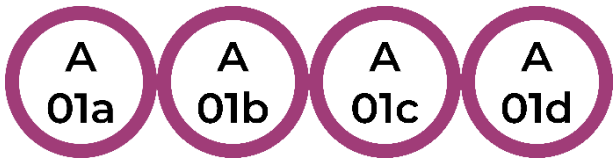


Lembar Jawaban
Assignment – A01

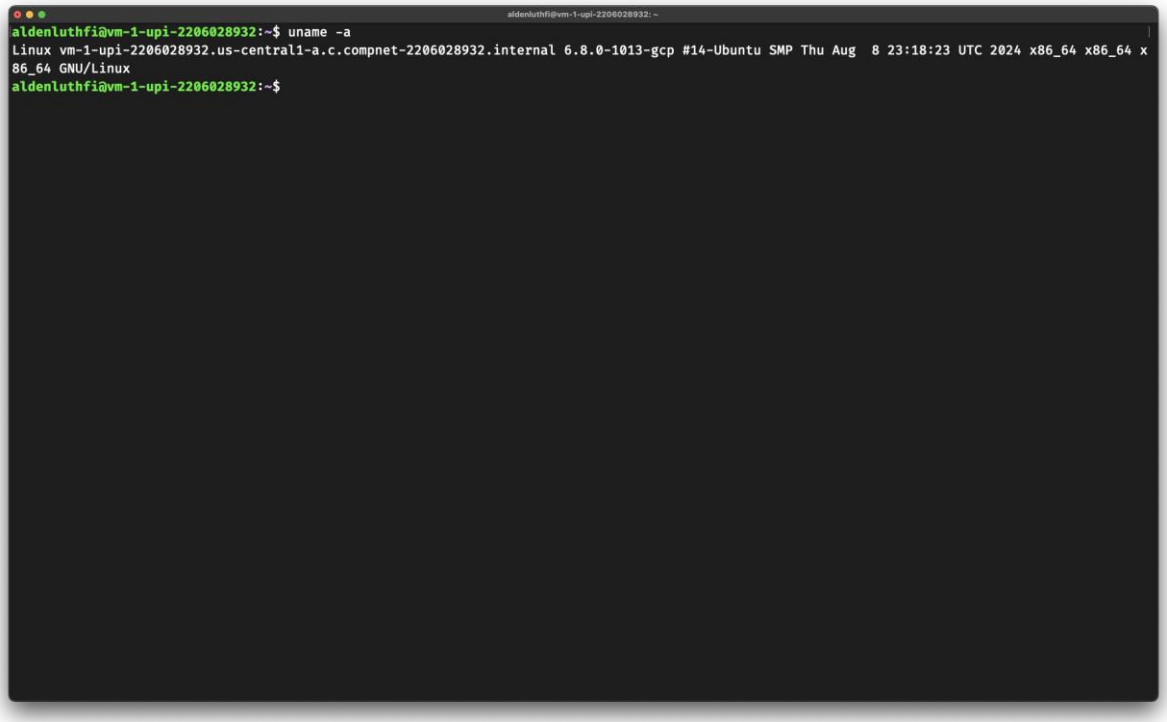
Introduction to Google Cloud Platform, Packet Tracer, Networking Tools, and Go Programming Language

Nama : Alden Luthfi
NPM : 2206028932

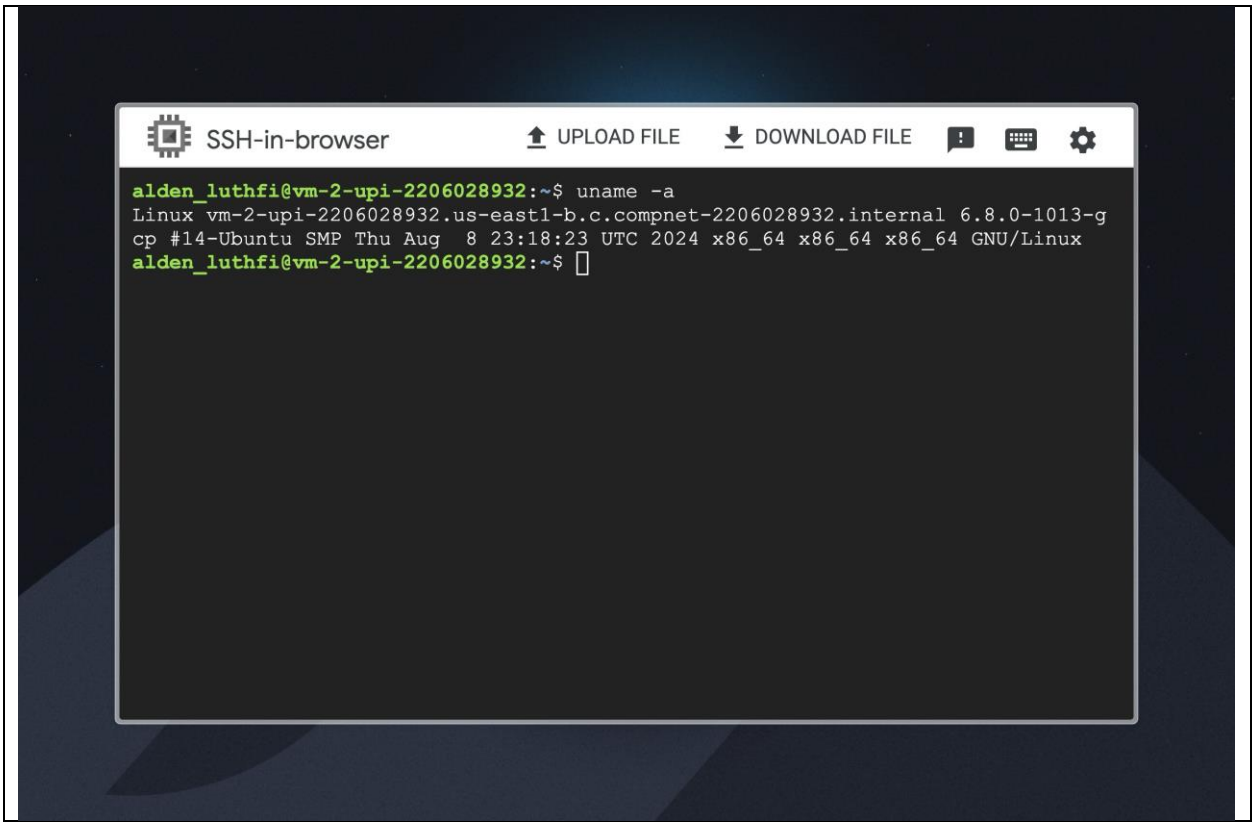
A01a – Introduction to Google Cloud Platform

Bukti Koneksi SSH

Tangkapan Layar VM1

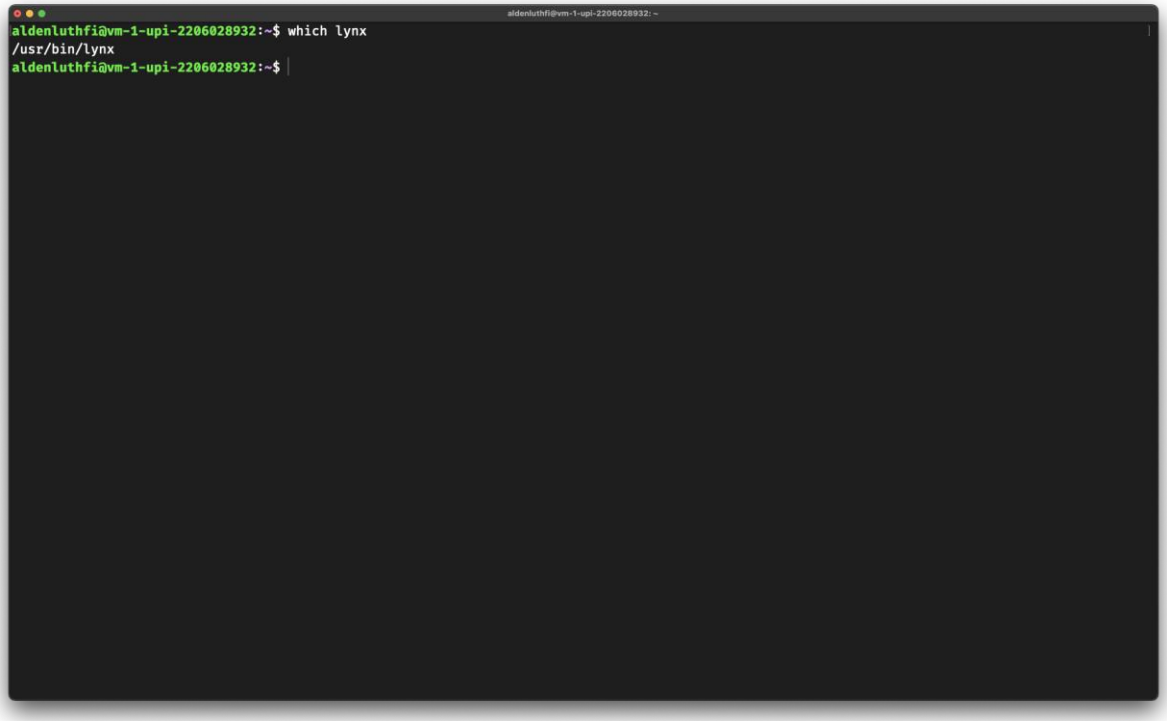


Tangkapan Layar VM2

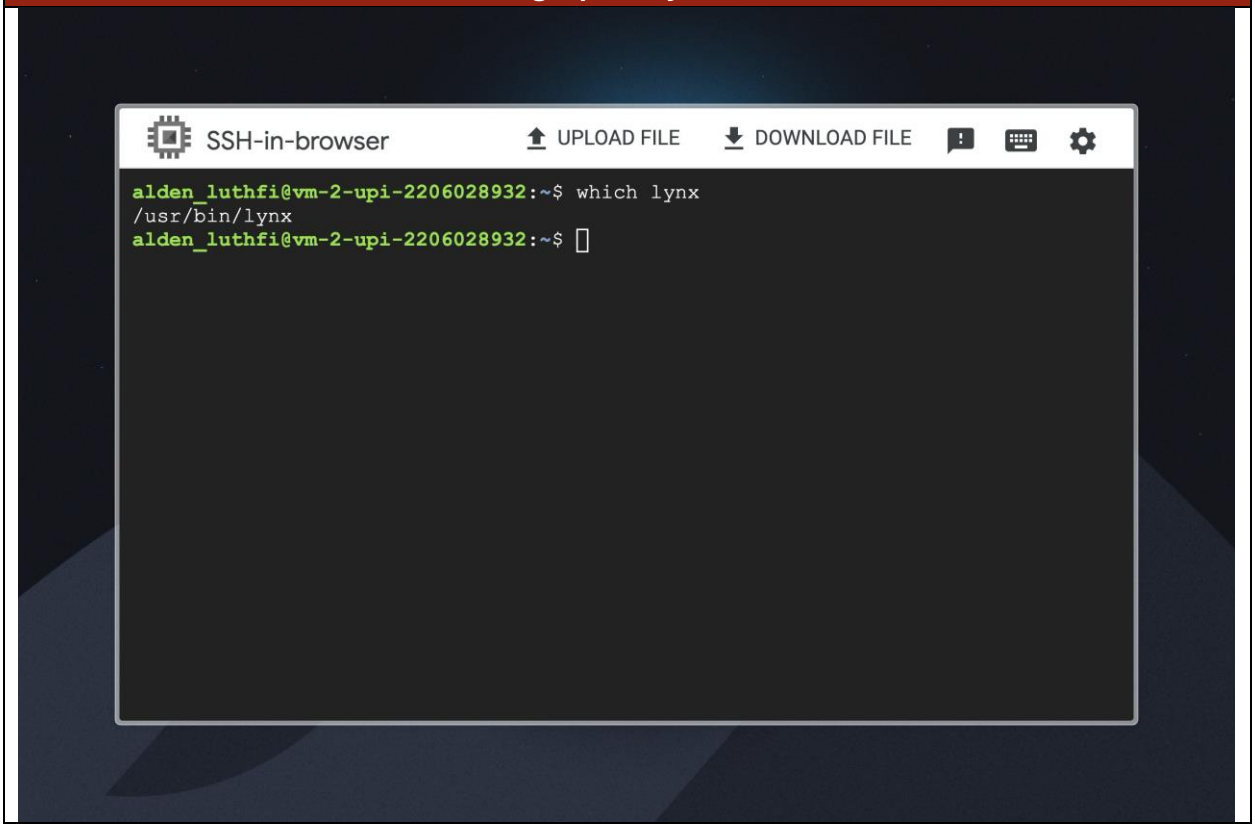


Pemasangan Aplikasi

Tangkapan Layar VM1



Tangkapan Layar VM2



Bukti Pembuatan Aturan Firewall

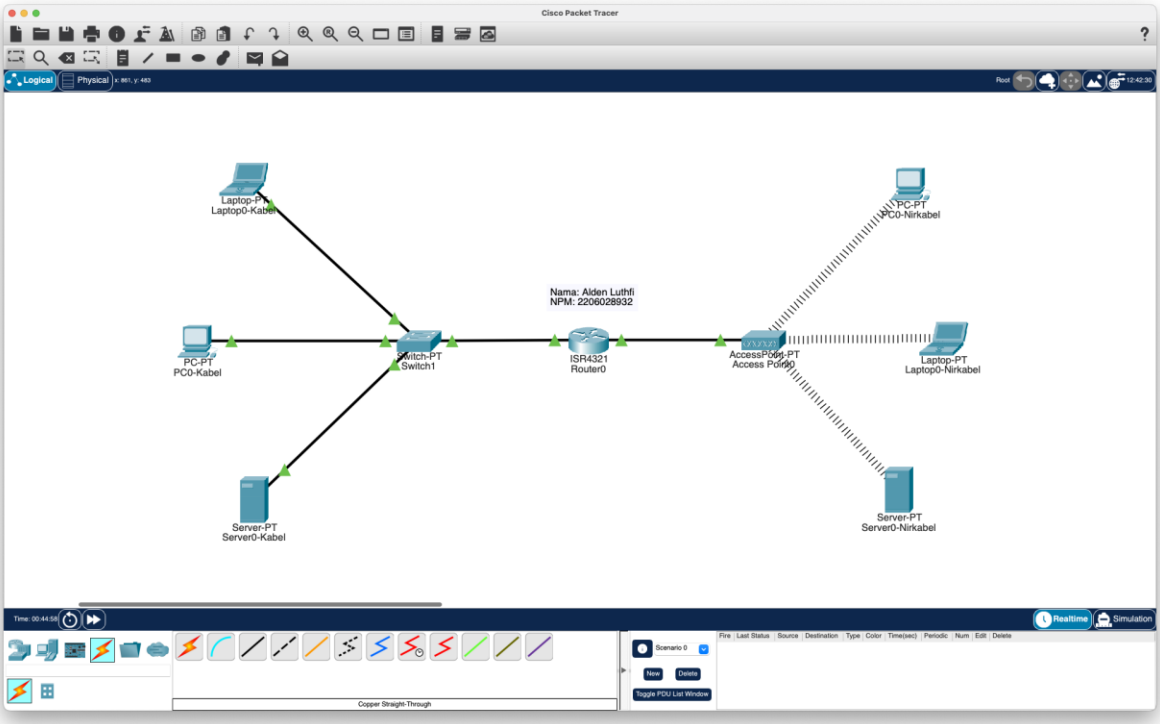
Kalian tidak perlu mencantumkan apa pun di laporan untuk bagian ini. Kalian cukup mengumpulkan berkas yang diminta sesuai spesifikasi.

Bukti Pembuatan VM

Kalian tidak perlu mencantumkan apa pun di laporan untuk bagian ini. Kalian cukup mengumpulkan berkas yang diminta sesuai spesifikasi.

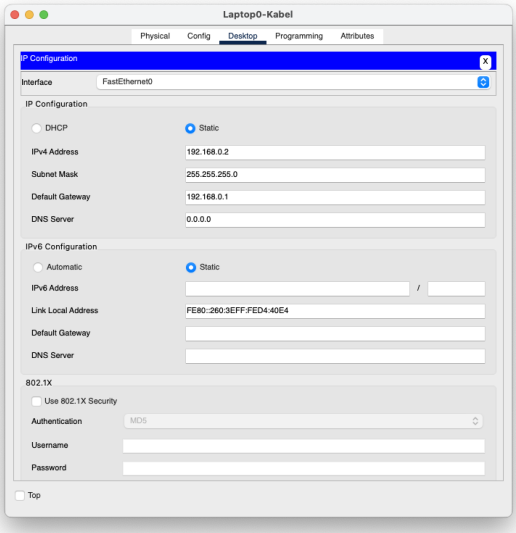
A01b - Introduction to Packet Tracer

1. [10] Topologi

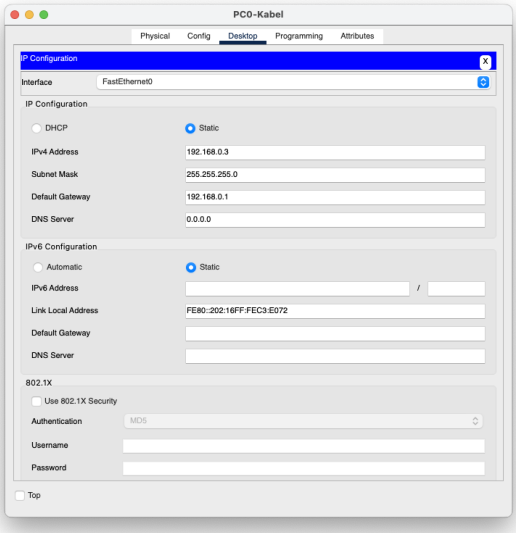
Tangkapan Layar Topologi


2. [40] Konfigurasi Perangkat

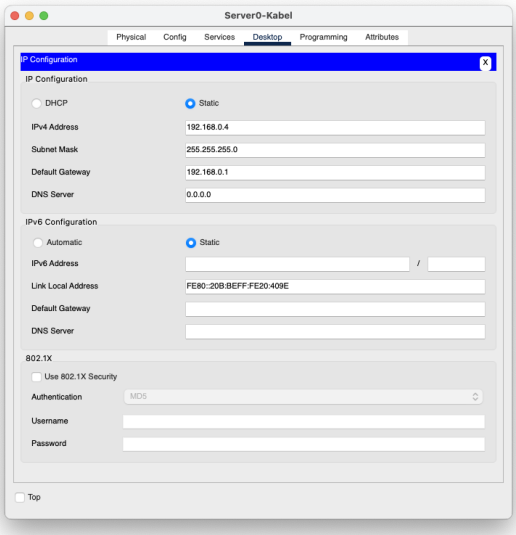
Laptop0-Kabel	PC1-Kabel



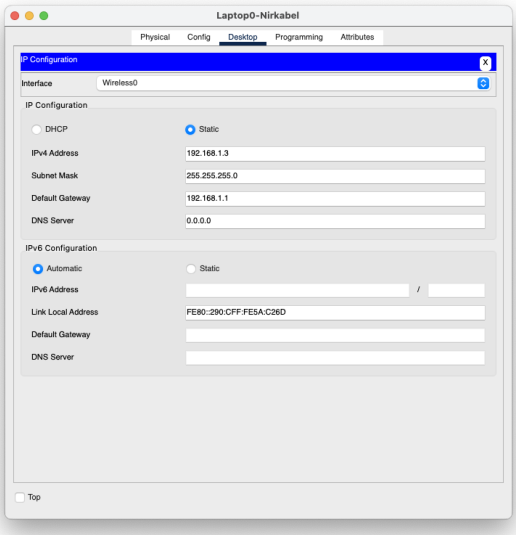
Server0-Kabel



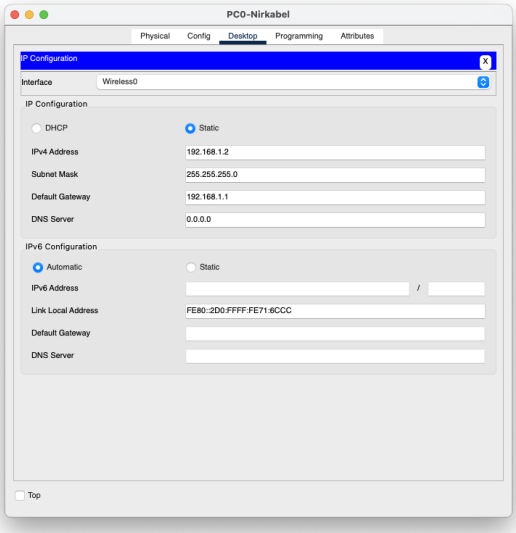
Laptop0-Nirkabel

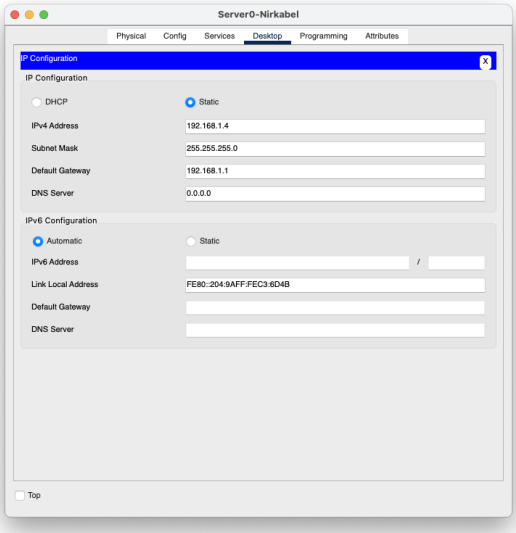


PC1-Nirkabel

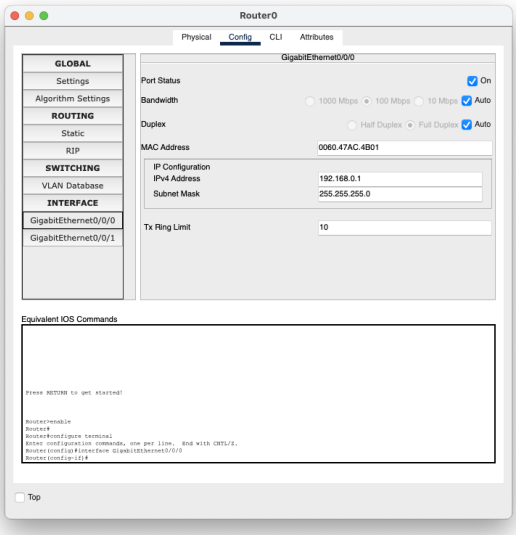


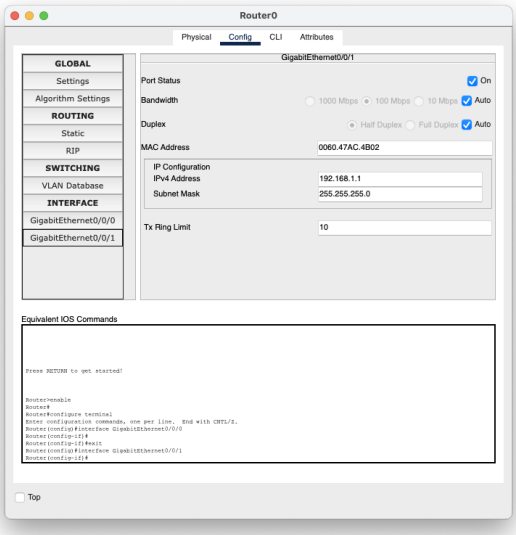
Server0-Nirkabel





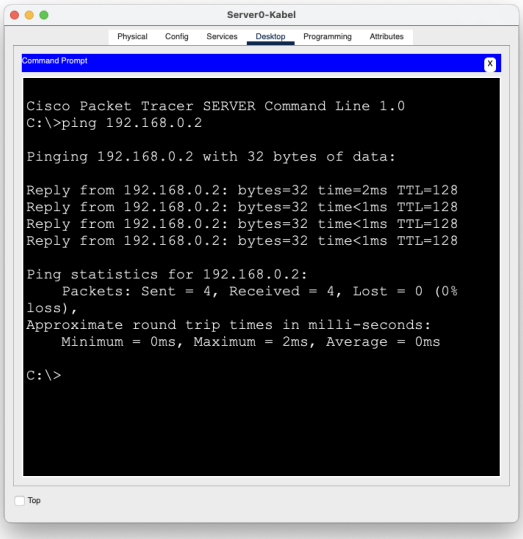
Router0-Gig0/0/0	Router0-Gig0/0/1



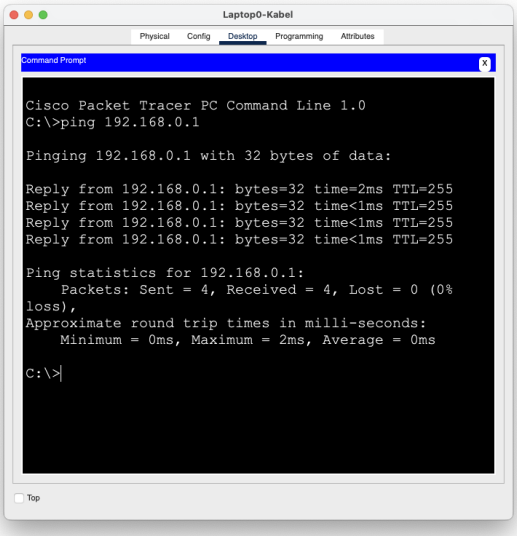


3. [30] Uji Konektivitas

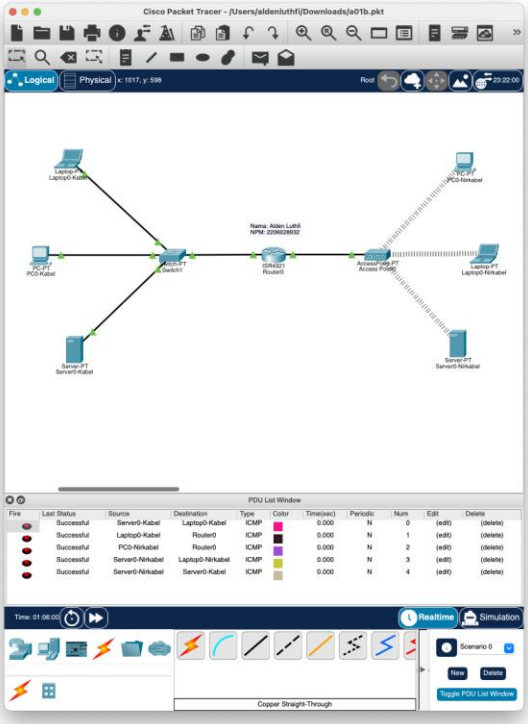
Command Prompt – PING	PDU Sederhana
a. Server0-Kabel ke Laptop0-Kabel	Hasil Seluruh (a-e) Uji Konektivitas

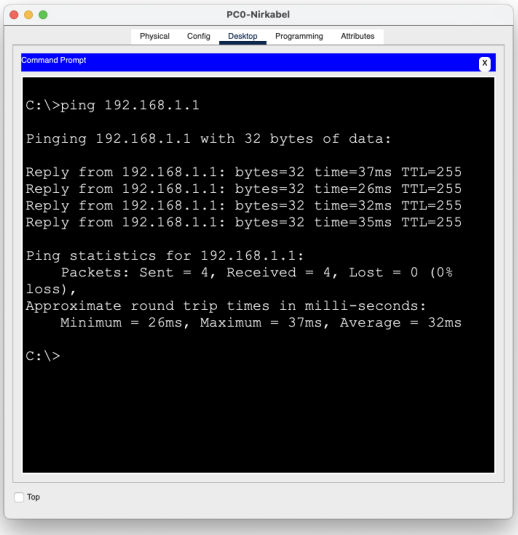


b. Laptop0-Kabel ke Router0

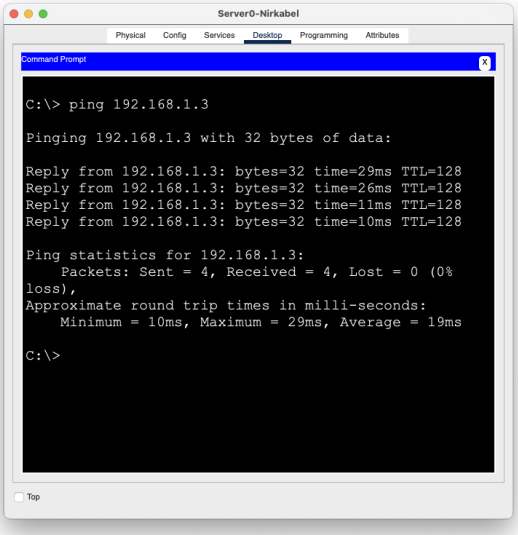


c. PC0-Nirkable ke Router0

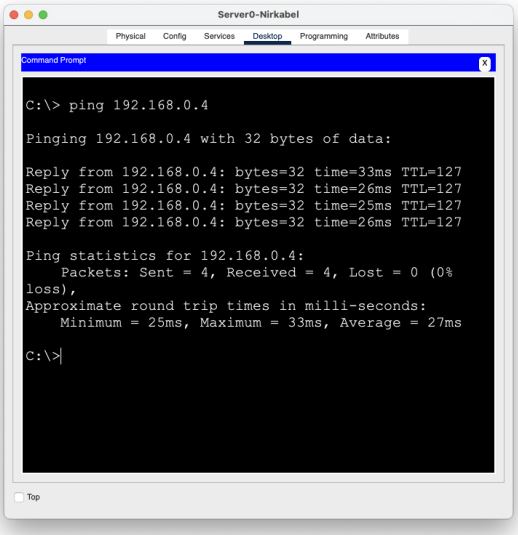




d. Server0-Nirkabel ke Laptop0-Nirkabel



e. Server0-Nirkabel ke Server0-Kabel

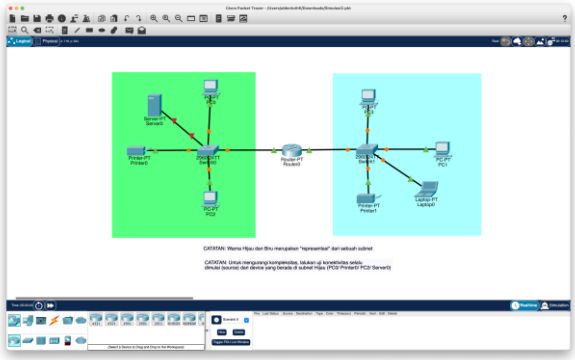


4. [20] Uji Konektivitas Dengan Mode Simulasi

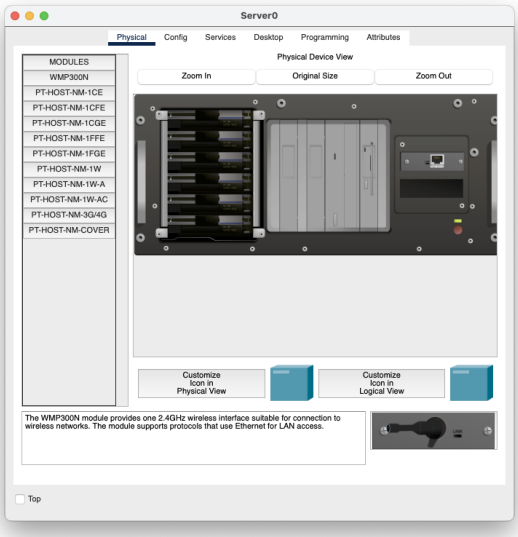
1. File Simulasi 1: Berhasil/Gagal
2. File Simulasi 2: Berhasil/Gagal

Tangkapan Layar *step-by-step debugging*

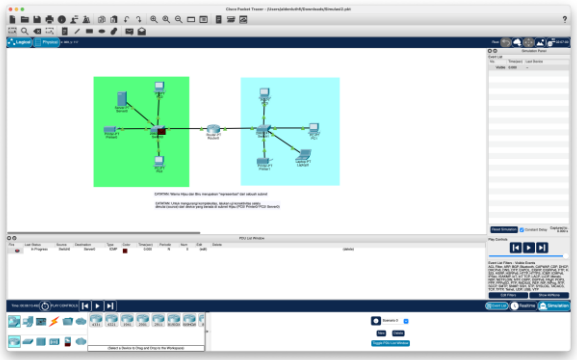
1.



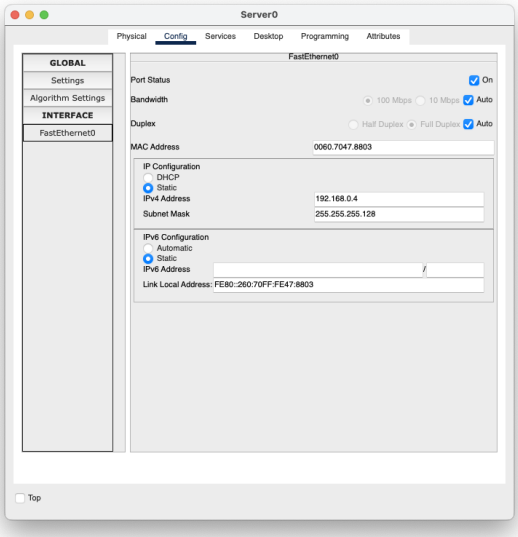
2.



3.



4.



5.

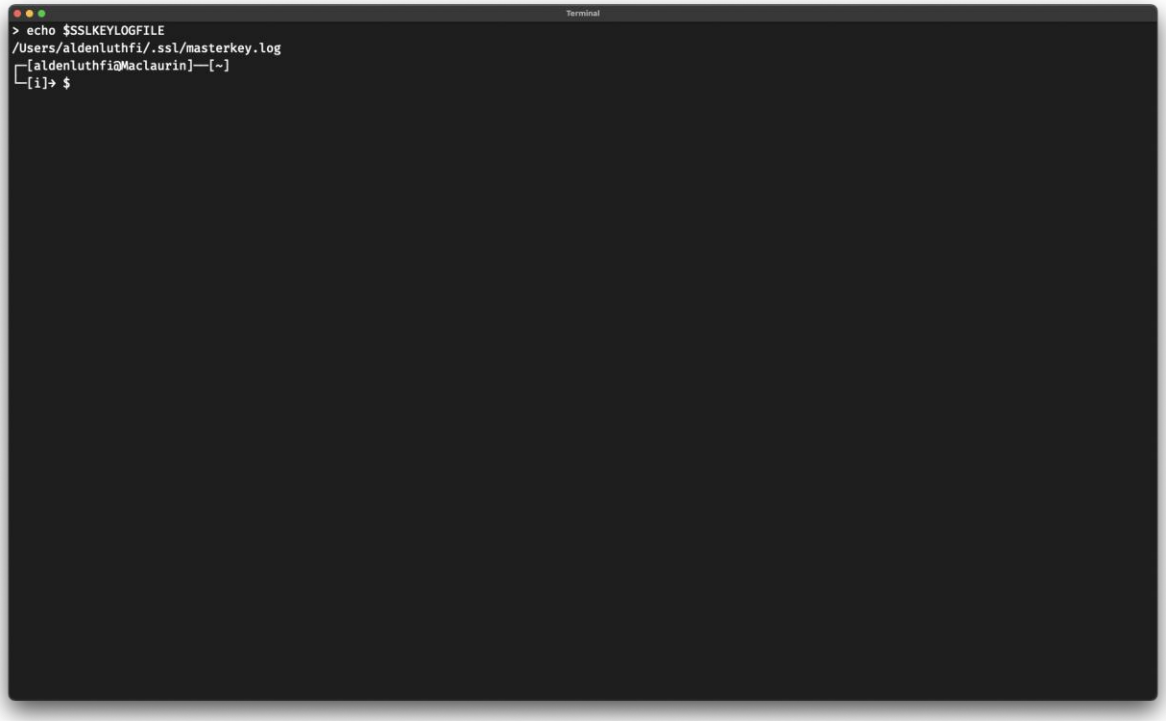
Penjelasan step-by–step debugging dan saran perbaikan

1. Hal pertama yang dapat diperhatikan adalah Server0 yang dalam keadaan off
2. [SARAN PERBAIKAN] Menyalakan server0 dari keadaan off menjadi on
3. Setelah menjalankan pengiriman PDU dari segala macam perangkat, terdeteksi masalah di Server0 dan Printer1. Server0 yang memiliki IPv4 address duplikat dan Printer1 yang tidak memiliki default gateway
4. [SARAN PERBAIKAN] Mengganti IPv4 address Server0 menjadi 192.168.0.5
5. [SARAN PERBAIKAN] Menganti default gateway Printer1 menjadi 192.168.1.1

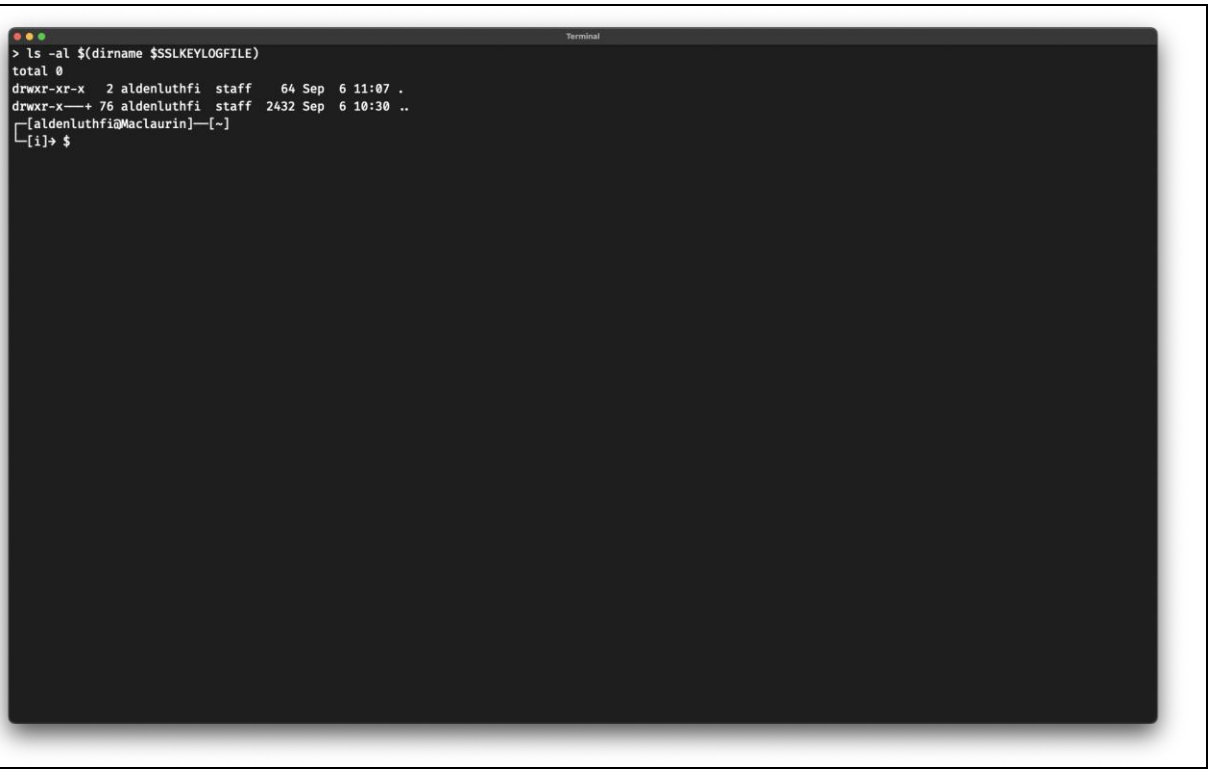
A01c – Introduction to Networking Tools

[30] Packet Capture and Decrypt with Wireshark

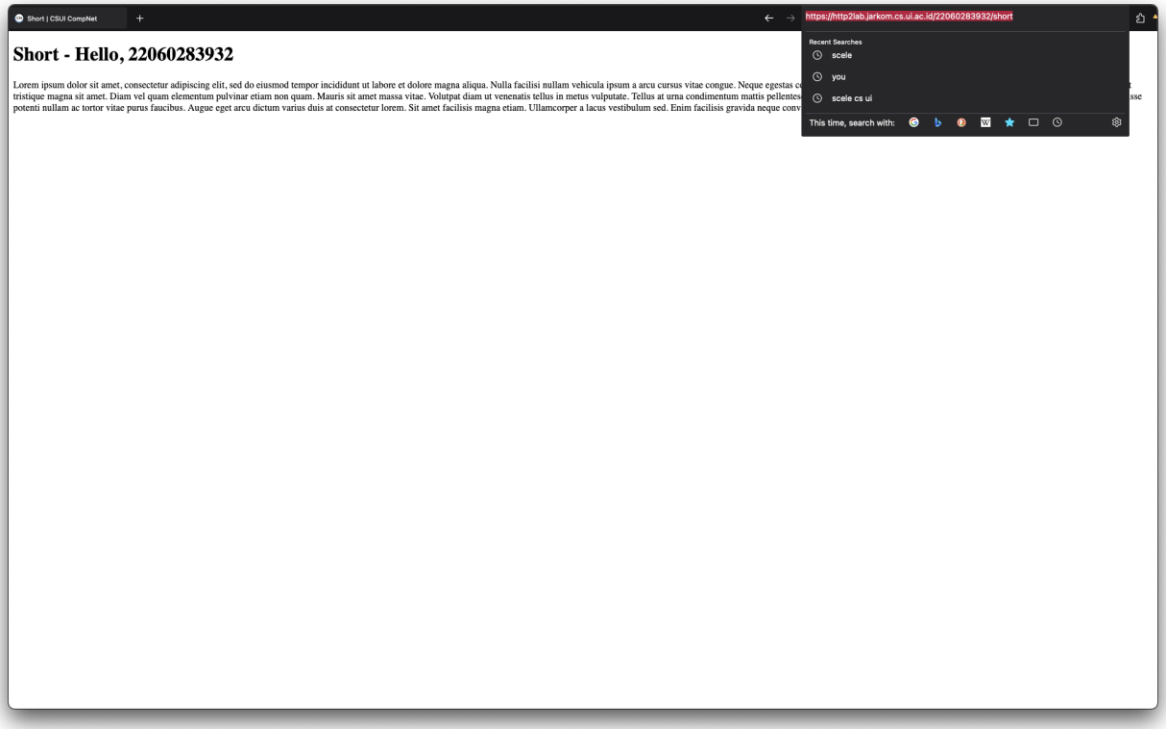
Penambahan SSLKEYLOGFILE di Environment Variable



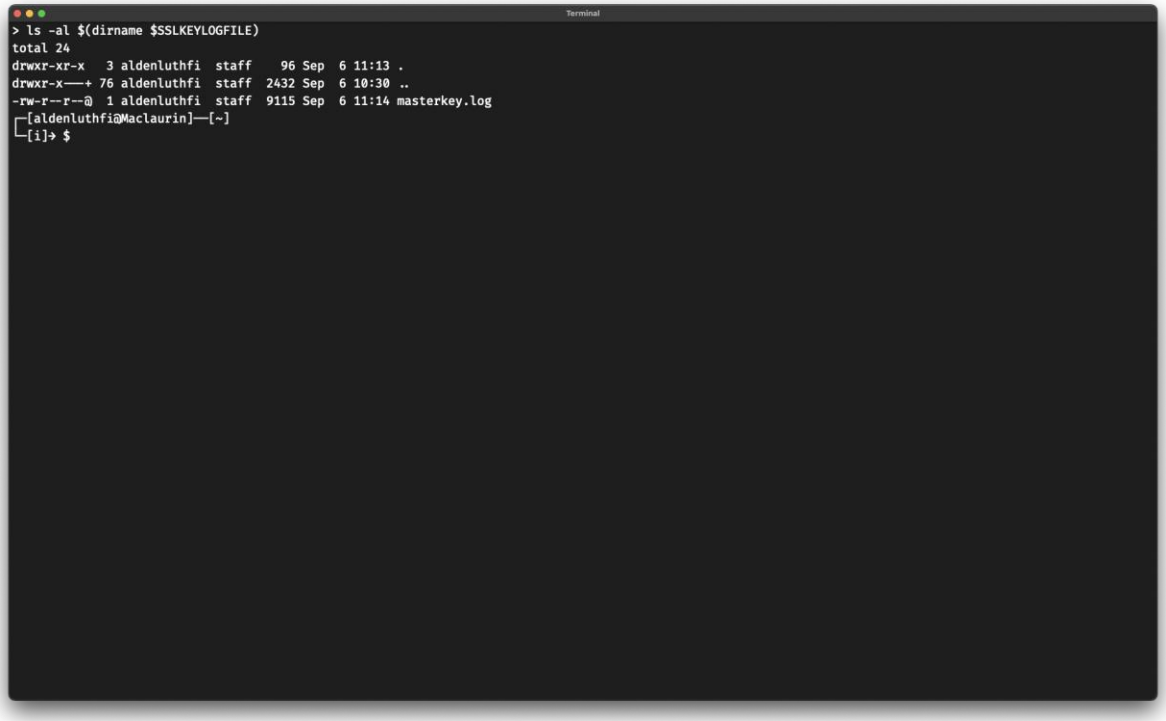
Direktori SSLKEYLOGFILE Sebelum Mengakses Website



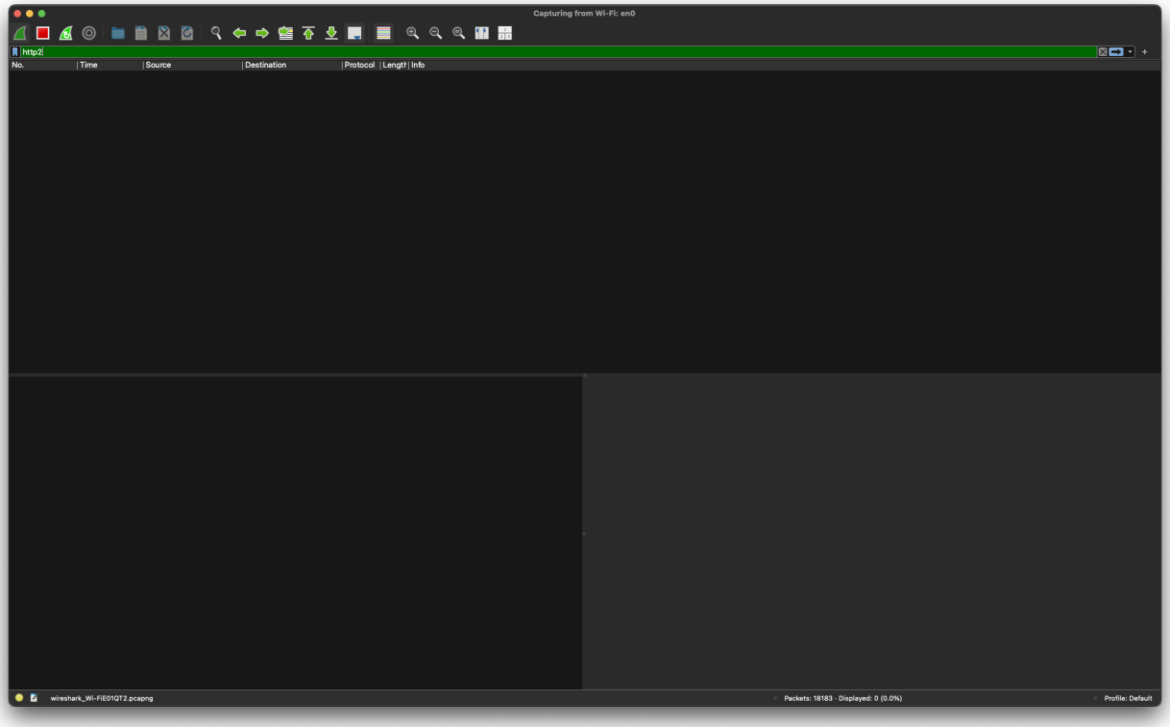
Mengakses Halaman *Website*



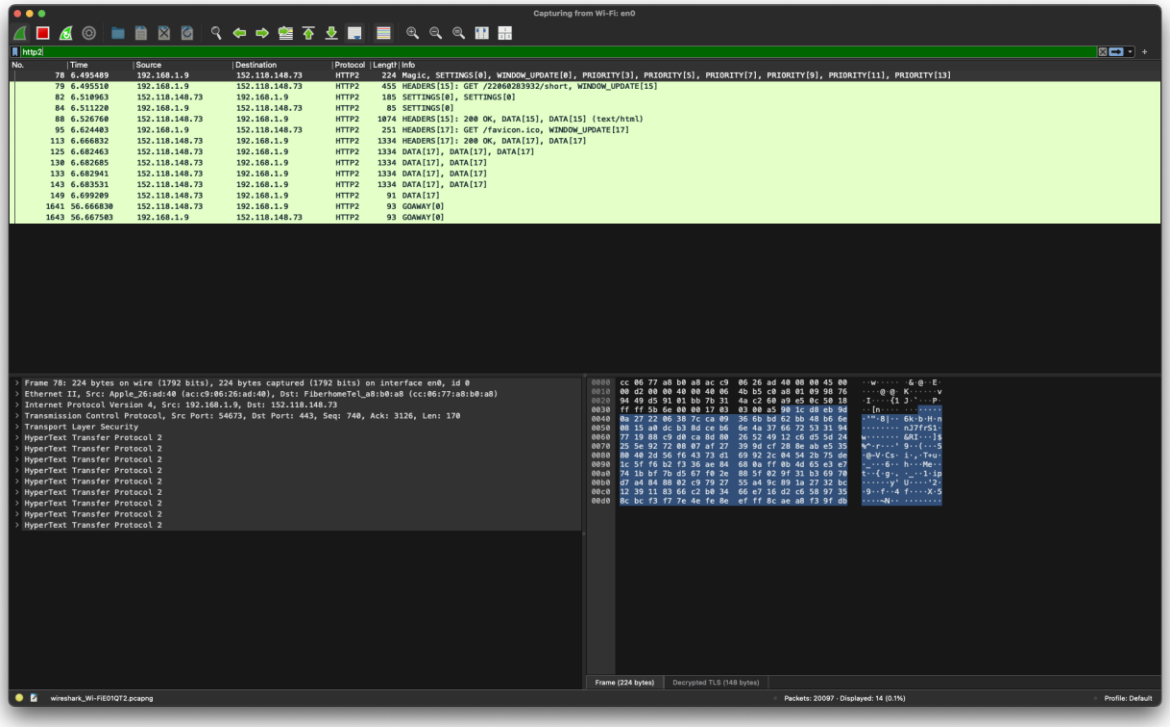
Direktori SSLKEYLOGFILE Setelah Mengakses Website



Tangkapan Paket Sebelum Dilakukan Dekripsi

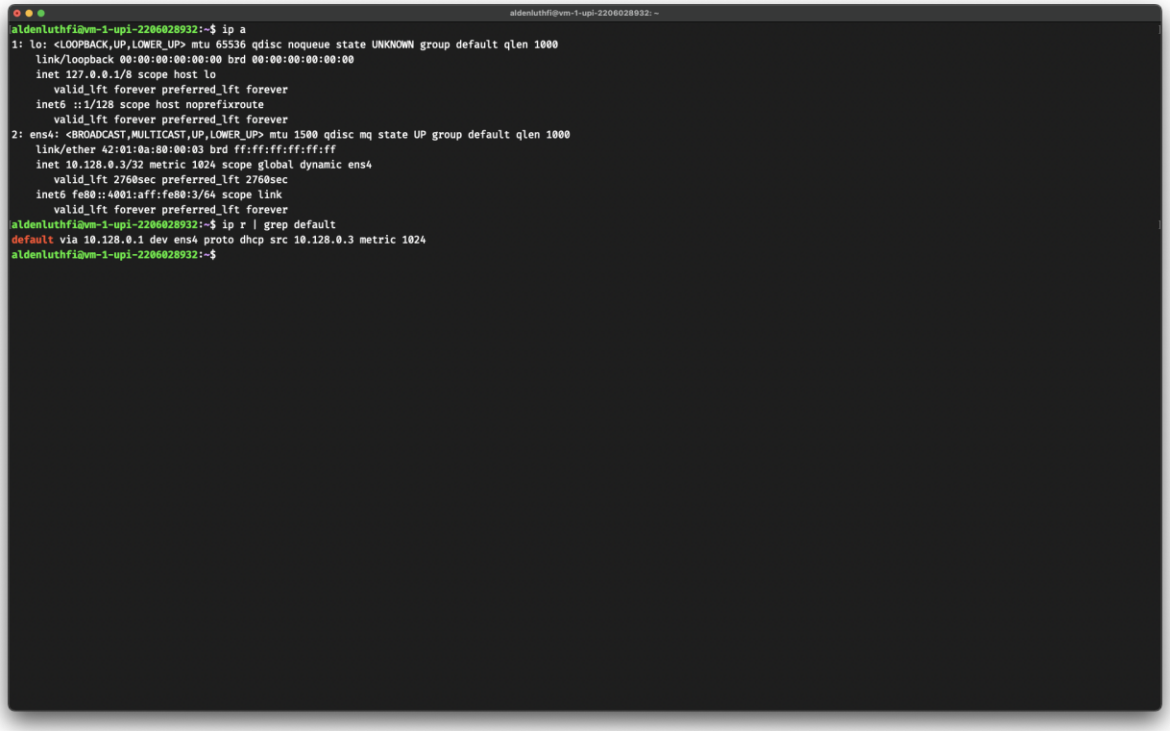


Tangkapan Paket Setelah Dilakukan Dekripsi



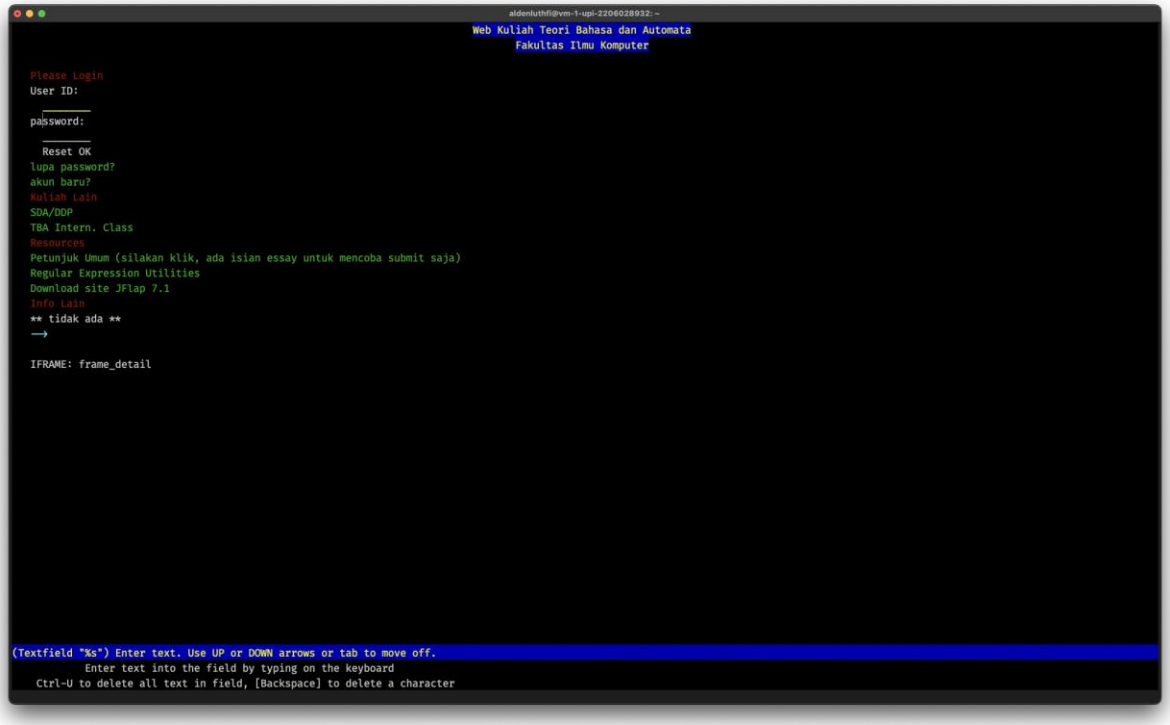
[40] Packet Capture with Tcpdump and Analysis

Instance Primary Network Interface IP Address



IP internal adalah: 10.128.0.3

Visiting Website Page Via Aren



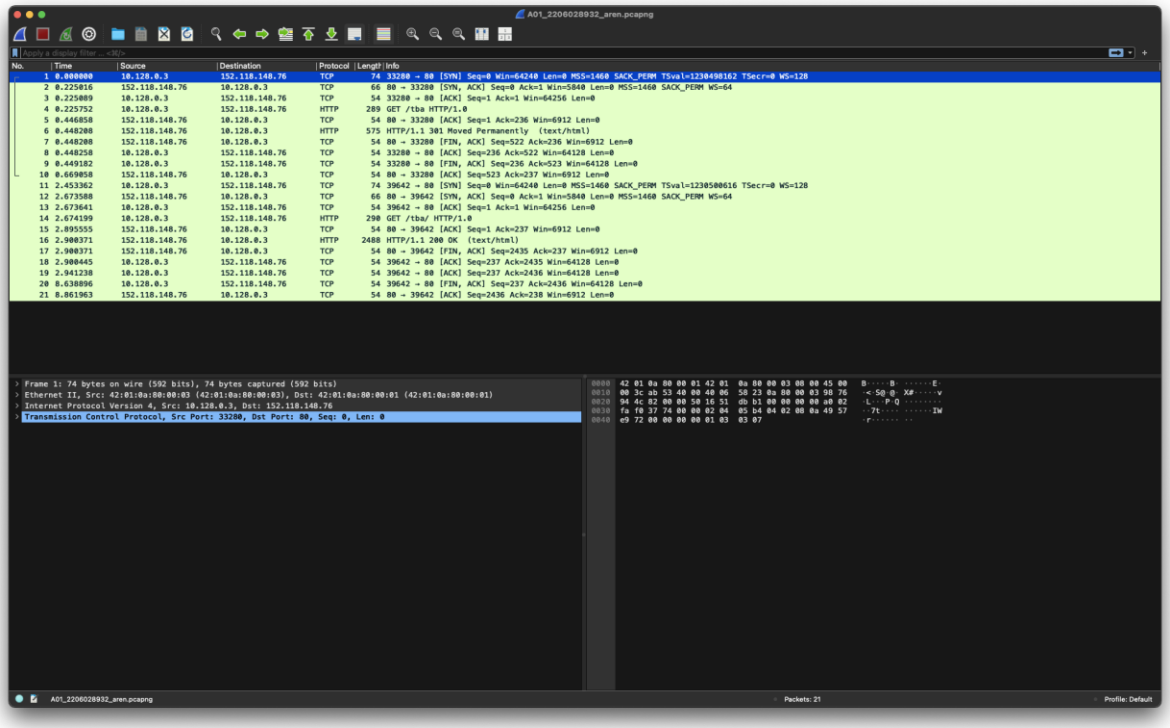
Tcpdump Command and Output After Aborting

```
aldenluthfi@vm-1-upi-2206028932:~$ nslookup aren.cs.ui.ac.id
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   aren.cs.ui.ac.id
Address: 152.118.148.76

aldenluthfi@vm-1-upi-2206028932:~$ sudo tcpdump -i ens4 tcp port 80 and host 152.118.148.76 -w A01_2206028932_aren.pcapng
tcpdump: listening on ens4, link-type EN10MB (Ethernet), snapshot length 262144 bytes
^C21 packets captured
21 packets received by filter
0 packets dropped by kernel
aldenluthfi@vm-1-upi-2206028932:~$
```

Screenshot of Capture Result in Wireshark

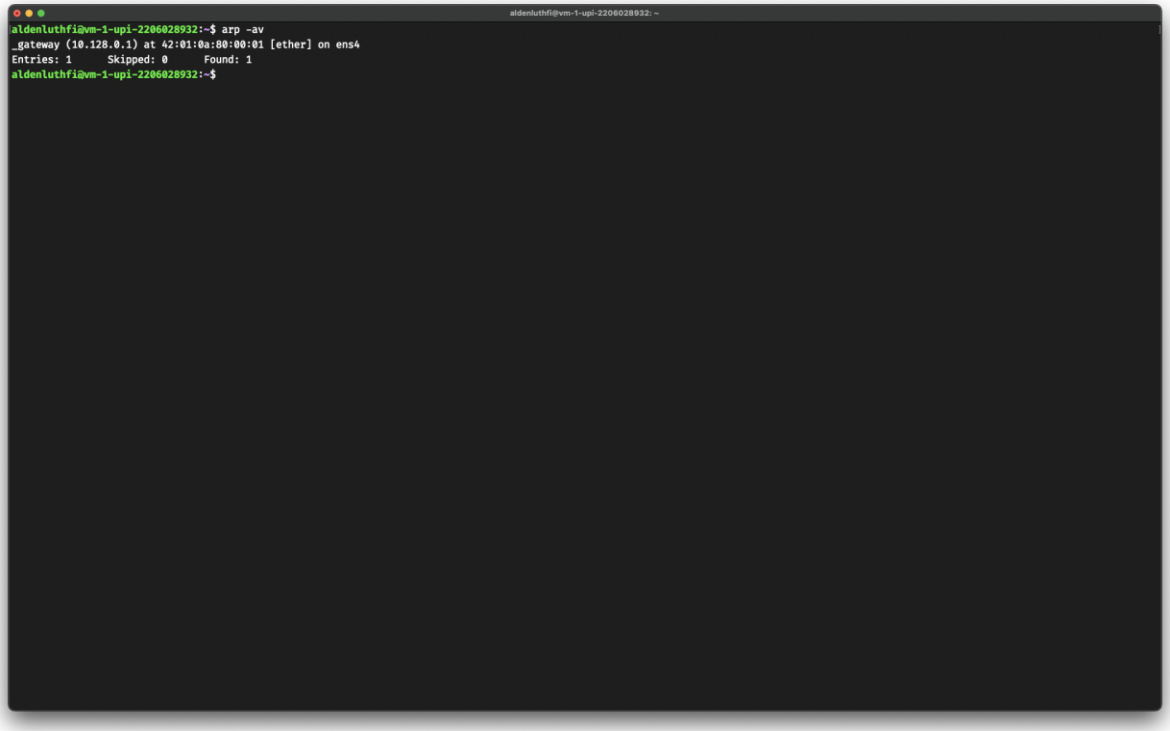


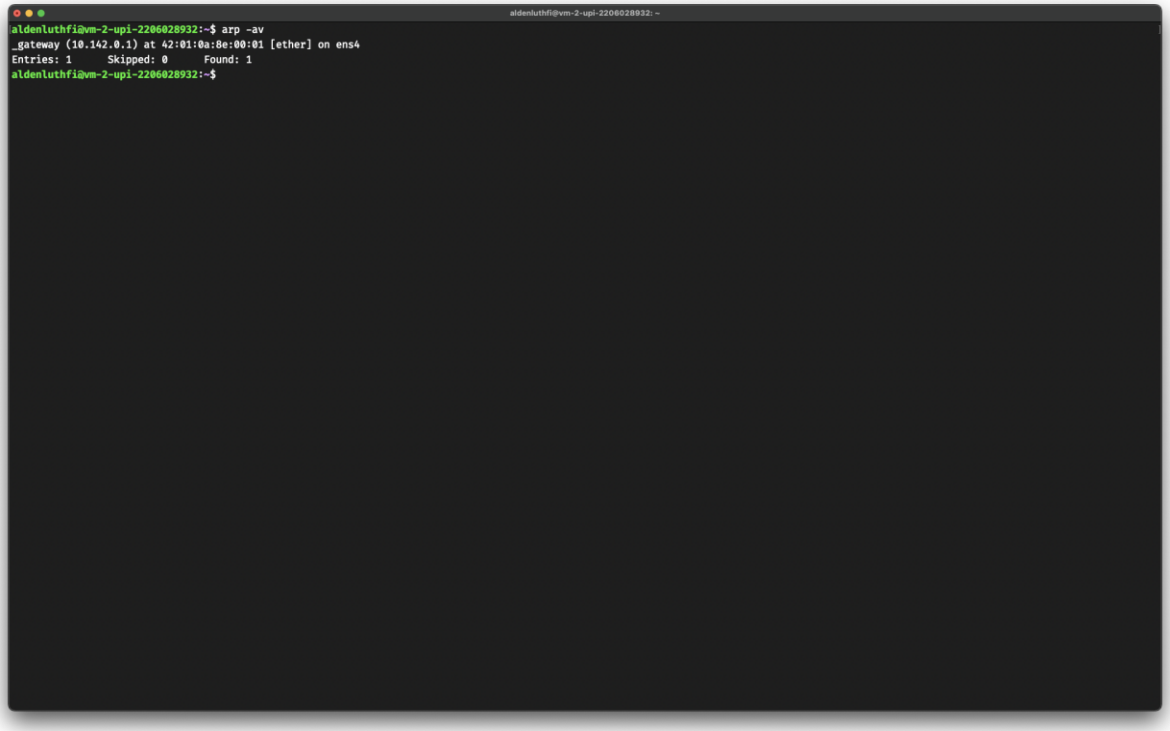
Packet Analysis
1. (TCP SYN): (SYN = synchronize) Paket ini menandakan permulaan koneksi TCP dari *client* ke *server* 2. (TCP SYN, ACK): (ACK = Acknowledge), server sudah menyadari koneksi dari *client* 3. (TCP ACK): tanda bahwa koneksi sudah berhasil 4. (HTTP GET): *request* GET untuk meminta *resource* dari server 5. (TCP ACK): *Server* menyadari permintaan GET dari *client*. 6. (HTTP 301 Moved Permanently): Server mengalihkan *client* ke lokasi *resource* yang baru. 7. (TCP FIN, ACK): (FIN = finish) *client* memulai penutupan koneksi. 8. (TCP ACK): *Server* menyadari permintaan penutupan koneksi. 9. (TCP FIN, ACK): *Server* mulai menutup koneksi. 10. (TCP ACK): Koneksi TCP ditutup. 11. (TCP SYN): *Client* memulai koneksi TCP. 12. (TCP SYN, ACK): *Server* menyadaripermintaan koneksi baru. 13. (TCP ACK): Koneksi TCP baru berhasil. 14. (HTTP GET): *equest* GET untuk meminta *resource* dari server 15. (TCP ACK): *Server* menyadari permintaan GET dari *client*. 16. (HTTP 200 OK): Respon sukses dari *server*. 17. (TCP ACK): Klien menyadari penerimaan data HTTP. 18. (TCP FIN, ACK): Klien memulai penutupan koneksi. 19. (TCP ACK): Server menyadari permintaan penutupan koneksi. 20. (TCP FIN, ACK): Server mulai menutup koneksi. 21. (TCP ACK): Koneksi ditutup.

[30] Network Diagnostics

ARP

Screenshot Command dan Output-nya



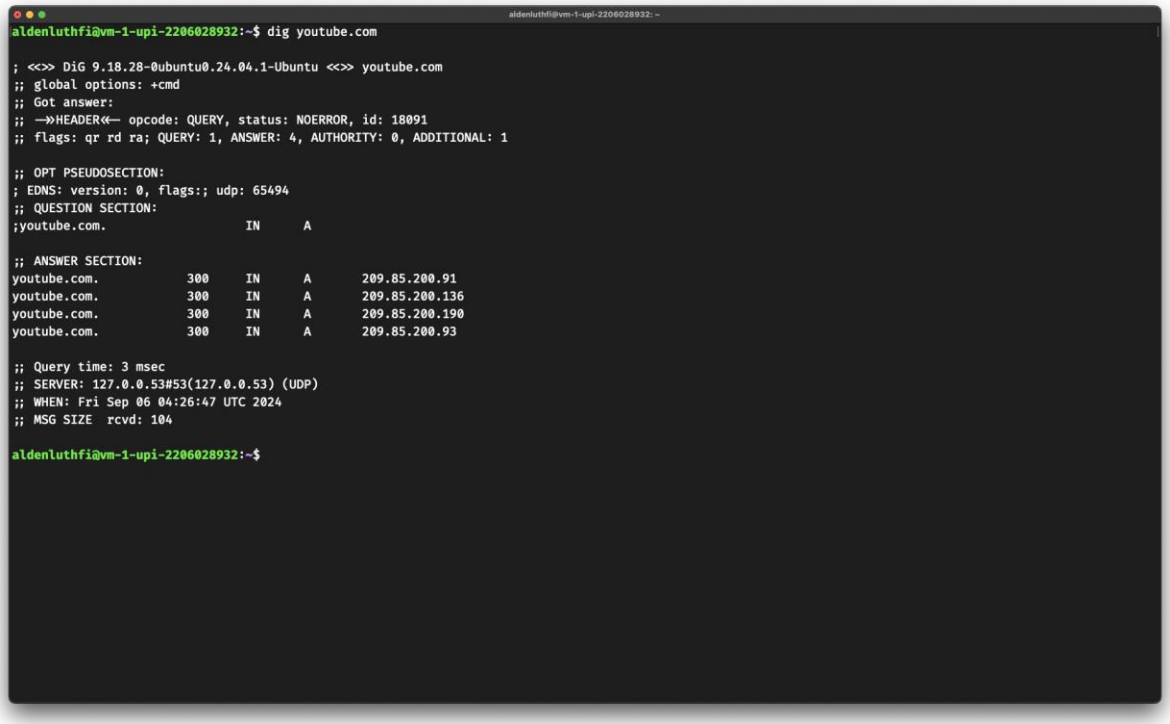


Penjelasan

Pada kedua VM, hanya terdapat satu entri pada masing-masing tabel ARP, tertulis juga default gateway pada VM1 yaitu 10.128.0.1 dan VM2 yaitu 10.142.0.1. kedua perangkat memakai interface jaringan ens4 dan MAC adress yang sama yaitu 42:01:0a:80:00:01

DiG

Screenshot Command dan Output-nya



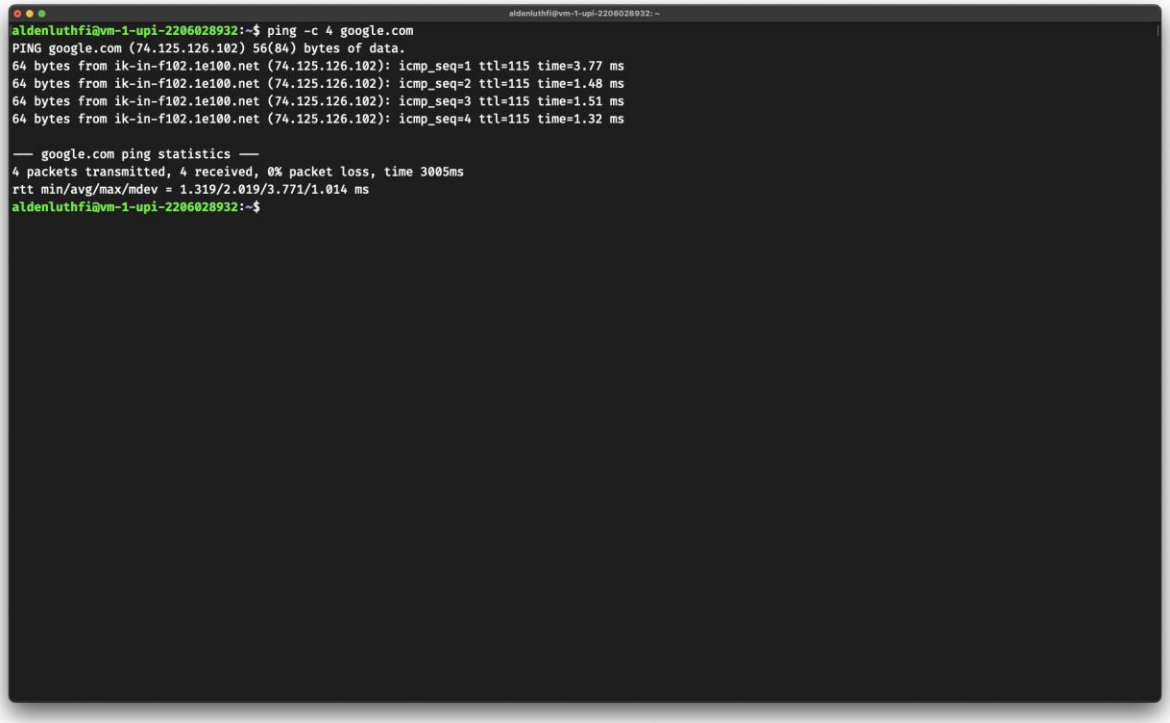
Penjelasan

Perintah dig (Domain Information Groper) digunakan untuk mencari informasi DNS dan memberikan rincian mengenai alamat IP yang berhubungan dengan nama domain tertentu. Dalam hasil yang ditampilkan, perintah ini mengajukan permintaan ke server DNS lokal (yang ditunjukkan oleh alamat 127.0.0.53) untuk menemukan alamat IP yang terhubung dengan domain youtube.com.

Terdapat 4 IP address yang terikat pada domain youtube.com, 74.125.69.190, 74.125.69.91, 74.125.69.136, dan 74.125.69.93. Angka 300 menandakan jumlah nanodetik yang dibutuhkan untuk query. Command juga mengeluarkan pesan sukses.

Ping

Screenshot Command dan Output-nya

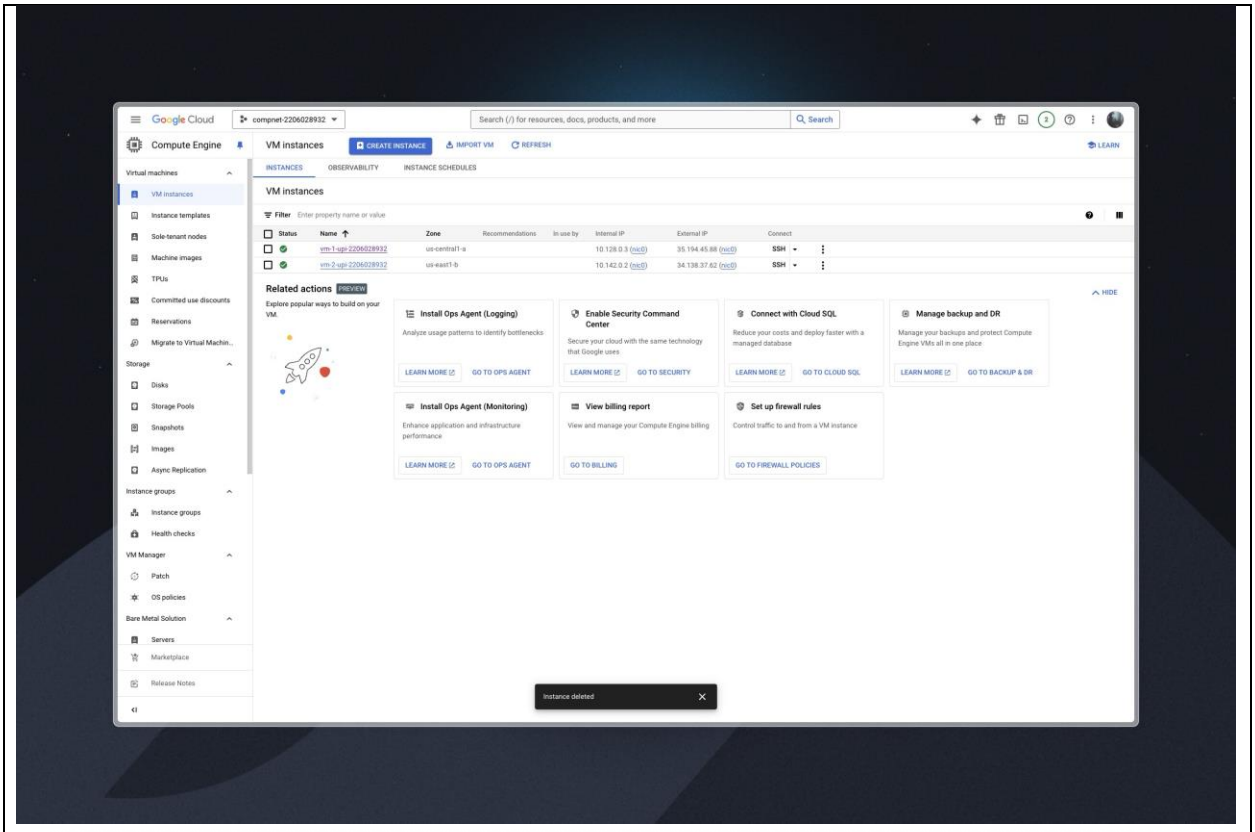


Penjelasan

Flag –c digunakan untuk mengeluarkan tepat 4 paket. Dari luaran diatas, bisa dilihat perintah ping ke google.com berhasil mengirim 4 paket. Ini adalah salah satu tanda jaringan instance lancar tanpa ada kehilangan paket 0% packet loss serta RTT untuk empat ping yang dilakukan berkisar antara sekitar 1,13 ms hingga 3,01 ms.

Traceroute

Screenshot Command dan Output-nya


Google Cloud
compnet-2206028932
Search (/) for resources, docs, products, and more
Search
Compute Engine
VM instances
CREATE INSTANCE
IMPORT VM
REFRESH
LEARN
INSTANCES
OBSERVABILITY
INSTANCE SCHEDULES
VM instances
Filter
Enter property name or value
Status
Name
Zone
Recommendations
In use by
Internal IP
External IP
Connect
vm-1-upi-2206028932
us-central1-a
10.128.0.3 (nic0)
35.194.45.88 (nic0)
SSH
vm-2-upi-2206028932
us-east1-b
10.142.0.2 (nic0)
34.138.37.62 (nic0)
SSH
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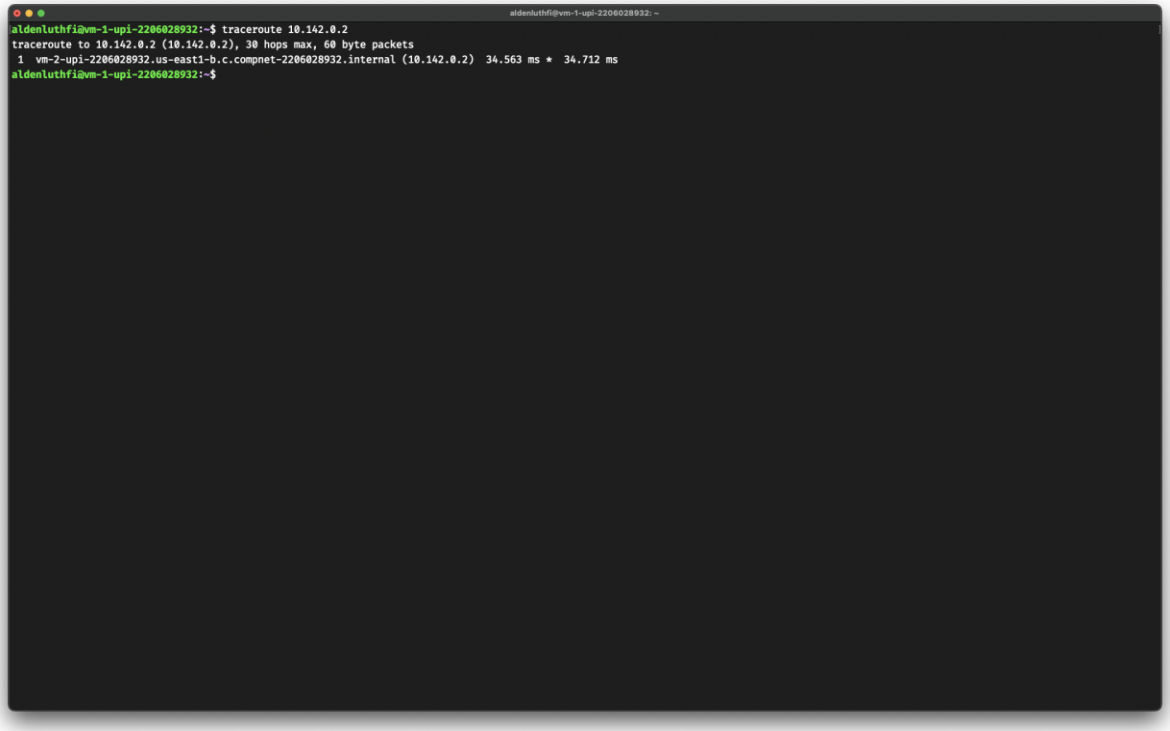
Reservations
Migrate to Virtual Machin...
Storage
Disks
Storage Pools
Snapshots
Images
Async Replication
Instance groups
Instance groups
Health checks
VM Manager
Patch
OS policies
Bare Metal Solution
Servers
Marketplace
Release Notes

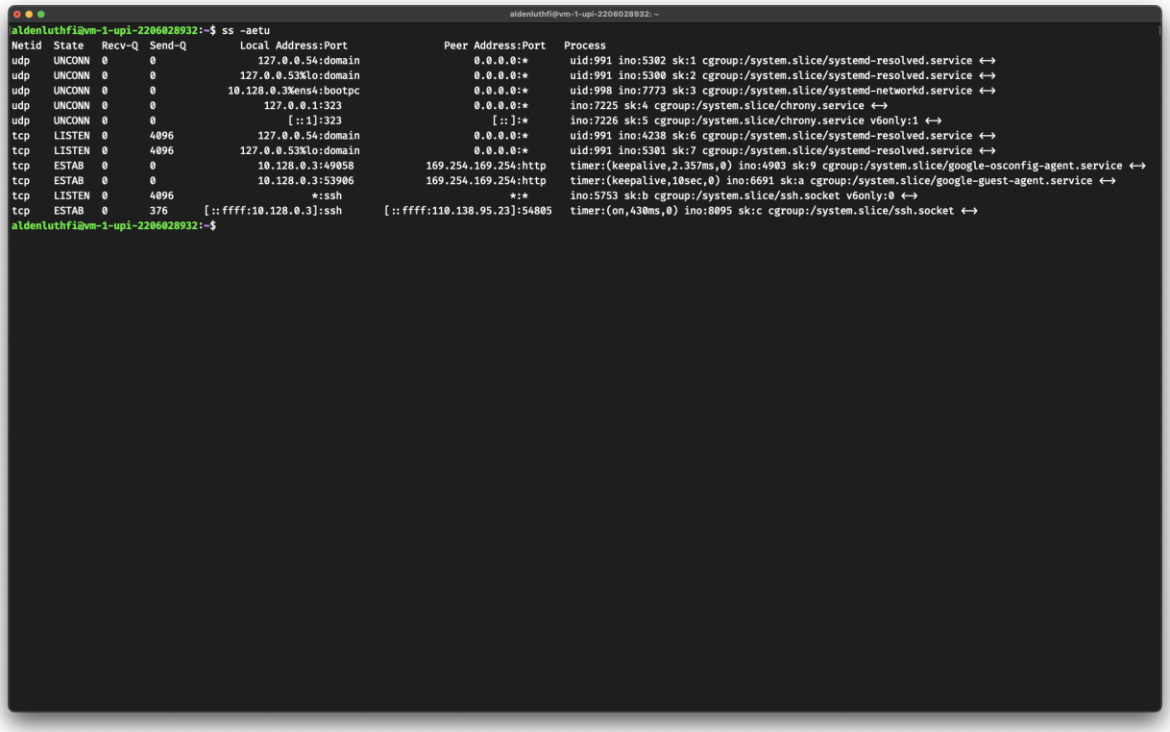

aldenluthfi@vm-1-upi-2206028932: ~
aldenluthfi@vm-1-upi-2206028932:~$ traceroute 10.142.0.2
traceroute to 10.142.0.2 (10.142.0.2), 30 hops max, 60 byte packets
1 vm-2-upi-2206028932.us-east1-b.c.compnet-2206028932.internal (10.142.0.2) 34.563 ms * 34.712 ms
aldenluthfi@vm-1-upi-2206028932:~$

Penjelasan

Karena jumlah hop yang dilakukan oleh VM1 ke VM2 menunjukkan bahwa kedua VM berada pada lokasi yang berdekatan di arsitektur cloud.

Netstat/ss

Screenshot Command dan Output-nya



Penjelasan

Perintah ini menjukkan jaringan yang aktif di sistem. Kolom state menunjukkan status koneksi socket seperti UNCONNECTED, LISTEN dan ESTABLISHED, kolom recv-Q menunjukan jumlah bytes yang diterima, kolom send-Q menunjukkan jumlah bytes yang dikirim, tertulis juga kolom address lokal serta port yang digunakan dan address rekan dan port yang digunakan.

A01d – Introduction to Go Programming Language

[5] Testcase 1

Tangkapan Layar Luaran Testcase 1

```
> go run .
Name: Alden Luthfi, ID Student: 2206028932
═══════════════════════════════════════
Welcome to Sigmart Point of Sales
Please input your command below
═══════════════════════════════════════
ADD_ITEM MK201 MASKER 12500 20
[SUCCESS] successfully added item MK201 to list of items
ADD_MEMBER MM001 JOJO
[SUCCESS] successfully added member MM001 to list of members
ADD_TRANSACTION 2 MK201
[SUCCESS] successfully added transaction item MK201
ADD_TRANSACTION 15 MK201 MM001
[SUCCESS] successfully added transaction item MK201 for member MM001
DELETE_ITEM MK201
[FAILED] there is at least one transaction taking item MK201
EXIT
exit status 1
┌─[aldenluthfi@Maclaurin]──[~/Documents/Shenanigans/Go/a01d - sigmart]
└─[i]→ $
```

[8] Testcase 2

Tangkapan Layar Luaran Testcase 2

```
> gor un .
zsh: command not found: gor
> go run .
Name: Alden Luthfi, ID Student: 2206028932
═══════════════════════════════════════
Welcome to Sigmart Point of Sales
Please input your command below
═══════════════════════════════════════
ADD_MEMBER MM010 JAKA
[SUCCESS] successfully added member MM010 to list of members
ADD_ITEM XI021 XIAOMAY_14 14500
[FAILED] your input command is incorrect
ADD_MEMBER MM010 JOKO
[FAILED] member MM010 is already in list of members
ADD_TRANSACTION 2 XI021 MM010
[FAILED] item XI021 is not in list of items
ADD_ITEM SS910 SUMSANG_GALAXY_S24 9500000 20
[SUCCESS] successfully added item SS910 to list of items
ADD_TRANSACTION 1 SS910
[SUCCESS] successfully added transaction item SS910
TRANSACTION_ITEM_RECAP SS910
-x-x-x-x-x-x-x-x-x-x-x-x-
SKU: SS910, ID Member: -, Qty: 1, Total Price: 9500000
-x-x-x-x-x-x-x-x-x-x-x-x-
DELETE_MEMBER MM010
[SUCCESS] successfully deleted member MM010 from list of members
EXIT
exit status 1
┌─[aldenluthfi@Maclaurin]──[~/Documents/Shenanigans/Go/a01d - sigmart]
└─[i]→ $
```

[12] Testcase 3

Tangkapan Layar Luaran Testcase 3

```
Name: Alden Luthfi, ID Student: 2206028932
═══════════════════════════════════════
Welcome to Sigmart Point of Sales
Please input your command below
═══════════════════════════════════════
ADD_MEMBER MM921 JONO
[SUCCESS] successfully added member MM921 to list of members
ADD_ITEM MR134 MIRONAGA_BALITA 21500 10
[SUCCESS] successfully added item MR134 to list of items
ADD_ITEM BB732 BOBOLAC_BATITA 34300 5
[SUCCESS] successfully added item BB732 to list of items
ADD_TRANSACTION 15 MR134 MM921
[FAILED] stock qty for item MR134 is not enough
ADD_MEMBER MM934 JONI
[SUCCESS] successfully added member MM934 to list of members
ADD_TRANSACTION 5 BB732 MM934
[SUCCESS] successfully added transaction item BB732 for member MM934
ADD_TRANSACTION 2 MR134
[SUCCESS] successfully added transaction item MR134
RESTOCK_ITEM BB732 2
[SUCCESS] successfully restock qty for item BB732
ADD_TRANSACTION 1 BB732
[SUCCESS] successfully added transaction item BB732
DELETE_MEMBER MR134
[FAILED] member MR134 is not in list of members
TRANSACTION_MEMBER_RECAP MM934
-x-x-x-x-x-x-x-x-x-x-x-x-
SKU: BB732, ID Member: MM934, Qty: 5, Total Price: 171500
-x-x-x-x-x-x-x-x-x-x-x-x-
TRANSACTION_ITEM_RECAP BB732
-x-x-x-x-x-x-x-x-x-x-x-x-
SKU: BB732, ID Member: MM934, Qty: 5, Total Price: 171500
-x-x-x-x-x-x-x-x-x-x-x-x-
EXIT
exit status 1
┌─[aldenluthfi@Maclaurin]──[~/Documents/Shenanigans/Go/a01d - sigmart]
└─[i]→ $
```