

CSED353

TERM PROJECT

20190084

무은재학부 권민재

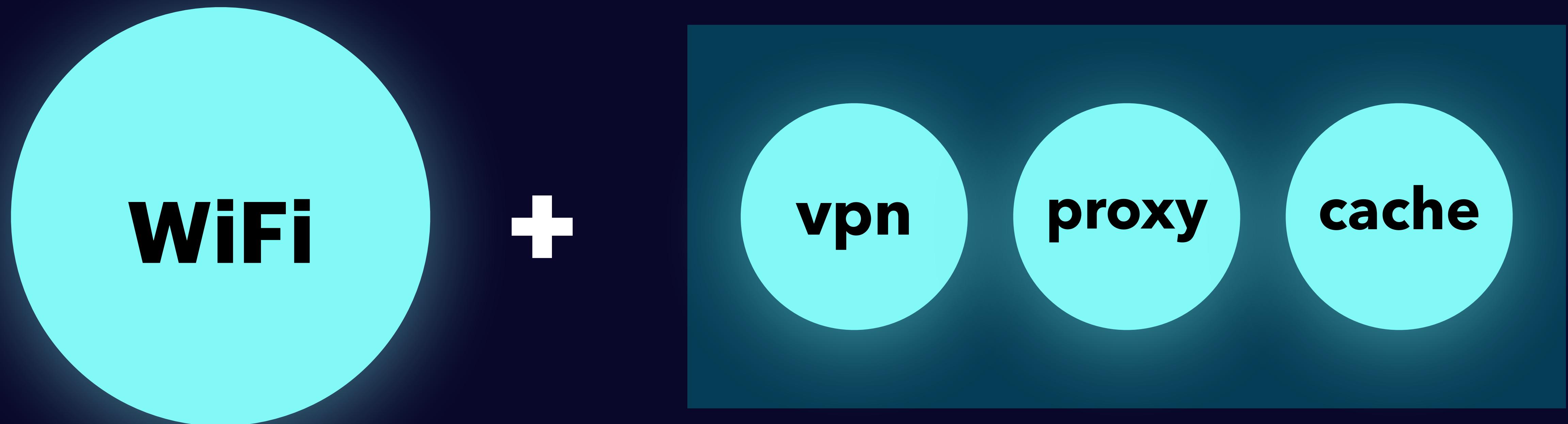
2020.07.03.

Please check the report for more details.

STRUCTURE

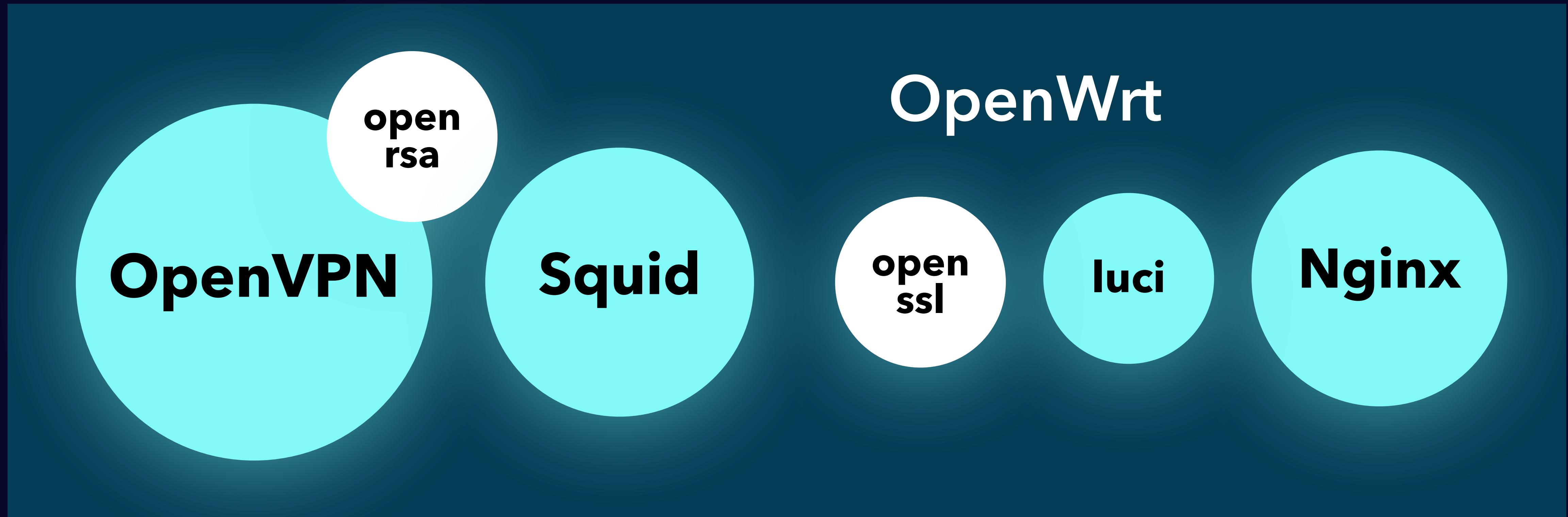
STRUCTURE

SPECIAL FUNCTIONS



STRUCTURE

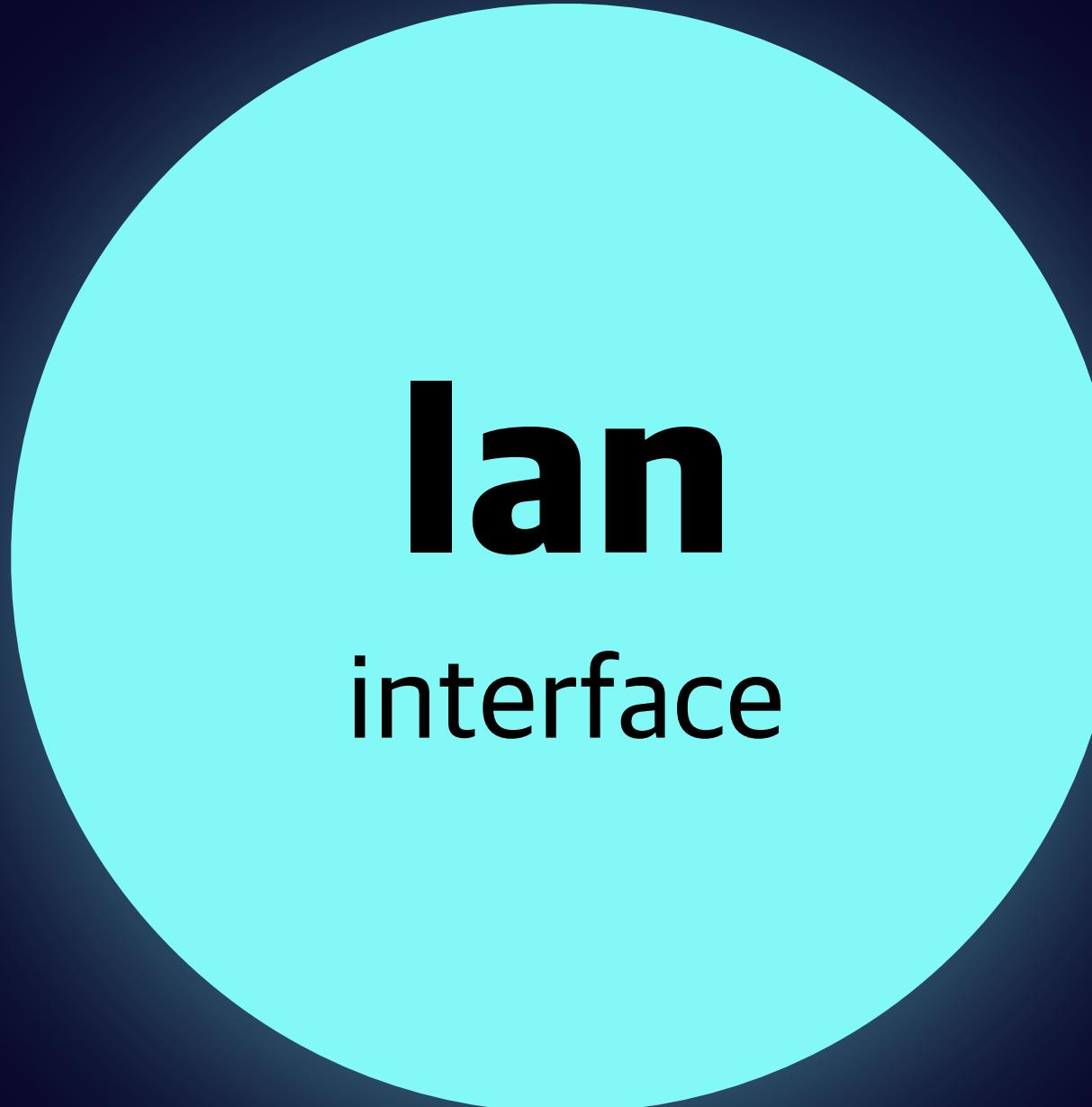
SOFTWARES



WIFI AP

WIFI AP

INTERFACE



lan
interface

Wired Interface.

Using **Static IP** [IP of POSTECH]

Communicates with the **External Internet**

ifname "**eth0**", type "**bridge**"

WIFI AP

INTERFACE



wifi
interface

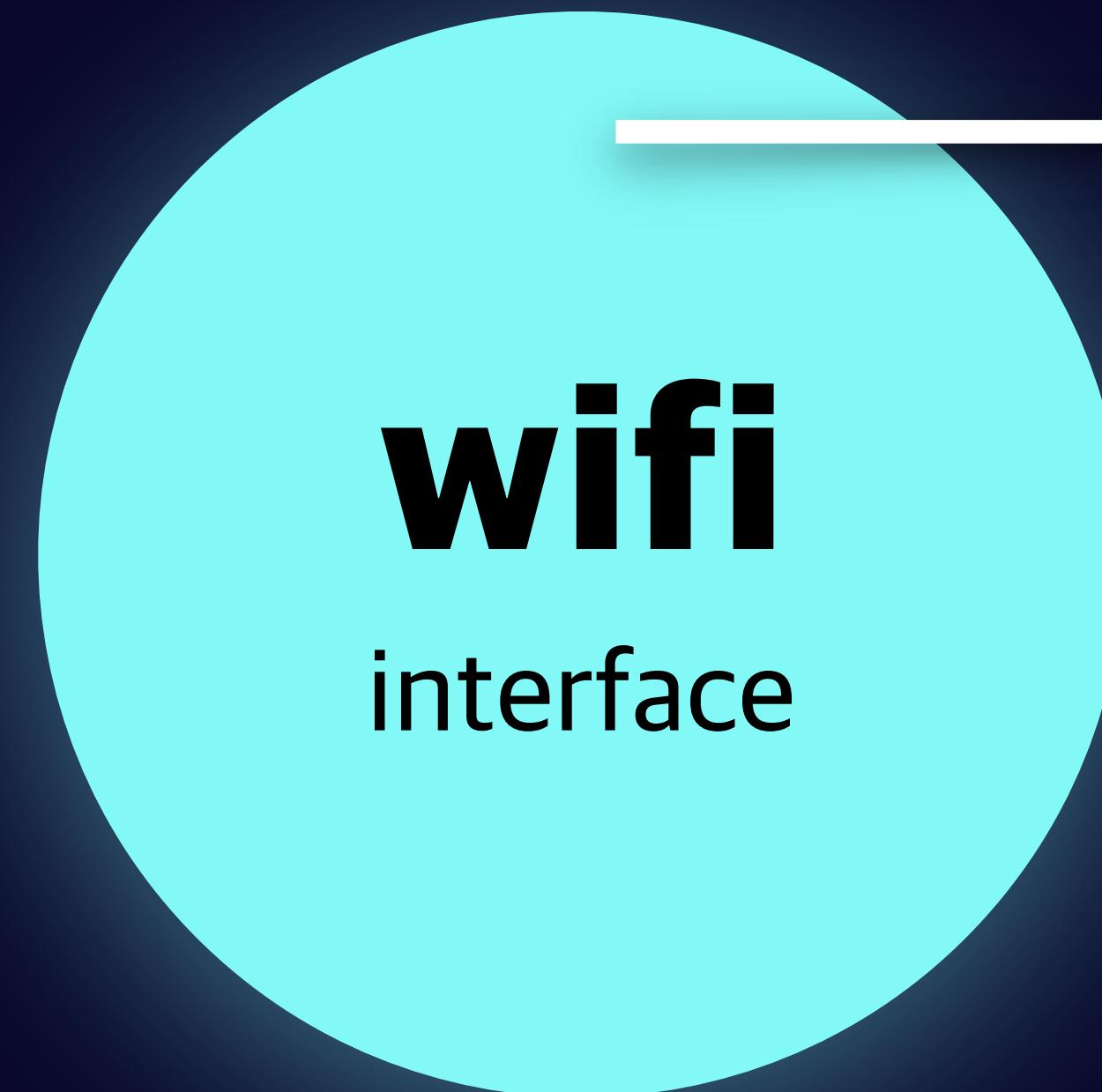
Wireless Interface.

Use Static IP [IP of Wireless Gateway]

Implement **NAT** by **DHCP**

WIFI AP

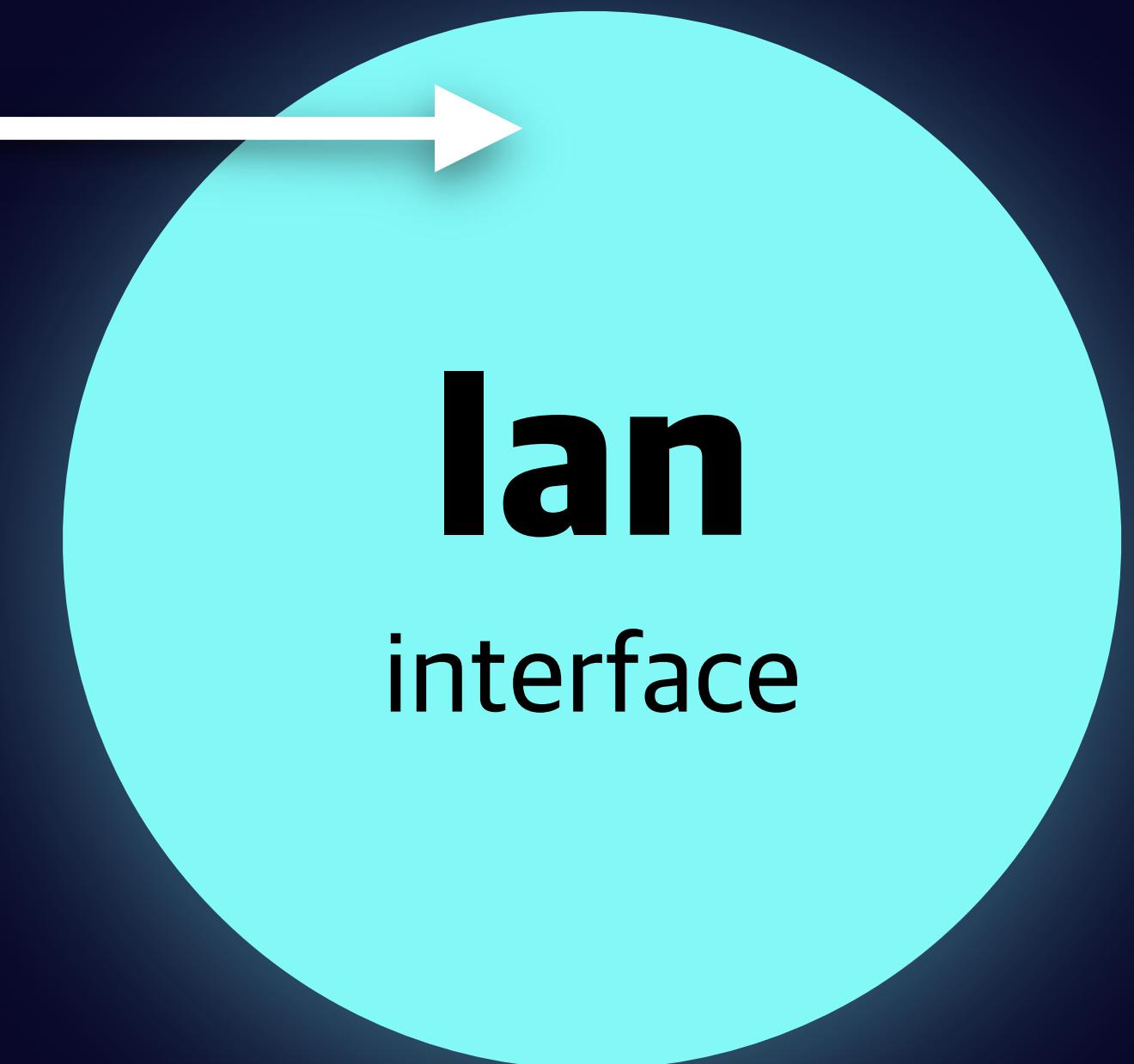
FIREWALL



Firewall RULE

Forward 'wifi' to 'lan'
by using firewall rules.

'lan' uses **MASQUERADE!**



WIFI AP

DHCP



Uses DHCP Server for NAT
at subnet 192.168.2.0/24



Static IP
Not using DHCP

WIFI AP

WIRELESS



wifi

SSID "beta"
Using psk2 encryption

VPN

VPN

OPENVPN

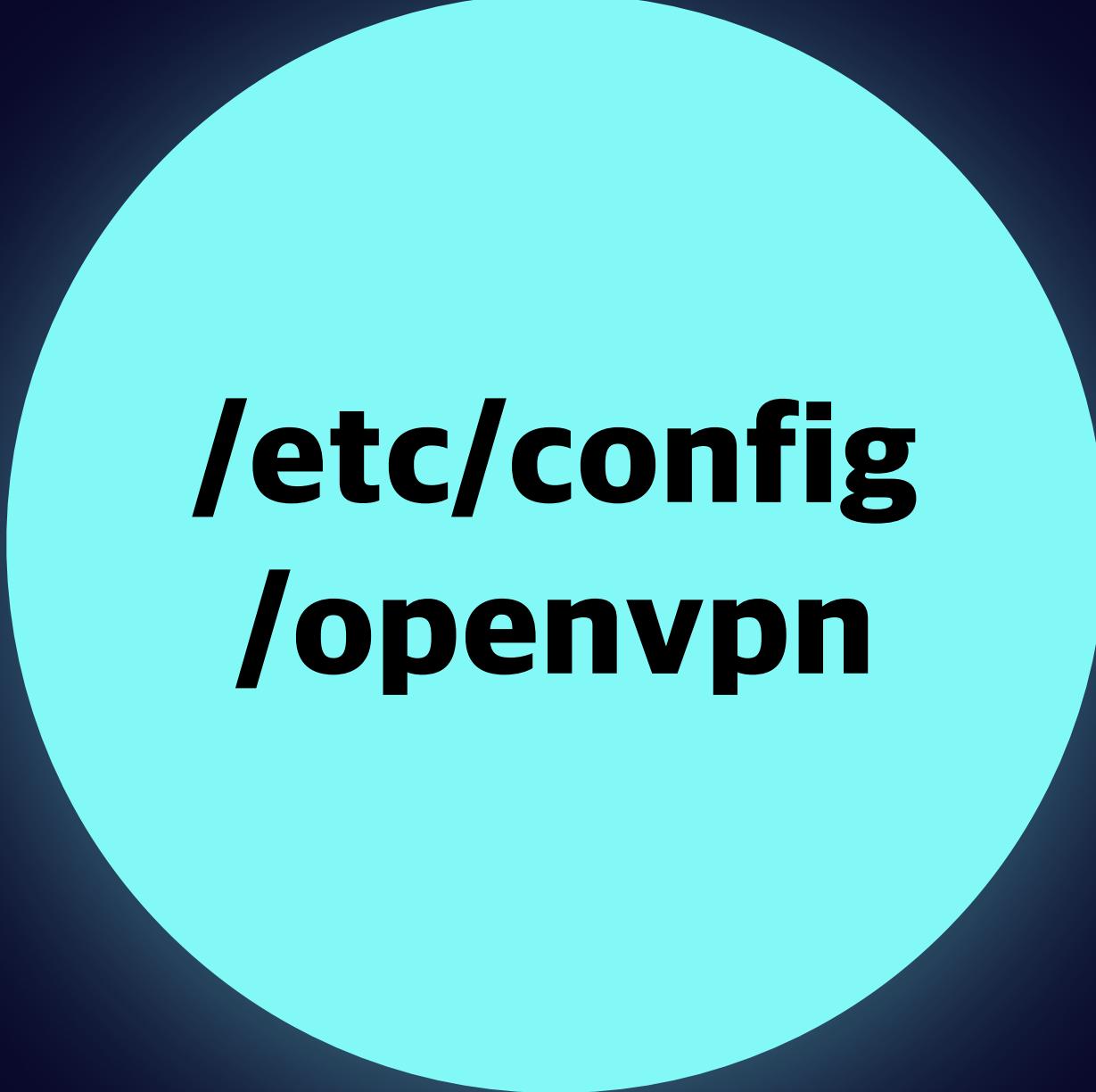
This AP provides **VPN Server**.

It uses **OpenVPN protocol**.

Use **OpenVPN Client** to access **VPN of AP**.

VPN

OPENVPN



**/etc/config
/openvpn**

opkg install openvpn-openssl

Using port 1194

common in openvpn.

Uses DHCP Server for NAT

at subnet 10.8.0.0/24

VPN

OPENVPN



**/etc/config
/openvpn**

Provide TCP VPN

Certified with package 'easyrsa'

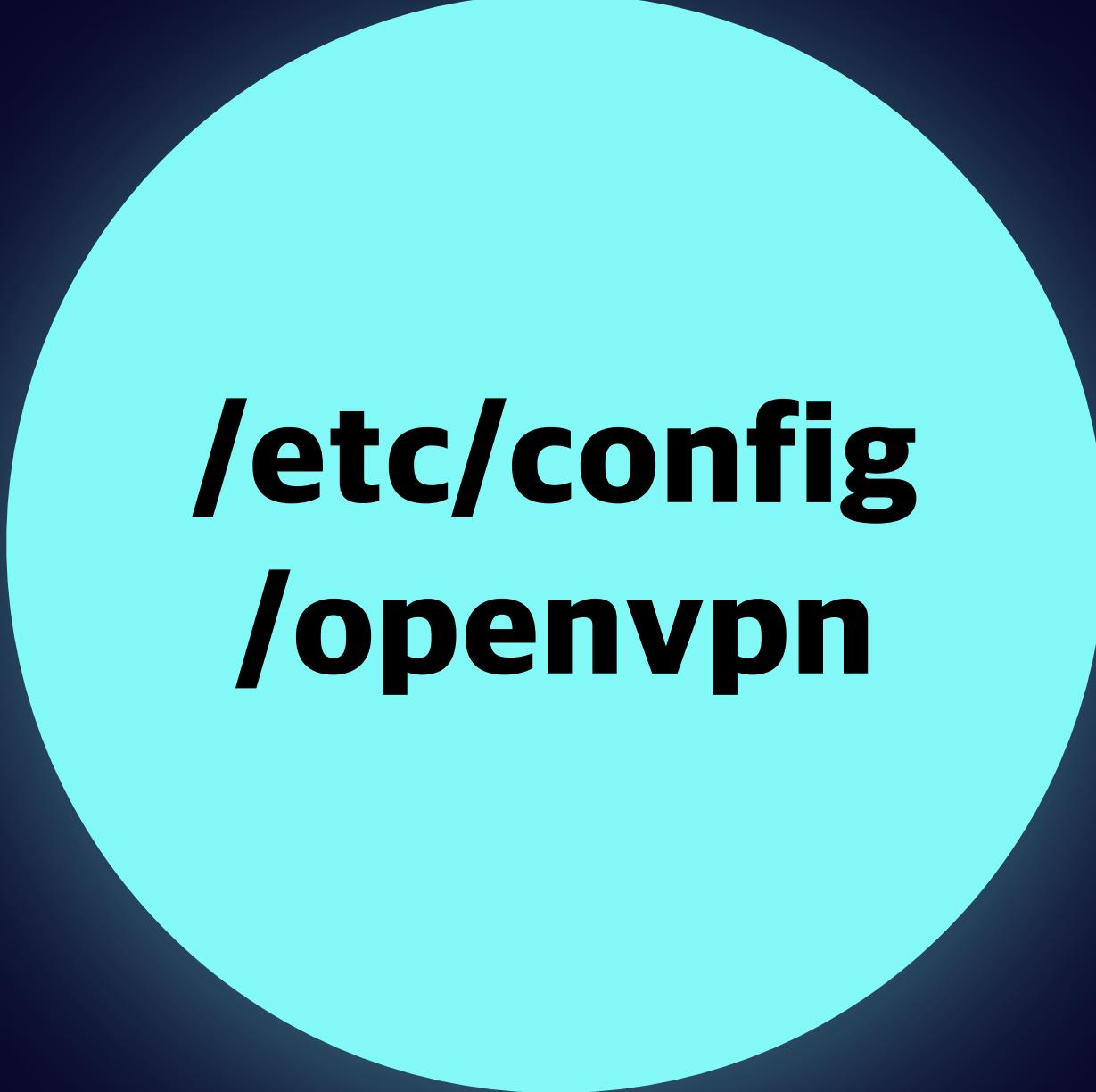
opkg install easyrsa

Redirect all Client Packet to VPN

at subnet 10.8.0.0/24

VPN

OPENVPN



**/etc/config
/openvpn**

Using lzo compress

Using one client key to access

For the convenience of testing VPN.

VPN

/ETC/FIREWALL.USER

Firewall RULE

tun0

vpn interface

eth0

lan interface



'tun0' and 'eth0'
forward to each other.

It uses **MASQUERADE** for NAT.

PROXY WITH CACHING

PROXY WITH CACHING

SQUID

This AP provides **Proxy Server**.

It uses **Squid** to **Proxy-ing** and **Caching**.

You can connect this **Proxy Server as usual**.

PROXY WITH CACHING

SQUID



**/etc/squid
/squid.conf**

opkg install squid

Using port 3128

common in Squid.

Using acl, Set safe ports and local subnets.

Used to restrict risky access to proxy server.

PROXY WITH CACHING

SQUID



**/etc/squid
squid.conf**

Refresh pattern

to Capture-and-Caching almost whole packets.

4096MB allocated for cache

at /tmp/squid/cache

CACHING

CACHING

NGINX

This AP provides **Cache for POSTECH.**

It uses **Nginx** to **Proxy-ing** and **Caching**.

Limited to HTTP connections.

CACHING

NGINX



**/etc/nginx
/nginx.conf**

opkg install nginx

Using port 80

to capture whole http packet.

1GB Cache Allocated

at /nginx-cache/POSTECH

CACHING

NGINX



**/etc/nginx
/nginx.conf**

Capture all packet to "*.postech.ac.kr"

Provide Cache to Client

when Cache is Valid

Proxy_pass to host

when Cache is not Valid

CACHING

NGINX



/etc/
dnsmasq.conf

Set "*.postech.ac.kr" to "IP of WiFi AP"

Then, packet toward POSTECH goes to AP.

A NEED FOR IMPROVEMENT

Cache Stage is too small!

The cache capacity is too small to be efficient.

It looks like router needs an external storage device.

Wasting cache capacity!

Cache capacity is too small, but Nginx and Squid store the same site when entering the POSTECH website with a proxy connection.

I think it would be better to delete Squid's cache feature.

Why doesn't it work at https?!

The Nginx cache feature does not work on https for reasons related to the certificate.

QNA