

FIT9137 Workshop Session

Week-7

Topics:

- Local Area Networks (LAN) and Virtual LAN (VLAN)

Covered Learning Outcomes:

- Analyze and formulate the functions and architectures of (wireless) local area networks, wide area networks and the Internet.
- Examine networks using the underlying fundamental theories, models, and protocols for data transmission.

Instructions:

- One of the main purposes of an applied session is to build the learning community, create connections and include the learners. The other goal is to give and receive feedback from your peers and or your tutors.
- Form groups of 2 students (peers) to work through the exercises. If you meet a problem, try to solve it by asking direct questions to your peers. If the issue was not solved within peers, ask your tutor. If you did not get a chance to solve the problem during your applied session with your peer or tutor, jump into one of many consultation hours and ask any of the tutors to help you. Please visit the “Teaching Team and Unit Resources” tile in the FIT9137 Moodle site.

ACTIVITY A: Design a (simple) LAN in CORE

In this activity, we want to design a LAN with multiple users, two switches and a router inside CORE. Take your student ID, for example 4825373. The rightmost digit is R=3 and the leftmost digit is L=4. Follow the below steps to create a LAN:

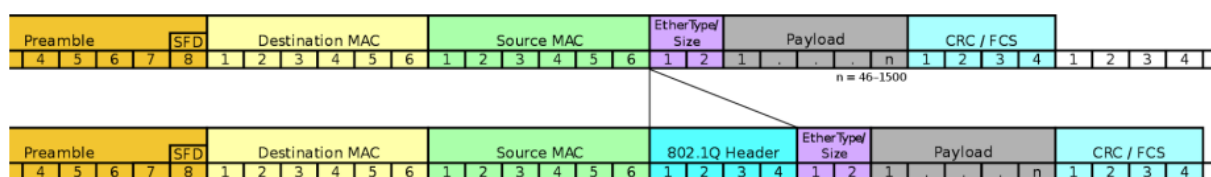
1. From the available tools in the left column, select an “ethernet switch” and place it to the right of your screen. Name it whatever you like.
2. From the available tools in the left column, select “PC”. Add R PCs close to the switch. In our example R=3.
3. From the top menu, select “Tools” and then “IP Addresses”. Select for example 192.168.0.0. Discuss the other options with your group.
4. From the left column tools, use “link” to draw R lines between the created switch in the first step and each PC in the second step.
5. Check your current network by selecting “start a session” from the left column. If everything goes green eventually, your network is ready.

6. Use the “two-node tool” again from the left column. Assign random sources and destinations on top of the page and use “Ping” and “Traceroute” to check the network. Discuss what you see with other members of your group.
7. Stop the session.
8. Repeat steps 1-6 and create another independent network to the left of your screen.
9. Can you “ping” a PC from the left network to a PC from the right one? Why?
10. Connect two switches using a router.
11. Repeat step 9.
12. What are the main differences between your switches and your router?

Activity B: Virtual Local Area Networks Tags

A VLAN is a LAN defined by software rather than physical wiring and allows to divide a LAN into multiple logical segments. Each VLAN is identified by a VLAN ID and similar to a LAN, devices that are connected to the same VLAN will be assigned an IP address from the same subnet. A VLAN is not limited by physical location and can span multiple switches. The Ethernet frames that are transferred between the VLAN switches have the VLAN IDs inserted inside the 802.1Q headers and removed before being delivered to the destination specified by the MAC address. Because of this, we cannot see the VLAN headers in the Wireshark frames when capturing from a host. The Monash backbone network is built from the intelligent, programmable switches that support Virtual Local Area Networks.

1. Referring to Figure-1, explain the IEEE802.1Q header of 4 Bytes called VLAN tags?



2. Explain the process when Alice accesses a service on Zeus server.
3. Explain the process when Alice accesses a service on Hera server.

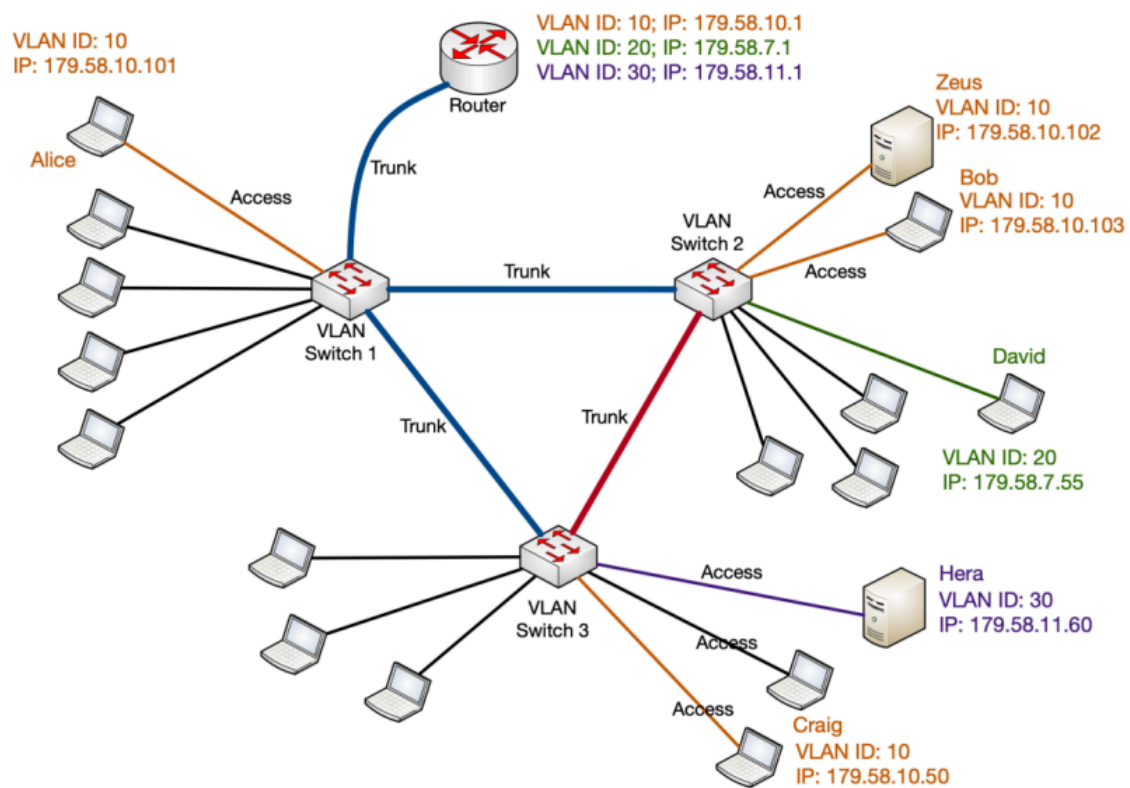


Figure 2: Network Configuration of Talos Corp.