

# SOAL Nomor 1

# Konfigurasi BGP routing untuk menghubungkan 3 Data Center  
SBY=Surabaya  
JKT=Jakarta  
BDG=Bandung

## Konfigurasi OASBYBBRTR01

#### Konfigurasi IP address and Hostname pada OASBYBBRTR01

Router(config)#hostname OASBYBBRTR01

OASBYBBRTR01(config)#interface GigabitEthernet 0/0

OASBYBBRTR01(config-if)#ip address 10.10.10.1 255.255.255.252

OASBYBBRTR01(config-if)#no shutdown

OASBYBBRTR01(config-if)#exit

OASBYBBRTR01(config)#interface GigabitEthernet 0/1

OASBYBBRTR01(config-if)#ip address 10.10.20.1 255.255.255.252

OASBYBBRTR01(config-if)#no shutdown

OASBYBBRTR01(config-if)#exit

OASBYBBRTR01(config)#interface GigabitEthernet 0/2

OASBYBBRTR01(config-if)#ip address 192.168.100.1 255.255.255.248

OASBYBBRTR01(config-if)#no shutdown

OASBYBBRTR01(config-if)#exit

#### Konfigurasi BGP

Konfigurasi BGP AS number 100 untuk OASBYBBRTR01 dan tambahkan OAJKTBBRTR01 (10.10.10.2) dan OABDGBBRTR01 (10.10.20.2) sebagai neighbor. Kemudian advertise local network 192.168.100.0/30 dari OASBYBBRTR01.

OASBYBBRTR01(config)#router bgp 100

OASBYBBRTR01(config-router)#neighbor 10.10.10.2 remote-as 200

OASBYBBRTR01(config-router)#neighbor 10.10.20.2 remote-as 300

OASBYBBRTR01(config-router)#network 192.168.100.0 mask 255.255.255.248

#### Simpan konfigurasi

OASBYBBRTR01(config-router)#do wr mem

## Konfigurasi OASBYBBRTR01

#### Konfigurasi IP address and Hostname pada OAJKTBBRTR01

Router(config)#hostname OAJKTBBRTR01

OAJKTBBRTR01(config)#interface GigabitEthernet 0/0

```
OAJKTBBRTR01(config-if)#ip address 10.10.10.2 255.255.255.252
OAJKTBBRTR01(config-if)#no shutdown
OAJKTBBRTR01(config-if)#exit
```

```
OAJKTBBRTR01(config)#interface GigabitEthernet 0/1
OAJKTBBRTR01(config-if)#ip address 192.168.200.1 255.255.255.252
OAJKTBBRTR01(config-if)#no shutdown
OAJKTBBRTR01(config-if)#exit
```

#### ### Konfigurasi BGP

Konfigurasi BGP AS number 200 untuk OAJKTBBRTR01 dan tambahkan OASBYBBRTR01 sebagai neighbor. Kemudian advertise local network 192.168.200.0/30 dari OAJKTBBRTR01.

```
OAJKTBBRTR01(config)#router bgp 200
OAJKTBBRTR01(config-router)#neighbor 10.10.10.1 remote-as 100
OAJKTBBRTR01(config-router)#network 192.168.200.0 mask 255.255.255.252
```

#### ### Simpan konfigurasi

```
OAJKTBBRTR01(config-router)#do wr mem
```

#### ## Konfigurasi OABDGBBRTR01

##### ### Konfigurasi IP address and Hostname pada OABDGBBRTR01

```
Router(config)#hostname OABDGBBRTR01
OABDGBBRTR01(config)#interface GigabitEthernet 0/0
OABDGBBRTR01(config-if)#ip address 10.10.20.2 255.255.255.252
OABDGBBRTR01(config-if)#no shutdown
OABDGBBRTR01(config-if)#exit
```

```
OABDGBBRTR01(config)#interface GigabitEthernet 0/1
OABDGBBRTR01(config-if)#ip address 192.168.201.1 255.255.255.252
OABDGBBRTR01(config-if)#no shutdown
OABDGBBRTR01(config-if)#exit
```

#### ### Konfigurasi BGP

Konfigurasi BGP AS number 300 untuk OABDGBBRTR01 dan tambahkan OASBYBBRTR01 (10.10.20.1) sebagai neighbor. Kemudian advertise local network 192.168.201.0/30 dari OABDGBBRTR01.

```
OABDGBBRTR01(config)#router bgp 300
OABDGBBRTR01(config-router)#neighbor 10.10.20.1 remote-as 100
OABDGBBRTR01(config-router)#network 192.168.201.0 mask 255.255.255.252
```

#### ### Simpan konfigurasi

```
OABDGBBRTR01(config-router)#do wr mem
```

## ## Testing

OASBYBBRTR01#sh ip bgp

BGP table version is 11, local router ID is 192.168.100.1

Status codes: s suppressed, d damped, h history, \* valid, > best, i - internal,  
r RIB-failure, S Stale

Origin codes: i - IGP, e - EGP, ? - incomplete

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 192.168.100.0/29	0.0.0.0	0	0	32768	i
*> 192.168.200.0/30	10.10.10.2	0	0	0	200 i
*> 192.168.201.0/30	10.10.20.2	0	0	0	300 i

OASBYBBRTR01 mempelajari network 192.168.200.0/30 dengan next hp ip address 10.10.10.2 dan mempelajari 192.168.201.0/30 dengan next hop ip address 10.10.20.2

OASBYBBRTR01#sh ip route bgp

B 192.168.200.0 [20/0] via 10.10.10.2, 00:00:00

B 192.168.201.0 [20/0] via 10.10.20.2, 00:00:00

Pada routing table, terdapat network 192.168.200.0 dan 192.168.201.0

C:\>tracert 192.168.200.2

Tracing route to 192.168.200.2 over a maximum of 30 hops:

1	0 ms	0 ms	0 ms	192.168.100.1
2	0 ms	0 ms	0 ms	10.10.10.2
3	0 ms	0 ms	0 ms	192.168.200.2

Trace complete.

C:\>tracert 192.168.201.2

Tracing route to 192.168.201.2 over a maximum of 30 hops:

1	0 ms	0 ms	0 ms	192.168.100.1
2	0 ms	0 ms	0 ms	10.10.20.2
3	0 ms	0 ms	0 ms	192.168.201.2

Trace complete.

Traceroute dari OANMC01 ke OAJKTWWW01 (192.168.200.2) dan OABDGWWW01 (192.168.201.2) berhasil

## SOAL Nomor 2

### ## A. Konfigurasi Dasar

#### Membuat 1300 user berserta password dengan akses sudo dan konfigurasi ssh untuk login menggunakan password dan public key

```
oabdillah@oalab01:~# for i in {1..1300}; do USERNAME="sevima-adm$i";  
PASSWORD="w3bsite#$i"; sudo useradd -s /bin/bash -G sudo "$USERNAME" && echo  
"$USERNAME:$PASSWORD" | chpasswd && echo "User $USERNAME dibuat dengan sudo  
access"; done
```

```
oabdillah@oalab01:~$ sudo vim /etc/ssh/sshd_config.d/sevima.conf  
PasswordAuthentication Yes  
PubkeyAuthentication Yes
```

#### Mengubah port ssh menjadi 2025 serta mengaktifkan seluruh aktifitas log dari user dengan value VERBOSE pada LogLevel

```
oabdillah@oalab01:~$ sudo vim /etc/ssh/sshd_config.d/sevima.conf  
Port 2025  
LogLevel VERBOSE
```

#### Untuk mengaktifkan konfigurasi restart

```
oabdillah@oalab01:~$ sudo systemctl daemon-reload  
oabdillah@oalab01:~$ sudo systemctl restart ssh.socket
```

#### Menyesuaikan sumberdaya sesuai dengan ulimit

```
oabdillah@oalab01:~$ sudo vim /etc/security/limits.conf  
@sudo soft nfile 2048  
@sudo hard nfile 4096
```

### ## B. Certificate Authority

#### Setup root certificate authority

```
oabdillah@oalab01:~$ sudo mkdir -p /root/ca  
oabdillah@oalab01:~$ sudo openssl req -x509 -newkey rsa:4096 -nodes \  
-keyout /root/ca/cacert.key \  
-out /root/ca/cacert.pem \  
-days 3650 \  
-subj "/C=ID/O=PT. Sentra Vidya Utama/CN=SEVIMA CA"
```

### Generate dan sign tiap-tiap web certificate

```
for domain in www.sevima.site utara.sevima.site timur.sevima.site barat.sevima.site; do \  
    sudo openssl genrsa -out /root/ca/$domain.key 2048; \  
    sudo openssl req -new -key /root/ca/$domain.key -out /root/ca/$domain.csr -subj \  
"/C=ID/O=PT. Sentra Vidya Utama/CN=$domain"; \  
    sudo openssl x509 -req -in /root/ca/$domain.csr -CA /root/ca/cacert.pem -CAkey \  
/root/ca/cacert.key -CAcreateserial -out /root/ca/$domain.crt -days 365; \  
done
```

## C. Web Server

### 1. Virtual host HTTP-only untuk melayani utara.sevima.site menggunakan apache2 (Port 8025).

```
oabdillah@oalab01:~$ sudo apt -y install apache2  
oabdillah@oalab01:~$ sudo vim /etc/apache2/ports.conf  
Listen 8025
```

```
oabdillah@oalab01:~$ sudo vim /etc/apache2/sites-available/utara.conf
```

```
<VirtualHost *:8025>  
    ServerName utara.sevima.site  
    DocumentRoot /var/www/utara  
  
    # Custom Headers  
    Header set X-Owner-By "Oktavian Rizki Abdillah"  
    Header set X-Served-By "apache2"  
</VirtualHost>
```

```
oabdillah@oalab01:~$ sudo mkdir -p /var/www/utara  
oabdillah@oalab01:~$ sudo bash -c 'echo "Hello World from Utara Site" >  
/var/www/utara/index.html'  
oabdillah@oalab01:~$ sudo a2enmod headers ; sudo a2ensite utara ; sudo systemctl restart  
apache2
```

Menggunakan curl untuk cek response web server pada port 8025. Body, X-Owner-By dan X-Served-By sudah sesuai.

```
oabdillah@oalab01:~$ curl -v localhost:8025  
* Host localhost:8025 was resolved.  
* IPv6: ::1  
* IPv4: 127.0.0.1  
* Trying [::1]:8025...
```

```
* Connected to localhost (::1) port 8025
> GET / HTTP/1.1
> Host: localhost:8025
> User-Agent: curl/8.5.0
> Accept: */*
>
< HTTP/1.1 200 OK
< Date: Sat, 17 Jan 2026 05:19:49 GMT
< Server: Apache/2.4.58 (Ubuntu)
< Last-Modified: Sat, 17 Jan 2026 05:18:57 GMT
< ETag: "1c-6488e98401551"
< Accept-Ranges: bytes
< Content-Length: 28
< X-Owner-By: Oktavian Rizki Abdillah
< X-Served-By: apache2
< Content-Type: text/html
<
Hello World from Utara Site
* Connection #0 to host localhost left intact
```

### 2. Virtual host HTTP-only untuk melayani utara.sevima.site menggunakan nginx (Port 8125). Comment Listen 80 pada apache2 untuk menghindari port conflict dan menghindari service nginx tidak berjalan karena nginx juga menggunakan port 80 by default.

```
oabdillah@oalab01:~$ sudo vim /etc/apache2/ports.conf
#Listen 80
```

```
oabdillah@oalab01:~$ sudo apt -y install nginx
oabdillah@oalab01:~$ sudo vim /etc/nginx/sites-available/timur
```

```
server {
    listen 8125;
    server_name timur.sevima.site;

    location / {
        add_header X-Owner-By "Oktavian Rizki Abdillah";
        add_header X-Served-By "nginx";
        root /var/www/timur;
        index index.html;
    }
}
```

```
oabdillah@oalab01:~$ sudo mkdir -p /var/www/timur
```

```
oabdillah@oalab01:~$ sudo bash -c 'echo "Hello World from Timur Site" >
/var/www/timur/index.html'
oabdillah@oalab01:~$ sudo ln -s /etc/nginx/sites-available/timur /etc/nginx/sites-enabled/
oabdillah@oalab01:~$ sudo systemctl restart nginx
```

Menggunakan curl untuk cek response web server pada port 8125. Body, X-Owner-By dan X-Served-By sudah sesuai.

```
curl -v localhost:8125
* Host localhost:8125 was resolved.
* IPv6: ::1
* IPv4: 127.0.0.1
* Trying [::1]:8125...
* connect to ::1 port 8125 from ::1 port 45226 failed: Connection refused
* Trying 127.0.0.1:8125...
* Connected to localhost (127.0.0.1) port 8125
> GET / HTTP/1.1
> Host: localhost:8125
> User-Agent: curl/8.5.0
> Accept: */*
>
< HTTP/1.1 200 OK
< Server: nginx/1.24.0 (Ubuntu)
< Date: Sat, 17 Jan 2026 05:33:57 GMT
< Content-Type: text/html
< Content-Length: 28
< Last-Modified: Sat, 17 Jan 2026 05:31:18 GMT
< Connection: keep-alive
< ETag: "696b1ea6-1c"
< X-Owner-By: Oktavian Rizki Abdillah
< X-Served-By: nginx
< Accept-Ranges: bytes
<
Hello World from Timur Site
* Connection #0 to host localhost left intact
```

### 3. Virtual host HTTPS untuk melayani barat.sevima.site menggunakan nginx dengan port https 4435. Terlebih dahulu, comment Listen port 80 dan [::]:80 pada "default" virtual host nginx.

```
oabdillah@oalab01:~$ sudo vim /etc/nginx/sites-enabled/default
#listen 80 default_server;
#listen [::]:80 default_server;

oabdillah@oalab01:~$ sudo vim /etc/nginx/sites-available/barat
```

```
server {
    listen 80;
    server_name barat.sevima.site;
    return 301 https://$host:443$request_uri;
}
```

```
server {
    listen 4435 ssl;
    server_name barat.sevima.site;

    ssl_certificate /root/ca/barat.sevima.site.crt;
    ssl_certificate_key /root/ca/barat.sevima.site.key;

    location / {
        root /var/www/barat;
        index index.html;
    }
}
```

```
oabdillah@oalab01:~$ sudo mkdir -p /var/www/barat
oabdillah@oalab01:~$ sudo bash -c 'echo "Hello World from Barat Site" >
/var/www/barat/index.html'
oabdillah@oalab01:~$ sudo ln -s /etc/nginx/sites-available/barat /etc/nginx/sites-enabled/
oabdillah@oalab01:~$ sudo systemctl restart nginx
```

## D. Load Balancer dengan HAProxy

### Install haproxy dan jadikan satu .crt dan .key file untuk www.sevima.site

```
oabdillah@oalab01:~$ sudo apt -y install haproxy
```

```
oabdillah@oalab01:~$ sudo bash -c 'cat /root/ca/www.sevima.site.crt
/root/ca/www.sevima.site.key > /etc/haproxy/www.sevima.site.combined.pem'
```

Edit file haproxy.cfg dan tambahkan konfigurasi seperti dibawah ini

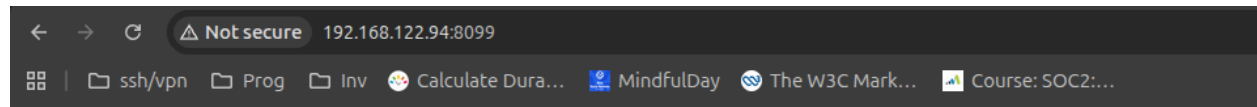
```
oabdillah@oalab01:~$ sudo vim /etc/haproxy/haproxy.cfg
```

```
frontend http_front
    bind *:8099
    bind *:443 ssl crt /etc/haproxy/www.sevima.site.combined.pem
    default_backend sevima_cluster
```

```
backend sevima_cluster
    balance roundrobin
    server utara 127.0.0.1:8025 check
```



server timur 127.0.0.1:8125 check



# Hello World from Timur Site