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# Lab 7.3.5 Testing a Prototype Network



Straight-through cable

Serial cable

Console (Rollover)

Crossover cable
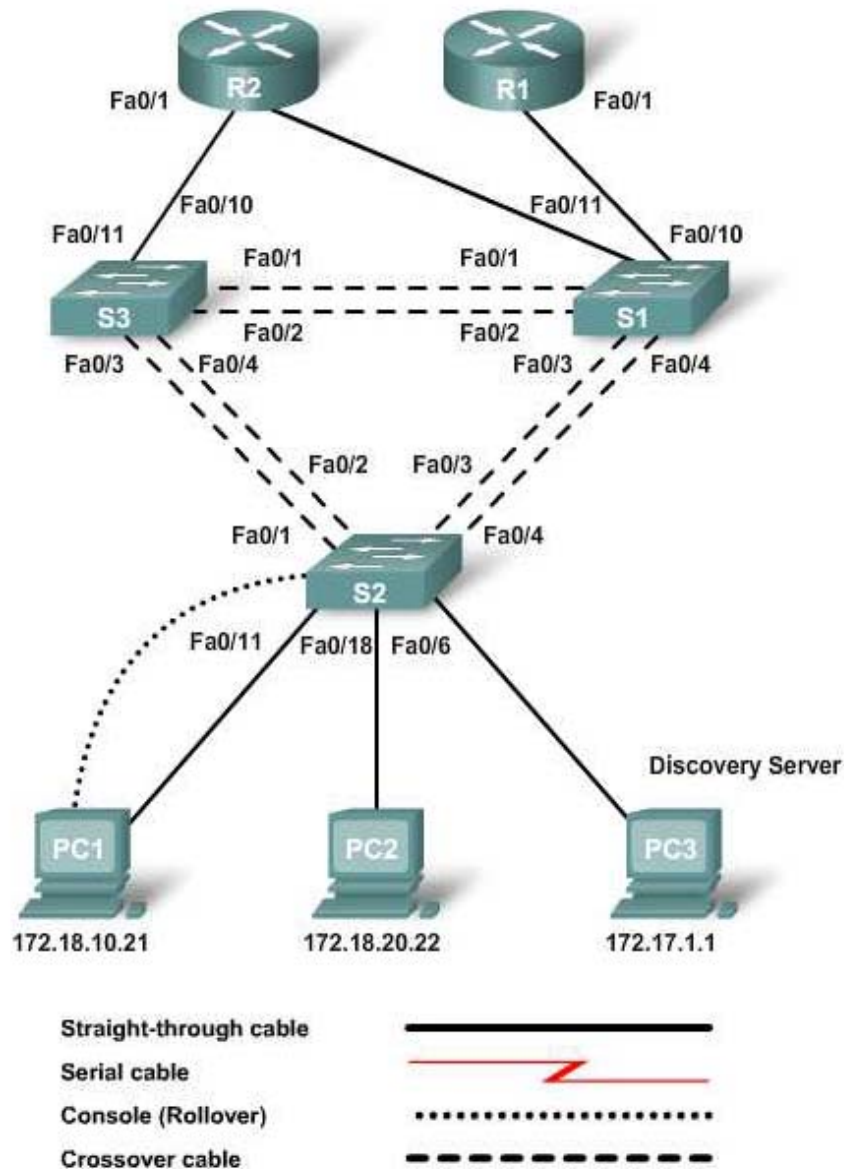
## IP Address Plan

| Device Designation | Interface | IP Address | Default Gateway |
|---|---|---|---|
| S1 | VLAN1 | 172.18.1.11/24 | 172.18.1.1 |
| S2 | VLAN1 | 172.18.1.12/24 | 172.18.1.1 |
| S3 | VLAN1 | 172.18.1.13/24 | 172.18.1.1 |
| R1 – Simulated Internet Router | Fa0/0 | 209.165.200.15/30 | To the Internet |
| | Fa0/1 | 172.18.4.1/28 | |
| R2 – Simulated Branch Router | Fa0/0 | 172.18.4.2/28 | Default Route: |
| | Fa0/1.1 | 172.18.1.1/24 | 172.18.4.1 to the |

| Device Designation | Interface | IP Address | Default Gateway |
|---|---|---|---|
| | Fa0/1.10<br>Fa0/1.20<br>Fa0/1.30 | 172.18.10.1/27<br>172.18.20.1/27<br>172.17.0.1/16 | Internet connection. |
| PC1 – Simulated Database Server | Fast Ethernet | 172.18.10.21/27 | 172.18.10.1 |
| PC2 – Simulated File Server | Fast Ethernet | 172.18.20.22/27 | 172.18.20.1 |
| PC3 – Discovery Server | Fast Ethernet | 172.17.1.1/16 | |

**VLAN Plan:**

| VLAN Name | Switches to Configure | IDs | IP Address Range | Group |
|---|---|---|---|---|
| Management | All | 1 | 172.18.1.0/24 | IT Managers |
| Backbone | S1 | 4 | 172.18.4.0/30 | Routers |
| Database | All | 10 | 172.18.10.0/27 | Private Servers |
| FileServers | All | 20 | 172.18.20.0/27 | Internal-only Servers |
| WebServers | All | 30 | 172.17.0.0/16 | Web-accessible Servers |
| Default VLAN | All | 99 | none | Default VLAN for unassigned ports and trunk links |

## Objectives

- Connect and configure the devices for the prototype FilmCompany server farm.
- Verify successful implementation of RSTP, VLAN trunking, and VTP.
- Configure routing between VLANs.
- Create and apply appropriate ACLs to filter undesirable traffic.
- Evaluate network performance based on previously determined checklist criteria.

## 640-802 CCNA Exam Objectives

This lab contains skills that relate to the following CCNA exam objectives:

- Interpret network diagrams.
- Determine the path between two hosts across a network.
- Select the components required to meet a network specification.
- Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts.
- Perform and verify initial switch configuration tasks, including remote access management.
- Verify network status and switch operation using basic utilities (including: ping, traceroute, telnet, SSH, arp, ipconfig), and `show` and `debug` commands.
- Describe enhanced switching technologies (including: VTP, RSTP, VLAN, PVSTP, 802.1q).

- Describe how VLANs create logically separate networks and the need for routing between them.

- Configure, verify, and troubleshoot VLANs.

- Configure, verify, and troubleshoot trunking on Cisco switches.

- Configure, verify, and troubleshoot inter-VLAN routing.

- Select the appropriate media, cables, ports, and connectors to connect routers to other network devices and hosts.

- Access and use the router to set basic parameters, including CLI/SDM.

- Connect, configure, and verify operation status of a device interface.

- Verify device configuration and network connectivity using ping, traceroute, Telnet, SSH or other utilities.

## Expected Results and Success Criteria

Before starting this lab, read through the tasks that you are expected to perform. What do you expect the result of performing these tasks will be?

_____

_____

_____

Why is connectivity testing performed prior to configuring and applying ACLs, as well as after?

_____

_____

_____

## Background / Preparation

In this lab, you will construct the FilmCompany server farm prototype network and perform the tests described in the Server Farm Test Plan. You will analyze the network performance after applying all the configurations, and will complete the results and conclusions sections of the Test Plan.

## Task 1: Assemble and connect component devices

### Step 1: Review the Topology Diagram and the Equipment section of the test plan

a. Determine which equipment or suitable substitutes will be required to meet the objectives of the lab.

b. Modify the topology diagram as necessary to fit available equipment.

### Step 2: Review the Installation Checklist provided in lab 7.3.2.

Accommodate any equipment limitations with the use of loopback addresses.

## Task 2: Perform Test 1: Basic Connectivity Test

### Step 1: Using the Installation Checklist, perform the steps to connect and configure the prototype network to perform Test 1.

| Installation Steps | Completed |
|---|---|
| **Test 1 Requirements:** | |

| | |
|---|---|
| Step 1: Perform basic switch configuration on each of the three switches. Include hostname, passwords, and VLAN1 IP address. | |
| Step 2: Connect the cables between switches as shown in the topology diagram. | |
| Step 3: Configure VLAN 4 on switch S1. Configure ports Fa0/10 and Fa0/11 for VLAN 4. | |
| Step 4: Perform basic router configuration on each of the two routers. Include hostnames, passwords, and the backbone link (the 172.18.4.0 network). | |
| Step 5: Connect the cables between the two routers and switch S1 as shown in the topology diagram. | |
| Step 6: Perform Test 1 according to the Server Farm Design Test Plan | |

**Step 2: Perform the Test 1 procedures according to the Server Farm Design Test Plan and record the results in the Results and Conclusions section.**

Determine if the test was successful. If not, discuss your results with your instructor and the other students in your class. Perform the test again if necessary.

## Task 3: Perform Test 2: VLAN Configuration Test

**Step 1: Using the Installation Checklist, perform the steps to connect and configure the prototype network to perform Test 2.**

| Test 2 Requirements: | |
|---|---|
| Step 1: Create and name VLANs on each switch per the VLAN plan. | |
| Step 3: Assign switch ports to VLANs as shown on the topology diagram. Place the rest of the ports in the default VLAN, VLAN 99. | |
| Step 4: Configure VTP domain. Set switch S1 as the server and the other two switches as clients. Use **Test** as the domain name and **cisco** as the domain password. | |
| Step 5: Create trunk ports on the inter-switch links. On switch S1, exclude VLAN 4 from the trunk links. Use the `switchport trunk allowed vlan remove 4` command in interface configuration mode. | |
| Step 6: Configure Rapid STP protocol. | |
| Step 7: Set switch S1 as the root bridge. | |
| Step 8: Perform Test 2 according to the Server Farm Design Test Plan | |

**Step 2: Perform the Test 2 procedures according to the Server Farm Design Test Plan and record the results in the Results and Conclusions section.**

Determine if the test was successful.  If not, discuss your results with your instructor and the other students in your class.  Perform the test again if necessary.

## Task 4: Perform Test 3: VLAN Routing Test

**Step 1: Using the Installation Checklist, perform the steps to connect and configure the prototype network to perform Test 3.**

| Test 3 Requirements: | |
|---|---|
| Step 1:  Connect the cable between switch S3 and Router R2 as shown in the topology diagram. | |
| Step 1:  Create a trunk port on switch S3 to connect to Router R2 as shown in the topology diagram. | |
| Step 2:  Create subinterface configuration on Router R2 Fa0/1 for each of the VLANs on the trunk link using the 802.1q encapsulation.  Do not put an IP address on the subinterface for VLAN 99. | |
| Step 3:  Perform Test 3 according to the Server Farm Design Test Plan | |

**Step 2: Perform the Test 3 procedures according to the Server Farm Design Test Plan and record the results in the Results and Conclusions section.**

Determine if the test was successful.  If not, discuss your results with your instructor and the other students in your class.  Perform the test again if necessary.

## Task 5: Perform Test 4: ACL Filtering Test

### Step 1: Review security goals for the FilmCompany network

Examine the test plan, checklist, and other documentation to determine how ACLs can support the security goals.

### Step 2: Examine results of connectivity tests to determine targets for the ACLs

Decide which devices should be permitted, which protocols should be used, and where ACLs should be placed.

### Step 3: Create ACLs

Complete this chart to record the structure and syntax of the proposed ACLs:

| Firewall Rule | ACL Statements |
|---|---|
| | |
| | |

| Firewall Rule | ACL Statements |
|---------------|----------------|
|               |                |
|               |                |

**Step 4: Using the Installation Checklist, perform the steps to connect and configure the prototype network to perform Test 4.**

| Test 4 Requirements: | |
|----------------------|---|
| Step 1:  On router R2, configure ACLs to limit or permit access for testing. | |
| Step 2:  Apply the access control lists to the appropriate interfaces and subinterfaces to permit or deny the selected traffic. | |
| Step 3:  Perform Test 4 according to the Server Farm Design Test Plan | |

**Step 5: Perform the Test 4 procedures according to the Server Farm Design Test Plan and record the results in the Results and Conclusions section.**

Determine if the test was successful.  If not, discuss your results with your instructor and the other students in your class.  Perform the test again if necessary

## Task 6 Reflection

Examine the test results and conclusions. How this network would be affected if:

1.  The number of servers was doubled?

    _____
    _____

2.  The S2 switch had a system failure?

    _____
    _____

3.  A new branch office with 25 new hosts was added?

    _____
    _____

Now that you have followed the process of prototyping from creating the plan through testing and recording results and conclusions, what are the advantages and disadvantages of using a simulation program, such as Packet Tracer, compared to building the prototype with physical devices?

_____
_____
_____
_____
_____