

LAPORAN Pengerjaan

Make Your Web Great Again

Posisi: Site Reliability Engineer (SRE)

Nama: Angga Alfiansah

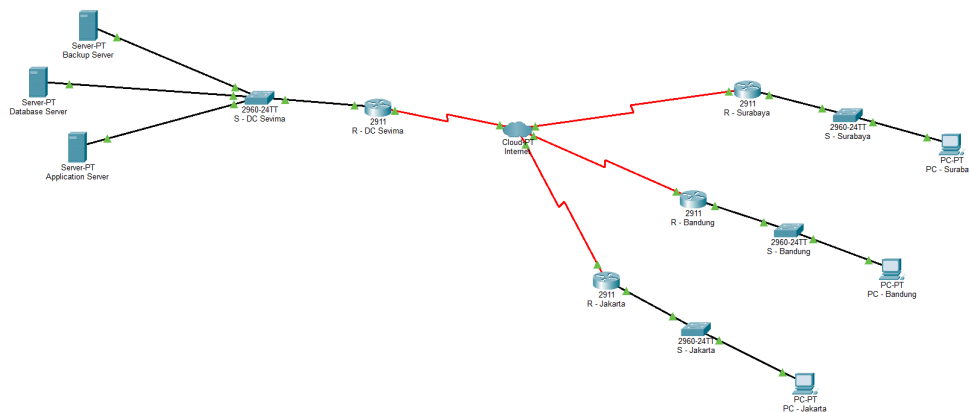
Repositori: <https://github.com/anggaalfiansah/taskopsec2025>

1. PENDAHULUAN

Laporan ini disusun untuk memenuhi tugas seleksi Site Reliability Engineer di SEVIMA. Proyek ini mencakup perancangan infrastruktur jaringan skala nasional menggunakan Cisco Packet Tracer dan implementasi *containerized server* yang mencakup manajemen user, keamanan SSH, Certificate Authority (CA) internal, serta Load Balancing.

2. SOLUSI NOMOR 1: INFRASTRUCTURE PROVISIONING

2.1 Topologi Jaringan

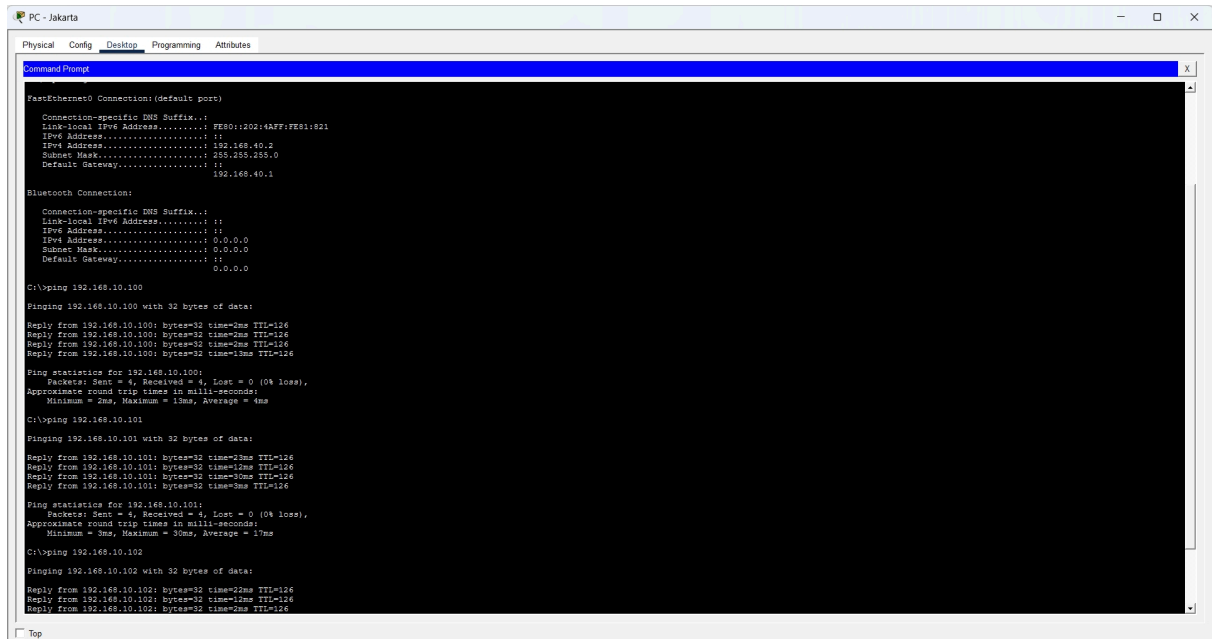


Dirancang topologi yang menghubungkan Data Center pusat dengan tiga kantor cabang (Jakarta, Bandung, Surabaya).

- **Routing:** Menggunakan konfigurasi routing untuk memastikan semua segmen jaringan dapat saling berkomunikasi.
- **Validasi:** Pengujian dilakukan dengan metode *End-to-End Ping*.

2.2 Bukti Konektivitas

- PC Jakarta to Server: [PASS]



```
PC - Jakarta
Physical  Config  Desktop  Programming  Attributes

Command Prompt

NetEthernet0 Connection (default port)

Connection-specific DNS Suffix...:
Link-local IPv6 Address . . . . . : FE80::201:4AFF:FE51:821
IPv6 Address. . . . . : 
IPv6 Address. . . . . : 192.168.40.2
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.40.1

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address . . . . . : 
IPv6 Address. . . . . : 
IPv6 Address. . . . . : 0.0.0.0
Subnet Mask . . . . . : 0.0.0.0
Default Gateway . . . . . : 0.0.0.0

C:\>ping 192.168.10.100

Pinging 192.168.10.100 with 32 bytes of data:

Reply from 192.168.10.100: bytes=32 time=2ms TTL=126
Reply from 192.168.10.100: bytes=32 time=2ms TTL=126
Reply from 192.168.10.100: bytes=32 time=2ms TTL=126
Reply from 192.168.10.100: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.10.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 2ms, Average = 2ms

C:\>ping 192.168.10.101

Pinging 192.168.10.101 with 32 bytes of data:

Reply from 192.168.10.101: bytes=32 time=13ms TTL=126
Reply from 192.168.10.101: bytes=32 time=13ms TTL=126
Reply from 192.168.10.101: bytes=32 time=30ms TTL=126
Reply from 192.168.10.101: bytes=32 time=3ms TTL=126

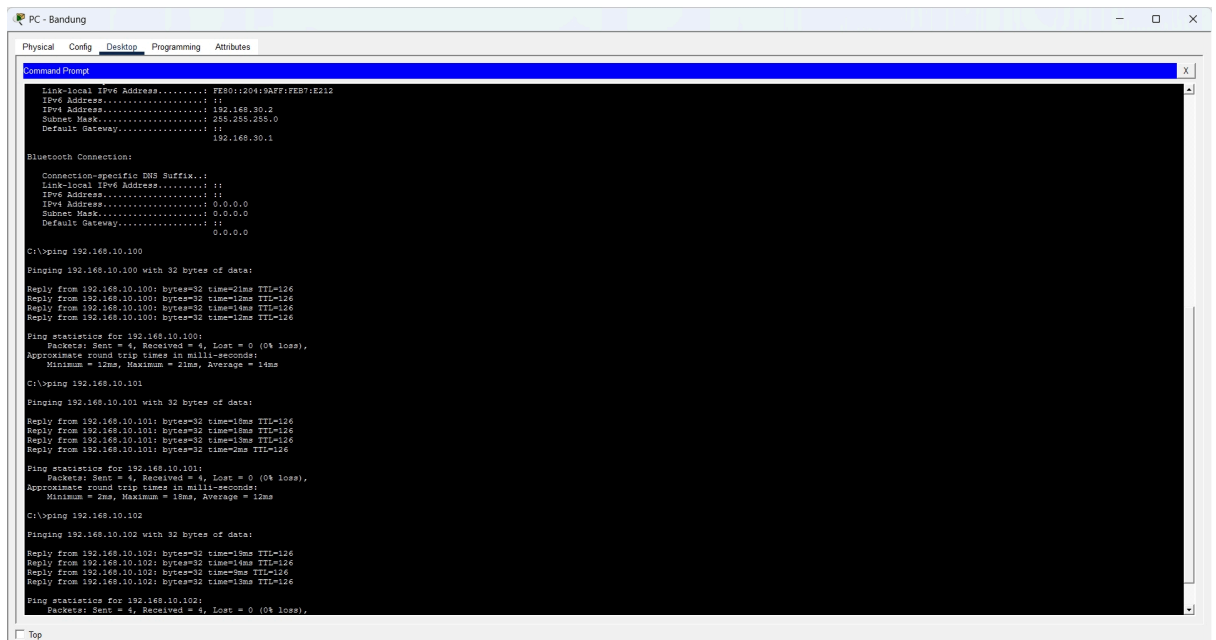
Ping statistics for 192.168.10.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 30ms, Average = 17ms

C:\>ping 192.168.10.102

Pinging 192.168.10.102 with 32 bytes of data:

Reply from 192.168.10.102: bytes=32 time=22ms TTL=126
Reply from 192.168.10.102: bytes=32 time=12ms TTL=126
Reply from 192.168.10.102: bytes=32 time=2ms TTL=126
```

- PC Bandung to Server: [PASS]



```
PC - Bandung
Physical  Config  Desktop  Programming  Attributes

Command Prompt

Link-local IPv6 Address . . . . . : FE80::204:9AFF:FE57:E212
IPv6 Address. . . . . : 
IPv6 Address. . . . . : 192.168.40.2
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.40.1

Bluetooth Connection:

Connection-specific DNS Suffix...:
Link-local IPv6 Address . . . . . : 
IPv6 Address. . . . . : 
IPv6 Address. . . . . : 0.0.0.0
Subnet Mask . . . . . : 0.0.0.0
Default Gateway . . . . . : 0.0.0.0

C:\>ping 192.168.10.100

Pinging 192.168.10.100 with 32 bytes of data:

Reply from 192.168.10.100: bytes=32 time=21ms TTL=126
Reply from 192.168.10.100: bytes=32 time=13ms TTL=126
Reply from 192.168.10.100: bytes=32 time=14ms TTL=126
Reply from 192.168.10.100: bytes=32 time=13ms TTL=126

Ping statistics for 192.168.10.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 13ms, Maximum = 21ms, Average = 15ms

C:\>ping 192.168.10.101

Pinging 192.168.10.101 with 32 bytes of data:

Reply from 192.168.10.101: bytes=32 time=18ms TTL=126
Reply from 192.168.10.101: bytes=32 time=18ms TTL=126
Reply from 192.168.10.101: bytes=32 time=13ms TTL=126
Reply from 192.168.10.101: bytes=32 time=2ms TTL=126

Ping statistics for 192.168.10.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 18ms, Average = 12ms

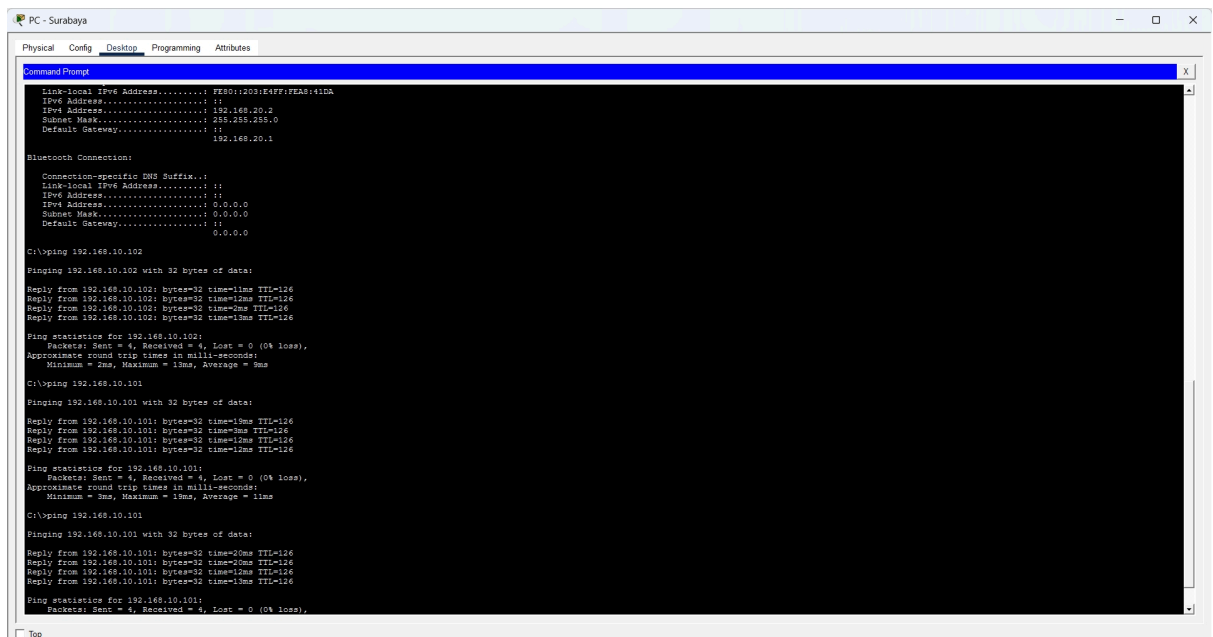
C:\>ping 192.168.10.102

Pinging 192.168.10.102 with 32 bytes of data:

Reply from 192.168.10.102: bytes=32 time=19ms TTL=126
Reply from 192.168.10.102: bytes=32 time=14ms TTL=126
Reply from 192.168.10.102: bytes=32 time=1ms TTL=126
Reply from 192.168.10.102: bytes=32 time=13ms TTL=126

Ping statistics for 192.168.10.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

- **PC Surabaya to Server: [PASS]**



```
PC - Surabaya
Physical Config Desktop Programming Attributes
Command Prompt
Link-local IPv6 Address . . . . . FE80::1021:FAFF:FEA8::10A
IPv6 Address . . . . . ::
IPv6 Subnet Mask . . . . . ::
Subnet Mask . . . . . 255.255.255.0
Default Gateway . . . . . 192.168.20.1

Bluetooth Connection:
Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . ::
IPv6 Address . . . . . ::
IPv6 Subnet Mask . . . . . 0.0.0.0
Subnet Mask . . . . . 0.0.0.0
Default Gateway . . . . . 0.0.0.0

C:\>ping 192.168.10.102

Pinging 192.168.10.102 with 32 bytes of data:
Reply from 192.168.10.102: bytes=32 time=1ms TTL=126
Reply from 192.168.10.102: bytes=32 time=1ms TTL=126
Reply from 192.168.10.102: bytes=32 time=1ms TTL=126
Reply from 192.168.10.102: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.10.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 3ms, Average = 3ms

C:\>ping 192.168.10.101

Pinging 192.168.10.101 with 32 bytes of data:
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.10.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 3ms, Average = 3ms

C:\>ping 192.168.10.101

Pinging 192.168.10.101 with 32 bytes of data:
Reply from 192.168.10.101: bytes=32 time=20ms TTL=126
Reply from 192.168.10.101: bytes=32 time=20ms TTL=126
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126
Reply from 192.168.10.101: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.10.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

3. SOLUSI NOMOR 2: ORCHESTRATION & WEB SERVICES

3.1 Konfigurasi Dasar (Soal A)

- **Manajemen User:** Menggunakan skrip `setup_users.sh` untuk membuat **1300 user** (`sevima-adm1` s/d `sevima-adm1300`) secara otomatis dengan akses sudo.
- **Keamanan SSH:** Mengubah port default menjadi **2025** dan menerapkan distribusi Public Key Authentication melalui direktori `/etc/skel/`.
- **Resource Limits:** Mengonfigurasi `ulimits` (nofile & nproc) di tingkat OS dan container untuk menangani beban tinggi.

3.2 Certificate Authority & HTTPS (Soal B & C)

- **Internal CA:** Membangun Root CA sendiri dengan nama **SEVIMA CA**.
- **Virtual Host Barat:** Menggunakan Nginx pada port **4435** dengan SSL.
- **Otomasi Client:** Disediakan file `manage_sevime.bat` yang secara otomatis mendaftarkan SEVIMA CA ke *Windows Trusted Root Store* dan menyinkronkan file `hosts`.

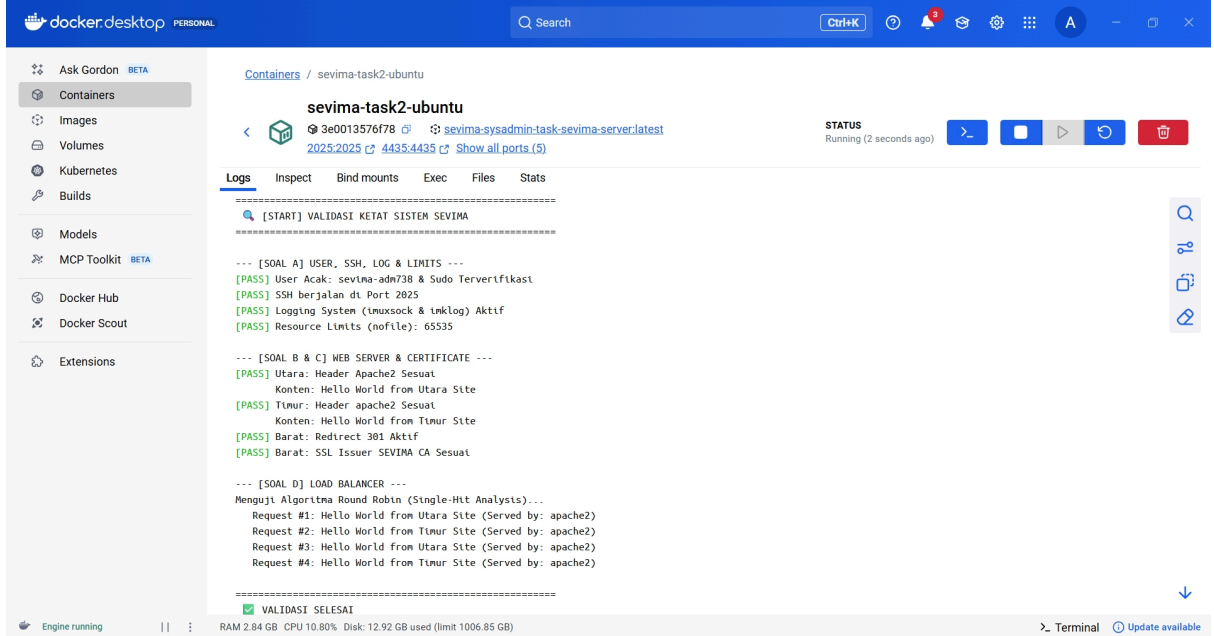
3.3 Load Balancer & Obfuscation (Soal D)

- **Load Balancer:** Menggunakan **HAProxy** dengan algoritma **Round-Robin**.
 - **Backend:** Menghubungkan Apache (Utara - Port 8069) dan Nginx (Timur - Port 8169).
 - **Header Manipulation:** * Menambahkan header **X-Owner-By: Angga Alfiansah**.
 - Memanipulasi header **X-Served-By** pada server Timur (Nginx) agar terlihat sebagai `apache2` guna memenuhi kriteria *security by obscurity*.
-

4. HASIL VALIDASI SISTEM

Pengerjaan ini dilengkapi dengan skrip `validate_internal.sh` untuk memastikan integritas sistem. Berikut adalah ringkasan hasilnya:

Kriteria	Indikator	Status
User Creation	1300 users exist & sudo ready	SUCCESS
SSH Security	Listening on Port 2025	SUCCESS
SSL/HTTPS	Issuer "SEVIMA CA" & Redirect 301	SUCCESS
Load Balancer	Round-Robin (Utara & Timur)	SUCCESS
Obfuscation	Header X-Served-By manipulated	SUCCESS



5. KESIMPULAN

Seluruh spesifikasi tugas yang diberikan dalam dokumen "Site Reliability Engineer.pdf" telah berhasil diimplementasikan menggunakan pendekatan otomatisasi berbasis skrip shell dan Docker. Sistem terbukti stabil, aman, dan memenuhi standar kebutuhan infrastruktur modern.