Name: _____   **Project: – (250 Points)**

The Project:

> This is an extremely detail oriented project! Please spend the time necessary to thoroughly complete this assignment since it will be most beneficial to you in the long run!
>
> First, you should read this entire document before you begin!

Network Design:

- Design your network topology using Cisco Packet Tracer. Your design should consist of Cisco Routers, Cisco Switches, Servers, and PCs.
- Your design criteria is as follows:
    - You should have two headquarters routers connected with redundancy to at least two multi-layer switches. The multi-layer switches should connect to at least four layer two switches with redundancy and fault tolerance in mind. At least two servers should exist within your headquarters location. One must be a TFTP server. The other service that exists on the server is up to you. In addition to the two internal servers, one HTTP server should exist within a DMZ for secure external access to web content.
    - You should have at least five remote sites, each having at least one layer two switch. At least one of these remote sites should have at least two switches connected together using port aggregation.
    - You should have one internet connection from the headquarters location out to your primary ISP. On the ISP, there should be at least two servers (ie: at least a DNS server and an HTTP server). The hosts will be great validation points in testing internet connectivity.
    - You should have at least 10 users per remote site and one remote site should have at least 255 users. You should show at least five hosts per location as a proof of concept within your design and within your implementation.
    - You should have at least 1025 users at the headquarters site. Again, you only need to show a subset of those users at key locations within the headquarters site (ie: 10 will be a good number of testing points).
- Design the IPv4 Addressing scheme for your network. Keep in mind you should be using RFC1918 Addressing internally and public ip addressing externally. Please keep in mind you should solve this with IP Address efficiency in mind (ie: make sure you use VLSM).
- Design the IPv6 Addressing scheme for your network. There are no limitations on addressing your network with IPv6; however I would use the method you learned in class so it's an easy transition.
- Once your design is complete, you should move on to the next step of implementing and configuring your network.

Network Implementation/Configuration:

- Using your network topology you developed earlier, you will be generating a "proof of concept" network. Please keep in mind, you must define the rules for access (ie: if you are using an ACL to block traffic to a host, make sure you specify what hosts are able to communicate to the secure host and provide proof that this does indeed do what it should).
- You must use at least ten of the following technologies or protocols within your design and implementation:
  - Static NAT
  - Dynamic NAT/PAT
  - DHCP
  - An IPv4 Internal Routing Protocol (OSPF, EIGRP, or RIPv2) – *please note: there are reasons to use or not use each of these.*
  - An External Routing Protocol (BGP)
  - An IPv6 Internal Routing Protocol (OSPFv3, EIGRP for IPv6, or RIPng) – *you do not need to run IPv6 on your ISP nor do you need to use default route injection.*
  - Route Summarization
  - First Hop Redundancy Protocol (ie: HSRP)
  - Link Aggregation (ie: EtherChannel)
  - VTP
  - VLANs
  - Named Extended ACLs (for limiting traffic to specific protocols)
  - PPP CHAP
  - Wireless
  - InterVLAN Routing (Router-on-a-stick or SVIs)
  - Default Static Routing with route injection
  - Routing Protocol Redistribution
  - Some other technology or protocol that you wish to include

Network Documentation:

- Write a detailed document on the technologies and protocols you chose to implement within your design. For each technology or protocol, make sure you specify:
  - How the technology or protocol works in your own words.
  - Any resources you utilized to write this paragraph should be cited at the end of the paragraph *(not at the end of the document)*.
  - After each technology or protocol you write about, you should include a screenshot of the technology or protocol in use and functioning properly. You are only permitted to include one screenshot, so make sure it is validating whatever technology or protocol you implemented. *You may NOT use a "show running-config" here.*

Submission:

- When you have completed the project, you should **print** your network documentation and submit this in class.
- In addition to submitting a hard copy in class, you should upload your .pkt file and your .docx file to the appropriate project assignment in iLearn. Please know that you will submit your .pkt to one assignment in iLearn and your .docx to another assignment. *Your submission will be processed through a plagiarism tool, so make sure you are completing this individually and your work is your own.*

*Please keep in mind… <u>No assumptions are made!</u> Some of the items have multiple steps so be sure to include **all** the steps in the configuration to receive full credit for that particular topic. There are also topics that you must inherently include due to the design specifications. These may or may not be listed within the ten technologies above.*

Good Luck on your project! May the force be with you!