Network Slice Selection Function on M-CORD

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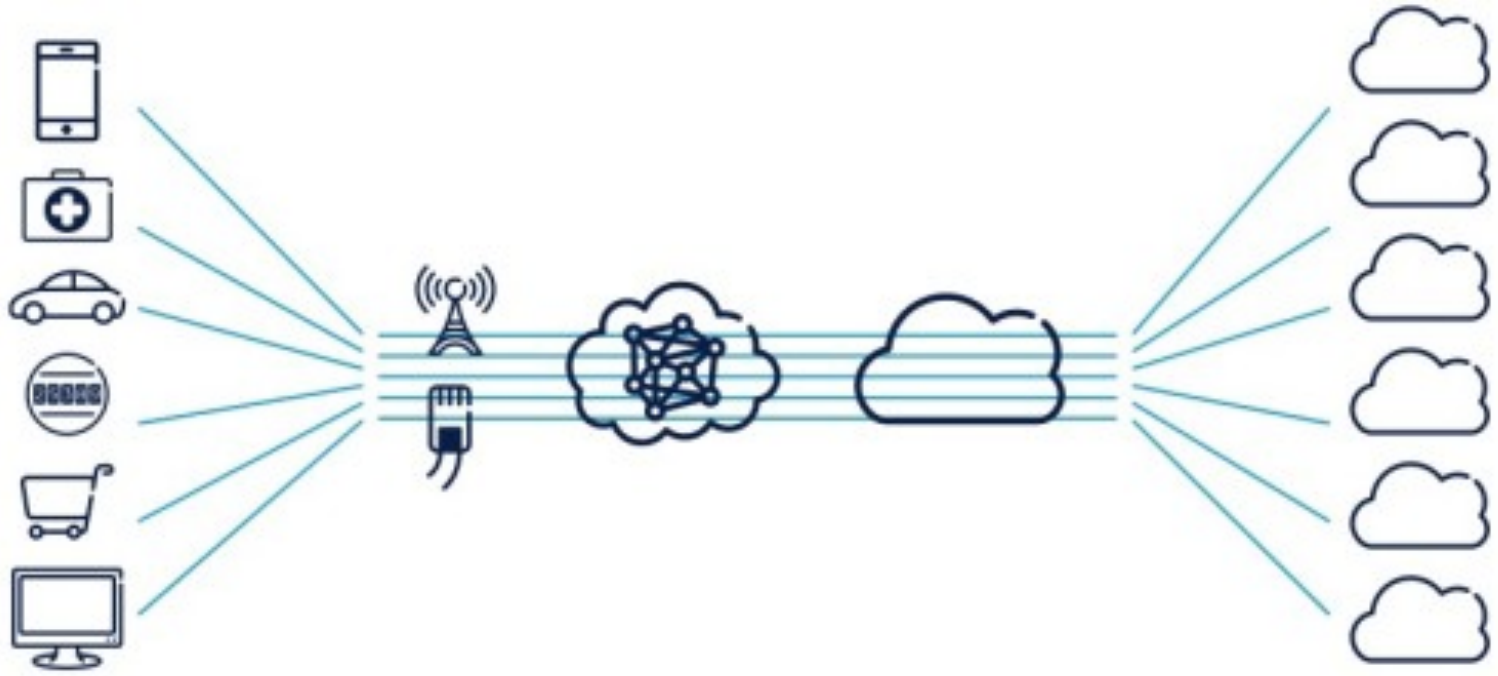
Contents

Introduction

Source: European Commission - Future Connectivity Systems

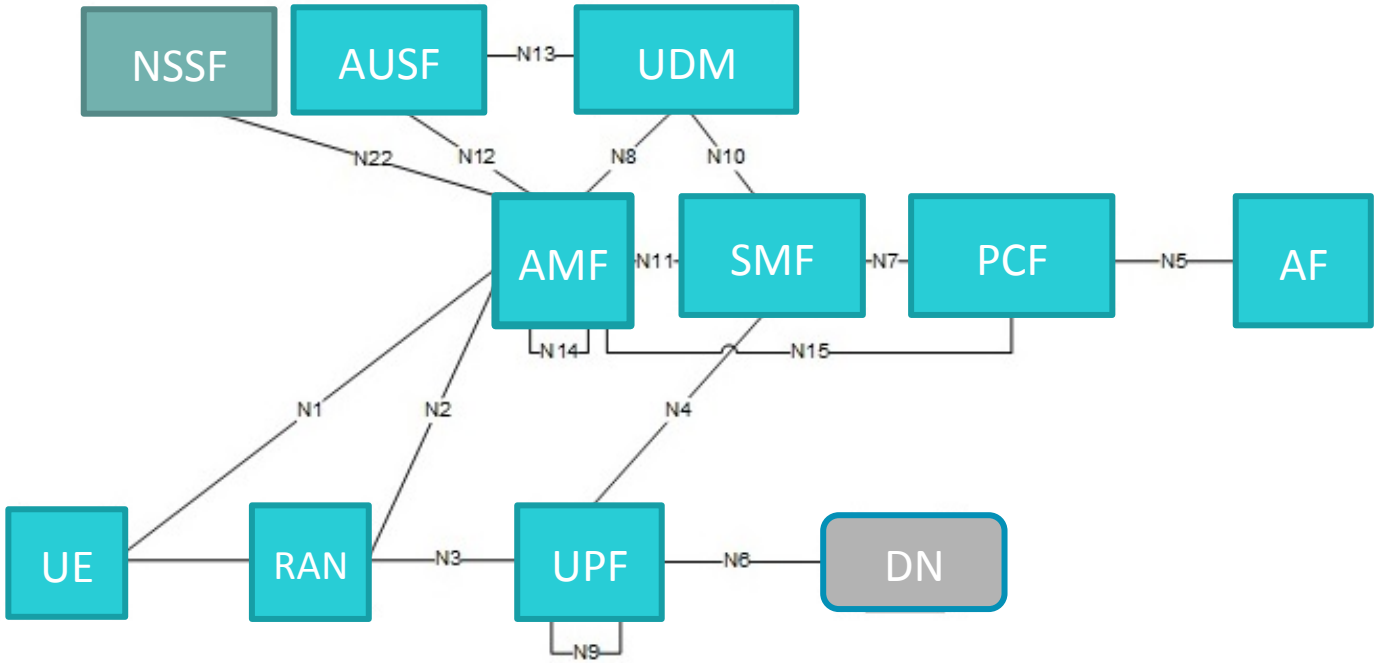
Network Slicing

One of the multiple benefits that NFV brings into the table is enabling Network Slicing by allowing a physical infrastructure to be separated into multiple virtual networks that can support multiple services



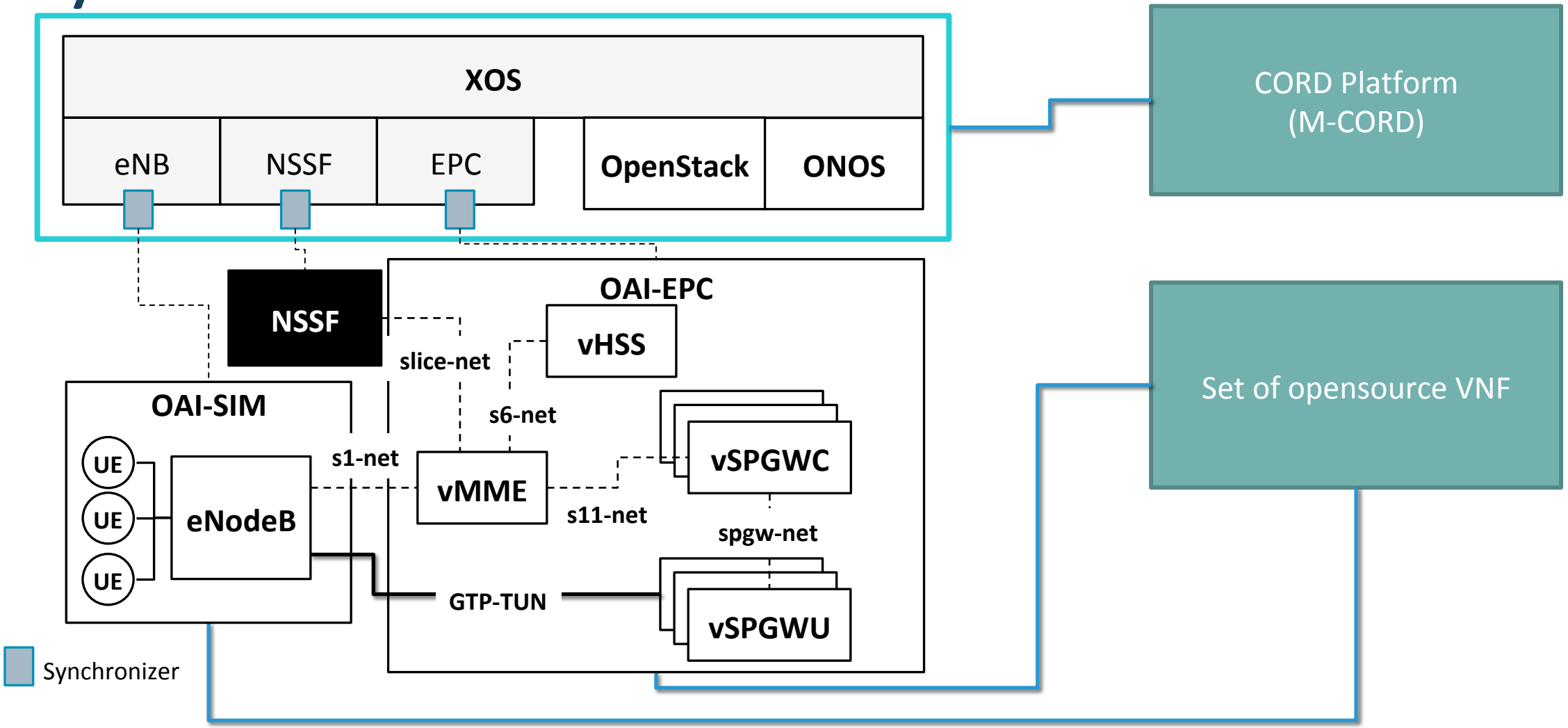
Source: Ericsson

5G Architecture



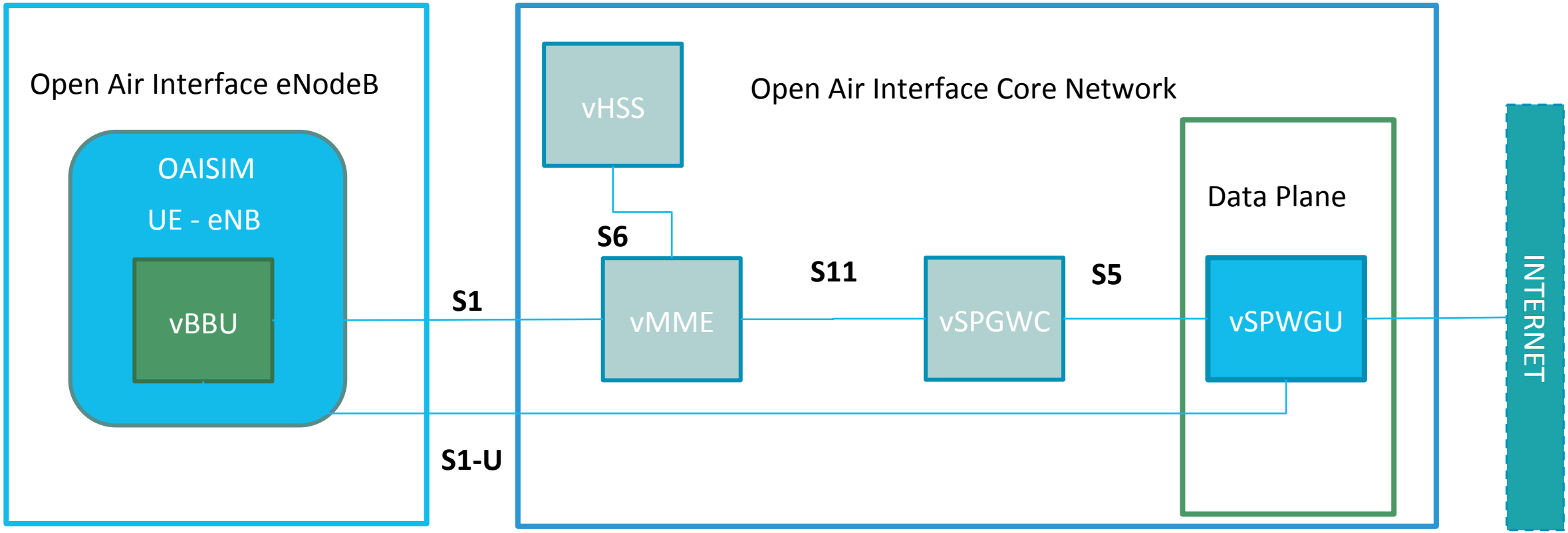
3GPP TS 23.501 – 5G Architecture

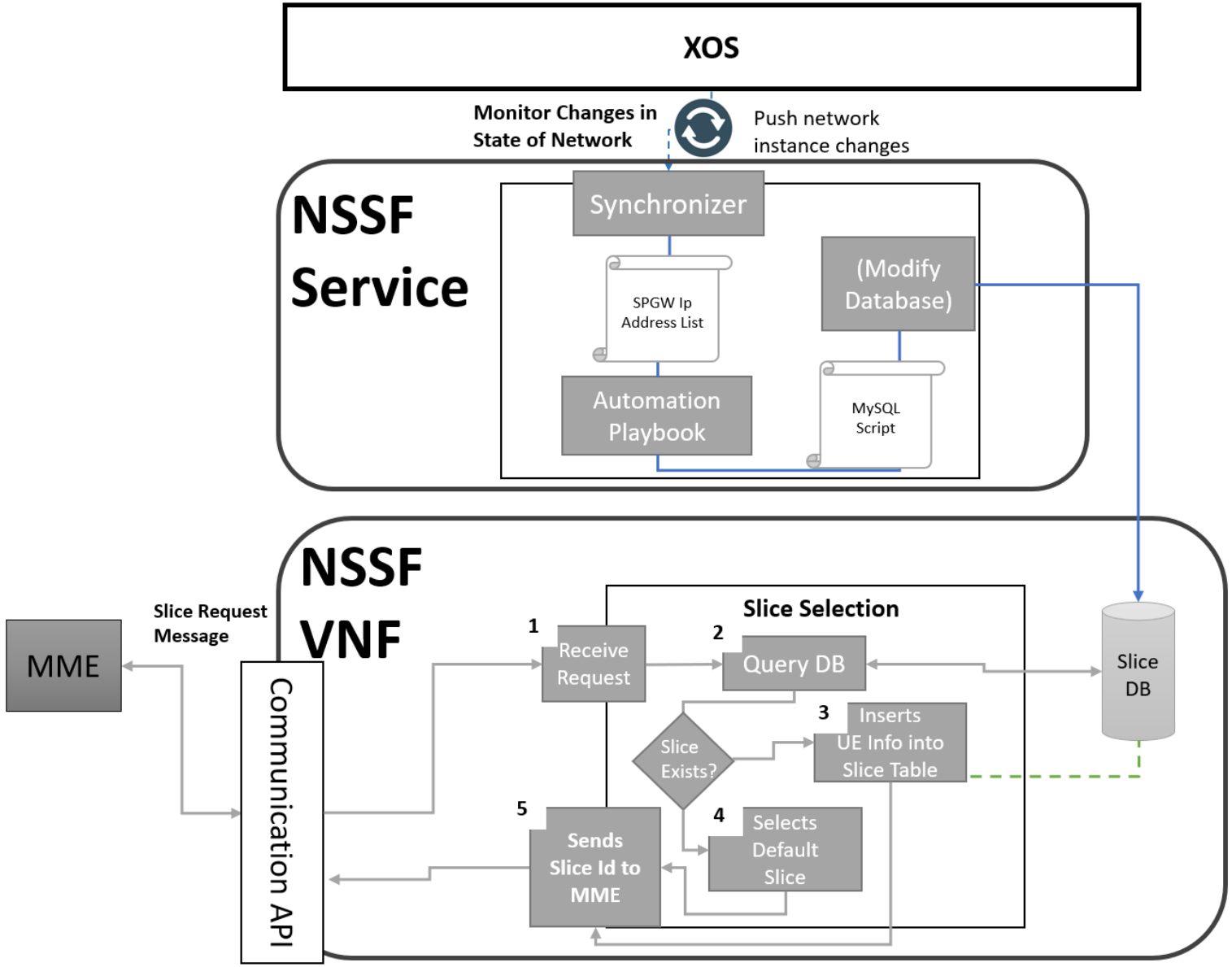
System Overview



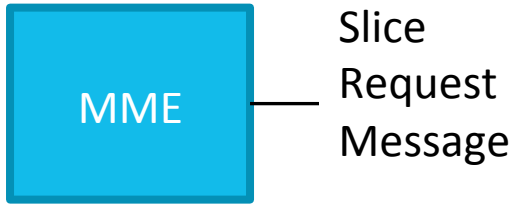
Components Description

EPC and eNodeB VNF are *Open-Air Interface* projects. Developed by *Eurecom*.

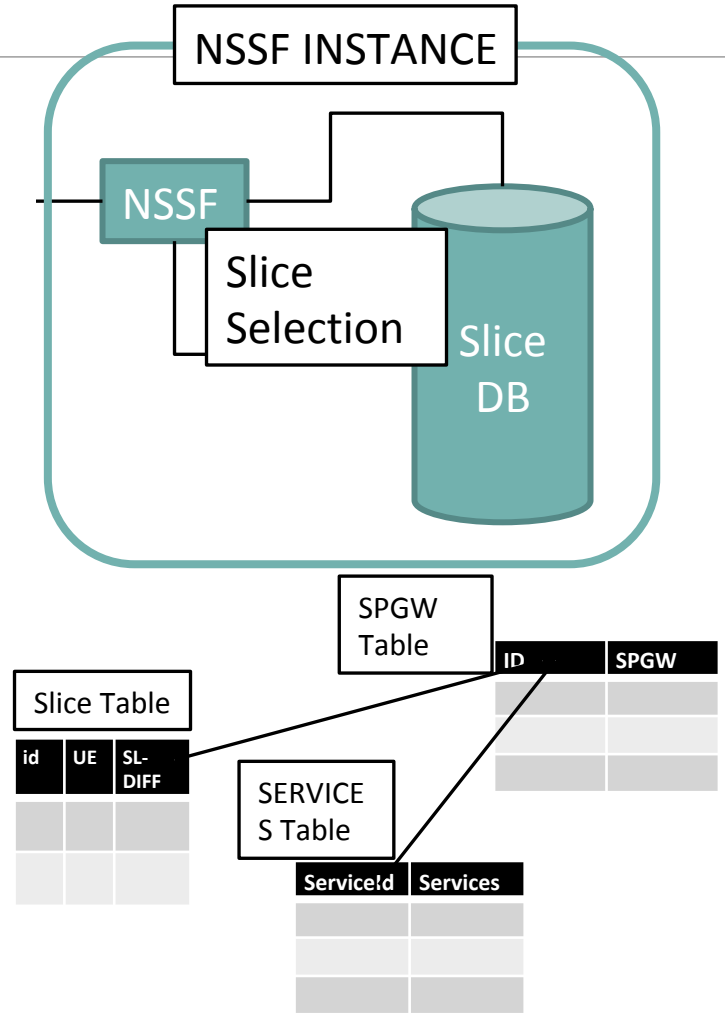



XOS
Monitor Changes in State of Network
Push network instance changes
NSSF Service
Synchronizer
SPGW Ip Address List
(Modify Database)
Automation Playbook
MySQL Script
NSSF VNF
Slice Request Message
MME
Communication API
Slice Selection
1
Receive Request
2
Query DB
Slice DB
3
Inserts UE Info into Slice Table
Slice Exists?
5
Sends Slice Id to MME
4
Selects Default Slice

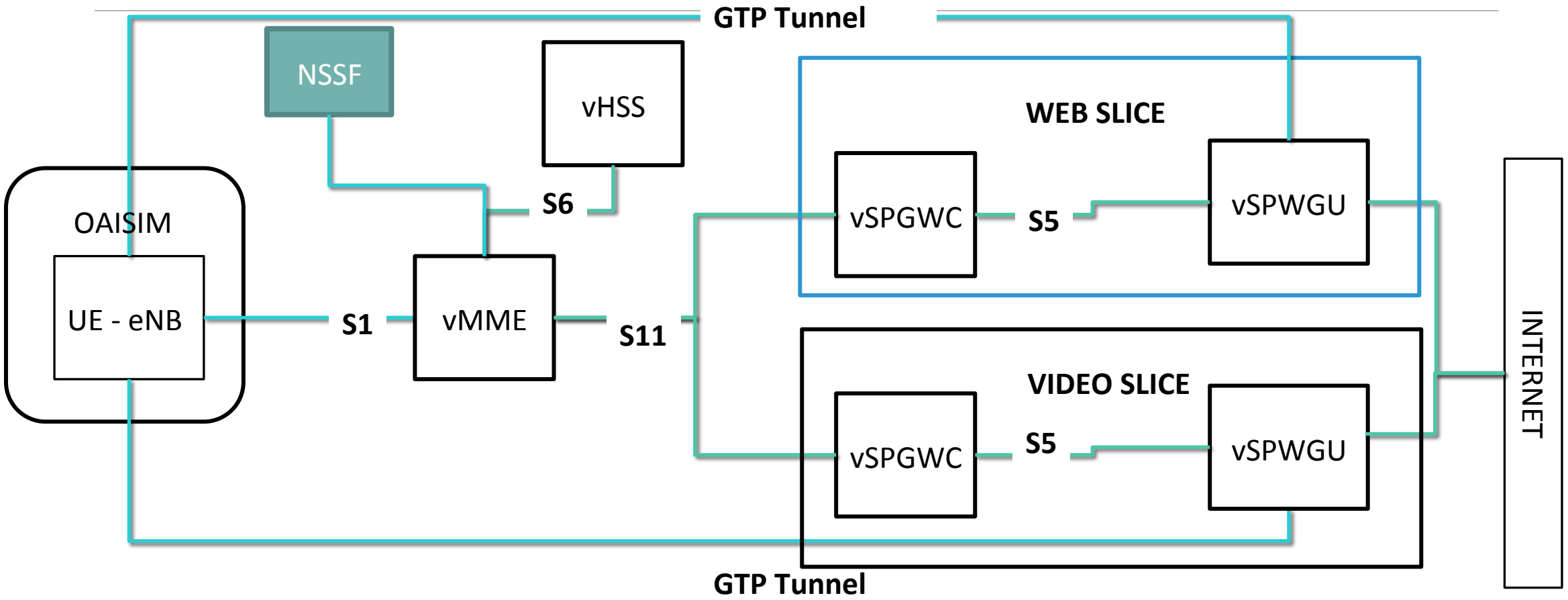
Scenario Description



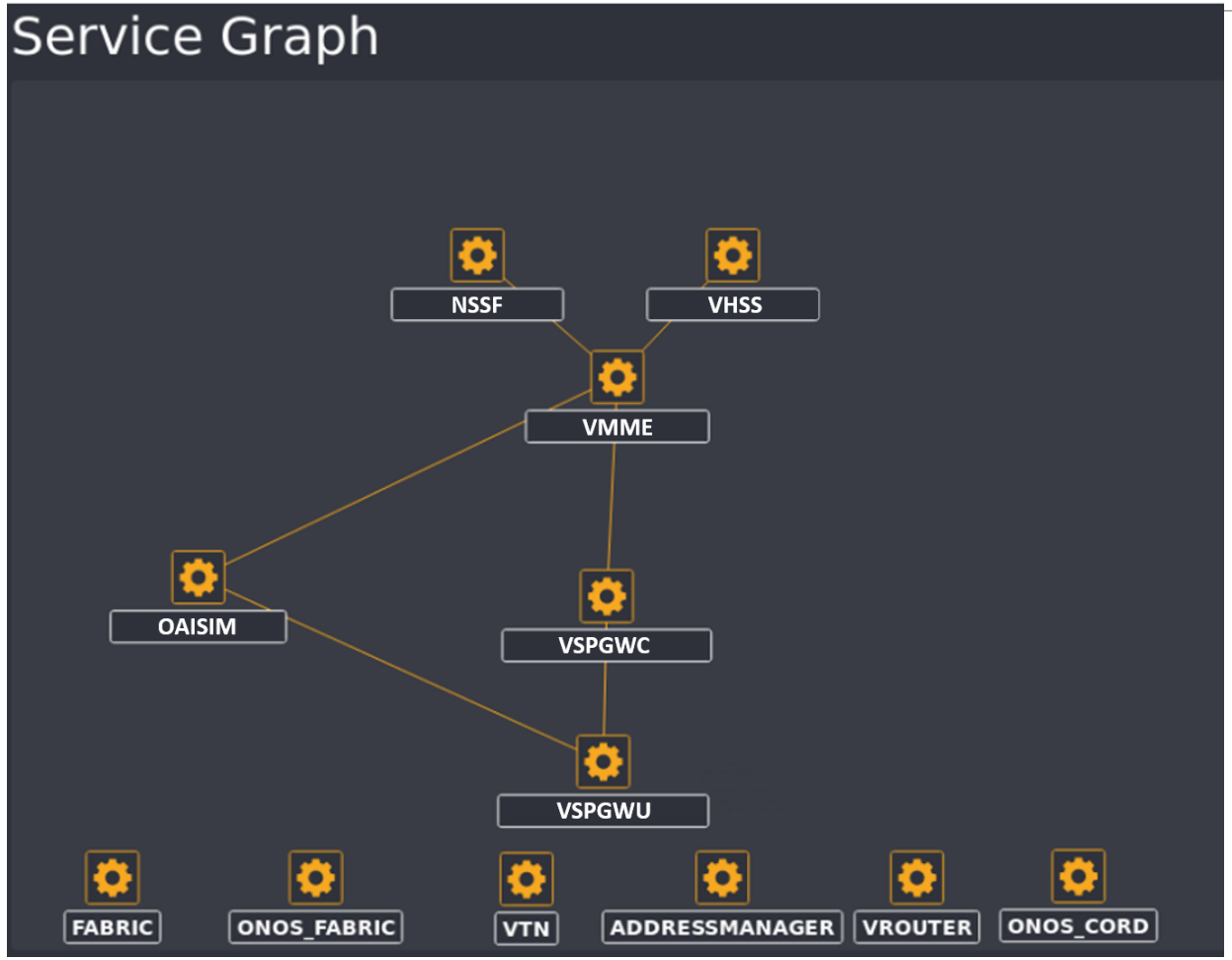
Slice Request Message is a
RPC that includes the **UE IMSI**
And returns an **SPGW-ID** as a String



Test and Results



Test and Results



XOS view of Services

- OAISM: Represents the eNodeB/UE
- NSSF: Represents the Network Slice Selection Function
- VMME, VHSS, VSPGWC and VSPGWU are also represented by their own services

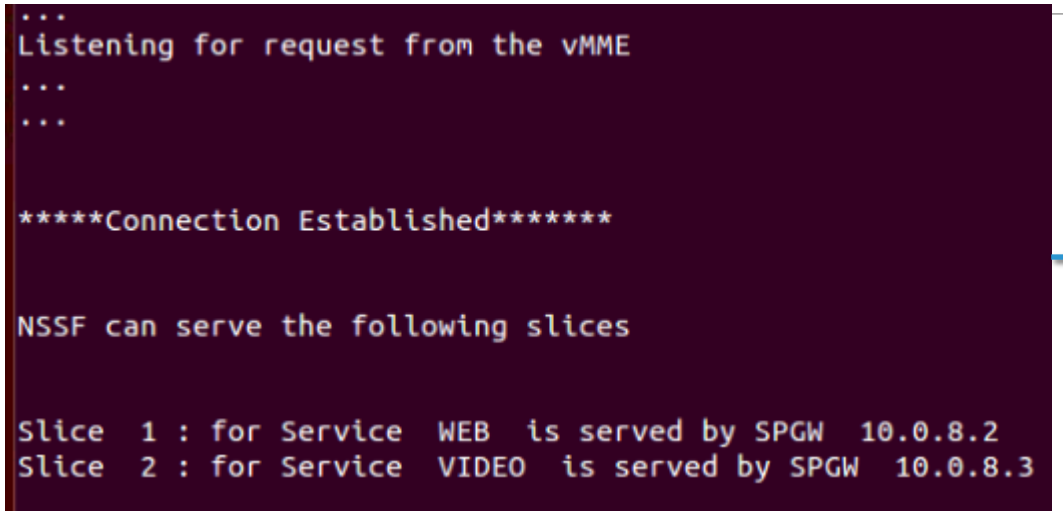
The services that are not connected are part of MCORD deployment

Test and Results

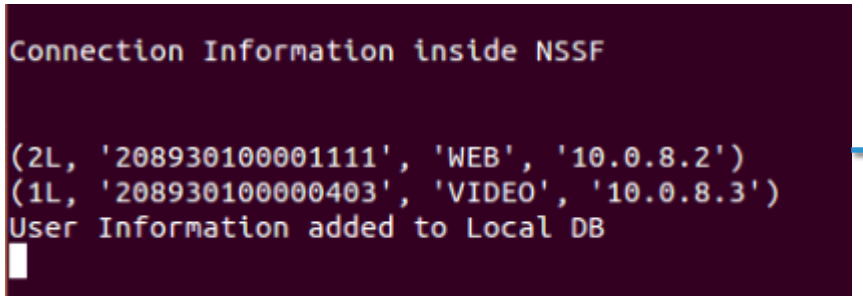
```
vagrant@head1:~$ nova list --all-tenants
+--------------------------------------+------------------+--------+------------+-------------+-----------------------------------------------------------------------------------------------------------+
| ID                                   | Name             | Status | Task State | Power State | Networks                                                                                                  |
+--------------------------------------+------------------+--------+------------+-------------+-----------------------------------------------------------------------------------------------------------+
| b9616e90-1f52-45fa-8504-37062a1e0f23 | mysite_nssf1-4   | ACTIVE | -          | Running     | nssf_network=10.0.10.2; management=172.27.0.5; public=10.8.1.3                                           |
| 9d3ec8eb-281d-489f-8dda-49fa4bc25b8e | mysite_vbbu1-5   | ACTIVE | -          | Running     | management=172.27.0.11; vbbu_network=10.0.5.2; public=10.8.1.8                                           |
| ab791c5c-e226-47de-9291-f9d878a21535 | mysite_vhss1-1   | ACTIVE | -          | Running     | management=172.27.0.2; vhss_network=10.0.7.2                                                              |
| 23393b0b-9bdd-4612-831b-9ca880c16ea3 | mysite_vmme1-6   | ACTIVE | -          | Running     | management=172.27.0.6; public=10.8.1.4; vmme_network=10.0.6.2                                             |
| a06af6e6-8ac6-4f63-a6bd-c5da2c94a8f3 | mysite_vspgwc1-3 | ACTIVE | -          | Running     | management=172.27.0.4; vspgwc_network=10.0.8.2                                                            |
| 71d7f118-860a-4888-bd0d-dbdb5118d708 | mysite_vspgwc1-8 | ACTIVE | -          | Running     | management=172.27.0.8; vspgwc_network=10.0.8.3                                                            |
| 5b1b323f-28f2-43e8-9558-ad9909ce7374 | mysite_vspgwu1-10 | ACTIVE | -          | Running     | management=172.27.0.10; public=10.8.1.7; vspgwu_network=10.0.9.5                                          |
| 15312880-d1dc-4e44-b810-0eb9e33f7191 | mysite_vspgwu1-2 | ACTIVE | -          | Running     | management=172.27.0.3; public=10.8.1.2; vspgwu_network=10.0.9.2                                           |
```

VNF Instances in Open Stack

Tests and Results

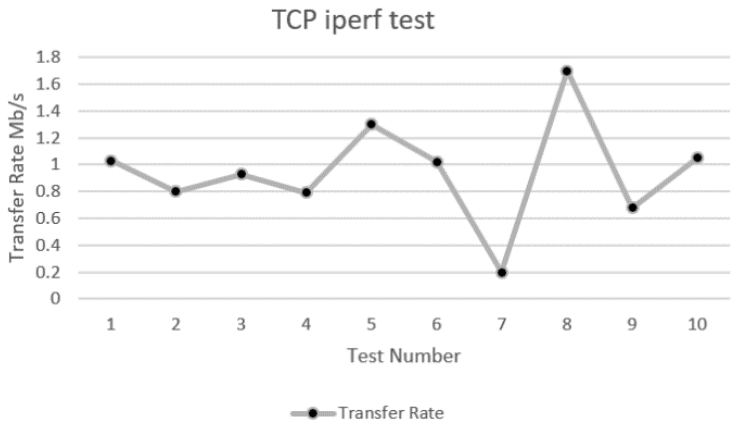


The **NSSF** VNF is always listening to **vMME** requests and provides some information about the current slices every time a *connection is established*.



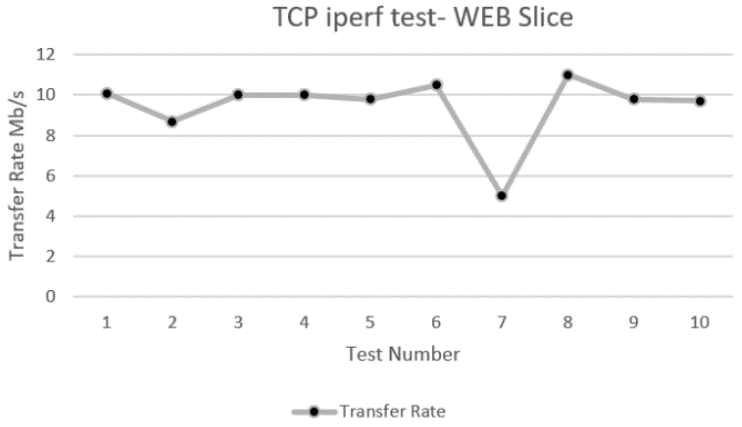
When a **UE** connects each of their **IMSI** is stored along with the **slice** that is serving.
Service differentiation is done by taking the last digit of the **IMSI**

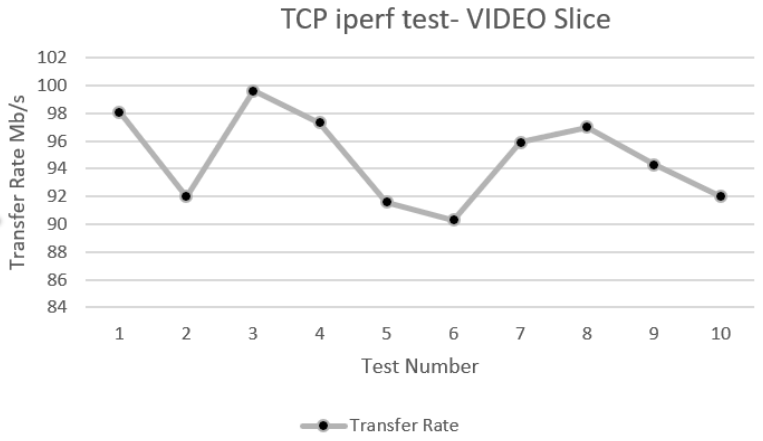
Iperf Tests



The emulated eNodeB is causing a bottleneck for the E2E connection

Running directly from the EPC

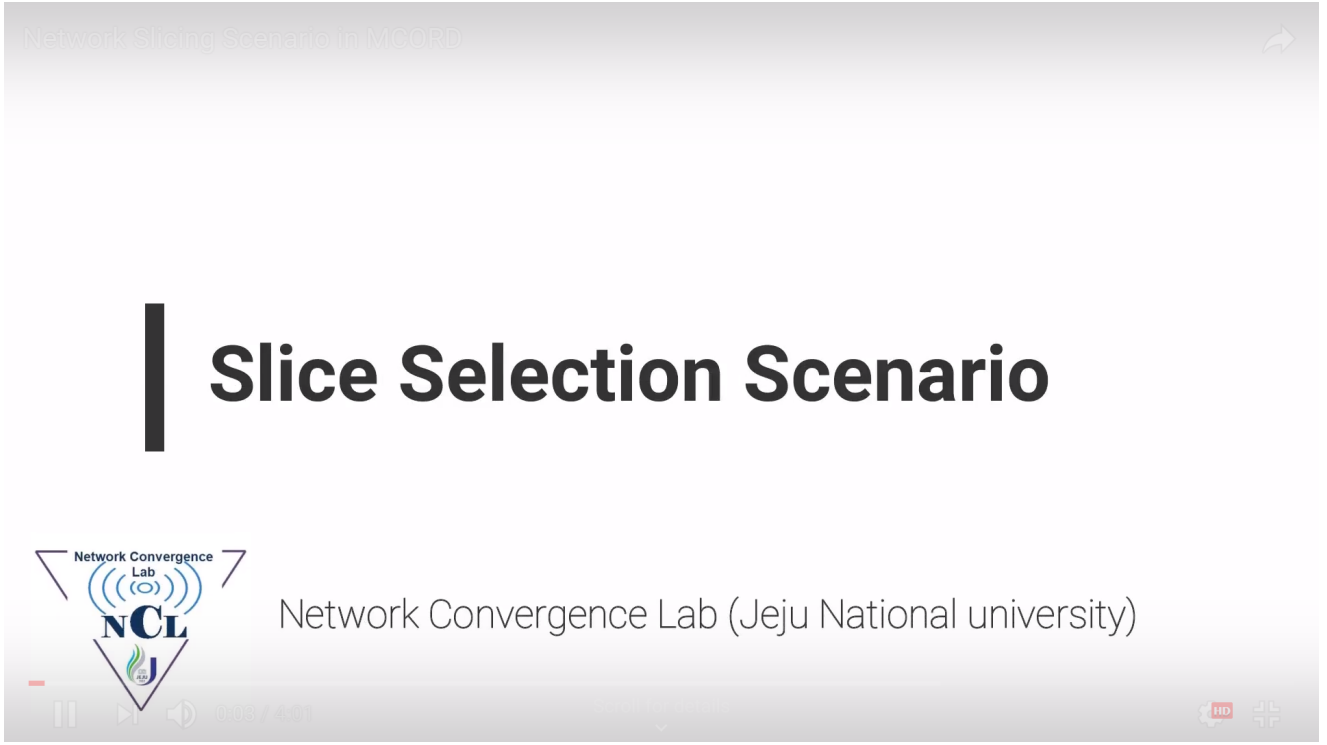




Test and Results

Youtube video of the whole scenario:

- https://youtu.be/xFIybs-Y5G8



References

3GPP TS 23.501 V15.0.0 Technical Specification Group Services and System Aspects; System Architecture for the 5G System; Release 15, Dec 2017.

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Special Thanks to Wei-Yu Chen: National Chiao Tung University

MCORD oai-scenario https://github.com/aweimeow/oai_scenario

Thank you