Nebula Lab Report

1. Objective
- Deploy a **Nebula Lighthouse** on a cloud VPS (with public IP).
- Configure **Windows PC** (behind NAT) as a Nebula client.
- Establish a secure overlay network between Lighthouse and client.
- Verify connectivity using **ping** and **SSH login**.

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2. Environment
- **Operating Systems**: Windows 10 (local PC), Linux VPS (Lighthouse)
- **Software Tools**:
  - Nebula 1.9.6
  - PowerShell
  - GitHub (for report submission)
- **Network Setup**:
  - Lighthouse VPN IP: `192.168.100.1`
  - Client VPN IP: `192.168.100.150`
  - Overlay subnet: `192.168.100.0/24`

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3. Steps

3.1 Download and Install Nebula
Downloaded from [Releases](https://github.com/slackhq/nebula/releases) and extracted to `C:\nebula\`.

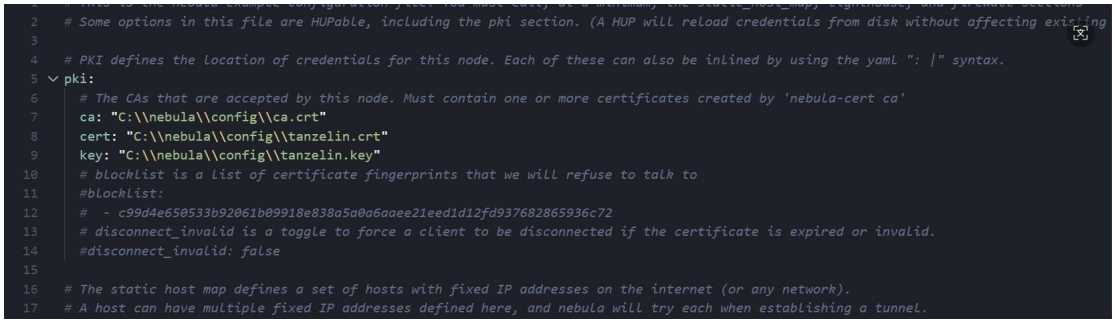
Screenshot 1: Nebula folder structure

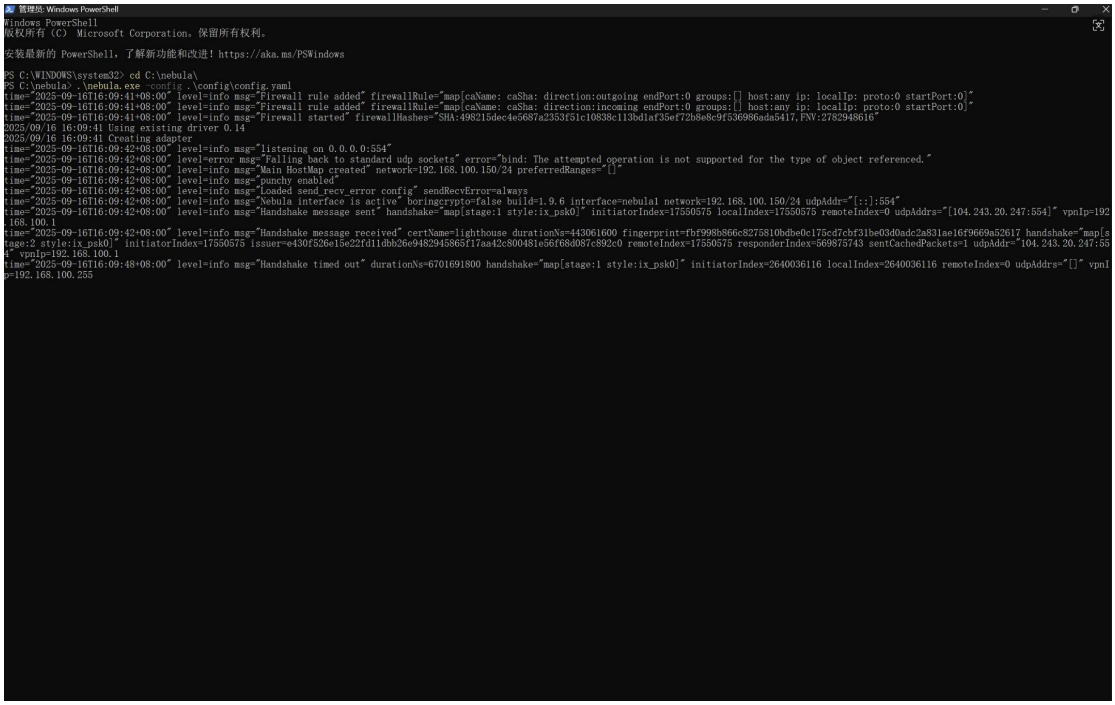
3.2 Obtain Certificates and Keys
Received the following files from the instructor and placed them in `C:\nebula\config\`:
- `ca.crt`
- `tanzelin.crt`
- `tanzelin.key`

Screenshot 2: Certificate files in config folder

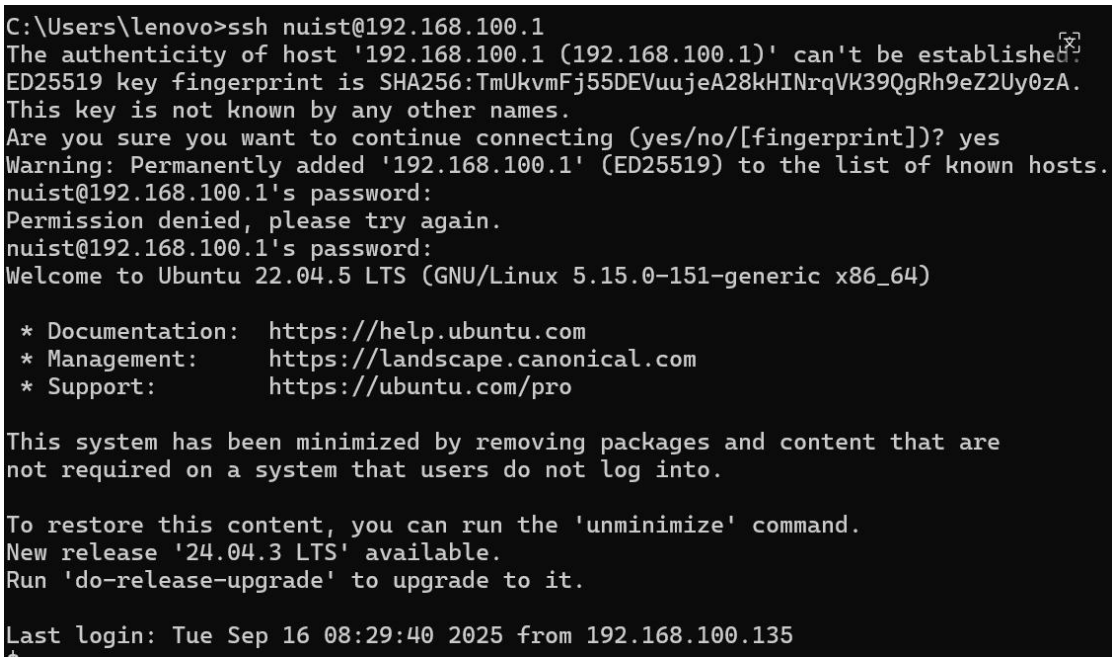
3.3 Edit `config.yaml`
Configured as follows (use `/` or double `\\` in paths):

```yaml
pki:
  ca: "C:/nebula/config/ca.crt"
  cert: "C:/nebula/config/tanzelin.crt"
  key: "C:/nebula/config/tanzelin.key"

static_host_map:
  "192.168.100.1": ["104.243.20.247:554"]

lighthouse:
  am_lighthouse: false
  hosts:
    - "192.168.100.1"

listen:
  host: 0.0.0.0
  port: 554

tun:
  dev: nebula1
  cidr: 192.168.100.150/24

punchy:
  punch: true
```






```
Microsoft Windows [版本 10.0.26100.6584]
(c) Microsoft Corporation。保留所有权利。

C:\Users\lenovo>ping 192.168.100.1

正在 Ping 192.168.100.1 具有 32 字节的数据:
来自 192.168.100.1 的回复: 字节=32 时间=215ms TTL=64
来自 192.168.100.1 的回复: 字节=32 时间=213ms TTL=64
来自 192.168.100.1 的回复: 字节=32 时间=573ms TTL=64
来自 192.168.100.1 的回复: 字节=32 时间=210ms TTL=64

192.168.100.1 的 Ping 统计信息:
    数据包: 已发送 = 4, 已接收 = 4, 丢失 = 0 (0% 丢失),
往返行程的估计时间(以毫秒为单位):
    最短 = 210ms, 最长 = 573ms, 平均 = 302ms

C:\Users\lenovo>
```


C:\Users\lenovo>ssh nuist@192.168.100.1
The authenticity of host '192.168.100.1 (192.168.100.1)' can't be established.
ED25519 key fingerprint is SHA256:TmUkvmFj55DEVuujeA28kHINrqVK39QgRh9eZ2Uy0zA.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.100.1' (ED25519) to the list of known hosts.
nuist@192.168.100.1's password:
Permission denied, please try again.
nuist@192.168.100.1's password:
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 5.15.0-151-generic x86_64)
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro
This system has been minimized by removing packages and content that are
not required on a system that users do not log into.
To restore this content, you can run the 'unminimize' command.
New release '24.04.3 LTS' available.
Run 'do-release-upgrade' to upgrade to it.
Last login: Tue Sep 16 08:29:40 2025 from 192.168.100.135