

Lingkungan Praktik Mandiri

Sistem Terdistribusi

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1. Protokol MQTT

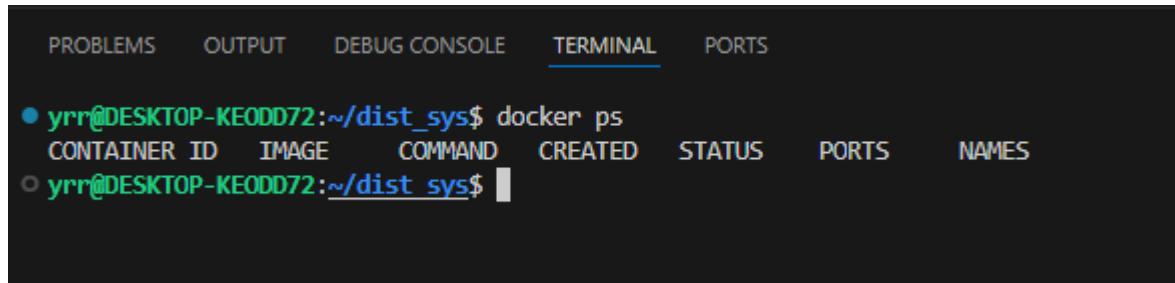
MQTT (Message Queuing Telemetry Transport) merupakan protocol Komunikasi yang yang menggunakan model Broker, Publisher, dan Subscriber. Protokol ini dirancang untuk

- Perangkat dengan resource terbatas (IoT, Embedded System)
- Jaringan tidak stabil/bandwidth kecil (Jaringan Seluler, komunikasi Satelit)

Arsitektur MQTT meliputi Broker, Publisher, dan Subscriber. Model tersebut merupakan:

- Broker
Komponen utama untuk mengatur lalu lintas pesan, contoh: Eclipse Mosquito
- Publisher
Pihak yang mengirim pesan ke sebuah topik, contoh: Sensor suhu mengirim data ke topik
- Subscriber
Pihak yang menerima pesan dari topik tertentu, contoh: aplikasi mobile subscribe akan mendapat update setiap ada data baru

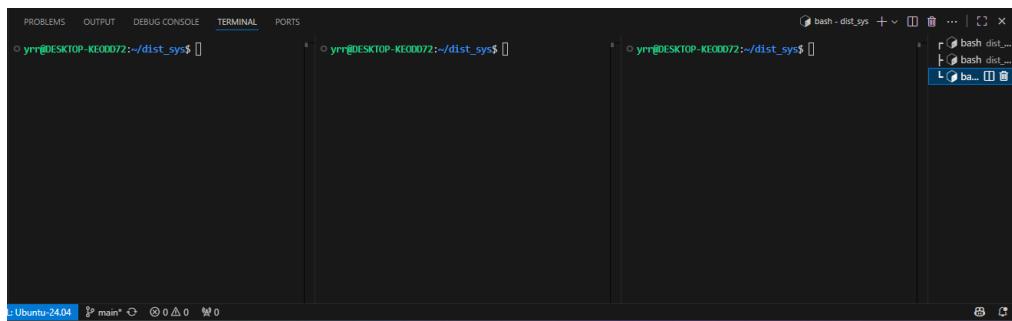
Eksplorasi Protokol MQTT



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

● yrr@DESKTOP-KE0DD72:~/dist_sys$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
○ yrr@DESKTOP-KE0DD72:~/dist_sys$
```

“docker ps” untuk melihat list docker yang sedang aktif



Membuat 3 terminal baru, “Ctrl+Shift+5”

```
● yrr@DESKTOP-KE00D72:~/dist_sys$ docker co
  mpose -f compose/mqtt.yml up -d
```

“docker compose -f compose/mqtt.yml up -d”, membaca file compose, membuat network internal, menjalankan container, -d berjalan pada background

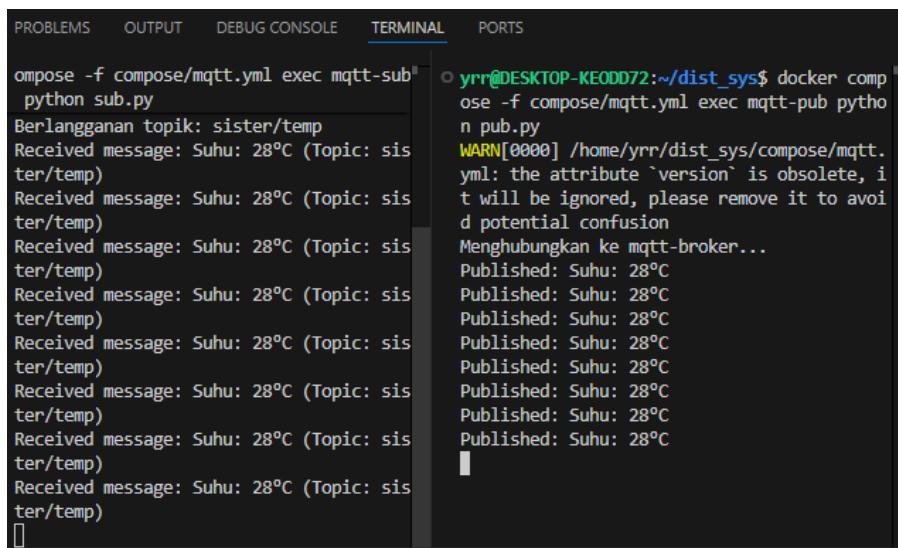
```
○ yrr@DESKTOP-KE00D72:~/dist_sys$ docker c
  ompose -f compose/mqtt.yml exec mqtt-sub
  python sub.py
```

```
○ yrr@DESKTOP-KE00D72:~/dist_sys$ docker comp
  ose -f compose/mqtt.yml exec mqtt-pub pytho
  n pub.py
```

Mengaktifkan program TCP server sesungguhnya (subscriber) di dalam container, “docker compose -f compose/mqtt.yml exec mqtt-sub python sub.py”

mengaktifkan program TCP server sesungguhnya (publisher.py) di dalam container.

“docker compose -f compose/mqtt.yml exec mqtt-pub python pub.py”



- Publisher mengirim pesan, broker menerima
- Broker melakukan proses checking siapa subscriber dari topic
- Broker mendistribusikan pesan ke semua subscriber

Proses log untuk mencatat semua proses komunikasi pada protocol MQTT sebagai berikut:

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ ip a
```

Pada terminal ke 3, cek ip untuk mencari kode br yang akan digunakan pada proses mencatat log. “ip a”.

```
inet6 fe80::d4a2:5dff:fe70:8ee/64 scope link
  valid_lft forever preferred_lft forever
2: veth24c645b@if2: <BROADCAST,MULTICAST,UP,LOWER_UP>
  mtu 1500 qdisc noqueue master br-d22e66d8d792 state UP
  group default
```

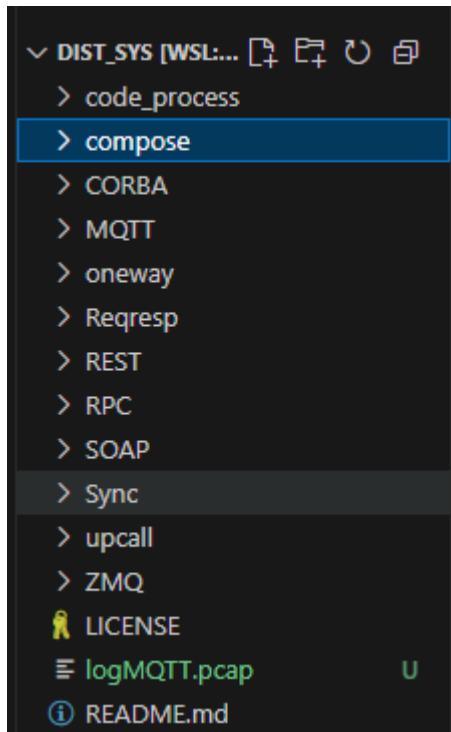
Ambil kode br-d22e66d8d792

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -nvi br-d22e66d8d792 -w logMQTT.pcap
```

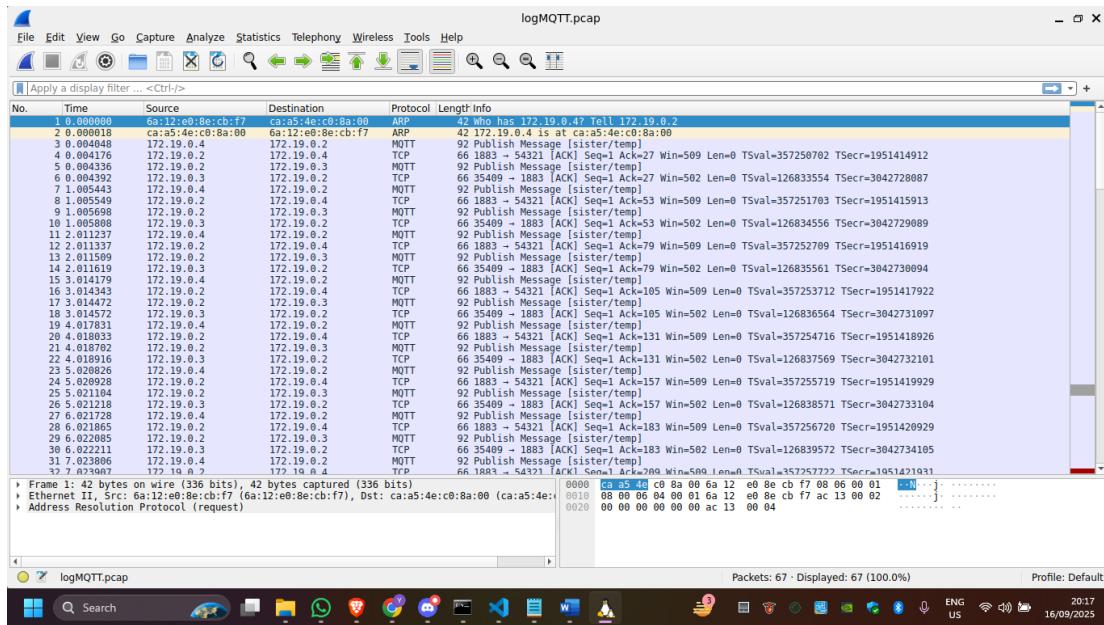
Melakukan pencatatan log dengan perintah “sudo tcpdump -nvi [kode br] -w [namaf file log].pcap”

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -nvi br-d22e66d8d792 -w logMQTT.pcap
tcpdump: listening on br-d22e66d8d792, link-type EN10MB (Ethernet), snapshot length 262144 bytes
[...]
```

Proses pencatatan log berjalan

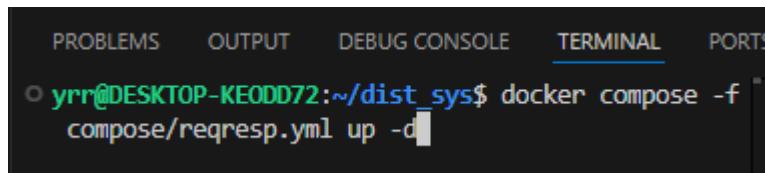


Untuk membuka log, Double click "logMQTT.pcap"



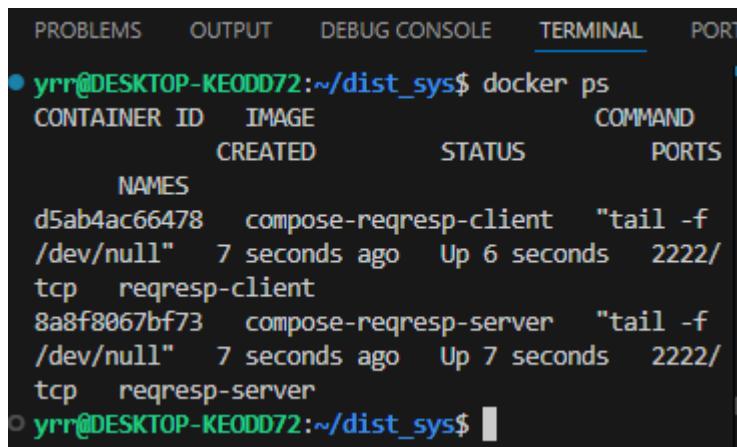
Tinggal Analisa

2. Protokol TCP (Req/Resp)



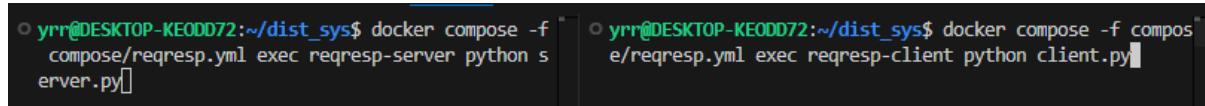
```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f
compose/reqresp.yml up -d
```

Terminal 1, membaca file compose, membuat network internal, menjalankan container, -d berjalan pada background



```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
yrr@DESKTOP-KEODD72:~/dist_sys$ docker ps
CONTAINER ID IMAGE COMMAND
CREATED STATUS PORTS
NAMES
d5ab4ac66478 compose-reqresp-client "tail -f
/dev/null" 7 seconds ago Up 6 seconds 2222/
tcp reqresp-client
8a8f8067bf73 compose-reqresp-server "tail -f
/dev/null" 7 seconds ago Up 7 seconds 2222/
tcp reqresp-server
yrr@DESKTOP-KEODD72:~/dist_sys$
```

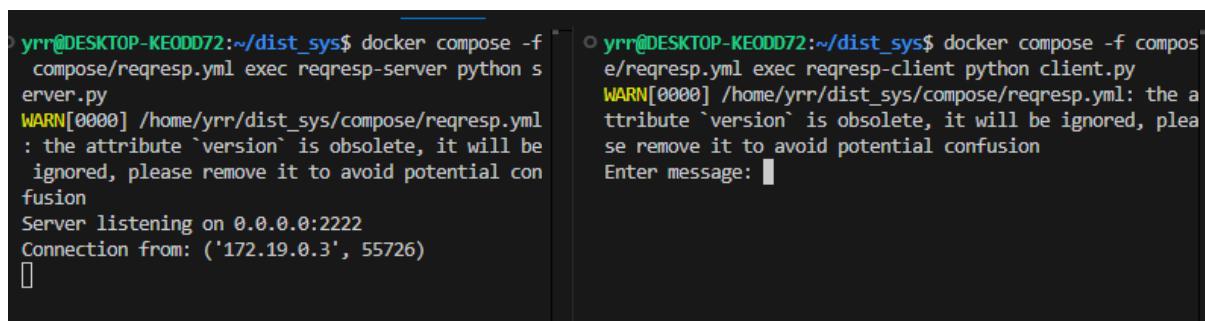
List docker ps, tcp berjalan di port 2222



```
yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f
compose/reqresp.yml exec reqresp-server python s
erver.py
yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f compos
e/reqresp.yml exec reqresp-client python client.py
```

Kiri terminal 1 (bertindak sbg server)

Kanan terminal 2 (bertindak sbg client)



```
yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f
compose/reqresp.yml exec reqresp-server python s
erver.py
WARN[0000] /home/yrr/dist_sys/compose/reqresp.yml: the a
ttribute `version` is obsolete, it will be ignored, plea
se remove it to avoid potential confu
Server listening on 0.0.0.0:2222
Connection from: ('172.19.0.3', 55726)
yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f compos
e/reqresp.yml exec reqresp-client python client.py
WARN[0000] /home/yrr/dist_sys/compose/reqresp.yml: the a
ttribute `version` is obsolete, it will be ignored, plea
se remove it to avoid potential confusion
Enter message:
```

Mendapatkan connection 172.19.0.3

```

yrr@DESKTOP-KE00D72:~/dist_sys$ docker compose -f
compose/reqresp.yml exec reqresp-server python s
erver.py
[WARN]0000] /home/yrr/dist_sys/compose/reqresp.yml
: the attribute `version` is obsolete, it will be
ignored, please remove it to avoid potential con
fusion
Server listening on 0.0.0.0:2222
Connection from: ('172.19.0.3', 55726)
[]

yrr@DESKTOP-KE00D72:~/dist_sys$ docker compose -f
compose/reqresp-client python client.py
[WARN]0000] /home/yrr/dist_sys/compose/
reqresp.yml: the attribute `version` is obsolete, it will be
ignored, please remove it to avoid potential conf
usion
Enter message: []

yrr@DESKTOP-KE00D72:~/dist_sys$ ip addr
inet6 fe80::8c3b:12ff:fe48:1e1b/64 scope link
    valid_lft forever preferred_lft forever
25: veth9140bd2@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
noqueue master br-542d7725c408 state UP group default
    link/ether a6:4b:ce:f5:d5:7c brd ff:ff:ff:ff:ff:ff
inet6 fe80::a44b:ceff:fe59:d57c/64 scope link
    valid_lft forever preferred_lft forever
26: vetha47a4c10@if2: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc
noqueue master br-542d7725c408 state UP group default
    link/ether 06:8f:e6:45:9e:30 brd ff:ff:ff:ff:ff:ff
inet6 fe80::48f:e6ff:fe45:9e30/64 scope link
    valid_lft forever preferred_lft forever
yrr@DESKTOP-KE00D72:~/dist_sys$ 

```

Hasil ip addr

24: br-542d7725c408: <...> mtu 1500 qdisc noqueue state UP group default

link/ether 8e:3b:01:42:81:0d brd ff:ff:ff:ff:ff:ff

- inet 172.19.0.1/16 brd 172.19.255.255 scope global br-542d7725c408

Interface br-542d7725c408 punya IP **172.19.0.1/16**

- Inilah gateway bridge untuk container 172.19.0.2 (server) dan 172.19.0.3 (client).
- Kode br yang harus dipantau adalah **br-542d7725c408**

```

yrr@DESKTOP-KE00D72:~/dist_sys$ sudo tcpdump -nvi br-
542d7725c408 -w logTCP.pcap
tcpdump: listening on br-542d7725c408, link-type EN10
MB (Ethernet), snapshot length 262144 bytes
Got 0 

```

sudo tcpdump -nvi [br nya samean] -w [namafile yang samwan mau].pcap

```

compose -f compose/reqresp.yml exec reqre
sp-client python client.py
Received from server: Echo: halo
Enter another message: ingin mencoba unt
uk mengirim pesan
<class 'bytes'>
Received from server: Echo: ingin mencob
a untuk mengirim pesan
Enter another message: apakah berhasil
<class 'bytes'>
Received from server: Echo: apakah berha
sil
Enter another message: 

```

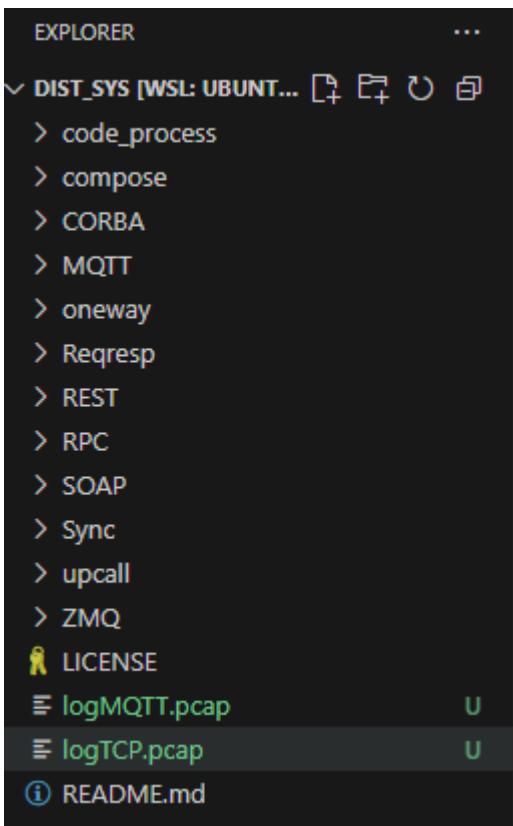
Terminal 2, sebagai client berkirim pesan

```
compose -f compose/reqresp.yml exec r
eqresp-server python server.py
reqresp.yml: the attribute `version` is
  obsolete, it will be ignored, please
  remove it to avoid potential confusio
n
Server listening on 0.0.0.0:2222
Connection from: ('172.19.0.3', 55726)
Received from client: halo
Received from client: ingin mencoba un
tuk mengirim pesan
Received from client: apakah berhasil
```

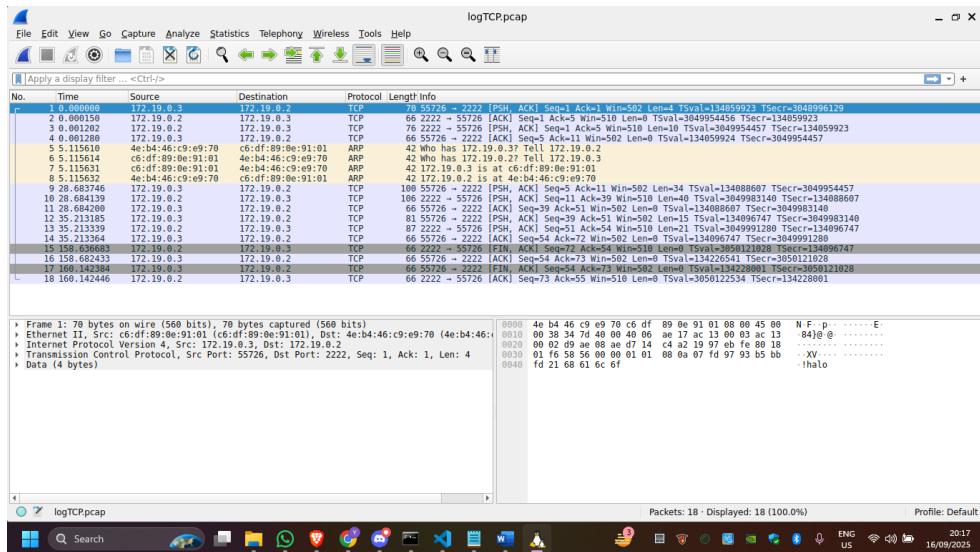
Terminal 1 sebagai server menerima pesan

```
(no such device)
yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcp
dump -nvi br-542d7725c408 -w logTCP.pcap
tcpdump: listening on br-542d7725c408, 1
link-type EN10MB (Ethernet), snapshot len
gth 262144 bytes
Got 14
```

Terminal 3 mengcapture packet



Buka logTCP.pcap



Hasil capture packet

3. Protokol REST

```
● yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f compose/rest.yml up -d
```

membaca file compose, membuat network internal, menjalankan container, -d berjalan pada background

```
#12 resolving provenance for metadata file
#12 DONE -1.1s
[+] Running 4/4
  ✓ compose-rest-client    Built      0.0s
  ✓ Network compose_default Created    0.3s
  ✓ Container rest-server  Started    0.9s
  ✓ Container rest-client  Started    1.4s
```

```
● yrr@DESKTOP-KEODD72:~/dist_sys$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
9b338fcda096 compose-rest-client "tail -f /dev/null" About a minute ago Up About a minute 5151/tcp rest-client
6394f05824a3 compose-rest-server "python server.py" About a minute ago Up About a minute 0.0.0.0:8080->5151/tcp, [::]:8080->5151/tcp rest-server
○ yrr@DESKTOP-KEODD72:~/dist_sys$
```

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f compose/rest.yml exec rest-server python server.py
```

```
-f compose/rest.yml exec rest-server python server.py
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5151
* Running on http://172.18.0.2:5151
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 879-840-764
```

```
○ yrr@DESKTOP-KE0DD72:~/dist_sys$ docker compose
-f compose/rest.yml exec rest-client python client.py --op both -a 7 -b 7
```

```
○ yrr@DESKTOP-KE0DD72:~/dist_sys$ ip a | grep inet
```

```
    inet 172.17.0.1/16 brd 172.17.255.255 scope
global docker0
    inet6 fe80::90d1:38ff:fe60:cb9d/64 scope
link
        inet 172.18.0.1/16 brd 172.18.255.255 scope
global br-f8c6b823f5c9
    inet6 fe80::4461:97ff:fe63:7c3b/64 scope
link
        inet6 fe80::28be:6aff:fed3:ca8c/64 scope
link
        inet6 fe80::6ce0:a4ff:fedf:ada9/64 scope
link
○ yrr@DESKTOP-KE0DD72:~/dist_sys$
```

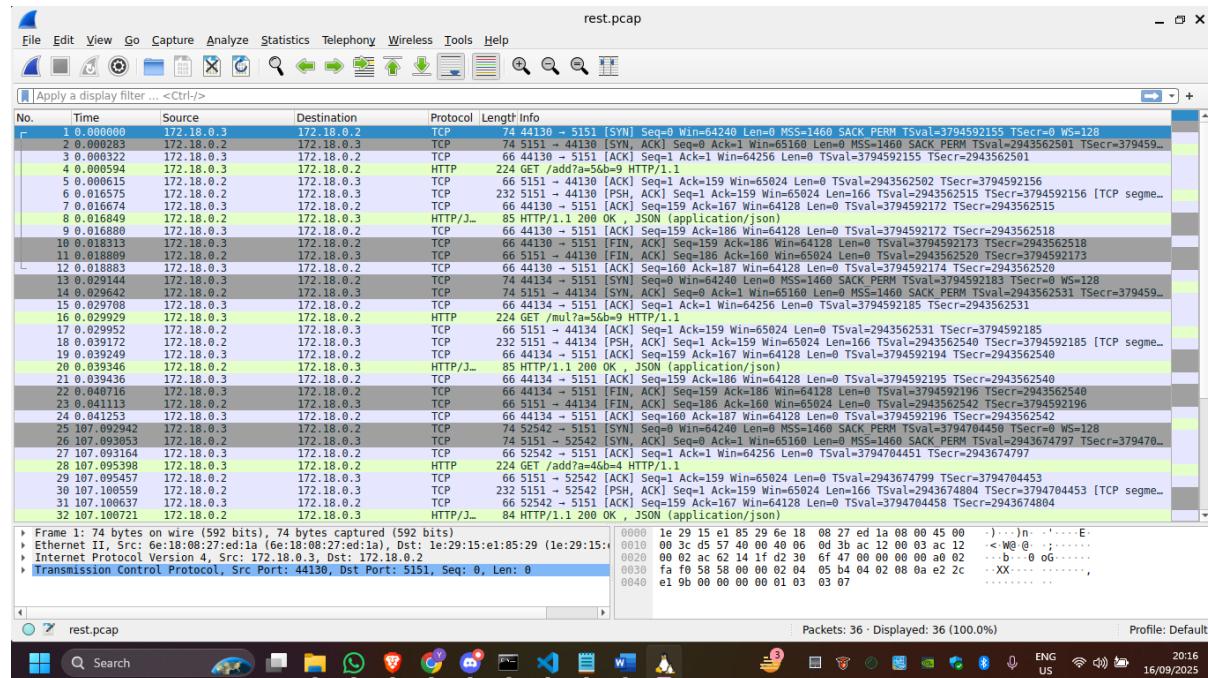
Dapat br-f8c6b823f5c9

```
○ yrr@DESKTOP-KE0DD72:~/dist_sys$ sudo tcpdump -n
vi br-f8c6b823f5c9 -w rest.pcap
```

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
-f compose/rest.yml exec rest-client python cli
ent.py --op both -a 5 -b 9
```

Jalankan perintah Kembali agar data dapat di capture

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -n
vi br-f8c6b823f5c9 -w rest.pcap
tcpdump: listening on br-f8c6b823f5c9, link-type
EN10MB (Ethernet), snapshot length 262144 bytes
got 24
```



4. Protokol ZMQ

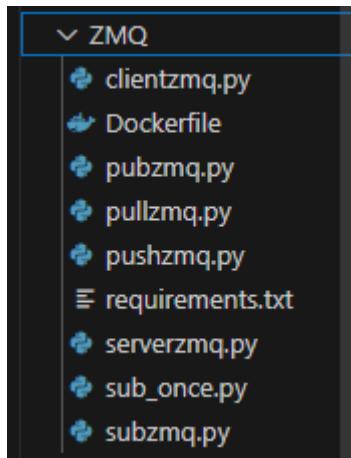
```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
-f compose/zmq.yml up -d
```

```
#22 DONE 0.1s
[+] Running 13/13
✓ compose-zmq-pub      Built      0.0s
✓ compose-zmq-sub      Built      0.0s
✓ compose-zmq-push      Built      0.0s
✓ compose-zmq-pull      Built      0.0s
✓ compose-zmq-rep      Built      0.0s
✓ compose-zmq-req      Built      0.0s
✓ Network compose_default Created  0.4s
✓ Container zmq-rep    Started   6.0s
✓ Container zmq-push   Started   5.6s
✓ Container zmq-pub   Started   5.4s
✓ Container zmq-pull   Started   9.9s
✓ Container zmq-sub   Started   9.5s
✓ Container zmq-req   Started   9.6s
```

```
● yrr@DESKTOP-KE0DD72:~/dist_sys$ docker ps
CONTAINER ID   IMAGE          COMMAND
           CREATED        STATUS        PORTS
TS           NAMES
f14374efd31c  compose-zmq-req  "tail -f /dev
/null"        46 seconds ago  Up 39 seconds  555
5/tcp, 12345/tcp  zmq-req
03723103ba7c  compose-zmq-sub  "tail -f /dev
/null"        46 seconds ago  Up 40 seconds  555
5/tcp, 12345/tcp  zmq-sub
f0533843c1e9  compose-zmq-pull  "tail -f /dev
/null"        46 seconds ago  Up 39 seconds  555
5/tcp, 12345/tcp  zmq-pull
d53e3ab4f040  compose-zmq-pub   "python pubzm
q.py"        46 seconds ago  Up 43 seconds  555
5/tcp, 12345/tcp  zmq-pub
06d89fe7a66c  compose-zmq-rep   "python serve
rzmq.py"      46 seconds ago  Up 43 seconds  555
5/tcp, 12345/tcp  zmq-rep
214791e20ad6  compose-zmq-push  "python pushz
mq.py"        46 seconds ago  Up 43 seconds  555
5/tcp, 12345/tcp  zmq-push
● yrr@DESKTOP-KE0DD72:~/dist_sys$
```

➊ Intinya ZMQ mendukung banyak pola komunikasi

1. **REQ/REP** → Request/Reply (mirip client-server).
2. **PUB/SUB** → Publish/Subscribe (broadcast pesan).
3. **PUSH/PULL** → Pipeline (distribusi kerja ke banyak worker).



Jadi pasangan lengkap:

- clientzmq.py ↔ serverzmq.py (**REQ/REP**)
- pubzmq.py ↔ subzmq.py / sub_once.py (**PUB/SUB**)
- pushzmq.py ↔ pullzmq.py (**PUSH/PULL**)

A. Client Server

```
5  @author: widhi
6  """
7
8
9  import zmq
10
11 context = zmq.Context()
12 socket = context.socket(zmq.REQ)
13 # Connect using docker service DNS name of the REP server
14 socket.connect("tcp://zmq-rep:5555")
15 q=20
16 for request in range(15):
17     print(f"Sending request {request} ...")
18     socket.send(b"hello "+str(q+request).encode())
19     message = socket.recv()
20     print(f"Received reply {request}: {message}")
21
```

Sisi client

```

5
6     @author: widhi
7     """
8
9     import zmq
10
11    context = zmq.Context()
12    socket = context.socket(zmq.REQ)
13    # Connect using docker service DNS name of the REP server
14    socket.connect("tcp://zmq-rep:5555")
15    q=20
16    for request in range(15):
17        print(f"Sending request {request} ...")
18        socket.send(b"hello" +str(q+request).encode())
19        message = socket.recv()
20        print(f"Received reply {request}: {message}")
21

```

Sisi server

```

● yrr@DESKTOP-KEODD72:~/dist_sys$ ip a | grep in
t
    inet 127.0.0.1/8 scope host lo
        inet 10.255.255.254/32 brd 10.255.255.254 s
        cope global lo
        inet6 ::1/128 scope host
        inet 172.28.34.158/20 brd 172.28.47.255 sco
        pe global eth0
        inet6 fe80::215:5dff:fe06:bb27/64 scope lin
        k
        inet 172.17.0.1/16 brd 172.17.255.255 scope
        global docker0
        inet6 fe80::90d1:38ff:fe60:cb9d/64 scope li
        nk
        inet 172.18.0.1/16 brd 172.18.255.255 scope
        global br-7b2205ccd30f
        inet6 fe80::34e4:1dff:fee5:ed57/64 scope li
        nk
        inet6 fe80::9cb7:60ff:fe62:c4c3/64 scope li
        nk
        inet6 fe80::5c4a:e8ff:fed0:db78/64 scope li
        nk
        inet6 fe80::844a:bbff:fe9d:9079/64 scope li
        nk
        inet6 fe80::e810:2dff:fe9a:989e/64 scope li
        nk
        inet6 fe80::a057:9ff:fe71:c631/64 scope lin
        k
        inet6 fe80::ccf8:82ff:fedf:8cf0/64 scope li
        nk
● yrr@DESKTOP-KEODD72:~/dist_sys$ 

```

Dapat br-7b2205ccd30f

```

○ yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -n
vi br-7b2205ccd30f -w logzmqclientserver.pcap
tcpdump: listening on br-7b2205ccd30f, link-type
  EN10MB (Ethernet), snapshot length 262144 bytes
Got 0

```



```

○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker logs -f
zmq-req

```

```

yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
-f compose/zmq.yml exec zmq-req python clientzm
q.py

```

```

yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -n
vi br-7b2205ccd30f -w logzmqclientserver.pcap
tcpdump: listening on br-7b2205ccd30f, link-type
  EN10MB (Ethernet), snapshot length 262144 bytes
Got 48

```



```

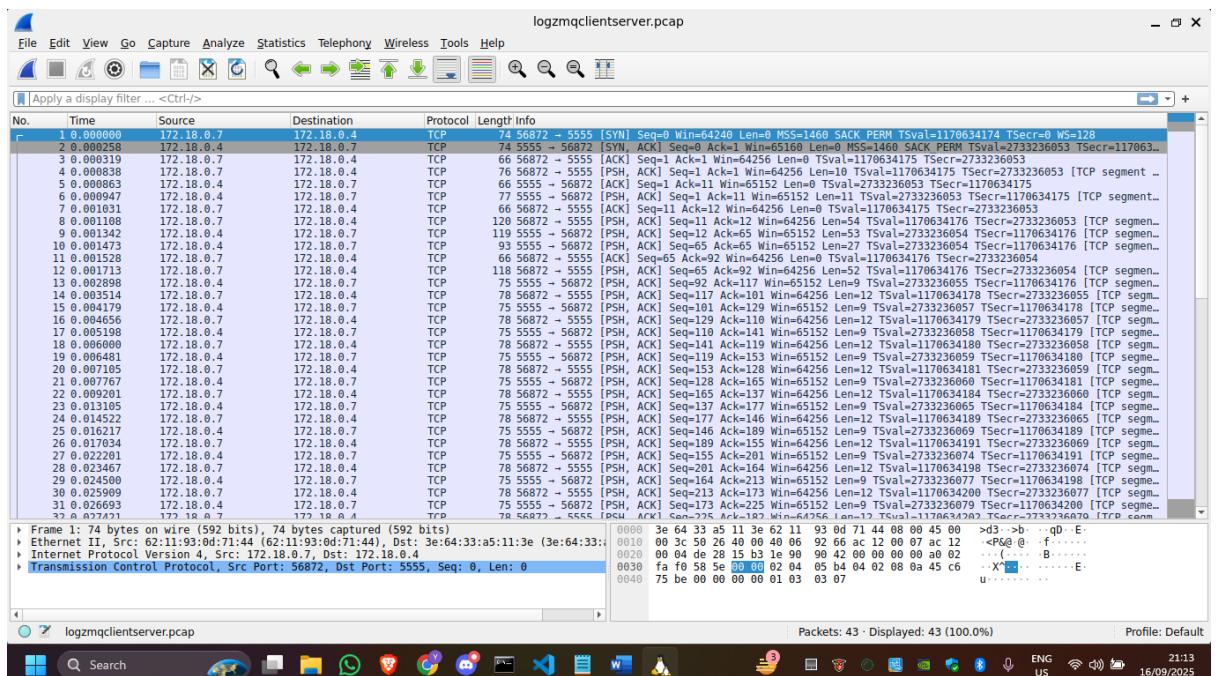
RECEIVED request: b'hello 1'
Received request: b'hello 2 32'
Received request: b'hello 22 33'
Received request: b'hello 23 34'
Received request: b'hello 24 35'
Received request: b'hello 25 36'
Received request: b'hello 26 37'
Received request: b'hello 27 38'
Received request: b'hello 28 39'
Received request: b'hello 29 40'
Received request: b'hello 30 41'
Received request: b'hello 31 42'
Received request: b'hello 32 43'
Received request: b'hello 33 44'
Received request: b'hello 34 45'

```

```

-f compose/zmq.yml exec zmq-req python clientzm
q.py

```



B. Push Pull

```

○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
-f compose/zmq.yml down

```

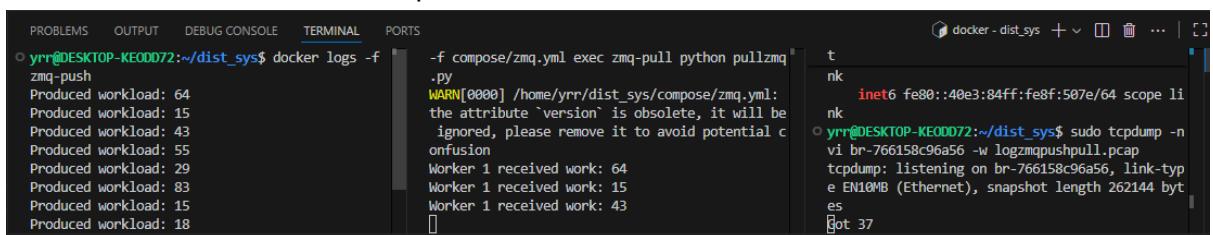
Di down dulu biar dapet br yang berbeda

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose -f compose/zmq.yml up -d
```

Di up lagi

```
● yrr@DESKTOP-KEODD72:~/dist_sys$ ip a | grep inet
inet 127.0.0.1/8 scope host lo
inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
inet6 ::1/128 scope host
inet 172.28.34.158/20 brd 172.28.47.255 scope global eth0
inet6 fe80::215:5dff:fe06:bb27/64 scope link
inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
inet6 fe80::90d1:38ff:fe60:cb9d/64 scope link
inet 172.18.0.1/16 brd 172.18.255.255 scope global br-766158c96a56
inet6 fe80::d01f:5cff:fef1:c199/64 scope link
inet6 fe80::9413:abff:fe1d:9e3b/64 scope link
inet6 fe80::c39:e5ff:fed2:b81c/64 scope link
inet6 fe80::38f5:8cff:fef7:158f/64 scope link
inet6 fe80::5c29:4bff:fe02:580a/64 scope link
inet6 fe80::787a:c0ff:feb9:cb96/64 scope link
inet6 fe80::40e3:84ff:fe8f:507e/64 scope link
○ yrr@DESKTOP-KEODD72:~/dist_sys$
```

Dapat br br-766158c96a56

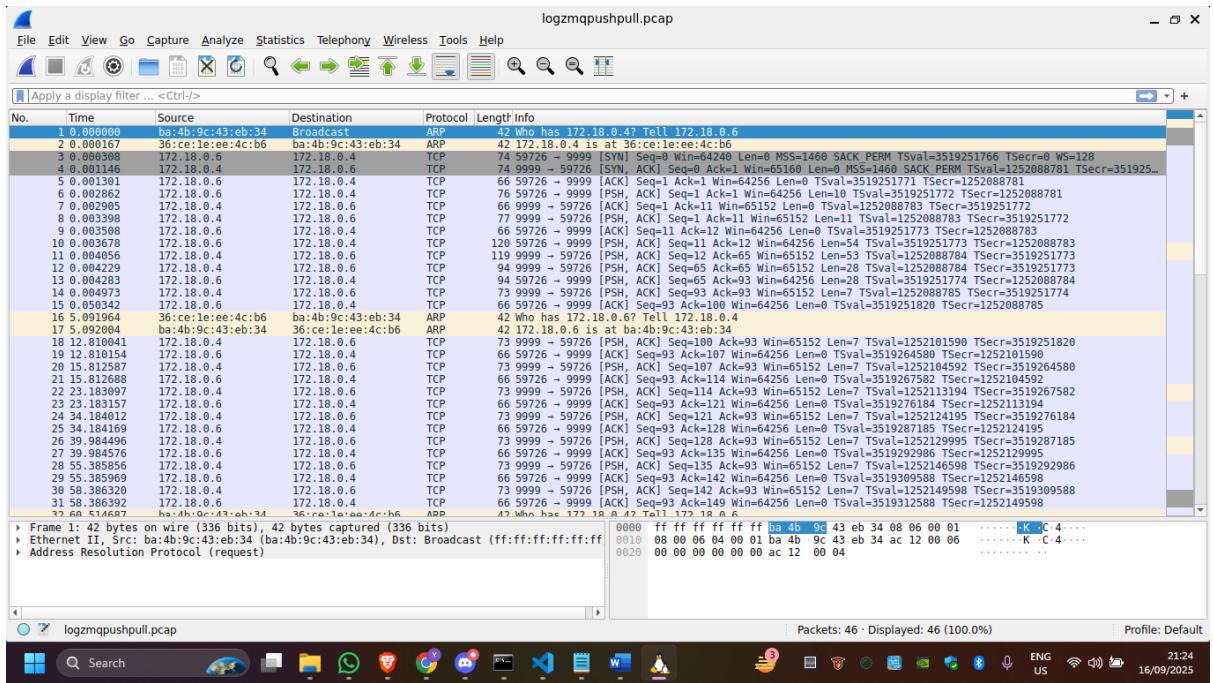


PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker logs -f zmq-push
Produced workload: 64
Produced workload: 15
Produced workload: 43
Produced workload: 55
Produced workload: 29
Produced workload: 83
Produced workload: 15
Produced workload: 18
```

```
-f compose/zmq.yml exec zmq-pull python pullzmq.py
WARN[0000] /home/yrr/dist_sys/compose/zmq.yml:
the attribute `version` is obsolete, it will be
ignored, please remove it to avoid potential c
onfusion
Worker 1 received work: 64
Worker 1 received work: 15
Worker 1 received work: 43
```

```
t
inet6 fe80::40e3:84ff:fe8f:507e/64 scope li
nk
inet6 fe80::40e3:84ff:fe8f:507e/64 scope li
nk
○ yrr@DESKTOP-KEODD72:~/dist_sys$ sudo tcpdump -n
in br-766158c96a56 -w logzmqpushpull.pcap
tcpdump: listening on br-766158c96a56, link-type
EN10MB (Ethernet), snapshot length 262144 bytes
got 37
```



C. PUB SUB

```

○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
  -f compose/zmq.yml down

```

```

○ yrr@DESKTOP-KEODD72:~/dist_sys$ docker compose
  -f compose/zmq.yml up -d

```

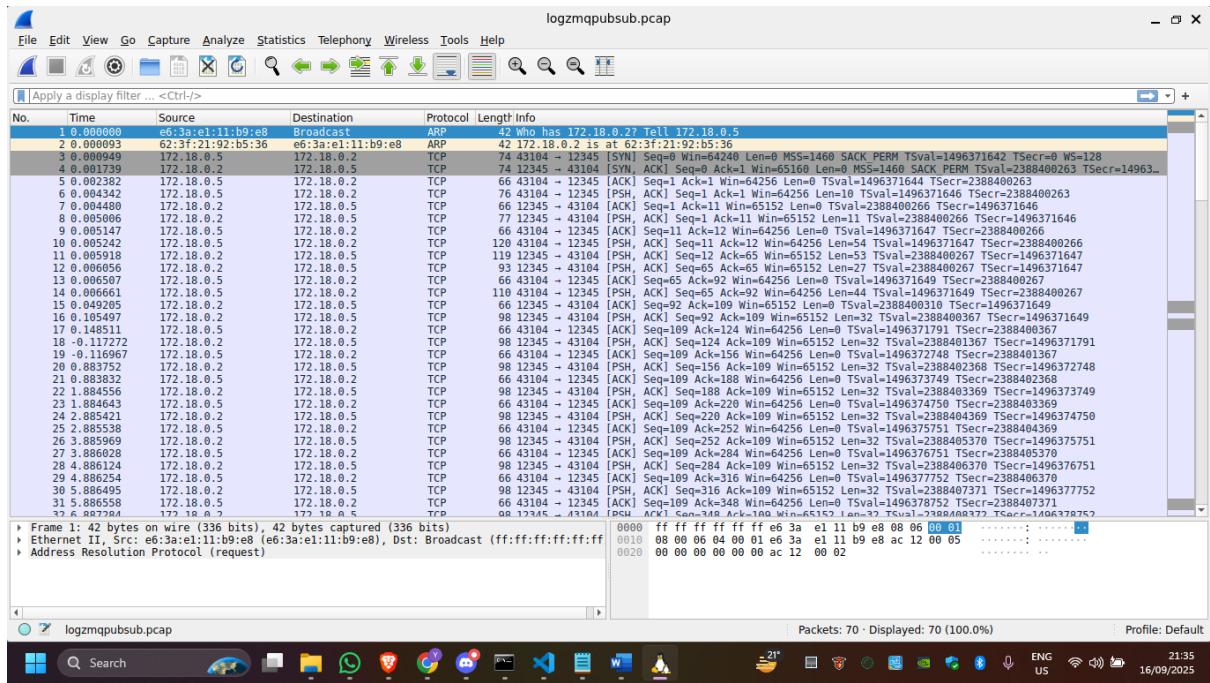
```
● yrr@DESKTOP-KEODD72:~/dist_sys$ ip a | grep interface
      inet 127.0.0.1/8 scope host lo
              inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
                  inet6 ::1/128 scope host
                  inet 172.28.34.158/20 brd 172.28.47.255 scope global eth0
                      inet6 fe80::215:5dff:fe06:bb27/64 scope link
      inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
          inet6 fe80::90d1:38ff:fe60:cb9d/64 scope link
      inet 172.18.0.1/16 brd 172.18.255.255 scope global br-0cd875ac60e4
          inet6 fe80::dc3f:fdff:fe53:3f0f/64 scope link
      inet6 fe80::54e5:c2ff:feff:abd2/64 scope link
      inet6 fe80::80ea:b1ff:fe49:331a/64 scope link
      inet6 fe80::4c85:f9ff:feba:d750/64 scope link
      inet6 fe80::b42e:d3ff:feab:47d9/64 scope link tentative
● yrr@DESKTOP-KEODD72:~/dist_sys$
```

br-0cd875ac60e4

```
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS bash - dist_sys + □ ... [C]

④ yrr@DESKTOP-KE0DD72:~/dist_sys$ docker logs -f
zmq-pub
Published: WAKTU Tue Sep 16 14:28:13 2025
Published: WAKTU Tue Sep 16 14:28:14 2025
Published: WAKTU Tue Sep 16 14:28:15 2025
Published: WAKTU Tue Sep 16 14:28:16 2025
Published: WAKTU Tue Sep 16 14:28:17 2025
Published: WAKTU Tue Sep 16 14:28:18 2025
Published: WAKTU Tue Sep 16 14:28:19 2025
Published: WAKTU Tue Sep 16 14:28:20 2025
Published: WAKTU Tue Sep 16 14:28:21 2025
Published: WAKTU Tue Sep 16 14:28:22 2025
Published: WAKTU Tue Sep 16 14:28:23 2025
Published: WAKTU Tue Sep 16 14:28:24 2025
Published: WAKTU Tue Sep 16 14:28:25 2025
Published: WAKTU Tue Sep 16 14:28:26 2025
Published: WAKTU Tue Sep 16 14:28:27 2025
Published: WAKTU Tue Sep 16 14:28:28 2025

④ yrr@DESKTOP-KE0DD72:~/dist_sys$ docker compose -f compose/zmq.yml exec zmq-sub python subzmq.py
y
WARN[0000] /home/yrr/dist_sys/compose/zmq.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion
Received: WAKTU Tue Sep 16 14:31:05 2025
Received: WAKTU Tue Sep 16 14:31:05 2025
Received: WAKTU Tue Sep 16 14:31:06 2025
Received: WAKTU Tue Sep 16 14:31:07 2025
Received: WAKTU Tue Sep 16 14:31:08 2025
Received: WAKTU Tue Sep 16 14:31:09 2025
Received: WAKTU Tue Sep 16 14:31:10 2025
Received: WAKTU Tue Sep 16 14:31:11 2025
Received: WAKTU Tue Sep 16 14:31:12 2025
^CTraceback (most recent call last):
  File "/app/subzmq.py", line 22, in <module>
                                             t
                                             global br-0cd875ac60e4
                                             inet6 fe80::dc3f:fdff:fe53:f0f/64 scope li
                                             nk
                                             inet6 fe80::54e5:c2ff:fef3:abd2/64 scope li
                                             nk
                                             inet6 fe80::80ea:b1ff:fe49:331a/64 scope li
                                             nk
                                             inet6 fe80::4c85:f9ff:feba:d750/64 scope li
                                             nk
                                             inet6 fe80::b42e:d3ff:feab:47d9/64 scope li
                                             nk tentative
④ yrr@DESKTOP-KE0DD72:~/dist_sys$ sudo tcpdump -nvi br-0cd875ac60e4 -w logzmqpubsub.pcap
tcpdump: listening on br-0cd875ac60e4, link-type EN10MB (Ethernet), snapshot length 262144 bytes
[0] 36
```



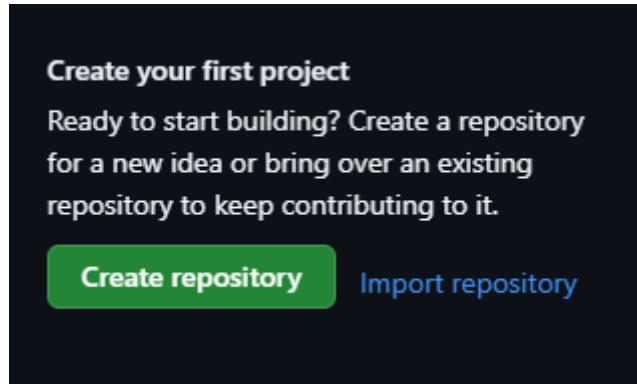
Intinya

REQ/REP → client-server sederhana.

PUB/SUB → broadcast ke banyak subscriber.

PUSH/PULL → distribusi task ke worker.

Menambahkan Repository



Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#).
Required fields are marked with an asterisk (*).

1 General

Owner *  **Repository name ***
Your new repository will be created as `Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25`.
The repository name can only contain ASCII letters, digits, and the characters ., -, and _.

Great repository names are short and memorable. How about `symmetrical-octo-funicular`?

Description

40 / 350 characters

2 Configuration

Choose visibility *  **Public** Choose who can see and commit to this repository

github.com/yayanrr-cmyk/Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25

Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25 (Public)

Start coding with Codespaces
Add a README file and start coding in a secure, configurable, and dedicated development environment.
[Create a codespace](#)

Add collaborators to this repository
Search for people using their GitHub username or email address.
[Invite collaborators](#)

Cannot fork because you own this repository and are not a member of any organizations.

Quick setup — if you've done this kind of thing before
Set up in Desktop or HTTPS SSH https://github.com/yayanrr-cmyk/Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25.git
Get started by [creating a new file](#) or [uploading an existing file](#). We recommend every repository include a [README](#), [LICENSE](#), and [.gitignore](#).

...or create a new repository on the command line

21° ENG US 16/09/2025

`yrr@DESKTOP-KEODD72:~/dist_sys$ rm -rf .git`

Untuk menghapus profile github sebelumnya

...or create a new repository on the command line

```
echo "# Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25" >> README.md
git init
git add README.md
git commit -m "first commit"
git branch -M main
git remote add origin https://github.com/yayanrr-cmyk/Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25.git
git push -u origin main
```

Note:

Git add .

```
④ yrr@DESKTOP-KE00D72:~/dist_sys$ git commit -m "first commit"
Author identity unknown

*** Please tell me who you are.

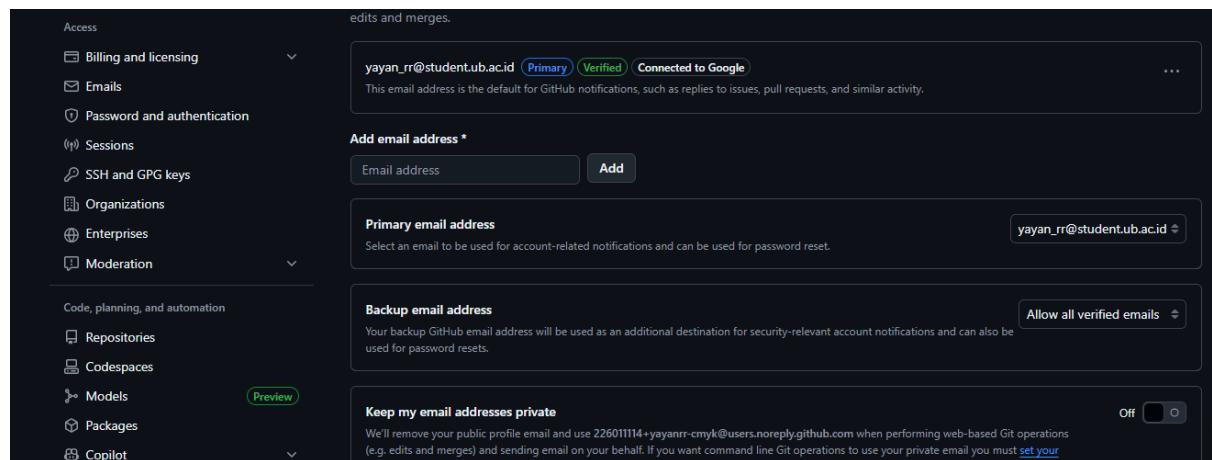
Run

git config --global user.email "you@example.com"
git config --global user.name "Your Name"

to set your account's default identity.
Omit --global to set the identity only in this repository.

fatal: empty ident name (for cyrr@DESKTOP-KE00D72.localdomain) not allowed
⑤ yrr@DESKTOP-KE00D72:~/dist_sys$ git config --global user.email "yayan_rr@student.ub.ac.id"
⑥ yrr@DESKTOP-KE00D72:~/dist_sys$ git config --global user.name "yayanrr-cmyk"
  git: command not found
⑦ yrr@DESKTOP-KE00D72:~/dist_sys$ git config --global user.name "yayanrr-cmyk"
⑧ yrr@DESKTOP-KE00D72:~/dist_sys$ git branch -M main
⑨ yrr@DESKTOP-KE00D72:~/dist_sys$ git remote add origin https://github.com/yayanrr-cmyk/Sistem-Terdistribusi_Lingkungan-Praktik-Mandiri_15.09.25.git
```

Jika masih awal, akan memasukkan identitas email dan id



Keep email private off

Lalu git push