.0  10.1.1.255      STATIC        172.16.1.1     false
vmk2  10.1.2.12     255.255.255.0  10.1.2.255      STATIC        172.16.1.1     false
[root@esxi02:~] esxcli network ip interface list | egrep "Name|Portset|Portgroup"
   Name: vmk0
   Portset: vSwitch0
   Portgroup: Management Network
   VDS Name: N/A
   Name: vmk1
   Portset: vSwitch1
   Portgroup: SAN
   VDS Name: N/A
   Name: vmk2
   Portset: vSwitch2
   Portgroup: vMotion
   VDS Name: N/A
[root@esxi02:~] esxcli network vswitch standard list | egrep "Name|Uplink|Portgroups"
   Name: vSwitch0
   Uplinks: vmnic0
   Portgroups: VM Network, Management Network
   Name: vSwitch1
   Uplinks: vmnic1
   Portgroups: SAN
   Name: vSwitch2
   Uplinks: vmnic2
   Portgroups: vMotion
   Name: vSwitch3
   Uplinks: vmnic3
   Portgroups: Data
[root@esxi02:~]
```

Additional Objectives