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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

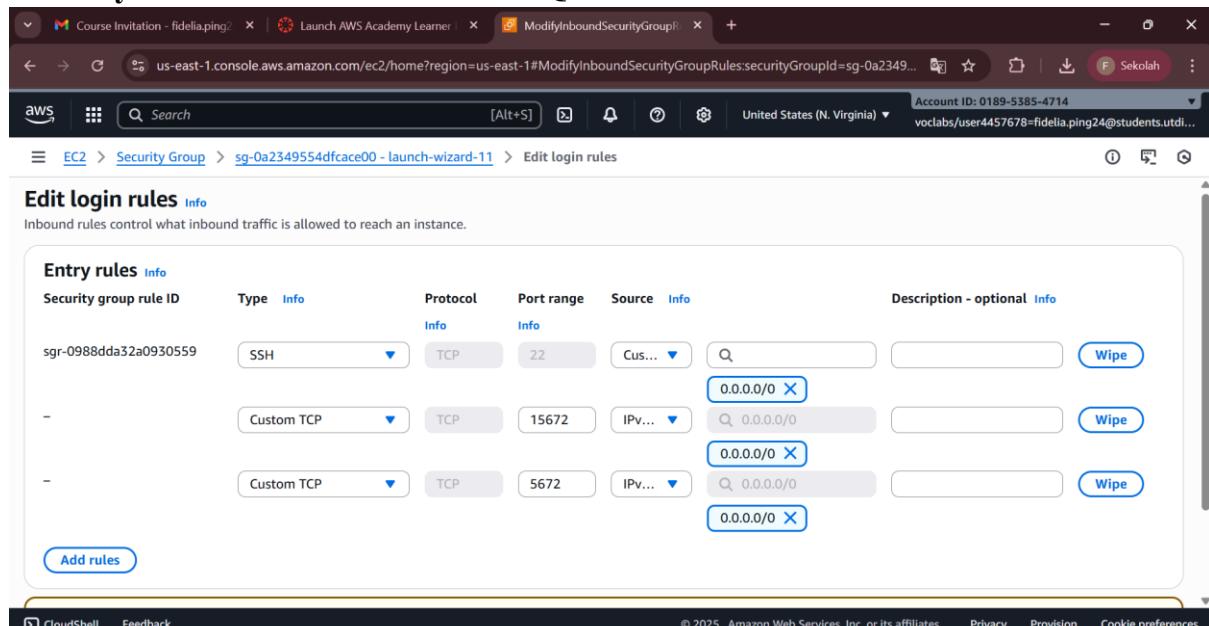
BAGIAN 1 : PERSIAPAN INFRASTRUKTUR AWS

1. Buat Instance EC2

<input checked="" type="checkbox"/> vm Server-Rab...	i-00832d29fd94f1c77	<input checked="" type="checkbox"/> Menjalankan	t2.micro	<input type="checkbox"/> Menginisialisasi...	Lihat alarm +
<input checked="" type="checkbox"/> vm Client-App	i-0a2329db1f1fbabd5	<input checked="" type="checkbox"/> Menjalankan	t2.micro	<input type="checkbox"/> Menginisialisasi...	Lihat alarm +

2. Konfigurasi Firewall (Security Group)

Security untuk VM server-RabbitMQ



The screenshot shows the AWS Cloud Console interface for managing security groups. The URL in the browser is <https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ModifyInboundSecurityGroupRules:securityGroupId=sg-0a2349554dfcace00-launch-wizard-11>. The page title is "Edit login rules".

Entry rules

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0988dda32a0930559	SSH	TCP	22	Cus... ▾	0.0.0.0/0 Wipe
-	Custom TCP	TCP	15672	IPv... ▾	0.0.0.0/0 Wipe
-	Custom TCP	TCP	5672	IPv... ▾	0.0.0.0/0 Wipe

[Add rules](#)

Security untuk VM Client-APP

Edit aturan masuk Info

Aturan masuk mengontrol lalu lintas masuk yang diizinkan untuk menjangkau instans.

ID aturan grup keamanan	Jenis	Protokol	Rentang port	Sumber	Deskripsi - opsional
sgr-01422de2d63cec5e3	SSH	TCP	22	Kus...	0.0.0.0/0

Tambahkan aturan

⚠️ Aturan dengan sumber 0.0.0.0/0 atau ::/0 memungkinkan semua alamat IP mengakses instans Anda. Sebaiknya atur aturan grup keamanan untuk mengizinkan akses hanya dari alamat IP yang diketahui.

Batalan Pratinjau perubahan Simpan aturan

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-asnl 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 libsocat
Suggested packages:
  erlang-erlang-manpages erlang-doc lksctp-tools
The following NEW packages will be installed:
  erlang-asnl 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 libsocat
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-lubuntu4.5 [10.2 MB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main amd64 erlang-asnl amd64 1:25.3.2.8+dfsg-lubuntu4.5 [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-lubuntu4.5 [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-lubuntu4.5 [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-lubuntu4.5 [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://54.175.233.220:15672>: 15672

Login dengan user: admin

Password: admin123. Jika berhasil masuk ke dashboard hijau

Name	File descriptors	Socket descriptors	Erlang processes	Memory	Disk space	Uptime	Info	Reset stats
rabbit@ip-172-31-30-93	38 65536 available	0 58893 available	370 1048576 available	142 MiB 383 MiB high watermark	26 GiB 48 MiB low watermark	11m 39s	basic disc 1 rss	This node All nodes

BAGIAN 3 : KONFIGURASI CLIENT (VM-2)

1. Install Python dan Library

```
sudo apt-get update
```

```
ubuntu@ip-172-31-26-125:~$ 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://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1334 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 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 amd64 Components [175 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [303 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-0a2329db1f1fbcdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

Menginstall library pika langsung dari repositori Ubuntu

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

```
ubuntu@ip-172-31-26-125:~$ sudo apt-get install -y python3-pika
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Suggested packages:
  python-pika-doc
The following NEW packages will be installed:
  python3-pika
0 upgraded, 1 newly installed, 0 to remove and 27 not upgraded.
Need to get 109 kB of archives.
After this operation, 748 kB of additional disk space will be used.
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 python3-pika all 1.2.0-1 [109 kB]
Fetched 109 kB in 0s (3614 kB/s)
Selecting previously unselected package python3-pika.
(Reading database ... 71735 files and directories currently installed.)
Preparing to unpack .../python3-pika_1.2.0-1_all.deb ...
Unpacking python3-pika (1.2.0-1) ...
Setting up python3-pika (1.2.0-1) ...
Scanning processes...
Scanning linux images...
```

i-0a2329db1f1fbcdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

BAGIAN 4 : IMPLEMENTASI KODE (CODING)

1. Membuat Script Penerima (consumer.py)

```
nano consumer.py
```

```
import pika, sys, os

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

# 1. Buat Koneksi ke Server
credentials = pika.PlainCredentials(USERNAME, PASSWORD)
connection = pika.BlockingConnection(
    pika.ConnectionParameters(host=HOST_BROKER, port=5672, virtual_host='/', credentials=credentials))
channel = connection.channel()

# 2. Pastikan antrian (queue) bernama 'lab_message' tersedia
channel.queue_declare(queue='lab_message')

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

i-0a2329db1f1fbcdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

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 ^Y Replace ^U Paste ^J Justify ^/ Go To Line M-E Redo M-G Copy ^C Where Was

i-0a2329db1f1fbcdc5 (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-0a2329db1f1fbcdc5 (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-0a2329db1f1fbcdc5 (vm Client-App)

PublicIPs: 52.207.66.84 PrivateIPs: 172.31.26.125

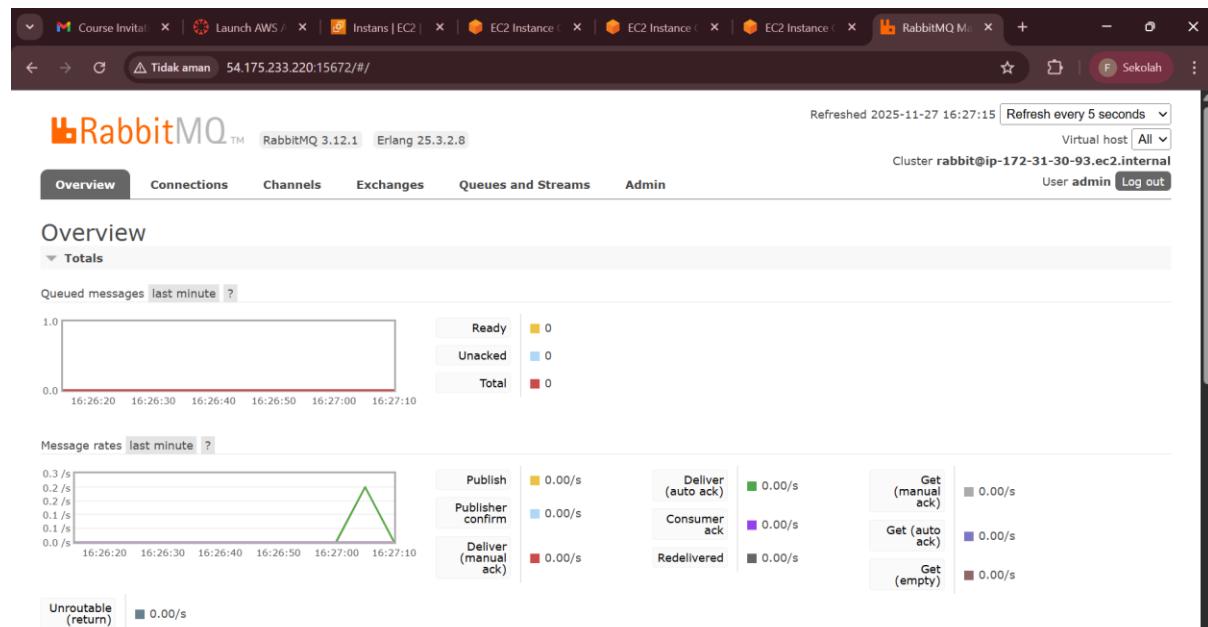
Hasil yang diharapkan:

- 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-0a2329db1f1fbcdc5 (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.