INR lab 3 - STP, VLAN, and Fault Tolerance

1. Preparation:
   a. Read the notes at the end.
   b. Select a virtual switching solution that you would like to try. For example (Mikrotik, vyos, Cumulus VX).
   c. GNS3 already have a template for these switches (Mikrotik, vyos, Cumulus VX), try to use these templates as it will save you a lot of time and troubleshooting.
   d. Be sure to take a snapshot of your infrastructure before you start

2. VLANs:
   a. Change the topology of your network to as [follows](#), and make the necessary configurations.
   b. Configure the switches and make sure you have connectivity between the hosts.
   c. How do VLANs work at a packet level? What are the two main protocols used for this?
   d. What is the **Native VLAN**?
   e. Configure the VLANs on the switches to isolate the two virtual networks as [follow](#).
   f. Ping between **ITManager** and **HR**, do you have replies? Ping between **ITManager** and **Management**, do you have replies? Can you see the VLAN ID in Wireshark?
   g. Configure **Inter-VLAN** Routing between **Management VLAN** and **HR VLAN** and Show that you can now ping between them.

3. Fault Tolerance:
   a. What is Link Aggregation? How does it work (briefly)? What are the possible configuration modes?
   b. Use link aggregation between the **Web** and the **Gateway** to have **Load Balancing** and **Fault Tolerance** as [follows](#).
   c. Test the Fault Tolerance by stopping one of the cables and see if you have any downtime.

4. *STP (bonus):*
   a. Change the topology as [follows](#) and Disable **STP** on the **Internal network switches**.
   b. Send a broadcast ping request to the PCs connected to the **Internal Network**.
   c. What can you notice? Why did this happen? What are the implications of this on the network?
   d. Enable back **STP** on the Switches and do the experiment again.
   e. Can you see **STP** traffic? Explain it briefly.
   f. Configure the switches to have the *Internal* as the **Root switch**.
   g. Would we need STP between routers?

Notes:
- Make the report as technical as possible (no installation guide please).
- Try to include a network scheme in your report
- If you paste some data (routing table), please make sure it is readable and the format did not change
- If you want to include a command in the report, please highlight it (bold, italic, different format, ...)
- Keep your lab project file, you might use it for the next lab.
- For **STP**, you will have a CPU load of 100%, please be careful