Oxapampa, Peru

Atalaya, Peru
(10.7318° S, 73.7586° W)

facebook connectivity

Magma

Bring more people online by enabling operators with open, flexible, and extensible network solutions.

Open Source MANO

whitestack & telenor

# Orchestrated Evolved Packet Core based on Open Source technologies


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Telenor

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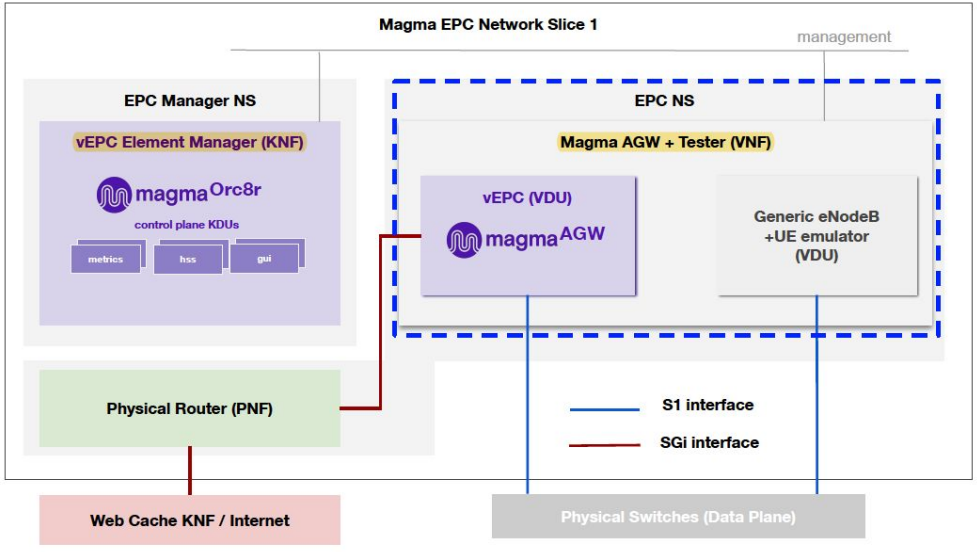
# Introduction

# Telenor motivation for the PoC




- OSM powered automated operations with speedy and flexible deployment of the open source Magma EPC
- Hybrid Network with VNFs, PNFs and KNFs
- Next steps:
  - Connect it to a real radio network
  - Implement strategic 5G use cases with focus on Private Networks for Enterprises
  - Implement closed loop automation with Service Assurance

# Goal: NFV-powered, automated vEPC

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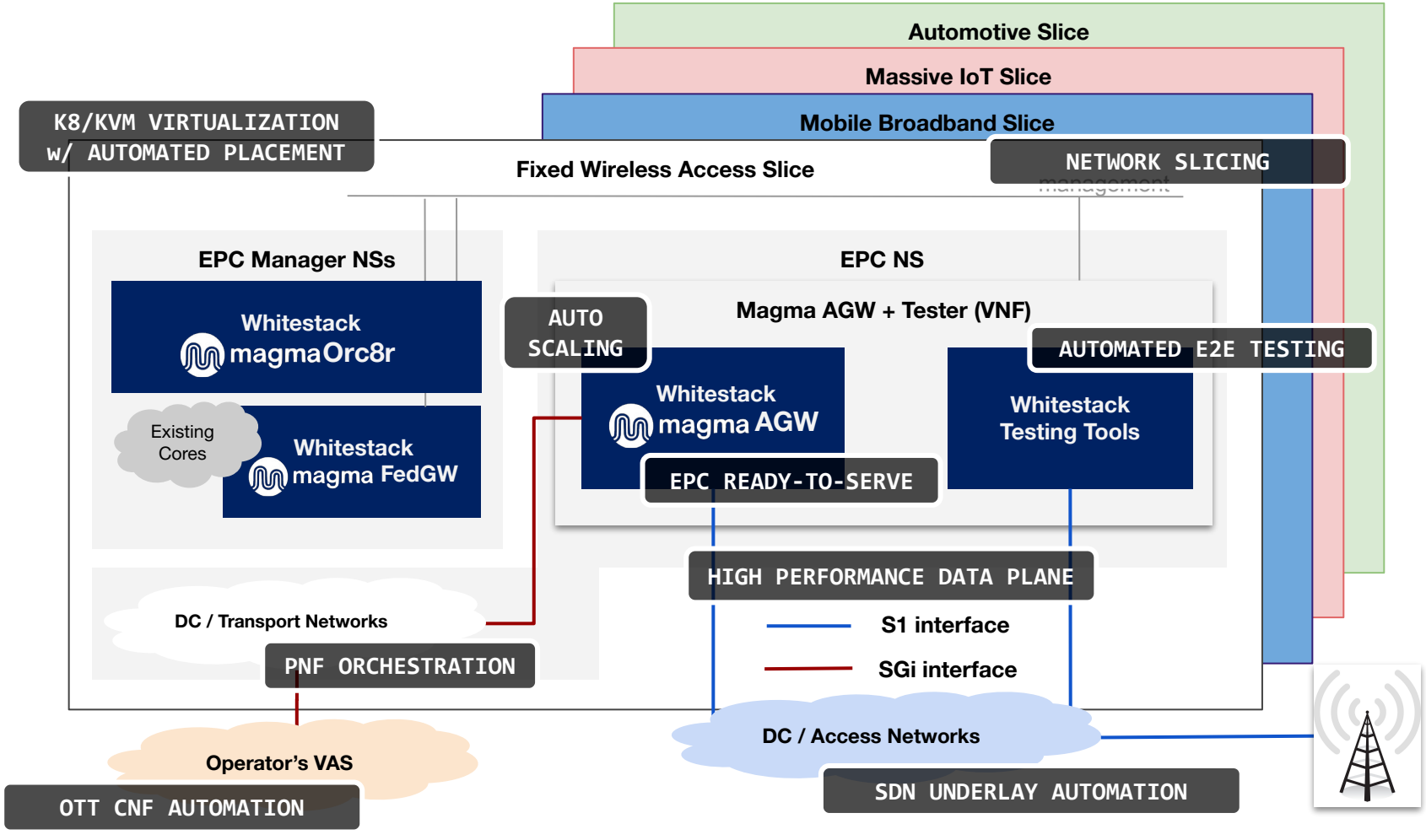


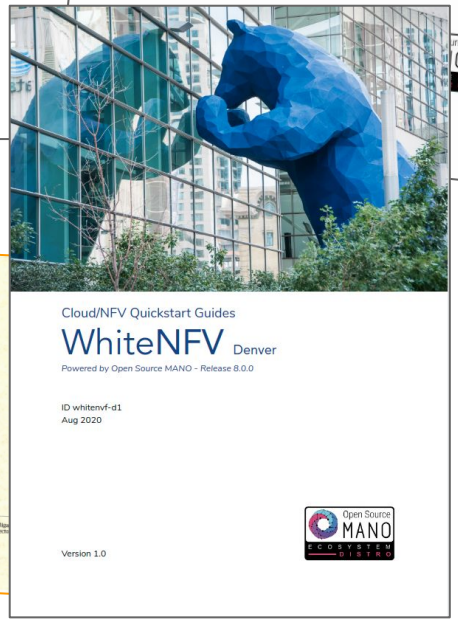
# About WhiteNFV

**WhiteNFV** was the first 100%-aligned OSM distribution available, and accrues an important number of POCs and interoperation tests

- Deployed on top of Kubernetes
- Fast deployment and upgrades
- Implement HA principles
- Additional features oriented to production environments (distributed storage, unified DB engines, security, and more!)

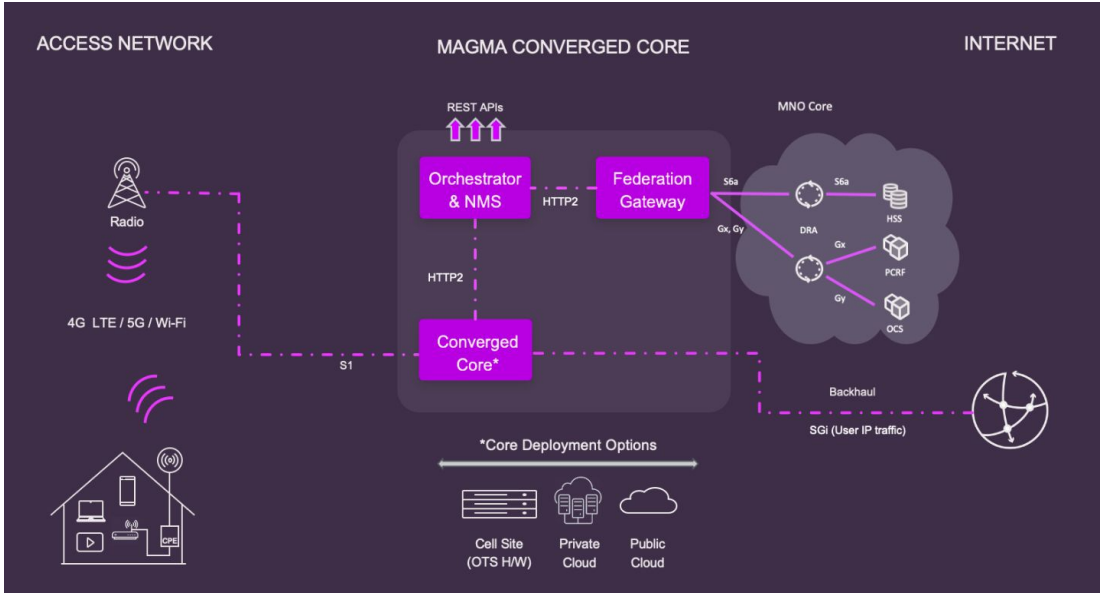
It has been validated in ETSI Plugtests with several VNFs and VIMs (since Jan/2018)



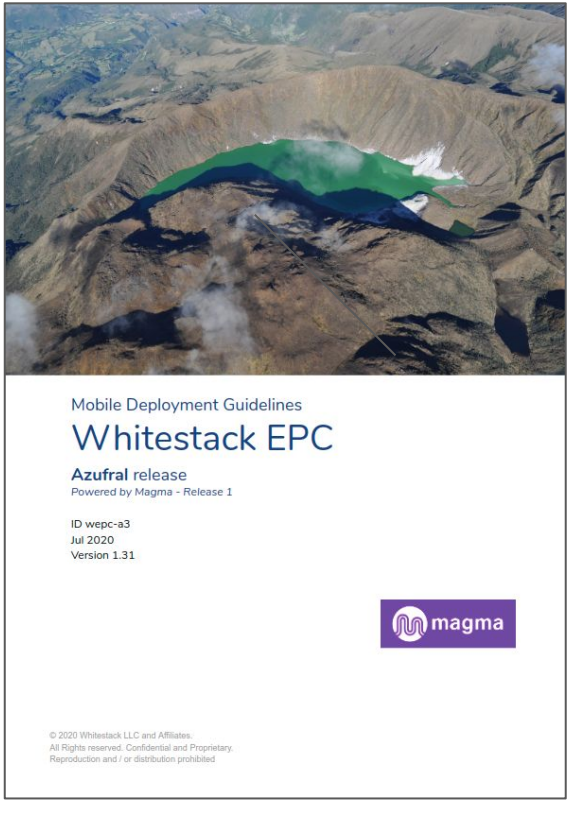


# About WhiteEPC

**WhiteEPC (wEPC)** is based on **Facebook's Magma,** an open-source software platform that allows operators to easily deploy mobile networks in hard-to-reach areas.




The first release, Azufral-1, includes a distributed Packet Core, advanced automation and network management tools, and the ability to federate with existing LTE networks.



# WhiteEPC additions to upstream

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**WhiteEPC (wEPC)** adds the following functionalities to **Facebook's Magma.**

| wEPC Azufral-3 | |
|---|---|
| Code base | Magma v1.1.0 |
| Additional features | **SR-IOV Interfaces**<br>Ability to virtualize the AGW using SR-IOV interfaces to accelerate the data plane. |
| | **On-premises High Availability**<br>Orc8r, NMS and vAGW components are redundant via multiple Kubernetes nodes. |
| Components | wEPC Manager, NMS & AGW & Testing tools |
| **wEPC Azufral-2** | |
| Code base | Magma v1.0.1 |
| Additional features | **Virtualized AGW**<br>Ability to support the Access Gateway in a virtual machine where applicable. |
| | **On-premises Orc8r & NMS**<br>Magma Orc8r and NMS are able to be deployed on-premises, in a private Kubernetes cluster. |
| Components | wEPC Manager, NMS & AGW |
| **wEPC Azufral-1** | |
| Code base | Magma v1.0.0 |
| Components | wEPC Manager, NMS & AGW |

# An orchestrated functional stack

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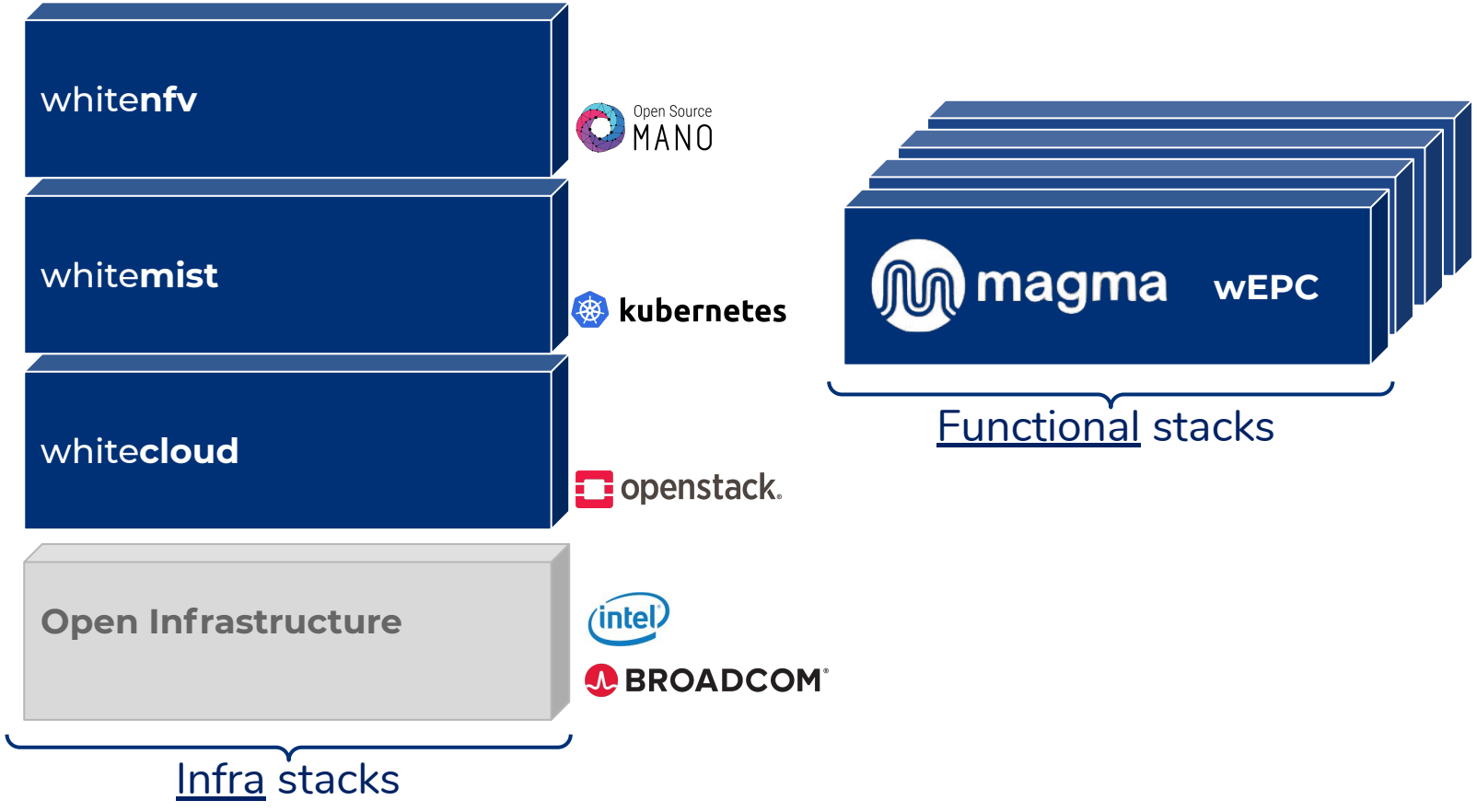
Whitestack is **leveraging and combining the value of open-source** technologies for NFV!



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# PoC Phase #1:
# Basic Integration with eNodeB Emulators

# Phase #1 Topology

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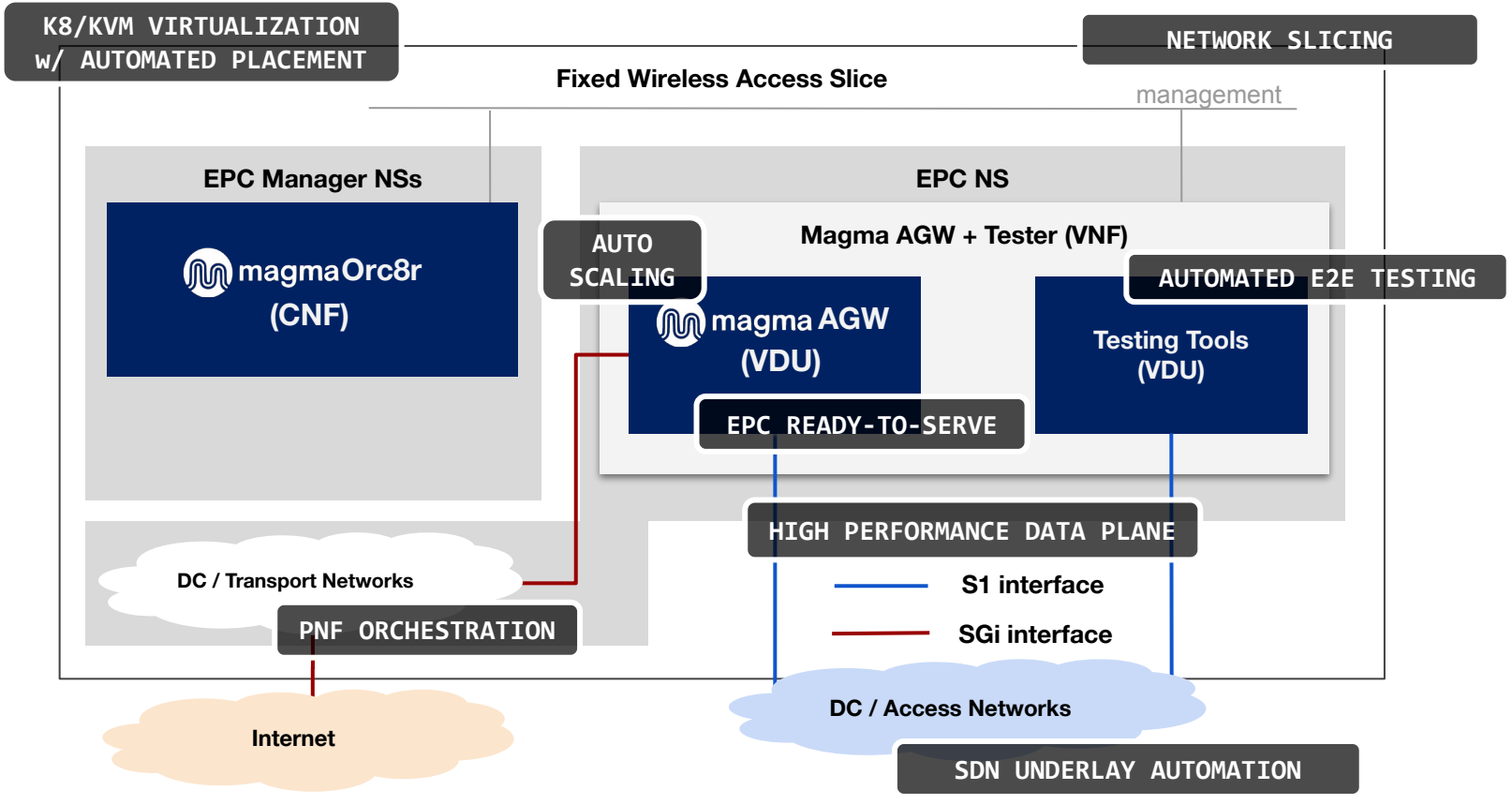
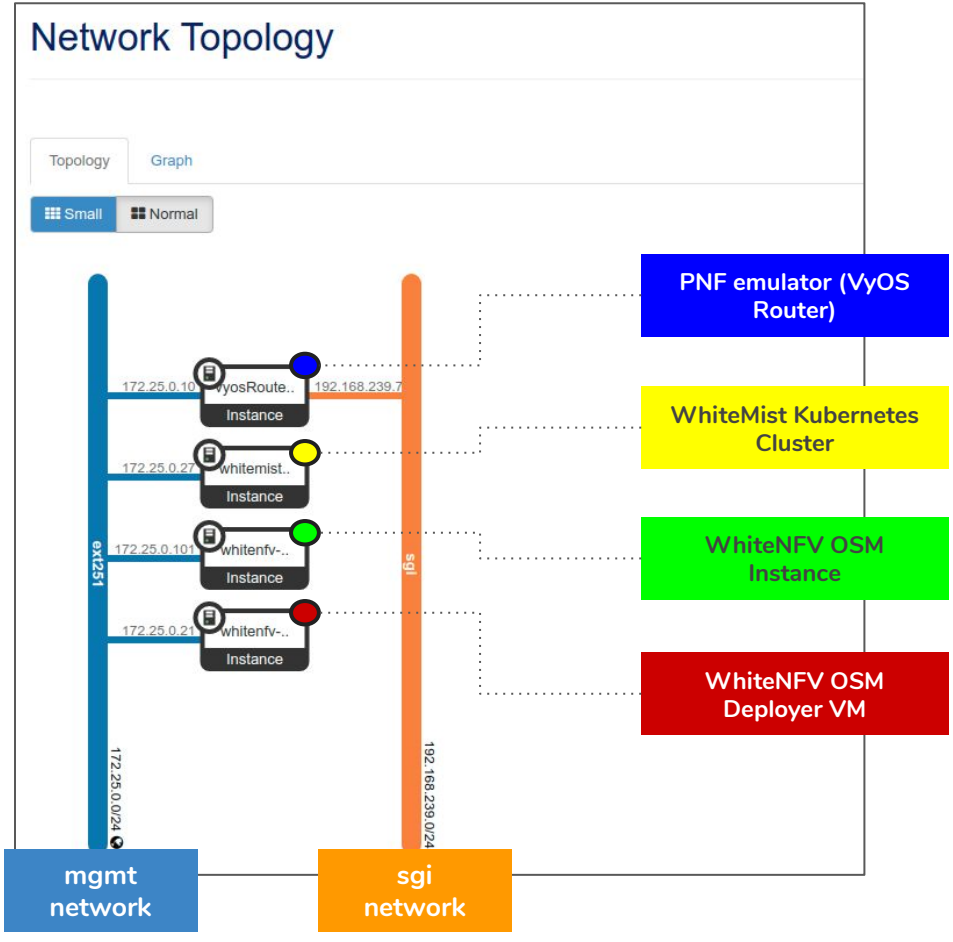
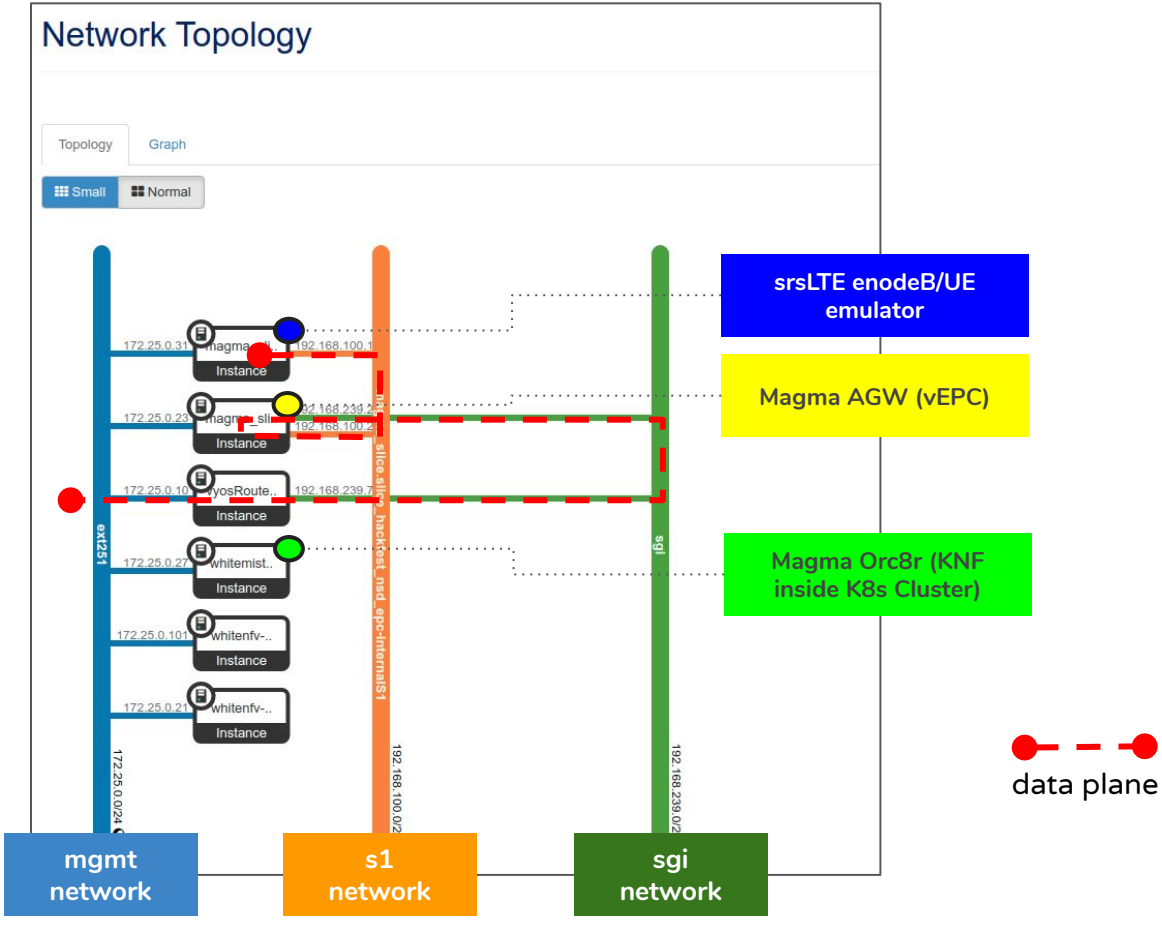


# WhiteCloud Initial Components

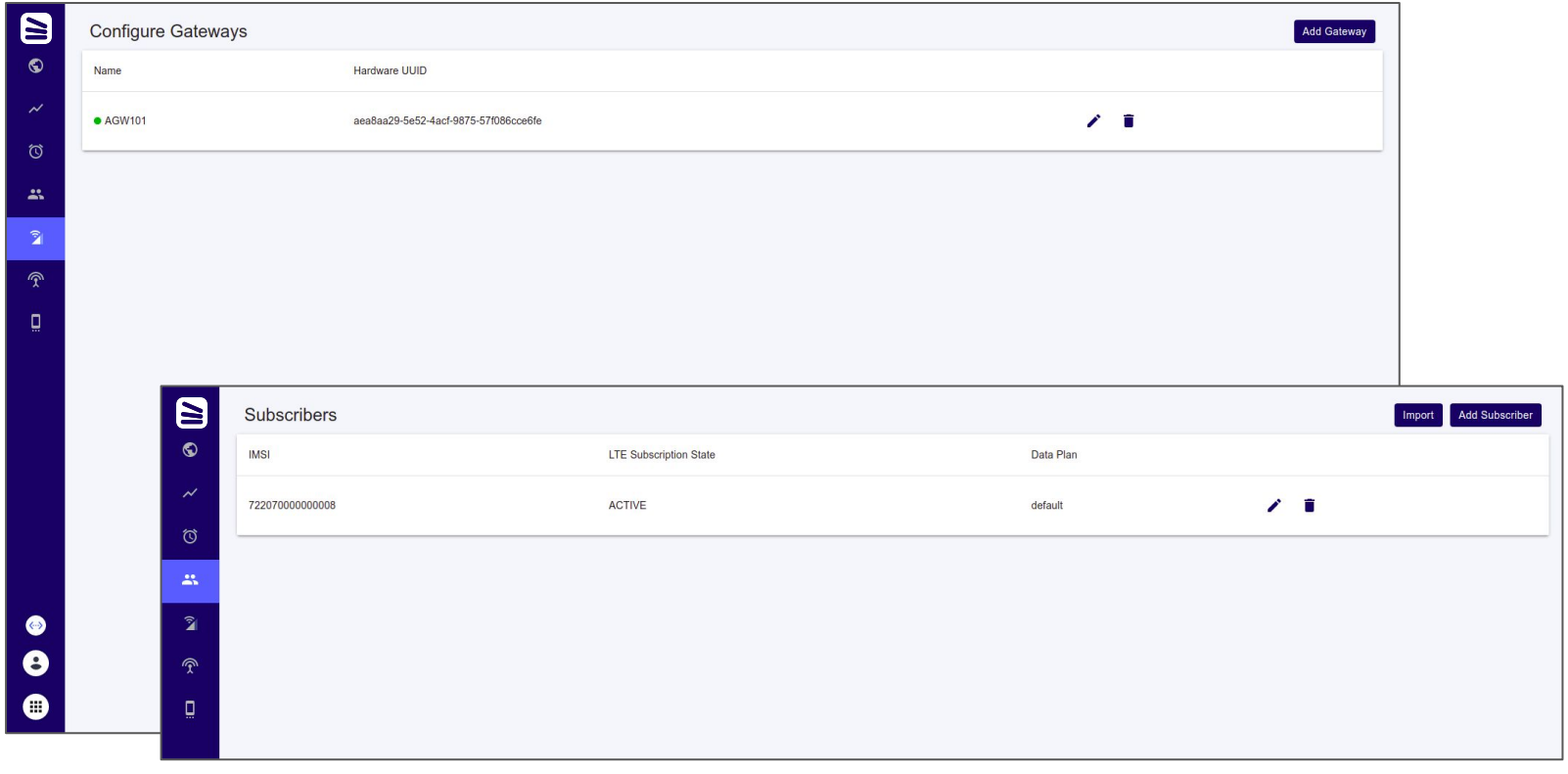


# WhiteCloud Topology with first Slice



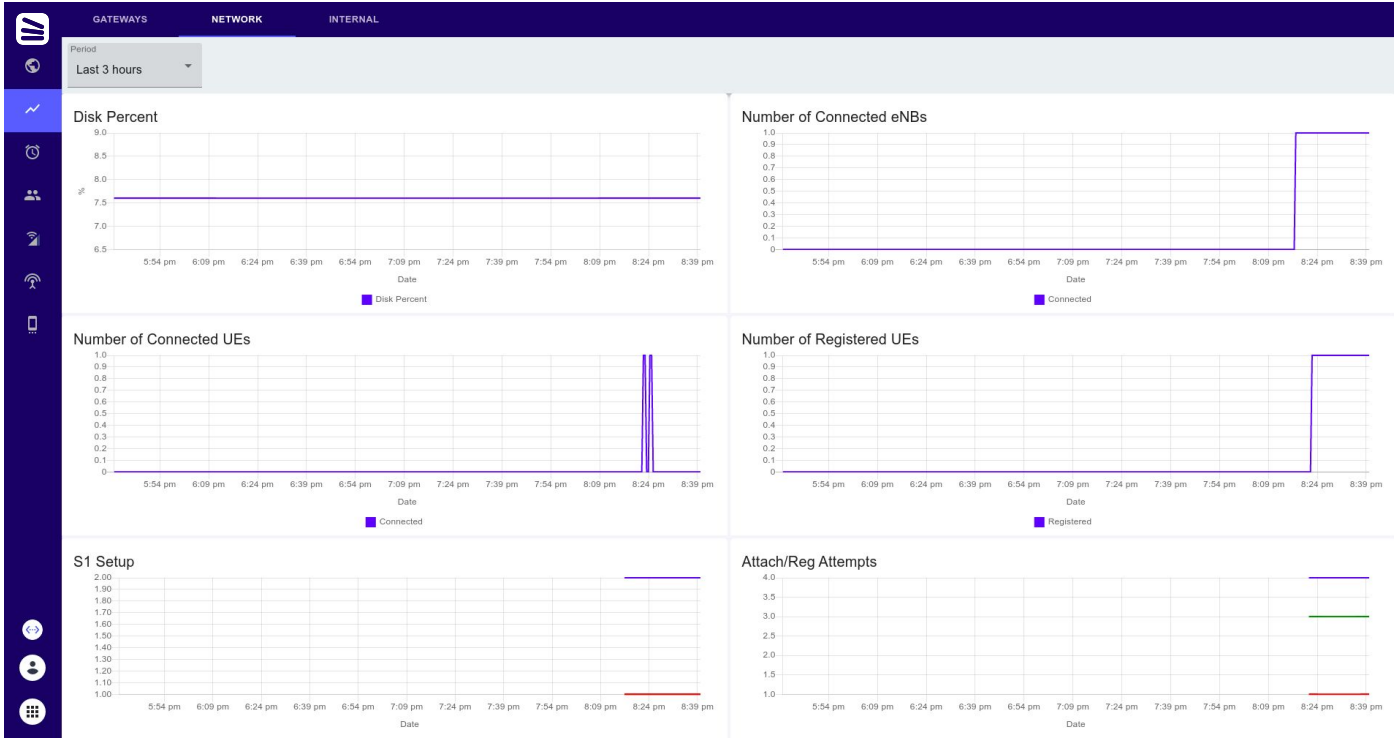
# Instantiation and Day-1 Operations

- In the first slice, one Magma Orc8r KNF and one Magma AGW are deployed
- The AGW EPC is launched and self-registers to Magma Orc8r
- A test subscriber is created



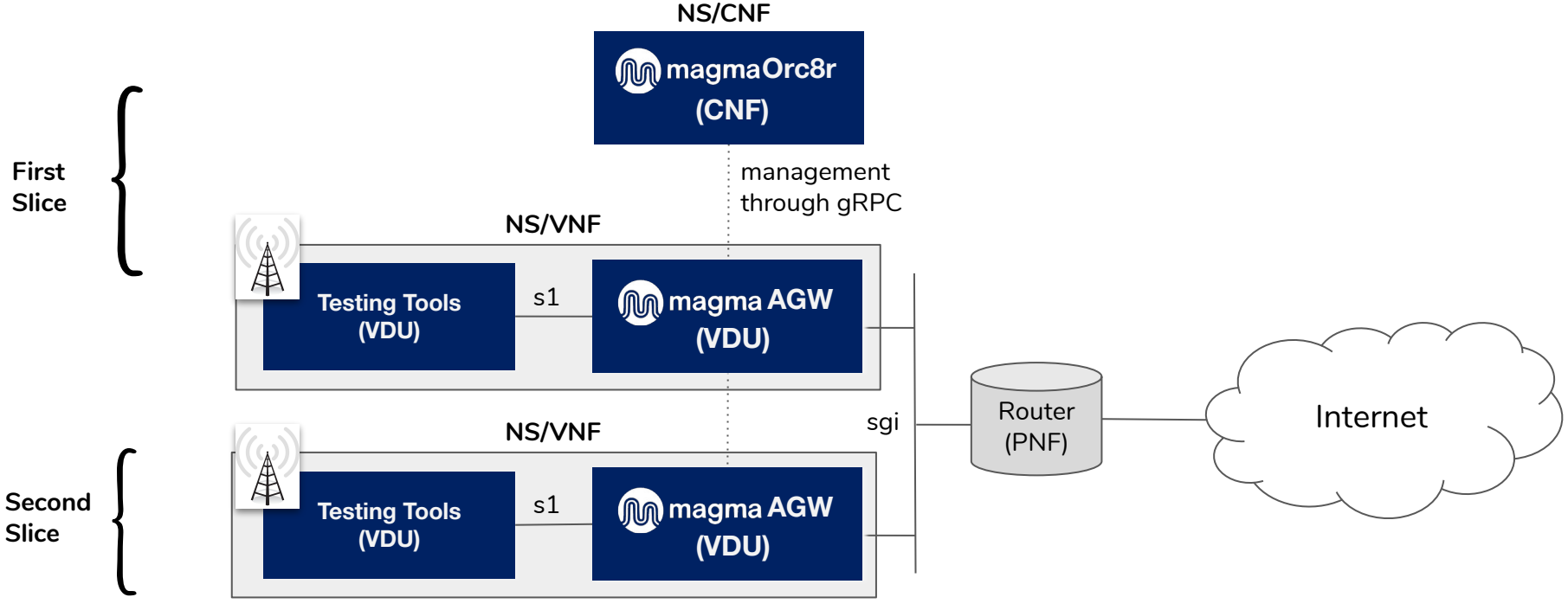
# Day-2 Operations

- **eNodeB emulator is registered** (./register_enodeB.sh [ns_name])
- **UE emulator is attached** (./attach_UE.sh [ns_name])
- **PNF is configured to allow traffic from new AGW** (./allow_Internet [AGW IP])



# A second Network Slice & final picture

- In the second slice, since Magma Orc8r KNF is shared, only a new AGW is deployed
- The second AGW EPC is launched and self-registers to the existing Magma Orc8r
- Day-2 operations remain the same



# Conclusions & Next Steps

# Conclusions

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- An end-to-end mobile network automated deployment is possible.

- NFV MANO Orchestration is key to fulfill multi-vendor Hybrid NF onboarding & automation, from instantiation to operations.

- The value of open-source is extending from MANO to NFs, contributing to reducing hardware vendor lock-in.

# Next Steps

We propose the following next steps in the scope of this PoC:

- **Phase 2 - Lab expansion**
  - Latest WhiteNFV (Denver-2) & WhiteEPC (Azufral-3) code
  - Real eNodeBs & CPEs from Telenor Labs
  - Performance testing
- **Phase 3 - Field Trial**
  - Validate the FWA use case in a greenfield
  - Test integrations with existing HSS & PCRF
  - Explore 5G use cases for private enterprises.

# Thanks!

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Transforming the telecom industry, with open technologies.