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SCICOMP202 NETWORKS & COMMUNICATIONS

PROJECT 2 SIMULATING THE UCR NETWORK IN 2014

This is all my own work. I have not knowingly allowed others to copy my work. This work has not been submitted for assessment in any other context.

WORK ARTEFACTS & ASSUMPTIONS

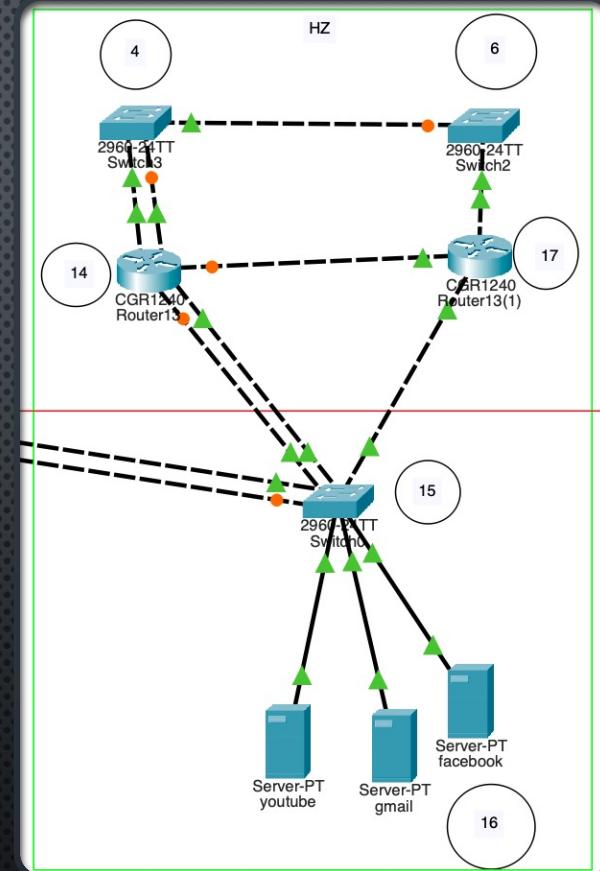
- HZ: 4,6,14,17,15,16
- THEODORE: 1,2,9,10,11
- FRANKLIN: 12
- ELEANOR:13
- UCR SUPPORT DOMAIN: 9,10,11,12,13,15,16
- NUMBER OF ELEMENTS: 13
- **CONNECTION DEVICES:**
- ALL THE SWITCHES: 2960 IOS15
- 6 ROUTERS: 5 CGR1240. 1 HOME WIRELESS ROUTER.
- **END DEVICES:**
- 7 SERVERS:
- 3 LAPTOPS: WIRELESS CONNECTION
- PCs

VARIABLES:

- INDEPENDENT VARIABLES: (LINKS AND ARTEFACTS) ROUTERS
- DEPENDENT VARIABLES: PING TTL

Hz:

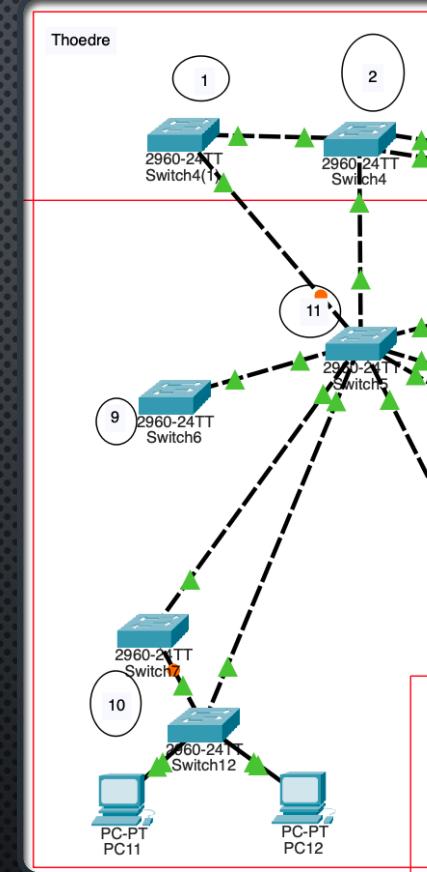
- 2 ROUTERS: 2 LANs.
- 3 SERVERS: THE SERVERS ARE NAMED AS SHOWN.
- SWITCH 15: CONNECTION TO UCR (THEODORE)



We can deny access to any of the defined servers for computers in the diagram.

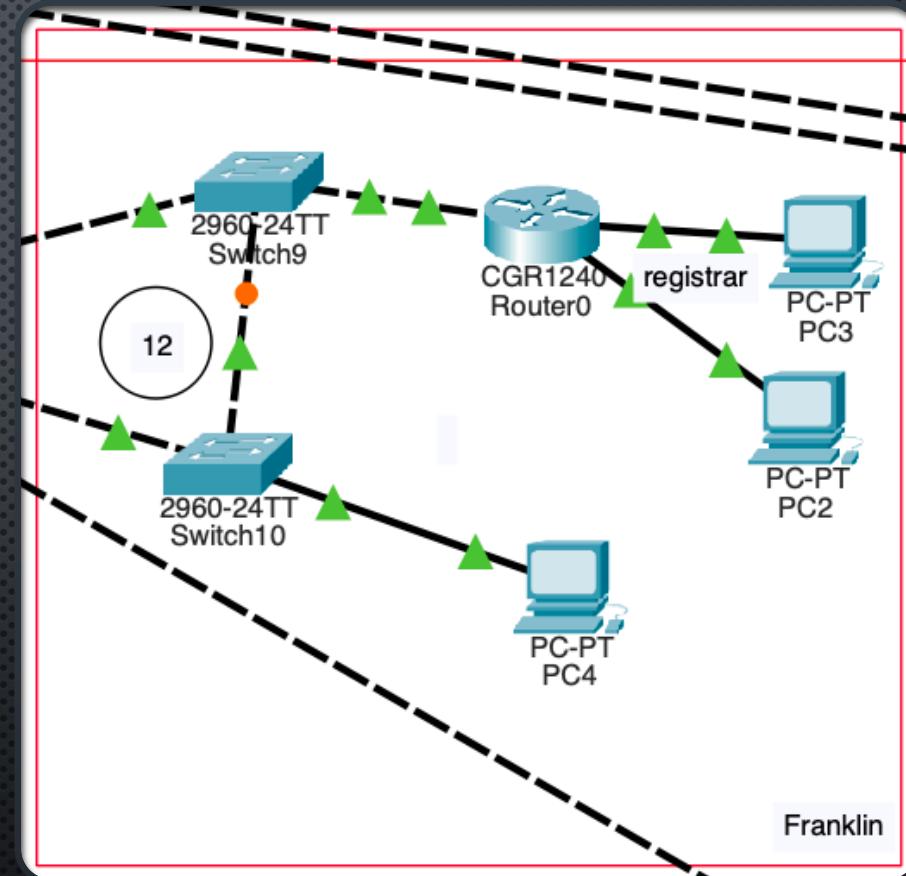
THEODORE:

- SWITCH 2 IS THE CONNECTION TO HZ
- SWITCH 11 IS THE UCR GATEWAY
- WE HAVE TWO PCs IN THIS IMAGE: WE HAVE DEFINED UCR **EMAIL ADDRESSES, DOMAIN NAMES**, WHICH WILL BE DISCUSSED IN FURTHER SLIDES.
- WE HAVE DEFINED **STATIC** IPv4 ADDRESSES. (**SUBNETS** SHOULD BE EQUAL).



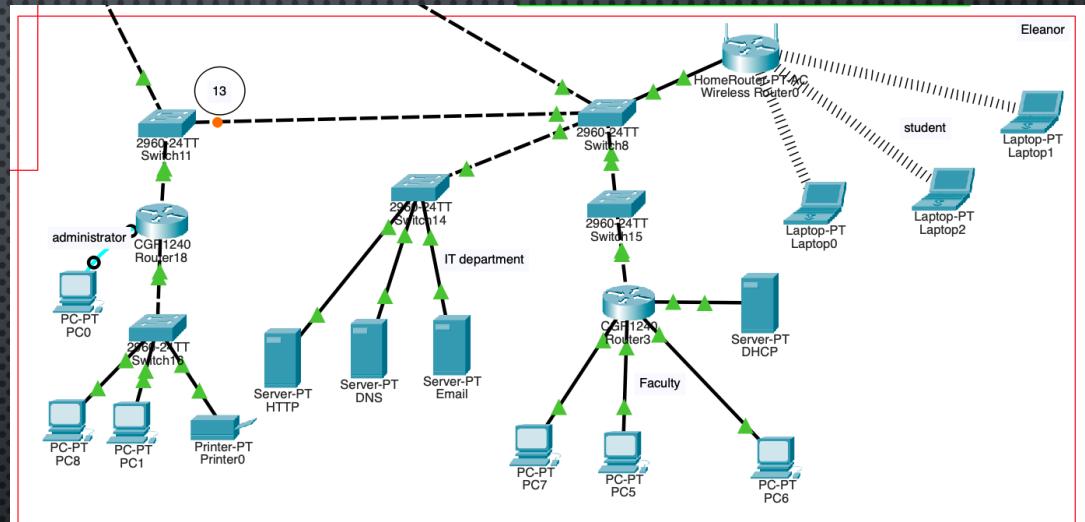
FRANKLIN:

- 2 LANS
- ONE LAN IS FOR REGISTRAR. THIS WILL INCREASE SECURITY USING THE ROUTER. (INACCESSIBILITY)
- THE TWO PCs HAVE **DHCP** **IPS**. (BY USING THE **DHCP SERVER** IN THE ELEANOR PART). WE ASSUMED HERE WE ONLY HAVE **1 DHCP SERVER**.
- THE PCs HAVE THE **SAME SUBNETS** AS THE **FACULTIES**.
- **PC4** HAS **STATIC** IP ADDRESS.



ELEANOR: (MAIN PART)

- 4 LANs (3 Routers)
- LAN 1: Students
- LAN 2: Faculty
- LAN 3: Administrator & Printer
- LAN 4: Main Network
- Dividing the network we can inaccess students to faculties computers by the router.



LAN 1

- STUDENTS: WIRELESS CONNECTIONS
- NO PINGING TO OTHER UCR PCS AVAILABLE. (REQUEST TIME OUT. FIREWALL)
- THE THREE LAPTOPS HAVE DHCP IPS WITH 192.168.0 SUBNET.

Laptop2

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:>ping pc12
C:>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.11:
  Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Control-C
^C
C:>
```

The kind of the routers are different.

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LAN 2:

The screenshot shows a network management interface with a command-line window at the top and a configuration table below.

Command-line output:

```
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.2.4:
  Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
  Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping pc5
Pinging 192.168.1.6 with 32 bytes of data:
Request timed out.
Request timed out.

Ping statistics for 192.168.1.6:
  Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),

Control-C
^C
C:\>ping pc6
Ping request could not find host pc6. Please check the name and try again.
C:\>
```

Configuration Table (DHCP Server):

	DNS	SYSLOG	AAA	NTP	EMAIL	FTP	IoT	VM Management	Radius EAP	
DNS Server	192.168.1.2									
Start IP Address :	192	168	1	0						
Subnet Mask:	255	255	255	0						
Maximum Number of Users :	256									
TFTP Server:	0.0.0.0									
WLC Address:	0.0.0.0									
Add		Save		Remove						
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address			
MY_LAN	192.168...	192.168...	192.168...	255.255...	256	0.0.0.0	0.0.0.0			
serverPool	0.0.0.0	0.0.0.0	192.168...	255.255...	512	0.0.0.0	0.0.0.0			

- FACULTY: 3 PCS WITH DHCP SERVER
- DHCP SERVER.
- SO ANY ADDED PC WILL AUTOMATICALLY HAVE A IP.
- THEY HAVE THE SAME SUBNET AS PC2 AND PC3 IN REGISTRAR.
- PC5 HAS A DNS BUT PC6 AND 7 DO NOT.

LAN 3:

- NETWORK ADMINISTRATOR WITH CONSOLE CABLE. (ROUTER ACCESS THORUGH THE PC)
- TWO PCs WITH STATIC IP ADDRESSES.

```
%LINK-5-CHANGED: Interface FastEthernet2/3, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/3, changed state to up
%LINK-5-CHANGED: Interface FastEthernet2/4, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet2/4, changed state to up
Router>enable
Router#
Router#
```

LAN 4
(IT)

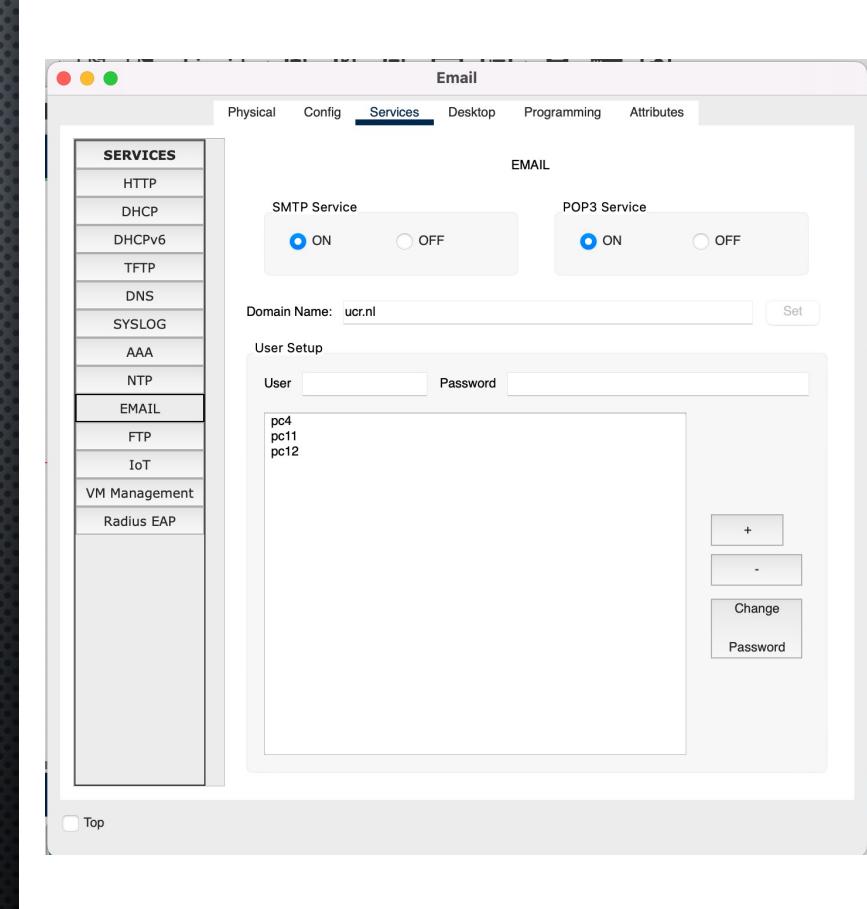
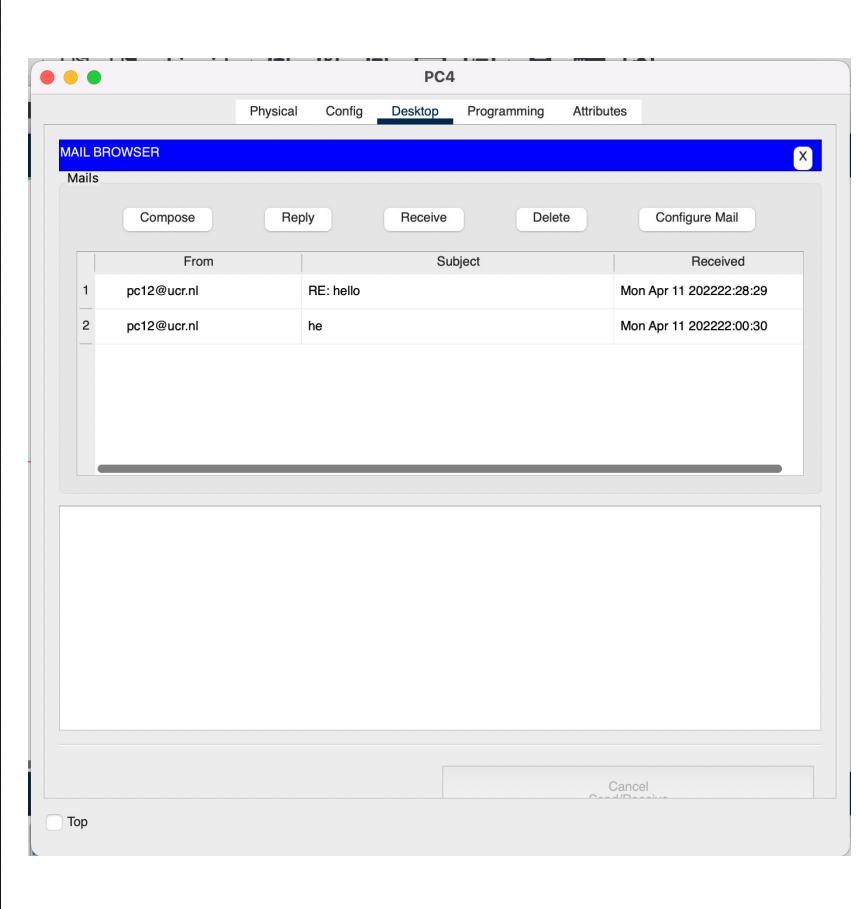
Each server can be pinged and has a static IP address

3 servers:

Server 1:email

Server 2: http

Server 3: DNS



DNS

- Physical
- Config
- Services**
- Desktop
- Programming
- Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management**
- Radius EAP

DNS

DNS Service On Off

Resource Records

Name	Type
	A Record

Address

No.	Name	Type	Detail
0	dns	A Record	192.168.2.10
1	pc11	A Record	192.168.2.11
2	pc12	A Record	192.168.2.12
3	pc4	A Record	192.168.2.4
4	pc5	A Record	192.168.1.6
5	ucr.nl	A Record	192.168.2.9
6	www.ucr.nl	A Record	192.168.2.8

DNS Cache

Top

```
C:\>ping www.ucr.nl
```

```
Pinging 192.168.2.8 with 32 bytes of data:
```

```
Reply from 192.168.2.8: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 192.168.2.8:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\>
```

```
Reply from 192.168.2.4: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 192.168.2.4:
```

```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
C:\>ping pc5
```

```
Pinging 192.168.1.6 with 32 bytes of data:
```

```
Request timed out.
Request timed out.
```

```
Ping statistics for 192.168.1.6:
```

```
Packets: Sent = 3, Received = 0, Lost = 3 (100% loss),
```

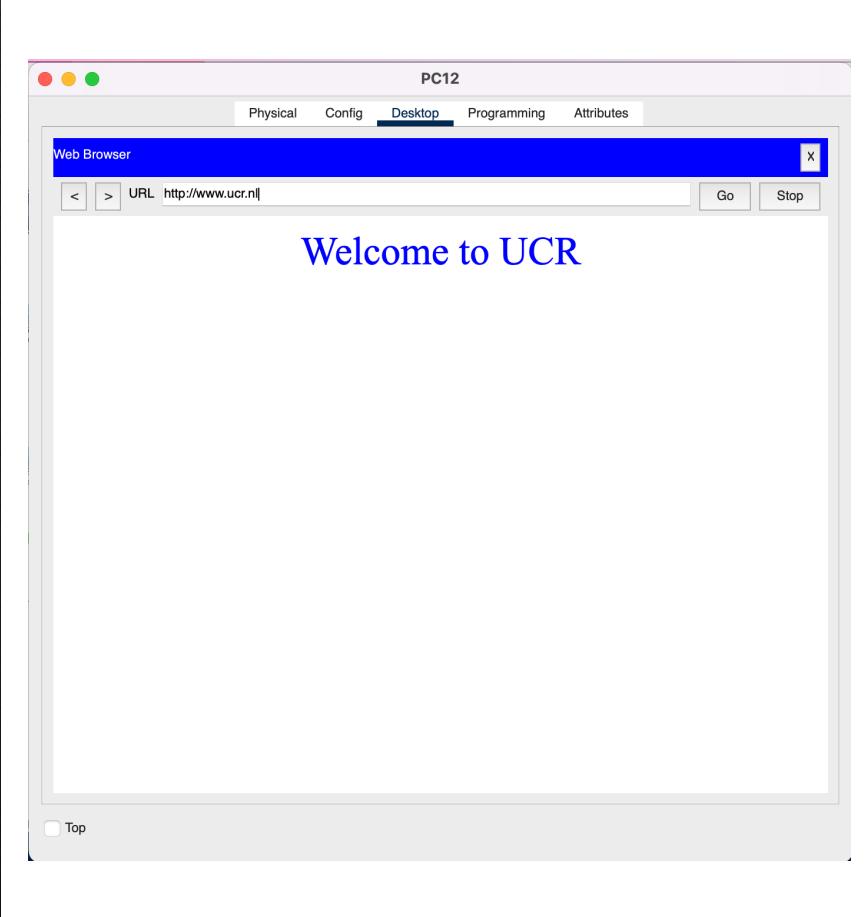
```
Control-C
```

```
^C
```

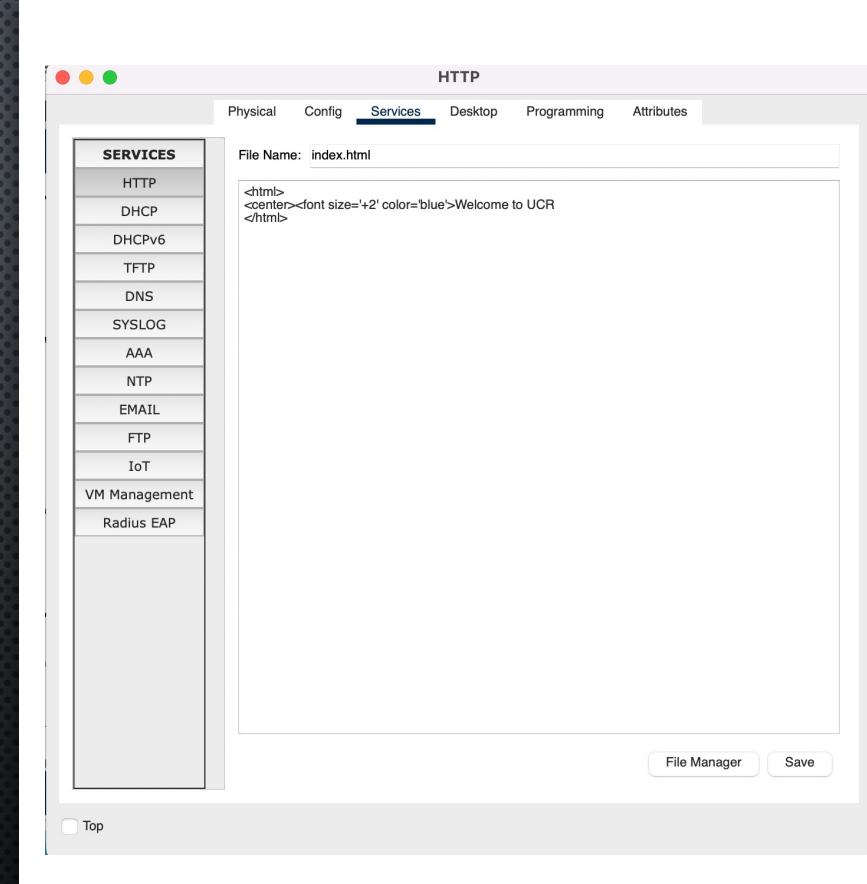
```
C:\>ping pc6
```

```
Ping request could not find host pc6. Please check the name and try again.
```

```
C:\>
```

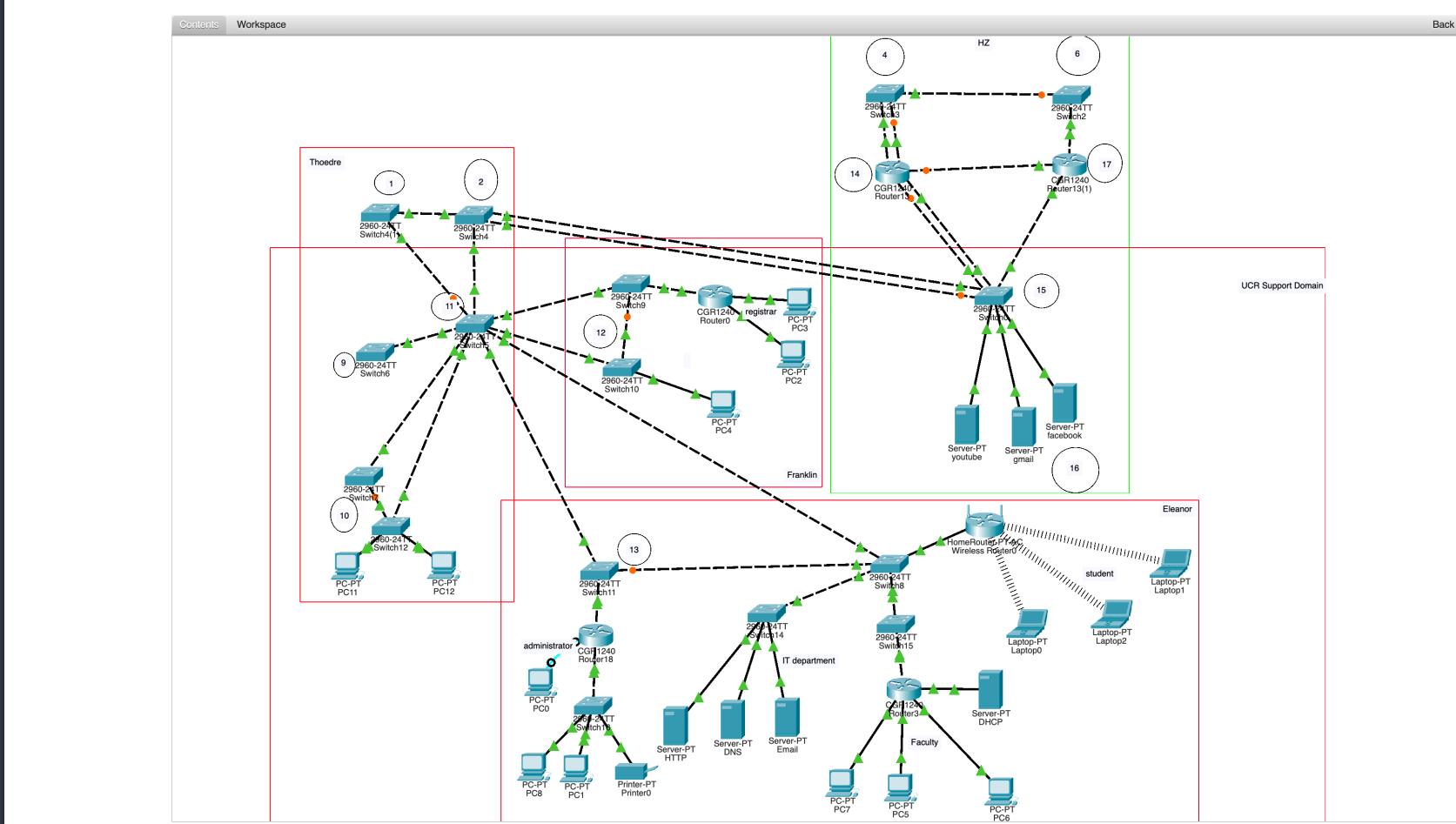


The webpage



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- UCR DOMAIN SYSTEM HAS 3 MAIN SECTIONS
- THEY ARE ALL ONE LOCAL NETWORK
- IT HAS AN EMAIL, HTTP, AND DNS SERVER (SOMEWHERE)
- THE MAXIMUM NUMBER OF PCs.

What IF:

- 1-IF WE DIVIDED THE NETWORK OF FACULTY MEMBERS AND OTHER SECTIONS WE CAN INCREASE THE SECURITY OF THEIR PERSONAL PCs
- 2-I THINK UCR EMAIL SERVER IS IN UTRECHT, SO HAVING OUR OWN SERVER WOULD POSSIBLY ALLOW US TO CHANGE THE EMAILING ENVIRONMENT.
- 3-LOCAL NETWORKING EACH DEPARTMENT WOULD ALLOW US TO INCREASE THE BANDWIDTH AND SECURITY. (IF THE STUDENT POPULATION WAS MORE)
- 4-HZ HAS 2 ROUTERS AFTER THE GATEWAY BUT WE DIRECTLY CONNECT TO THE INTERNET.

REFERENCES:

- [HTTPS://JUNIORBOYBOY2.MEDIUM.COM/CAMPUS-UNIVERSITY-NETWORK-DESIGN-CONFIGURATION-ON-PACKET-TRACER-SIMULATION-5C6EB04E5307](https://juniorboyboy2.medium.com/campus-university-network-design-configuration-on-packet-tracer-simulation-5c6eb04e5307)
- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=RSBn0vF21n4](https://www.youtube.com/watch?v=RSBn0vF21n4)
- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=3ASZlwOqit8](https://www.youtube.com/watch?v=3ASZlwOqit8)
- [HTTPS://COMPUTERNETWORKING747640215.WORDPRESS.COM/2018/07/05/HOW-TO-CONFIGURE-DHCP-SERVER-IN-PACKET-TRACER/](https://computernetworking747640215.wordpress.com/2018/07/05/how-to-configure-dhcp-server-in-packet-tracer/)
- [HTTPS://COMPUTERNETWORKING747640215.WORDPRESS.COM/2018/07/05/DNS-SERVER-CONFIGURATION-IN-PACKET-TRACER/](https://computernetworking747640215.wordpress.com/2018/07/05/dns-server-configuration-in-packet-tracer/)
- [HTTPS://COMPUTERNETWORKING747640215.WORDPRESS.COM/2018/07/05/CONFIGURING-A-MAIL-SERVER-IN-PACKET-TRACER/](https://computernetworking747640215.wordpress.com/2018/07/05/configuring-a-mail-server-in-packet-tracer/)
- [HTTPS://WWW.YOUTUBE.COM/WATCH?V=MtD2F2lmsQ](https://www.youtube.com/watch?v=MtD2F2lmsQ)

Second one is a video of securing the network.

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