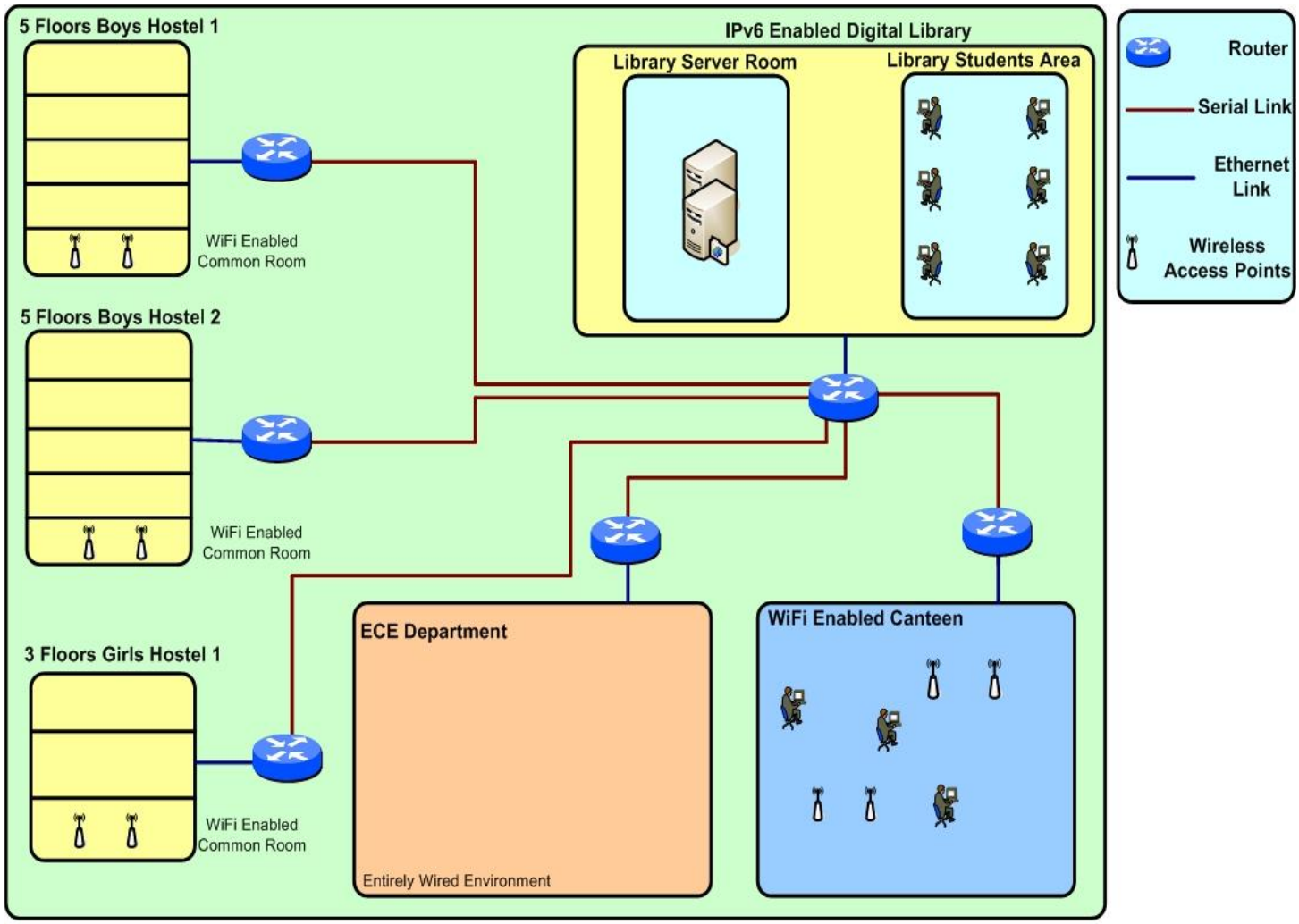
Use Case for Summer Training (June, July, Aug'14)

To implement the concepts and technologies learnt during the summer training, a use case is being provided to the students which they have to implement on "Packet Tracer" software with extreme precision. The project once submitted will be taken as a measuring unit to evaluate the trainee's performance during the entire period.

Please find below the network architecture that has to be implemented:



College Network Logical Infrastructure

The details of the network:

1. Entire network will run on IPv4 except for library, which is entirely IPv6 based.
2. The network has to be created between three hostels, ECE department, canteen and library.
3. Each building will have its own router (models have to be decided by trainee). Each router will have serial link connection only between them as per the diagram.

4. The router will further be connected to access switches (models and quantity to be decided by trainee).
5. The end users and wireless access points (WAPs) will be connected to the access switches.
6. Each floors/areas, where WAPs are present, PoE switch will have to be used.
7. 1 WAP will be suitable for 10 users only. As soon as number of users exceeds 10, a new WAP will have to be installed.
8. Detailed IP Schema is to be designed for the entire network and minimum number of IPs has to be utilized.
9. No hubs or bridges are to be used.

Library:

1. Two separate areas present – server room and student area. Both will be in separate broadcast domains.
2. 5 Ports on the switch will be utilized by the server.
3. Student area will have capacity of 35 students. 35 PCs will be present connected via wired LAN.
4. From 9 am to 12 pm and 2 pm to 5 pm, only students in the library area can access the servers. Rest of the time, i.e., from 5:01 pm to 8:59 am and 12:01 pm to 1:59 pm, all the students from any area of the college can access the library servers. ECE department will have 24 hours access.
5. The entire topology has to be IPv6 based.

Boys Hostel 1:

1. This hostel will have 5 floors.
2. Ground floor will have common room with a seating capacity for 25 students. This will be a wireless zone.
3. Rest all floors will have wired rooms. There are a total of 12 rooms per floor and each room will have two students.
4. Each floor will have one switch; switches cannot be shared between multiple floors.

Boys Hostel 2:

1. This hostel will have 5 floors.
2. Ground floor will have common room with a seating capacity for 25 students. This will be a wireless zone.
3. Rest all floors will have wired rooms. There are a total of 12 rooms per floor and each room will have two students.
4. Each floor will have separate switches; switches cannot be shared between multiple floors.

Girls Hostel 1:

1. This hostel will have 3 floors.
2. Ground floor will have common room with a seating capacity for 15 students. This will be a wireless zone.
3. Rest all floors will have wired rooms. There are a total of 15 rooms per floor and each room will have two students.
4. Each floor will have separate switches; switches cannot be shared between multiple floors.

ECE Department:

1. This department will be present on the 5th floor of the academic building.
2. This department has multiple labs and staff rooms with seating capacity of 150 people.
3. ECE department LAN can only be accessed by internal users. No external user (hostel, canteen or library) can reach out to the internal LAN.
4. Users from here will have 24x7 access to the entire campus LAN including library.

Canteen:

1. This will be completely wireless zone.
2. Canteen has a maximum seating capacity of 100 students but it is noticed that generally only 50 to 60 students are present during the peak hours like lunch; and about 20 to 30 students during rest of the day.
3. Access of internal LANs is not a priority at the canteen area.

General Requirements and Rules:

A. Cost

1. Unit of cost is "***K***".
2. Each IPv4 address costs 2 K, IPv6 address costs 0.2 K.
3. Switch costs:
   a) 2950 – 40 K
   b) 2960 – 60 K
   c) 3560P – 100 K
4. Router costs:
   a) 1841 – 10 K
   b) 1941 – 15 K
   c) 2620/2621 – 20 K
   d) 2811/2901 – 25 K
   e) 2911 – 30 K
5. Wireless Access Points:
   a) Generic – 5 K
   b) Linksys – 20 K
6. Every FastEthernt port utilization on switch/router costs 5 K, every GigabtEthernet port utilization on switch/router costs 1 K.
7. Serial link cost – 0 K, Ethernet cost – 0.5 K
8. Installation of switch – 2 K, Installation of router – 3 K, Installation of WAP – 1 K

B. Routing

1. **EIGRP** has to be used to run the entire set up.
2. EIGRP tables (neighbour, topology and routing) are to be shown separately for each router in the end results.
3. Each router and switch has to be named appropriately according to the location of installation.
4. Each router and switch should be available on telnet with proper security measures.

5. All the routers and switches have to be configured centrally via the Library router and the configuration codes and commands for the same have to shown in the report submitted.
6. Access points can be configured locally.

C. Security

1. ACLs need to be implemented wherever required.
2. Each router and switches must be properly secured with login access to admin only. Admin will be operating from the library.
3. All the lines – consoles, telnet, SSH, etc are to properly secured so that they do not get hacked by the students.
4. WAPs can be access via the students only using proper passwords.

D. Switching

1. Each switch will represent a separate VLAN, i.e., student from 1st floor of a hostel will be in separate subnet compared to a student from 2nd floor. Also they will fall under separate VLANs.
2. Entire ECE Department will have 4 VLANs with Staff VLANs being secured from rest of the VLANs.
3. Each VLAN should be properly numbered and named to avoid any confusion.

E. IP Addressing

1. Minimum number of IP addresses has to be utilized.
2. All the IPs used should be closely packed. For example, if you have to use 100 IPs per network in 2 (two) VLANs, then 10.10.10.0/25 and 10.10.10.128/25 will be considered as using of 255 IP addresses; whereas 10.10.10.0/25 and 10.10.11.0/25 will be considered as using of 510 IP addresses.
3. IP addresses used in the entire infrastructure have to be properly documented in a table and have to be shown at the end of the commands used.
4. Proper documentation of all the devices, their names, IP addresses, Login usernames and passwords have to be formulated in a tabular format at the beginning of the commands.
5. A proper and neat Infrastructure diagram with proper detailing is to be shown at the beginning of the project.
6. A short description of every protocol used in the project has to be written at the beginning of the project.