UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY

INFR 2431U: Advanced Networking III – Final Project

Due Date: Nov 23rd, 2018, (11:59 PM) via Blackboard

Scenario

The International Travel Agency (ITA) is a multinational corporation that provides packaged travel services for small to medium enterprises (SMEs) around the world. Boasting thousands of customers and hundreds of employees, the ITA is using your company's previously deployed network topology to deliver critical services required daily by their employees and customers. Currently their primary data center is connected to multiple regional offices in order to centralize their IT resources.

Part 1

The ITA has contracted your team to design and prototype a new network for them. Currently, they are working on producing a detailed list of technical requirements the new network must adhere to. Your task is to design and build their new network prototype, and to provide full and complete network documentation for the newly proposed network solution.

Part 2

Over the next year, the ITA has deployed the prototype network, which is now being used as their current, live network. Recently, one of the main network engineers working at the International Travel Agency was fired. On his way out, he caused multiple unknown errors in the ITA network and changed his password to something no one else at the ITA knows. This has resulted in unacceptable amounts of downtime, which is critical in a highly competitive industry. The ITA has been trying to fix these issues, but needs your help. The ITA has tasked your team with troubleshooting any network-related issues occurring between their core network and Travel Data Provider (TDP) endpoints. Using your expert knowledge, your team should identify and fix any issues arising on their network to ensure all SLAs are met.

Requirements

Part 1 – due no later than November 2nd, 2018 by 11:59pm

1) Prototype a new network design for the ITA based on the following requirements:
    1. Must contain a total of **at least** 5 routers and 3 switches
    2. Must fully support both IPv4 and IPv6 hosts
    3. Must use at least two interior gateway protocols with mutual redistribution
    4. Must use BGP to route between the edge of your network and the provider edge (one of your routers)
    5. Must contain three hosts in three different subnets on three different devices
    6. EtherChannel should be configured where appropriate to increase throughput
    7. Spanning Tree must be configured on the switches
        i. The same mode on all switches
        ii. Distribution layer switches should be elected as the root bridge

   iii. Client-facing ports should have PortFast and BPDUGuard enabled
8. All hosts should be able to ping the Internet (simulated by a Loopback interface on provider edge router) using both IPv4 and IPv6.
9. Network must contain the following features:
   i. DHCP pools for different subnets
   ii. NAT on the customer edge router
   iii. ACLs

2) Fully document the prototype ITA network. Must submit the network and all documentation to the CIO no later than Friday, November 2nd, 2018 at 11:59pm.

   Documentation must contain the following:
   1. Physical network diagram
   2. Logical IPv4/IPv6 diagrams
   3. Full and complete IP addressing table
   4. VLAN assignment table
   5. Layer 2 redundancy diagrams / tables
   6. Routing protocols implemented and where (diagram/table)
   7. Application layer protocols implemented and where
   8. Security measures implemented

Part 2 – due no later than Friday, November 23rd, 2018 at 11:59pm

3) Troubleshoot and document all network issues found in the ITAs network. Network must be fully operational and all issues documented and submitted to the CIO no later than November 23rd, 2018 at 11:59pm.

   Each network issue found must contain the following:
   a. The actual issue and what the problematic network device is.
   b. Troubleshooting approach used to find the issue.
   c. Steps taken to find the issue (must follow selected troubleshooting approach).
   d. Commands entered to correct the issue.
   e. Verification that the issue has been resolved.