DATA NETWORKING_TELE_5330 CISCO PACKET TRACER

Due Date 7 March 2020

Max Marks: 150 + 15(Bonus)

Project

Design a network for a corporate organization using cisco packet tracer.

Description

Design and implement a multi-location, inter-networking strategy for a small and stable organization. This organization currently has 5 locations. Corporate headquarters is located in Boston and Mumbai. The company is placed at 3 other locations, which are New York, London and Beijing. Design your network considering following constraints.

- Every office should have the 250 employees with 85% of redundancy (For IP addresses).
- You are provided 192.168.xx.0/19 (xx = put last two digits of the NUID) network for your entire organization.
- Use Subnetting to provide network within the above given range.
- Boston and Mumbai offices have Finance, HR and Technical departments.
- Other locations have HR and Technical departments.
- All the IP addresses inside departments should be assigned by DHCP server.
- The DHCP server for the Boston and Mumbai is present in the Boston's Technical department and for other 3 locations DHCP server is present in Mumbai's technical department.
- Finance departments shouldn't be accessed by any other departments, but Finance can access any other department.
- Two Finance departments can access each other.
- All other departments should be able to access each other
- Show the following no. of terminals as given below for each department in each city

Finance Department	HR Department	Technical Department
2	2	2

Project Design

- High level diagram consisting of basic network infrastructure
- Mention routers, switches, access points, servers and workstations

- Finding out the cost of network equipment along with the Model No. and count of devices
- Consider geographical locations while designing your network.
- Use OSPF as the routing protocol. There are 5 offices, implement the area concept of OSPF and configure every office in separate area for example: Boston-Area 1, Mumbai- Area2, Beijing- Area3, London-Area 4 and New York-Area5 and Backbone network as area 0.
- Set the router ID manually in each OSPF routers.
- Implement HSRP for Boston and Mumbai office. Change the Hello timer to 2s, hold timer to 6s.
- Implement VLAN's for each department. Set only the VLANs used in the Networks as the VLANs allowed on trunk.
- Change the Native VLAN on the Trunk to the one used for HR department.
- Implement Rapid STP and switch redundancy for London and New York office.
- Enable Port fast and BPDU guard on all the ports that are connected to the host machine.
- Implement Frame Relay to improve the data rate.
- Defend MAC flooding attack in the HQ locations
- Area Border Router (ABR) in Boston can access all other locations ABR but not reverse. A technical department from Boston alone has an access to ABR of Boston [Hint: build a hardware connection]

Network Optimization

- Assign yourself a realistic budget and try to optimize your network according to your costing
- Detailed Network Architecture along with all devices
- Individual office network architecture with IP addressing
- Routing & Switching protocols implemented in each office and across the organization
- Security & Redundancy plan

Add-ons (optional – 15 Marks)

- Implement a multi-layer switch in the Beijing location, this multilayer switch should carry inter-VLAN routing.
- Configure EtherChannel with LACP as the protocol on NY.

Guide for Report

You may want to mention following topics on your report, it's only an example, you can also mention something else that you think it's important.

1. PROJECT DESIGN

• High Level Diagram
• Cost of Network Equipment.

2. NETWORK OPTIMIZATION

- Cost Optimization of Network
- Detailed Network Architecture
- Individual Office Network (Headquarter)
- Assignment of IP address

3. Takeaway Questions

- Routing Protocol OSPF: Explain the following
    - Which one is better Routing protocol RIPv2 or OSPF? Why? Explain why do we use the area concept in OSPF?
    - Why do we configure backbone network as area 0?
    - List and explain the different types of LSA in OSPF

- Security and Redundancy plan
- How does STP avoid looping? Explain its working in detail
- Difference between STP, PVSTP and MSTP.

4. TEST PLAN FOR THE NETWORK (*Important,10%Marks)

Write down the detailed steps for testing the functions below. Screenshot of your test results are required.

- Test VLAN
- Test routing protocol
- Test security plan
- Test redundancy plan
- Test add-ons
- Others (Optional)

5. CONCEPTS LEARNED DURING THE PROJECT

6. CONCLUSION

NOTE

This is an individual project. Mail a zip file containing your project report and .pkt file to **all Tas** and submit also submit report on Blackboard.