Chapter 11, Pre-task 3, Cisco c8000v Edge Router VM Creation on VMware Workstation

File name:	Ch11_Pre-task3_Cisco_c8kv_Router_VM_Creation_on_VMware_WS.pdf
Version:	1.0
Created on:	25/Jun/2023
Download URL:	https://github.com/ansnetauto/appress_ansnetauto
Applicable to:	Chapter 15

About this document:

Welcome to the software installation guide for the Apress book, "***Introduction to Ansible Network Automation: A Practical Primer***" This guide has been created by the authors as supplementary material to the book, but it is not part of the actual book itself. ***The content has been borrowed from the prequel book, "Introduction to Python Network Automation: The First Journey" written by Brendan Choi in 2021***. Its purpose is to provide clear and concise instructions to assist readers in installing the necessary software required to follow the examples and exercises in the book.

By following the steps outlined in this guide, you will be able to set up the required software for Ansible/Python network automation and begin exploring the concepts while engaging in the practical exercises covered in the book. Please note that this guide is not intended to serve as a comprehensive resource on network automation or Ansible, but rather as a focused guide designed to help you get started quickly and easily.

If you encounter any questions or issues during the installation process, please do not hesitate to reach out to the authors or refer to the resources listed in the guide. We hope this guide proves helpful in your journey toward mastering Ansible/Python network automation.

What's required?

Host OS:	Windows 11
Desktop Hypervisor:	VMware Workstation 17 Pro
File name:	c8000v-universalk9.17.06.03a.ova
Internet connection:	Yes

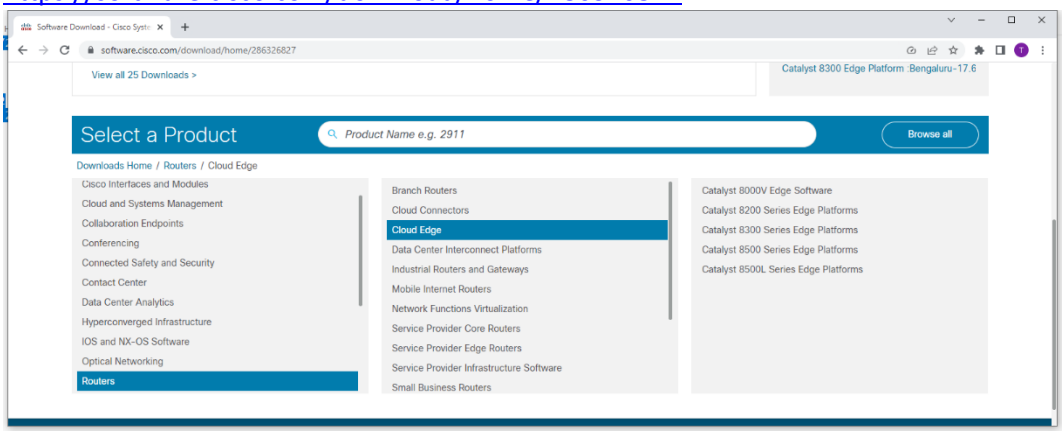
Warning! The software used in this guide may include a combination of free, open-source and proprietary software. Readers can search for most of the free and open-source software on the internet. However, the authors are unable to legally provide the proprietary software. Please ensure that you acquire the proprietary software through authorized channels.

Contents

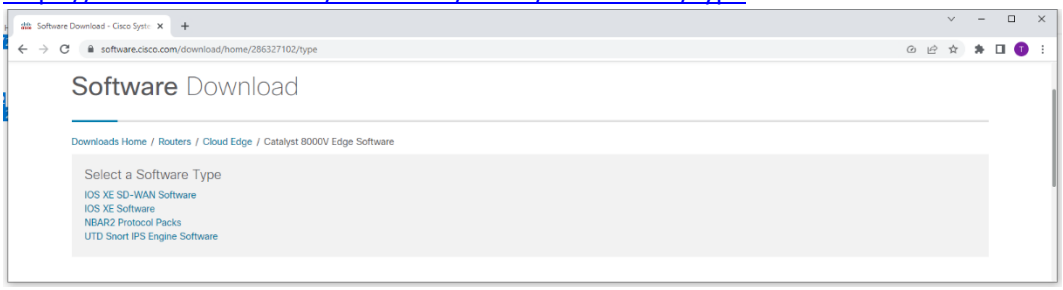
Installation Steps:

Here are the steps to create virtual routers using VMware Workstation 17 for Cisco CSR 8000v routers. Once you create the first virtual machine (router), c8kv01, you will clone it to create the second virtual router named c8kv02.

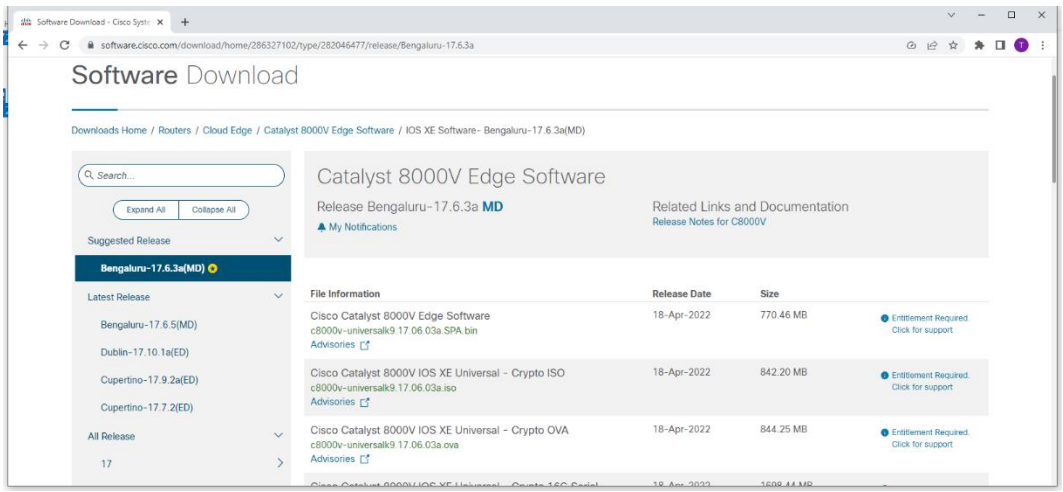
1. Download the .ova file from the Cisco Product download page. You will require a Cisco Login ID as well as a valid contract to download the latest version of Cisco CSR 8000 virtual Edge router images.
   https://software.cisco.com/download/home
   https://software.cisco.com/download/home/286326827



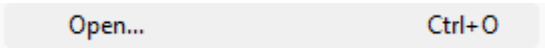
https://software.cisco.com/download/home/286327102/type



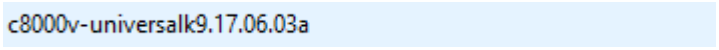
https://software.cisco.com/download/home/286327102/type/282046477/release/Bengaluru-17.6.3a



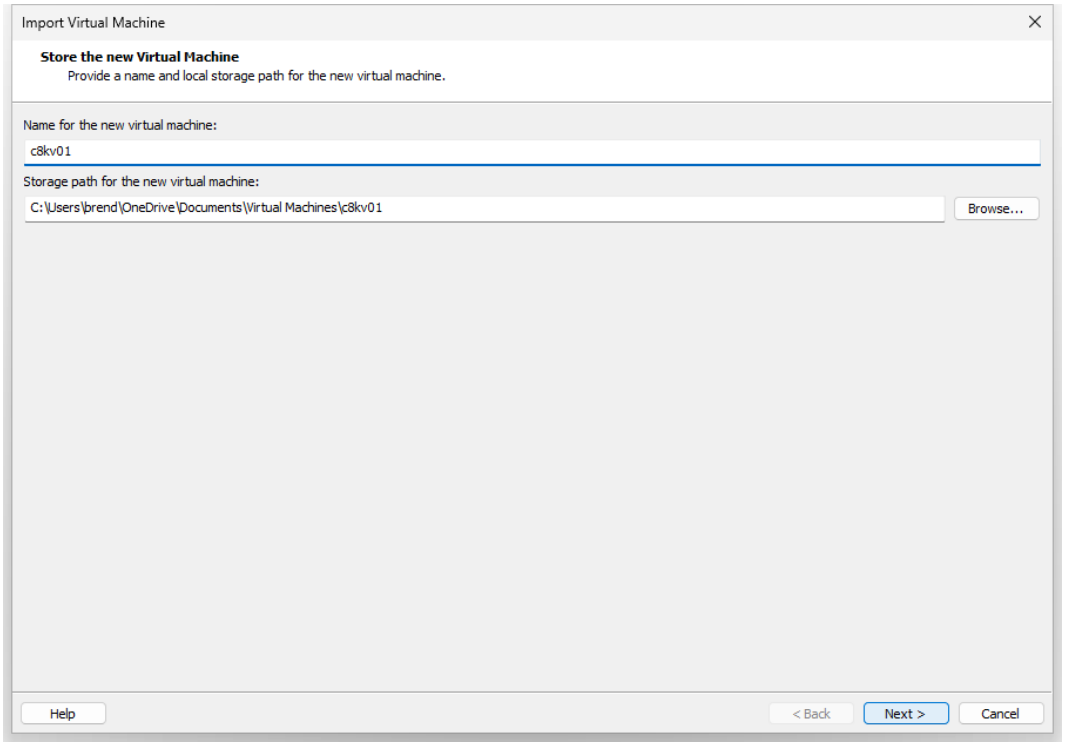
2. Go to VMware Workstation 17 and navigate to the main menu, then under the “File” menu, select “Open”. Alternatively, press “Ctrl+O”



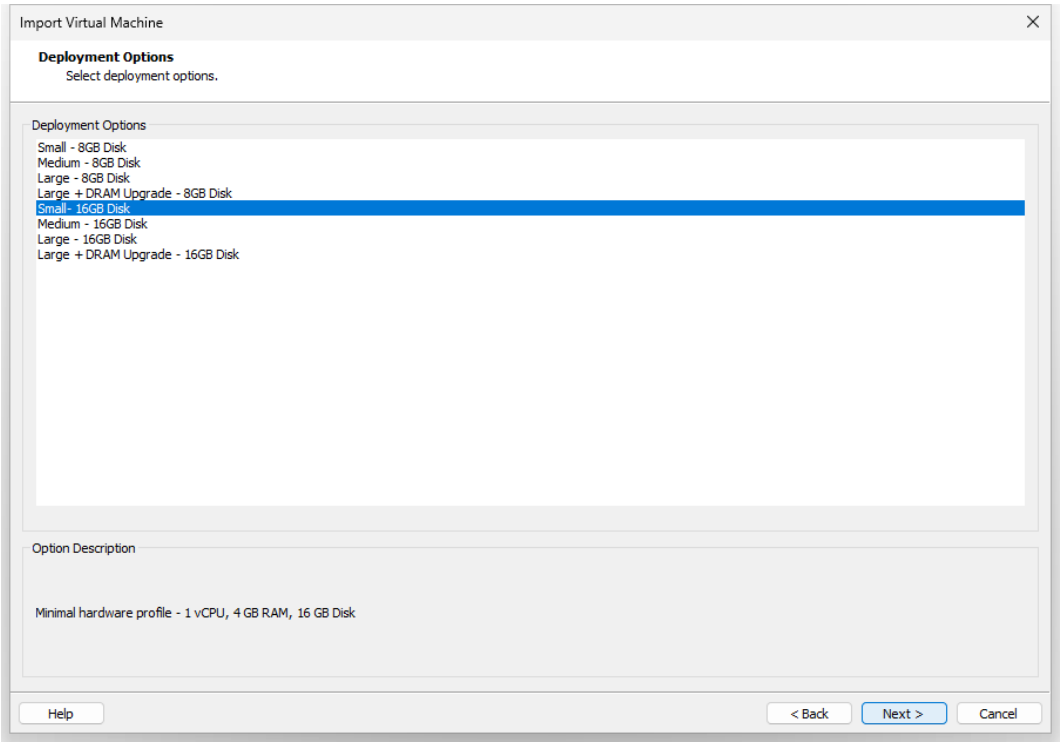
3. In your Downloads folder, locate the Cisco c8000v iso file you have downloaded from Cisco Website and select your image and click “Open”.



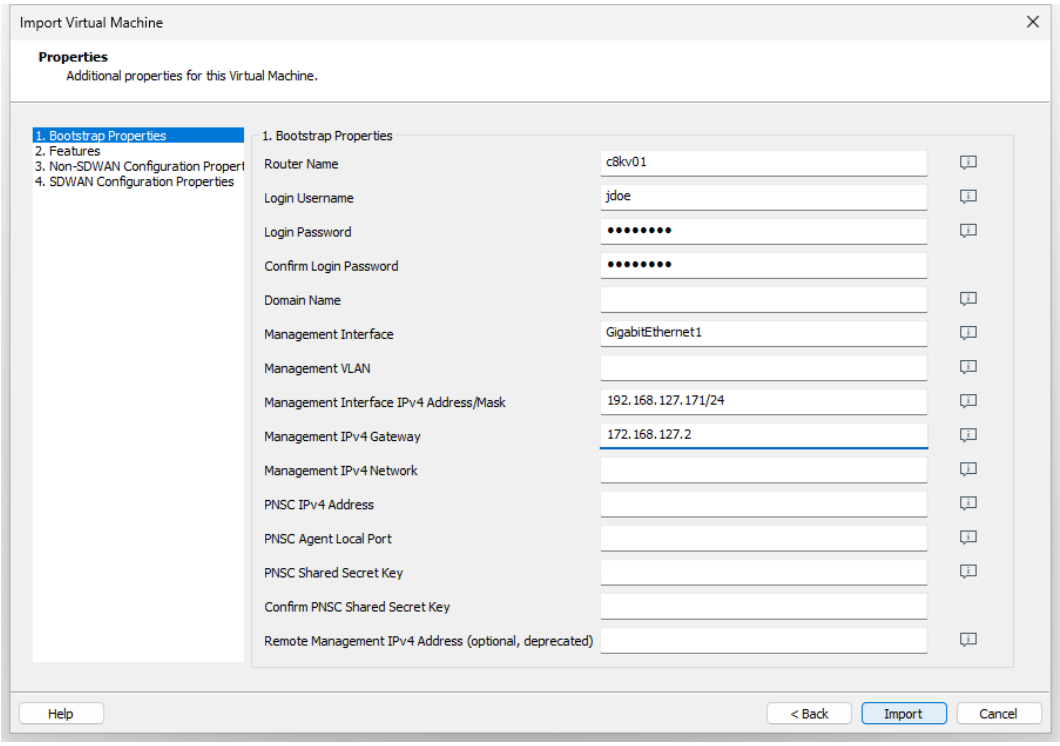
4. Name your virtual router as c8kv01 and select the Storage path, then click on the “Next” button.



5. Leave the default Deployment option as “Small – 16GB Disk” and select “Next”.

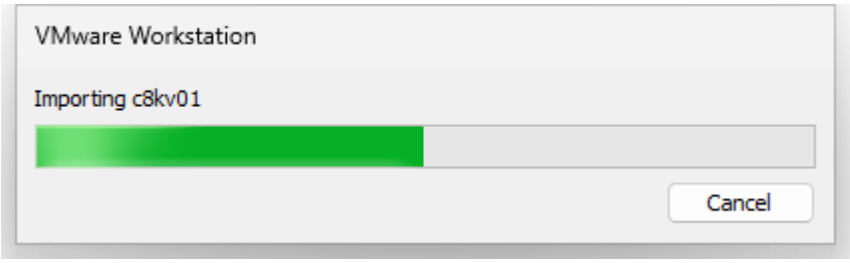


6. Enter the minimum information for your virtual router and select the "Import" button.



The following information has been used above:
Router name: **c8kv01**
Username: **jdoe**
Password: **5uper5cret9assw0rd**
Management interface: **GigabitEthernet1**
Mgt interface IP: **192.168.127.171/24**
Default Gateway: **192.168.127.2**

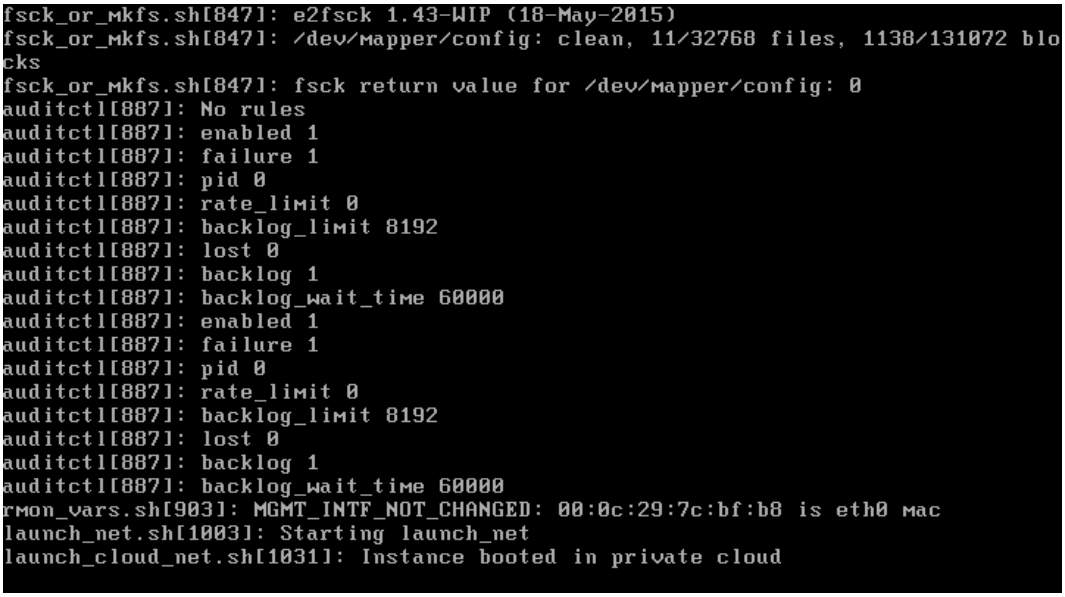
7. Wait until the virtual machine (router) is imported.



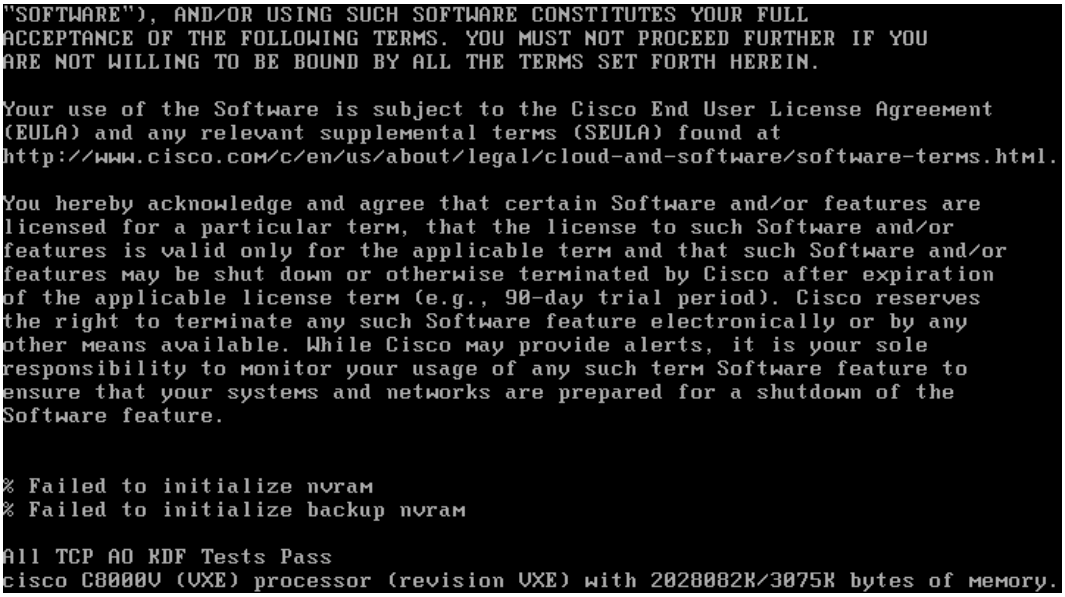
8. Once your router is imported, it will start the boot with the following screen. Just sit back and let it go through its POST cycles.

9. The router will go through some background system configurations and then reboot once and you will see the following screen. The system will boot into "*C8000V – package.conf".

10. Observe the screen and you may think that the screen is stuck/frozen. Let the router do its own thing for a while and wait patiently. After all, we are trying to install this on your laptop, not on a powerful ESXi server in the DC, so some performance issue is expected during the installation.



11. Now, when you see the following screen, you know that the router has booted properly, ignore the Failed to initialize messages.



12. Now run your Cisco favorite command, “enable” and then “show version”.

```
c8kv01#show version
Cisco IOS XE Software, Version 17.06.03a
Cisco IOS Software [Bengaluru], Virtual XE Software (X86_64_LINUX_IOSD-UNIVERSAL
K9-M), Version 17.6.3a, RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Fri 08-Apr-22 04:51 by mcpre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documentation or "License Notice" file accompanying the IOS-XE software,
or the applicable URL provided on the flyer accompanying the IOS-XE
software.


ROM: IOS-XE ROMMON

c8kv01 uptime is 2 minutes
Uptime for this control processor is 6 minutes
 --More--
```

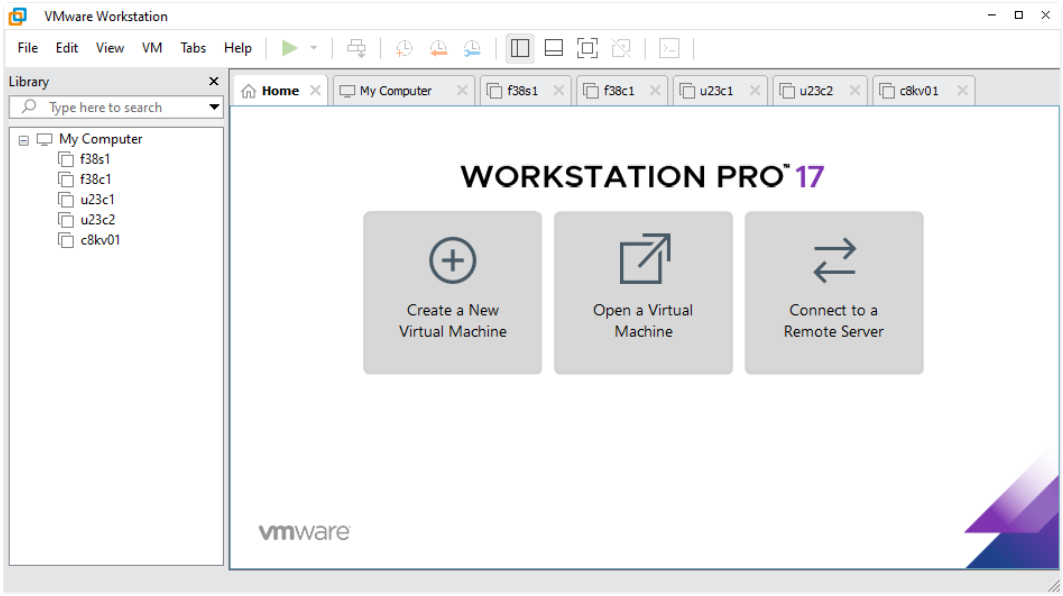
13. The new virtual router will boot with 10 MB throughput by default. To use the image for our testing, we want to increase the throughput to support 250MB. You need HSEC authorization code to increase the bandwidth by more than 250MB. Also, we will accept the EULA and configure the boot level for the license. We are using this purely for testing only and you have 90 days for testing. For our testing and learning, this throughput is good enough.

    c8kv01#**configure terminal**
    Enter configuration commands, one per line. End with CNTL/Z.
    c8kv01(config)#**license accept end user agreement**
    c8kv01(config)#**license boot level network-essentials addon dna-essentials**
    % use 'write' command to make license boot config take effect on next boot

    c8kv01(config)#**platform hardware throughput level MB 250**
    %Throughput has been set to 250 Mbps

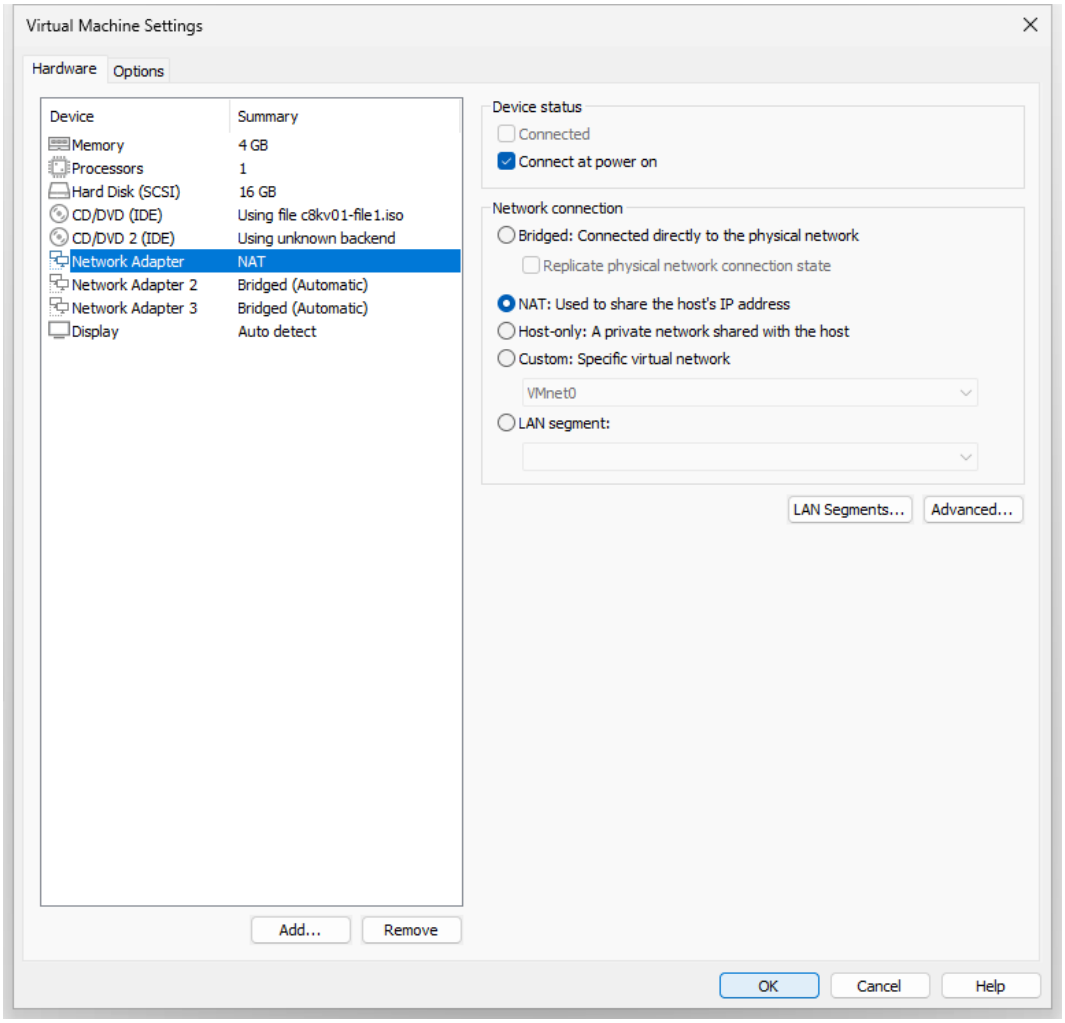
    c8kv01(config)#**exit**
    c8kv01#**write**
    Building configuration...
    [OK]
    c8kv01#**reload**
    Proceed with reload? [confirm]

14. Now let's power off the virtual machine from the VMware workstation by selecting the virtual machine and power off option. At this stage, you should have your first virtual router and the four Linux servers under the VM Library.

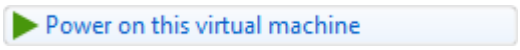


15. Since we need to modify the Network Adapter settings to use "NAT", highlight c8kv01 on the right screen and select "Edit virtual machine settings".

16. By default, all three network adapters are configured in Bridged (Automatic) mode. Select the first Network Adapter, "Network Adapter", and then change it to "NAT: Used to share the hosts' IP Address". Now select "OK" to exit the Virtual Machine Settings.



17. Power on c8kv01 using “Power on this virtual machine”.



18. Once your virtual router goes through the POST process again and comes up. You need to configure the router’s management IP address, configure DNS, and the default gateway of the last resort. The original IP configuration gets disappeared, although your Administrator ID and password will still work.

    Using the following screenshot as the reference, configure your GigabitEthernet1 with the same or similar settings to allow communication to other servers and the internet.

```
c8kv01#
c8kv01#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
c8kv01(config)#interface GigabitEthernet1
c8kv01(config-if)#ip add 192.168.127.171 255.255.255.0
c8kv01(config-if)#no shut
c8kv01(config-if)#exit
c8kv01(config)#ip dns server
c8kv01(config)#ip domain lookup
c8kv01(config)#ip name-server 192.168.127.2
c8kv01(config)#ip route 0.0.0.0 0.0.0.0 192.168.127.2
c8kv01(config)#exit
c8kv01#
*Mar 20 13:33:03.859: %SYS-5-CONFIG_I: Configured from console by console
c8kv01#ping 192.168.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/4 ms
c8kv01#ping www.google.com
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 142.250.66.196, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/12/13 ms
c8kv01#
```

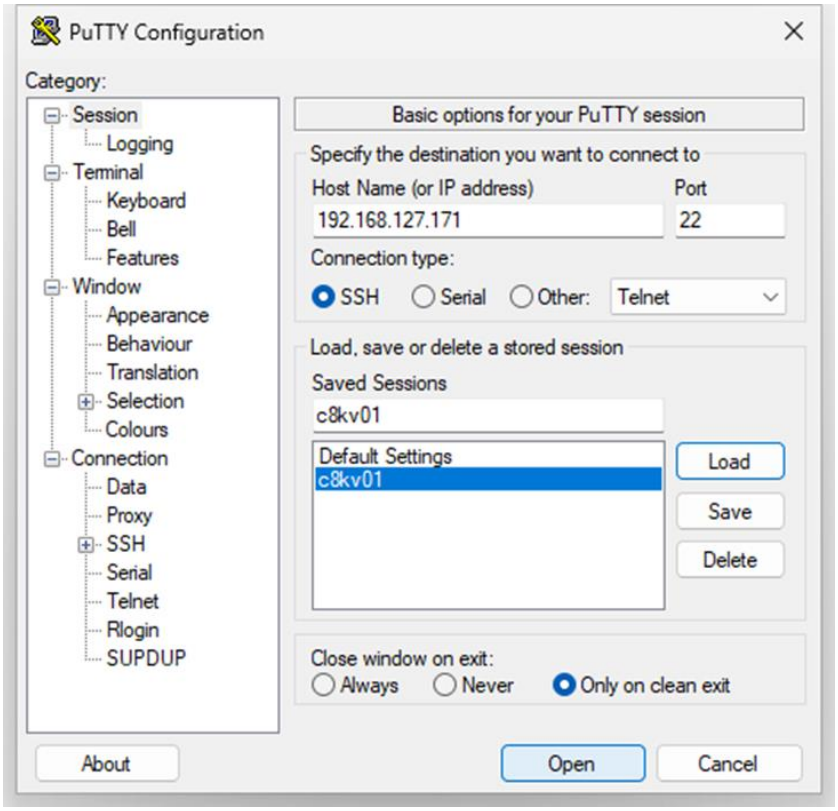
Perform the ping test to your internet router's interface, then Google DNS (8.8.8.8) or www.google.com. If your configuration is all correct, then your router should be able to communicate with the outside world via your laptop's wireless LAN, home/work internet router, and out to the net.

Warning! By chance, if there is "ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1 172.168.127.2" configuration in the configuration from the installation, you will have to remove this route by issueing the following command.

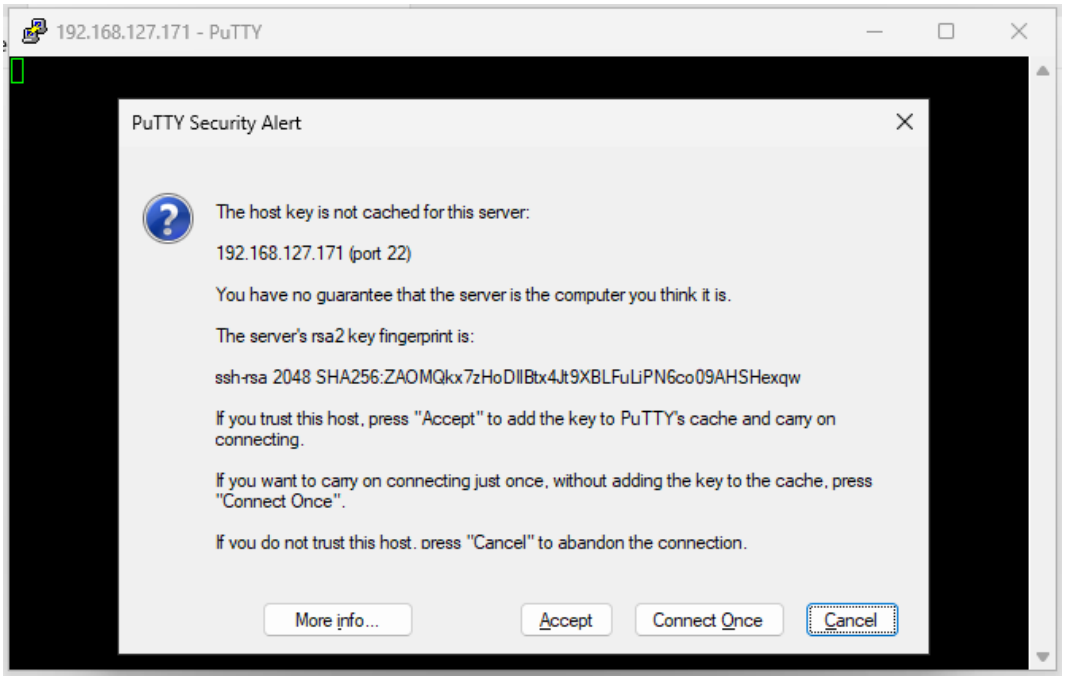
```
c8kv01(config)#no ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1 172.168.127.2
```

no ip route 0.0.0.0 0.0.0.0 GigabitEthernet 1 172.168.127.2

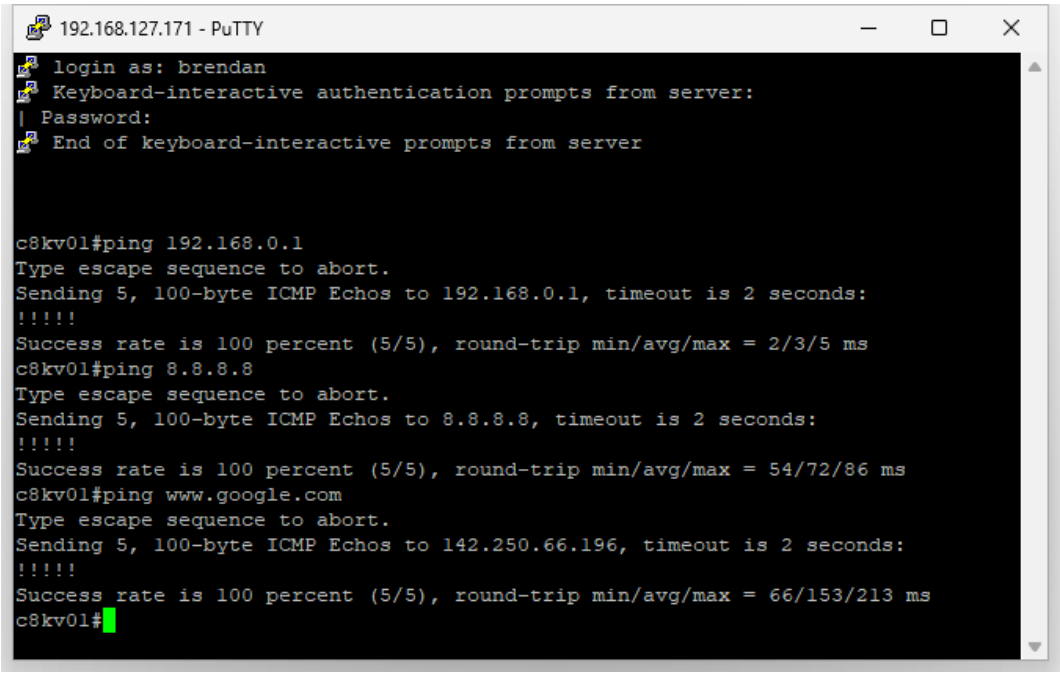
19. Use PuTTY to SSH into your new edge router.



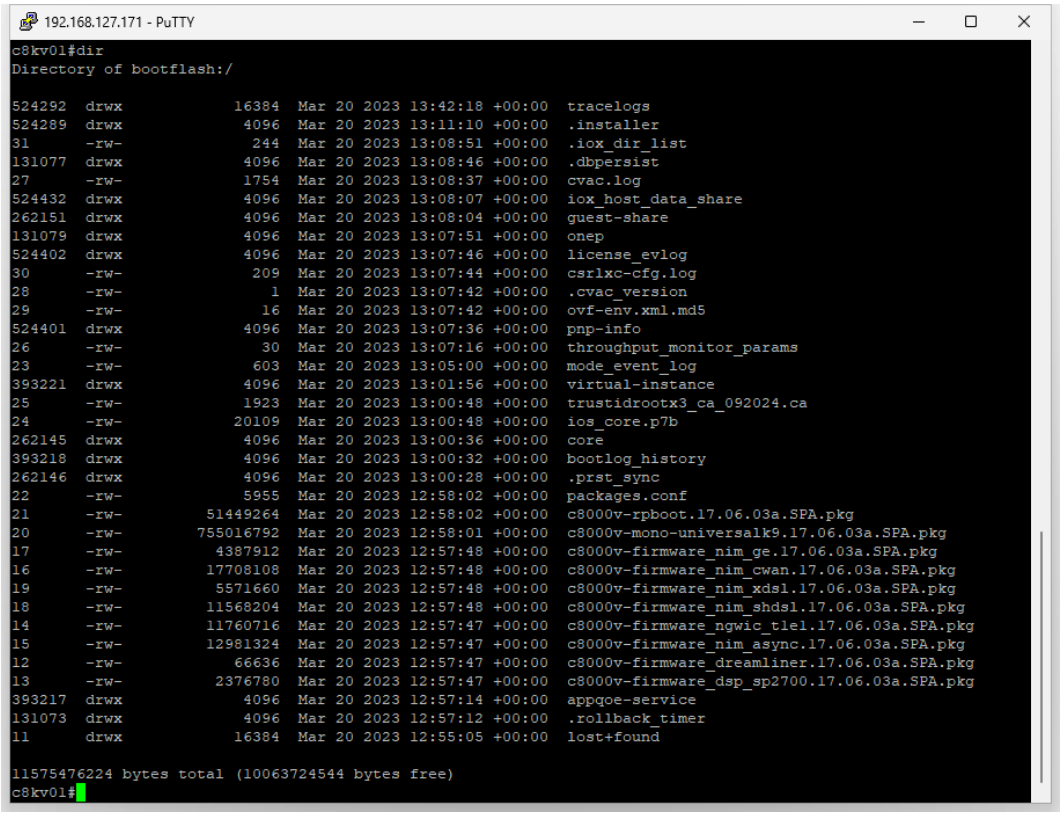
20. Make sure you accept the rsa2 key fingerprint.



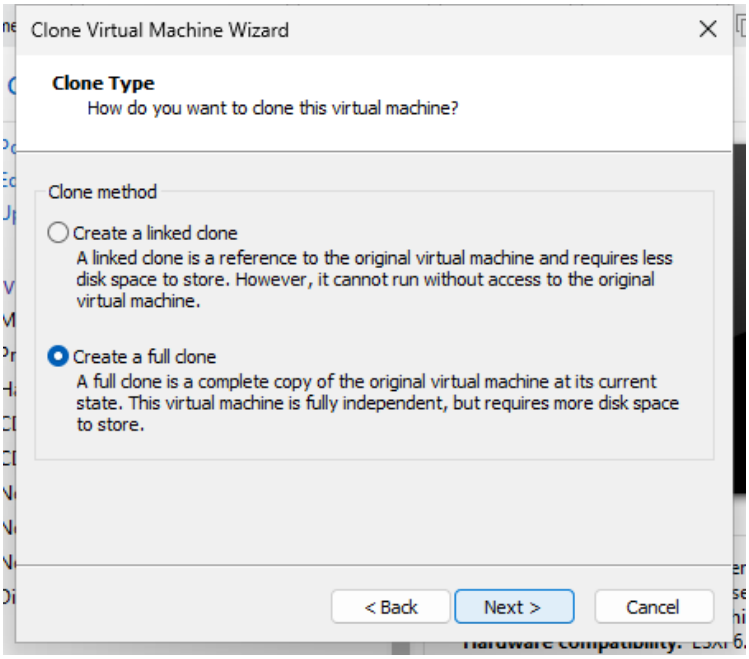
21. Confirm that your SSH login works here. If you cannot log in properly, go back to the router console on the VMware Workstation and reset the username and password accordingly.

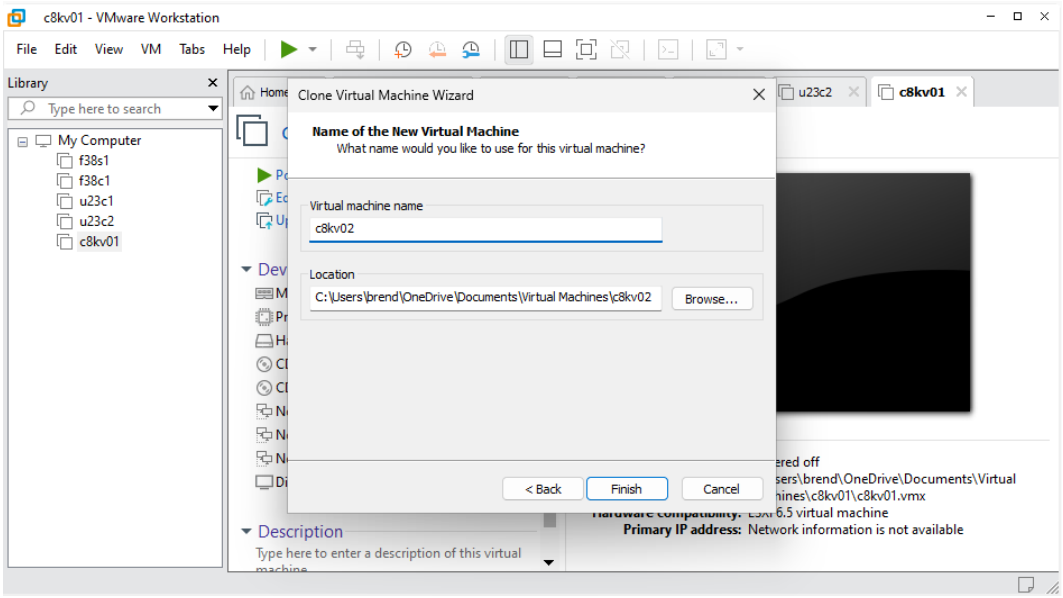


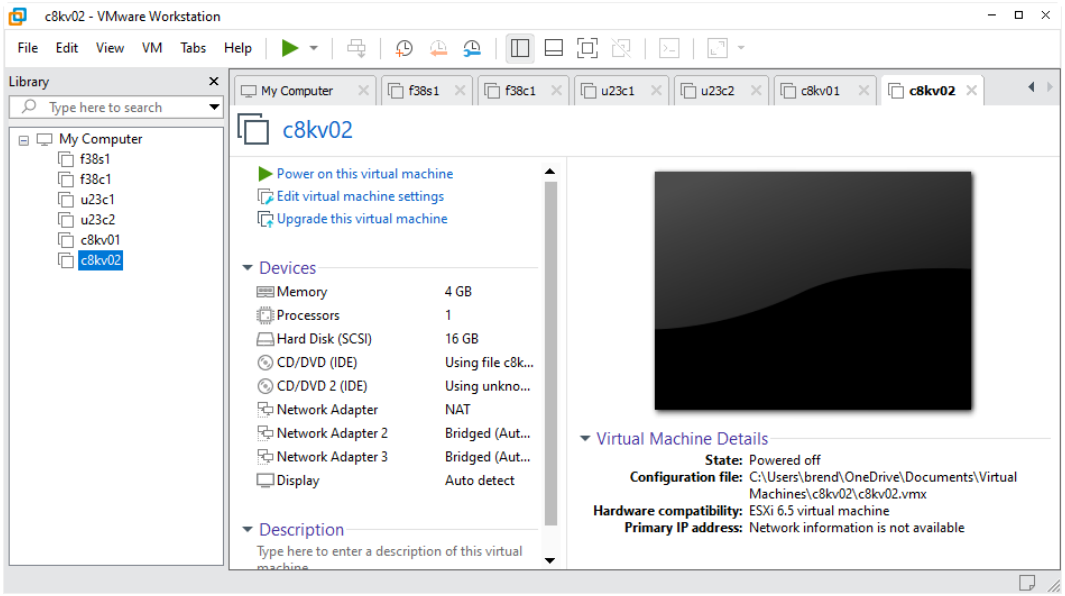
22. While you are here, let's check the router's directory setup too.



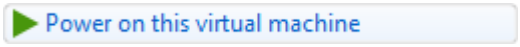
23. Now you have a virtual router for your lab. To test commands on multiple devices, we always need an extra virtual router. Let's power off c8kv01 and then make a clone of this device and name the second virtual router c8kv02.

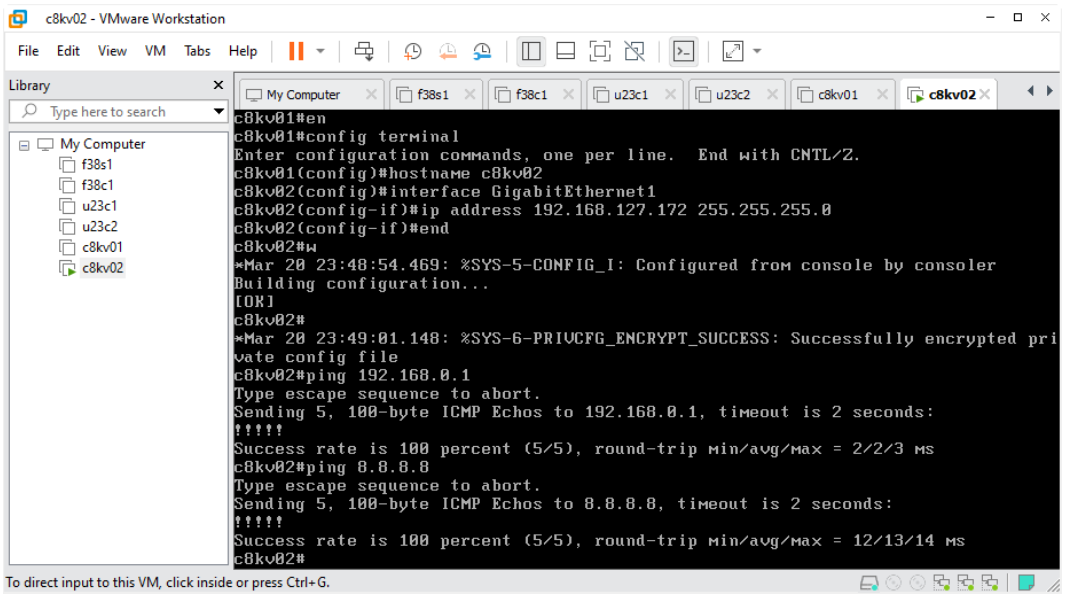

Clone Virtual Machine Wizard
Clone Type
How do you want to clone this virtual machine?
Clone method
Create a linked clone
A linked clone is a reference to the original virtual machine and requires less disk space to store. However, it cannot run without access to the original virtual machine.
Create a full clone
A full clone is a complete copy of the original virtual machine at its current state. This virtual machine is fully independent, but requires more disk space to store.
< Back
Next >
Cancel


c8kv01 - VMware Workstation
File Edit View VM Tabs Help
Library
Type here to search
My Computer
f38s1
f38c1
u23c1
u23c2
c8kv01
Clone Virtual Machine Wizard
Name of the New Virtual Machine
What name would you like to use for this virtual machine?
Virtual machine name
c8kv02
Location
C:\Users\brend\OneDrive\Documents\Virtual Machines\c8kv02
Browse...
< Back
Finish
Cancel
Description
Type here to enter a description of this virtual machine.
Primary IP address: Network information is not available



24. Once c8kv02 is created from the cloning process, power on the second virtual router and change the hostname to c8kv02 and the IP address to 192.168.127.172 with the subnet of 255.255.255.0.



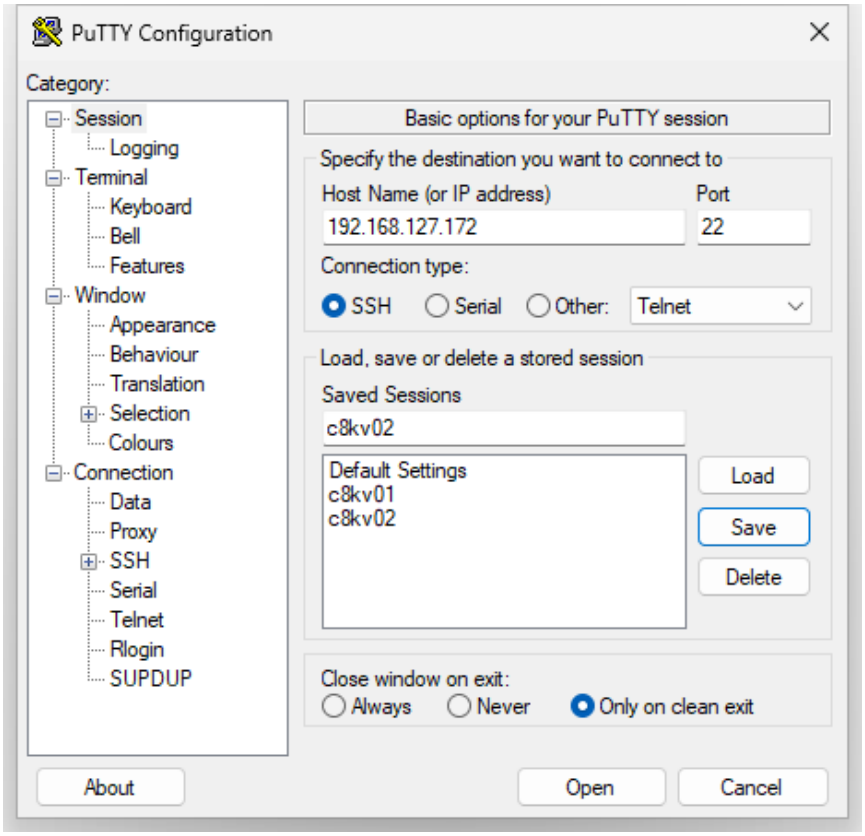


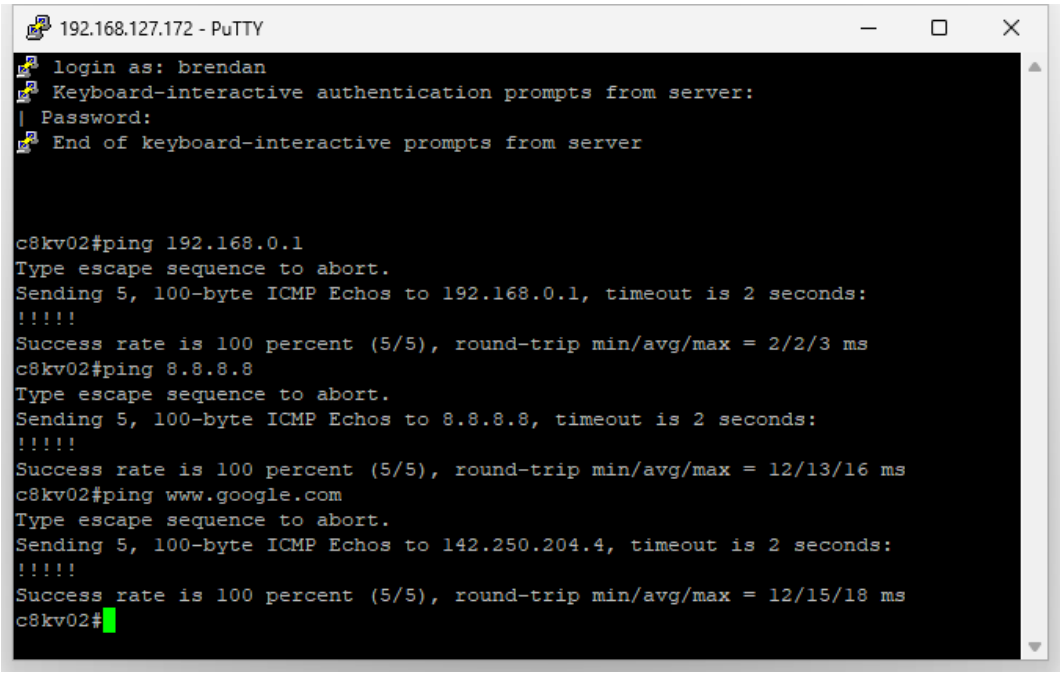
25. Once the configuration is completed, perform the ping tests and save the configuration.

The following information is used for initial configuration:
Router name: **c8kv02**
Username: **jdoe**
Password: **5uper5cret9assw0rd**
Management interface: **GigabitEthernet1**
Mgt interface IP: **192.168.127.172/24**
Default Gateway: **192.168.127.2**

```
c8kv01#en
c8kv01#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
c8kv01(config)#hostname c8kv02
c8kv02(config)#interface GigabitEthernet1
c8kv02(config-if)#ip address 192.168.127.172 255.255.255.0
c8kv02(config-if)#end
c8kv02#w
*Mar 20 23:48:54.469: %SYS-5-CONFIG_I: Configured from console by consoler
Building configuration...
[OK]
c8kv02#
*Mar 20 23:49:01.148: %SYS-6-PRIVCFG_ENCRYPT_SUCCESS: Successfully encrypted pri
vate config file
c8kv02#ping 192.168.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 2/2/3 ms
c8kv02#ping 8.8.8.8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 12/13/14 ms
c8kv02#_
```

26. SSH into the second router and make sure that your SSH is working correctly.

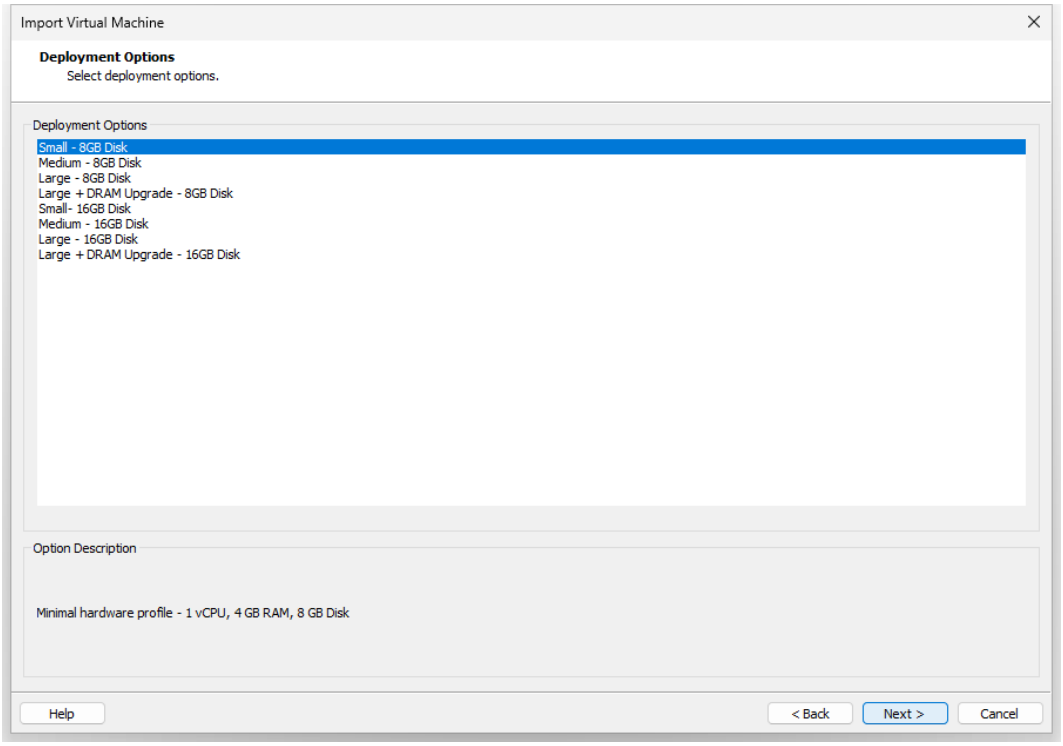




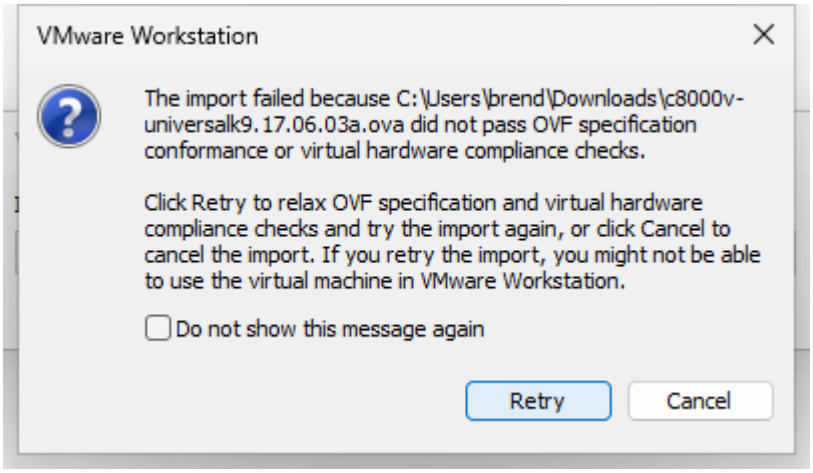
That's it! Now you have completed the installation of Cisco virtual routers for the testing lab. Now continue your reading and study with the book.

Configuration warning

Warning: Leave the default selection at "Small – 16GB Disk", we have tried to create a virtual router using the "Small – 8GB Disk" option and were running into errors.



Error encountered 1.



Error encountered 2.