PRACTICUM MODULE VII

TRACEROUTE

COMPETENCE:

- Students can use the traceroute utility to troubleshoot problems in the network.
- Students can trace the path from the source host to the destination host by using the traceroute utility.

TOOLS AND MATERIALS:

- Software Simulator GNS3
- Stable Internet Connection
- Connect to a VPN Server of the IT Department

THEORY REVIEW:

Traceroute is a network program in the UNIX/LINUX operating system that is useful for tracking data paths between two points, our host and the destination host. Traceroute uses the TTL (Time to Live) field of the IP protocol and waits for icmp messages "TIME_EXCEEDED " from every gateway traversed along the path to the intended host.

Traceroute works by sending UDP packets with TTL values starting from 1 to the destination host, and waiting for icmp TIME_EXCEEDED from the gateways that is passed. Once you get the ICMP message TIME_EXCEEDED (which means that the TTL value runs out before it reaches its destination), traceroute will resend the UDP packet by raising the TTL value by 1 from the previous value. And keep repeating until you get an ICMP "PORT UNREACHABLE" message which means that the package has reached the intended host.

When using Traceroute program, the paramater required is only the destination hostname or destination IP address. However, traceroute provides many parameters that can be used. The complete information about parameters can be seen in the traceroute manual on the Linux operating system.

Some commonly used parameters in traceroute are:

1. **traceroute <host destination name / ip host name destination>** : is a standard traceroute usage
2. **traceroute <host destination name / ip host name destination> -n** : turn off mapping host name and ip address
3. **traceroute <host destination name /ip host name destination> -w** <in seconds>: modify the response waiting time by entering the time value in seconds, the default is 5 seconds.
4. **traceroute <host destination name / ip host name destination> -q <number of queries> :** modify the number of queries / packets sent per hop by entering the value of the number of queries, the default is 3 queries.
5. **traceroute <host destination name /ip host name destination> -f <the initial value of TTL>** : modifying the initial value of TTL on the package, the default is 1.

For Windows operating systems, a similar traceroute program also exists, namely tracert. For options or parameters that can be added to the tracert program, among others are:

1. -d : turn off mapping host name and ip address
2. -h : set the maximum hop value to the destination host
3. -w: sets the maximum waiting time in milliseconds (as opposed to traceroute in seconds)

PRACTICUM PREPARATION

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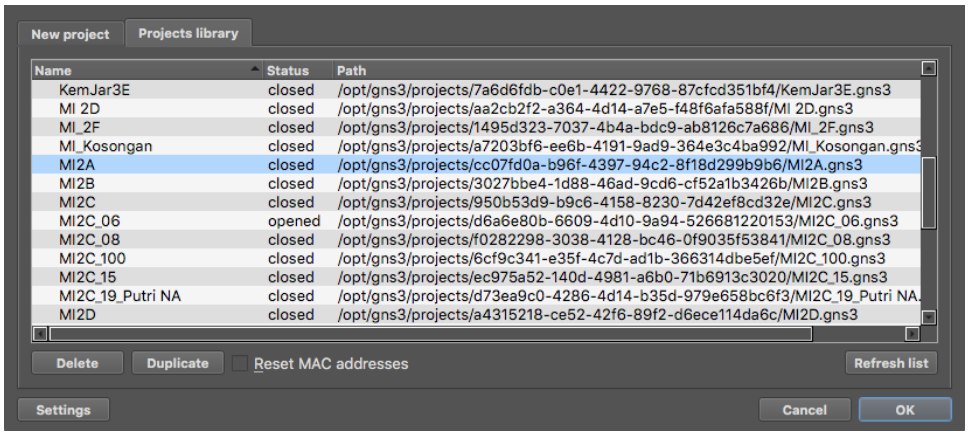
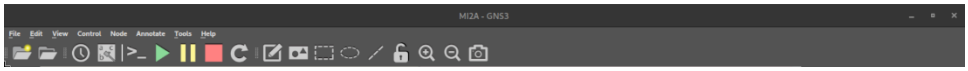
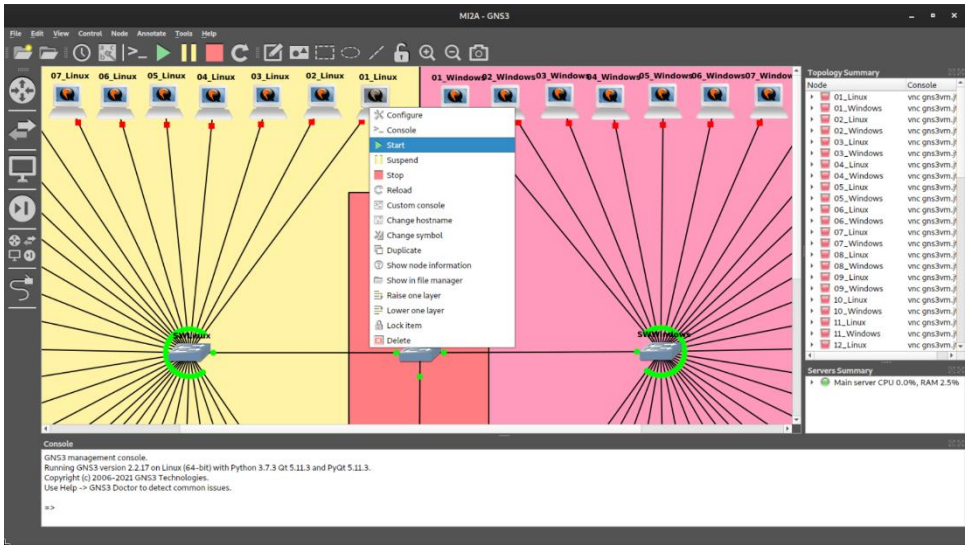
1. Connect your computer to the internet network.
2. Connect your computer to an Information Technology Department VPN server using the OpenVPN Connect app. Use the profile, username and password you have obtained at previous meetings.
3. Once connected to an OpenVPN server, open the GNS3 app on your computer.
4. In the initial view of the GNS3 application window, select the Project library tab. Then select the project that has been set up for your class (e.g. TI2I). Then remove the check mark on the Reset MAC Address option. Then press the OK button.



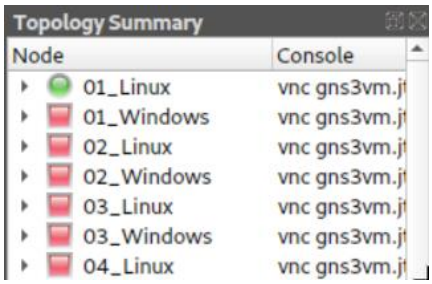
5. Then after the project opens in the main window of the GNS3 application, you can adjust the zoom on the appearance of the project as you wish by pressing the positive magnifying glass button (to enlarge) or the negatif magnifying glass button (to minimize) on the toolbar at the top of the window.



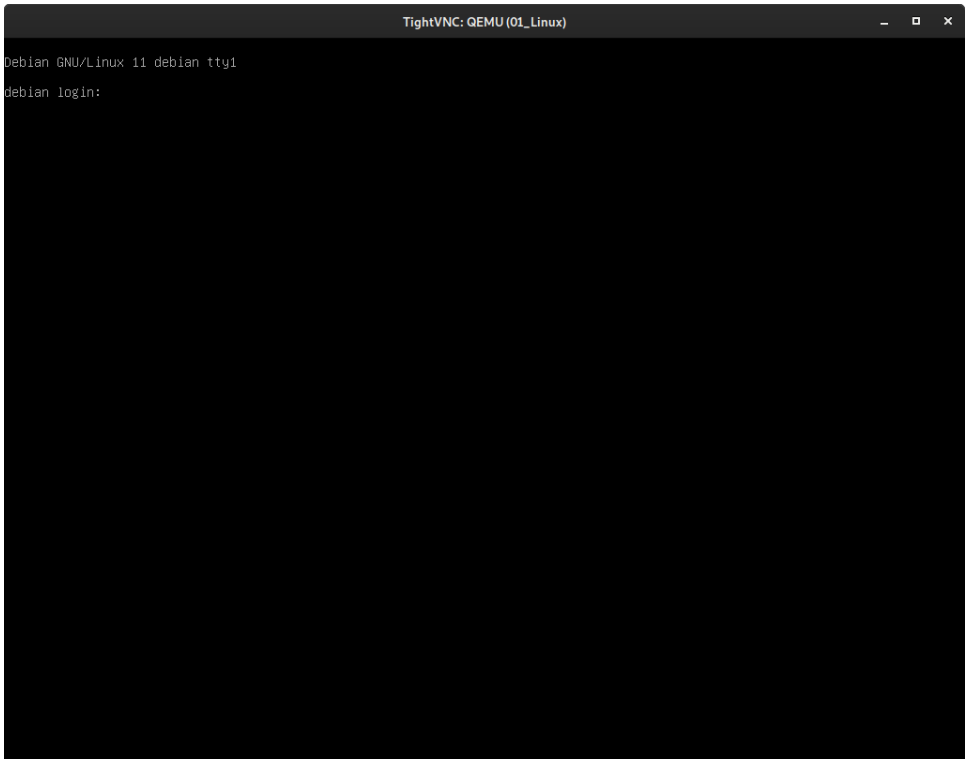
6. Then you can turn on the computer you are going to use. To do this, right-click on the logo of the computer you are going to use, and then select the Start option.



7. Wait a while and you can check the status of whether or not your computer is turned on, in the Topology Summary sidebar to the right of the window.



8. Once your computer is on, access your computer by double-clicking (2x) on your computer logo. Then a new window will appear, which is the console to your computer as shown below.



9. You can use the computer for practicum according to the next steps.

PRACTICUM STEPS:

1. Use the traceroute program to track gateways that are traversed to hosts outside the Polinema intranet network (facebook, google or others). Observe the results and save the screenshot.
2. Use the traceroute program to track the gateway passed **TO** polinema.ac.id. Observe the results and save the screenshot.
3. Explain the meaning of the traceroute result.
4. Use the traceroute program with the other 4 parameters explained previously, to the destination host (whatever the destination you choose), observe the difference and save the screenshot.
5. Use the windows operating system and tracert program to track gateways traversed to hosts outside the intranet network (facebook, google, or others) and to polinema.ac.id. Observe the results and save the screenshot.
6. Use the 3 parameters described above for the tracert program and observe and then save the screenshot.

ASSIGNMENT

1. Perform a trial step and document each step in a report.