

VMware Cloud Experience: Configuring VLC for Holodeck

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VCF Experience Program Lab Overview

The VMware Cloud Foundation (VCF) Experience Program is designed to provide a hands-on experience highlighting how VCF delivers a *Cloud Operating Model* for customer managed on-premises environments, capable of hosting traditional and modern applications. This Experience Program guide is intended for use with a VCF Lab Constructor (VLC) based nested environment built using the Automated Holodeck config.

Credentials

The following credentials are used in this lab. For your convenience, links to all management interfaces are in the bookmark bar of Google Chrome in your lab environment.

- **SDDC Manager**
 - Username: administrator@vsphere.local
 - Password: VMware123!
- **vCenter Server Admin Console**
 - Username: root
 - Password: VMware123!
- **vSphere Web Client**
 - Username: administrator@vsphere.local
 - Password: VMware123!
- **VMware NSX Manager**
 - Username: admin
 - Password NSX-T: VMware123!VMware123!
- **vRealize Automation Cloud Assembly**
 - Username: configadmin
 - Password: VMware123!
- **Windows Console (Jump Host)**
 - Username: administrator
 - Password: VMware123!
- **Opencart Apache and MySQL VMs**
 - Username: ocuser
 - Password: VMware123!

Configuring VLC for use in Holodeck Multi Pod

Overview

The “VCF Holodeck Multi Pod” configuration is an opinionated nested VMware Cloud Foundation configuration used as the baseline for several Private Cloud operation and consumption lab exercises created by the Cloud Foundation Technical Marketing team. Each “Pod” on a Holodeck Multi Pod deployment runs an identical nested configuration to simplify lab development and maintenance. For configurations needing different nested instances of Cloud Foundation to communicate with each other, please see the companion guide *“Configuring VLC for use in Holodeck Multi Region”*

This lab guide details deploying a nested Holodeck configuration with VCF Lab Constructor 4.4HH. This guide is intended to be used in conjunction with the VCF Lab Constructor 4.4 manual.

Prerequisites

- Server requirements
 - Minimum server: Single ESXi host with 20 cores, 512gb memory and 2TB SSD/NVME
 - Ideal server: Single ESXi host with 40+ cores, 1.5TB memory and 6TB SSD/NVME
- Default server configuration:
 - Stand alone, non vCenter Server managed host
- Licenses for 8 hosts minimum (16 hosts if planning to test Cloud Foundation Multi region with NSX Federation)
 - SDDC Manager
 - NSX Enterprise
 - vSAN Enterprise
 - vSphere Enterprise Plus
 - vCenter Server (One license)
 - vRealize Suite Advanced or Enterprise (Or access to Cloud Assembly Cloud)

- Holodeck internal networks (default deployment)
 - 10.0.0.0/24 - Management
 - 10.0.0.4/24 - vMotion
 - 10.0.0.8/24 - vSAN
 - 10.1.0.0/16 – Opencart “Supernet”
 - 10.50.0.0/24 - AVN Region segment
 - 10.60.0.0/24 – AVN X-Region seg
 - 10.70.0.0/24 – Tanzu Ingress
 - 10.80.0.0/24 – Tanzu Egress
 - 172.27.11.0/24 – Edge TEP
 - 172.27.12.0/24 – Edge Uplink 1
 - 172.27.13.0/24 – Edge Uplink 2
 - 172.16.254/24 – Host TEP/DHCP
- External networks required
 - ESXi host management IP
 - Windows console IP (user side accessible)
 - One jump host per Holodeck instance
 - Plan for 3-4 addresses per ESXi host for larger hosts
 - Lab Uplink (user side accessible)
 - 10.0.0.0/24 management network in each Holodeck instance requires internet access. Separate router instances allow overlapping Holodeck addressing
 - Plan for 3-4 router addresses on customer side network
 - Holodeck users guide documents PFsense CE 2.6 deployment for lab routers
 - User could configure Jump Host as alternate router if desired
- Software needed
 - ESXi 7.0u3 (for lab host)

- [*Cloud Foundation Cloud Builder 4.4.1 OVA*](#)
- [*VCF Lab Constructor Holodeck-Standard*](#) package (includes VCF lab Constructor, Holodeck support automation scripts and lab guides)
- [*Windows Server 2019 ISO*](#) on ESXi host datastore
- [*PFSense 2.6 community edition*](#) on ESXi datastore (for external lab connectivity)
- Documentation needed
 - VCF Lab Constructor Install Guide 44-021022.pdf (or later version)

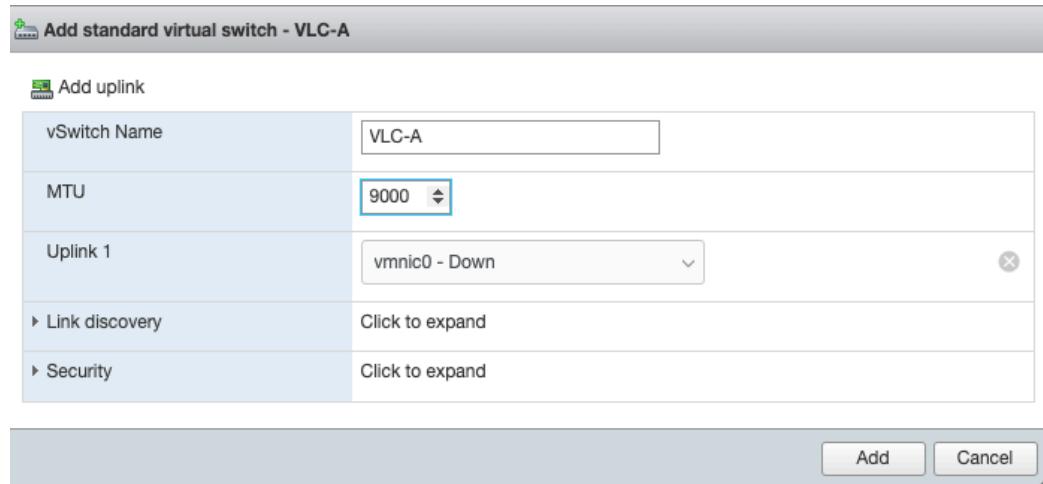
Task 1: Configure ESXi host networking

Configuring core ESXi host networking is covered on page 7 in the *VCF Lab Constructor Install Guide*. In the Holodeck configuration, we make a small change to plan for multiple instances of Holodeck running on the same server. This task assumes you have a stand-alone host not managed by vCenter Server.

- This task can be repeated for additional switches VLC-B, VLC-C and VLC-D and portgroups VLC-B-PG, VLC-C-PG, VLC-D-PG
- “*Holodeck-multi-pod-switch.ps1*” is a sample powershell script to create 4 virtual switches and portgroups for use in Holodeck Multi Pod. Edit the file and change ESXi - Server and -Password fields to match your environment

[Example1] Configure VLC vSwitch for nested networking

- A. Create a standard switch called “VLC-A” with no uplinks, and MTU 9000. Click the x on the uplink line to remove uplink if necessary



- B. Click Add

[Example 2] Configure VLC Portgroup

- A. Add a new port group
- B. Name the portgroup VLC-A-PG
- C. Set VLAN ID to 4095 (Trunk all VLAN)
- D. Set virtual switch to VLC-A
- E. Open security and set all to accept

F. Click Add

Add port group - VLC-A-PG	
Name	VLC-A-PG
VLAN ID	4095
Virtual switch	VLC-A
▼ Security	
Promiscuous mode	<input checked="" type="radio"/> Accept <input type="radio"/> Reject <input type="radio"/> Inherit from vSwitch
MAC address changes	<input checked="" type="radio"/> Accept <input type="radio"/> Reject <input type="radio"/> Inherit from vSwitch
Forged transmits	<input checked="" type="radio"/> Accept <input type="radio"/> Reject <input type="radio"/> Inherit from vSwitch

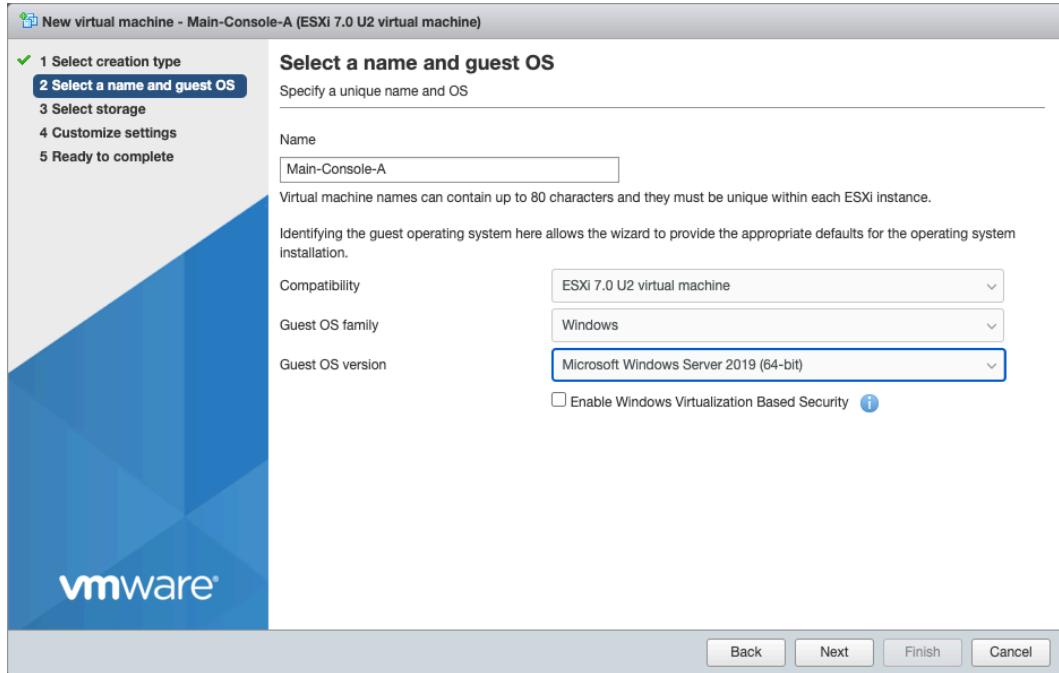
Add **Cancel**

Task 2a: Deploy nested jump host

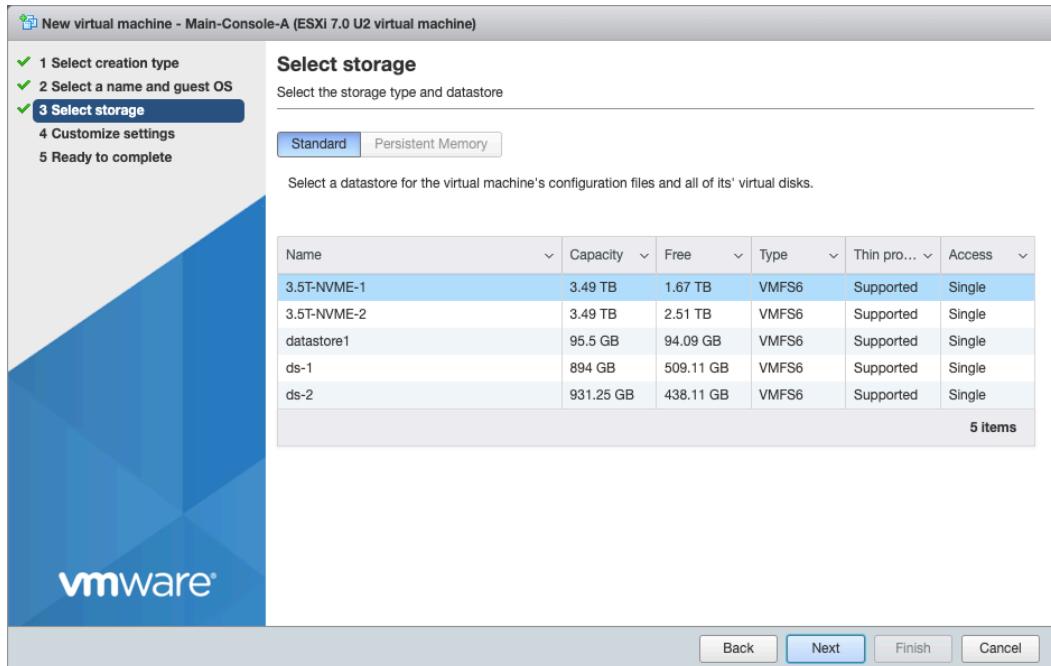
Deploying a nested jump host is covered on pages 8-10 *VCF Lab Constructor Install Guide*. In the Holodeck Multi Pod configuration, this task must be repeated for each additional Holodeck instance deployed on a host.

[Example 1] Holodeck sample screens

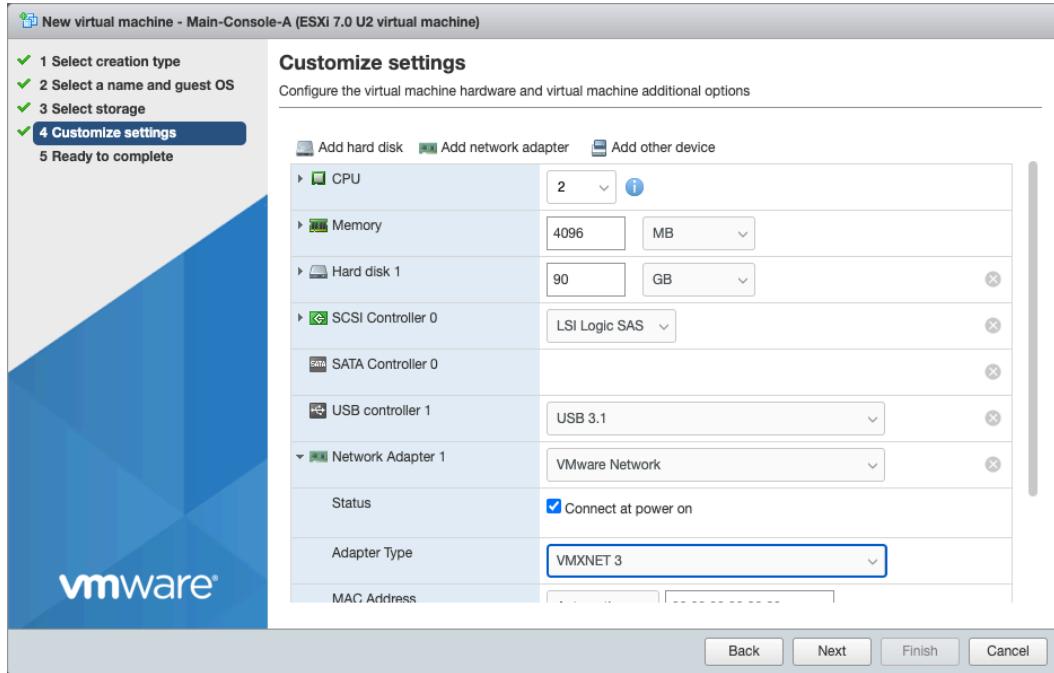
- A. Name the VM Main Console-A (In this Holodeck example we are using “Holo-Console-A”)



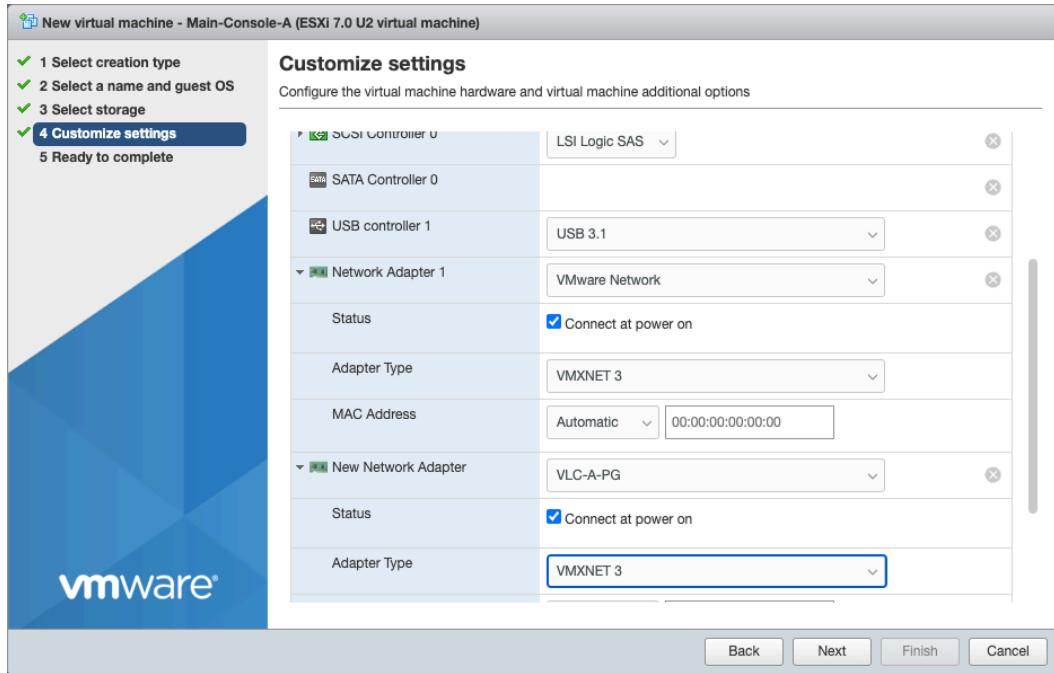
B. Select storage appropriate for your ESXi host then click next



- C. Set network adapter 1 to your external facing portgroup (VM Network in this example)
D. Select VMXNET 3 as adapter type



- E. Click Add network adapter
- F. Connect to VLC-A-PG Portgroup (replace VLC-A-PG with VLC-B-PG, etc as needed for additional instances)
- G. Select VMXNET 3



- H. Click CD/DVD Drive and set to Datastore ISO

- I. Select the appropriate location for your Windows Server 2019 ISO
- J. Click Next
- K. Click Finish

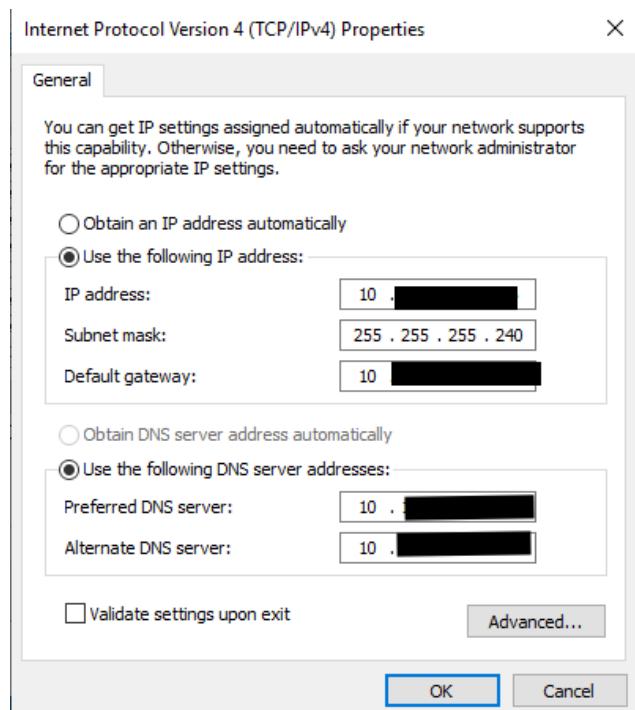
[Step 2] Power on new virtual machine and install VMware Tools

Task 2b: Configure jump host networking

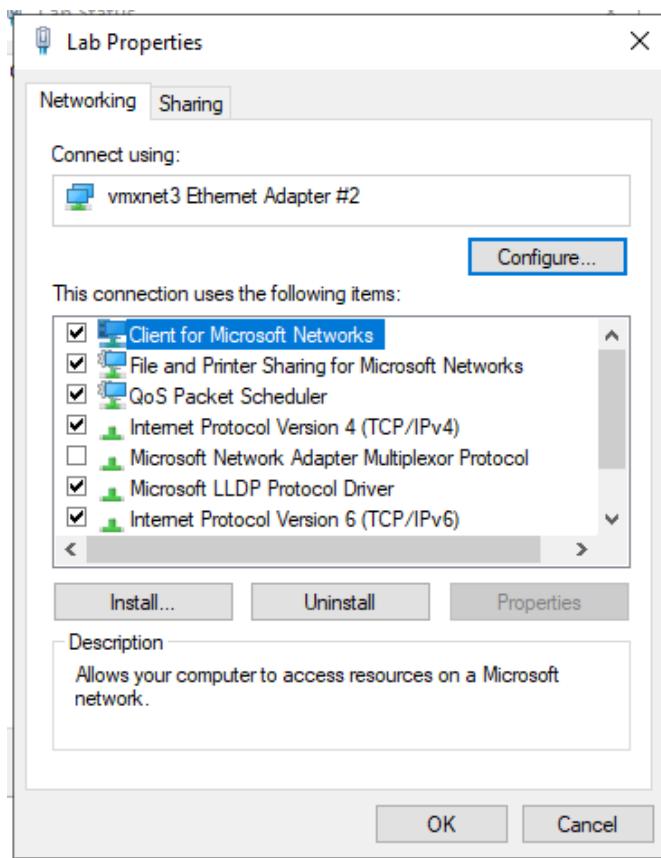
In this task we will configure networking on the Windows Server 2019 jump host

[Example 1] Set external networking

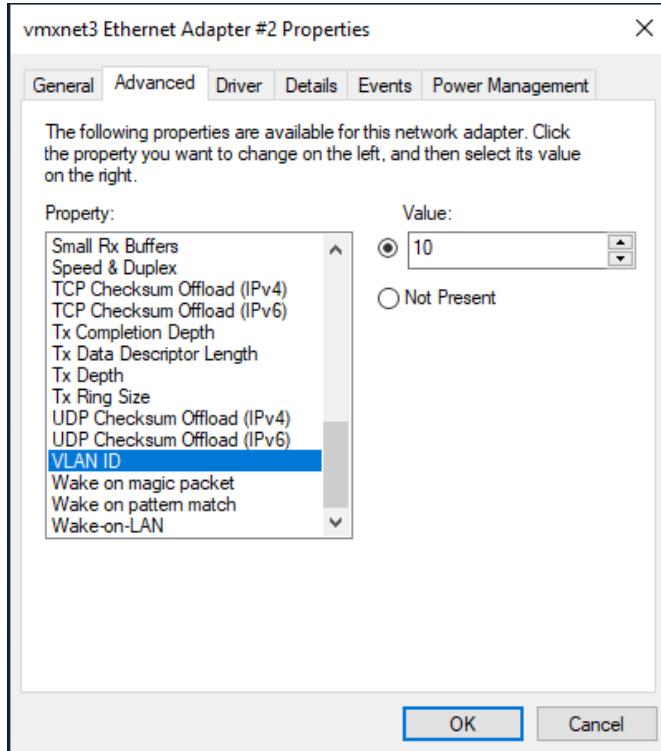
- A. Open Windows control panel
- B. Select Network and Internet
- C. Select your external facing interface and configure outward facing IP, gateway and DNS



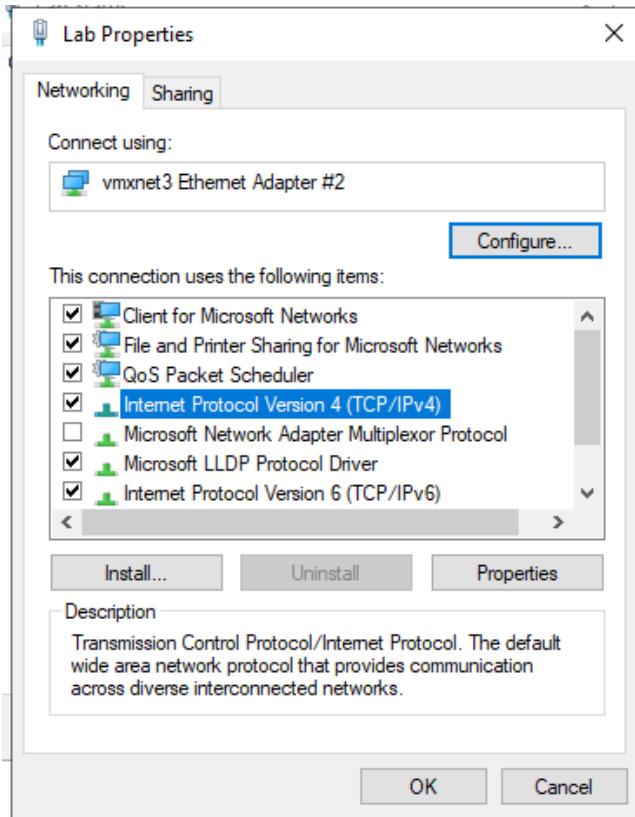
- D. Select the VLC facing interface and click properties
- E. Click Configure under the interface



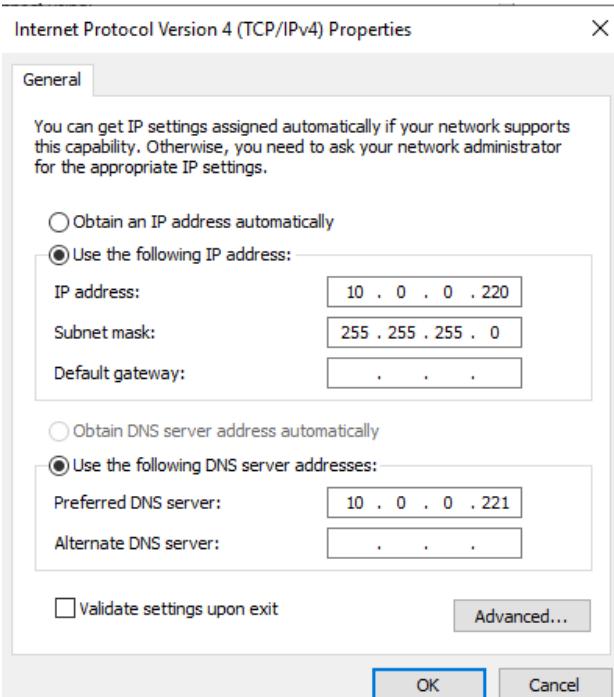
- F. Click Advanced, then scroll down to VLAN ID
G. Set VLAN ID 10, then ok



H. Click properties, then Internet Protocol Version 4, then properties



I. Set IP address to 10.0.0.220, netmask 255.255.255.0, DNS 10.0.0.221



- J. Click OK, then close

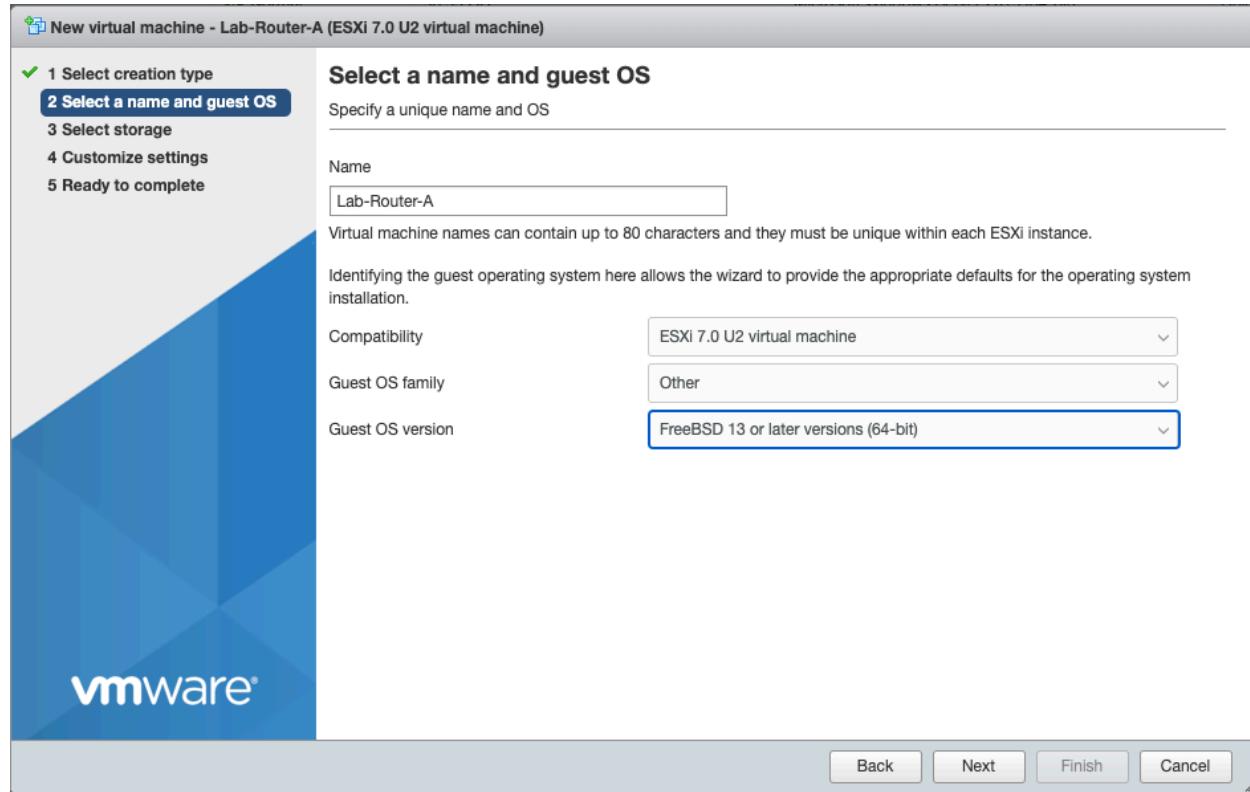
Task 3a: Deploy PFsense Lab Gateway

In this task we will deploy a PFsense router to act as a lab gateway. This step requires you have downloaded [PFsense CE 2.6](#)

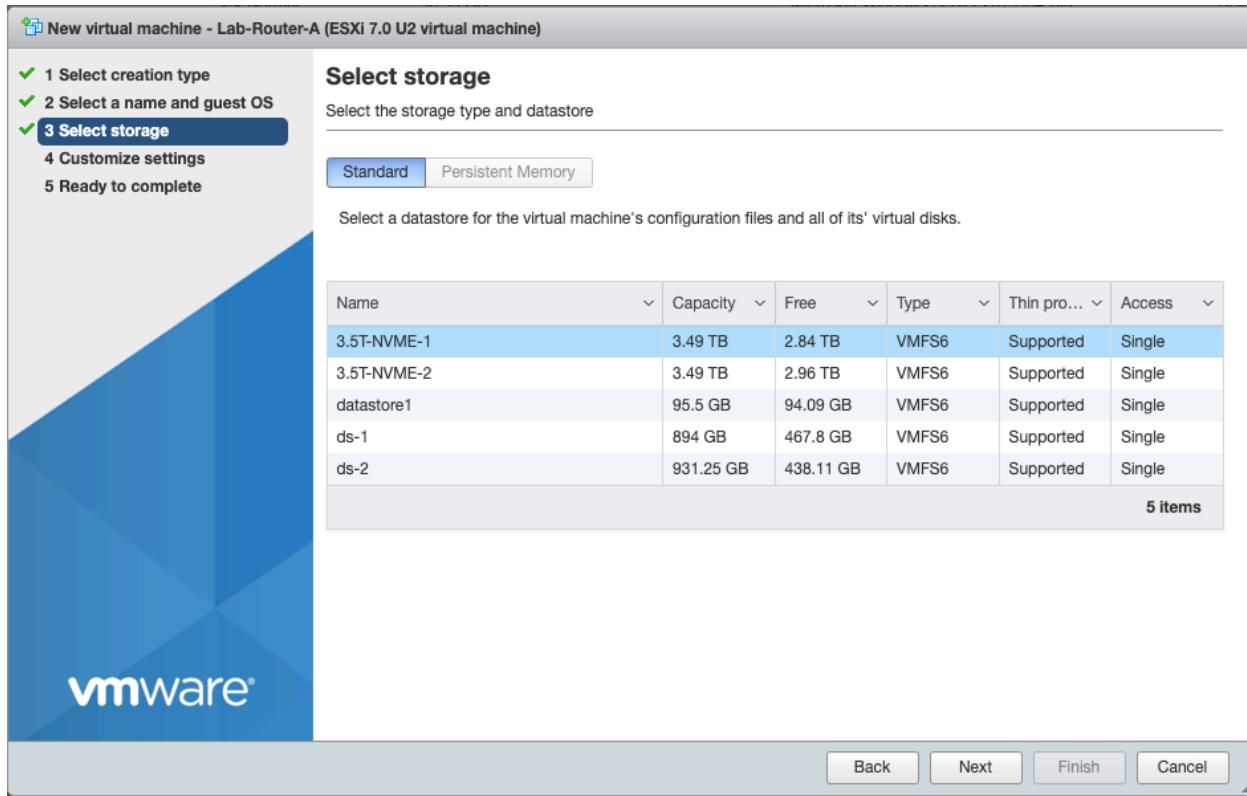
[Step 1] Create new virtual machine

- A. From the virtual machine tab select Create/Register VM
- B. Select create new VM
- C. Name the VM Lab-Router-A (or similar)
- D. Select OS Other, and FreeBSD 13 or later 64 bit

vmx

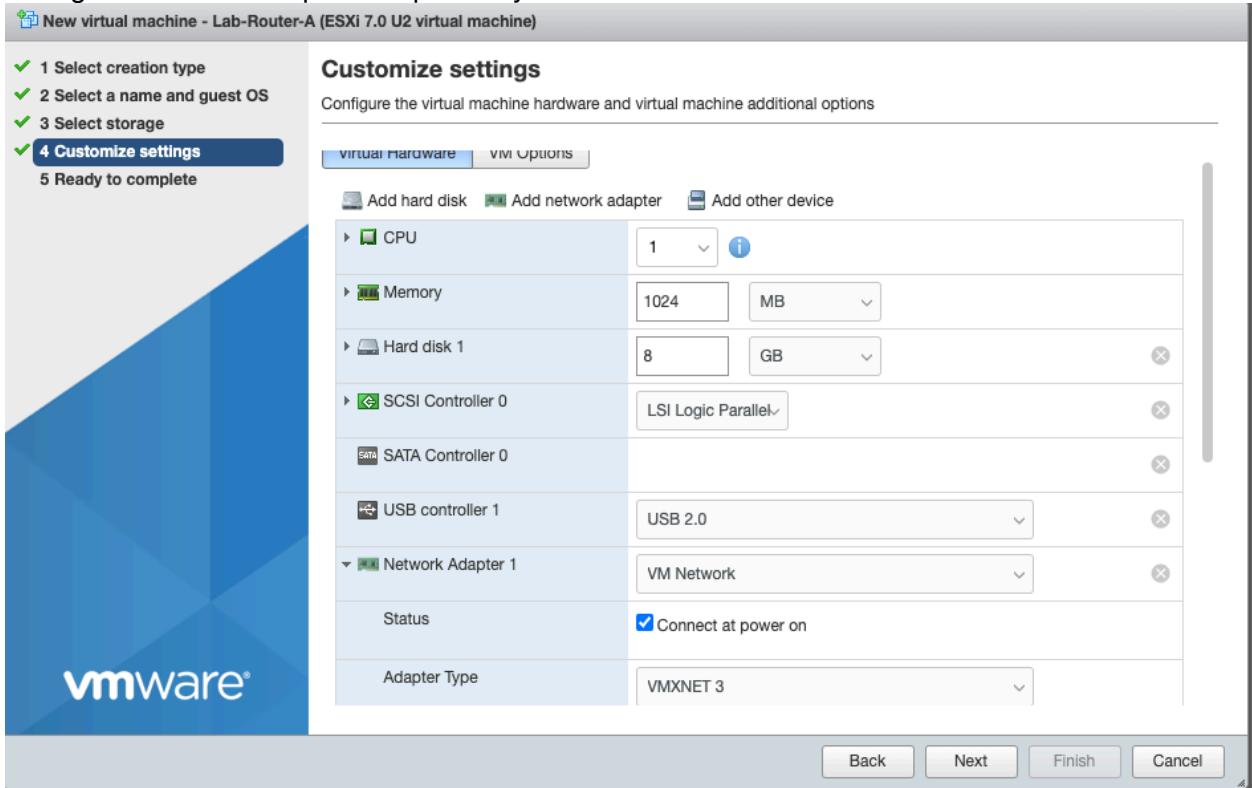


- E. Select Storage

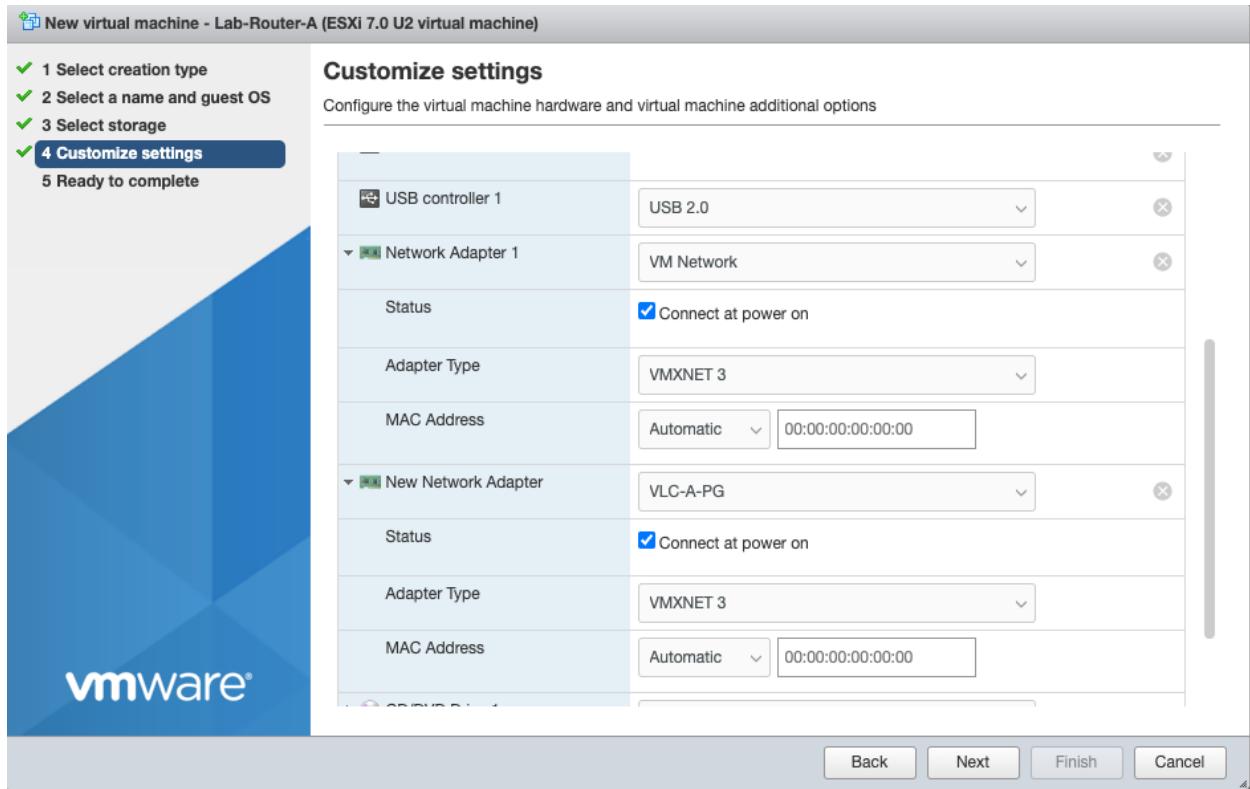


- F. Default CPU, memory and disk are adequate
G. Set SCSI Controller to LSI Logic Parallel

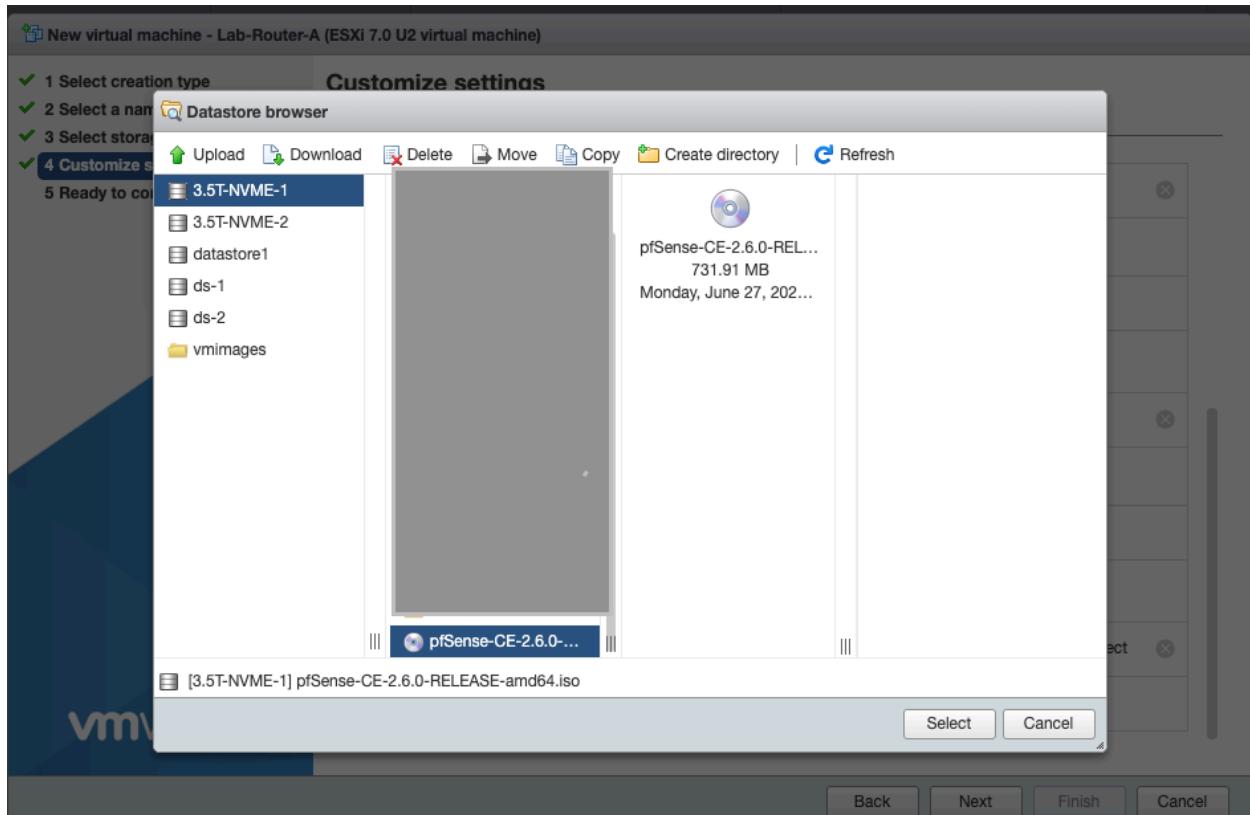
H. Configure Network Adapter 1 to point to your external network.



I. Add a second network adapter and connect to VLC-PG-A

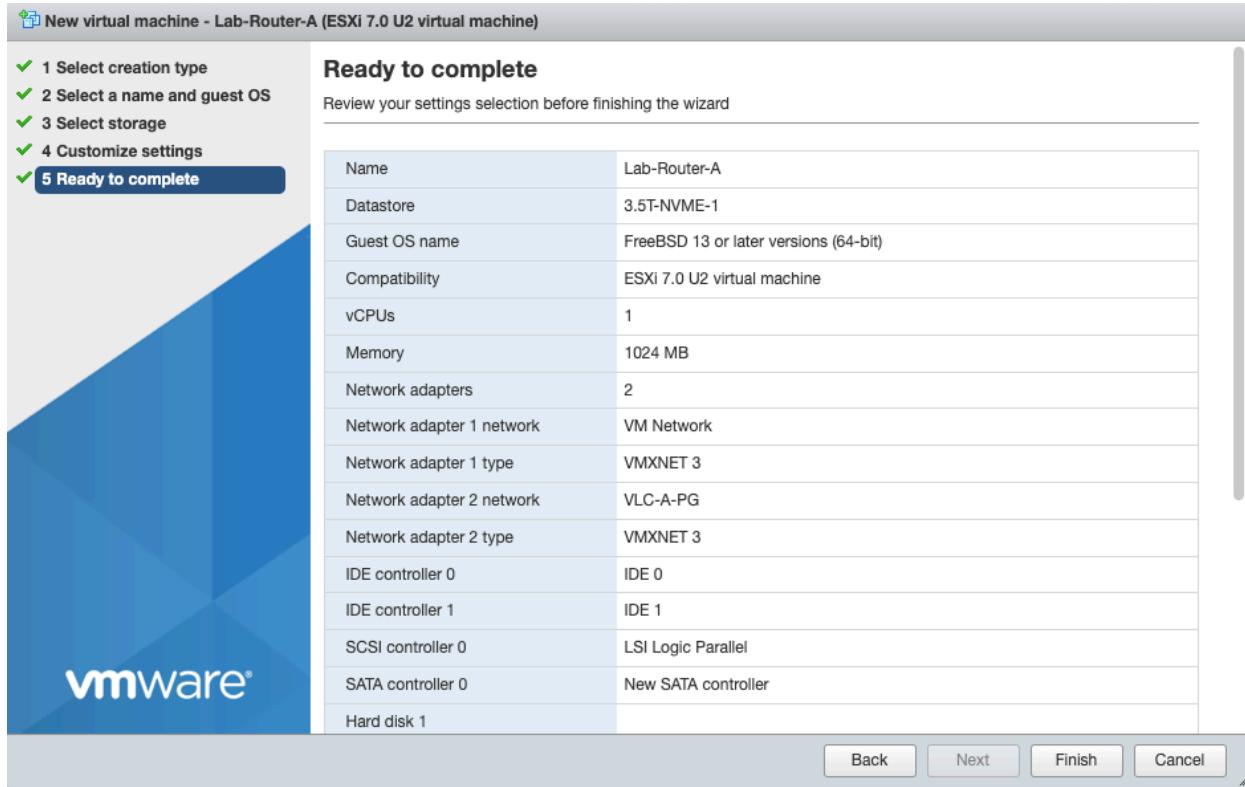


J. Set CD to Datastore ISO and select location of the PFsense iso

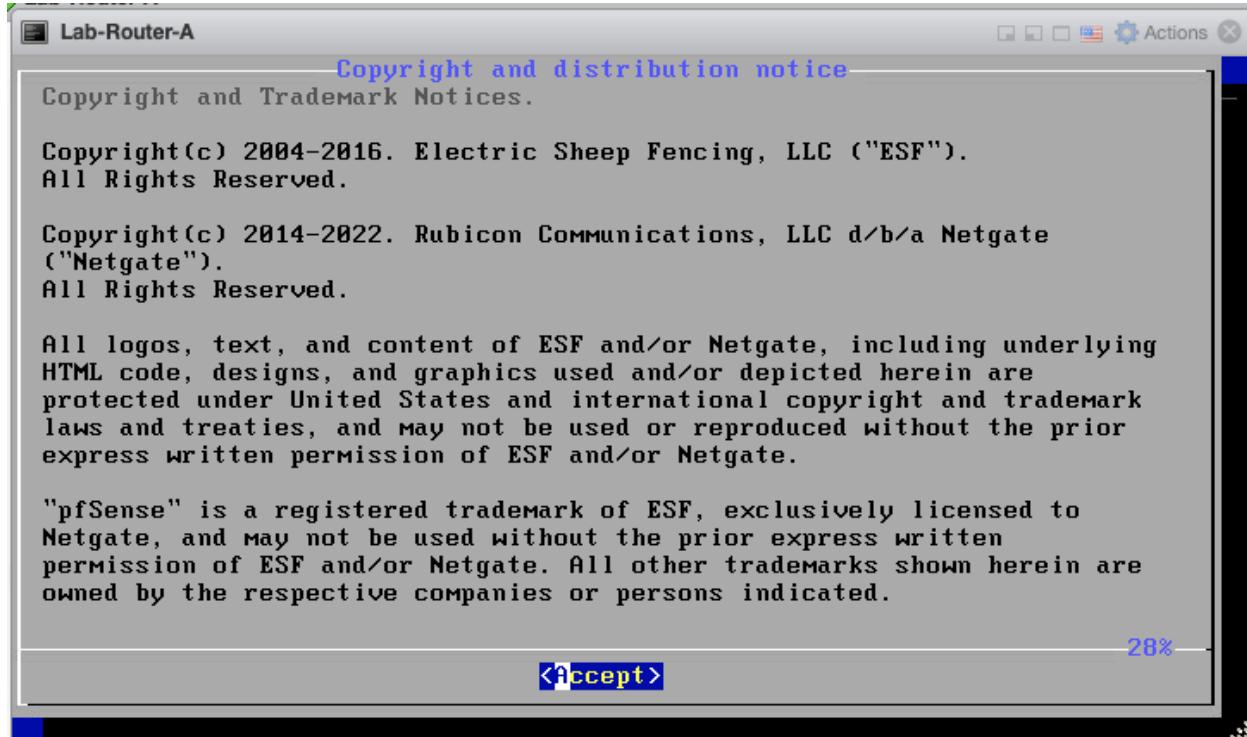


K. Click Next

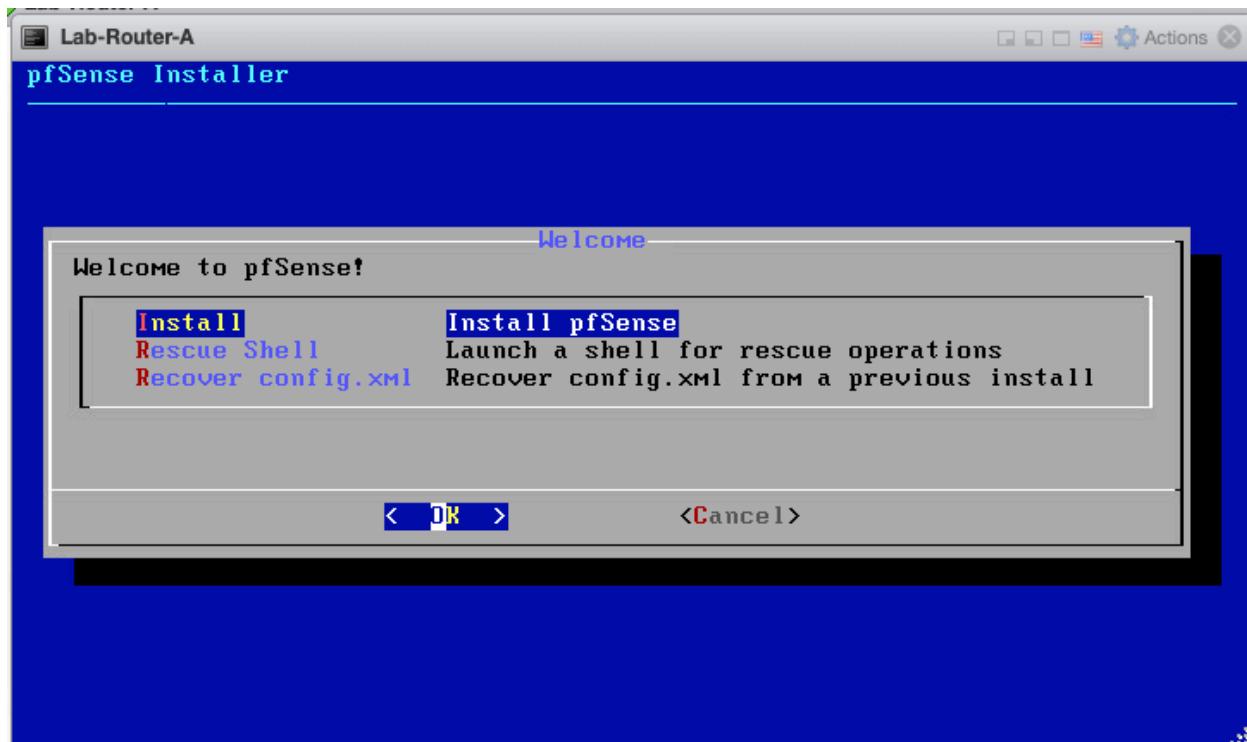
L. Your deployment should look like this



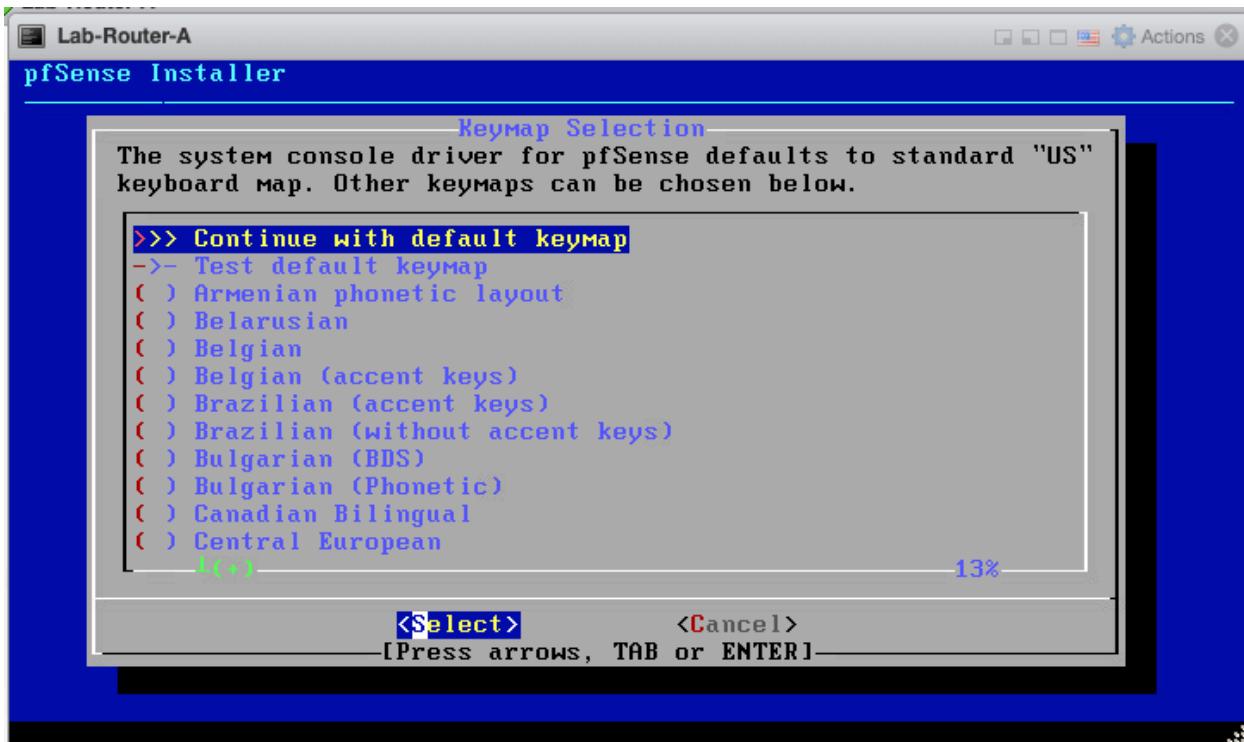
- M. Click Finish
- N. Power on the VM
- O. Open a console into the VM
- P. Accept the EULA



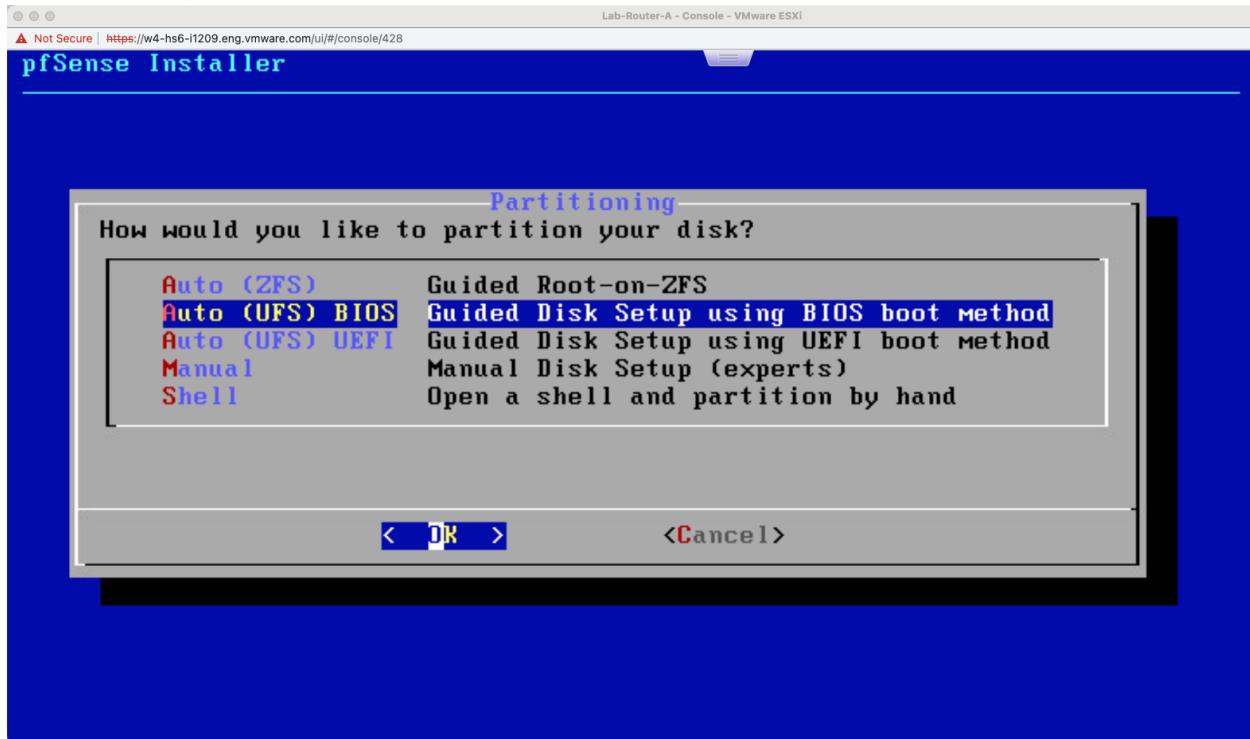
Q. Select install



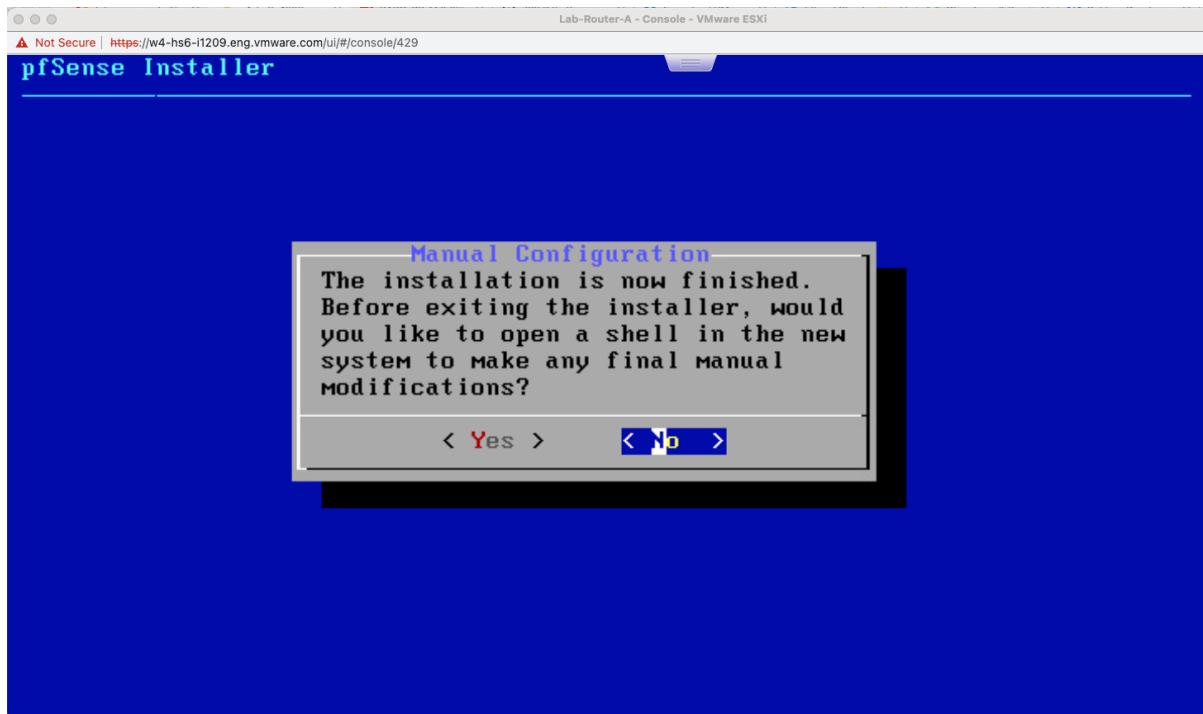
R. Select continue with default keymap



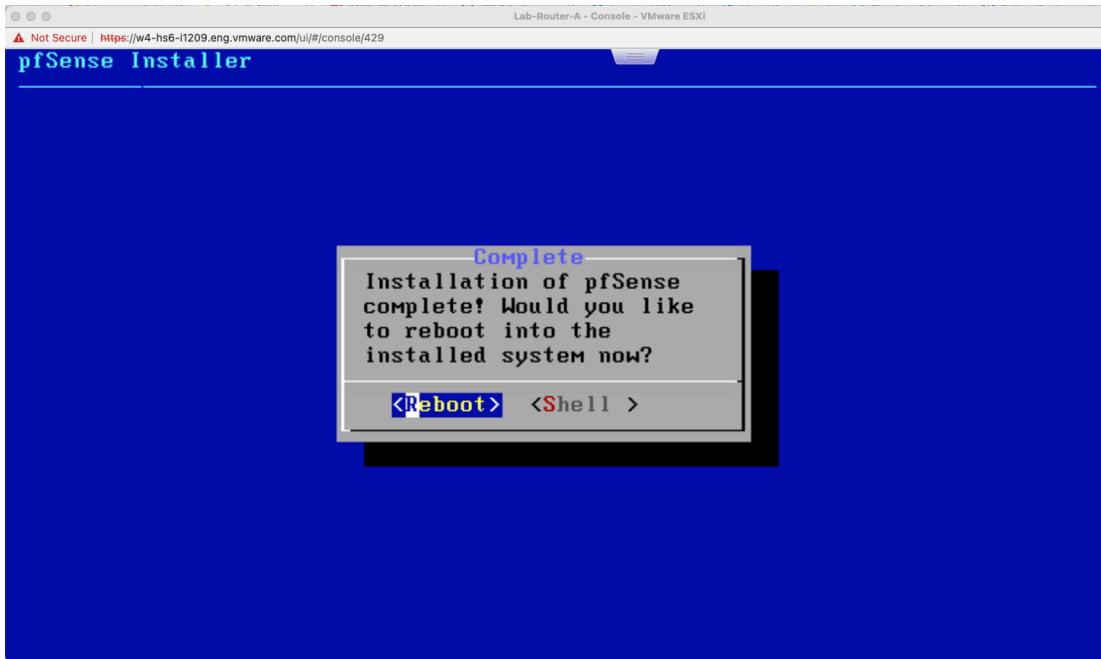
S. Select Auto (UFS) BIOS



- T. Select Proceed with install
- U. Select no when asked if you would like to open a shell



V. Select reboot



[Step 2] Configure PFsense

This step will configure PFsense for your environment.

- After initial boot, your PFsense config should look like the following

Lab-Router-A - Console - VMware ESXi
 ▲ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429

```
XSAVE Features=0xf<XSAVEOPT,XSAVEC,XINUSE,XSAVES>
AMD Extended Feature Extensions ID EBX=0x1201<CLZERO>
TSC: P-state invariant
Hypervisor: Origin = "VMwareVMware"
Done.
.... done.
Initializing..... done.
Starting device Manager (devd)...done.
Loading configuration.....done.
Updating configuration...done.

Default interfaces not found -- Running interface assignment option.
vmx0: link state changed to UP
vmx1: link state changed to UP

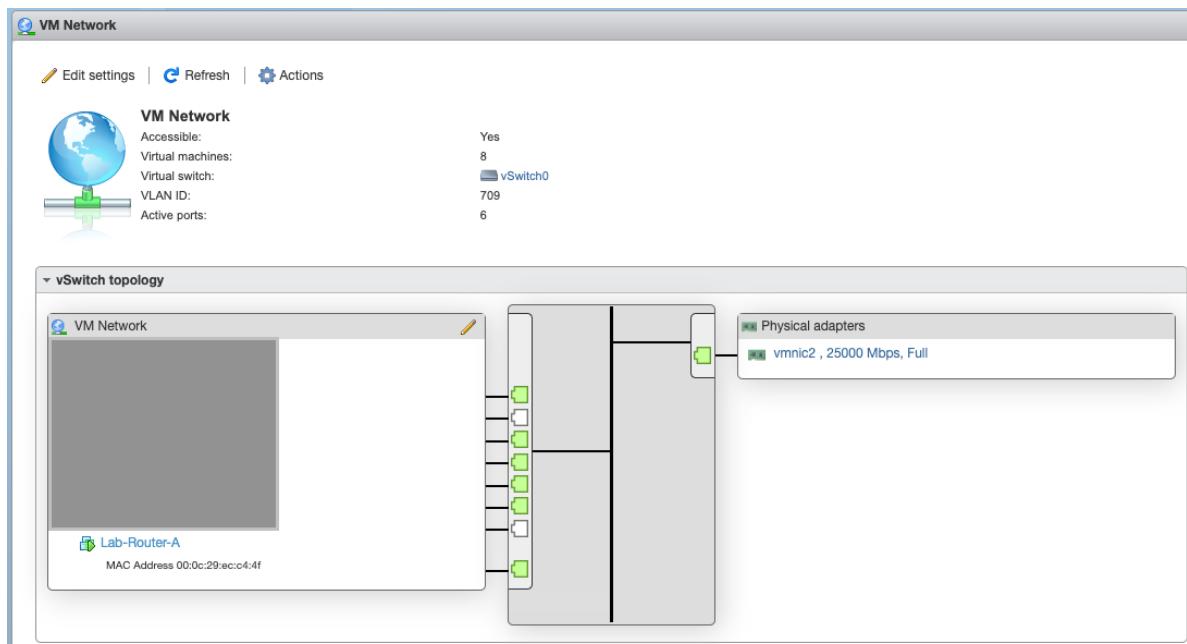
Valid interfaces are:

vmx0      00:0c:29:ec:c4:4f (down) VMware VMXNET3 Ethernet Adapter
vmx1      00:0c:29:ec:c4:59 (down) VMware VMXNET3 Ethernet Adapter

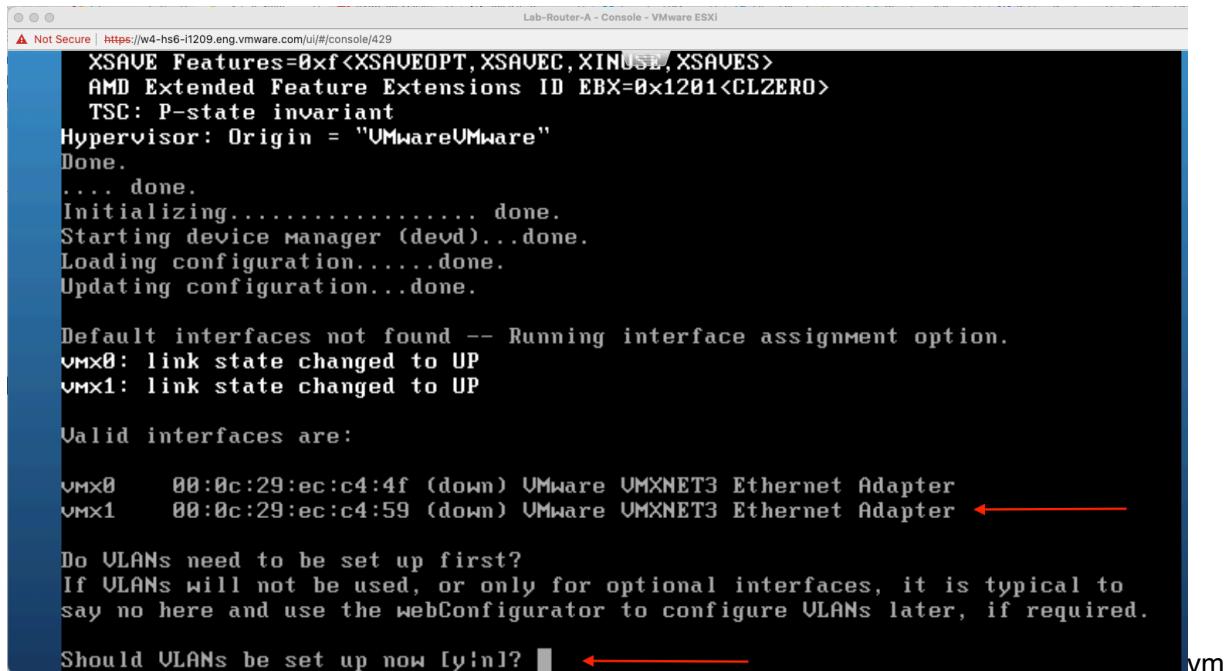
Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y\?n]? ■
```

- B. From your vSphere client, determine which interface (using mac address) connects to your external network. This will be your “WAN” interface later. In this example we can see that the vmx0 interface with MAC ending in c4:4f is connected to our external network



- C. For the VLC Holodeck configuration, we need the inside (LAN) interface to connect on VLAN 10. We will configure vmx0 for VLAN use. Select **y** on the PFsense console to configure VLANs



```

XSAVE Features=0xf<XSAVEOPT,XSAVEC,XINUSE,XSAVES>
AMD Extended Feature Extensions ID EBX=0x1201<CLZERO>
TSC: P-state invariant
Hypervisor: Origin = "VMwareVMware"
Done.
.... done.
Initializing..... done.
Starting device manager (devd)...done.
Loading configuration.....done.
Updating configuration...done.

Default interfaces not found -- Running interface assignment option.
vmx0: link state changed to UP
vmx1: link state changed to UP

Valid interfaces are:

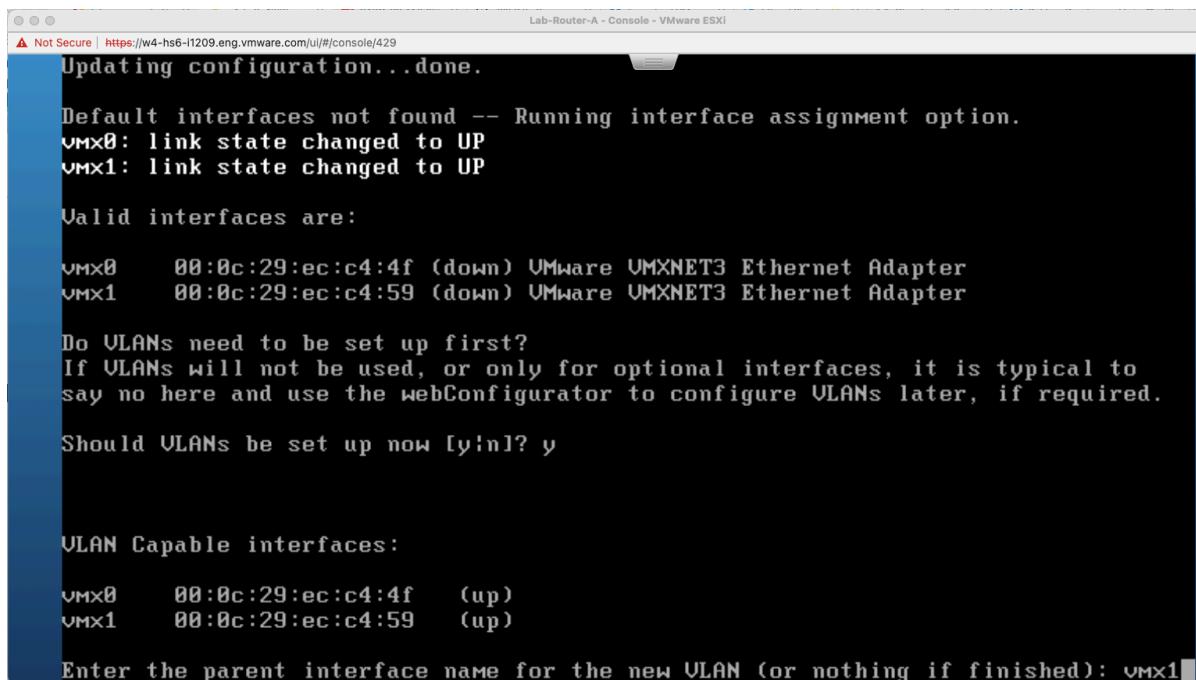
vmx0    00:0c:29:ec:c4:4f (down) VMware VMXNET3 Ethernet Adapter
vmx1    00:0c:29:ec:c4:59 (down) VMware VMXNET3 Ethernet Adapter ←

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y:n]? [ ] ←

```

- D. Enter the parent interface for the new VLAN. In this example our LAN interface will be on vmx1, so we will enter vmx1 and enter



```

Updating configuration...done.

Default interfaces not found -- Running interface assignment option.
vmx0: link state changed to UP
vmx1: link state changed to UP

Valid interfaces are:

vmx0    00:0c:29:ec:c4:4f (down) VMware VMXNET3 Ethernet Adapter
vmx1    00:0c:29:ec:c4:59 (down) VMware VMXNET3 Ethernet Adapter

Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y:n]? y

VLAN Capable interfaces:

vmx0    00:0c:29:ec:c4:4f    (up)
vmx1    00:0c:29:ec:c4:59    (up)

Enter the parent interface name for the new VLAN (or nothing if finished): vmx1 [ ] ←

```

- E. Enter VLAN tag 10
- F. Hit enter when asked for parent interface for next VLAN (signaling we do not need another VLAN)

The screenshot shows a terminal window titled "Lab-Router-A - Console - VMware ESXi". It displays the configuration of a VMware VMXNET3 Ethernet Adapter. The user is prompted to set up VLANs, with a note that it's typical to say no here and use the webConfigurator later. The user enters "y" to set up VLANs now. It lists VLAN Capable interfaces (vmx0, vmx1) and asks for the parent interface name for the new VLAN. The user types "vmx1" and "10" as the VLAN tag. It then lists the interfaces again and asks for the parent interface name again, with a cursor in the input field.

```
VMX1      00:0c:29:ec:c4:59 (down) VMware VMXNET3 Ethernet Adapter
Do VLANs need to be set up first?
If VLANs will not be used, or only for optional interfaces, it is typical to
say no here and use the webConfigurator to configure VLANs later, if required.

Should VLANs be set up now [y\?n]? y

VLAN Capable interfaces:

VMX0      00:0c:29:ec:c4:4f    (up)
VMX1      00:0c:29:ec:c4:59    (up)

Enter the parent interface name for the new VLAN (or nothing if finished): vmx1
Enter the VLAN tag (1-4094): 10

VLAN Capable interfaces:

VMX0      00:0c:29:ec:c4:4f    (up)
VMX1      00:0c:29:ec:c4:59    (up)

Enter the parent interface name for the new VLAN (or nothing if finished): █
```

- G. Enter the interface that is connected to your external network for WAN interface. In this example, the WAN interface was determined to be on vmx0

```

VMX0      00:0c:29:ec:c4:4f  (up)
VMX1      00:0c:29:ec:c4:59  (up)

Enter the parent interface name for the new VLAN (or nothing if finished): vmx1
Enter the VLAN tag (1-4094): 10

VLAN Capable interfaces:

VMX0      00:0c:29:ec:c4:4f  (up)
VMX1      00:0c:29:ec:c4:59  (up)

Enter the parent interface name for the new VLAN (or nothing if finished): 

VLAN interfaces:

VMX1.10      VLAN tag 10, parent interface VMX1

If the names of the interfaces are not known, auto-detection can be used instead. To use auto-detection, please disconnect all interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection (vmx0 vmx1 vmx1.10 or a): vmx0

```

H. Enter the interface for the LAN interface. In this example we need to select the vmx1.10 interface to enable VLAN10

```

Enter the VLAN tag (1-4094): 10

VLAN Capable interfaces:

VMX0      00:0c:29:ec:c4:4f  (up)
VMX1      00:0c:29:ec:c4:59  (up)

Enter the parent interface name for the new VLAN (or nothing if finished): 

VLAN interfaces:

VMX1.10      VLAN tag 10, parent interface VMX1

If the names of the interfaces are not known, auto-detection can be used instead. To use auto-detection, please disconnect all interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection (vmx0 vmx1 vmx1.10 or a): vmx0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT mode.
(vmx1 vmx1.10 a or nothing if finished): vmx1.10

```

I. We do not need an optional interface, so hit enter

```

Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429
Lab-Router-A - Console - VMware ESXi

VLAN Capable interfaces:

vmx0      00:0c:29:ec:c4:4f  (up)
vmx1      00:0c:29:ec:c4:59  (up)

Enter the parent interface name for the new VLAN (or nothing if finished):

VLAN interfaces:

vmx1.10      VLAN tag 10, parent interface vmx1

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(vmx0 vmx1 vmx1.10 or a): vmx0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT Mode.
(vmx1 vmx1.10 a or nothing if finished): vmx1.10

Enter the Optional 1 interface name or 'a' for auto-detection
(vmx1 a or nothing if finished): █

```

J. Your output should look like this

```

Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429
Lab-Router-A - Console - VMware ESXi

VLAN interfaces:

vmx1.10      VLAN tag 10, parent interface vmx1

If the names of the interfaces are not known, auto-detection can
be used instead. To use auto-detection, please disconnect all
interfaces before pressing 'a' to begin the process.

Enter the WAN interface name or 'a' for auto-detection
(vmx0 vmx1 vmx1.10 or a): vmx0

Enter the LAN interface name or 'a' for auto-detection
NOTE: this enables full Firewalling/NAT Mode.
(vmx1 vmx1.10 a or nothing if finished): vmx1.10

Enter the Optional 1 interface name or 'a' for auto-detection
(vmx1 a or nothing if finished): █

The interfaces will be assigned as follows:

WAN  -> vmx0
LAN  -> vmx1.10

Do you want to proceed [y:n]? █

```

K. Enter y to proceed. PFsense will reconfigure and reboot

L. After reboot, select 2 to set IP addressing

The screenshot shows a terminal window titled "Lab-Router-A - Console - VMware ESXi". The URL in the address bar is "Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui#/console/429". The terminal output displays pfSense boot logs:

```
Starting syslog...done.  
Starting CRON... done.  
pfSense 2.6.0-RELEASE amd64 Mon Jan 31 19:57:53 UTC 2022  
Bootup complete
```

It then shows the Netgate Device ID: d57493a2cc54727d8940.

*** Welcome to pfSense 2.6.0-RELEASE (amd64) on pfSense ***

Network connections:

```
WAN (wan)      -> vmx0      ->  
LAN (lan)      -> vmx1.10   -> v4: 192.168.1.1/24
```

Configuration options:

```
0) Logout (SSH only)          9) pfTop  
1) Assign Interfaces          10) Filter Logs  
2) Set interface(s) IP address 11) Restart webConfigurator  
3) Reset webConfigurator password 12) PHP shell + pfSense tools  
4) Reset to factory defaults 13) Update from console  
5) Reboot system              14) Enable Secure Shell (sshd)  
6) Halt system                15) Restore recent configuration  
7) Ping host                  16) Restart PHP-FPM  
8) Shell
```

Enter an option: █

- M. Select 1 for WAN interface . Configure as per your environment. In this example, we will use a fixed /28 IPv4 address (no DHCP) and no IPv6

The screenshot shows a terminal session on a VMware ESXi host named 'Lab-Router-A'. The user is prompted to enter an option (2) and select a WAN interface (1). They then choose to configure the WAN interface via DHCP (n), enter a new IPv4 address (10. [REDACTED]), and specify a subnet bit count (28). Finally, they enter a new upstream gateway address (10. [REDACTED]).

```
Lab-Router-A - Console - VMware ESXi
A Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429
Enter an option: 2
Available interfaces:
1 - WAN (vmx0 - dhcp, dhcp6)
2 - LAN (vmx1.10 - static)

Enter the number of the interface you wish to configure: 1
Configure IPv4 address WAN interface via DHCP? (y/n) n
Enter the new WAN IPv4 address. Press <ENTER> for none:
> 10. [REDACTED]

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
     255.255.0.0 = 16
     255.0.0.0 = 8

Enter the new WAN IPv4 subnet bit count (1 to 32):
> 28

For a WAN, enter the new WAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
> 10. [REDACTED]
```

N. Select yes for HTTP for web configurator

```
y
Lab-Router-A - Console - VMware ESXi
⚠ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui#/console/429
Configure IPv4 address WAN interface via DHCP? (y/n) n
Enter the new WAN IPv4 address. Press <ENTER> for none:
> 10. [REDACTED]

Subnet masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
      255.255.0.0   = 16
      255.0.0.0     = 8

Enter the new WAN IPv4 subnet bit count (1 to 32):
> 28

For a WAN, enter the new WAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
> 10. [REDACTED]

Configure IPv6 address WAN interface via DHCP6? (y/n) n
Enter the new WAN IPv6 address. Press <ENTER> for none:
>
Disabling IPv4 DHCPD...
Disabling IPv6 DHCPD...

Do you want to revert to HTTP as the webConfigurator protocol? (y/n) [REDACTED]
```

O. Press enter to continue

```
Lab-Router-A - Console - VMware ESXi
▲ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429
Enter the new WAN IPv4 subnet bit count (1 to 32):
> 28

For a WAN, enter the new WAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
> 10. [REDACTED]

Configure IPv6 address WAN interface via DHCP6? (y/n) n

Enter the new WAN IPv6 address. Press <ENTER> for none:
>

Disabling IPv4 DHCPD...
Disabling IPv6 DHCPD...

Do you want to revert to HTTP as the webConfigurator protocol? (y/n) y

Please wait while the changes are saved to WAN...
Reloading filter...
Reloading routing configuration...
DHCPD...
Restarting webConfigurator...

The IPv4 WAN address has been set to 10. [REDACTED]

Press <ENTER> to continue. [REDACTED]
```

P. Select option 2 to set IP for LAN interface, then 2 to select LAN

2

```
Lab-Router-A - Console - VMware ESXi
⚠ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429
VMware Virtual Machine - Netgate Device A57493a2cc54727d8940

*** Welcome to pfSense 2.6.0-RELEASE (amd64) on pfSense ***

WAN (wan)      -> vmx0      -> v4: 10. [REDACTED]
LAN (lan)      -> vmx1.10   -> v4: 192.168.1.1/24

0) Logout (SSH only)          9) pfTop
1) Assign Interfaces          10) Filter Logs
2) Set interface(s) IP address 11) Restart webConfigurator
3) Reset webConfigurator password 12) PHP shell + pfSense tools
4) Reset to factory defaults 13) Update from console
5) Reboot system              14) Enable Secure Shell (sshd)
6) Halt system                15) Restore recent configuration
7) Ping host                  16) Restart PHP-FPM
8) Shell

Enter an option: 2

Available interfaces:

1 - WAN (vmx0 - static)
2 - LAN (vmx1.10 - static)

Enter the number of the interface you wish to configure: 2
```

- Q. Set LAN interface to 10.0.0.1/24. You do not need an upstream gateway, IPv6 info or DHCP server

```
Lab-Router-A - Console - VMware ESXi
⚠ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429

1 - WAN (vmx0 - static)
2 - LAN (vmx1.10 - static)

Enter the number of the interface you wish to configure: 2

Enter the new LAN IPv4 address. Press <ENTER> for none:
> 10.0.0.1

Subnet Masks are entered as bit counts (as in CIDR notation) in pfSense.
e.g. 255.255.255.0 = 24
      255.255.0.0   = 16
      255.0.0.0     = 8

Enter the new LAN IPv4 subnet bit count (1 to 32):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
```

R. Your end result should look like this

```
Lab-Router-A - Console - VMware ESXi
⚠ Not Secure | https://w4-hs6-i1209.eng.vmware.com/ui/#/console/429

Enter the new LAN IPv4 subnet bit count (1 to 32):
> 24

For a WAN, enter the new LAN IPv4 upstream gateway address.
For a LAN, press <ENTER> for none:
>

Enter the new LAN IPv6 address. Press <ENTER> for none:
>

Do you want to enable the DHCP server on LAN? (y/n) n
Disabling IPv4 DHCPD...
Disabling IPv6 DHCPD...

Please wait while the changes are saved to LAN...
Reloading filter...
Reloading routing configuration...
DHCPD...

The IPv4 LAN address has been set to 10.0.0.1/24
You can now access the webConfigurator by opening the following URL in your web
browser:
      http://10.0.0.1/

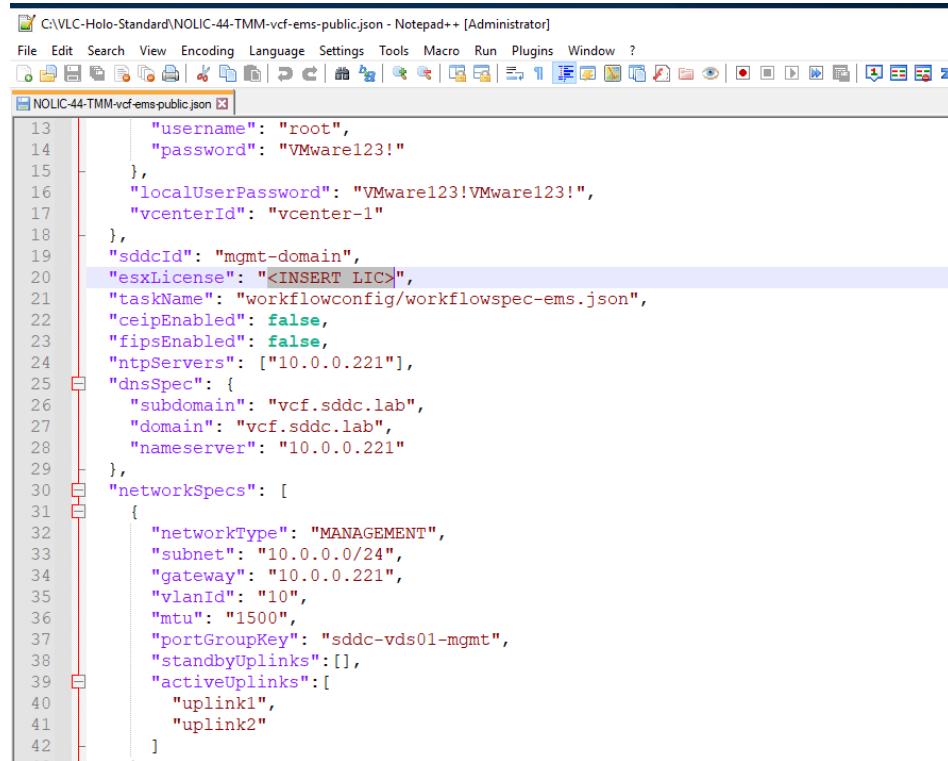
Press <ENTER> to continue.
```

Task 4: Deploy VCF using VLC

In this task we deploy a nested VCF instance using VCF Lab Constructor. This task documentation is designed to act as an extension to the VCF Lab Constructor manual that comes with VLC. This step assumes you have downloaded the full VLC Holodeck Standard package from <https://github.com/jsenicka/holodeck-standard.git> and copied the VLC-Holo-Standard directory to c:\VLC-Holo-Standard on your jump host

[Step 1] Add licensing info to EMS json

- Open c:\VLC-Holo-Standard\ NOLIC-44-TMM-vcf-ems-public.json with your editor
- Within this file you will find and replace <INSERT LIC> with a valid license in 4 locations.
 - esxiLicense
 - nsxtLicense
 - vSAN licenseFile
 - vCenter licenseFile



```

13     "username": "root",
14     "password": "VMware123!"
15   },
16   "localUserPassword": "VMware123!VMware123!",
17   "vcenterId": "vcenter-1"
18 },
19 "sddcId": "mgmt-domain",
20 "esxiLicense": "<INSERT LIC>",
21 "taskName": "workflowconfig/workflowspec-ems.json",
22 "ceipEnabled": false,
23 "fipsEnabled": false,
24 "ntpServers": ["10.0.0.221"],
25   "dnsSpec": {
26     "subdomain": "vcf.sddc.lab",
27     "domain": "vcf.sddc.lab",
28     "nameserver": "10.0.0.221"
29   },
30   "networkSpecs": [
31     {
32       "networkType": "MANAGEMENT",
33       "subnet": "10.0.0.0/24",
34       "gateway": "10.0.0.221",
35       "vlanId": "10",
36       "mtu": "1500",
37       "portGroupKey": "sddc-vds01-mgmt",
38       "standbyUplinks": [],
39       "activeUplinks": [
40         "uplink1",
41         "uplink2"
42       ]
43     }
44   ]
45 }

```

- Save the edited file as c:\VLC-Holo-Standard\ LIC-44-TMM-vcf-ems-public.json

[Step 2] Download Cloud Foundation 4.4.1 Cloud Builder

- A. Access [VMware Customer Connect](#) to download Cloud Foundation 4.4.1 Cloud Builder.
Note: You will need a valid login to VMware Customer Connect to download cloud builder

The screenshot shows the VMware Customer Connect interface. At the top, there's a navigation bar with links for 'Products and Accounts', 'Knowledge', 'More', a search icon, a globe icon, 'Register', and 'Login'. Below the navigation, the URL 'Home / VMware Cloud Foundation 4.4.1' is displayed. The main title is 'Download Product'. On the left, there are details for version 4.4.1: 'Select Version' dropdown set to 4.4.1, 'Documentation' link to 'Release Notes', 'Release Date' 2022-05-12, and 'Type' Product Binaries. To the right, under 'Product Resources', are links for 'View My Download History', 'Product Information', and 'Documentation'. Below this, there are tabs for 'Product Downloads' (which is selected), 'Drivers & Tools', 'Open Source', 'Custom ISOs', and 'OEM Addons'. Under 'Product Downloads', there's a table with two columns: 'File' and 'Information'. The first row shows 'VMware Cloud Builder' with file size 19.82 GB and file type ova. It includes a 'Read More' link and a prominent blue 'DOWNLOAD NOW' button.

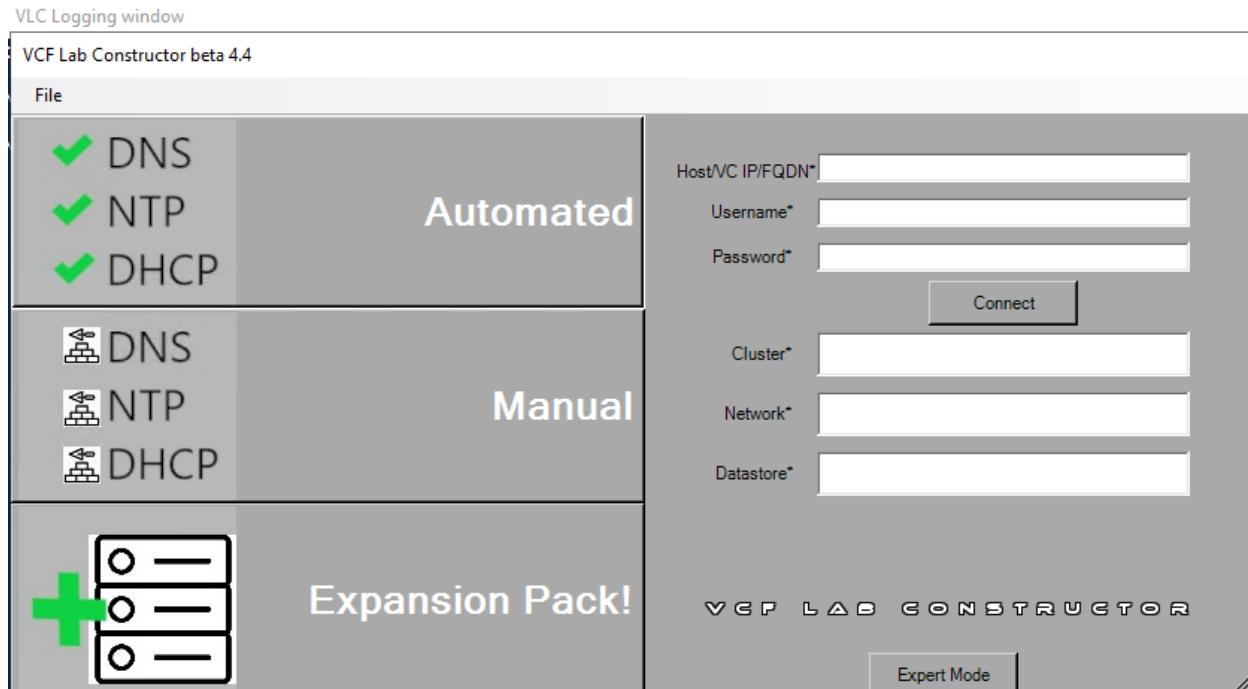
- B. Place the Cloud Builder OVA in C:\Cloud Builder (or similar directory)

[Step 3] Run VLC

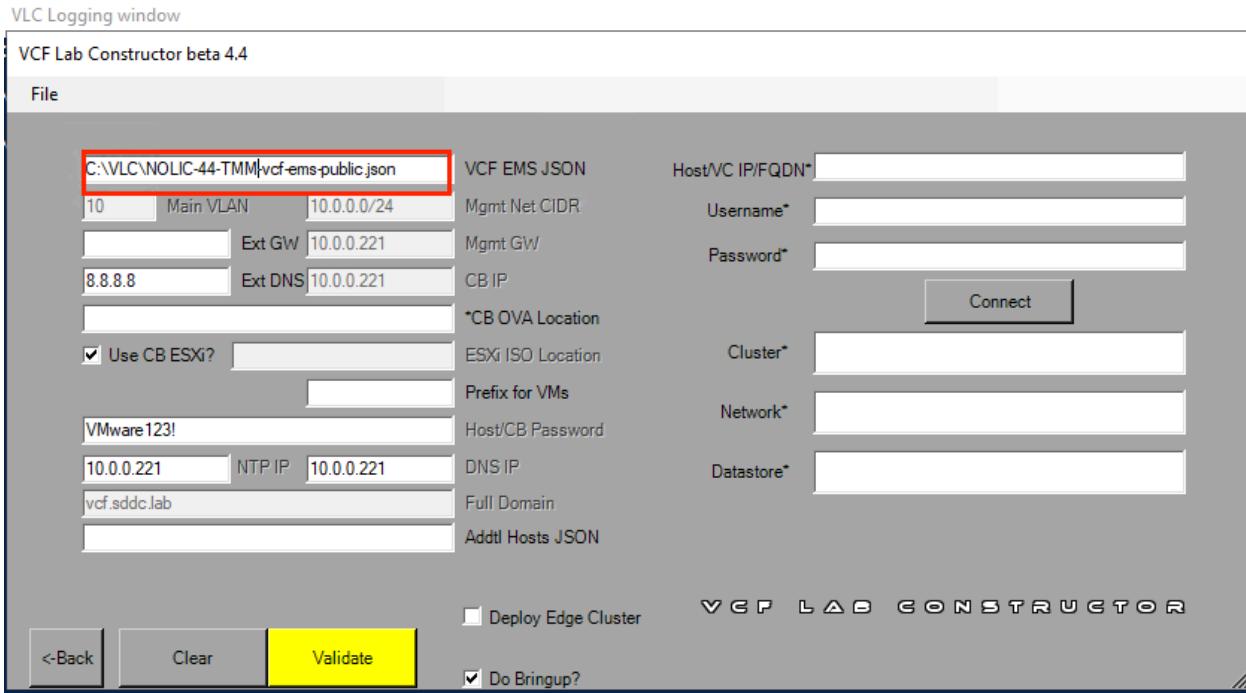
- A. While logged in to your jump host as administrator, right click on VLCGuiHH.ps1 and click Run with Powershell (in this example I am using a pre-release version called VLCGuiHH-3.ps1)

Name	Date modified	Type	Size
automated_api_jsons	5/6/2022 3:43 AM	File folder	
bin	5/6/2022 3:43 AM	File folder	
cb_esx_iso	8/9/2022 12:30 AM	File folder	
conf	5/23/2022 10:04 PM	File folder	
etc	5/6/2022 3:43 AM	File folder	
Logs	8/9/2022 12:49 AM	File folder	
Templates	8/9/2022 12:31 AM	File folder	
add_3_big_hosts	5/26/2022 12:53 PM	JSON File	1 KB
add_3_hosts	2/7/2022 4:05 PM	JSON File	1 KB
add_3_hosts_bulk_commission VSAN	12/25/2020 8:39 AM	JSON File	1 KB
add_4_big_hosts	5/24/2022 4:46 PM	JSON File	1 KB
add_4_big_hosts_ESXi5-8	6/11/2022 2:01 PM	JSON File	1 KB
add_4_hosts_bulk_commission VSAN	5/24/2022 6:45 PM	JSON File	1 KB
LIC-44-TMM-vcf-ems-public	5/6/2022 6:39 AM	JSON File	6 KB
NOLIC-44-TMM-vcf-ems-public	2/7/2022 3:55 PM	JSON File	6 KB
NSXT Edge nodes AMD Ryzen Fix	2/11/2022 5:44 AM	Chrome HTML Do...	1,544 KB
VCF Lab Constructor Install Guide 44-021...	2/11/2022 6:05 AM	Chrome HTML Do...	1,947 KB
VLCGuiHH-2	8/9/2022 12:29 AM	Windows PowerS...	220 KB

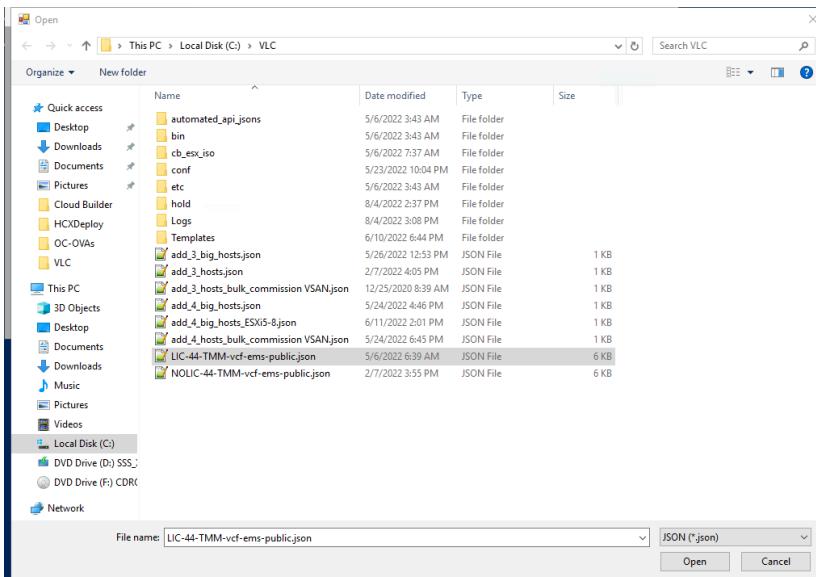
B. Click Automated on the VLC UI



C. Click on VCF EMS JSON field

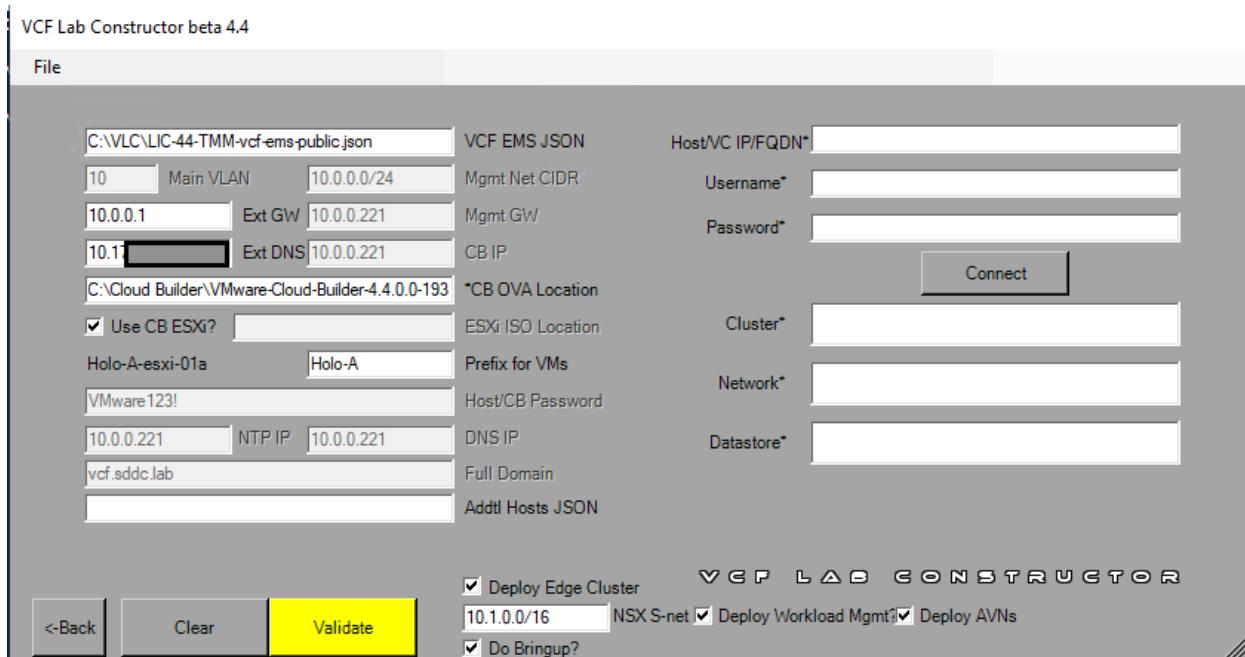


D. Select the modified EMS json with your license keys, then Open

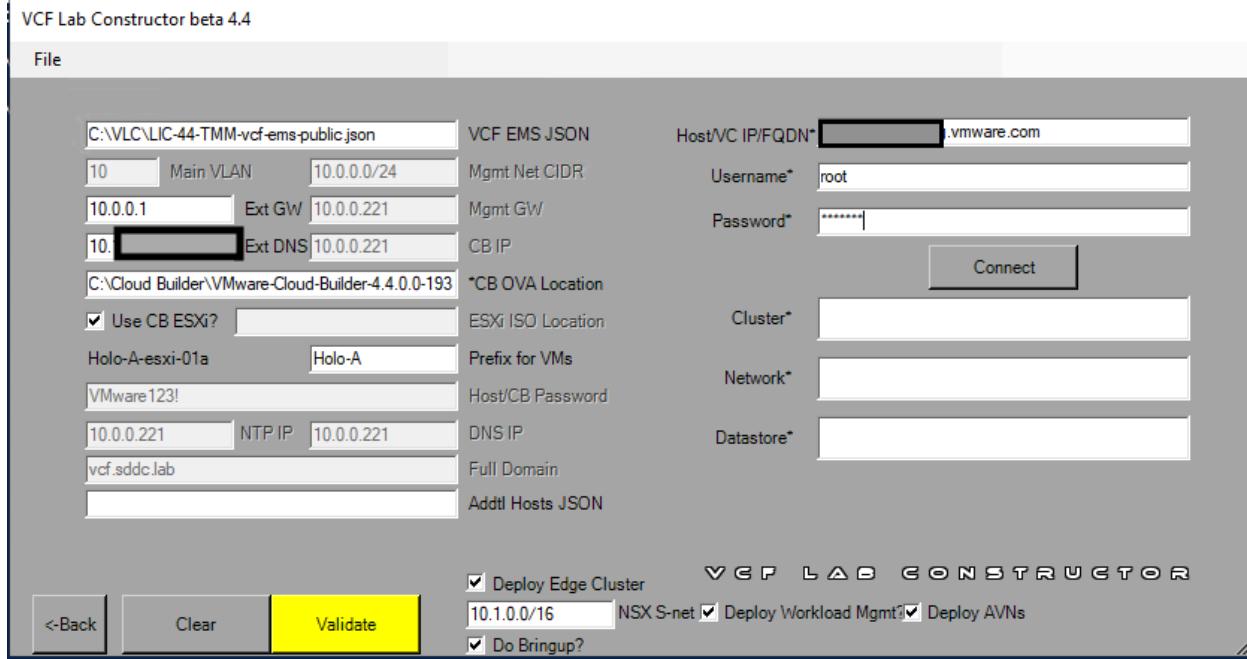


- E. Enter the address of the lab gateway created in previous steps (10.0.0.1) in the Ext GW field**
- F. If your lab requires use of DNS other than 8.8.8.8, enter in Ext DNS**
- G. Leave Mgmt Net CIDR, Mgmt GW and CB IP default**
- H. Leave "Use CB ESXi" checked**

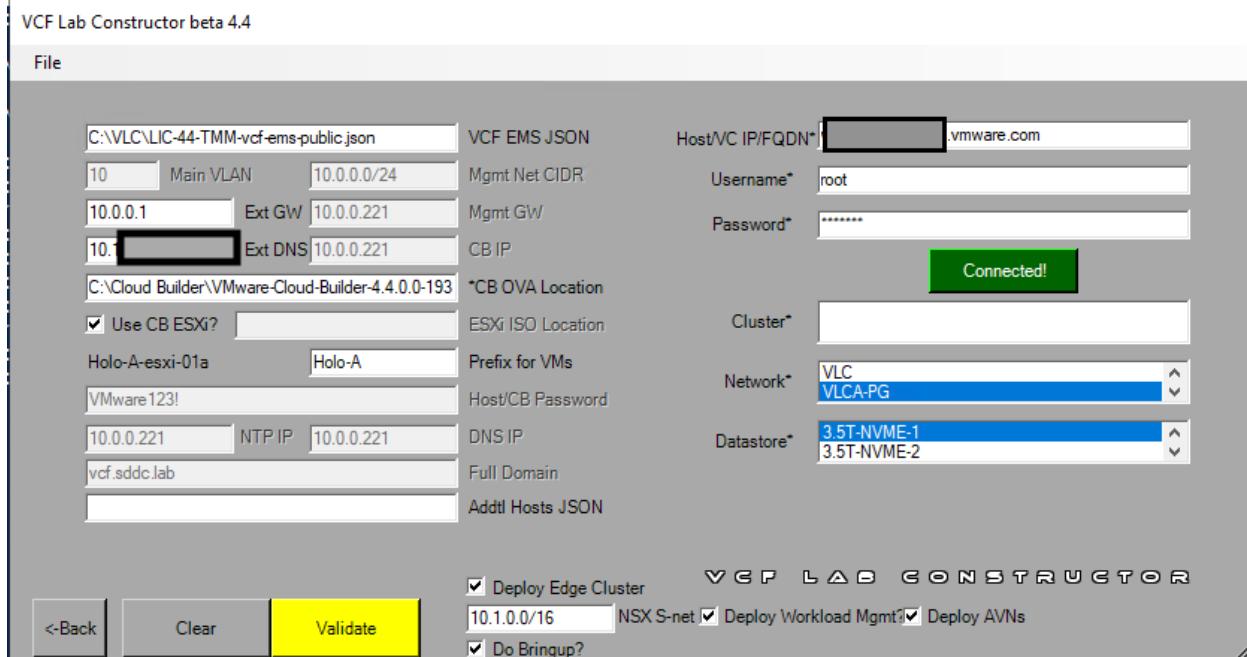
- I. If you plan to deploy more than one lab on this physical host, add a unique name in the Prefix for VMs field. In this example we use Holo-A
- J. Leave Host/CB Password, NTP IP and DNS IP at default
- K. Leave Full Domain at default
- L. Check Deploy Edge Cluster
- M. Leave NSX S-net default at 10.1.0.0/16 (This is used for the Holodeck labs later)
- N. Select Deploy Workload Mgmt (Enables Tanzu/Container workloads later)
- O. Select Deploy AVN (used for vRealize and other infrastructure later)



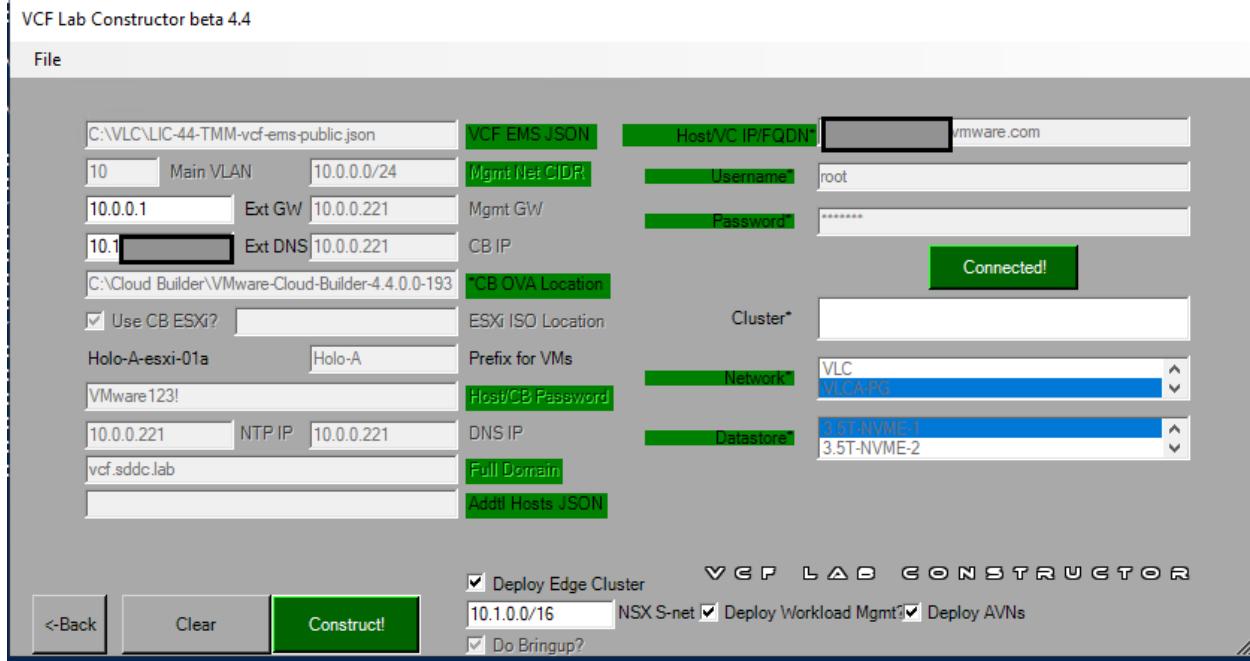
- P. Enter hostname, username and password for your ESXi host



- Q. Click Connect
- R. Select the portgroup and datastore you will use for this deployment. In this example we VLC-A-PG we created earlier



- S. Click Validate
- T. Your results should look like



U. Click Construct

V. VLC will deploy your configuration. The process takes about 3 hours

```

VCF Lab Constructor beta v4.4.1 - Process Window
03:33:05 :> Validating Free Space on Datastore 800GB or more for deployment, 300GB or more for Expansion.
03:33:06 :> current free space on datastore 3.5T-NVME-1 is 2172GB. Validation Passed.
Form is valid: True
03:33:06 :> Validation complete, all checks passed!
03:37:33 :> -----Inputs-----4.4.1--
03:37:33 :: password ca$hC0w
03:37:33 :: dnsServer 10.0.0.221
03:37:33 :: typeGuestDisk Thin
03:37:33 :: username root
03:37:33 :: cbiSOLoc C:\Cloud Builder\VMware-Cloud-Builder-4.4.0.0-19312029_ovf10.ova
03:37:33 :: useCBIso True
03:37:33 :: nestedVMPrefix Holo-A-
03:37:33 :: vcfDomainName vcf.sddc.lab
03:37:33 :: nsxSuperNet 10.1.0.0/16
03:37:33 :: deployWldMgmt True
03:37:33 :: masterPassword VMware123!
03:37:33 :: cbName CB-01a
03:37:33 :: deployAVNs True
03:37:33 :: cluster
03:37:33 :: esxhost [REDACTED] vmware.com
03:37:33 :: internalSvcs True
03:37:33 :: ds 3.5T-NVME-1
03:37:33 :: mgmtNetSubnet 10.0.0.0/24
03:37:33 :: mgmtNetVlan 10
03:37:33 :: addHostsJson
03:37:33 :: labDNS 10. [REDACTED]
03:37:33 :: vcfEMSFile C:\VLC\LIC-44-TMM-vcf-ems-public.json
03:37:33 :: buildOps
03:37:33 :: mgmtNetCidr 24
03:37:33 :: mgmtNetGateway 10.0.0.221
03:37:33 :: labGateway 10.0.0.1
03:37:33 :: deployEdgeCluster True
03:37:33 :: vsphereISOLOC
03:37:33 :: ntpServer 10.0.0.221
03:37:33 :: guestOS vmkernel165guest
03:37:33 :: cbIPAddress 10.0.0.221
03:37:33 :: netName VLCA-PG
03:37:33 :: bringupAfterBuild True
03:37:33 :> -----END-Inputs-----0
1
2
3
03:37:33 :> Importing CloudBuilder oVF
21
Opening OVA source: C:\Cloud Builder\VMware-Cloud-Builder-4.4.0.0-19312029_ovf10.ova
The manifest does not validate
Opening VI target: vi://root@w4-hs6-i1209.eng.vmware.com:443/
Deploying to VI: vi://root@w4-hs6-i1209.eng.vmware.com:443/
Disk progress: 55%

```

W. When complete, VLC will advise the user to click enter then access SDDC Manager via web browser

```
VCF Lab Constructor beta v4.4.1 - Process Window
id : urn:uuid:8bae5c5d-170d-4044-b35c-90def77c8b88
capabilities : @ltransferIn=System.Object[]; transferOut=System.Object[]
vcspVersion : 2

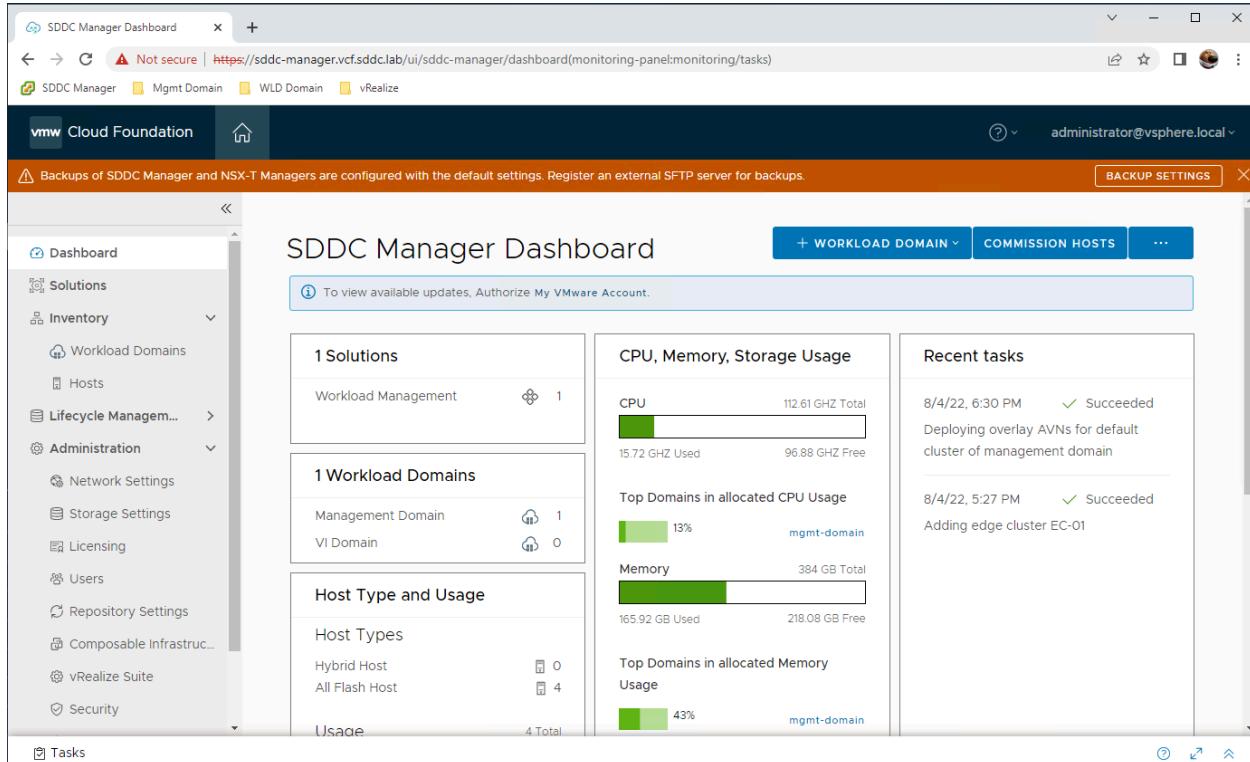
06:06:13 :> 8/4/2022 6:06:13 PM New-ContentLibrary An error occurred while trying to subscribe to a content library. For more details check the inner exception.
06:06:13 :> Problem connecting to https://wp-content.vmware.com/v2/latest/lib.json, setting up local content library.
06:06:13 :> You will need to manually download TKG photon images and put in this content library before you can deploy Tanzu.
06:06:15 :> Getting Cluster Info: domain-c8
06:06:19 :> Getting Storage Policy ID: aa6d5a82-1c88-45da-85d3-3d74b91a5bad
06:06:20 :> Getting DVS ID (key): 50 13 24 d3 ec af 25 8f-f6 bb bd 46 fd ed 93 aa
06:06:20 :> Getting portgroup ID: dvportgroup-12
06:06:20 :> Getting Edge Cluster ID: cfd0ad58-fb68-455f-bf8f-726ce41d3bfa
06:06:20 :> Load Workload Management API JSON for customization
06:06:20 :> Convert customized Workload Management config to JSON
06:06:21 :> POSTing Workload Management API - This takes ~45 minutes
06:06:21 :> Attempt: 0

06:06:22 :> workload Management config status: CONFIGURING
06:06:22 :> Checking again in 3 minutes.
06:09:23 :> workload Management config status: CONFIGURING
06:09:23 :> Checking again in 3 minutes.
06:12:24 :> Workload Management config status: CONFIGURING
06:12:24 :> Checking again in 3 minutes.
06:15:24 :> Workload Management config status: CONFIGURING
06:15:24 :> Checking again in 3 minutes.
06:18:25 :> Workload Management config status: CONFIGURING
06:18:25 :> Checking again in 3 minutes.
06:21:26 :> Workload Management config status: CONFIGURING
06:21:26 :> Checking again in 3 minutes.
06:24:27 :> Workload Management config status: CONFIGURING
06:24:27 :> Checking again in 3 minutes.
06:27:27 :> Workload Management config status: CONFIGURING
06:27:27 :> Checking again in 3 minutes.
06:30:28 :> Workload Management configured!
06:30:28 :> Configuring Namespace
06:30:28 :> Attempt: 0

06:30:28 :> Obtaining deployed Edge Cluster ID
06:30:28 :> Token Expired 06:30:28
06:30:29 :> Token Expired 06:30:29
06:30:35 :> Loading AVN API JSON - NSX_AVN_API.json
06:30:35 :> Adding Edge Cluster ID: c3e851b5-7441-4e48-af53-1c5d96558543
06:30:35 :> Calling AVN creation API - this takes < 5 minutes
06:30:45 :> Current task: Create Overlay AVN Segment in NSX-T
06:30:55 :> Complete!
06:30:55 :> Total RunTime: 02:53:22.7474564
06:30:55 :> Please open a browser and navigate to https://sddc-manager.vcf.sddc.lab
Your VCF SDDC setup is complete. Press enter to continue!: _
```

[Step 3] Test VLC Deployment

- Open a Chrome browser and click on the SDDC Manager bookmark
- Ignore security warnings (click advanced and proceed to sddc-manager.vcf.sddc.lab)
- Ignore security warnings (click advanced and proceed to vcenter-mgmt.vcf.sddc.lab as SDDC Manager use vCenter SSO for authentication)
- Login as *administrator@vsphere.local* password VMware123!
- Uncheck the VMware CEIP box
- Your result should look like



Task 5: Create Holodeck Opencart Lab Infrastructure

In this task we will configure a set of virtual machines and virtual machine templates that are utilized in the Holodeck SDN and VRA lab modules. This step assumes you have downloaded the complete VLC Holodeck package from <https://github.com/jsenicka/holodeck-standard.git> unzipped to c:\VLC-Holo-Standard on your jump host

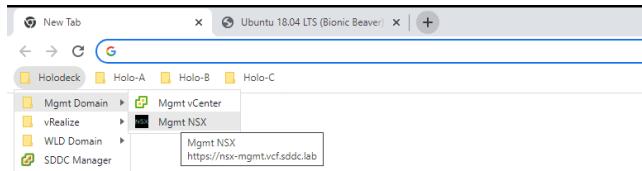
[Step 1] Download Ubuntu 18.04 Cloud Image

- Open a browser and download the [Ubuntu 18.04 LTS Daily Build](#)
- Copy this file to c:\VLC-Holodeck-Standard\Holo-Build\bionic.ova

[Step 2] Configure AVN region-seg01 as build platform

This step will configure a DHCP server and IP address space at the top of the “region-seg01” NSX segment. This provides a simple way to build virtual machines using DHCP and powershell automation. This step assumes the Holodeck environment was deployed with AVN and Edge Cluster using the automated build.

- Open a new tab in the Chrome browser
- Click the Holodeck bookmark folder, then Mgmt Domain folder, then select Mgmt NSX



- C. Click advanced / proceed to nsx-mgmt.vcf.sddc.lab, if required to accept the certificate
- D. Log into NSX Manager as user: **admin** with the password: **VMware123!VMware123!**
- E. From the NSX-T Manager home/overview screen click the Networking Tab, then DHCP

Category	Value
Tier-0 Gateways	1
Tier-1 Gateways	1
VPN Services	0
EVPN Tenants	0

F. Click Add DHCP Profile

- G. Enter the following
 - Profile Name: Holodeck
 - Profile Type DHCP Server
 - Server IP Address 10.50.0.254/24

- Edge Cluster EC-01

The screenshot shows the 'DHCP' configuration page. A new profile named 'Holodeck' is being created. The 'Profile Name' is 'Holodeck', 'Profile Type' is 'DHCP Server', 'Server IP Address' is '10.50.0.254/24', and 'Lease Time (seconds)' is '86400'. The 'Tags' section contains 'Edge Cluster' and 'EC-01'. The 'Edges' section has a 'Set' button. At the bottom are 'SAVE' and 'CANCEL' buttons.

H. Click Save

The screenshot shows the 'DHCP' configuration page after saving. The 'Holodeck' profile is now listed in the table. It has a status icon, a 'Edit' icon, and a 'Delete' icon. The table columns are 'Profile Name', 'Profile Type', 'Server IP Address', and 'Lease Time (seconds)'. The 'Holodeck' entry shows 'Holodeck' under Profile Name, 'DHCP Server' under Profile Type, '10.50.0.254/24' under Server IP Address, and '86400' under Lease Time (seconds).

- Click Segments on the left navigation panel
- Click the three dots to the left of region-seg01
- K.

The screenshot shows the NSX-T interface. The left sidebar has 'Segments' selected. The main area is titled 'Segments' and shows a table of segments. One segment, 'region-seg01', is highlighted. The table columns are 'Segment Name' and 'Connected Gateway'. The 'region-seg01' row shows 'region-seg01' under Segment Name and 'VLC-Tier-1' under Connected Gateway. There are 'Available actions' dropdown menus for each row.

- Click edit
- M. Click Set DHCP Config

The screenshot shows the 'Segments' screen in the VMware Cloud Experience Program. A segment named 'region-seg01' is selected. The configuration details shown include:

- Connected Gateway:** VLC-Tier-1 | Tier1
- Transport Zone:** mgmt-domain-tz-overlay01
- Subnets:** 10.50.0.1/24
- Ports:** Not Set

A 'SET DHCP CONFIG' button is located at the bottom right of the configuration panel.

- N. Set the following
- Local DHCP Server
 - DHCP Profile: Holodeck (should be defaulted)
 - DHCP Config Enabled
 - DHCP Server Address: 10.50.0.254/24
 - DHCP Range: 10.50.0.225-10.50.0.253
 - DNS Server: 10.0.0.221

The 'Set DHCP Config' dialog box is open for the segment 'region-seg01'. The configuration settings are as follows:

- IPv4 Gateway:** 10.50.0.1/24
- DHCP Type:** Local DHCP Server
- DHCP Profile:** Holodeck
- DHCP Server Address:** 10.50.0.254/24
- DHCP Range:** 10.50.0.225-10.50.0.253
- Lease Time:** Default value is 86400 (seconds)
- DNS Servers:** 10.0.0.221, e.g. 10.10.10.10

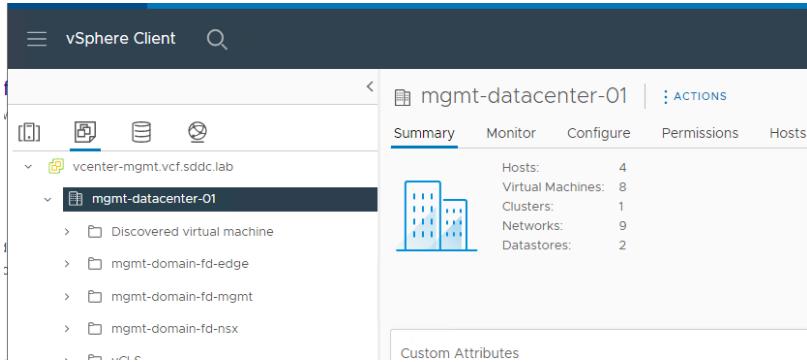
At the bottom of the dialog are 'CANCEL' and 'APPLY' buttons.

- O. Click Apply
P. Click Save on the segment screen
Q. Click close editing

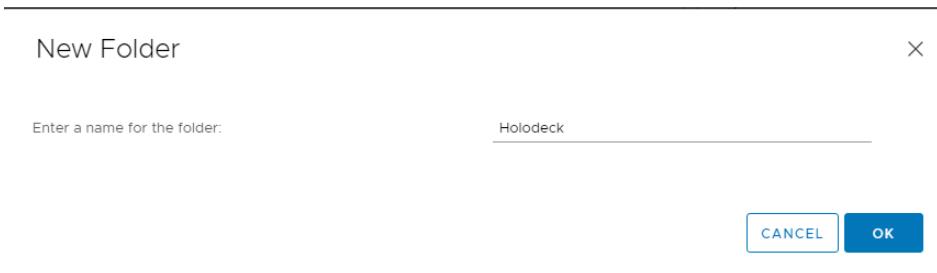
[Step 3] Create VM and Template folder

- A. Click on the Holodeck-> Management vCenter Server tab in the browser

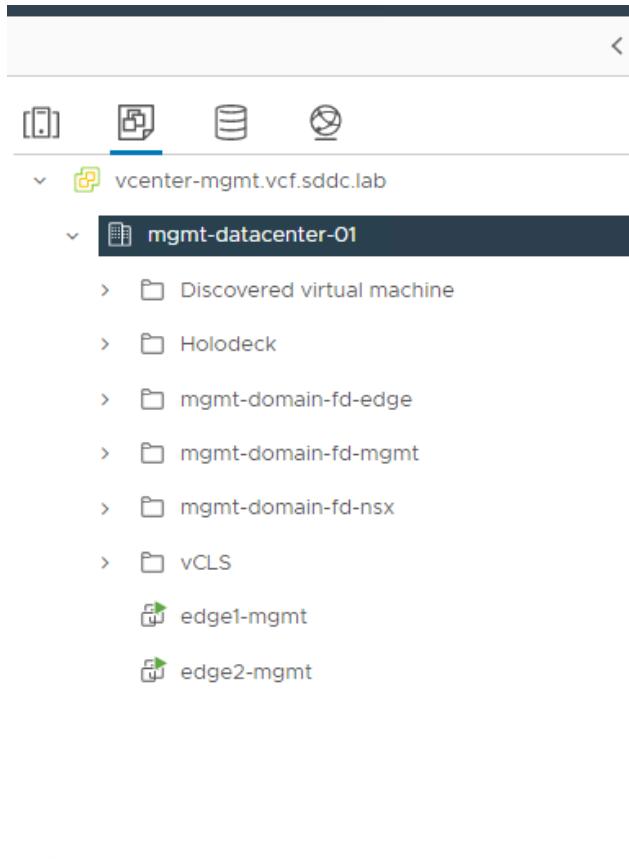
- B. Click on Advanced to avoid certificate warning if needed
- C. Login user: **administrator@vsphere.local** password: **VMware123!**
- D. From the top left menu, open Inventory, then the Hosts and Templates view
- E. Open vcenter-mgmt and mgmt-datacenter-01. Click on mgmt-datacenter-01



- F. Right click on mgmt-datacenter-01
- G. Select New Folder, then New VM and Template Folder
- H. Name the folder Holodeck, then ok

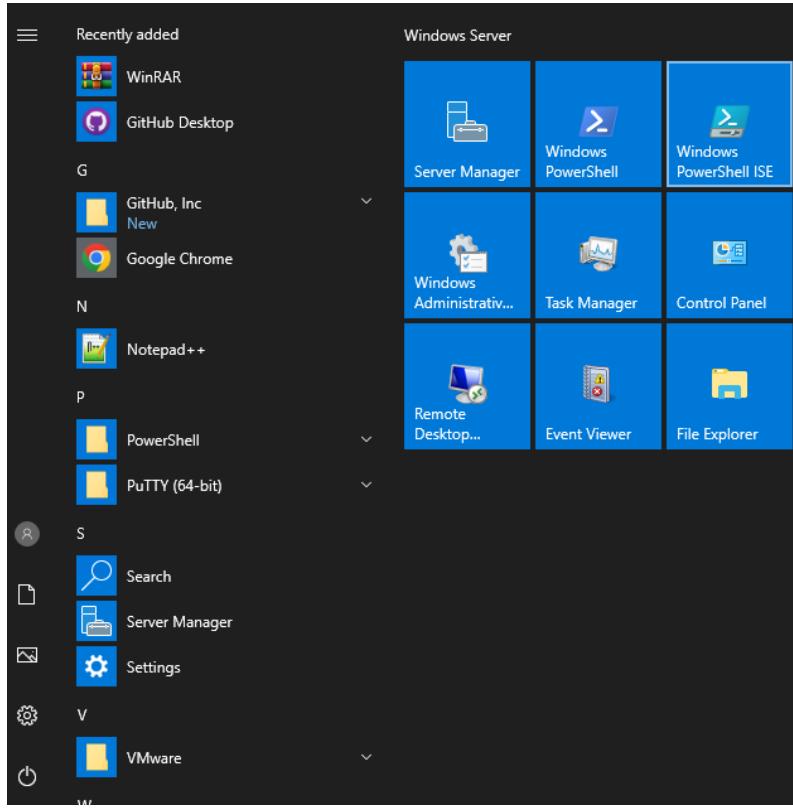


- I. Your result should look like this



[Step 4] Run Holo-Build scripts

- A. Open Windows File Manager and navigate to c:\VLC-Holo-Standard\Holo-Build
- B. Verify you have copied the Ubuntu 18.04 *Bionic Beaver LTS* latest daily build to c:\VLC-Holodeck-Standard\Holo-Build\bionic.ova
- C. Click on the Windows icon and launch Powershell ISE



- D. In the command window, type cd c:\VLC-Holo-Standard\Holo-Build
- E. Type dir

```

PS C:\Users\Administrator> cd C:\VLC-Holo-Standard\Holo-Build
PS C:\VLC-Holo-Standard\Holo-Build> dir

Directory: C:\VLC-Holo-Standard\Holo-Build

Mode                LastWriteTime         Length Name
----                <-----              ----- 
-a---     8/14/2022  11:27 AM           372756480 bionic.ova
-a---     8/14/2022  5:35 PM            539 holo-generate-template.json
-a---     8/15/2022  8:20 AM            2671 holo-generate-v1.json
-a---     8/14/2022  5:35 PM            7335 Holo-Template.yaml
-a---     8/15/2022  8:20 AM            3289 Install-CloudInitVM.ps1
-a---     8/15/2022  9:47 PM            2476 main.ps1
-a---     8/14/2022  5:35 PM            7952 OC-Apache.yaml
-a---     8/15/2022  9:31 AM            1367 OC-Generate-Prep-Store.ps1
-a---     8/14/2022  5:35 PM            502 OC-Generate-Prep.ps1
-a---     8/14/2022  5:35 PM            6605 OC-MySQL.yaml
-a---     8/14/2022  5:35 PM            1077 Readme.txt
-a---     8/14/2022  6:38 PM            2265 Wait-Job.ps1

PS C:\VLC-Holo-Standard\Holo-Build> |

```

- F. Type .\OC-Generate-Prep.ps1

```

PS C:\Users\Administrator> cd C:\VLC-Holo-Standard\Holo-Build
PS C:\VLC-Holo-Standard\Holo-Build> dir

    Directory: C:\VLC-Holo-Standard\Holo-Build

Mode                LastWriteTime         Length Name
----                <-----              ----- 
-a---     8/14/2022  11:27 AM      372756480 bionic.ova
-a---     8/14/2022  5:35 PM          539 holo-generate-template.json
-a---     8/15/2022  8:20 AM          2671 holo-generate-v1.json
-a---     8/14/2022  5:35 PM          7335 Holo-Template.yaml
-a---     8/15/2022  8:20 AM          3289 Install-CloudInitVM.ps1
-a---     8/15/2022  9:47 PM          2476 main.ps1
-a---     8/14/2022  5:35 PM          7952 OC-Apache.yaml
-a---     8/15/2022  9:31 AM          1367 OC-Generate-Prep-Store.ps1
-a---     8/14/2022  5:35 PM          502 OC-Generate-Prep.ps1
-a---     8/14/2022  5:35 PM          6605 OC-MySQL.yaml
-a---     8/14/2022  5:35 PM          1077 Readme.txt
-a---     8/14/2022  6:38 PM          2265 Wait-Job.ps1

PS C:\VLC-Holo-Standard\Holo-Build> .\OC-Generate-Prep.ps1

```

G. Your output should look like this

```

PS C:\VLC-Holo-Standard\Holo-Build> .\OC-Generate-Prep.ps1
WARNING: Please consider joining the VMware Customer Experience Improvement Program, so you can help us make VMware better.
Set-PowerCLIConfiguration -Scope User -ParticipateInCEIP $true

VMware's Customer Experience Improvement Program ("CEIP") provides VMware with information that enables VMware to improve its products and services. This information does not personally identify any individual.

For more details: type "help about_ceip" to see the related help article.

To disable this warning and set your preference use the following command and restart PowerShell:
Set-PowerCLIConfiguration -Scope User -ParticipateInCEIP $true or $false.

Name                  Port   User
----                  ---   ---
vcenter-mgmt.vcf.sddc.lab    443   VSphere.LOCAL\Administrator

Host     : OC-MySQL
User    : ocuser
Password : VMware123!
File    :

Host     : OC-Apache-A
User    : ocuser
Password : VMware123!
File    :

Host     : OC-Apache-B
User    : ocuser
Password : VMware123!
File    :

Host     : OC-Apache-C
User    : ocuser
Password : VMware123!
File    :

Host     : Holo-Template
User    : ocuser
Password : VMware123!
File    :

PS C:\VLC-Holo-Standard\Holo-Build>

```

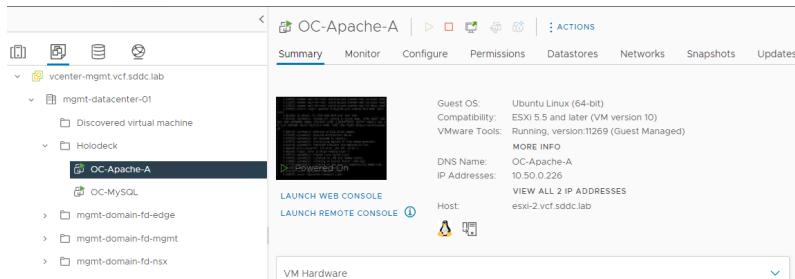
H. Type .\main.ps1 and click enter

```
PS C:\VLC-Holo-Standard\Holo-Build> .\main.ps1
```

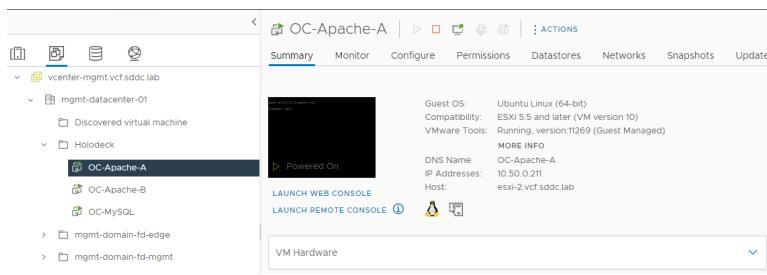
- I. The script will begin deploying OC-MySQL, followed by OC-Apache-A, OC-Apache-B, OC-Apache-C and Holo-Template

```
PS C:\VLC-Holo-Standard\Holo-Build> .\main.ps1
Deploying Set 1
Instance OC-MySQL
```

- J. The script takes approximately 20 minutes to complete
- K. Monitor the script progress by locating the VM's being deployed in the Holodeck folder.
- L. Each VM goes through 2 phases during cloud init.
 - The first phase has a DHCP address assigned in the 10.50.0.225-243 range



- As the cloud-init progresses, each VM will switch to a fixed address in the 10.50.0.200-220 range



M. Monitor progress in the Powershell ISE window

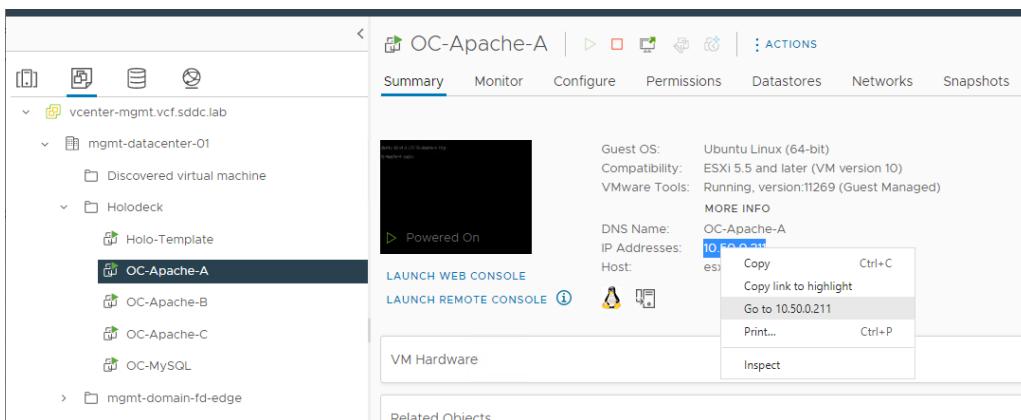
```
PS C:\VLC-Holo-Standard\Holo-Build> .\main.ps1
Deploying Set 1
Instance OC-MySQL Completed
Instance OC-Apache-A Completed
Instance OC-Apache-B Completed
```

```
PS C:\VLC-Holo-Standard\Holo-Build> .\main.ps1
Deploying Set 1
  Instance OC-MySQL    Completed
  Instance OC-Apache-A  Completed
  Instance OC-Apache-B  Completed
  Instance OC-Apache-C  Completed
  Instance Holo-Template Completed
Set 1 completed

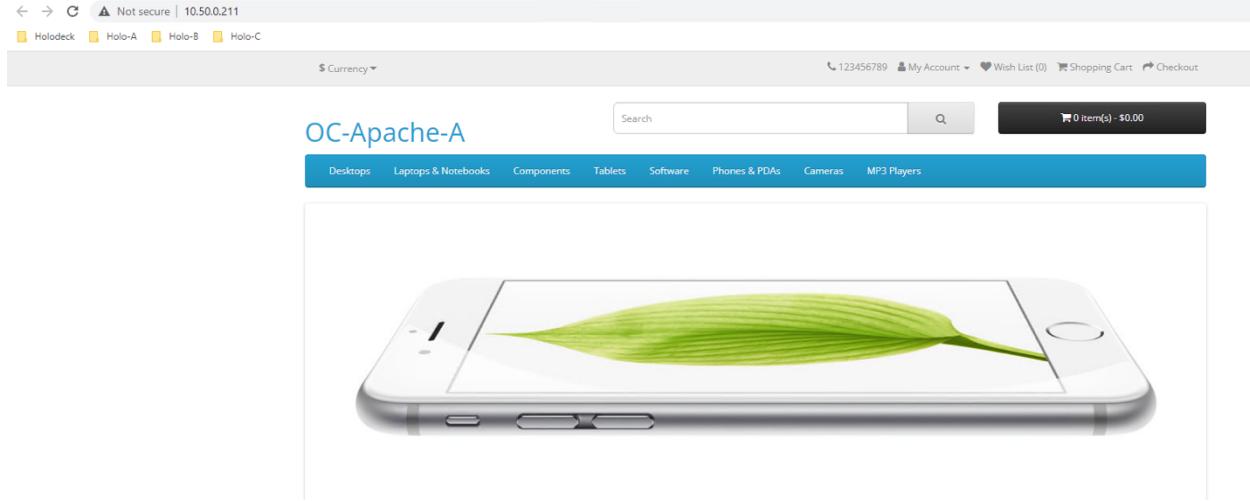
PS C:\VLC-Holo-Standard\Holo-Build>
```

[Step 5] Test Holo Infrastructure

- From the vSphere client VM and template view, Click on OC-Apache-A
- Notice the IP address 10.50.0.211
- Double click on the IP address, right click and select go to 10.50.0.211



- Your result should be



[Step 6a] Convert and shutdown Holo Infrastructure VM's

This final step preps each VM for later use in Holodeck SDN and VRA labs

- From the vSphere client VM and template view, Click on OC-Apache-A
- Click Launch web console
- Login as **ocuser**, password **VMware123!**
- Change directory to /etc/holodeck
- List directory contents
- Run the script `./sdn-lab-prepare.sh`

```
ocuser@OC-Apache-A:~$ cd /etc/holodeck
ocuser@OC-Apache-A:/etc/holodeck$ ls
90-sdn-lab.yaml  sdn-lab-prepare.sh
ocuser@OC-Apache-A:/etc/holodeck$ ./sdn-lab-prepare.sh
```

- Repeat step 6 A-F for OC-MySQL, OC-Apache-B and OC-Apache-C

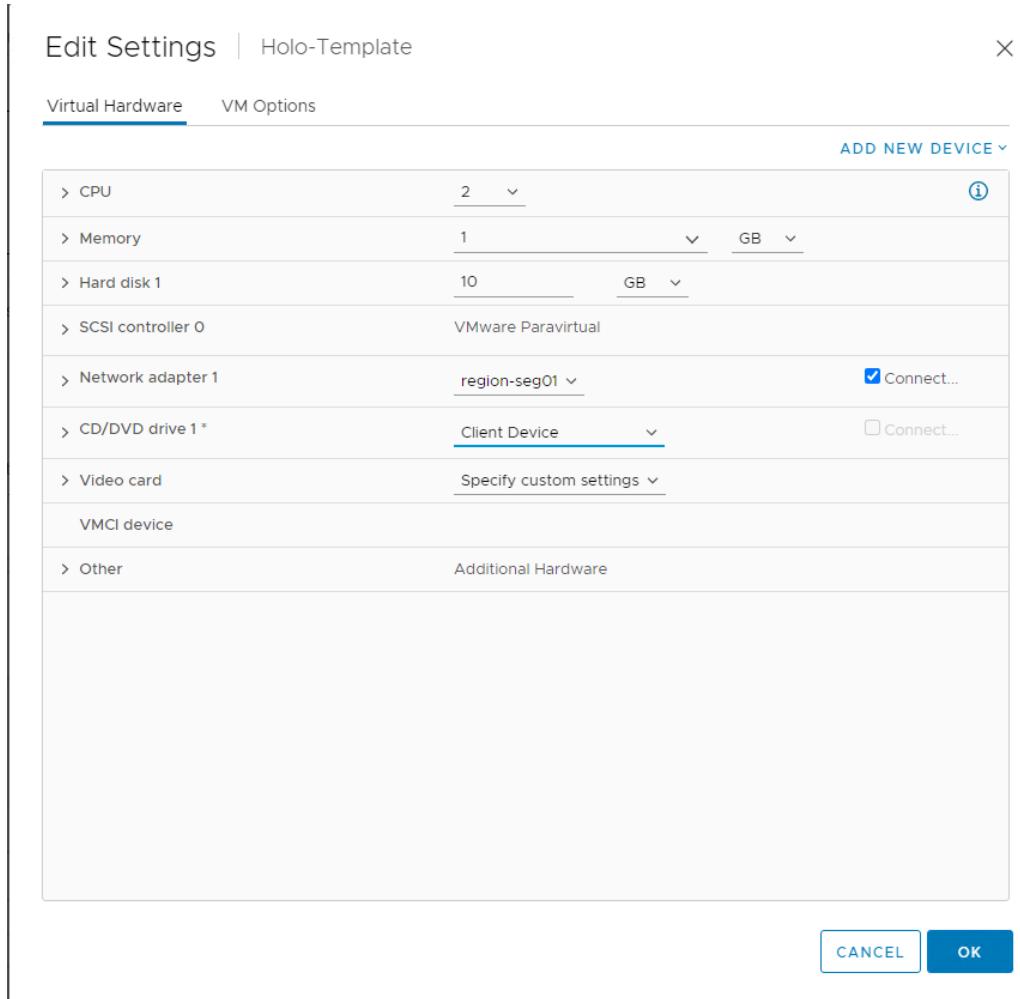
[Step 6b] Convert and shutdown Holo-Template

- From the vSphere client VM and template view, Click on Holo-Template
- Click Launch web console
- Login as **ocuser**, password **VMware123!**
- Change directory to /etc/holodeck
- List directory contents
- Run the script `./ubuntu-prepare.sh`
- The host will update packages, and then shutdown

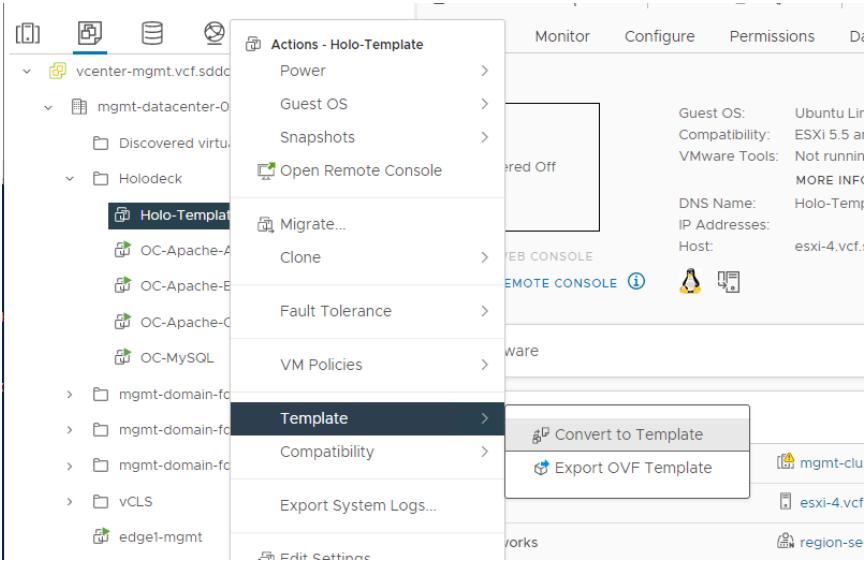
```
ocuser@Holo-Template:~$ cd /etc/holodeck
ocuser@Holo-Template:/etc/holodeck$ ls
ubuntu-prepare.sh
ocuser@Holo-Template:/etc/holodeck$ ls -al
total 12
drwxr-xr-x  2 root root 4096 Aug 15 20:52 .
drwxr-xr-x 96 root root 4096 Aug 15 20:53 ..
-rw-r--r--  1 root root 2567 Aug 15 20:52 ubuntu-prepare.sh
ocuser@Holo-Template:/etc/holodeck$ sudo ./ubuntu-prepare.sh
```

H. On the vSphere client, right click on Holo-Template, -> Edit Settings

I. Change CD/DVD to Client Device then click OK



J. On the vSphere client, right click on Holo-Template, -> Template -> Convert to Template



K. Click yes to confirm





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