

# CPE Automation

## CPE Automation

Use this procedure to create NF Gateway enabled equipment automatically.

### 1. Summary

This guide will cover the following sections

- Create an automation VM by using OVA provided by NetFoundry. This is a one-time setup.
- Install CentOS7 OS on the CPE box.
- Run the automation script from the automation VM to setup the CPE box

This guide will not cover

- This guide will **only** cover deployment of OVA with VMWare6.7, it will not cover all hypervisor out there. However, the provided OVA will work with VM Workstation 12 or EXSi 6.5 or later and VirtualBox.
- This guide will not cover how to setup installation media of Cent7 OS. At the end of guide, it will describe where to find the OS image and some tools.

### 2. Create Automation VM



#### Note

This procedure only needs to execute once for all CPE boxes. It is recommended to create this VM using VMWare hypervisor.

## Obtain the CPE-Automation OVA

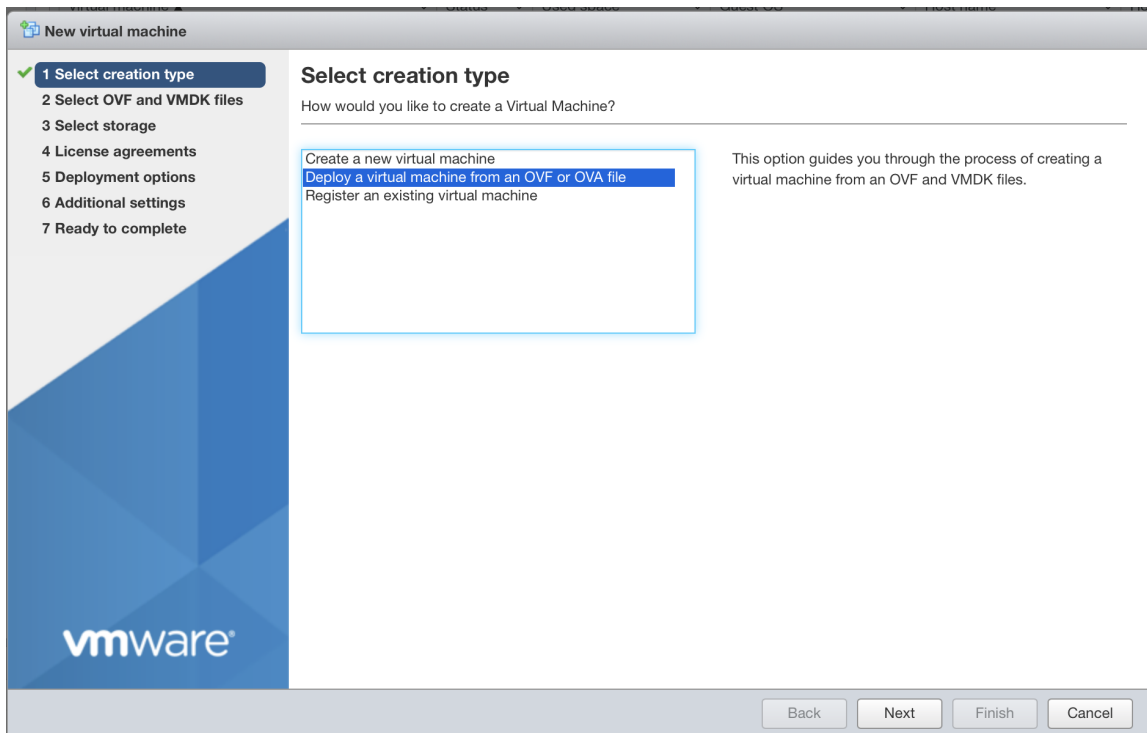


### Todo

We will need to put the OVA somewhere customer can download.

## Create the VM with the OVA

From your hypervisor, create a VM and use the **Deploy from OVA** option



Hit "**Next**", and you can choose your OVA image and give a name to the VM you are creating

The screenshot shows the 'New virtual machine - CPE-Automation' wizard. On the left, a sidebar lists seven steps: 1. Select creation type (checked), 2. Select OVF and VMDK files (highlighted), 3. Select storage, 4. License agreements, 5. Deployment options, 6. Additional settings, and 7. Ready to complete. The main panel is titled 'Select OVF and VMDK files' and instructs the user to 'Select the OVF and VMDK files or OVA for the VM you would like to deploy'. Below this, there is a text input field for the virtual machine name, which contains 'CPE-Automation'. A note states: 'Virtual machine names can contain up to 80 characters and they must be unique within each ESXi instance.' A large light blue rectangular area contains a file icon and the text 'CPE-Automation-v2.ova'. At the bottom right, there are four buttons: 'Back', 'Next', 'Finish', and 'Cancel'.

Hit "**Next**", it will ask you which storage (Disk) you want to put your VM. Choose one that suits you.

The screenshot shows the 'New virtual machine - CPE-Automation' wizard at Step 3: 'Select storage'. The sidebar on the left shows steps 1 through 7, with step 3 highlighted. The main panel is titled 'Select storage' and asks the user to 'Select the storage type and datastore'. There are two tabs: 'Standard' (selected) and 'Persistent Memory'. Below the tabs, a note says: 'Select a datastore for the virtual machine's configuration files and all of its' virtual disks.' A table lists available datastores:

Name	Capacity	Free	Type	Thin pro...	Access
BigDisk	7.28 TB	6.42 TB	VMFS5	Supported	Single
datastore1	1.81 TB	1.67 TB	VMFS5	Supported	Single

At the bottom right of the table area, it says '2 items'. At the bottom of the wizard, there are four buttons: 'Back', 'Next', 'Finish', and 'Cancel'.

Hit "**Next**" and choose your Network. (Hint, "VM Network" is your default network, that usually is a good choice). For "Disk provisioning", you can leave it

at the default choice of "Thin".

The screenshot shows the 'New virtual machine - CPE-Automation' wizard. On the left, a progress bar indicates five steps: 1 Select creation type, 2 Select OVF and VMDK files, 3 Select storage, 4 Deployment options (highlighted), and 5 Ready to complete. The main area is titled 'Deployment options' with the subtitle 'Select deployment options'. It contains three rows of settings: 'Network mappings' with a dropdown menu set to 'VM Network', 'Disk provisioning' with radio buttons for 'Thin' (selected) and 'Thick', and 'Power on automatically' with a checked checkbox. At the bottom right are buttons for 'Back', 'Next', 'Finish', and 'Cancel'.

Network mappings	VM Network
Disk provisioning	<input checked="" type="radio"/> Thin <input type="radio"/> Thick
Power on automatically	<input checked="" type="checkbox"/>

Hit "**Next**", and you are ready to deploy the OVA. Review the content carefully and hit "**Finish**" to deploy it.

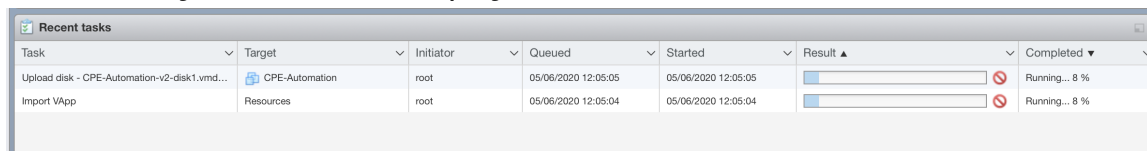
The screenshot shows the 'New virtual machine - CPE-Automation' wizard at the 'Ready to complete' step. The progress bar on the left now highlights step 5. The main area is titled 'Ready to complete' with the subtitle 'Review your settings selection before finishing the wizard'. It displays a summary table of the configuration. Below the table is a yellow warning icon and a message: 'Do not refresh your browser while this VM is being deployed.' At the bottom right are buttons for 'Back', 'Next', 'Finish', and 'Cancel'.

Product	UB1804-Ansible
VM Name	CPE-Automation
Disks	CPE-Automation-v2-disk1.vmdk
Datastore	datastore1
Provisioning type	Thin
Network mappings	VM Network: VM Network
Guest OS Name	Unknown

Do not refresh your browser while this VM is being deployed.

After you hit "**Finish**", on the Task window, you should notice the VM been created. Once the it reaches 100%, your VM is created. And it should

automatically start after the deployment is done.

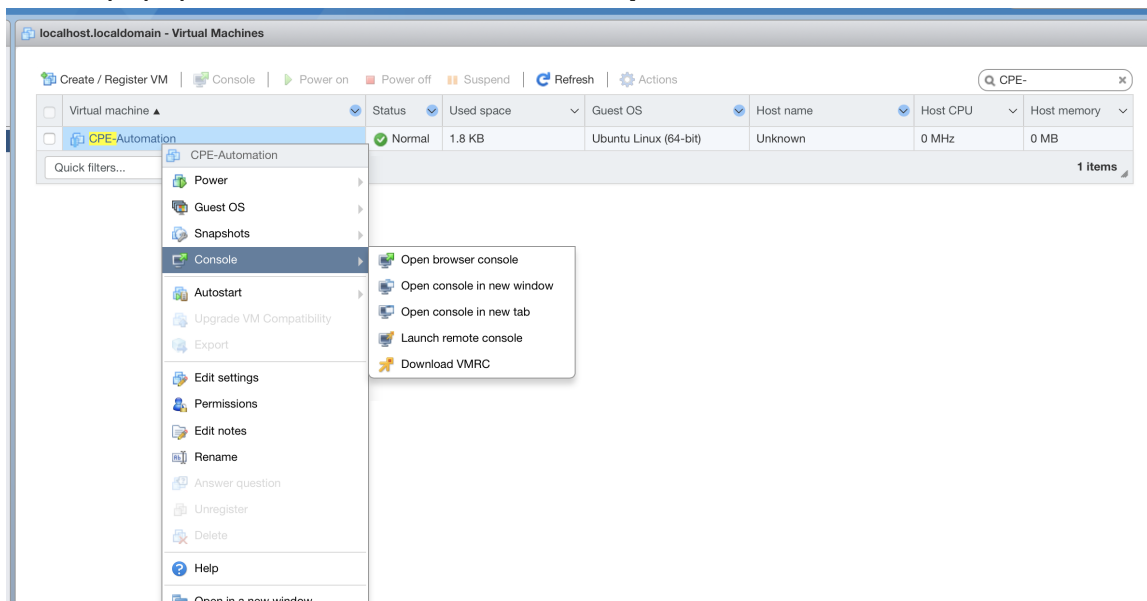


Task	Target	Initiator	Queued	Started	Result	Completed
Upload disk - CPE-Automation-v2-disk1.vmd...	CPE-Automation	root	05/06/2020 12:05:05	05/06/2020 12:05:05	<div><div></div></div>	Running... 8 %
Import VApp	Resources	root	05/06/2020 12:05:04	05/06/2020 12:05:04	<div><div></div></div>	Running... 8 %

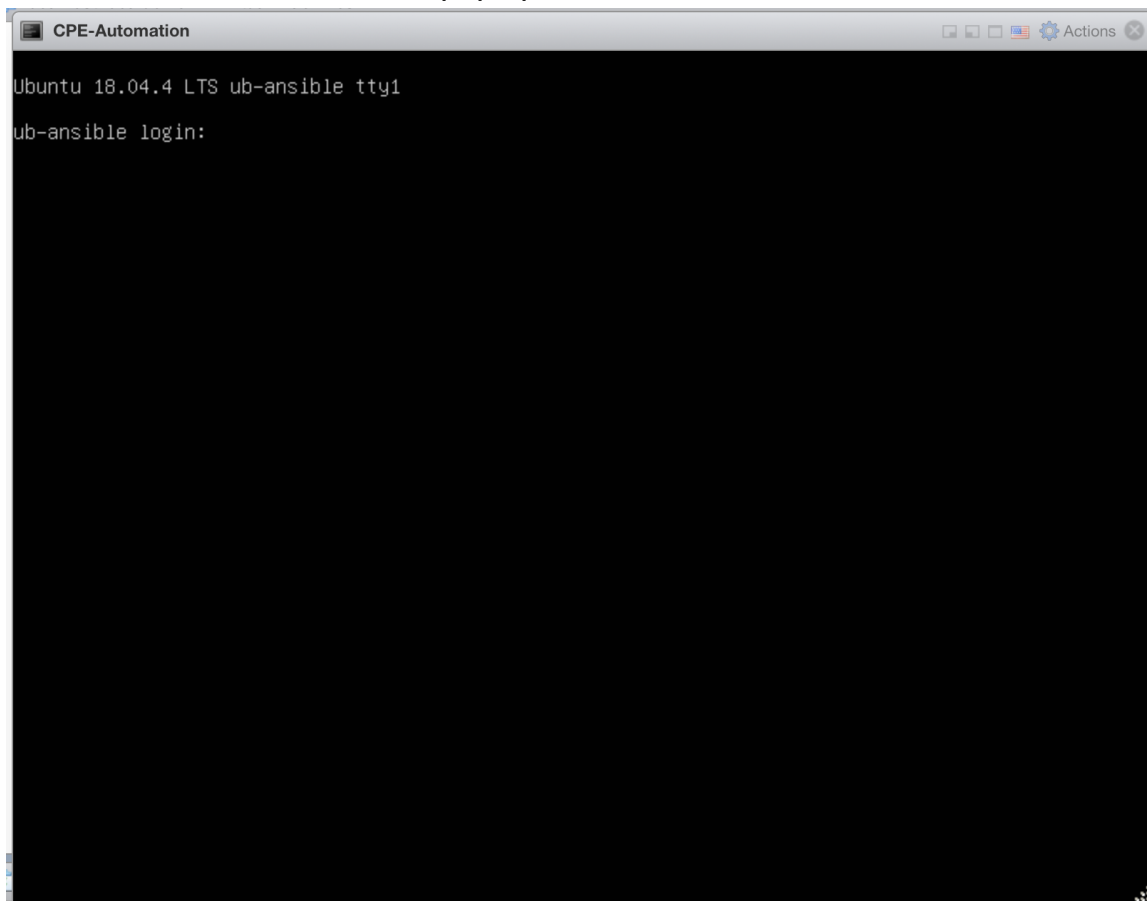
## Login and Check the automation VM

Once the VM is completely deployed, we need to make sure the VM is setup correctly.

Go to the main VM window, right click on your VM, on the popup menu, choose "**Console**" -> "**Open browser console**".



You will see a console window pop up like this:



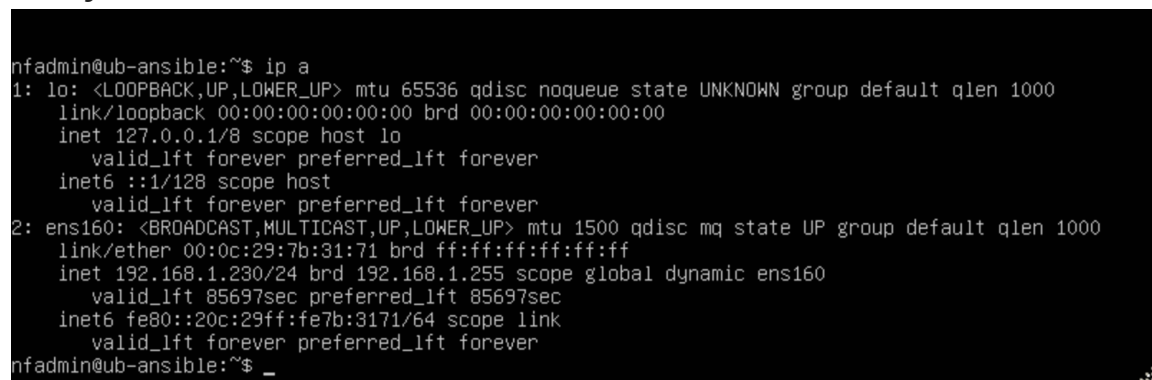
```
CPE-Automation
Ubuntu 18.04.4 LTS ub-ansible tty1
ub-ansible login:
```

Login to the console by using credential

Username: **nfadmin**

Password: **nfadmin**

Check the IP setting by issuing "**ip a**" command. If you see a valid IP address, then your VM is on a network.



```
nfadmin@ub-ansible:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens160: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:0c:29:7b:31:71 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.230/24 brd 192.168.1.255 scope global dynamic ens160
        valid_lft 85697sec preferred_lft 85697sec
    inet6 fe80::20c:29ff:fe7b:3171/64 scope link
        valid_lft forever preferred_lft forever
nfadmin@ub-ansible:~$ _
```

You can verify ssh access to the VM by using a ssh enabled terminal:

```
> ssh nfadmin@[ip_address_of_the_automation_vm]
```



## Conclusion

This is the end of deploying the automation VM.

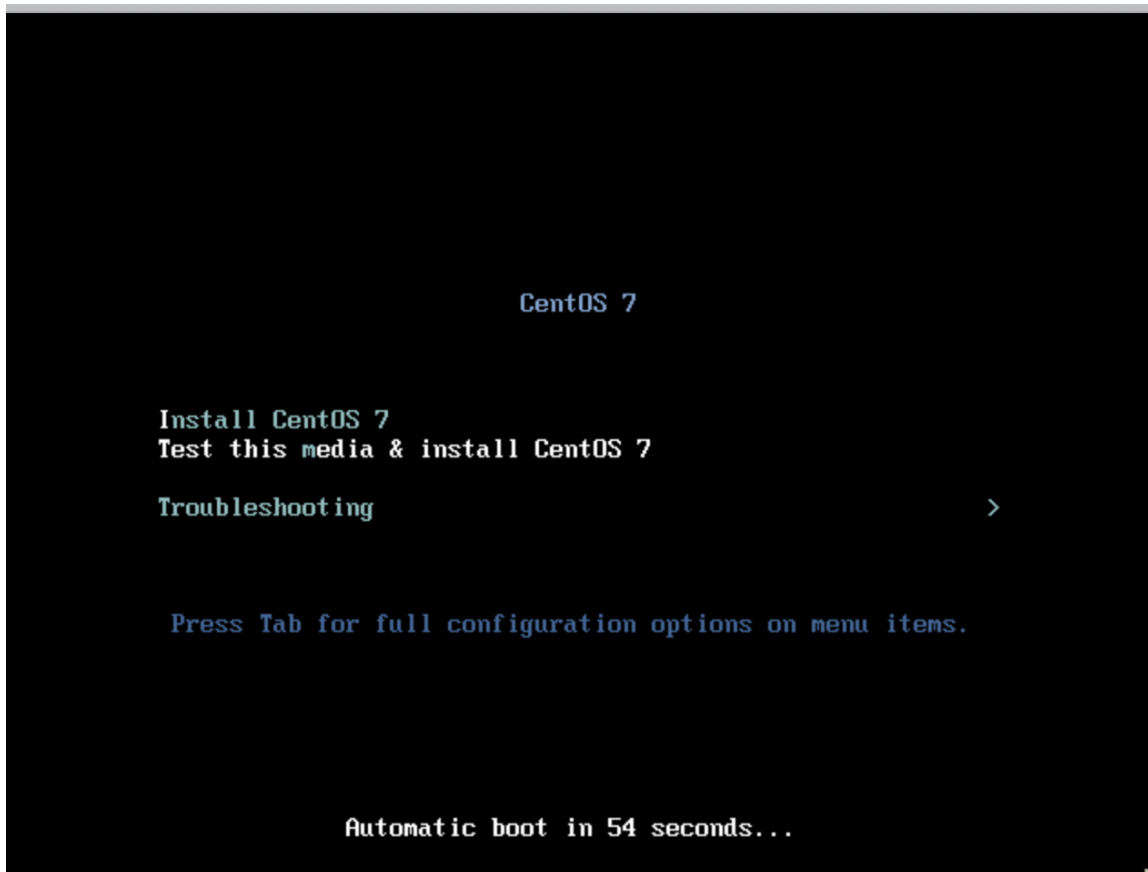
## 3. Installing CentOS 7 on the CPE



## Note

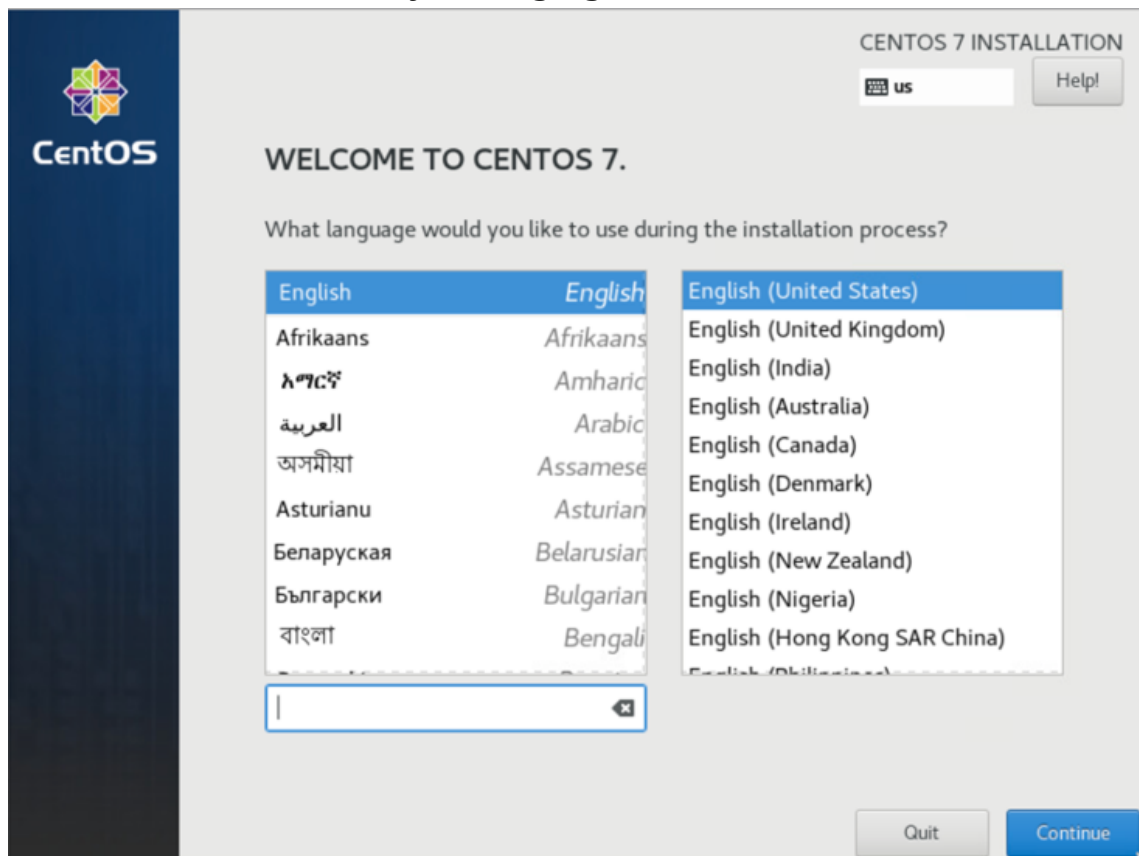
**Have this ready before you start:** You will need a CentOS 7 installation media before you start.

Insert an Ethernet Cable into your CPE and bootup your CPE via the installation media, you will encounter the first screen:



Choose "**Install CentOS 7**" to continue.

On the next screen, Choose your Language. And hit "**Continue**"



The "**INSTALLATION SUMMARY**" screen will appear.

Check to make sure the step (1) "**SOFTWARE SELECTION**" is set to "**Minimal Install**".



Then Click on step (2) "**INSTALLATION DESTINATION**" to setup the Disk.

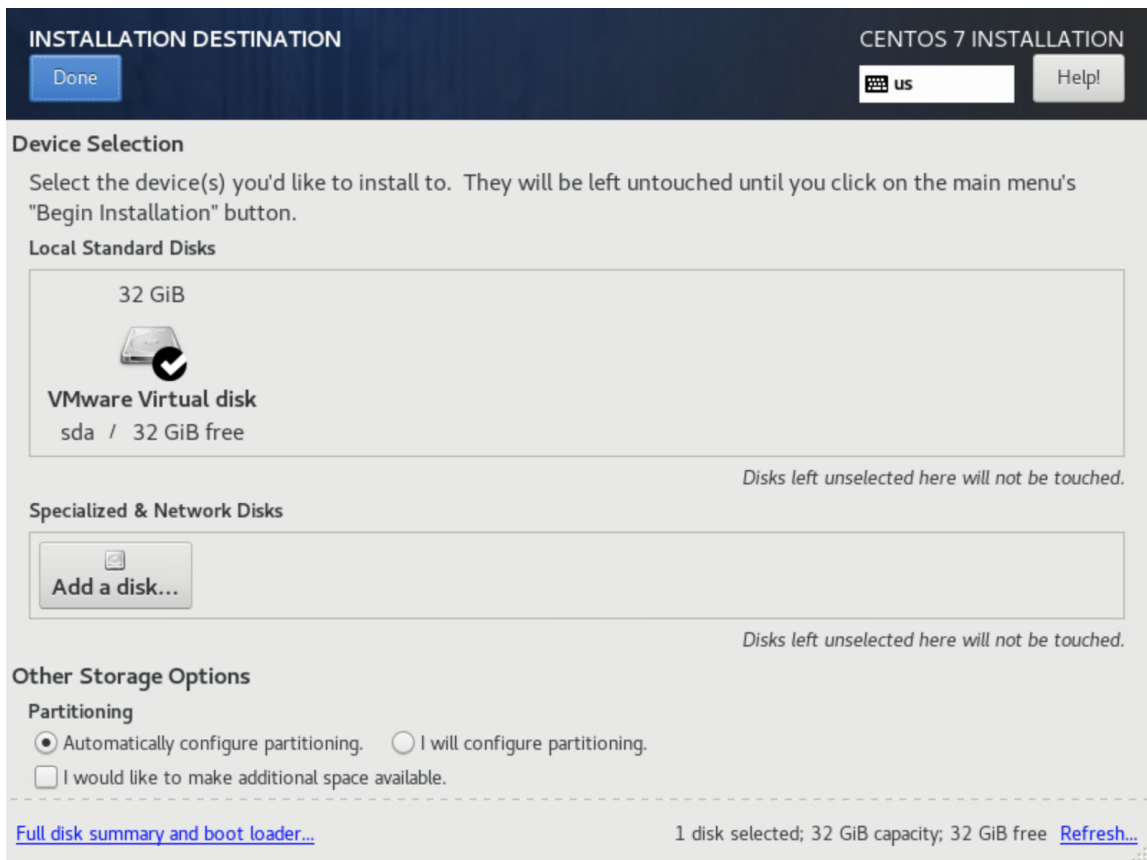


Once in the "**INSTALLATION DESTINATION**" screen

Choose your Disk (NOT the USB installation media)

Click on "**Automatically configure partitioning**" Then hit "**Done**" at the top

left screen to continue.



The image shows the 'INSTALLATION DESTINATION' screen for CentOS 7. At the top, there's a dark blue header with 'INSTALLATION DESTINATION' on the left, 'CENTOS 7 INSTALLATION' on the right, a 'Done' button, a keyboard icon with 'us', and a 'Help!' button. Below the header, the 'Device Selection' section explains that selected devices will be untouched until the 'Begin Installation' button is clicked. It lists 'Local Standard Disks' and shows a single disk: '32 GiB', 'VMware Virtual disk', 'sda / 32 GiB free'. A checkmark icon is next to the disk name. Below this, it says 'Disks left unselected here will not be touched.' The 'Specialized & Network Disks' section has an 'Add a disk...' button and also states 'Disks left unselected here will not be touched.' The 'Other Storage Options' section includes a 'Partitioning' subsection with three radio buttons: 'Automatically configure partitioning.' (selected), 'I will configure partitioning.', and 'I would like to make additional space available.' At the bottom, there's a dashed line, a link 'Full disk summary and boot loader...', and a status bar showing '1 disk selected; 32 GiB capacity; 32 GiB free' and a 'Refresh...' link.

INSTALLATION DESTINATION

CENTOS 7 INSTALLATION

Done

Keyboard icon: us

Help!

### Device Selection

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

#### Local Standard Disks

32 GiB

VMware Virtual disk

sda / 32 GiB free

Disks left unselected here will not be touched.

#### Specialized & Network Disks

Add a disk...

Disks left unselected here will not be touched.

#### Other Storage Options

##### Partitioning

☒ Automatically configure partitioning. ☐ I will configure partitioning.

☐ I would like to make additional space available.

---

[Full disk summary and boot loader...](#)

1 disk selected; 32 GiB capacity; 32 GiB free [Refresh...](#)

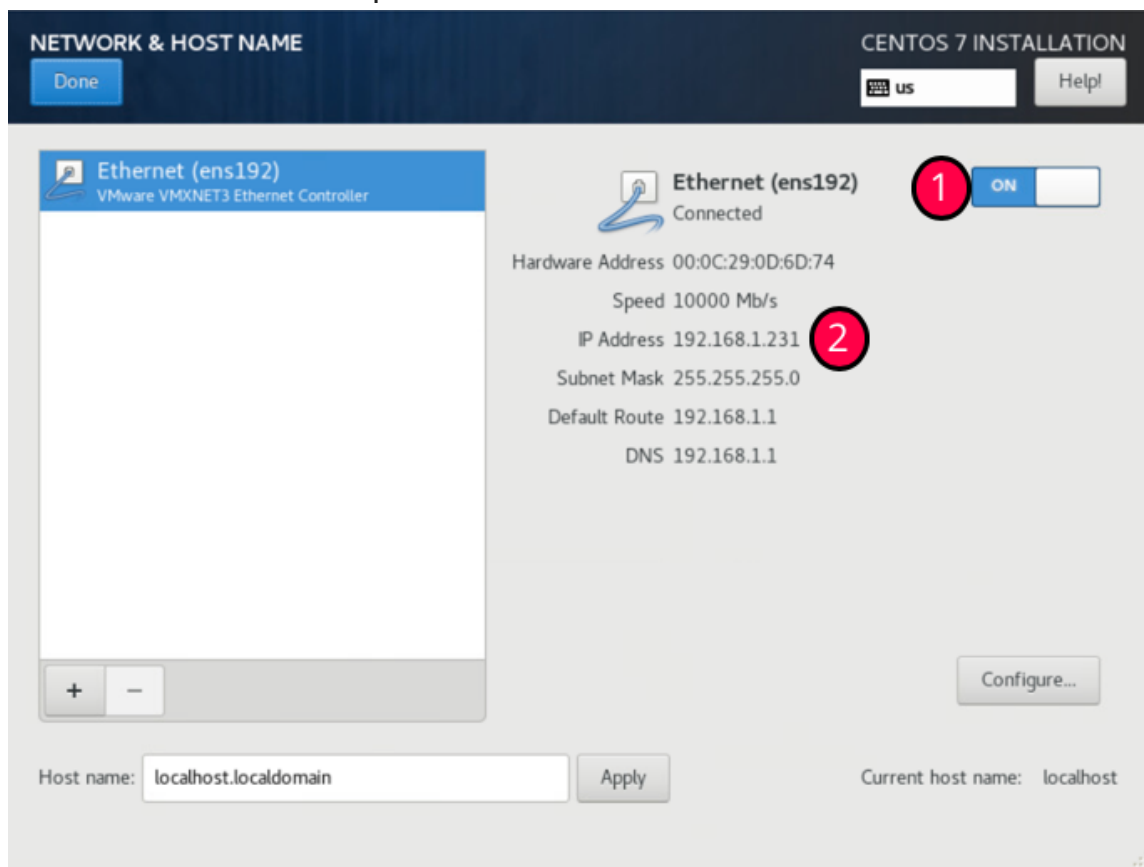
Once you are back to the "INSTALLATION SUMMARY" screen

Choose step (3) "NETWORK & HOST NAME". The following screen should appear.

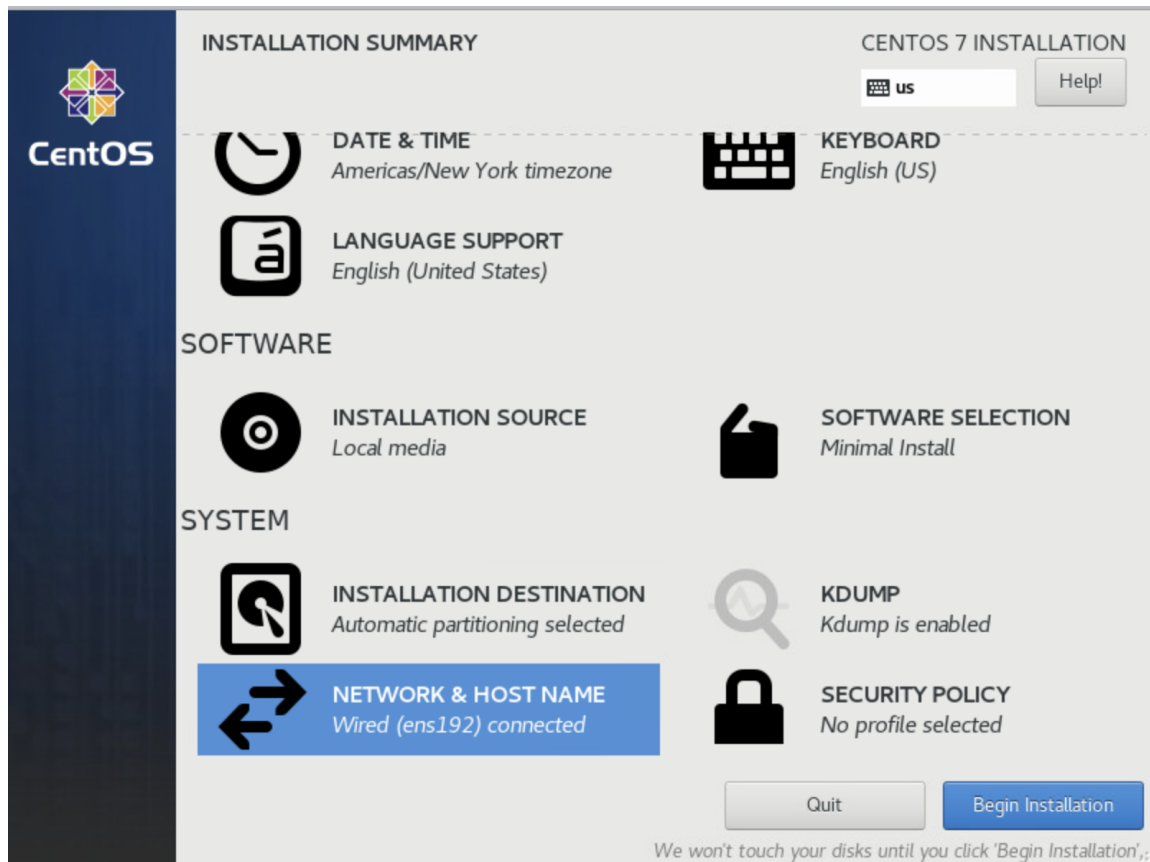
Turn on the Ethernet by hitting the button marked (1).

And then observe the IP Address appears below it (at area Marked (2)). (We will need that IP address when we run the automation).

Then hit "**Done**" at the top left screen to continue.

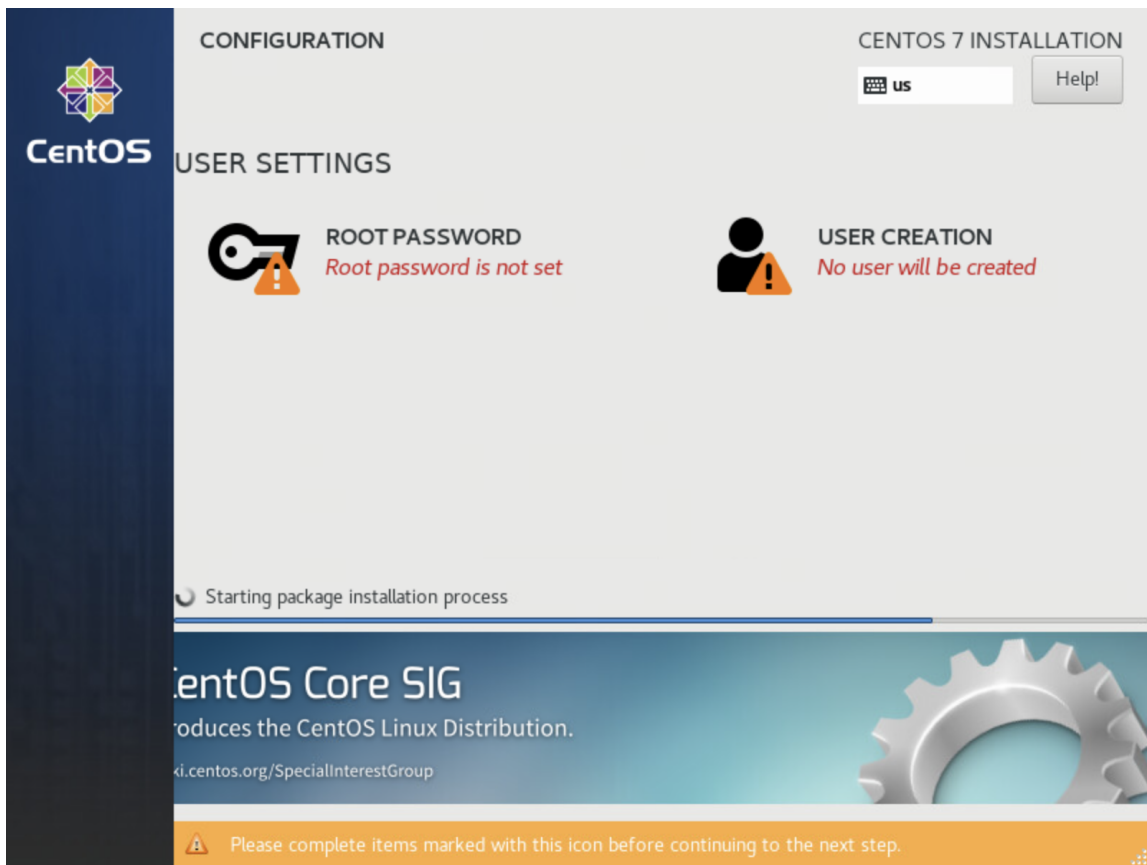


You should be back to the "INSTALLATION SUMMARY" screen again, and you can hit "**Begin Installation**" to start the Installation.



During the installation, you need to create a user account. For our deployment, you do not need to create root Password. So, press on "**USER CREATION**" to

create an Admin user.



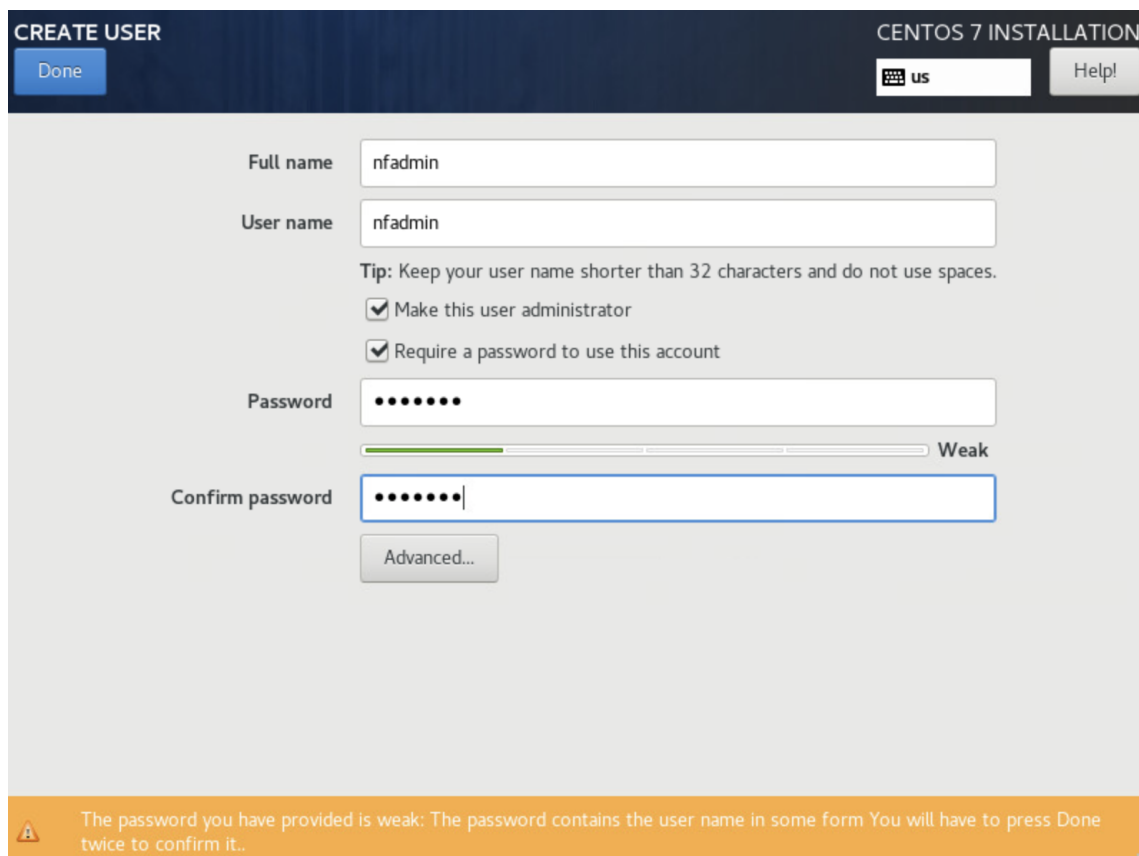
On the "**CREATE USER**" screen, you need to fill the following:

Username: **nfadmin**

click on "**Make this user administrator**"

Password: **nfadmin**

You then need to click "**Done**" twice to exit this screen.



**CREATE USER** **CENTOS 7 INSTALLATION**

Done us Help!

Full name

User name

Tip: Keep your user name shorter than 32 characters and do not use spaces.

☒ Make this user administrator


☒ Require a password to use this account

Password

Weak

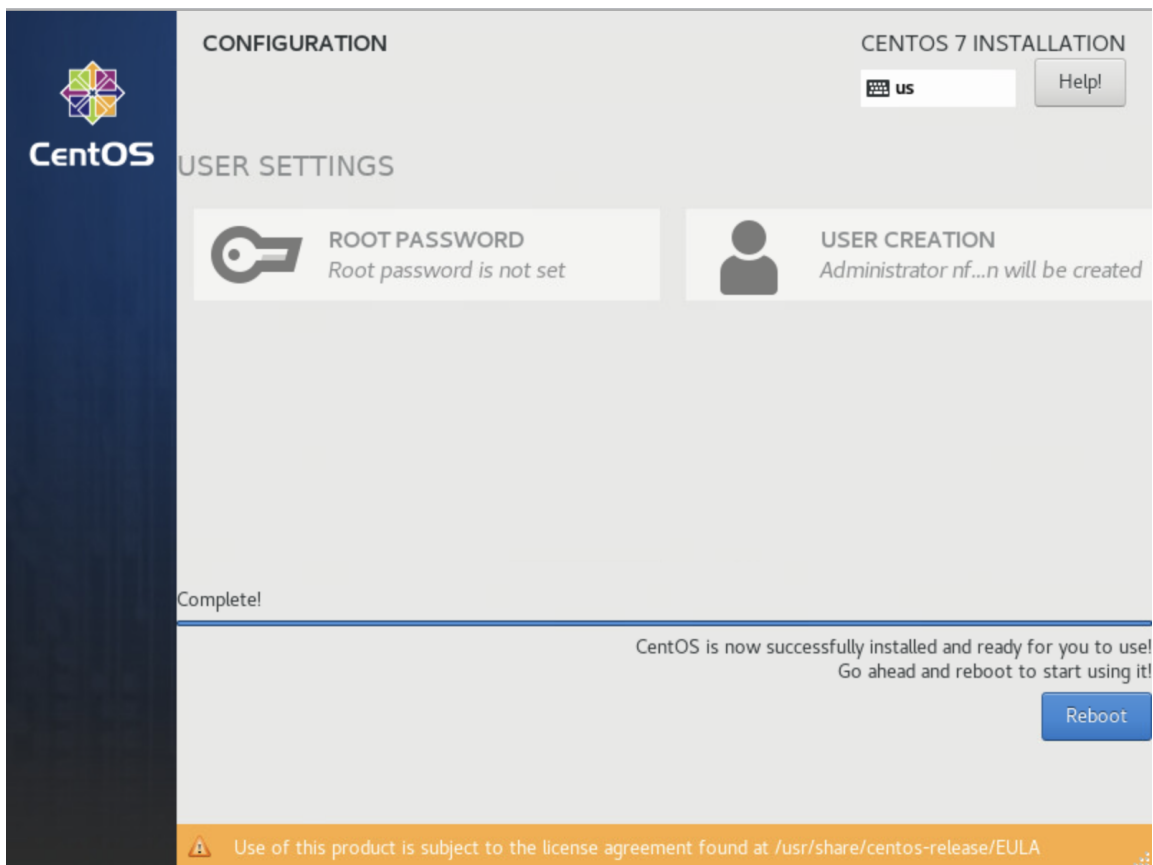
Confirm password

Advanced...

 The password you have provided is weak: The password contains the user name in some form You will have to press Done twice to confirm it..

You will be sent back to the installation screen, wait for it to complete installation, and the "**Reboot**" button will appear for you to restart the CPE with

the CentOS installed.



## Conclusion

This is the end of installing CentOS 7 on the CPE box.

## 4. Run Automation to setup the CPE box



### Note

You will need the IP address of your automation VM and the IP address of your CPE to continue this step

Connect to your automation VM via ssh from a terminal

```
> ssh nfadmin@[ip_address_of_the_automation_vm]
```

Login to the VM by using password: **nfadmin**

Start the automation by issuing the following command:

```
> ./setup-nfnbox.bash [ip_address_of_cpe]
```

The automation will prompt you to enter

**"SSH password"** to login to the CPE box (**nfadmin**)

**"BECOME password"** (hit <ENTER> key)

```
nfadmin@ub-ansible:~$ ./setup-nfnbox.bash 192.168.1.184
SSH password:
BECOME password[defaults to SSH password]: _
```

The automation will take a few minutes to complete. At the end of automation, you will see message like this:

#### PLAY RECAP

```
*****
10.111.111.1      : ok=6    changed=3    unreachable=0
failed=0    skipped=0    rescued=0    ignored=0
192.168.1.184    : ok=35   changed=28   unreachable=0
failed=0    skipped=2    rescued=0    ignored=0
```



### Conclusion

The CPE is now setup and ready.

## 5. CentOS 7 Installation Media



### Disclaimer

There are many ways to obtain and setup the installation media. If you never set one up before, the quickest and easiest way to create one is by downloading the OS image and burn it to a USB by using disk utility.



## CentOS 7 image

You can obtain a copy of OS image by visiting [centos.org](http://centos.org). But since you need to get a CentOS 7 image (not the latest CentOS 8), here is a quick link to Cent7OS mirror sites:

```
http://isoredirect.centos.org/centos/7/isos/x86\_64/
```

Recommend download the "CentOS-7-x86\_64-DVD-xxxx.iso" (around 4.5G). This is the image tested. Since we use minimal installation from CentOS 7, so the minimal image should work also "CentOS-7-x86\_64-Minimal-xxxx.iso" (around 1G)

## Burn Image to a USB stick

You can burn the image to a USB stick by using Rufus (if you are on a PC). You can find many tutorials on the internet if you have trouble