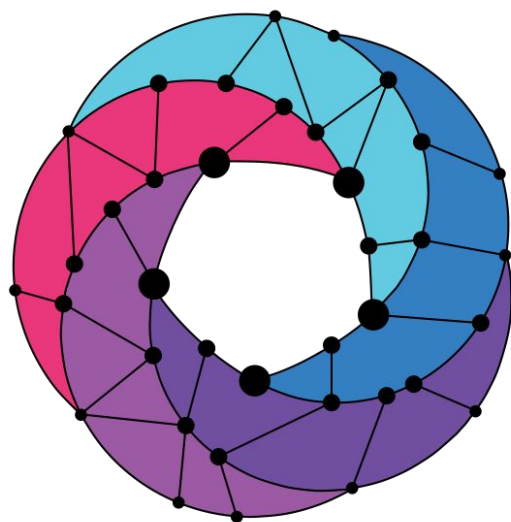




Open Source
MANO

OSM#9 Hackfest

Hackfest Scenario Overview

Mark Beierl (Canonical)

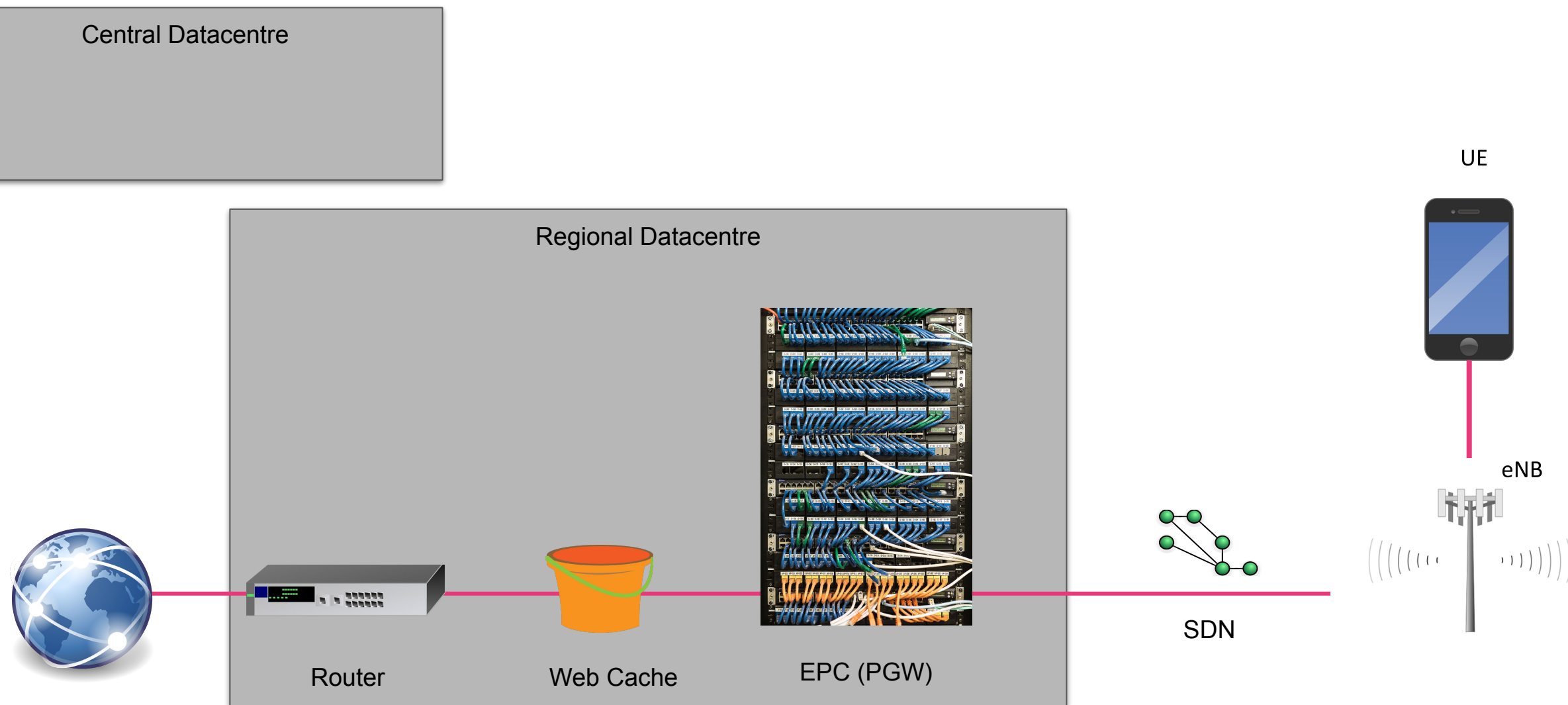


I Just Want to Watch YouTube

- Cellular data continues to explode
- 5G gives us even more bandwidth
- Backhaul costs are expensive
- Management of all the software components is expensive
- Remote management is even more expensive

This week we show how OSM helps with the management and orchestration of Evolved Packet Core (EPC) and over-the-top services

Cellular Data Path



Magma combines 3GPP functions into AGW

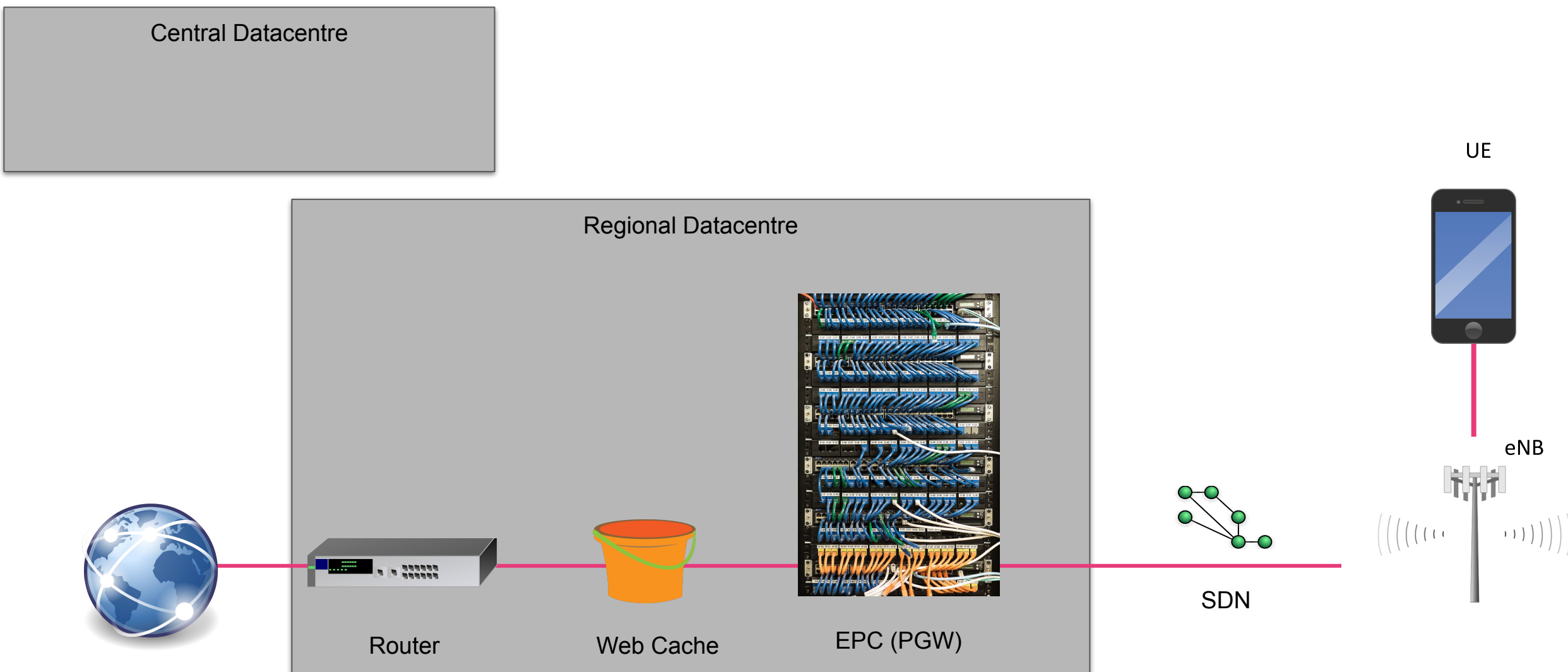


- MME | Mobility Management Entity
 - Keeps track of User Equipment registered on LTE network
 - Handles requests for network access - setting up and tearing down data sessions
- SGW | Serving Gateway
 - IP router with GTP support and charging functionality
 - Module for signalling between PGW and MME
- PGW | Packet Data Network Gateway
 - Provides access to external Packet Data Networks (ie: internet)

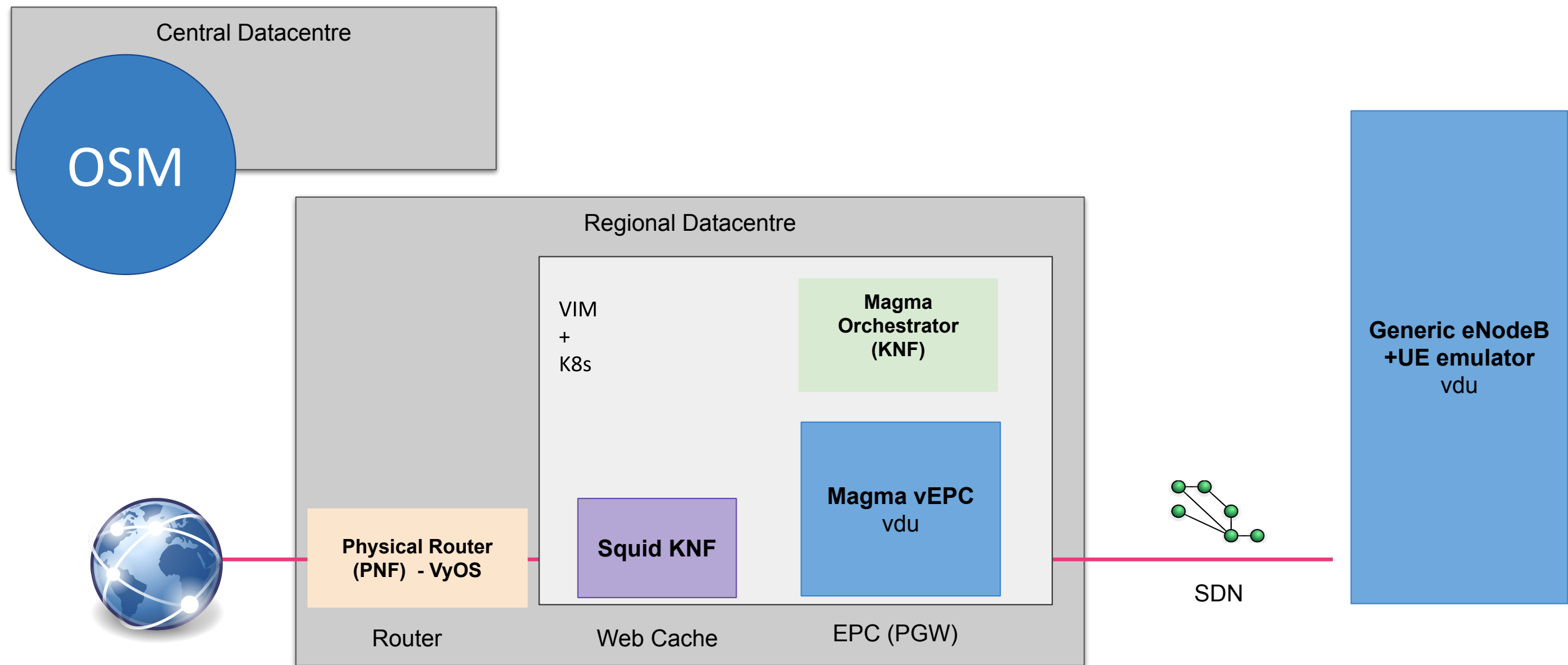
We will emulate in software...

- UE | User Equipment
 - This is the cell phone or device communicating over cellular network
- eNB | The evolved Node B
 - The Cell Phone Radio itself
 - Connected to the mobile phone network that communicates directly wirelessly with mobile handsets

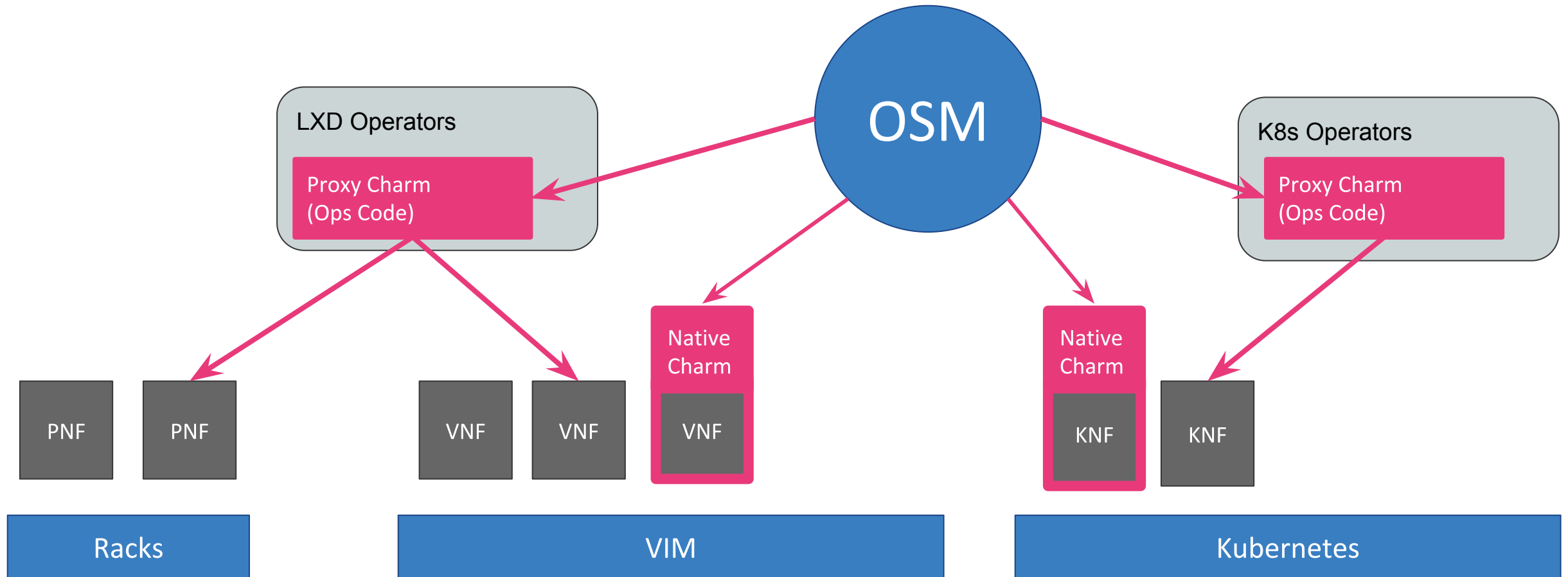
Cellular Data Path



Cellular Data Path

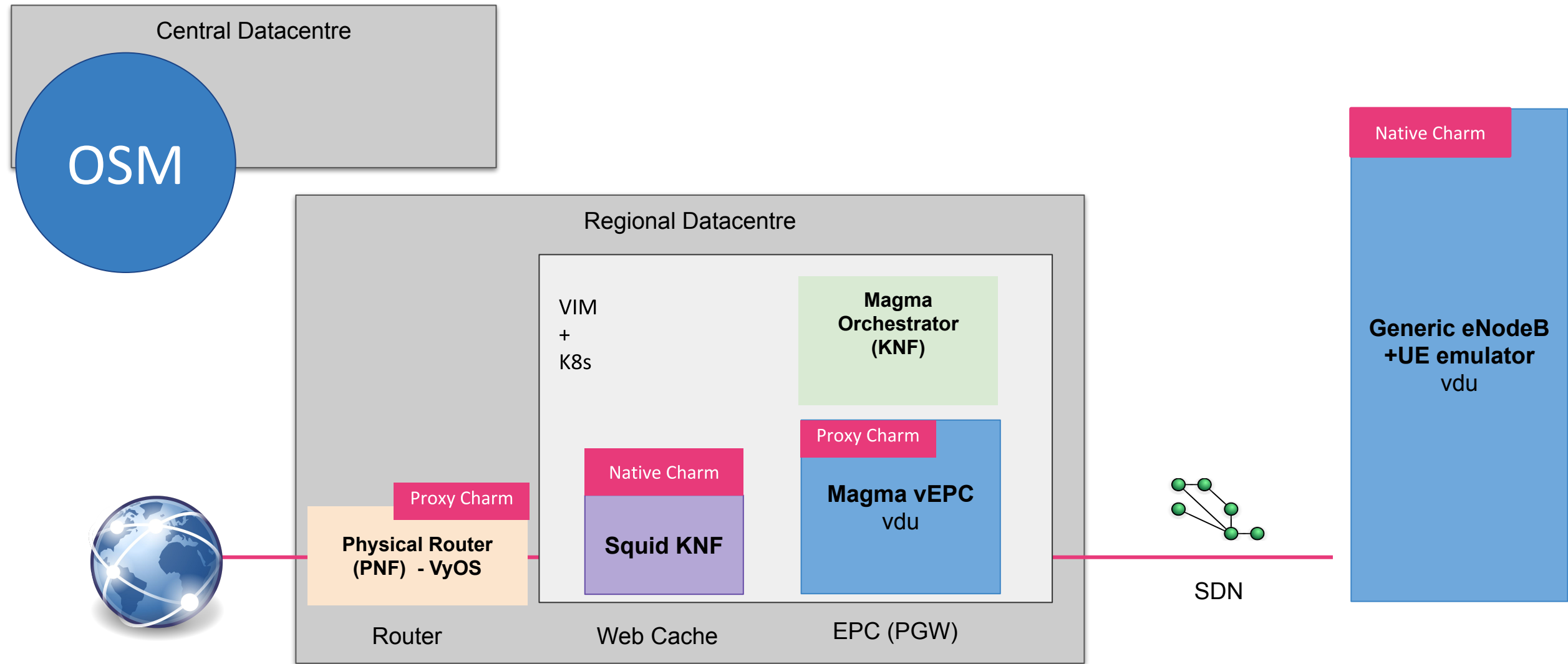


Reality is messy and mixed



- Last mile workload-specific workflows and codepaths
 - Scripts, file changes, integration, config, backup etc
- How? OSM uses scripts that are packaged in a Charm
 - Proxy
 - PNF or existing fixed functions with limited integration options
 - Charm acts on NF from a distance over some network protocol
 - SSH or REST or NetConf-Yang from the proxy charm
 - Native
 - Charm has direct access to function
 - App that can be installed on Win/Ubuntu/RHEL/CentOS, or
 - Docker image that can be driven by a charm directly
 - No need for open management port - actions run locally

Cellular Data Path



Charms are packages of scripts to drive apps

Lifecycle scripts

- install
- config
- update
- remove
- scale

“Action” scripts are OSM Primitives

“action: backup”
“action: restore”
“action: scan-viruses”
“action: health-check”
“action: add-repo”
“action: ...”
“action: ...”
“action: ...”

Integration scripts

- relate-mysql
- relate-ldap
- relate-proxy
- relate-...

Charm

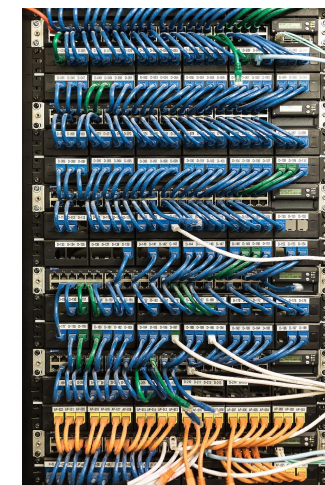
These are your
operations
primitives.



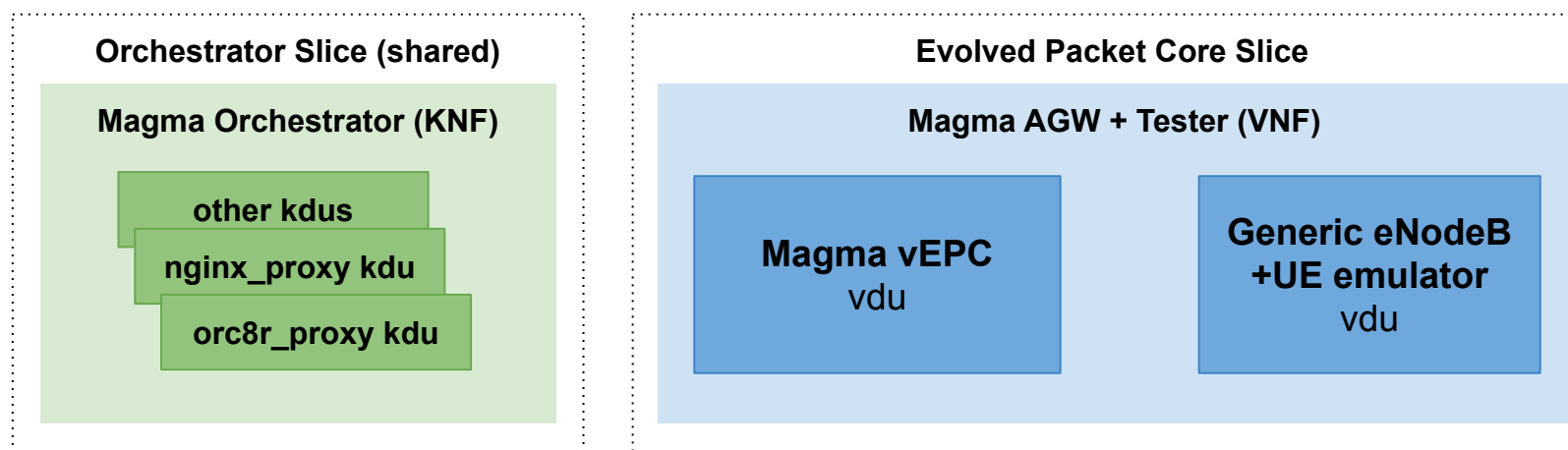
Software Components: Magma vEPC

OSM Creates and Configures:

- Magma vEPC Combination K8s and VMs
 - <https://github.com/facebookincubator/magma>
 - Management of Magma is series of K8s containers
 - Magma AGW is in a VM
 - Uses SR-IOV, CPU pinning and huge pages



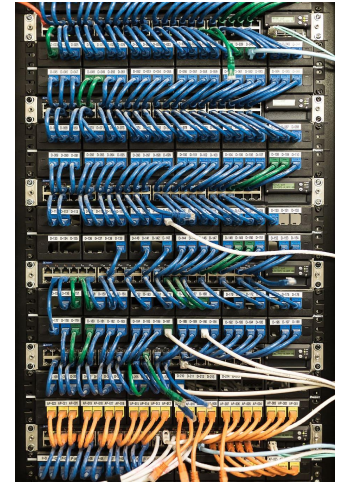
EPC (PGW)



Software Components: Magma AGW

Configuration:

- Information needed:
 - An ID for this EPC: agw_01
 - A name for this EPC: AGW01
 - An IP address of the Magma Orchestrator
 - The network name to create in Magma Orchestrator: osmnet
- Demonstrated using Proxy orchestration charm



EPC (PGW)

Software Components: PNF Router



- VyOS package, not customized
- Router already exists, no software to deploy
- Must be registered with OSM for orchestration

Configuration:

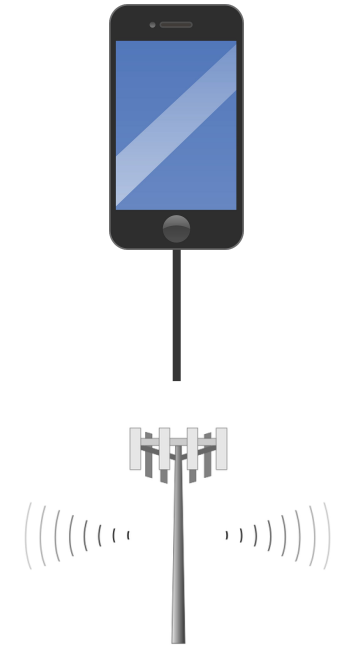
- Routing
 - Permit / Deny traffic from the Magma AGW to internet
- Demonstrated using Proxy orchestration charm

Software Components: eNodeB + UE

OSM will deploy and configure a VM with:

- srsLTE
 - Software Radio (eNodeB)
 - Software UE (Cellphone)
- Graphical Desktop with Firefox

<https://github.com/srsLTE/srsLTE>

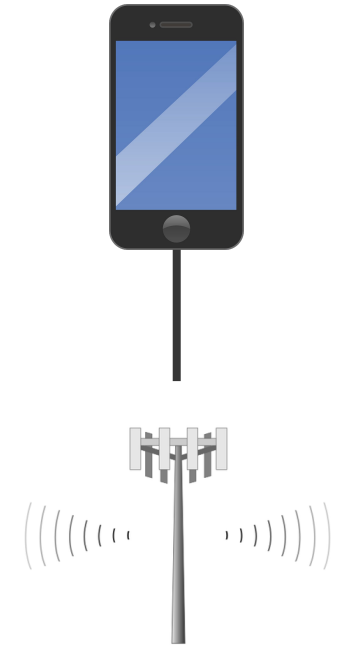


**Generic eNodeB
+UE emulator
vdu**

Software Components: eNodeB + UE

Configuration:

- Information needed:
 - Where is EPC Core
 - Radio parameters (MCC, MNC, etc)
 - UE parameters (IMSI, encryption keys)
- Demonstrated using Native orchestration charm



**Generic eNodeB
+UE emulator
vdu**

Software Components: Web Cache

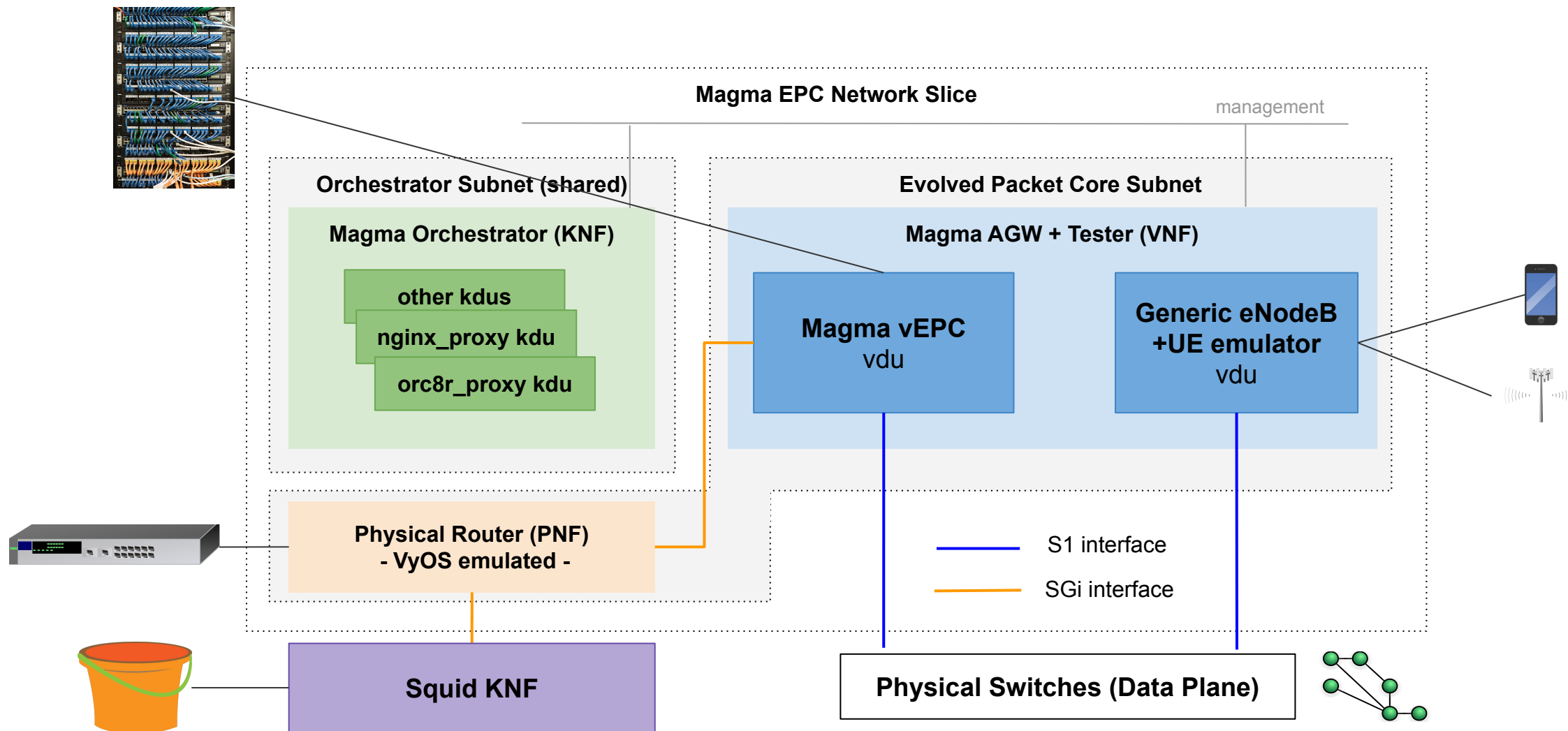


Web Cache

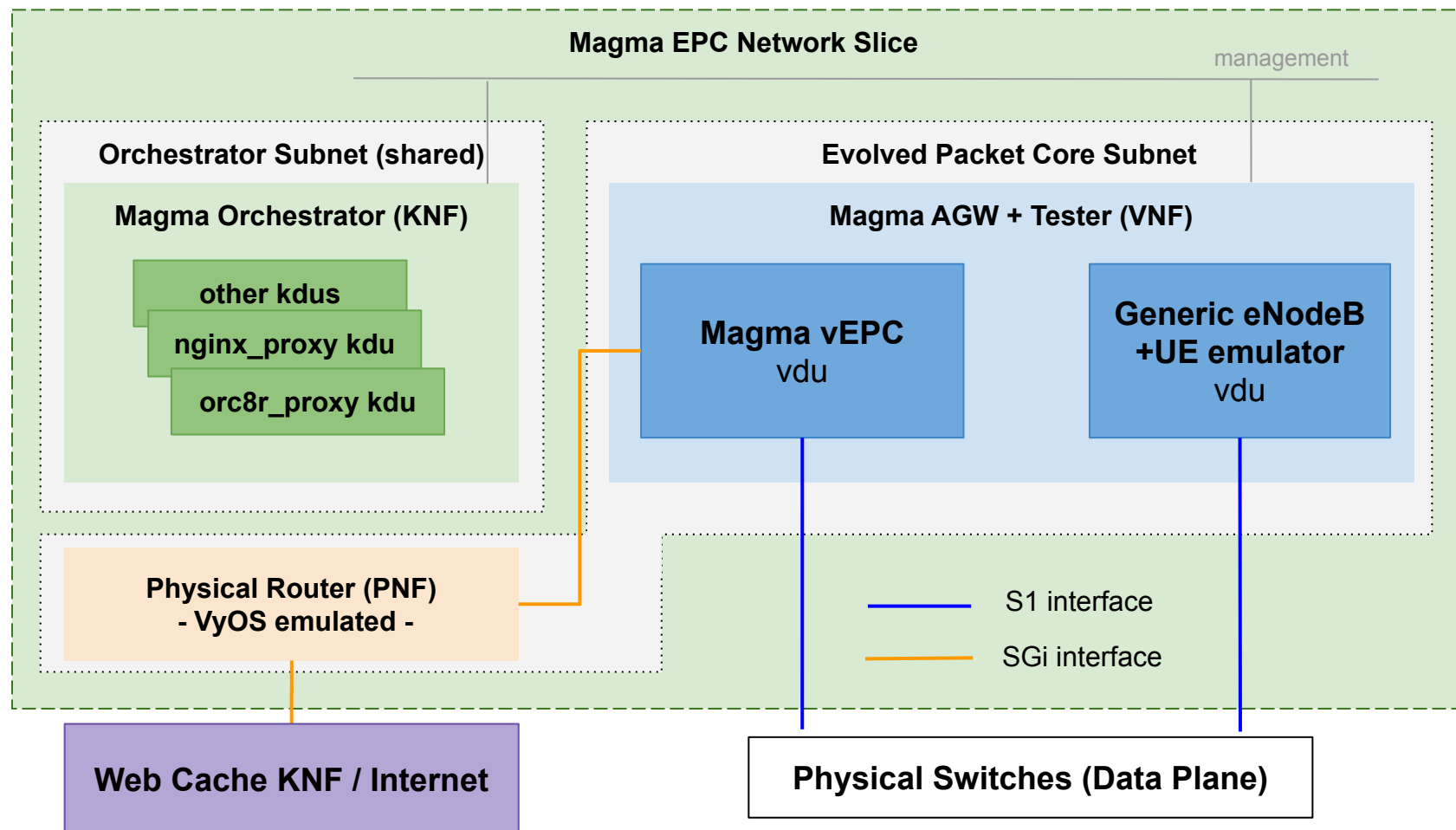
OSM Creates and Configures:

- Web Cache Container
 - Based on Squid
 - <http://www.squid-cache.org/>
- Demonstrated using Native K8s orchestration charm

The Big Picture

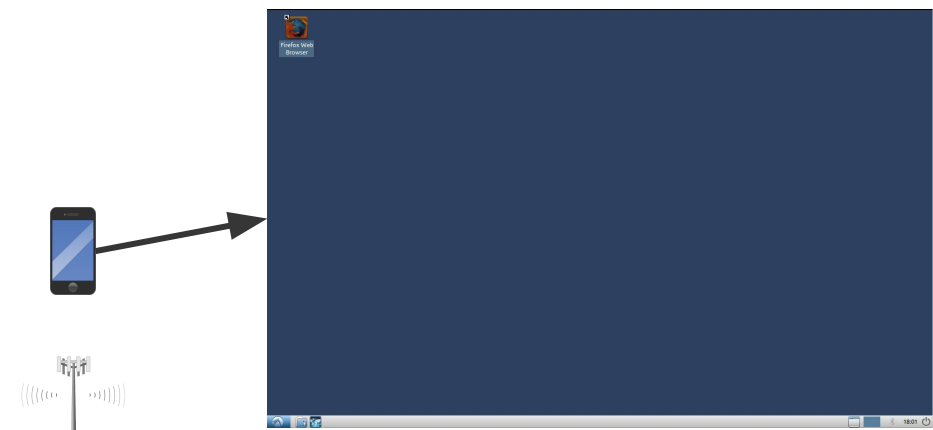


The EPC Network Slice



Our Cell Phone

- The VM that has the UE software is really an Ubuntu Desktop
- But... we are using that as if it were a Cell Phone
- Can log into the desktop using VNC - password srslte
- If VNC not available, use Horizon Dashboard
 - <http://172.21.247.1/project/instances/>
 - Desktop credentials: ubuntu / osm2020

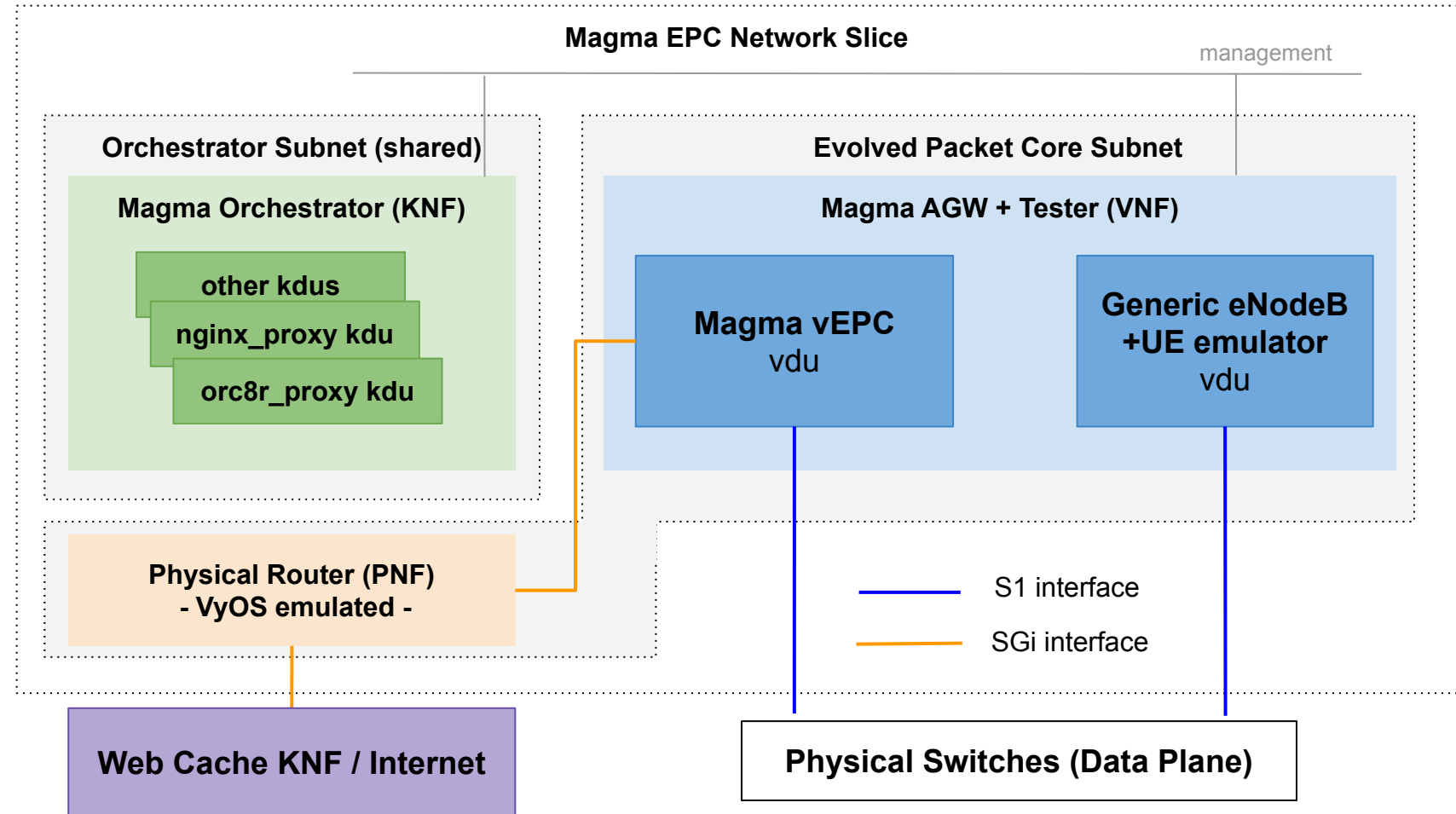


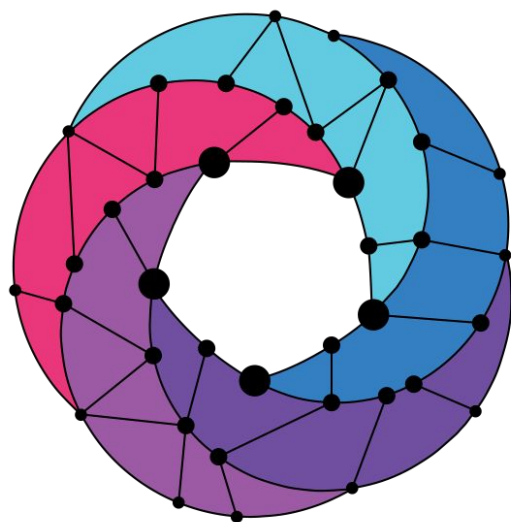
- Cell phone has SIM card with credentials
- Needs to be activated in Carrier's EPC
 - Day 1 Primitive operation to provision the phone in Magma
- Cell phone needs a radio
 - Day 2 Primitive operation to start radio emulator
 - Day 2 Primitive operation to register cell on network

End to End, But First We Learn

The next 3 days we will be breaking down the deployment step by step and teaching how each part gets created

Enjoy the Hackfest!





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Find us at:

osm.etsi.org
osm.etsi.org/wikipub