Lab 4: Introduction to Routing

CNIT 24000-005

Group 12

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Submitted To: Brandon Long

Date Submitted: 12/6/2019

Date Due: 12/9/2019

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Executive Summary

In this laboratory, the knowledge gained from previous labs were applied to enable dynamic routing protocols and to extend the network to other groups. The major phases in this project are separated into three sections. First, the addition of the TP-Link router back to the network architecture had to be successfully done by connecting one of the hosts to the TP-Link router, enabling RIP on it, creating a third VLAN, and adjusting NAT rules in the network. Second, a router to router connection with a neighboring group's router was made successfully by adding direct routes to the neighboring router and joining the same network ID as the other group's router. Third, establishing a connection to the CIT network from the connected router with another group was met successfully. There were 3 critical problems that were obstacles during this lab were, the installation of Quagga on the TP-Link router to enable RIP, the network connection of host 1 was unreachable, and the Wireshark app was unable to detect RIP protocols from the neighboring group. The highlighted recommendations in this lab are capturing frames only during the duration of the start of the protocol until the end, recording IP addresses in the network in order to prevent overlapping IP addresses in the network, and double-checking the version of Quagga when enabling RIP on the TP-Link router to prevent version errors. The business scenario section contains a real-life enterprise environment situation where this lab network architecture could be applied to and the procedure lists the steps of the recorded process in this lab to lead people reading this report to a successful lab results meeting all the requirements. The results section talks about the outcome of this lab such as what requirements were met or not and the conclusion and recommendation reflect back on the finished lab and searches for spaces for development. Appendix A lists what kind of problems were met during the completion of the lab and Appendix B contains all the configuration of the router and switches used in the lab in order to finish this lab completely.

Business Scenario

A medium-sized company named Net240 which provides secure networking services internationally is looking to connect a TP-Link router to its network architecture due to the lack of one Cisco router for creating another VLAN for its new marketing department and to connect it with the company's client company. To exchange routing information between the marketing department and the client, a RIP routing protocol is enabled in the TP-Link router between the two groups. Since the RIP protocol uses hops to determine the distance between the network, the marketing department needs to determine the most efficient way to route data to the client also preventing routing loops in the network. The marketing department has to deliver confidential information in the most efficient way in order to secure data efficiently and the TP-Link router with RIP protocol enabled makes this possible. The software that will be used in this project will be Putty, Internet Explorer, Windows Command Prompt, Windows 10, and Wireshark. The hardware that will be utilized in this lab will be a Cisco 1921 router, HP Procurve switch, TP-Link router, and two Windows Client Dell PCs. The assigned ISP IP address of the network was 10.17.12.0/24. The previous lab's logical diagram (Figure 1) is constructed by applying the DHCP protocol to assign IP addresses to hosts dynamically in a network architecture where two Cisco switches are added in between the Procurve switch and hosts.

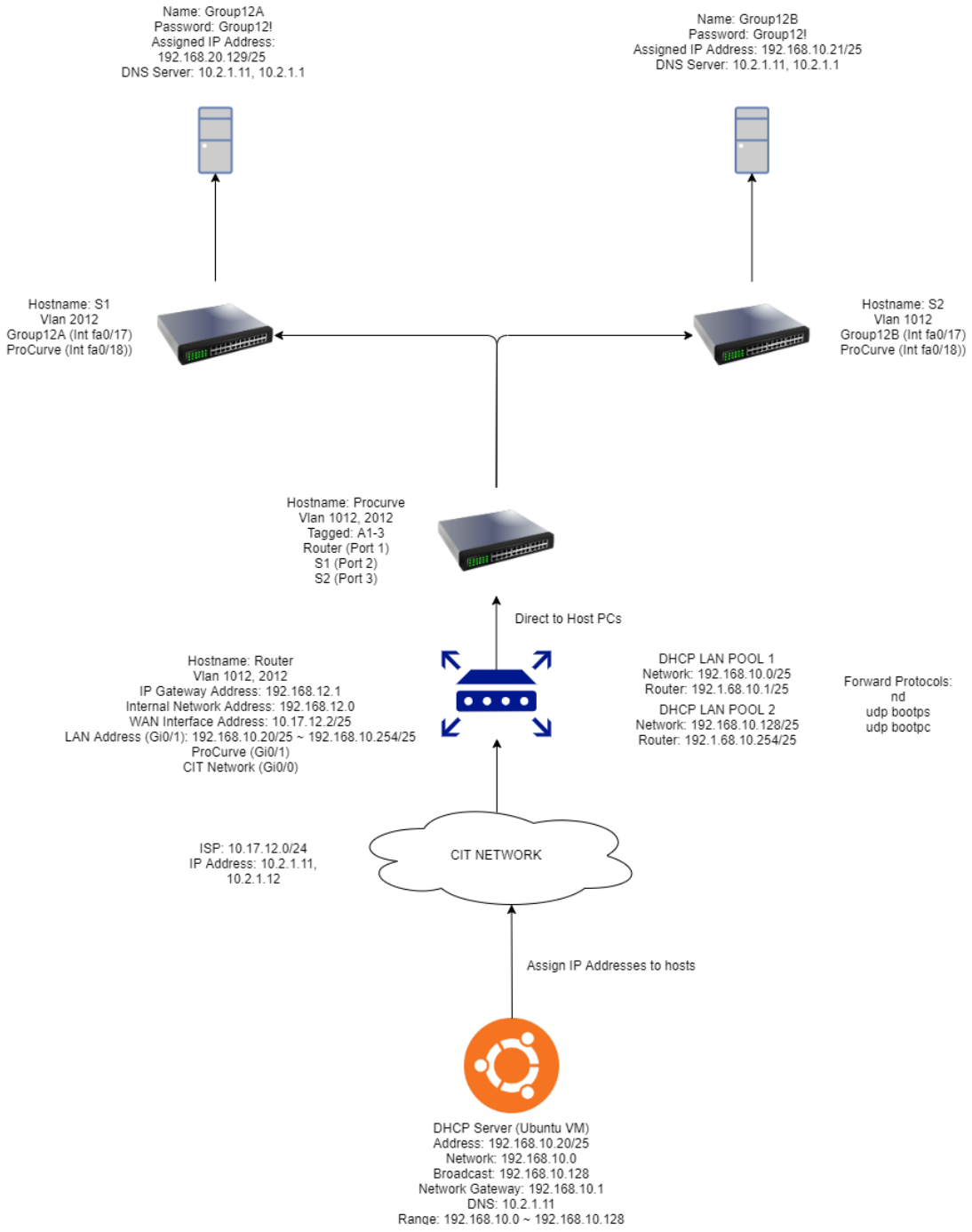

Figure 1: Pre-lab Logical Network Diagram

Procedures

This procedure phase is separated by the list of tasks shown chronologically in the check-off sheet. The format for the procedure is according to: **buttons** are bold, *options* are italicized, text entered into the computer is in Courier New, menu navigation is by the pipe symbol and italic words: *Start* | *Programs* | *MS Office* | *Word*.

1. Accessed Cisco 1921 Router to create a network route for TP-Link Router
    a. Plugged in USB Console cable into the USB port on PC 1 and Console port on the Cisco 1921 Router
    b. Opened Putty application
        i. Pressed the **Windows** button
        ii. In the opened Start menu, typed `Putty`
        iii. Clicked the *Putty.exe* to open
    c. On the Putty configuration window, specified *Serial* type of connection and *COM5* in the Serial Line with connection speed default set to *9600*
    d. Clicked **Open**
    e. Typed `ENABLE` to access the Cisco 1921 in privileged mode
    f. Typed `config t` to instruct the Cisco 1921 to go to global configuration mode
    g. Typed `int gigabitethernet0/1.3012` to access the sub interface for IP configuration
    h. Typed `encapsulation dot1Q 3012` in subinterface range configuration mode to apply a VLAN ID to the subinterface

i. Typed `ip address 192.168.212.1 255.255.255.0` to specify the starting IP broadcast range of the sub interface

j. Typed `ip nat inside` to specify the nat broadcast will be inside the network

k. Typed `no shut` to enable the configured interface

l. Typed `exit` and `write mem` to save the current configuration

2. Created 3rd VLAN on HP ProCurve 2900-24G Switch and Cisco 1921 Router for TP-Link Router

   a. Interfaced into HP ProCurve 2900-24G Switch via serial console cable

   b. Opened Putty application

      i. Pressed the **Windows** button

      ii. In the opened Start menu, typed `Putty`

      iii. Clicked the *Putty.exe* to open

   c. On the Putty configuration window, specified *Serial* type of connection and *COM1* in the Serial Line with connection speed default set to *9600*

   d. Clicked **Open**

   e. On the HP ProCurve 2900-24G Switch menu, created new VLAN

      i. Selected *Switch Configuration*

      ii. Selected *VLAN Menu*

      iii. Selected *VLAN Names*

      iv. Selected *ADD* to add a new VLAN into the switch and typed into VLAN ID `3012` for the ID tag and for `VLAN3012` for the name

   f. Once VLAN 3012 was created and saved, clicked *BACK* and select *VLAN Port Assignment*

g. In the VLAN Port Assignment window on the Port 4 line, selected Default VLAN, VLAN1012, and VLAN2012 as `TAGGED` and VLAN3012 as `UNTAGGED`

h. Set up TP-Link Router with incoming and outgoing IP address ranges

    i. Resetted TP-Link Router via pressing **reset** button in the back of the router

    ii. Plugged Cat5E cabling into yellow LAN port 1 in the back of TP-Link Router and into onboard Ethernet network card on PC 1

    iii. Opened Internet browser and typed *192.168.1.1* in address bar and pressed **Enter** to access the *OpenWRT* GUI

        1. Once the browser GUI opened, pressed **Enter** with no password to access the GUI

    iv. Specified WAN settings on TP-Link Router

        1. Clicked on **Network** in the upper bar on the GUI window and once the Network tab pulls up click the **Interface** tab
        2. Accessed WAN interface by clicking on **Edit**
        3. Instructed the TP-Link router to use a static IPv4 address of 192.168.212.2 with a subnet 255.255.255.0 of along with a default gateway of 192.168.212.1 in the configuration window

    v. Specified LAN settings on TP-Link Router

        1. Clicked on **Network** in the upper bar on the GUI window and once the Network tab pulls up click the **Interface** tab
        2. Accessed LAN interface by clicking on **Edit**

3. Instructed the TP-Link router to use a static IPv4 address of 172.30.12.1 with a subnet 255.255.255.0 of along with a default gateway of 172.30.12.1 in the configuration window
4. Clicked **Save and Apply** button to apply the new configuration settings
5. Unhooked the Cat5E cabling from the TP-Link Router connected to PC 1's onboard Ethernet card

3. Installed TP-Link Router into HP ProCurve 2900-24G Switch
    a. Plugged in Cat5E network cabling into network port 4 on HP ProCurve 2900-24G Switch and into the blue port labeled "Internet" on the TP-Link Router
4. Established IP broadcast routes on Cisco 1921 for network access on TP-Link Router
    a. Plugged in USB Console cable into a USB port on PC 1 and Console port on the Cisco 1921 Router
    b. Opened Putty application
        i. Pressed the **Windows** button
        ii. In the opened Start menu, typed `Putty`
        iii. Clicked the *Putty.exe* to open
    c. On the Putty configuration window, specified *Serial* type of connection and *COM5* in the Serial Line with connection speed default set to *9600*
    d. Clicked **Open**
    e. Typed `enable` to access the Cisco 1921 in privileged mode
    f. Typed `config t` to instruct the Cisco 1921 to go to global configuration mode

g. Typed `access-list 1 permit 192.168.0.0 0.0.255.255` to allow the IP addressed to pass through the network

h. Typed `access-list 2 permit 172.30.0.0 0.0.255.255` to allow the IP addressed to pass through the network

i. Typed `exit` and `write mem` to save the current configuration

5. Enabled RIP on the Cisco 1921 Router for network advertising

   a. Plugged in USB Console cable into the USB port on PC 1 and Console port on the Cisco 1921 Router

   b. Opened Putty application

      i. Pressed the **Windows** button

      ii. In the opened Start menu, typed `Putty`

      iii. Clicked the *Putty.exe* to open

   c. On the Putty configuration window, specified *Serial* type of connection and *COM5* in the Serial Line with connection speed default set to *9600*

   d. Clicked **Open**

   e. Typed `enable` to access the Cisco 1921 in privileged mode

   f. Typed `config t` to instruct the Cisco 1921 to go to global configuration mode

   g. Typed `router rip` to enable the RIP routing protocol on the Cisco 1921

   h. Typed `version 2` to specify the version of RIP that is to be used

   i. Typed `network 172.30.0.0` to specify the network to be advertised

   j. Typed `network 192.168.10.0` to specify the network to be advertised

   k. Typed `network 192.168.12.0` to specify the network to be advertised

   l. Typed `network 192.168.120.0` to specify the network to be advertised

m. Typed `network 192.168.212.0` to specify the network to be advertised

n. Typed `network 192.168.42.0` to specify the network to be advertised

o. Typed `no auto-summary` to disable the RIPv2 protocol from automatically summarizing the RIP report

p. Typed `exit` and `write mem` to exit configuration mode and save the current configuration

6. Enabled RIP on a TP-Link Router programmed with OpenWRT firmware via Putty software

    a. Opened Putty application

        i. Pressed the **Windows** button

        ii. In the opened Start menu, typed `Putty`

        iii. Clicked the *Putty.exe* to open

    b. On the Putty configuration window, specified *SSH* type of connection and *172.30.12.1* in the Host Name or IP Address line with the port set at *22*

    c. In the Putty window, typed `sudo apt-get install quagga-ripd quagga-zebra quagga-vtysh` to download and install the Quagga software

    d. Typed `vi /etc/quagga/ripd.conf` to open the RIP configuration file

        i. Typed `network 192.168.212.0` to add VLAN 3012

        ii. Typed `network 172.30.12.0` to add TP-Link internal network

    e. Typed `/etc/init.d/quagga start` to start Quagga on the TP-Link Router

7. Used Wireshark to capture the routing tables on the Cisco 1921 Router and the TP-Link Router

a. Double clicked on the *Wireshark* icon on desktop *Windows Menu* | *Applications* | *Wireshark*
b. Double clicked on the **Ethernet 2** in *Wireshark* window for monitoring
c. Clicked on the **stop** button  to stop the current execution.
d. Typed the test command in *cmd prompt* by typing `Command Prompt` in the *Windows Search Bar*
e. Specified in the *search* bar of the Wireshark software to search for RIP advertisement protocols
f. Clicked on the shark fin  button to start monitoring
g. Pressed the **enter** key to run the *cmd prompt* for show ip route test
h. After the *cmd prompt* run was finished, clicked on the **red stop button**  to stop *Wireshark* monitoring progress
i. Opened the file option in toolbar and clicked on **save** to save the current Wireshark capture
j. Named the *Wireshark* file based on the test that was configured

8. Performed a Trace Route to the RTFM CIT server before and after having established a router-to-router connection with another group's Cisco 1921 Router
    a. On PC 1, open *Command Prompt* by selecting the **Windows** button on the keyboard and typing `Run`. When the Run window displayed, entered the command `cmd`
        i. In the command prompt window, typed `tracert RTFM.cit.lcl` and observed results

b. Set up another VLAN connection in the HP ProCurve 2900-24G Switch and connect to Group 13's switch

   i. Opened Putty application

      1. Pressed the **Windows** button
      2. In the opened Start menu, typed `Putty`
      3. Clicked the *Putty.exe* to open

   ii. On the Putty configuration window, specified *Serial* type of connection and *COM1* in the Serial Line with connection speed default set to *9600*

   iii. Clicked **Open**

   iv. On the HP ProCurve 2900-24G Switch menu, created new VLAN

      1. Selected *Switch Configuration*
      2. Selected *VLAN Menu*
      3. Selected *VLAN Names*
      4. Selected *ADD* to add a new VLAN into the switch and typed into VLAN ID `4012` for the ID tag and for `VLAN4012` for the name

   v. Once VLAN 4012 was created and saved, clicked *BACK* and select *VLAN Port Assignment*

   vi. In the VLAN Port Assignment window on the Port 1 line of VLAN 4012 was selected as `TAGGED` and Port 23 of VLAN 4012 was `UNTAGGED`

   vii. Plugged in Cat5E cabling into Port 24 on the HP ProCurve 2900-24G Switch and plugged it into Port 6 on Group 13's switch

c. Set up Cisco 1921 Router to accept data connection from Group 13's Cisco 1921 Router with RIP active

i. Plugged in USB Console cable into USB port on PC 1 and Console port on Cisco 1921 Router

ii. Opened Putty application

1. Pressed the **Windows** button
2. In the opened Start menu, typed `Putty`
3. Clicked the *Putty.exe* to open
4. On the Putty configuration window, specified *Serial* type of connection and *COM5* in the Serial Line with connection speed default set to *9600*
5. Clicked **Open**
6. Typed `enable` to access the Cisco 1921 in privileged mode
7. Typed `config t` to instruct the Cisco 1921 to go to global configuration mode
8. Typed `router rip` to enable the RIP routing protocol on the Cisco 1921
9. Typed `neighbor 192.168.42.69` to specify to listen for advertisements on this IP range
10. Typed `exit` and `write mem` to exit from configuration mode and save the current configuration

iii. Used Wireshark to examine the RIP protocols with an active connection to Group 13's network via the HP ProCurve 2900-24G Switch

1. Double clicked on the *Wireshark* icon on desktop *Windows Menu* | *Applications* | *Wireshark*

2. Double clicked on the **Ethernet 2** in *Wireshark* window for monitoring
3. Clicked on the **stop** button  to stop the current execution.
4. Typed the test command in *cmd prompt* by typing `Command Prompt` in the *Windows Search Bar*
5. Specified in the *search* bar of the Wireshark software to search for RIP advertisement protocols
6. Clicked on the shark fin  button to start monitoring
7. Pressed the **enter** key to run the *cmd prompt* for show ip route test
8. After the *cmd prompt* run was finished, clicked on the **red stop button**  to stop *Wireshark* monitoring progress
9. Opened the file option in the toolbar and clicked on **save** to save the current Wireshark capture
10. Named the *Wireshark* file based on the test that was configured

iv. Performed additional Trace Route after established network connection to Group 13's network

1. On PC 1, open *Command Prompt* by selecting the **Windows** button on the keyboard and typing `Run`. When the Run window displayed, entered the command `cmd`
    a. In the command prompt window, typed `tracert RTFM.cit.lcl` and observed results

Results

Dividing the major phases into parts, first, the addition of the TP-Link router to the network architecture and creating a new VLAN for it and the host PC then configuring the Cisco 1921 router and the TP-Link router to link with each other. After, the installation and enabling RIP on the TP-Link router and Cisco 1921 router were done successfully. Second, a crossover cable was utilized to connect with Group 13's Cisco 1921 router with Group 12's Cisco 1921 router in order to share routes between two separate networks. By adding a direct IP route of the neighboring group's router IP made the connection of the routers successful. Then, using Wireshark RIP advertisements were captured coming in and out from Group 13's router.

All the instructions proposed in the lab were accomplished in the current lab. The first two major phases are shown in Figures 3 and 4 as pieces of evidence of completion of this lab. In Figure 3, one of the host PC traceroutes the RTFM.cit.lcl which is the ISP network which satisfies the second major phase and in Figure 4, it shows a Wireshark capture of RIP advertisements that justifies that RIP was successfully installed and enabled on the network which satisfies the first major phase. Thus, all the lab expectations were met in this project.

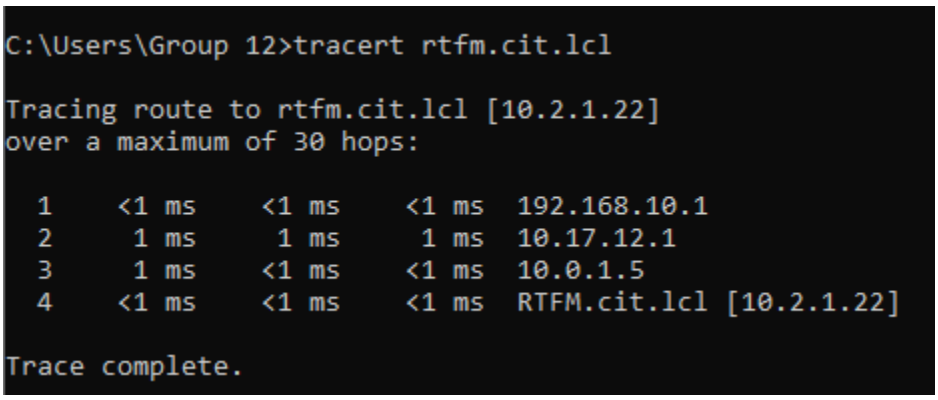

Figure 3: Traceroute to rtfm.cit.lcl

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.10.1	224.0.0.9	RIPv2	126	Response
4	10.104049	192.168.212.1	224.0.0.9	RIPv2	106	Response
9	16.852073	192.168.120.1	224.0.0.9	RIPv2	126	Response
10	25.247504	192.168.212.2	224.0.0.9	RIPv2	66	Response
12	27.784133	192.168.10.1	224.0.0.9	RIPv2	126	Response
20	39.324176	192.168.212.1	224.0.0.9	RIPv2	106	Response
22	46.260251	192.168.120.1	224.0.0.9	RIPv2	126	Response
23	50.267388	192.168.212.2	224.0.0.9	RIPv2	66	Response
24	55.448226	192.168.10.1	224.0.0.9	RIPv2	126	Response
40	67.740278	192.168.212.1	224.0.0.9	RIPv2	106	Response
47	72.320328	192.168.120.1	224.0.0.9	RIPv2	126	Response
53	75.287263	192.168.212.2	224.0.0.9	RIPv2	66	Response
59	83.408311	192.168.10.1	224.0.0.9	RIPv2	126	Response

Figure 4: Wireshark capture for RIPv2 Protocol

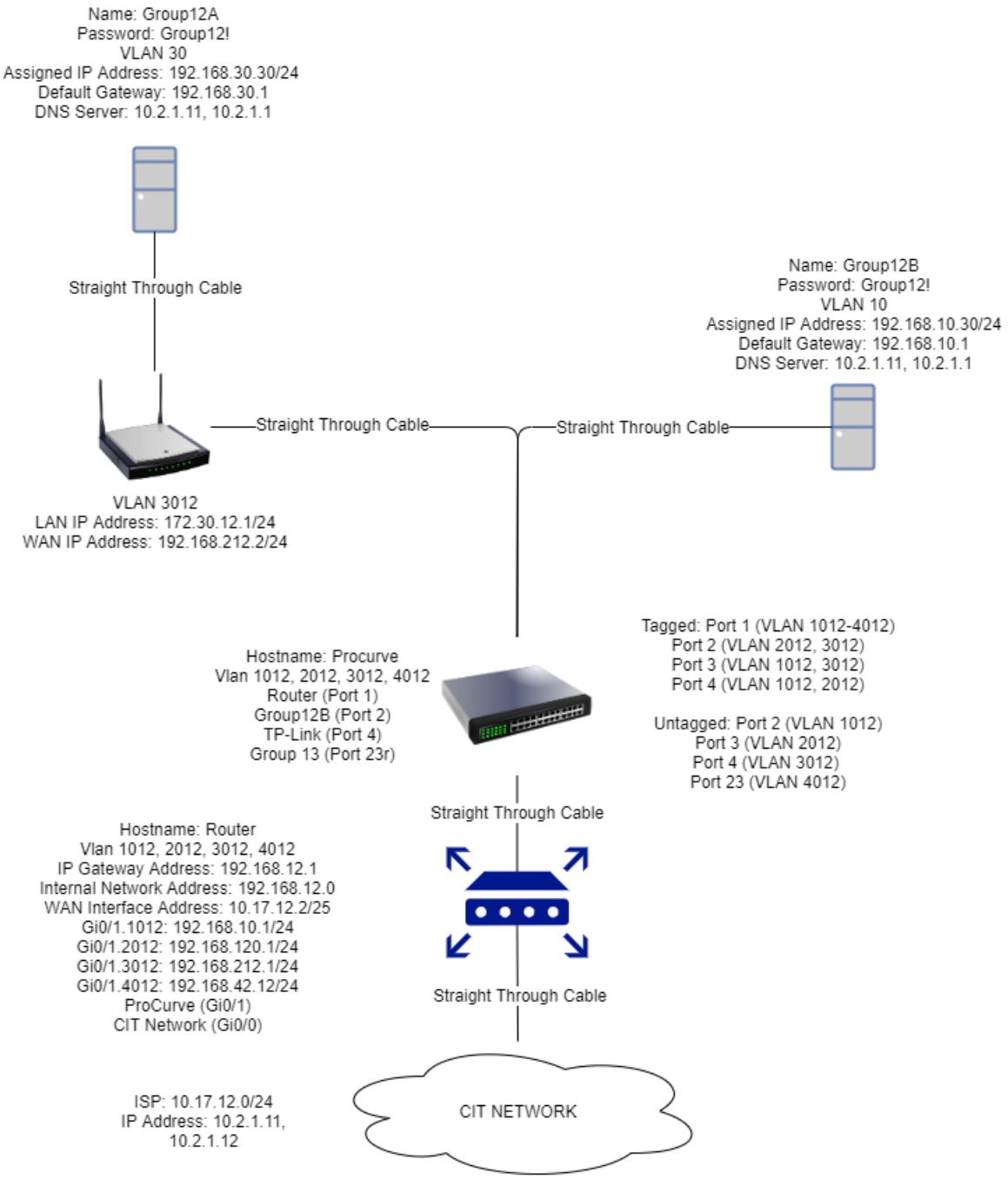

Figure 5: Physical Network Diagram

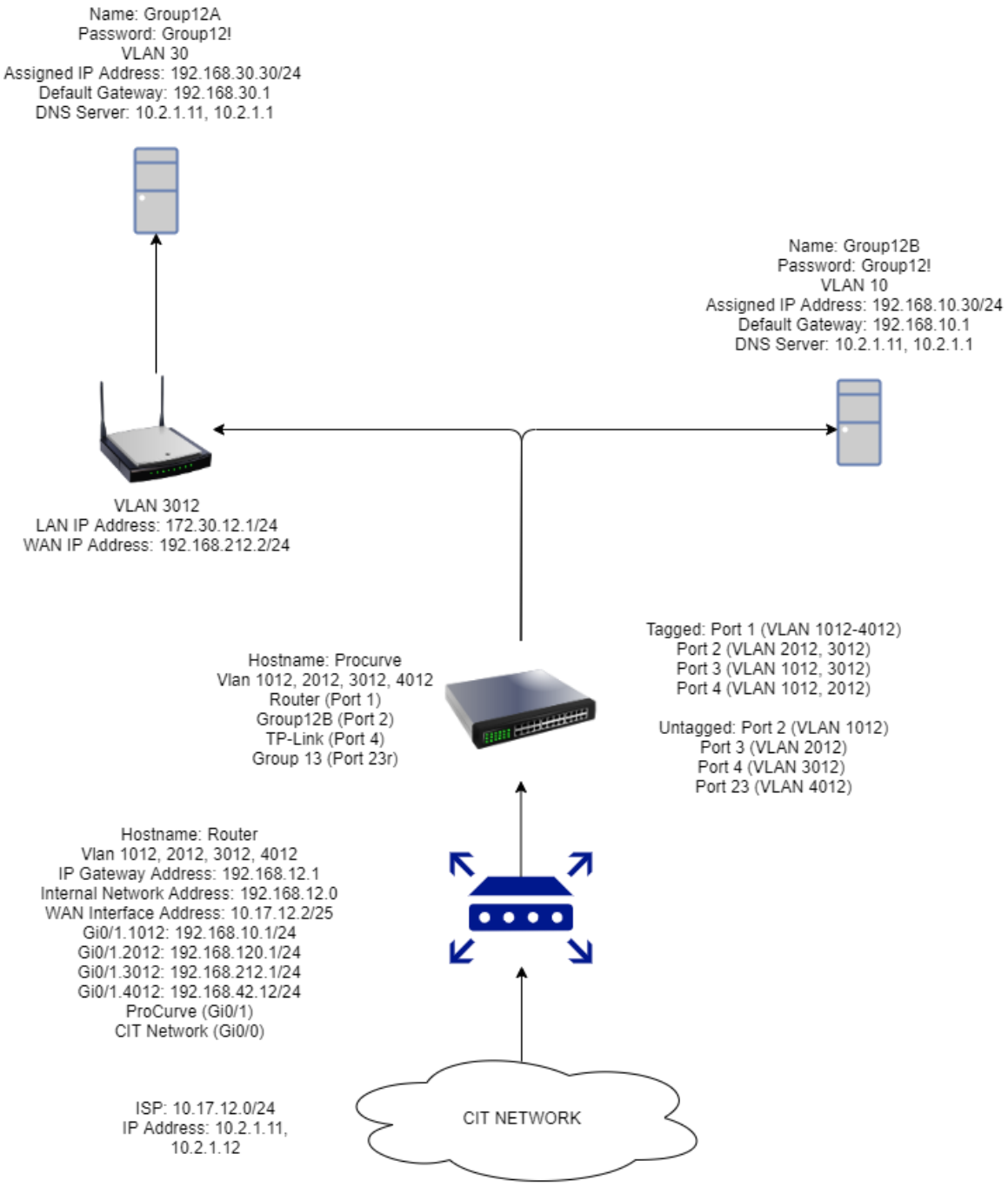

Figure 6: Logical Network Diagram

Conclusions and Recommendations

Basing on the business scenario mentioned previously, this lab project did meet all the requirements and expectations in order to successfully complete the lab as instructed. The expectation for the business case was to successfully apply RIP to the TP-Link router in order to exchange network information and transmit data in the most efficient route possible with the client company. In this lab, the RIP protocol was successfully implemented and enabled in the TP-Link router and was captured by Wireshark as stated in detail in the procedure section and the results section.

Recommendations

Recommendation 1: When capturing the RIP protocol with Wireshark in the first two major phases in this lab, only capture the duration of the frame in order to prevent unnecessary captures that are not needed to fulfill the lab requirements. This makes the needed protocols easier to find by filtering it.

Recommendation 2: Writing a list of which IP addresses are configured to which machines are critical to prevent overlapping IP addresses in the network that can lead to unknown connection errors in the lab. For example, in the current lab, there was an IP address duplication with the TP-Link router's WAN and VLAN 3012's IP address.

Recommendation 3: Double checking the version of Quagga resolves RIPv2 protocol issues when enabling RIP for the TP-Link router. Since in this lab, the TP-Link router requires the lastest version of Quagga, if a previous version of Quagga is downloaded, the TP-Link router would not be configured correctly.

Bibliography

Long B. (2019, November-December). Personal Communication.

Putty. (September 29, 2019). Putty (0.73) [Computer Software]. Available from https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html. (September 2019).

Windows. (May 2019). Windows 10 [Computer OS]. Available from https://www.microsoft.com/en-us/software-download/windows10. (May 2019).

Yang, B. (2019, November-December). Personal communication.

APPENDIX A: Problem Solving

Problem 1: Installing Quagga on TP-Link Router to enable RIP

Problem Description: Installing Quagga on TP-Link Router to enable RIP

Possible Solutions: The corrupted version of Quagga may have been downloaded, Quagga could have been outdated, TP-Link Router firmware could have needed to be updated, or Quagga software may have been incorrectly configured

Solutions Attempted: Verified firmware of the TP-Link Router was up to date, searched through online websites for current versions of Quagga, and attempted to re-install Quagga

Final Solution: The version of Quagga that was downloaded wasn't the most up to date version available and didn't have the version 2 RIP protocols. The TP-Link Router was instructed to download the latest Quagga software that was available on the OpenWRT server.

Problem 2: Internet Connection Error

Problem Description: The Internet connection to PC 1 via the TP-Link Router on IP Address 172.30.12.1 was non-operational

Possible Solutions: Defective Cat5E cabling, incorrect configurations on the Cisco 1921 router, or incorrect WAN / LAN configuration on the TP-Link router

Solutions Attempted: Checked the Cat5E cabling between the TP-Link router and the HP ProCurve2900-24G switch and verified 192.168.212.1 IP address set up for the incoming connection to the TP-Link router from the Cisco 1921 router

Final Solution: The TP-Link router's WAN address was set up as 192.168.212.1 which was causing a network conflict due to the Cisco 1921 had an IP address set for VLAN 3012 that also was 192.168.212.1. The conflict was easily resolved by changing the TP-Link WAN address to 192.168.212.2 and the Internet connection was restored

Problem 3: Wireshark Detection Error

Problem Description: Wireshark was unable to detect the RIP advertisements from Group 13's network

Possible Solutions: Defective Cat5E cabling, RIP not set up correctly, or incorrect port configurations on the HP ProCurve 2900-24G switch / Group 13's switch

Solutions Attempted: Checked the Cat5E cabling between the HP ProCurve 2900-24G switch and Group 13's switch and verified the port configurations on both the HP ProCurve 2900-24G and Group 13's switches were configured correctly

Final Solution: In the Cisco 1921 router, added into the router rip the command `Neighbor 192.168.42.69` which allowed Group 13's RIP advertisements to be discovered and identified

APPENDIX B: Router and Switch Configurations

Cisco 1921

```
hostname R1
!
boot-start-marker
boot-end-marker
!
no aaa new-model
ethernet lmi ce
!
ip dhcp excluded-address 192.168.10.1 192.168.10.20
ip dhcp excluded-address 192.168.10.254
ip dhcp excluded-address 192.168.10.128
ip dhcp excluded-address 192.168.20.1 192.168.20.20
ip dhcp excluded-address 192.168.20.254
ip dhcp excluded-address 192.168.20.128
!
ip dhcp pool LAN-POOL-1
 network 192.168.10.0 255.255.255.128
 default-router 192.168.10.1
 domain-name span.com
!
ip dhcp pool LAN-POOL-2
 network 192.168.10.128 255.255.255.128
 default-router 192.168.10.254
```

```
 domain-name span.com
!
no ip domain lookup
ip cef
no ipv6 cef
!
multilink bundle-name authenticated
!
license udi pid CISCO1921/K9 sn FTX182485P8
!
redundancy
!
interface Embedded-Service-Engine0/0
 no ip address
 shutdown
!
interface GigabitEthernet0/0
 ip address 10.17.12.2 255.255.255.128
 ip nat outside
 ip virtual-reassembly in
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 192.168.12.1 255.255.255.0
 ip nat inside
```

```
 ip virtual-reassembly in
 duplex auto
 speed auto
!
interface GigabitEthernet0/1.1012
 encapsulation dot1Q 1012
 ip address 192.168.10.1 255.255.255.0
 ip nat inside
 ip virtual-reassembly in
!
interface GigabitEthernet0/1.2012
 encapsulation dot1Q 2012
 ip address 192.168.120.1 255.255.255.0
 ip nat inside
 ip virtual-reassembly in
!
interface GigabitEthernet0/1.3012
 encapsulation dot1Q 3012
 ip address 192.168.212.1 255.255.255.0
 ip nat inside
 ip virtual-reassembly in
!
interface GigabitEthernet0/1.4012
 encapsulation dot1Q 4012
 ip address 192.168.42.12 255.255.255.0
 ip nat inside
```

```
 ip virtual-reassembly in
!
router rip
 version 2
 network 172.30.0.0
 network 192.168.10.0
 network 192.168.12.0
 network 192.168.42.0
 network 192.168.120.0
 network 192.168.212.0
 neighbor 192.168.42.69
 no auto-summary
!
ip forward-protocol nd
no ip forward-protocol udp domain
no ip forward-protocol udp time
no ip forward-protocol udp netbios-ns
no ip forward-protocol udp netbios-dgm
no ip forward-protocol udp tacacs
ip forward-protocol udp bootps
ip forward-protocol udp bootpc
!
no ip http server
no ip http secure-server
!
ip nat pool G12 10.17.12.2 10.17.12.2 netmask 255.255.255.0
```

```
ip nat inside source list 1 pool G12 overload
ip nat inside source list 10 interface GigabitEthernet0/0 overload
ip nat inside source list 2 pool G12 overload
ip route 0.0.0.0 0.0.0.0 10.17.12.1
ip route 0.0.0.0 0.0.0.0 192.168.113.1 2
ip route 10.17.112.0 255.255.255.0 10.17.12.1
!
access-list 1 permit 192.168.0.0 0.0.255.255
access-list 2 permit 172.30.0.0 0.0.255.255
!
control-plane
!
 vstack
!
line con 0
 exec-timeout 0 0
 logging synchronous
line aux 0
line 2
 no activation-character
 no exec
 transport preferred none
 transport output pad telnet rlogin lapb-ta mop udptn v120 ssh
 stopbits 1
line vty 0 4
 privilege level 15
```

```
 no login
 transport input none
!
scheduler allocate 20000 1000
!
end
```

HP ProCurve 2900-24G

```
trunk A1-A3 Trk2 Trunk
vlan 1
   name "DEFAULT_VLAN"
   untagged 5-22,24,A4,Trk2
   ip address dhcp-bootp
   tagged 1-4
   no untagged 23
   exit
vlan 1012
   name "VLAN1012"
   untagged 2
   tagged 1,3-4
   no ip address
   exit
vlan 2012
   name "VLAN2012"
   untagged 3
   tagged 1-2,4
```

```
   no ip address
   exit
vlan 3012
   name "VLAN3012"
   untagged 4
   tagged 1-3
   no ip address
   exit
vlan 4012
   name "VLAN4012"
   untagged 23
   tagged 1
   no ip address
   exit
snmp-server community "public" Unrestricted
spanning-tree Trk2 priority 4
```