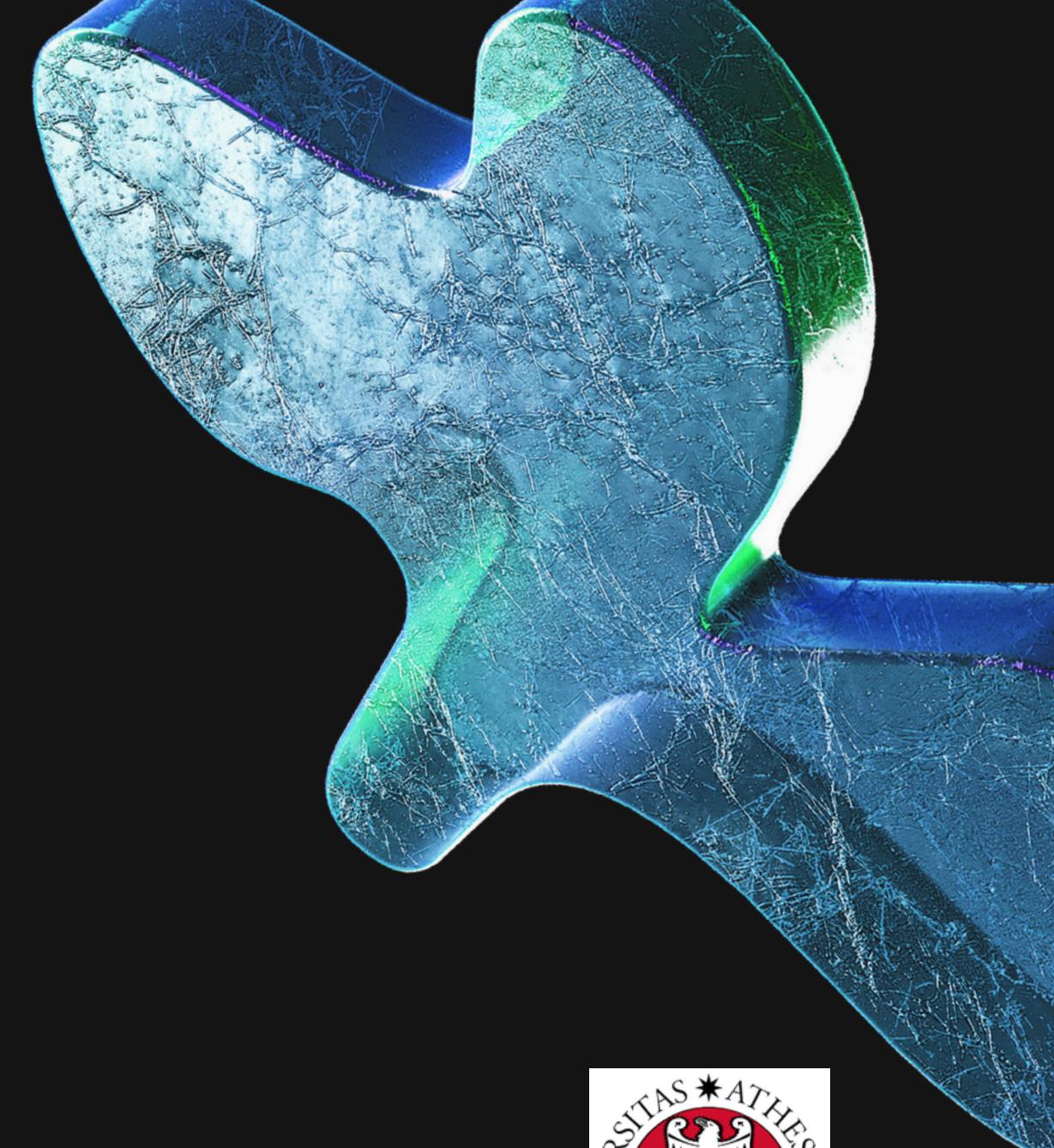


EMILIAN MANOLE

Advanced Deploy in ComNetsEmu of Open5gs and Ueransim

SOFTWARIZED AND VIRTUALIZED MOBILE NETWORKS



Goal of the project

Increase complexity from

https://github.com/fabrizio-granelli/comnetsemu_5Gnet



Each service in its own container

Full custom network

Automation of IPs and Interfaces

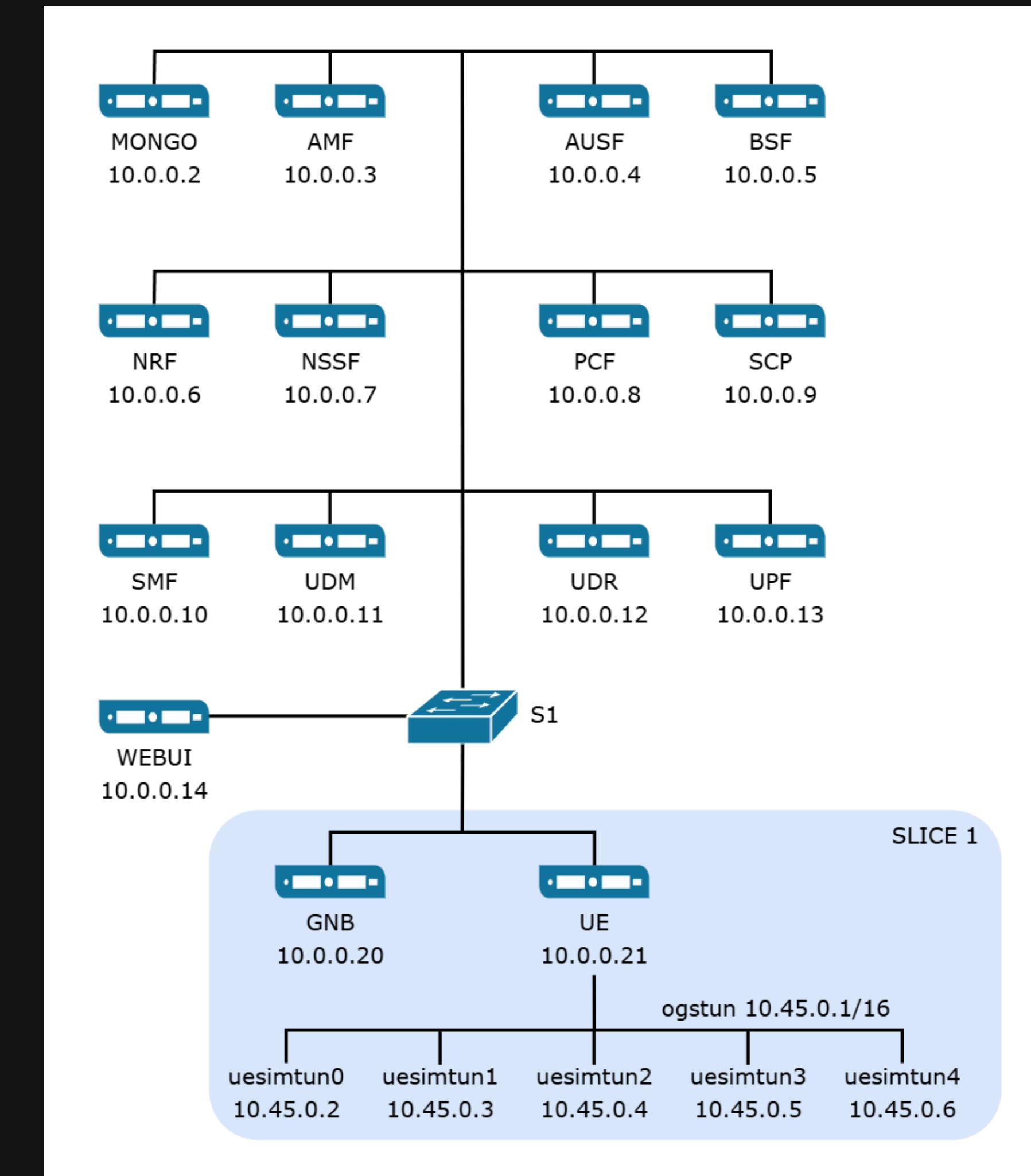
Control the flow of the deploy

Easy deploy of high number of UEs

Easy subscription of IMSIs

Topology

- Each 5g component is inside its own container
- Custom network without the helping of predefined docker one



Open5Gs Components

AMF

Access and Mobility Management Function

AUSF

Authentication Server Function

BSF

Binding Support Function

NRF

Network Repository Function

NSSF

Network Slice Selection Function

PCF

Policy Control Function

SCP

Service Communication Proxy

SMF

Session Management Function

UDM

Unified Data Management

UDR

Unified Data Repository

UPF

User Plane Function

MONGO

Database for users

WEBUI

Administration Panel

Ueransim Components

GNB

gNodeB (Bay Station)



UE

Final user (smartphone,
5G modem)



Automations

IP – INTERFACE

IPs are defined using .env file and passed to the container through system variable. Interfaces are automatically defined and assigned combining the name of the 2 nodes and using the IP of the container.

CONSISTENCY

IPs can be changed just in .env file and in starting script file, everything else is automated for each yaml.

STATUS – CONTROL DEPLOY FLOW

Each container has a status that is used to deploy others only if some preconditions are satisfied.

HIGH NUMBER OF UE-S

Deploying high number of ue-s just need a single modification.

EASY SUBSCRIPTION

Implemented the open5gs-dbctl tool from gradint to easily manage the registration and modification of imsi-s.

CLEAN STARTING SCRIPT

Developed CreateComponent 5g tool with all the functions needed to have a clean starting script.

Testing

Multiple testing tools for the network

BANDWITH TEST

Test different bandwidth using uesimtun devices.

```
iperf3 -c 10.45.0.1 -B 10.45.0.2 -t 5
```

LATENCY TEST

Test different latency using uesimtun/interfaces devices.

```
ping -I uesimtun3 google.it
```

NETWORK FLOW

Test which container is talking to

```
mininet tcpdump
```



GitHub

[https://github.com/emilianmanoleuni/Advanced-Deploy-in-
ComNetsEmu-of-Open5gs-and-Ueransim](https://github.com/emilianmanoleuni/Advanced-Deploy-in-ComNetsEmu-of-Open5gs-and-Ueransim)