**Case Study 2 – Redundancy and Security in a Switched Network -**

This covers the competencies 1.1-1.4, 2.1-2.2,2.4-2.5 of ICTNWK 604 and 1.1-1.5, 3.1-3.5, 4.1-4.5 5.1-5.3 of ICTPMG608. This carries 40% of the marks for ICTPMG608 and 10% for ICTPMG604.

Part of the case study will be done individually. The other part will be done as a group. The report is to be submitted individually



**Scenario**

 Your team has been assigned the task of designing the International Logistics Company switched network as shown in the diagram. The steps are described below.

1. Prepare for system implementation.

This will involve coming up a tentative design based on a design brief given to you. This can be done on a design software such as a packet tracer.

Identify implementation options and constraints and select a preferred options and constraints and select a preferred approach in consultation with the clients

Create the system user documentation and get it approved.

1. Manage acceptance testing and collate all the results
2. Manage user training

Undertake training needs analysis

1. Release new system

Create a rollback strategy and plan to guide rollback if changes are needed.

**Required Resources**

• 2 switches (Cisco 2960 with the Cisco IOS Release 12.2(46)SE C2960-LANBASEK9-M image or comparable)

• 2 switches (Cisco 3560 with the Cisco IOS Release 12.2(46)SE C3560-ADVIPSERVICESK9-mz image or comparable)

• Ethernet and console cables

**Requirements**

1. **Prepare for system implementation**

You will configure a group of switches and a router for the International Logistic Company. The network includes two distribution switches, DLS1 and DLS2, and two access layer switches, ALS1 and ALS2 You can subnet it any way you want, although it is recommended to use /24 subnets for simplicity.

**Part 1: Configure the network per specifications.**

**Use addresses as given below**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| VLAN No | Network | SVI | HSRP Virtual address | Host address |
| 10 | 192.168.10.0/24 | 192.168.10.10 (DLS1)192.168.10.20 (DLS2) | 192.168.10.1 | 192.168.10.100(ALS1) |
| 20 | 192.168.20.0/24 | 192.168.20.10 (DLS1)192.168.20.20 (DLS2) | 192.168.20.1 |  |
| 30 | 192.168.30.0/24 | 192.168.30.10 (DLS1)192.168.30.20(DLS2) | 192.168.30.1 | 192.168.30.100 (ALS2) |
| 49 | 192.168.49.0/24 | 192.168.49.10 (DLS1)192.168.49.20 (DLS2)192.168.49.30(ALS1)192.168.49.40(ALS2) | 192.168.49.1 |  |

Steps

1. Disable the links between ALS1 and ALS2.
2. Configure the Fa0/11 link between DLS1 and DLS2 as a Layer 3 link and assign a network to it.
3. Configure the Fa0/12 link between DLS1 and DLS2 as an 802.1q trunk, and statically set all other inter-switch links as 802.1q trunks.
4. Bind the links between DLS1 and ALS1 in an Ether Channel and configure the two switches to actively negotiate LACP link. **option 1**

Bind the links between DLS2 and ALS2 in an Ether Channel and configure the two switches to actively negotiate PAGP link. **Option 2**

1. Place all switches in the VTP domain CISCO with DLS1 as the VTP server using VTP version 2. Configure all other switches as VTP clients.
2. On DLS1, create VLAN 10 named STAFF, VLAN 20 named VOICE, VLAN 30 named STUDENT and VLAN 49 named MGMENT. Choose a 192.168.X.0/24 network as shown in the chart for each VLAN for use in subsequent steps.
3. Ensure that the VLAN 1 interface on all switches is not used for administrative management or user traffic.
4. Configure the Rapid PVST (PVRST+) protocol on all switches. **Option 1**. Configure PVST+ **Option 2**

Ensure that DLS1 becomes the spanning tree root of VLANs 10 and 20 and DLS2 becomes the backup. Ensure that DLS2 becomes the spanning tree root of VLANs 30 and 49 and DLS1 becomes the backup. **option 1**

Ensure that DLS2 becomes the spanning tree root of VLANs 10 and 20 and DLS2 becomes the backup. Ensure that DLS1 becomes the spanning tree root of VLANs 30 and 49 and DLS2 becomes the backup. **option 2**

1. On DLS1 and DLS2 configure SVIs and HSRP to provide gateway redundancy for access layer clients in VLANs 10, 20, 30 and 49. Create an SVI in VLANs 10, 20, 30 and 49, each with an IP address and mask from their respective networks chosen in the table.
2. Configure DLS1 as the active HSRP router for VLANs 10 and 20 and configure DLS2 as backup. Configure DLS2 as the active router for VLANs 30 and 49 and configure DLS1 as backup: .**option 1**

Configure DLS2 as the active HSRP router for VLANs 10 and 20 and configure DLS1 as backup. Configure DLS1 as the active router for VLANs 30 and 49 and configure DLS1 as backup: .**option 2**

1. On ALS1 and ALS2 create an SVI for MGMENT VLAN 49 with an IP address from the VLAN 49 network assigned in in the table.
2. For ALS1 and ALS2, specify the HSRP gateway address of VLAN 49 as the default gateway.
3. Enable PortFast on all access layer switch ports.
4. Permit the links between DLS2 and ALS2 to carry traffic only for the VLANs created in Step 6
5. Enable QoS globally on all switches.
6. On ALS1 configure Fa0/6 as an access port in STAFF VLAN 10 and to trust Cisco IP phones CoS using AutoQoS. Use VOICE VLAN 20 as the voice VLAN.
7. On ALS1, configure port Fa0/6 with port security. Allow up to two MAC addresses to be learned for IP phone support. Enable sticky learning. Shut down the port if a violation occurs.
8. On ALS2 configure port Fa0/6 as an access port in STUDENT VLAN 30.
9. Configure IP routing on DLS1 and DLS2, and use EIGRP to advertise 192.168.0.0/16 with automatic summarization disabled.
10. Configure client PC-A with an IP address in the VLAN 10 network and specify the VLAN 10 HSRP virtual address as the default gateway. Configure server PC-B with an IP address in VLAN 30 and specify the VLAN 30 HSRP virtual address as the default gateway.
11. Check whether you can ping from one PC to another.
12. Create a tcl script to check connectivity from DLS1 and DLS2 to all the active interfaces,

These two designs can be done on packet tracer and submitted to the client for approval.

The outputs needed for the initial design testing

1. Show VLANs are propagated to client switches
2. Show primary and secondary roots
3. Show ether channel is set up correctly
4. Show the proper working of HSRP.
5. Show port security is set up correctly.
6. Show that qos and auto qos in items 15 and 16 is set up correctly.
7. Show connectivity between hosts using tcl script.

Indicate which part of this design you could not do on the design software

1. **Approval of the design**

You have a discussion with the clients who will check your initial design

Modification of the design will be specified during the discussion.

1. **Setting up the new design on real equipment.**

You will set up the equipment with the modified design and conduct acceptance testing.

1. **Acceptance testing**

The following information is needed in the acceptance testing along with explanation.

1. Brief design scheme showing client requirements including subnetting information.
2. VTP scheme adopted. Tests to show VLANs have propagated to all switches.
3. Output to show the primary and secondary root of each VLAN
4. Proper setup of trunking.
5. Ether channels are correctly set up with the appropriate protocol
6. HSRP is setup correctly.
7. Port security is correctly set up
8. Qos on switches and auto qos on port are set up correctly.
9. Create a Tcl script and test connectivity from each distribution layer switch to the addresses you assigned in the topology.

**Deliverables. ( 40 marks)**

1. Short summary of the of the implementation plan including initial design, testing and approval. (The initial design on packet tracer and the test results to be submitted) (6 marks)
2. Summary of changes suggested in the discussion with the client. (6 marks)
3. Describe the coordination of the release of the system with the new design. You may also comment on the IOS needed to implement these changes. (4 marks)
4. Tests conducted on real equipment with the new design and their results. Comment on these results. (8 marks)
5. Release of the new system and any rollback you might suggest. ( 4 marks)
6. Undertake training needs analysis for the client to maintain the system. You may list the skills needed to maintain the system. ( 4 marks)
7. Documentation to be given to the client on the new system. This will have the new design and its details.( 8 marks)