Problem Statement

Organization Overview

Wonderville is a small town just outside New York City where can be reached by local commuter trains in about an hour. The town has a little less than 3000 residents, and the tranquility of a small-town atmosphere that has constantly attracted families moving here from the city or the surrounding area. Wonderville town hall has a small IT department of 3 staff who manage a network of computers supporting various software applications handling town businesses, ranging from parking permit applications, local crime cases, kids summer camp registration, recreational space management, budget management, staff management, and so on. Many documents and data for the town office are stored on a server resided in the town's internal network. Many town staff work remotely two days a week. To perform their duty, staff also use mobile devices to access services provided by the server.

An Internship Position

There are many organizations encountering cybersecurity breaches lately. The head of IT department, Linda Smith has recently learned in the news that hackers had been targeting at systems of municipalities to either gain information of their residents or to install ransomware. The town has a small IT budget and cannot afford to hire large consulting firms to help them diagnose their problems and harden their systems. Linda heard that you are a student of Cybersecurity major and would like to offer you an internship so that you may help them with system administration and security tasks needed for their computers and networks.

Town Systems and Networks

The town's internal network is behind a router which connects externally to the local Internet service provider through their fiber optics network. The router connects to the internal network where various servers locate. The router also serves both as a firewall and as a VPN server so that remote workers can connect to the internal network.

To access the town's network, please connect using a browser via **https://192.168.90.200:8006** using the credential that you have received in your email. You will need to connect to Pace University VPN first if you are outside Pace campus.

Since the network has two-factor authentication, you will need to login with the username/password in the email, and then use the Duo Mobile app on your phone to add a new credential and scan the QR code. This will provide you with a one-time password as the second factor to login. After logging into the network, you will need to start and login the individual hosts. The username and password for the hosts are below:

- Both Windows hosts: username is **Administrator** and the password is **Student1**.
- Linux host: the username is **student** and the password is **student.**

You will need to start the hosts when you use them the first time. To save computational resources, please shutdown the hosts when you do not need them.

Your Assignments

Linda has a list of tasks that she wishes your team can complete. Below is the list of tasks. For your individual assignment, you will have to complete both **the basic task** and **one of the advanced tasks**, choosing one from the five advanced tasks.

Basic Task

1. **Network topology figure**: Provide a figure of network topology. Please label all machines with its host name, the name of operating system, its corresponding IP address. Please also label the CIDR (i.g. 192.168.0.1/24) of each subnet on the figure.

Advanced Tasks

2. **Build a public key infrastructure**: Currently, there is no encryption of internal documents, even for documents being accessed externally. Linda hopes that the department can utilize existing Windows certificate functionality and security modules to encrypt internal documents for easy access. The documents should be easily decrypted even if they are moved from one host to another. She needs a solution to tell her how to implement this.