

The Controller (Evolved Packet Core/EPC)

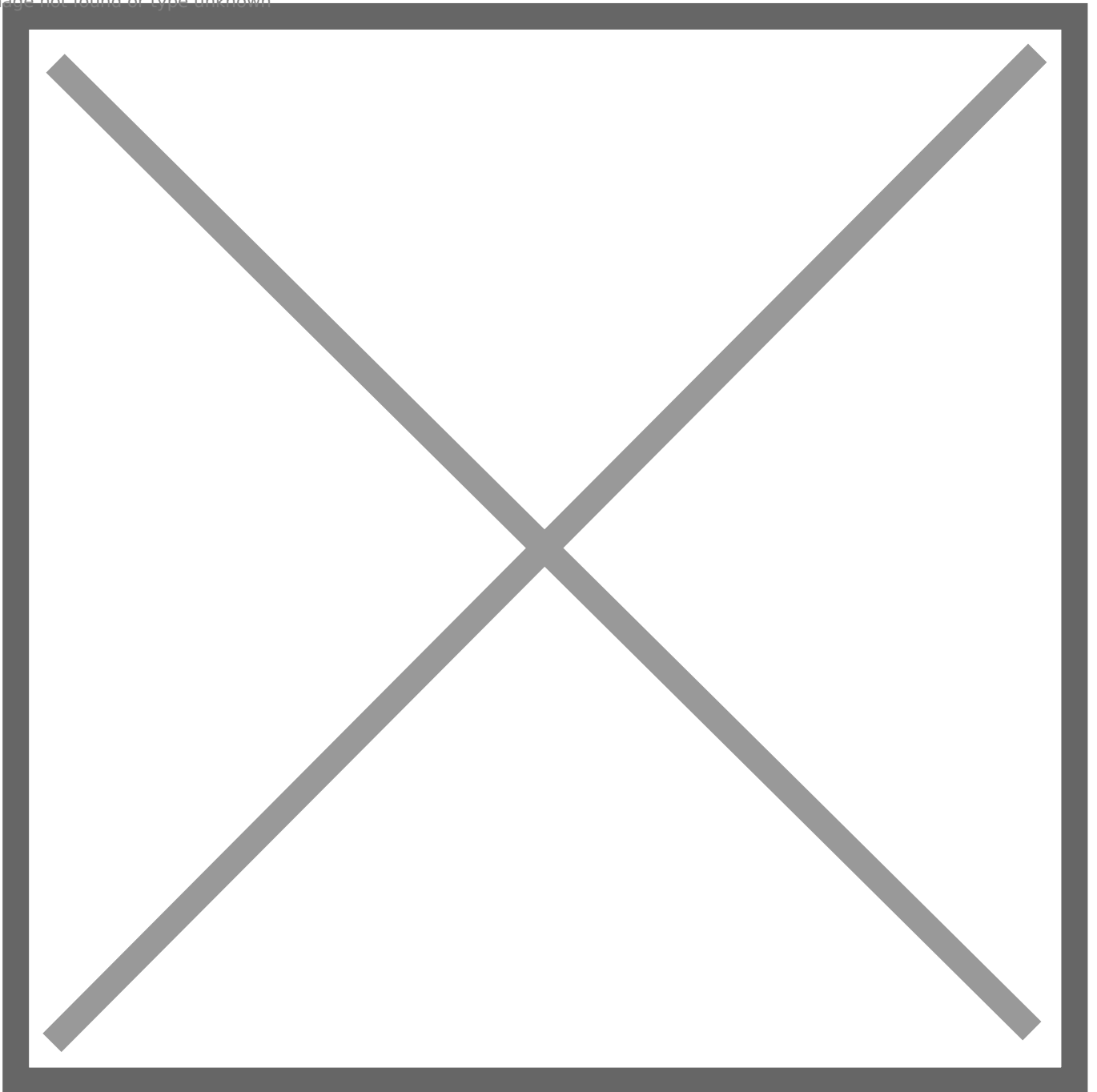
What is Open5GS and why it is needed?

From [GitHub](#):

Open5GS is a C-language Open Source implementation for 5G Core and EPC, i.e. the core network of LTE/NR network

Components

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From Page 18 of Ite-background presentation (see [High-Level Resources](#))

Mesh Implementation

The Open5GS setup used by NYC Mesh is bootstrapped using software from the University of Washington [Information and Communication Technology for Development \(ICTD\) Lab](#), called **CoLTE**, which is used and recommended by the [Seattle Community Network](#) (SCN).

What is CoLTE?

From [GitHub](#):

CoLTE is the Community LTE Project. It is designed to be an all-in-one turnkey solution that sets up a small-scale locally-run cellular network.

Deployment

- Open5GS lives on a virtual machine running on [Jon](#) at SN3
 - Access: lte.mesh (10.70.90.170)
- colte-cn-4g was installed and configured according to the [documentation](#)
 - Note: colte-prepaid was not installed as it is not required for LTE operation
 - Information regarding SIM cards and credentials provided directly from SCN
- Unlike SCN, our deployment runs the EPC "off-prem"
 - Instead of connecting the eNB (the LTE radio, e.g. BaiCells) directly to a computer/router with two ethernet ports, we connect the eNB directly to a hub with an existing router
 - The stipulation of this is we do not care about the 192.168.150.0/24 or 192.168.151.0/24 IP addresses mentioned in the documentation, as the eNB will be configured to get DHCP from the local hub
 - For routing purposes, we will use OSPF through the tunnel for clients that are able to use it (e.g. a MikroTik LTE device). The iptables rule can remain for other devices (e.g. a cellphone)

Integration

- Running the script produces an LTE tunnel that all of the LTE clients will use on a common subnet, the "ogstun" interface:

```
3: ogstun: <POINTOPOINT, MULTICAST, NOARP, UP, LOWER_UP> mtu 1400 qdisc fq_codel state
UP group default qlen 500
    link/none
    inet 10.45.0.1/16 brd 10.45.255.255 scope global ogstun
        valid_lft forever preferred_lft forever
    inet6 fe80::ae33:20bf:d586:8ed6/64 scope link stable-privacy
        valid_lft forever preferred_lft forever
```

- We will use BIRD to run OSPF on this tunnel:

```
protocol ospf {
    ...
    area 0 {
        networks {
            10.70.90.0/24;
            10.45.0.0/16;
        };
        interface "enp6s18" {
            cost 10;
            type broadcast;
        };
        interface "ogstun" {
            cost 100;
            type ptmp;
        };
    }
}
```

```
};  
};
```

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