# LAB 1
# Documentation

Team: ByteBunch5

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## Table of Contents

# PROJECT SUMMARY

This project presents a structured network setup for a Networks lab. A network topology has been precisely designed, complemented by specific VLANs, ensuring optimal connectivity between devices. This environment is also replicated in Project Tracer for validation and practice purposes. Key features of the project include established VLANs, trunking configurations, active EtherChannel between switches, set routing procedures, and remote management capabilities. Using DHCPv4, dynamic IP addressing has been integrated. The documentation that follows offers a detailed view of the network's specifications, connections, and other critical aspects, reflecting both the practical and virtual components of the project.

# NETWORK CONFIGURATION DETAILS- TABLES

## Addressing table

*Note VLANS and corresponding IP subnets*

| Device | Interface | IP Address | Default Gateway |
|---|---|---|---|
| SW1_broom | VLAN 10 | 192.168.10.2 /24 | 192.168.10.1 |
| SW2 | VLAN 10 | 192.168.10.3 /24 | 192.168.10.1 |
| Router_on_a_stick | F0/1.10<br>F0/1.20<br>F0/1.30<br>F0/1.40 | 192.168.10.1 /24<br>N/A<br>192.168.30.1 /24<br>192.168.40.1 /24 | N/A |
| Saana-PC | NIC | DHCP Assigned | DHCP Assigned |
| Student-PC | NIC | DHCP Assigned | DHCP Assigned |

## VLAN Table

| VLAN | Name | Interface Assigned | Trunking Ports |
|---|---|---|---|
| 10 | Remote_Management | SW1_broom: VLAN 10<br>SW2: VLAN 10<br>Router_on_a_stick: F0/1.10 | SW1_broom :G0/1-2 , F0/1<br>SW2 : G0/1-2<br>Router_on_a_stick: F0/1 |
| 20 | Native_Replacement | | SW1_broom :G0/1-2, F0/1<br>SW2 : G0/1-2<br>Router_on_a_stick: F0/1.20 |
| 30 | Smart_IoT_Students | SW2: F0/1 (access port)<br>Router_on_a_stick: F0/1.30 | SW1_broom :G0/1-2 , F0/1<br>SW2 : G0/1-2<br>Router_on_a_stick: F0/1 |

| | | | |
|---|---|---|---|
| 40 | Saana_LabRats | SW1_broom: F0/2 (access port)<br>Router_on_a_stick: F0/1.40 | SW1_broom :G0/1-2 , F0/1<br>SW2 : G0/1-2<br>Router_on_a_stick: F0/1 |

## EtherChannel Table

| Channel Group | Port-Channel | Ports | Protocol |
|---|---|---|---|
| 1 | Po1 | SW1_broom - G0/1-2<br>SW2 - G0/1-2 | PAgP |

## Subnets and DHCP settings

| VLAN | Subnet | Gateway | Pool Name | DHCP server | Excluded/reserved addresses |
|---|---|---|---|---|---|
| 10 | 192.168.10.0/24 | 192.168.10.1 | | | |
| 20 | 192.168.20.0/24 | | | | |
| 30 | 192.168.30.0/24 | 192.168.30.1 | Students | 192.168.30.254 | 192.168.30.1 – 192.168.30.10, 192.168.30.254 |
| 40 | 192.168.40.0/24 | 192.168.40.1 | Saana | 192.168.40.254 | 192.168.40.1 – 192.168.40.10, 192.168.40.254 |

## Physical Cable Table

| From - interface | To - interface |
|---|---|
| SW1_broom - G0/1-2 | SW2 – G0/1-2 |
| SW1_broom – F0/1 | Router_on_a_stick – F0/1 |
| SW1_broom – F0/2 | Saana-PC - NIC |
| SW2 – F0/1 | Student-PC - NIC |

## For remote access:

Username: ByteBunch5

Password: cisco

# TROUBLESHOOTING

1. Problem: The SSH server did not start, which inhibited remote connections.

Troubleshooting: After issuing the “show ip ssh” command, it was clear that the SSH service was not active due to the absence of rsa keys. After generating these keys, the system functioned as expected.

2. Problem: Remote connection to switches/router was unsuccessful in the classroom

Troubleshooting: From the logs we figured out that there was an encryption cipher incompatibility between the SSH client and the server. Despite of our best efforts the clients refused to connect with SSH server even with additional parameters. We recreated the same lab with exact same topology in Packet Tracer for testing and practice purposes. We were able to successfully connect remotely to both switches and to the router. (figure 3, figure 4, figure 5) We were able to connect remotely using PuTTY (figure 6, figure 7) .

2. Problem: SSH was not set up successfully on a router

Troubleshooting: Once router’s default name was changed, rsa keys could be generated successfully, and the SSH started automatically.
*Update: We removed SSH from the router.*

3. Problem: The VLANS were not established when transferred into the switch’s running config.

Troubleshooting: VLANs were again created manually as they are stored in vlans.dat rather than in the running config. The VLAN creation commands were added to the running config text file. Now, if vlan.dat is removed, the configuration can be restored by copy-pasting from the text file.

4. Problem: DHCP not operational on PCs

Troubleshooting: After reviewing configurations, it became apparent that the cable was connected to the wrong port. After that was fixed, the DHCP started working on both PCs.

5.Problem: Interface F0/1 was shutdown on the router, even though we configured and saved it as no shutdown

Troubleshooting: Each time the lab starts, F0/1 needs to be put in no shutdown.

# TEST RESULTS

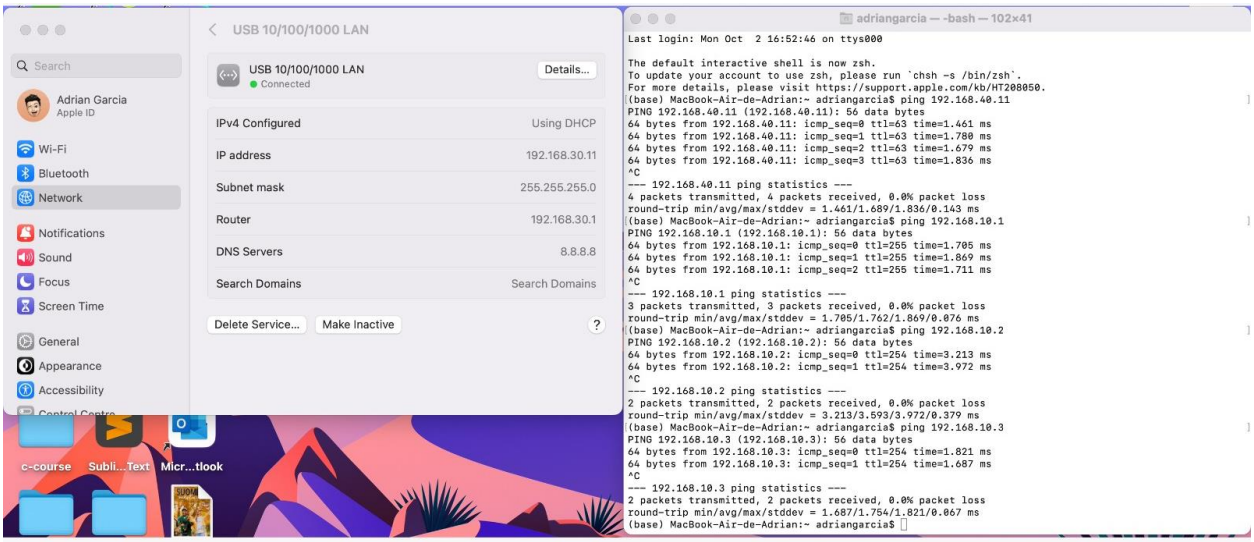


Figure 1: DHCP for Student-PC, Pings to Saana-PC, router and both switches

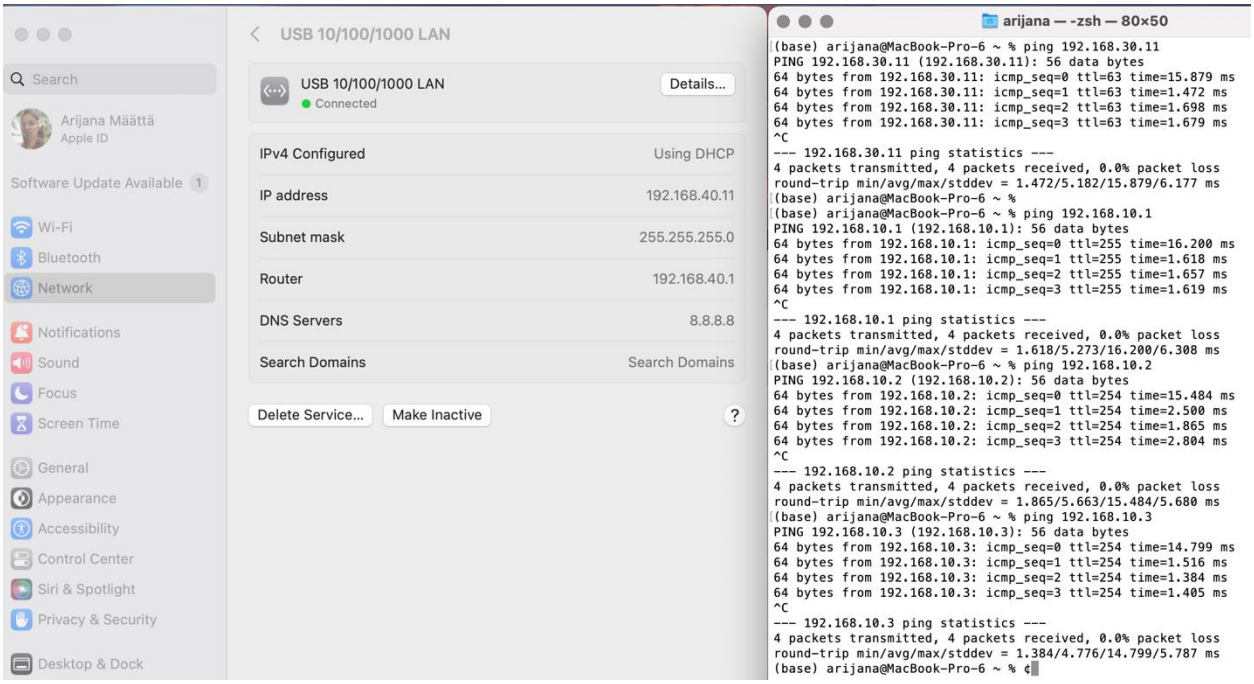


Figure 2: DHCP for Saana-PC, Pings to Student-PC, router and both switches

```
Last login: Mon Oct  2 17:29:33 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Air-de-Adrian:~ adriangarcia$ ssh -l ByteBunch5 192.168.10.2
Unable to negotiate with 192.168.10.2 port 22: no matching key exchange method found. Their offer: diffie-hellman-group-exchange-sha1,diffie-hellman-group14-sha1,diffie-hellman-group1-sha1
(base) MacBook-Air-de-Adrian:~ adriangarcia$
```

Figure 3: Connection from terminal to SW1- Unsuccessful

```
SW1_broom>show ip ssh
SSH Enabled - version 2.0
Authentication timeout: 120 secs; Authentication retries: 3
Minimum expected Diffie Hellman key size : 1024 bits
IOS Keys in SECSH format(ssh-rsa, base64 encoded):
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAAAgQDAjHPIATWLgVWSaO1EvBst3Z4gfNl9EoPwimElD/Z8
8WkjWWg/PDnCILOCywjuzqX2uUBDmSpu8KPmx+XuzJuPk3GW8cUSL0/kxDV8EX9QDn6fbbQfo/mGCD7g
Rd4cu6ouQSE0YabS2UPds62Yk82r8T5rJ3vTPOCL7sKo3U15uQ==
SW1_broom>
%SSH-3-NO_MATCH: No matching cipher found: client chacha20-poly1305@openssh.com,aes128-ctr,aes192-ctr,aes256-ctr,aes128-gcm@openssh.com,aes256-gcm@openssh.com server aes128-cbc,3
des-cbc,aes192-cbc,aes256-cbc
SW1_broom>
%SSH-3-NO_MATCH: No matching cipher found: client chacha20-poly1305@openssh.com,aes128-ctr,aes192-ctr,aes256-ctr,aes128-gcm@openssh.com,aes256-gcm@openssh.com server aes128-cbc,3
des-cbc,aes192-cbc,aes256-cbc_
9600-8N1   Xterm   Zmodem   ZOC2310__dev_cu.usbserial-1100130.log   01:19:00   178x53
```

Figure 4: SW1_broom unsuccessful ssh

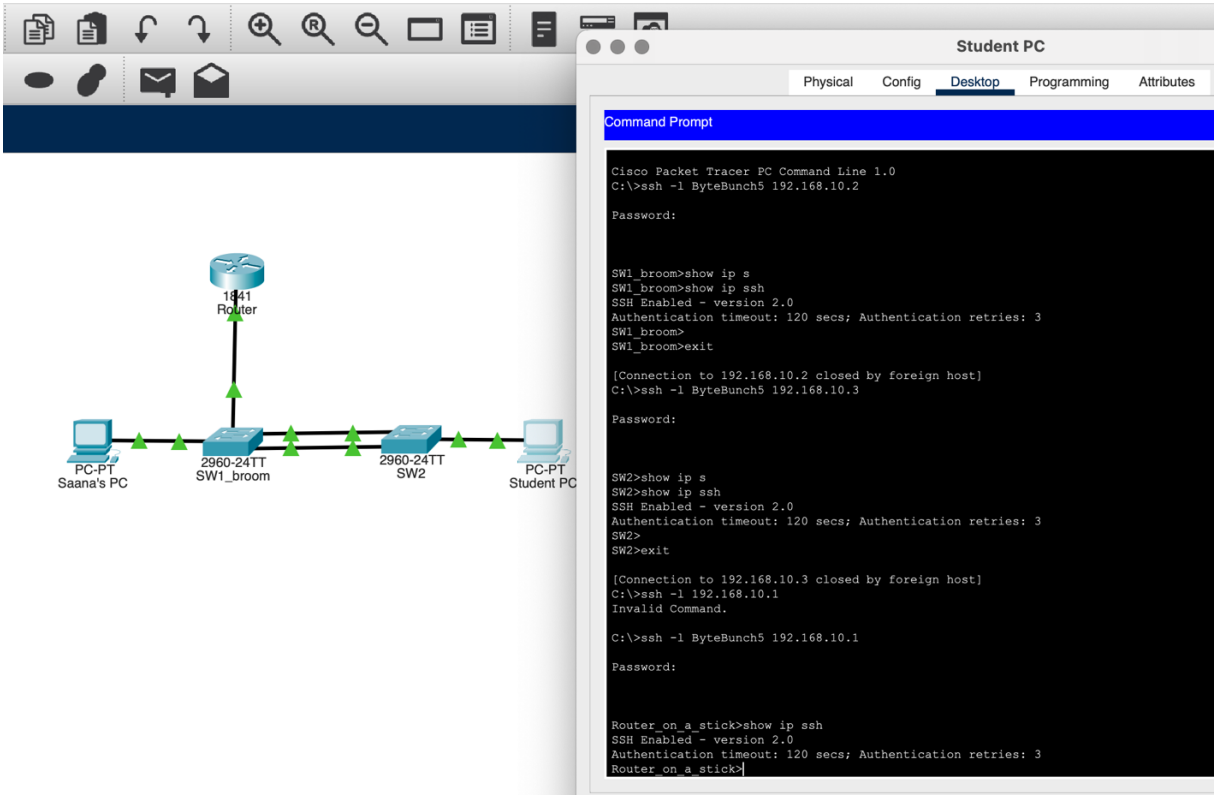


Figure 5: Connection from Packet Tracer to both switches and router – Successful

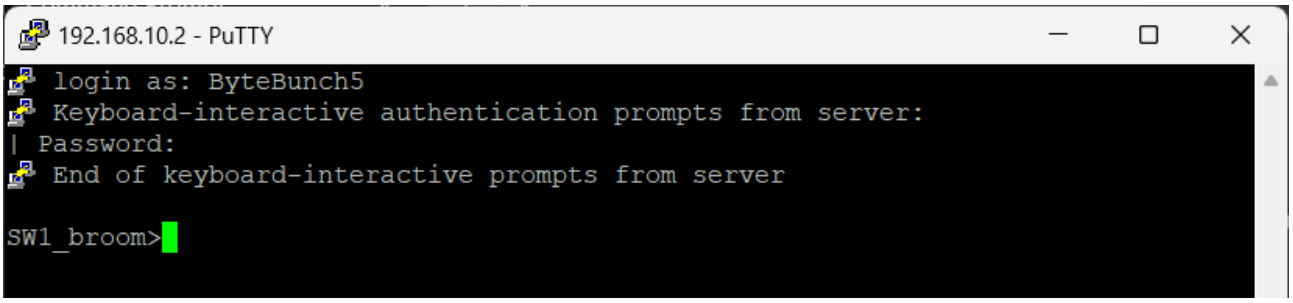


Figure 7: Remote connection to SW1_broom via PuTTY

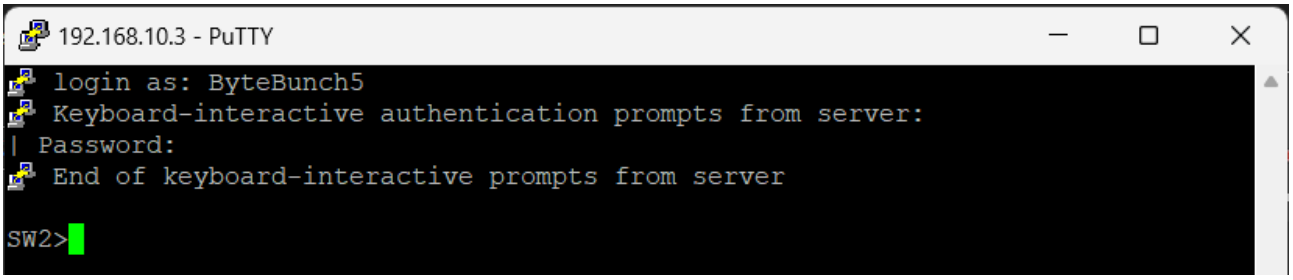


Figure 6: Remote connection to SW2 via PuTTY

## MEME

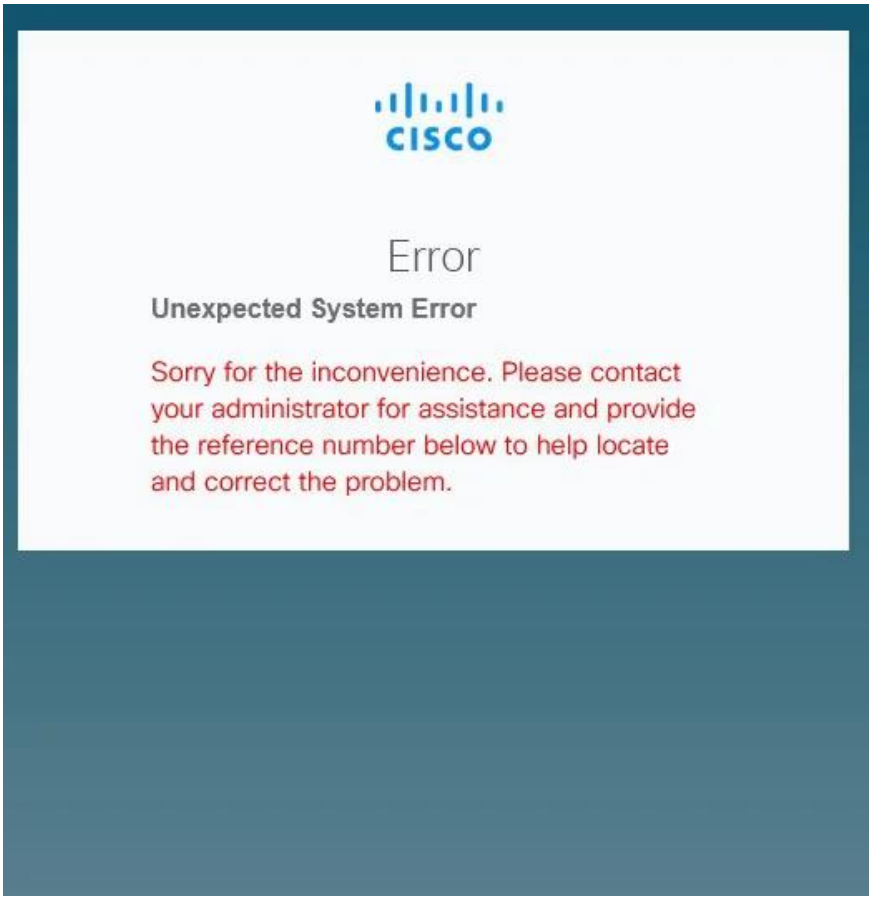


Figure 8: Meme