Mandatory assignment

Problem definition

A remote user (company employee) needs to access the organization's Private network securely. Security components include Confidentiality, Data integrity, Origin integrity (Authentication), Non-repudiation and Availability

Requirements

It is a startup company; naturally, it wants to spend as less money as possible. Therefore, they prefer open source software. Their requirements are as follows.

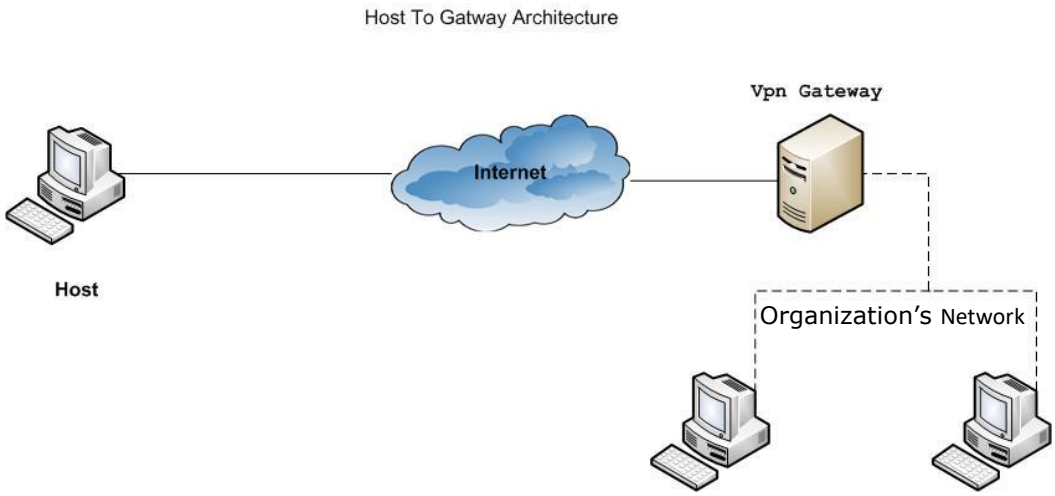
Architecture: Host to Gateway

OS (Gateway): Linux (Ubuntu or any other distros)

VPN server: OpenVPN

VPN client (on host): OpenVPN GUI for windows

Overview of the solution



Host = roadwarior/employee Outside the company's network

Practical Part

You can assist each other and even work in groups of 2-4 students during the practical/configuration part of the assignment, provided that the following requirements are met.

1. Each student must install and configure OpenVPN server in a virtual machine on his own laptop
2. Each student must install and configure OpenVPN client GUI on own laptop in host operating system i.e. windows
3. Each student must create a secure connection between roadwarior(host) and the OpenVPN server

To prove 1-3 the following steps are required

4. Document the configuration steps of the server and some screen dumps to prove that it is on your laptop
5. Copy of the server log file that shows: a successful handshake, chosen encryption algorithms, client request, client IP assignment etc.
6. Copy of the OpenVPN client's configuration file e.g client1.ovpn
7. A screen dump of a connected client running in windows on your own laptop
8. A screen dump of client accessing a resource on organizations network e.g. a web-server (optional)

Installation and Configuration

As we do not have a real scenario of a roadwarior(employee) and a real organization with a LAN and a registered domain, therefore you could use virtual machines (VMware or VirtualBox) to create the platform for implementing and testing OpenVPN.

How to test

You can use a switch or your Mobile Phone as access-point and connect 2 laptops to it where one of the laptops runs OpenVPN server in Ubuntu in a VirtualBox [Gateway]. The 2nd laptop will play the role of an employee who is outside the Company's LAN/network. This laptop will be running the OpenVpn Client software. This employee will use the VPN to securely connect to the LAN.

(to start with, you can install the client software on your own laptop in windows 10 and try to connect to the OpenVPN server running on Ubuntu in VirtualBox)

NOTE: *To document your implementation and Configuration take notes and screen dumps of the important steps*

Theoretical Part

You are not allowed to assist each other in answering the following questions. Wiseflow automatically detects plagiarism. Plagiarism is not tolerated.

Hand in

The theoretical part as a pdf file and the practical part as a .zip file must be uploaded to Wiseflow no later than 20th of November before 12:00. You will receive an email from wiseflow with the Hand-in date.

Theoretical part's Questions and Topics

Q1. Give a Short description of OpenVpn

Q2. How one can acquire a certificate?

Q3. What a certificate is used for?

Q4. Explain the role of Certificate Authority

Q5. Describe different attributes of x.509 certificate

Q6 Explain the following topics

1. OpenVPN Static Key mode
2. OpenVPN TLS mode
3. Recent Attacks on SSL/TLS
   Find information about recent attacks on SSL/TLS and describe it in your own words.
4. Confidentiality
5. Data Integrity
6. Authentication
7. Non-repudiation
8. Availability

TLS handshake

In order to establish a secure session, the TLS handshake protocol manages Cipher suite negotiation, authentication of server and optionally the client and session key information exchange.

Q8. Explain each step of the handshake (in the diagram) in detail