

Milestone 3 Nested Virtualization and Templates

💡 This we will be working with virtual templates in the form of an OVA file that we imports as well as templates the we create ourselves. A Template is a FULL copy of a virtual machine that can stand alone. It can be customized to receive pre configured parameters

This is a 2 Part Lab:

- Part 1 is nesting ESXi Hosts as VMs on our existing ESXi physical host (superX)
- Part 2 is creating and using Templates for Ubuntu 22.04 and Rocky 8
- The 2 Parts are not really related!

Part 1: Nested Virtualization

Step 1: DNS Entries on ad350

Create DNS and PTR records for the following systems

- nested1 :10.0.17.20
- nested2 :10.0.17.30
- nested3:10.0.17.40

Deliverable 1. Provide a screenshot showing the A records for nested 1-3 similar to the one below.

```
PS C:\Users\hermione-adm> Get-DnsServerResourceRecord -ZoneName hermione.local -RRType A
```

HostName	RecordType	Type	Timestamp	TimeToLive	RecordData
@	A	1	1/23/2022 1:00:00 PM	00:10:00	10.0.17.4
ad350-hermione	A	1	0	01:00:00	10.0.17.4
DomainDnsZones	A	1	1/23/2022 1:00:00 PM	00:10:00	10.0.17.4
ForestDnsZones	A	1	1/23/2022 1:00:00 PM	00:10:00	10.0.17.4
mamt1	A	1	0	01:00:00	10.0.17.100
nested1	A	1	0	01:00:00	10.0.17.20
nested2	A	1	0	01:00:00	10.0.17.30
nested3	A	1	0	01:00:00	10.0.17.40
pt	A	1	0	01:00:00	10.0.17.2
super1	A	1	0	01:00:00	192.168.3.11
vcenter	A	1	0	01:00:00	10.0.17.3

Step 2: ESXi Auto-Start

Using the ESXi console (not vcenter), make sure that pf, mgmt1, ad and vcenter autostart in that order.

- Under “actions” for the VMs - Enable Autostart in the order listed
- Then, go to Host-Manage-System-Autostart
 - Edit Settings - Enable Autostart on Host
 - Verify order is correct

Note: one would presume you could do this in vcenter, however the current version would not support it when tested, you may have better luck.

Step 3: 3 ESXi Virtual Appliances

💡 ESXi can be installed as a Virtual Machine, this non-intuitive method is called Nested Virtualization. We are doing this only to demonstrate what managing multiple hypervisors would look like. In production, please use real hardware.

You can install the ESXi appliance using a OVA template file.

In vcenter, this can be done by pointing to an OVA file via URL

You can choose the VMWare url from [here](#) (this will take a very long time).

(NOTE: Newer OVA's at:



<https://williamlam.com/nested-virtualization/nested-esxi-virtual-appliance>)

Or you can use a URL to the class web servers:

- Odd # supers use: http://192.168.7.241/ovas/Nested_ESXi7_Template.ova
- Even # supers use: http://192.168.7.240/ovas/Nested_ESXi7_Template.ova
- **Note:** you can import an Open Virtual Appliance (ova) file from a url in vcenter which is an improvement over esxi.

← → ↻ ⚠ Not Secure | 192.168.7.241/ovas/

Index of /ovas

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory		-	
 Nested ESXi7 Template.ova	2021-10-05 13:49	583M	

Apache/2.4.52 (Ubuntu) Server at 192.168.7.241 Port 80

From vcenter - Deploy OVF Template (This will create a new VM from the Template)

- Use URL from above
- Make sure to change the Virtual Machine Name to nested1

Deploy OVF Template

1 Select an OVF template

2 Select a name and folder

3 Select a compute resource

4 Review details

5 Select storage

Select an OVF template

Select an OVF template from remote URL or local file system

Enter a URL to download and install the OVF package from the Internet, or browse to a location accessible from your computer such as a local hard drive, a network share, or a CD/DVD drive.

☒ URL

https://download3.vmware.com/software/vmw-tools/nested-esxi/Nested_ESXi7.0u3_Appliance_Template_v1.ova

☐ Local file

UPLOAD FILES

No files selected.

When selecting Storage -Make sure the esxi VM is thinly provisioned and is tied to your 350-Internal Network. (Need to change from defaults)

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Deploy OVF Template

1 Select an OVF template

2 Select a name and folder

3 Select a compute resource

4 Review details

5 License agreements

6 Select storage

7 Select networks

8 Customize template

Select storage

Select the storage for the configuration and disk files

☐ Encrypt this virtual machine (Requires Key Management Server)

Select virtual disk format

Thin Provision

VM Storage Policy

Datastore Default

☐ Disable Storage DRS for this virtual machine

	Name	Storage Compatibility	Capacity	Provisioned	Free	Type	Cluster
<input type="radio"/>	datastore1-super1	--	348.75 GB	2.41 GB	346.34 GB	VMFS 6	
<input checked="" type="radio"/>	datastore2-sup...	--	931.25 GB	626.49 GB	871.9 GB	VMFS 6	

2 items

Compatibility

✓ Compatibility checks succeeded.

CANCEL

BACK

NEXT

Configure Network Settings - NOTE: Set esxi Root password for nested1 - or you can use SSH keys if you have that set up

▼ Select networks

Network mapping 1

VM Network 350-Internal

IP allocation settings

IP protocol IPV4

IP allocation Static - Manual

▼ Customize template

Properties

Hostname = nested1

IP Address = 10.0.17.20

Netmask = 255.255.255.0

Gateway = 10.0.17.2

VLAN ID =

DNS = 10.0.17.4

DNS Domain = hermione.local

NTP Servers = pool.ntp.org

Syslog Server =

SSH Key = ssh-rsa

AAAAB3NzaC1yc2EAAAADAQABAAQgQDM6k

hermione@mgmt1

SSH = True

VMFS = True

Follow Hardware MAC Address = True

💡 Note, this errored out the first time attempted, sometimes these errors are due to web certs, open esxi on superX and bypass any web cert complaints.

Do this 2 more times, replacing ip's to match nested2 and 3.

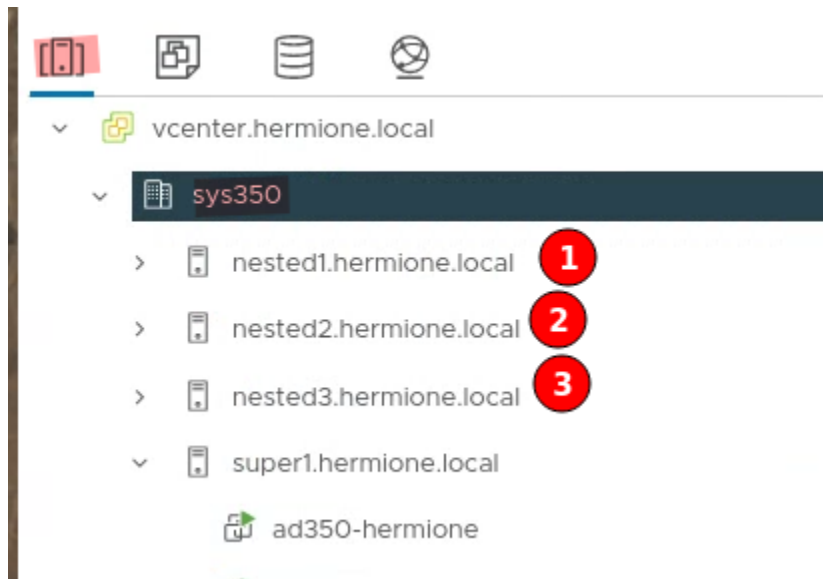
In order to make nested virtual networking work, you will need to hunt down and tweak the vSwitch settings for 350-Internal as shown below. **(From ESXi Host Site - Networking- 350-Internal- Edit Settings- Security**

350-Internal - Edit Settings

Properties		
Security	Promiscuous mode	<input checked="" type="checkbox"/> Override Accept
Traffic shaping	MAC address changes	<input type="checkbox"/> Override Reject
Teaming and fallover	Forged transmits	<input checked="" type="checkbox"/> Override Accept

Adding nested1,2,3 to your sys350 datacenter

Add and license these three nested hypervisors. Your current license should cover all of them
Deliverable 2. Provide a screenshot that shows your 4 hypervisors
(the nested ones are virtual)



Part 2: Templates (convert VM to Template- then Clone)

Step 1: Configure DHCP on your 350-Internal Network

- Configure DHCP in AD

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- **OR**
- Configure DHCP in pfSense


Step 2: Create an Ubuntu VM

Create an ubuntu 22.04 VM in **vcenter** (**not** using the nested esxi VMs for this)

Isos at:

- Odd supers: 192.168.7.241/isos
- Even super: 192.168.7.240/isos

Index of /isos

Name	Last modified	Size	Description
 Parent Directory		-	
 Rocky-8.6-x86_64-minimal.iso	2023-09-14 12:38	2.1G	
 SERVER_19_x64_FA23.iso	2023-09-07 12:24	5.3G	
 VMware-VCSA-all-8.0.0-20519528.iso	2023-09-07 12:27	7.9G	
 ubuntu-22.04-live-server-amd64.iso	2023-09-14 12:31	1.4G	

Apache/2.4.52 (Ubuntu) Server at 192.168.7.241 Port 80

- Remember: can wget isos directly into datastore by SSH'ing to your esxi host
- 350-Internal
- Stick with defaults - except:
 - Customize Hardware
 - Expand Hard Disk and select - Thin Provision
 - CD- point to ubuntu iso on Datastore
- VM Should get a DHCP IP Address
- Add a deployer user and password
- (Install can take awhile)
- install open-vm-tools
- install perl if it's not already installed
- Powerdown
- Remove the CD, point it to client device
- Take a snapshot called Base

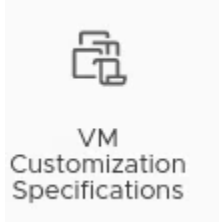
Step 3: Conversion of VM to a template

Figure out how to convert your new powered off VM into a template (fairly intuitive in vcenter).

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You should notice that a new file .vmtx has been added to the datastore and that you can no longer power the VM on - nor manage its associated snapshots.

Hunt down the VM Customization Specifications Shortcut in vcenter- and create an ubuntu specification - called Ubuntu-22.04 Specification



VM Customization Specifications

VM Customization Specifications

NEW... IMPORT... EDIT... DUPLICATE EXPORT DELETE

Name	Guest OS
Ubuntu-22.04-Specification	Linux

Name: Ubuntu-22.04-Specification

Description:

OS type: Linux

Computer name: <Ask User>

Time zone

Time zone: America/New York

Area: America

Location: New York

Hardware clock: Set to UTC

Customization script

Network type: Custom

Custom settings

NIC 1 IPv4: Prompt user

NIC 1 IPv6: Not used

DNS and domain: 10.0.17.4

DNS

Primary: 10.0.17.4

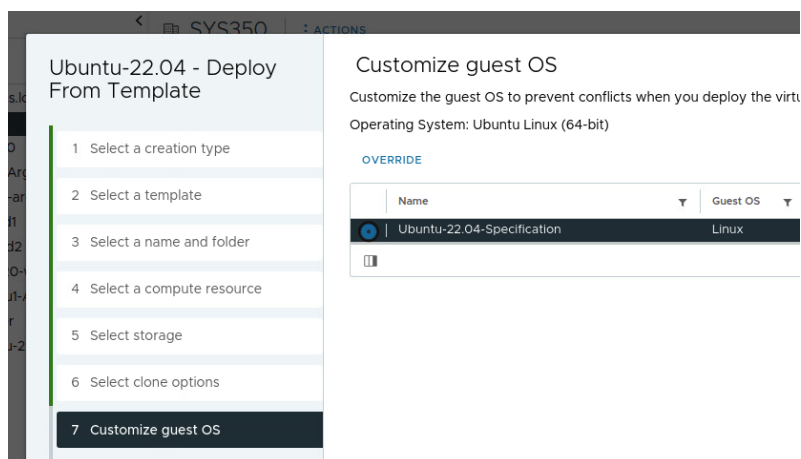
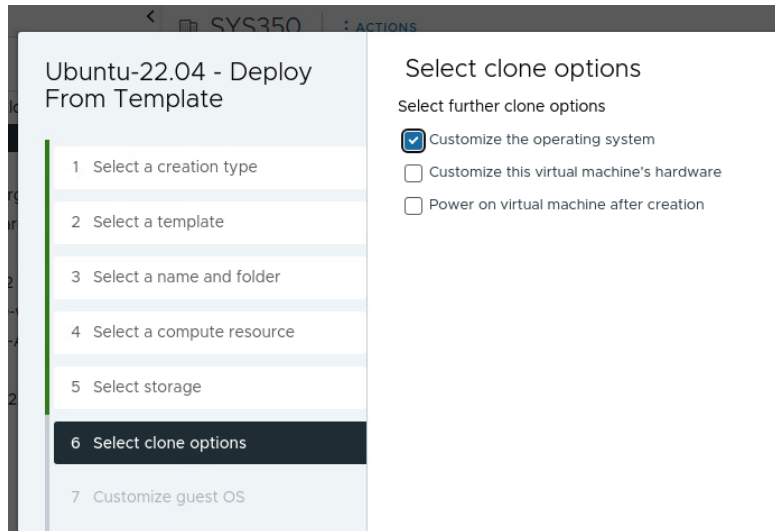
DNS search paths

Step 4: Create New VM from Template:

Create a VM called Ubuntu-01-*name* using your Ubuntu 22.04 template

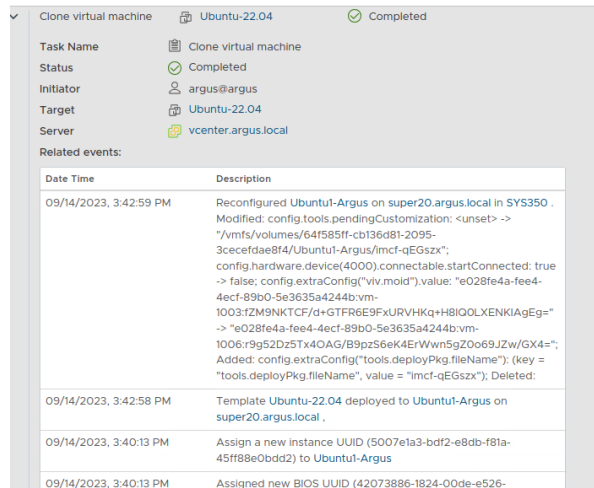
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When deploying, select “Customize the Operating System” and it will allow you to pick your Ubuntu 22.04 Specifications.



Deliverable 3. Find the Cloning Task in the vCenter Task Console and provide a screenshot of the successful deployment similar to the one below.

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Step 5: Create a Rocky VM -> Template -> Cloned VM

- Create a Rocky8 VM from ISO
- Create user "deployer" during installation (User Settings on Install Summary Screen)
- Install open-vm-tools and perl
- **NOTE: You need to reboot once to ensure that open-vm-tools will start**
- Poweroff, disconnect CD/ISO - and convert to Template
- Create "Rocky8-Specification" in custom specifications that allows user to:
 - Set hostname when cloning
 - Set IP address when cloning
- Deploy a VM called Rock-01-*name* as a Clone of the Rocky 8 Template using the Rocky8-Specification








Deliverable 4. Create another VM and Custom specification for Rocky 8.

Deploy the template with a custom IP address. Provide a screenshot of both the cloning task as seen in Deliverable 3. As well as a screenshot of the VMs powered on IP address that should match the one entered during New VM Creation.

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Task Console

EXPORT ▼ COPY TO CLIPBOARD FILTER

<input type="checkbox"/>	Task Name ▼	Target ▼	Status ▼	Details ▼	Initiator ▼	Qu
<input type="checkbox"/>	Clone virtual machine	 Rocky8	 Completed	Customizing the new Virtu...	argus@argus	
	Task Name	 Clone virtual machine				
	Status	 Completed				
	Initiator	 argus@argus				
	Target	 Rocky8				
	Server	 vcenter.argus.local				
	Details					
	Customizing the new Virtual Machine					
	Related events:					
	Date Time	Description				
	09/14/2023, 4:44:39 PM	Reconfigured Rocky01-argus on super20.argus.local in SYS350 . Modified: config.tools.pendingCustomization: <unset> -> "/vms/volumes/64f585ff-cb136d81-2095-3cecfdae8f4/Rocky01-argus/imcf-sBp8ZY"; config.hardware.device(4000).connectable.startConnected: true -> false; config.extraConfig("viv.moid").value: "e028fe4a-fee4-4ecf-89b0-5e3635a4244b:vm-1007:40J2hr7VM/6m5JL9QK5mFTqgVMvliq/FhOmUpHh53Hl=" -> "e028fe4a-fee4-4ecf-89b0-5e3635a4244b:vm-1009:dU5XNEKQiv8GpWAregpVcuG7GSL4Kek/zfKUfM50btE="; Added: config.extraConfig("tools.deployPkg.fileName"); (key = "tools.deployPkg.fileName", value = "imcf-sBp8ZY"); Deleted:				
	09/14/2023, 4:44:39 PM	Template Rocky8 deployed to Rocky01-argus on super20.argus.local ,				
	09/14/2023, 4:44:23 PM	Assign a new instance UUID (5007a96c-ad53-a85c-8e70-a818f39f6d3d) to Rocky01-argus				

<

Rocky01-argus

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ACTIONS

Summary

Monitor

Configure

Permissions


Datstores

Networks

Snapshots

Updates

Guest OS



LAUNCH REMOTE CONSOLE

LAUNCH WEB CONSOLE

Virtual Machine Details

Power Status

Powered On

Guest OS

CentOS 7 (64-bit)

VMware Tools

Running, version:12325 (Guest Managed)

DNS Name

IP Addresses (2)

10.0.7.93
fe80::250:56ff:fe87:216a

Encryption

Not encrypted

Deliverable 5. Make sure you capture what was done technically to meet the requirements of this milestone. This includes how to make nested versions of ESXi, The requirements for Solid DNS entries and the Technical steps required to create templates and their associated specifications. Make sure to capture and comment on the areas that gave you trouble. Provide links to the documentation you created in the course of this milestone.

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Resources

- [Milestone 3 - Overview Video](#)