CME 3204 - Data Communications and Computer Networks Project
Metropolitan Area Network Simulation

Computer Network planning and design is an iterative process, including topological design, network architectures, and network traffic characterization. Well-designed computer network architecture should support maximum number of network users, traffic load with minimum delay, and adequate hardware support for network expansions. However, the designer should keep the balance between the cost of network hardware and the system requirements.

In this project, a metropolitan area network (MAN) design and simulation using Packet Tracer is expected.

The network requirements and specifications are given below:

1. Metropolitan area network design includes two distinct branches office in a city, which are connected by routers (at least two routers for each branch) over an ISP (Internet Service Provider). You also should consider connection technologies between ISP and branches.
2. First branch's network is comprised of 3 distinct facilities and each facility has different units and requirements. All specification for the first branch office is as following:
    a. First facility has 5 workstation (PC) users, 5 wireless users (laptop) and 5 smartphone users. These users **browse web, send emails and transfer files** by using their devices.
    b. Second facility has 10 workstation users who **use Web and FTP**. 5 of workstations are used for **VoIP conference** events.
    c. Third facility has a server farm including **3 Web servers**, **2 FTP servers, 1 DHCP server, 1 mail server and 1 domain name server (DNS).**
3. Second branch includes 3 distinct facilities and each facility includes different units and requirements.
    a. First facility has 5 workstation users, 10 wireless users and 5 tablet users who connect to the **Internet** using **wireless connection**, **browse Web and use email** applications.
    b. Second facility has 10 workstation users and 5 smartphone users. They use **web browsing, editing applications and transfer files**.
    c. Third facility has 10 workstations and 5 mobile devices that are used to **browse Web, send and receive emails**.

Simulation Scenarios

Following activities should be simulated and analyzed within your model. You should test these scenarios and **explain them in detail in your report**.

1- A wireless user from first facility of second branch wants to read emails and browse Web.
2- A computer engineer from second facility of second branch developed a web application and wants to send her code files to FTP server in the third facility of first branch.
3- Two users from second facility of first branch want to talk via VoIP.
4- A user in the second facility of first branch wants to send an email message to his friend in the second facility of second branch.
5- A user from first facility of second branch pings Web server of second facility of first branch.
6- A laptop user from first facility of first branch office wants to send email to her friend in the first facility of second branch office.
7- A smartphone user from third facility of second branch office wants to use ssh to connect to a Web server in the third facility of first branch office.

You are expected to create **three more activities** to simulate and analyze your design. These activities should be different from those we specified.