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KELAS : INFORMATIKA 1

MODUL 8
KOMUNIKASI ANTAR-SERVER (MESSAGE BROKER)

DASAR TEORI

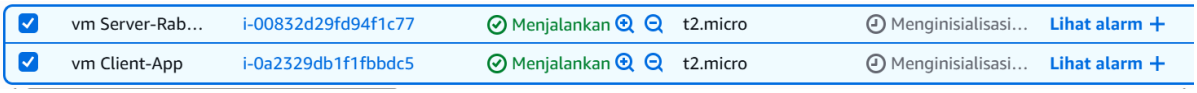
Topologi Sistem: Kita akan membuat 2 Virtual Machine (VM):

- VM-1 (Server RabbitMQ): Bertugas sebagai "Kantor Pos" yang menampung pesan.
- VM-2 (Client App): Bertugas sebagai Pengirim (Producer) dan Penerima (Consumer).

LAMPIRAN

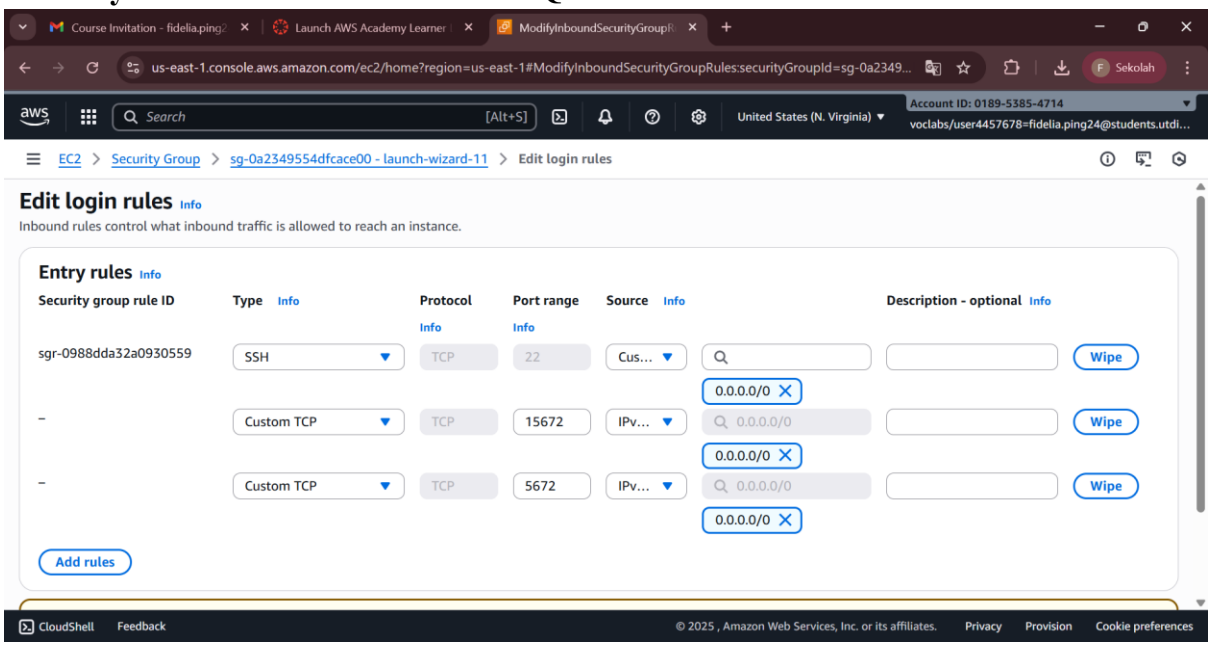
BAGIAN 1 : PERSIAPAN INFRASTRUKTUR AWS

1. Buat Instance EC2

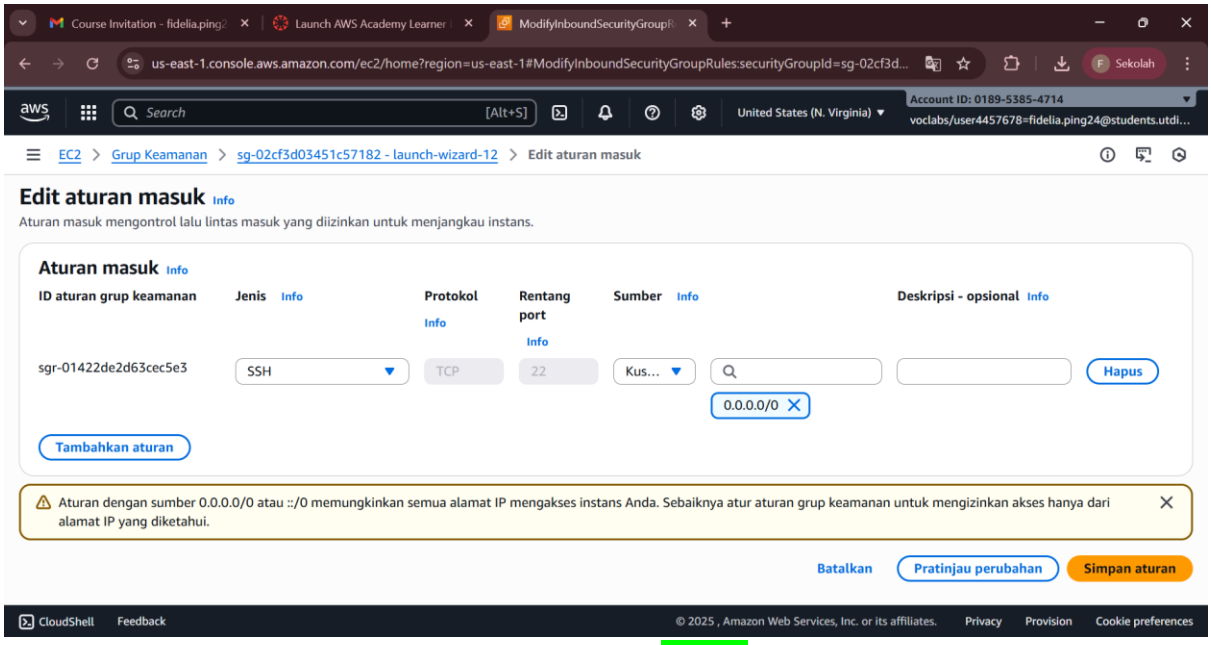


2. Konfirgurasi Firewall (Security Group)

Security untuk VM server-RabbitMQ



Security untuk VM Client-APP



BAGIAN 2 : INSTALASI SERVER BROKER (VM-1)

1. Install RabbitMQ

`sudo apt-get update`

```
ubuntu@ip-172-31-30-93:~$ sudo apt-get update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1334 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Components [3871 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 c-n-f Metadata [301 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Packages [269 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse Translation-en [118 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 Components [35.0 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/multiverse amd64 c-n-f Metadata [8328 B]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1619 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [303 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.7 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1500 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [304 kB]
Get:20 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [377 kB]
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)
PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

`sudo apt-get install -y rabbitmq-server`

```
ubuntu@ip-172-31-30-93:~$ sudo apt-get install -y rabbitmq-server
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  erlang-asn1 erlang-base erlang-crypto erlang-eldap erlang-ftp erlang-inets erlang-mnesia erlang-os-mon erlang-parsetools
  erlang-public-key erlang-runtime-tools erlang-snmp erlang-ssl erlang-syntax-tools erlang-tftp erlang-tools erlang-xmerl libsctp1 socat
Suggested packages:
  erlang erlang-manpages erlang-doc lksctp-tools
The following NEW packages will be installed:
  erlang-asn1 erlang-base erlang-crypto erlang-eldap erlang-ftp erlang-inets erlang-mnesia erlang-os-mon erlang-parsetools
  erlang-public-key erlang-runtime-tools erlang-snmp erlang-ssl erlang-syntax-tools erlang-tftp erlang-tools erlang-xmerl libsctp1
  rabbitmq-server socat
0 upgraded, 20 newly installed, 0 to remove and 27 not upgraded.
Need to get 36.5 MB of archives.
After this operation, 58.0 MB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-base amd64 1:25.3.2.8+dfsg-1ubuntu4.5 [10.2 MB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-asn1 amd64 1:25.3.2.8+dfsg-1ubuntu4.5 [911 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-crypto amd64 1:25.3.2.8+dfsg-1ubuntu4.5 [162 kB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-public-key amd64 1:25.3.2.8+dfsg-1ubuntu4.5 [754 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-mnesia amd64 1:25.3.2.8+dfsg-1ubuntu4.5 [892 kB]
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)
PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

2. Aktifkan Dashboard Web

`sudo rabbitmq-plugins enable rabbitmq_management`

```
ubuntu@ip-172-31-30-93:~$ sudo rabbitmq-plugins enable rabbitmq_management
Enabling plugins on node rabbit@ip-172-31-30-93:
rabbitmq_management
The following plugins have been configured:
  rabbitmq_management
  rabbitmq_management_agent
  rabbitmq_web_dispatch
Applying plugin configuration to rabbit@ip-172-31-30-93...
The following plugins have been enabled:
  rabbitmq_management
  rabbitmq_management_agent
  rabbitmq_web_dispatch

started 3 plugins.
ubuntu@ip-172-31-30-93:~$
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)

PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

3. Buat User Administrator

Buat user 'admin' dengan password 'admin123'

```
sudo rabbitmqctl add_user admin admin123
```

```
ubuntu@ip-172-31-30-93:~$ sudo rabbitmqctl add_user admin admin123
Adding user "admin" ...
Done. Don't forget to grant the user permissions to some virtual hosts! See 'rabbitmqctl help set_permissions' to learn more.
ubuntu@ip-172-31-30-93:~$
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)

PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

Jadikan user tersebut Administrator

```
sudo rabbitmqctl set_user_tags admin administrator
```

```
ubuntu@ip-172-31-30-93:~$ sudo rabbitmqctl set_user_tags admin administrator
Setting tags for user "admin" to [administrator] ...
ubuntu@ip-172-31-30-93:~$
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)

PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

Beri izin akses penuh ke sistem

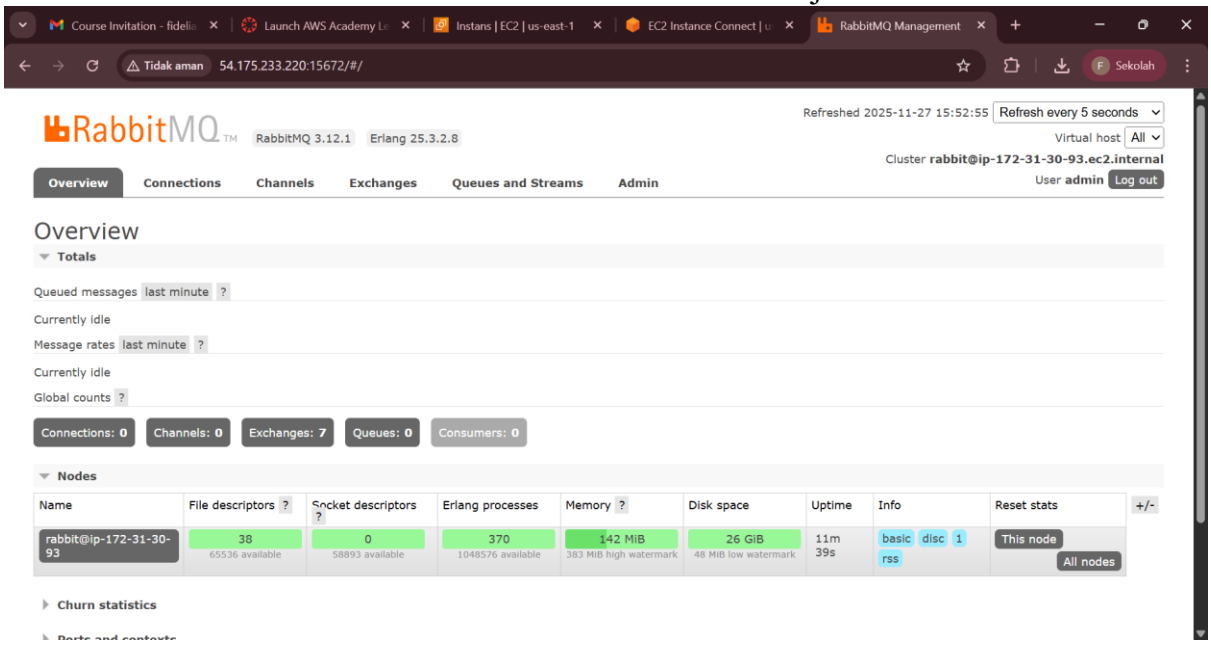
```
sudo rabbitmqctl set_permissions -p / admin ".*" ".*" ".*"
```

```
ubuntu@ip-172-31-30-93:~$ sudo rabbitmqctl set_permissions -p / admin ".*" ".*" ".*"
Setting permissions for user "admin" in vhost "/" ...
ubuntu@ip-172-31-30-93:~$
```

i-00832d29fd94f1c77 (vm Server-RabbitMQ)

PublicIPs: 54.175.233.220 PrivateIPs: 172.31.30.93

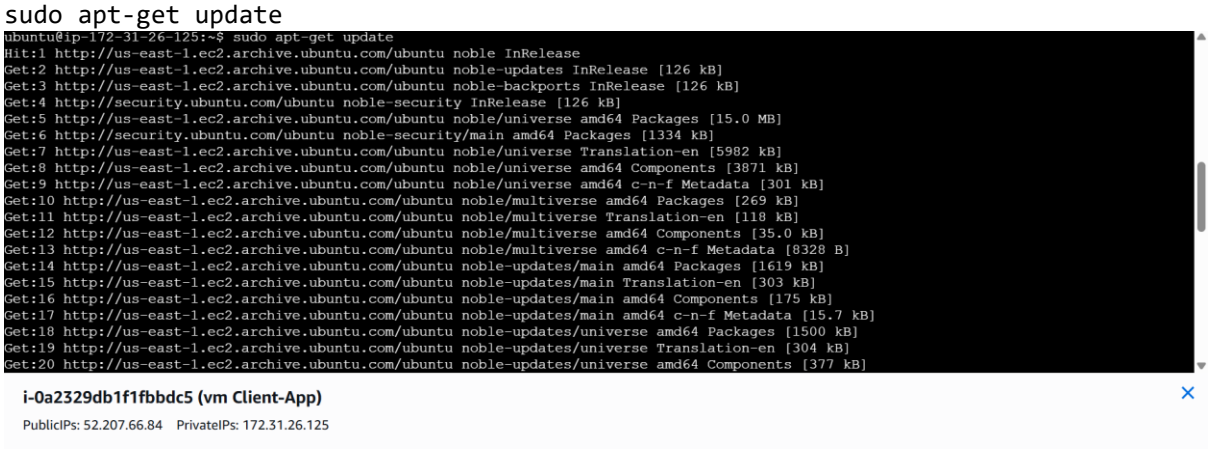
Cek Poin: Buka browser di laptop, akses:
http:// http://54.175.233.220:15672: 15672
Login dengan user: admin
Password: admin123. Jika berhasil masuk ke dashboard hijau



BAGIAN 3 : KONFIRGURASI CLIENT (VM-2)

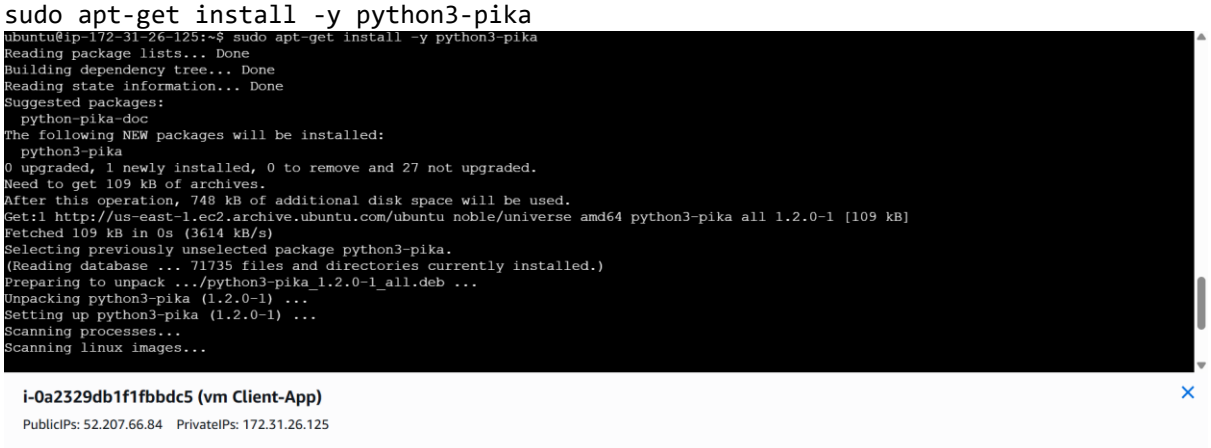
1. Install Python dan Library

`sudo apt-get update`



Menginstall library pika langsung dari repositori Ubuntu

`sudo apt-get install -y python3-pika`



BAGIAN 4 : IMPLEMENTASI KODE (CODING)

1. Membuat Script Penerima (consumer.py)

`nano consumer.py`

2. Membuat Script Pengiriman (producer.py)

`nano producer.py`

```
import pika

# --- KONFIGURASI ---
# Ganti IP di bawah ini dengan PRIVATE IP milik VM-1 (Server RabbitMQ)
HOST_BROKER = '172.31.30.93'
USERNAME = 'admin'
PASSWORD = 'admin123'
# -------------------

credentials = pika.PlainCredentials(USERNAME, PASSWORD)
connection = pika.BlockingConnection(
    pika.ConnectionParameters(host=HOST_BROKER, port=5672, virtual_host='/', credentials=credentials))
channel = connection.channel()

channel.queue_declare(queue='lab_message')

# Input pesan dari keyboard
```

```
^G Help      ^O Write Out   ^W Where Is   ^K Cut       ^T Execute   ^C Location   M-U Undo      M-A Set Mark   M-] To Bracket
^X Exit      ^R Read File   ^\ Replace    ^U Paste     ^J Justify   ^/ Go To Line M-E Redo      M-6 Copy       ^Q Where Was
```

i-0a2329db1f1fbbdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

BAGIAN 5 : PENGUJIAN (SIMULASI)

Di **VM-2**, jalankan consumer terlebih dahulu :

`python3 consumer.py`

```
ubuntu@ip-172-31-26-125:~$ python3 consumer.py
 [*] Menunggu pesan dari Producer... Tekan CTRL+C untuk keluar
```

i-0a2329db1f1fbbdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

`python3 producer.py`

```
ubuntu@ip-172-31-26-125:~$ python3 producer.py
Masukkan pesan untuk dikirim: Halo RabbitMQ, ini tes praktikum!
 [x] Terkirim ke Server: 'Halo RabbitMQ, ini tes praktikum!'
ubuntu@ip-172-31-26-125:~$
```

i-0a2329db1f1fbbdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

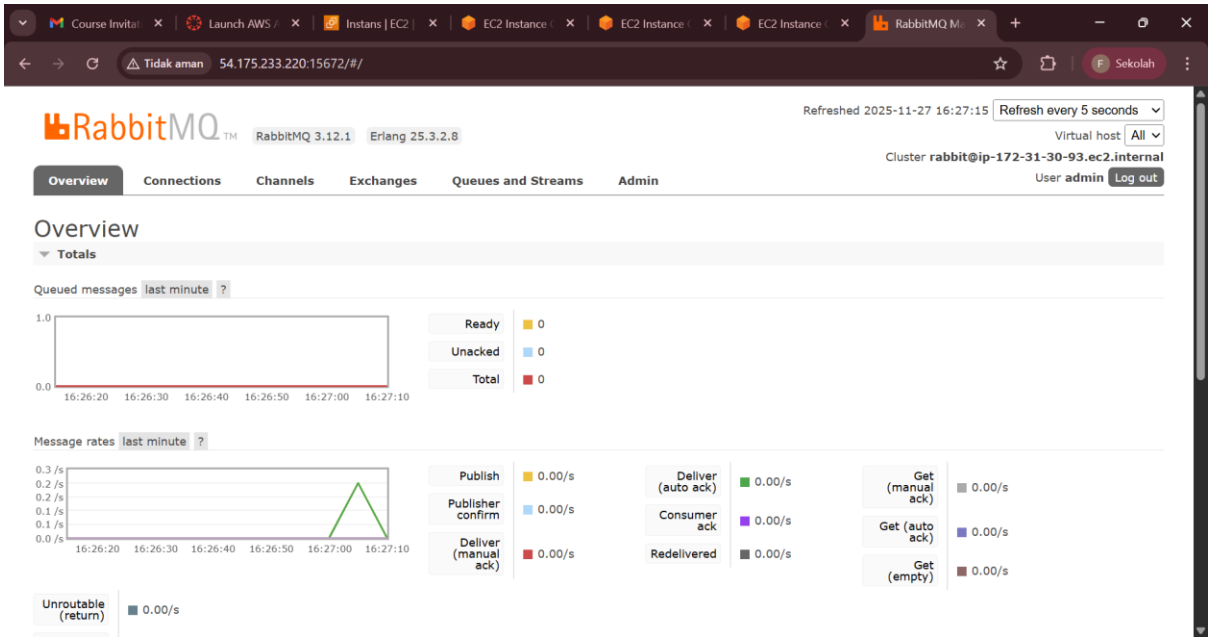
Hasil yang diharapkan:

- Di terminal Producer muncul: [x] Terkirim...
- Di terminal Consumer muncul seketika: [x] Pesan Diterima: Halo RabbitMQ...
- Di Dashboard Web (Browser Laptop): Perhatikan grafik pada tab "Overview" akan ada lonjakan (spike) trafik.

```
ubuntu@ip-172-31-26-125:~$ python3 consumer.py
 [*] Menunggu pesan dari Producer... Tekan CTRL+C untuk keluar
 [x] Pesan Diterima: Hallo, World
 [x] Pesan Diterima: Halo RabbitMQ, ini tes praktikum!
```

i-0a2329db1f1fbbdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125



TUGAS

1. **Lakukan hal berikut:**
   a. Jalankan consumer.py (vm-2) di 3 terminal/console
   b. Jalankan producer.py (vm-2) di terminal lain. jadi total koneksi terminal ke vm-2 ada 4 jendela
   c. Producer mengirim pesan berturut-turut berupa angka.
   d. Amati tiap terminal yang menjalankan consumer.py
2. Gambarkan ilustrasi proses komunikasi hasil praktikum ini. Cantumkan nama vm dan IP anda di gambar. Contoh :

KESIMPULAN

Hari ini saya belajar bagaimana mengirim pesan dari client ke client lain nya menggunakan rabbitMQ.