

2-Layer Network

Project Inception Phase 6

Learning Goal

Continue your exploration of Virtual Machine Managers (VMM) and create a 2-layer virtual network. This will test your research skills, your ability to transfer what you have learned about virtual machines to an enterprise platform and test your knowledge in networking. Before you receive assistance with this lab you will be required to show your research.

You now have some experience creating virtual machines using VirtualBox and Virt-Manager and learned to install operating systems using ISO files. You may have even recreated working systems from an image. You also experienced virtualizing a local area network (LAN) based on the Network Building Block.

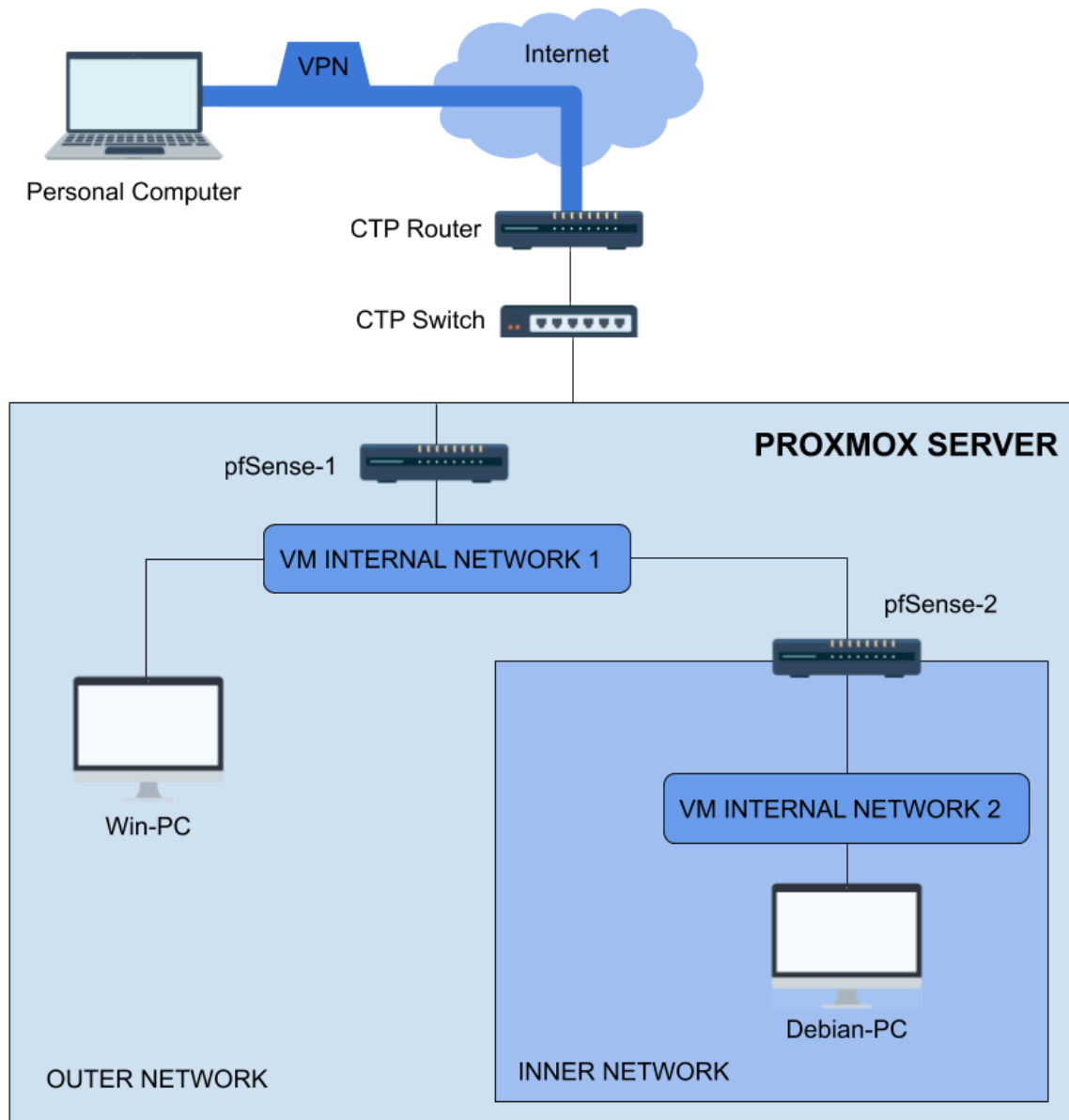
Requirements

In this lab, you will be recreating a 2-layer network, building the network building block of Phase 5. As always, when working with something new or unfamiliar your best ally is research.

You will need to first research how to setup a virtual LAN and then give some thought as to what you will need to do to create the second network layer. You may wish to build the basic 1-layer network building block before you add the second layer. Adding the second layer adds complexity, so we strongly recommend that you start with a network modeled after Phase 5's network first.

Note

In this lab, you will create a 2 layer network composed of an outer and inner network as depicted in the diagram below.



Outer Network

- pfSense router (pfSense-1)
- Windows 10 VM (Win-PC)

- A second pfSense router (pfSense-2)

Inner Network

- Debian Linux VM connected to pfSense-2.

Lab Instructions

Create a ticket for this week's lab if you do not yet have one. If you already have a ticket for this week, add to it. Before you start this lab, write a summary in your own words describing what you need to do for this lab.

Create the two pfSense routers

- Use the following configurations the routers
 - CPU: 1 core
 - RAM: 512 MB
 - Storage (IDE): 8 GB
 - 2 network interfaces
- ISO that can be used for installs are located in Local / Contents. If the ISO you need is not listed, you will need to copy it from the Student NAS. To access the Student NAS, see [CTT Available Network Resources](#) document.
- Router Networking Configuration:
 - pfSense-1-Name
 - Network ID: 192.168.0.0
 - Router IP (private): 192.168.0.1
 - Subnet Mask: 255.255.255.0
 - CIDR: 192.168.0.0/24
 - pfSense-2-Name
 - Network ID: 10.10.10.0
 - Router IP (private): 10.10.10.1
 - Subnet Mask: 255.255.255.0
 - CIDR: 10.10.10.0/24

Create the Windows10 VM

- Use the following configuration below:
 - Computer Name: Win-PC (e.g. Win-PC-Alex)
 - CPU: 2 cores
 - RAM: 4096 MB
 - Storage: 40 GB
 - Connect the network to your virtual network

Create the Debian Linux VM

- Use the following configuration below:
 - Computer Name: Debian-PC (e.g. Debian-PC-Alex)
 - Cores: 2
 - Memory: 2048 MB
 - Virtual Disk: 15 GB
 - Connect the network to your virtual network

Network Configuration and Testing

At this stage you have at least the components you need for the lab created, 2 routers and 2 VMs. Depending on what configuration you did when creating them you will probably need to do some testing and reconfiguration to get things to work.

1. Make note of the initial networking configurations for all the devices in your network:
 - Routers: Inside and outside IP addresses
 - VMs: IP address, Subnet Mask, Gateway
2. Test your network
 - a. Verify that you can ping pfSense-1's inside IP address (gateway) from Win-PC
 - b. Verify that you can ping pfSense-2's inside IP address (gateway) from Debian-PC

- c. Verify you have an internet connection on Win-PC and Debian-PC
 - d. Answer why or why not to each of these questions:
 - i. Can Debian-PC ping the inside address of pfSense-1?
 - ii. Can Debian-PC ping Win-PC?
 - iii. Can Win-PC ping Debian-PC?
 - e. Traceroute google.com from both Win-PC and Debian-PC. Are the routes different? What's different and why?
 - f. Take a snippet/screenshot of the DHCP lease from both pfSense-1 and pfSense-2
3. Change the pfSense-1 network configuration to:
 - Network ID: 172.16.0.0
 - LAN IP: 172.16.0.1
 - Subnet Mask: 255.255.255.0
 - CIDR: 172.16.0.0/24
 4. Test your network again. What effect did this change have on the network configuration?
 5. Make a configuration change to allow Win-PC to ping Debian-PC. Document your configuration change.
 6. Create a network diagram of your final network, showing the inner network, outer network, the vm host and CTP's network.
 7. Check in with instructor