Experiment - 2

Aim: Network Representation using the Cisco Packet tracer software.

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Objectives:

1. Introduction to Cisco Packet Tracer.

2. To learn how to use different components and represent a simple network

Exercises:

Q1. Represent the network in Packet Tracer.

Q2. Open a new instance of Packet Tracer. Create a new network with at least two LANs connected by a WAN. Connect all the devices.

Introduction to Cisco Packet Tracer

➢ Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and simulate modern computer networks.

➢ This tool provides a network simulation to practice simple and complex networks.

➢ Packet Tracer helps user to create a network with an almost unlimited number of network devices, encouraging practice, discovery, and troubleshooting.

➢ Users can build, configure, and troubleshoot networks using virtual equipment and simulated connections, alone or in collaboration with other users.

➢ Packet Tracer offers an effective, interactive environment for learning networking concepts and protocols.

➢ Most importantly, Packet Tracer helps to create own virtual "network worlds" for exploration, experimentation, and explanation of networking concepts and technologies.

➢ Since the protocols are implemented in software only method, this tool cannot replace the hardware Routers or Switches.

➢ Interestingly, this tool does not only include Cisco products but also many more networking devices.

➢ Engineers prefer to test any protocols on Cisco Packet Tracer before implementing them. Also, Engineers who would like to deploy any change in the production network prefer to use Cisco Packet Tracer to first test the required changes and proceed to deploy if and only if everything is working as expected.

➢ This makes the job easier for Engineers allowing them to add or remove simulated network devices, with a Command line interface and a drag and drop user interface.
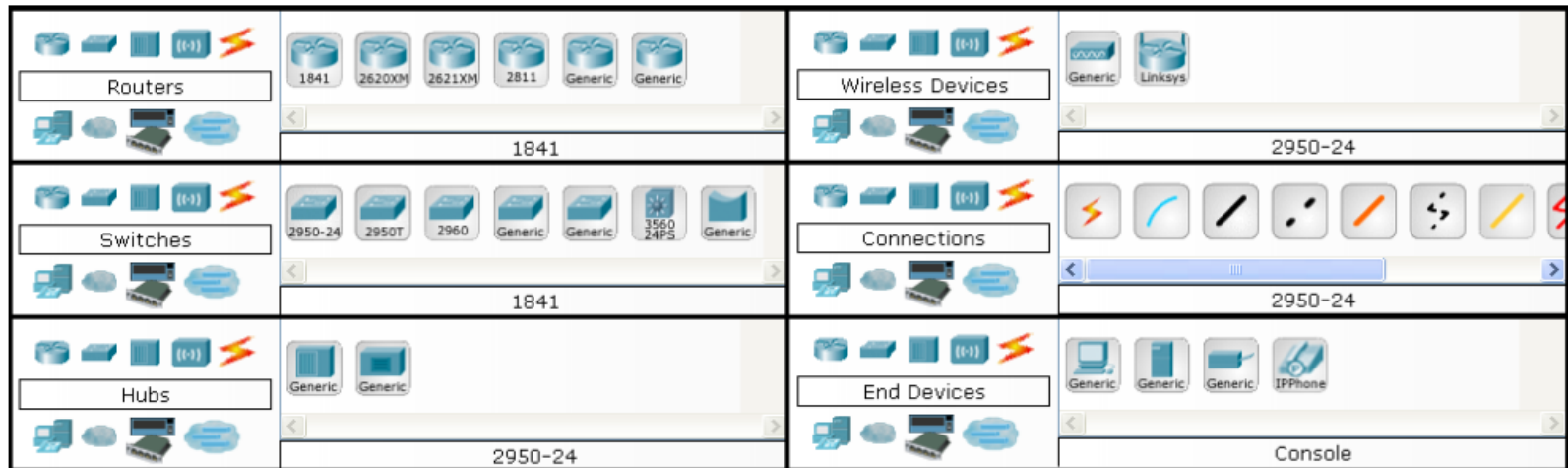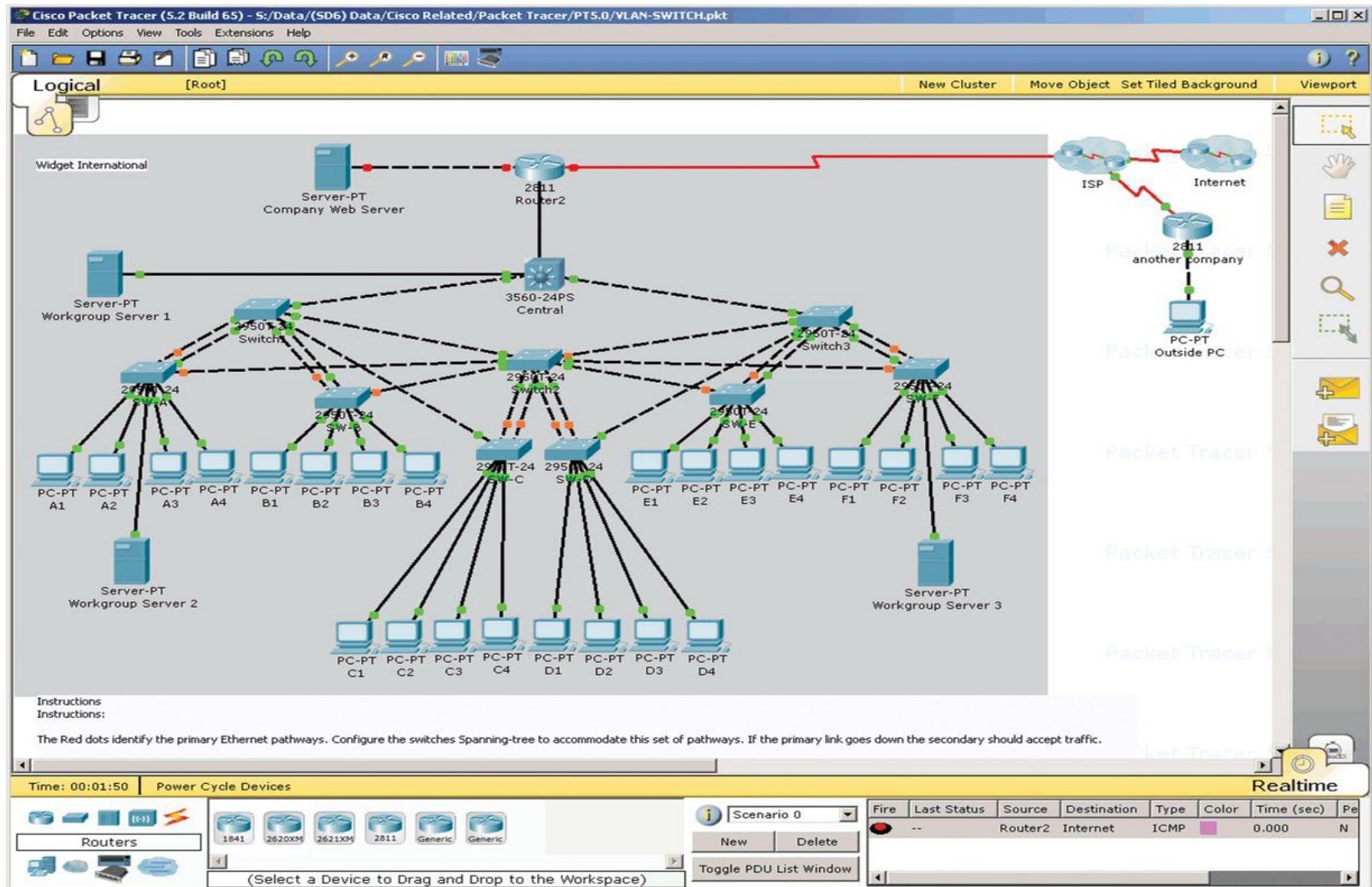
Network Devices and Connections

Figure 1. Packet Tracer's drag-and-drop interface allows users to configure and validate system architecture

Key Features

- **Packet Tracer Workspaces:** Cisco Packet Tracer has two workspaces— **logical and physical**.

➤ The logical workspace allows users to build logical network topologies by placing, connecting, and clustering virtual network devices.

➤ The physical workspace provides a graphical physical dimension of the logical network, giving a sense of scale and placement in how network devices such as routers, switches, and hosts would look in a real environment.

➤ The physical view also provides geographic representations of networks, including multiple cities, buildings, and wiring closets.

Figure 3. The physical workspace provides a graphical view of the logical network
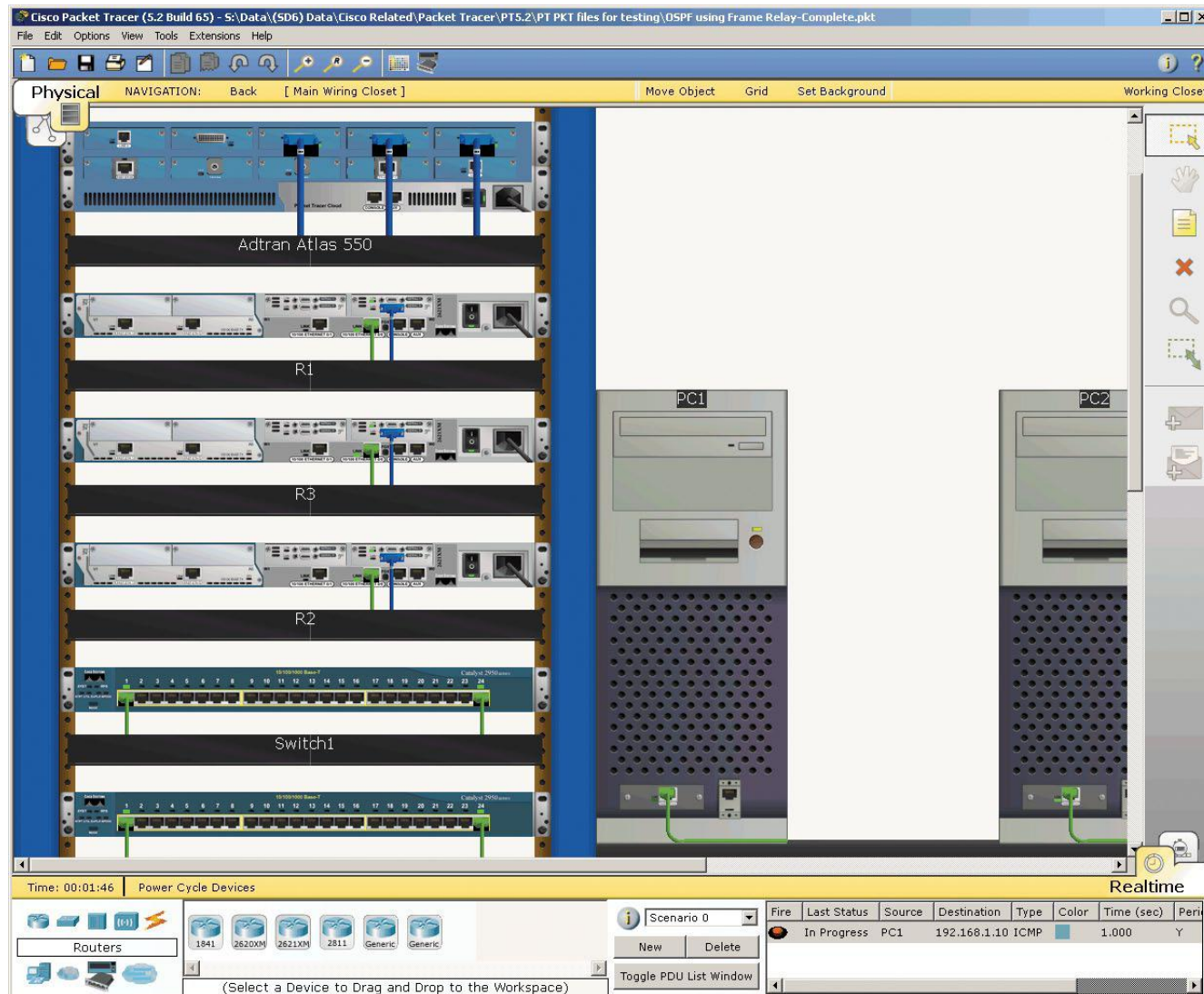
- **Packet Tracer Modes:**
- ➢ Cisco Packet Tracer provides two operating modes to visualize the behavior of a network—real-time mode and simulation mode.
- ➢ **In real-time mode** the network behaves as real devices do, with immediate real-time response for all network activities. The real-time mode gives users a viable alternative to real equipment and allows them to gain configuration practice before working with real equipment.
- ➢ **In simulation mode** the user can see and control time intervals, the inner workings of data transfer, and the propagation of data across a network. This helps users to understand the fundamental concepts behind network operations.

- **<u>Modular Devices:</u>**
- ➢ Graphical representations visually simulate hardware and offer the ability to insert interface cards into modular routers and switches, which then become part of the simulation.

- **Tutorials:**
- ➢ Packet Tracer includes several basic step-by-step tutorials that familiarize users with the product features and explain how to engage in simulations. Additional advanced tutorials are available for download from Academy Connection.

- **<u>Help:</u>**
- ➢ A help feature is available to familiarize users with the Cisco Packet Tracer interface, functions, and features. The help area includes important notes and tips and provides annotated screenshots to aid understanding.

Key Features:

- Unlimited devices

- E-learning

- Customize single/multi user activities

- Interactive Environment

- Visualizing Networks

- Real-time mode and Simulation mode

- Supports majority of networking protocols

- International language support

- Cross platform compatibility

Exercise 1:
Represent the network in Packet Tracer
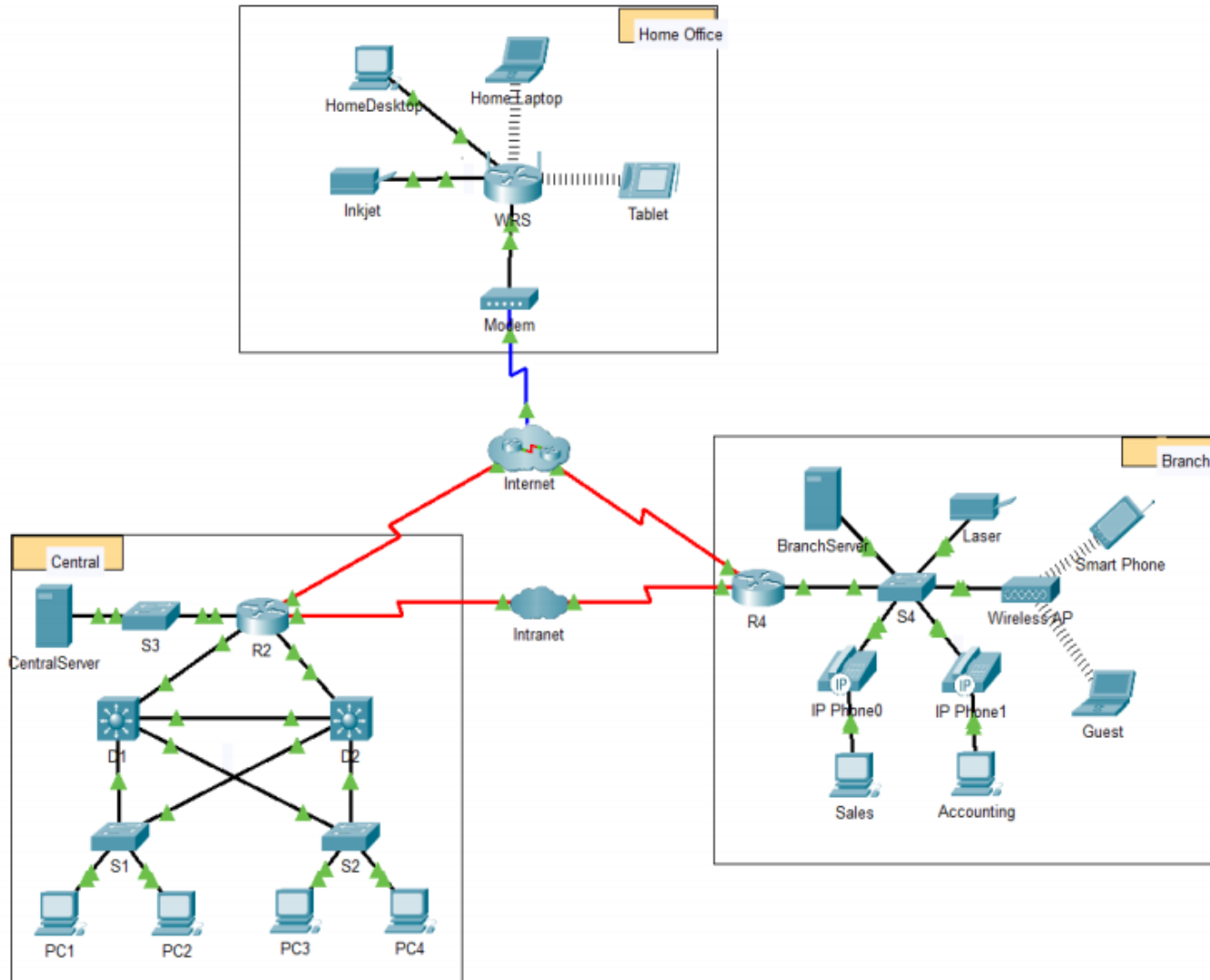
Exercise 1:

Activity 1: Identify common components of a network as represented in Packet Tracer.

a. The above topology has various categories of networking components. You should see categories that correspond to intermediary devices, end devices, and media. There is also an **End Devices** category and two categories specific to Packet Tracer: **Custom Made Devices** and **Multiuser Connection**. List the intermediary device categories.

b. Without entering into the Internet cloud or Intranet cloud, how many icons in the topology represent endpoint devices (only one connection leading to them)?

c. Without counting the two clouds, how many icons in the topology represent intermediary devices (multiple connections leading to them)?

d. How many end devices are not desktop computers?

e. How many different types of media connections are used in this network topology?

Exercise 1:

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<p style="text-align:center">**Ans:** Routers, Switches, Hubs, Wireless Devices, and WAN Emulation</p>

b. Without entering into the Internet cloud or Intranet cloud, how many icons in the topology represent endpoint devices (only one connection leading to them)?

    Ans:15

c. Without counting the two clouds, how many icons in the topology represent intermediary devices (multiple connections leading to them)?

    Ans:11

d. How many end devices are not desktop computers?

    Ans: 8

e. How many different types of media connections are used in this network topology?

    Ans: 4

Activity 2: Explain the purpose of the devices.

a. In Packet Tracer, only the Server-PT device can act as a server. Desktop or Laptop PCs cannot act as a server. Based on your studies so far, explain the client-server model.

b. List at least two functions of intermediary devices.

c. List at least two criteria for choosing a network media type.

Exercise 1:

Activity 2: Explain the purpose of the devices.

a. In Packet Tracer, only the Server-PT device can act as a server. Desktop or Laptop PCs cannot act as a server. Based on your studies so far, explain the client-server model.

Ans: In modern networks, a host can act as a client, a server, or both. Software installed on the host determines the role it plays on the network. Servers are hosts that have software installed that enables them to provide information and services, like email or web pages, to other hosts on the network. Clients are hosts that have software installed that enables them to request and display the information obtained from the server. A client could also be configured as a server simply by installing server software.

b. List at least two functions of intermediary devices.

Ans: Regenerate and retransmit data signals; maintain information about what pathways exist through the network and internetwork; notify other devices of errors and communication failures; Direct data along alternate pathways when there is a link failure; Classify and direct messages according to QoS priorities; Permit or deny the flow of data, based on security settings.

c. List at least two criteria for choosing a network media type.

Ans: The distance the media can successfully carry a signal. The environment in which the media is to be installed. The amount of data and the speed at which it must be transmitted. The cost of the media and installation.

Activity 3: Compare and contrast LANs and WANs.

a. Explain the difference between a LAN and a WAN. Give examples of each.

b. In the Packet Tracer network, how many WANs do you see?

c. How many LANs do you see?

d. The Internet in this Packet Tracer network is overly simplified and does not represent the structure and form of the real Internet. Briefly describe the Internet.

e. What are some of the common ways a home user connects to the Internet?

f. What are some common methods that businesses use to connect to the Internet in your area?

Exercise 1:

Activity 3: Compare and contrast LANs and WANs.

a. Explain the difference between a LAN and a WAN. Give examples of each.

Ans: LANs provide access to end users in a small geographical area. A home office or school campus are examples of LANs. WANs provide access to users in a wide geographical area over long distances spanning a few miles to thousands of miles. A Metropolitan Area Network and the Internet are examples of WANs. A company's intranet may also connect multiple remote sites using a WAN.

b. In the Packet Tracer network, how many WANs do you see?

Ans: There are two: the Internet and the Intranet WANs

c. How many LANs do you see?

Ans: There are three, easily identifiable because each has a border and label.

d. The Internet in this Packet Tracer network is overly simplified and does not represent the structure and form of the real Internet. Briefly describe the Internet.

Ans: The Internet is mostly used when we need to communicate with a resource on another network. The Internet is a global mesh of interconnected networks (internetworks).

e. What are some of the common ways a home user connects to the Internet?

Ans: Cable, DSL, dial-up, cellular, and satellite.

f. What are some common methods that businesses use to connect to the Internet in your area?

Ans: Dedicated leased line, Metro-E, DSL, Cable, Satellite

Exercise 2:

Open a new instance of Packet Tracer. Create a new network with at least two LANs connected by a WAN. Connect all the devices.