

Assignment 2: GNS3Single Switch LAN**Notes:**

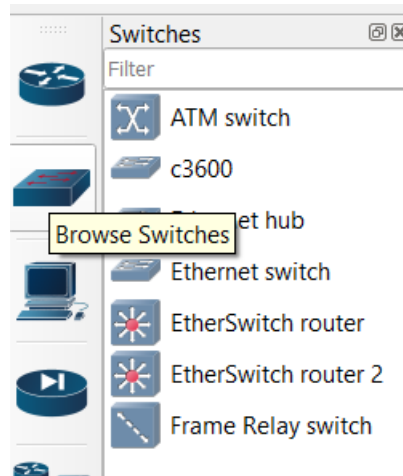
- 1- This is individual assignment.
- 2- The assignment will be due on Sunday 03/13/2022 @ 10:00 PM PST.
- 3- Late assignment won't be accepted.

Installing GNS3

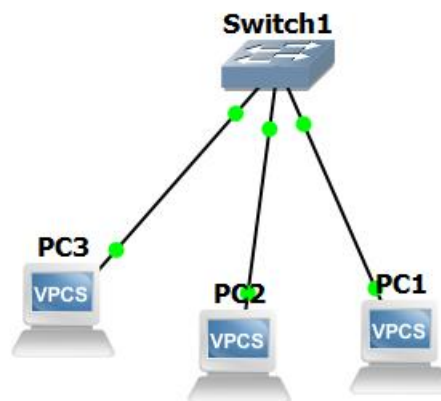
1. Navigate to the GNS3 [website](#).
2. Download the appropriate software for your operating system.
Note: You will need to create a GNS3 account.
3. Install the software
Note: For Windows, when prompted for "Choose Components", please uncheck "SolarWinds Response Time Viewer".

In this lab, you will construct a very simple network using GNS3. In GNS3 you will connect three computers to a switch and then use ping to test connectivity between the computers, make some configuration changes, and observe how the test results change as a result. You will gain a better understanding of layer 2, layer 3, ping, and arp.

1. Start GNS3on your computer or virtual machine and create a project named **Single Switch LAN**.
2. Click the **Browse Switches** icon on the left and drag an **ethernet** switch onto your workspace.



3. Click the **Browse End Devices** icon on the left and drag three VPCS devices onto your workspace. GNS3 will assign the names PC-1 and PC-2 and PC-3 to these devices by default.
4. Connect PC-1 to Port Ethernet 0 on your switch.
5. Connect PC-2 to Port Ethernet 1 on your switch.
6. Connect PC-3 to Port Ethernet 2 on your switch.
7. Power on the switch and all PCs by clicking the green arrow in the toolbar at the top of the screen. Your topology should look like this:



Q1: PC-1 and PC-2 and PC-3 are now in the same broadcast domain. In your own words, explain the concept of a broadcast domain.

1. Open console connections for PC-1 and PC-2 and PC-3 by right-clicking on all PCs and selecting Console.

2. In the PC-1 console, execute this command to set your IP address to 192.168.1.1:

```
ip 192.168.1.1
```

3. In the PC-1 console, issue the **show** command to verify that you have configured to IP address properly.

4. Following the same approach in the PC-2 console, configure an IP address of

```
192.168.1.2
```

Again, verify your configuration with a **show** command.

5. Repeat step 4 for PC-3 and configure with an IP address of 192.168.1.3
6. On all consoles, issue the **arp** command.

Q2: What was the result of the `arp` command on your PCs? Explain this result.

Q3: What are the MAC addresses assigned to PC-1 and PC-2 and PC-3?

Q4: Are PC-1 and PC-2 and PC-3 in the same layer 3 network? Explain your answer.

Q5: Are PC-1 and PC-2 and PC-3 in the same broadcast domain? Explain your answer.

1. On the PC-1 console, ping PC-2's IP address using this command:

```
ping 192.168.1.2
```

By default, the ping command on PC-1 will issue 5 ICMP requests to PC-2. If you have configured everything correctly, you should receive 5 replies. If you missed a step, you will receive a message that says the host is unreachable. If that happens, troubleshoot or seek help on the discussion forum. Don't continue the lab until the ping works successfully.

2. Repeat the step above between PC-1 and PC-3 and between PC-2 and PC-3 as well.
3. On all PCs, run the command `save`. That will save the IP addresses so that when your PCs are rebooted, you won't lose the IP addresses.
4. On all PCs, issue an `arp` command. Your `arp` tables should not be empty now. If your `arp` tables are empty, too much time went by since you did the pings and the `arp` entries timed out. If that happens, just repeat the pings and then look at the `arp` tables on all PCs again.

Q6: Include the contents of the `arp` tables from all PCs in your lab report.

Q7: Explain the purpose of ARP and how it works. Use appropriate terminology for things like OSI or TCP layer names or numbers, protocols, addresses, and datagram names (i.e. packet, segment, frame, etc.). Be specific and discuss how caching improves performance.

1. Now change the IP address of PC-2 to `192.168.2.2`
 - i. Use the same command you used earlier. Use a `show` command on PC-2 to verify your configuration.

Q8: Did the MAC address on the PCs change when you changed the IP address on PC2? Why?

Q9: Is PC-2 in the same layer 3 network as it was when it had an IP address of `192.168.1.2`? Explain.

Q10: Is PC-2 in the same broadcast domain as it was when it had an IP address of `192.168.1.2`? Explain.

2. From PC-1, try to ping `192.168.2.2`. This should fail.
3. From PC-3 try to ping `192.168.2.2`

Q11: Why does the ping from PC-1 to PC-2 (and PC-3 to PC-2) fail? Explain this in terms of layer 3 networks and broadcast domains

4. Stop your devices by clicking on the red square at the top of your GNS screen.
5. Shut down GNS3.20.
6. Navigate to where your project is saved (by default it should be `USER >> GNS3 >> PROJECTS >> [PROJECT NAME]`)
7. Compress the folder of `[PROJECT NAME]` into a zip folder.

Lab Submission Instructions

Create a document in PDF format. At the top of the document, include the following:

- Your Name
- Lab Title

- Date

Copy each question from this lab into your document and provide your answers as well. Be sure to include the question numbers in your lab document.

At the end of your document, write a brief reflection. This should be a paragraph or two in which you reflect on your lab experience. Discuss items such as the following:

What was the most valuable feature of the lab?

How did you prepare for this lab? What changes are you considering in preparing for your next lab? What did you learn from this experience?

What advice would you give someone who was preparing for this lab for the first time?

Don't think of the reflection as a question/answer section. This should be well-written paragraph or two that discusses items like those listed above.

Submit your document and your compressed project before the deadline.