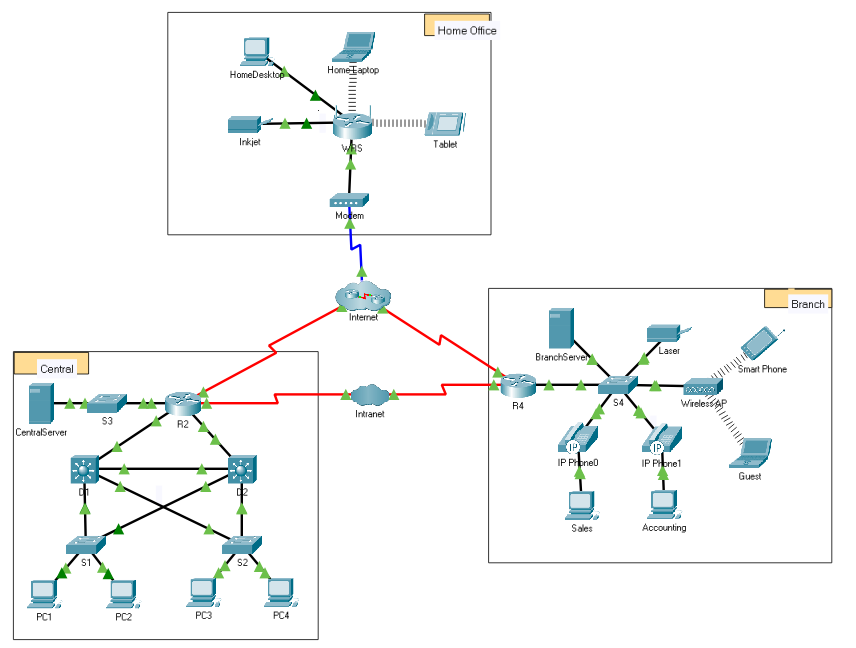
**LAB 25**

**Exploring ROUTING TABLES**

1. Download and open the PKA file from <https://contenthub.netacad.com/itn/1.5.7>

This is the example network we started the course with:



Let’s first have a look at the Central Office:

1. Have a look at all the different hosts (end devices) in the ‘Central office’. How many are there? In which networks are each of these located (IP network address and prefix)?

4 hosts and 1 server

1. All these networks are subnets of one of the IP address ranges for private IP addresses inside NAT networks, as specified by IETF (ranges you should know by heart, see lecture slides on NAT). What is that range? And what is the IP network address and prefix of that range? 10.0.0.0 to 10.255.255.255, 10.0.0.0/8

Now, let’s turn our attention towards the ‘Branch office’. The devices there can communicate with these in the ‘Central office’. Try e.g. pinging from the ‘Sales’ workstation to ‘PC2’. That should work. If it doesn’t, check if your ‘Sales’ workstation might have received an APIPA IP address. If it did, you can click the ‘fast forward’ button in PT a few times and then recheck until you’ve received a regular (private) IP address on the ‘Sales’ workstation. (The DHCP server isn’t active yet at the start of the PT scenario.)

Let’s find out how IP packets find their way from the ‘Sales’ workstation in the ‘Branch Office’ to ‘PC2’ in the ‘Central Office’ (how they are ‘routed’ in the network).

1. What is the (IP address of the) default gateway for the ‘Sales’ workstation? Use **netstat -r** to inspect the routing table of the ‘Sales’ workstation. (On real Windows PCs, **route print** would also work.)

172.16.0.1

1. What device has this IP address?

Router 4

1. How many active interfaces does router R4 have?

3

1. Open the CLI of router R4.

Show the contents of his IPV4 routing table. Paste below a screenshot of your command and its output.

Afbeelding met tekst

Automatisch gegenereerde beschrijving

1. Answer the questions below by carefully looking at the contents of that routing table.

* Does the ‘Central Office’ network (the IP network address you identified a few questions ago) belongs to these directly connected networks?

No

* Was the route to the ‘Central Office’ network added using static or dynamic routing? How do you know this?

The letter S indicates Static

1. What is the IPv4 address of the R2 router’s interface to which router R4 is connected? (Don’t pay attention to the ‘Intranet’ node in between both routers. That’s how they connect on the physical layer over DSL phone lines.)

64.100.200.1

Can you see where this IP address of R2 is used in the routing table of R4?

Yes

As that route was statically configured, it needs to be somewhere in R4’s configuration. Can you see how this has been configured on R4? Check out the contents of the current router configuration of router R4. In order to go to Privileged EXEC mode, you’ll need the password: *class*.

yes

So now we know how the Branch Office was configured to reach the Central Office via the routing table of the router in the Branch Office.

Of course, all work and no play makes Jack a dull boy. So if the person at the ‘Sales’ workstation would surf to e.g. Facebook or anything else on the Internet, how should its packets then be routed on R4? Let’s inspect that.

1. Again have a look at the routing table at R4. The ‘Sales’ workstation sends all non-local IP traffic to R4 (there were no other routes in its table), whether it’s communication with the Central Office or other Internet communication. But at R4 a routing decision will be taken to send IP traffic in one direction or another, depending on the IP destination address.

* Was a default route defined in R4’s routing table? In what 2 ways can you see this?

Gateway of last resort and the codeletter S

* And what is the IP address of that default gateway? In other words: to which IPv4 address are IPv4 packets sent for which no specific route is defined in the routing table? (Because you don’t want to specify a specific route to Facebook, Google, Soccer club Manchester web server, IKEA web server, local grocery shop web server, and all other billions of connected hosts on the Internet.)

64.100.150.1

* What is the name of that device which has that IP address?

ISP-Tier3a

* Again, as that route was statically configured, it needs to be somewhere in R4’s configuration. Can you see how this has been configured on R4? Check out the contents of the current router configuration of router R4.

Afbeelding met tekst

Automatisch gegenereerde beschrijving

So now we had a look at some routing table entries. Next lab, we’ll configure some of the routing tables ourselves.