Experience 2 – VTP, STP and Inter-VLAN Routing

Your department has received two more switches to ensure more redundancy in your network, a router to allow connectivity between the VLANs and two servers; the new topology should be the following one.
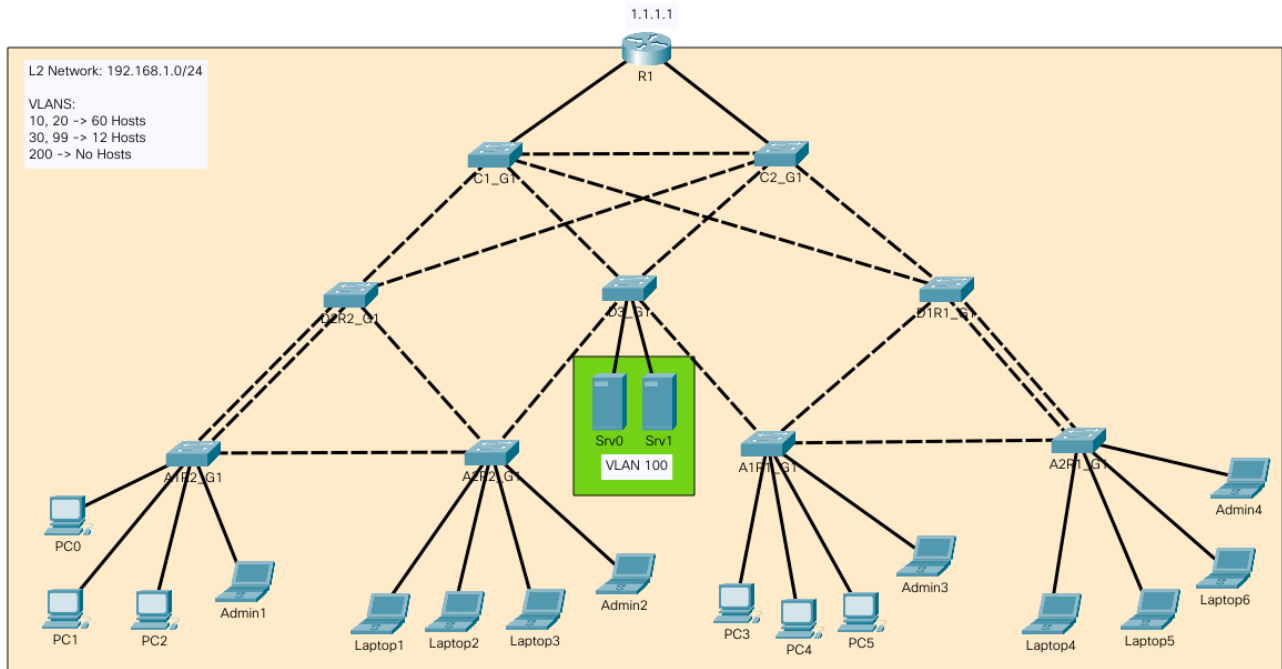

Figure 1: Topology Experience2

You have to add the two switches, named D3_G1 and C2_G1 in the topology. Before proceeding rename S_Core1 in C1_G1.

The connection and the configuration of the two servers to C2_G1 is explained in the Part1. Also add the router R1 (you can use a cisco model 2911); the configuration of this router is to be performed in the part 3 of the experience.

Add the new links in the pictures to guarantees redundancy in the topology. To maintain a balanced topology use the Gbit link only between C1_G1 and C2_G1, between them and R1 and from D3_G1 to the Servers.

Create a new **topology map** that updates the one of the Experience 1, to reflect the new topology.

Part 1 - VTP

Begin configuring the new switches in the same VLANs of the others (don't configure the VLAN 100 by now); practice with the VTP protocol to automatically syncronize the VLANs:

- configure D2R2_G1 and D1R1_G1 as VTP Servers (set lab.exp2 as domain name) and the others as Client,

- ensure that the Revision Number on the to be added switches is lesser than the Server,

- complete the configuration of the new switches to have the VLAN database syncronized with VTP.

Verify the connectivity, report also the tests performed to assess the correctness of the configurations and create a summary table for the VTP configurations to complement the informations in the topology map (also a single table can be acceptable if all the information fits in it). Verify also that the VLAN database is the same on all the switches.

Now it's time to add the servers:

- Add them to the topology (Srv0 and Srv1), add to them a Gigabit Ethernet interface, and finally connect them to the D3_G1 switch using the Gigabit links.

- The new servers should belong to the new VLAN 100; use for them a subnet of the 192.168.1.0/24 that can serve up to 6 hosts and assign to the servers the first two addresses.

- The VLAN 100 should appear only on D3_G1, C1_G1 and C2_G1. Mantain the VTP enabled in the network and use the correct mode that allows you to reach this goal.

Verify the connectivity between the servers, and provide an updated summary table for the VTP configurations. Verify that the VLAN 100 exists only on D3_G1, C1_G1 and C2_G1. Report the tests performed.

Finally, describe the procedure that should be needed to add a new defined VLAN that should be used everywhere in the newtork (e.g., VLAN 50). For this test add one host to A1R2_G1 and one to A2R1_G1, configure them in a 6 hosts subnet of the 192.168.1.0/24 and verify the connectivity. Provide also details on how to remove the newly added VLAN 50 from the topology. Report the test performed.

Part 2 - STP

The new topology ensure redundancy for all the switches, giving to each of them a link with at least two other devices.

- Examine how the STP is working. Who is the root bridge? Which ports are blocked? Is the network performing load balancing between the VLANs?.

- Change the configuration in order to have C1_G1 as root bridge for VLAN 10 and 30 and backup for VLAN 20 and 99; viceversa, C2_G2 should be root for the latters and backup for the formers. For the VLAN 100 the root should be D3_G1.

- Try to guess the port roles for the 5 VLANs and than check if the network is acting as you have planned. How the STP break the tie on the links between A1R2_G1 and D2R2_G1 (and between A2R1_G1 and D1R1_G1)?

- Experience yourself with the convergence time of the topology when a new link is activated or shutted down? The change is only local or the whole topology is affected? What happens if C1_G1 is powered off?

- What happens if you connect an host to a previously unused VLAN port? The STP is recomputed for all the VLANs? How much time it will take to move the network in a forwarding state (you can use the ping to check the downtime)?

- Configure *PortFast* and *BPDU Guard* where needed and practice with them.

Produce **a documentation for the the port roles** (for every VLAN) in the topology using the approach shown during the lessons. Report also the tests performed to assess the correctness of the configurations.

Part 3 - Inter-VLAN Routing

- Perform the basic configuration on R1 and enable only the SSH protocol for the remote access.

- Use R1 to route between VLANs with the router-on-stick configuration. Use the last address of the subnet for the router interface (this is a best practice to easily find out who is the default gateway).

- Route the VLAN 10, 30 on the interface connected to C1_G1 and the VLAN 20, 99 and 100 on the one connected to C2_G1.

- Create also a *Loopback0* interface on R1 with the address 1.1.1.1/32.

Verify the connectivity between the VLANs and the reachability of the 1.1.1.1 IP address of R1.

Experience 2 – ERRATA CORRIGE

This document is an integration to the Experience 2 that affects only the a specific requirement of the part 1 reported below. The other requests in that part and in the other remain the same.

Part 1 - VTP

On the time to add the VLAN 100, you may face a Packet Tracer bug trying to mix VTP Transparent Mode with Client and Server; the bug may lead to an high delay and packet loss in your network, to a loss of responsiveness of the graphical interface and to a mulfunction on the fast-forward time.

In a such case:

- report the implemented solution and the experienced behaviour,

- use only VTP Client and Server and

- even if now the VLAN 100 appears on every switch, configure the network to forward its packets only on the links connecting D3_G1, C1_G1 and C2_G1.