

Modeling to Support 5G RAN

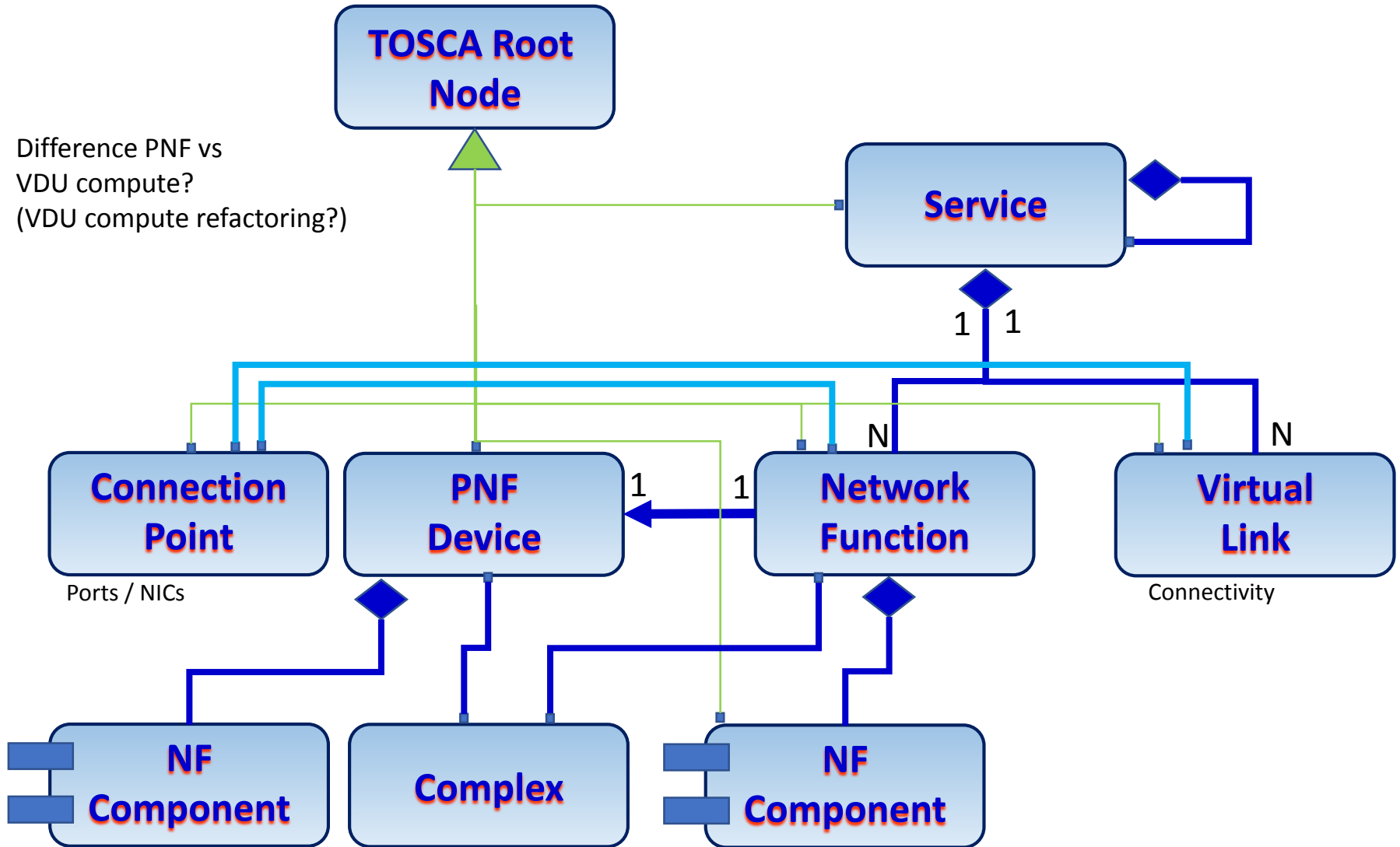


- ONAP Modeling

Modeling a Service

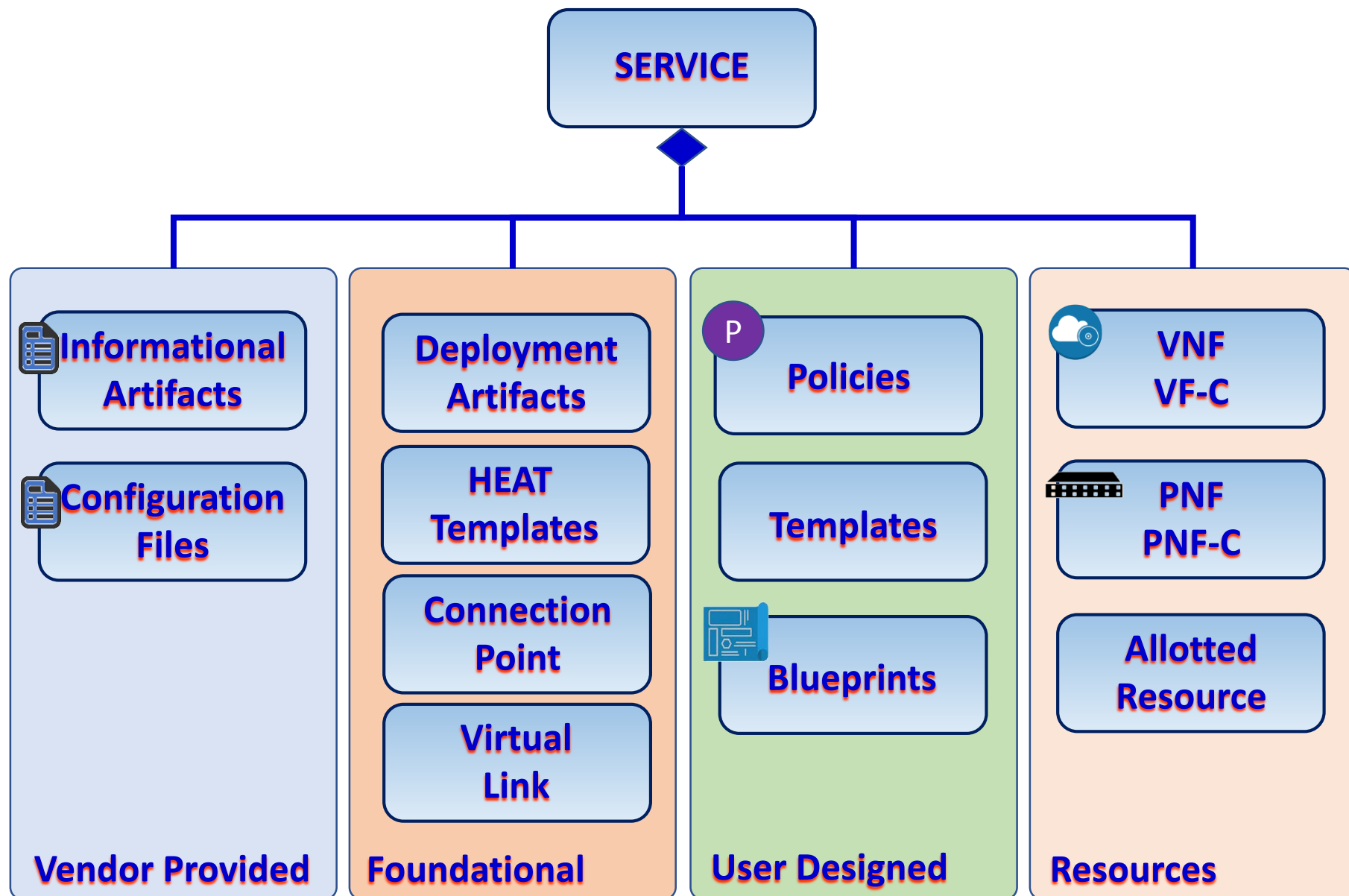


Difference PNF vs
VDU compute?
(VDU compute refactoring?)



Design time view of a service
Internal representation of a model
Onboarding Model > SDC produces

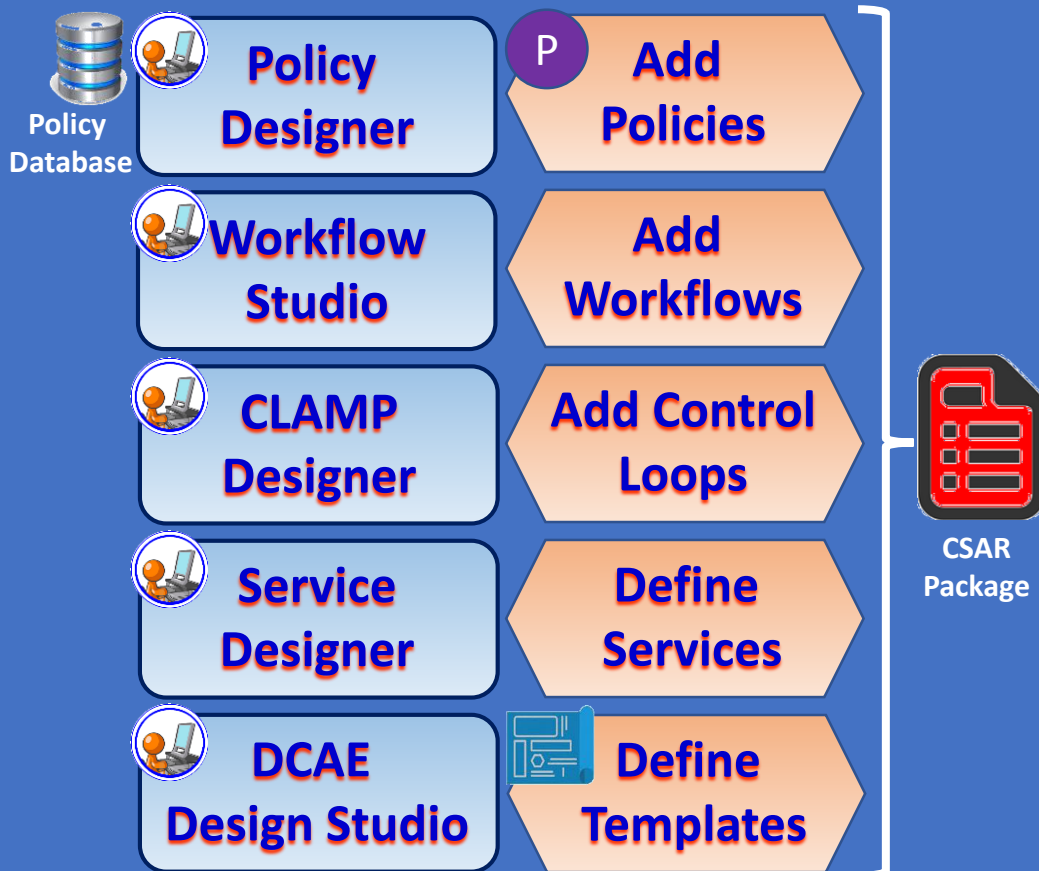
Defining a Service



Design-Time Process



DESIGN-TIME (SDC)



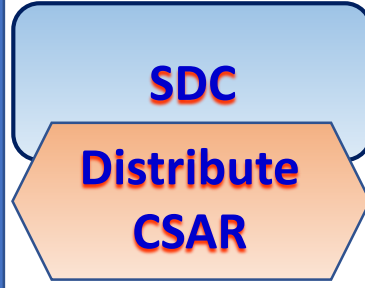
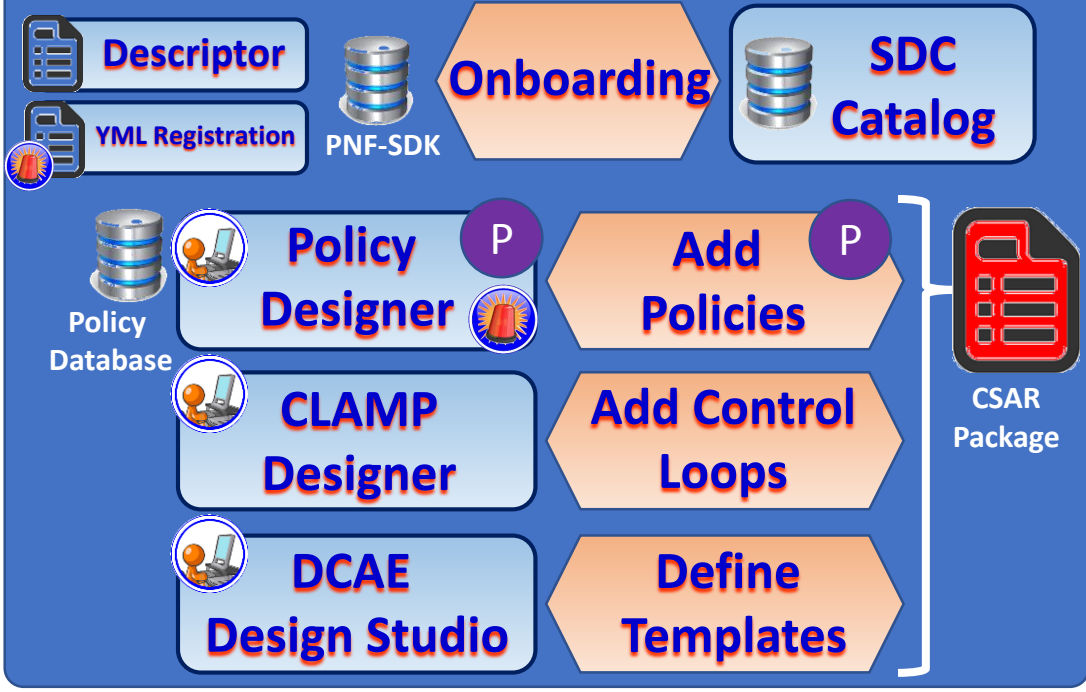
ONAP RUN-TIME



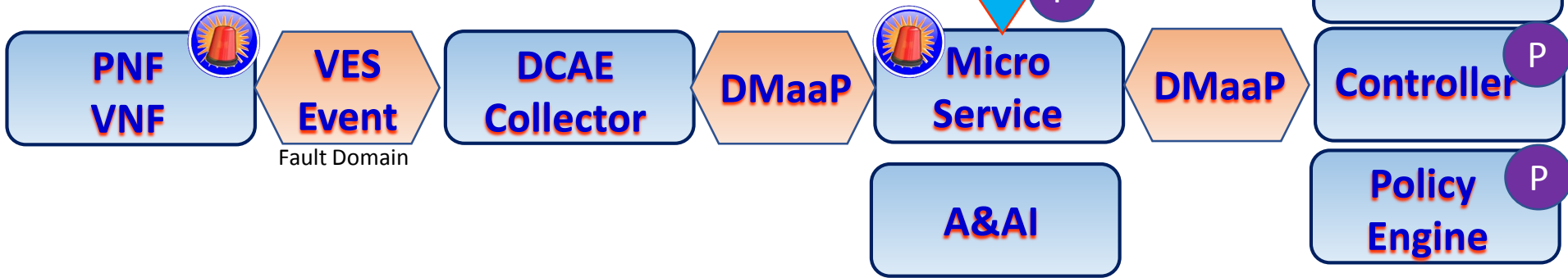
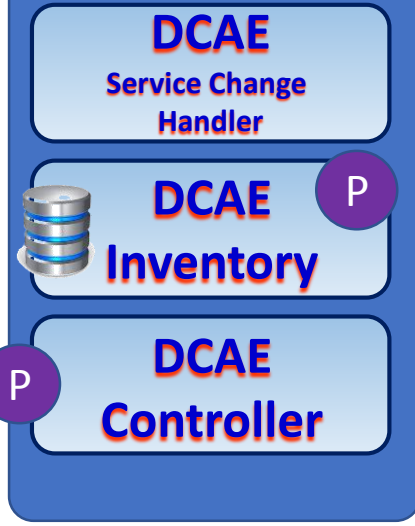
Policy Example



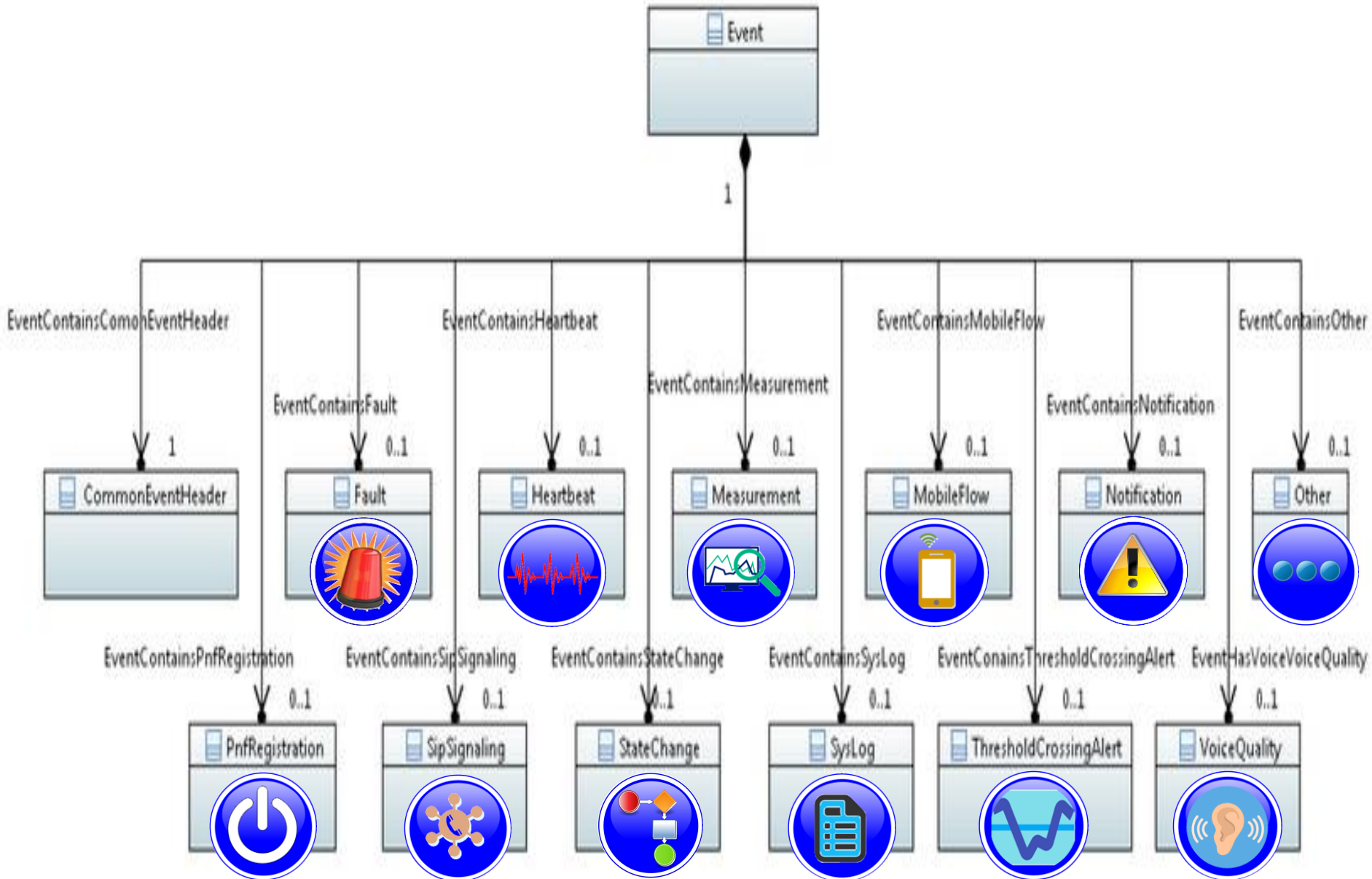
DESIGN-TIME (SDC)



DCAE (Run Time)



R4: Modelling VES Events





5G RAN Wireless Systems & ONAP



3GPP Release 15, IMT-2020 = 5G



eMBB (enhanced Mobile Broadband)

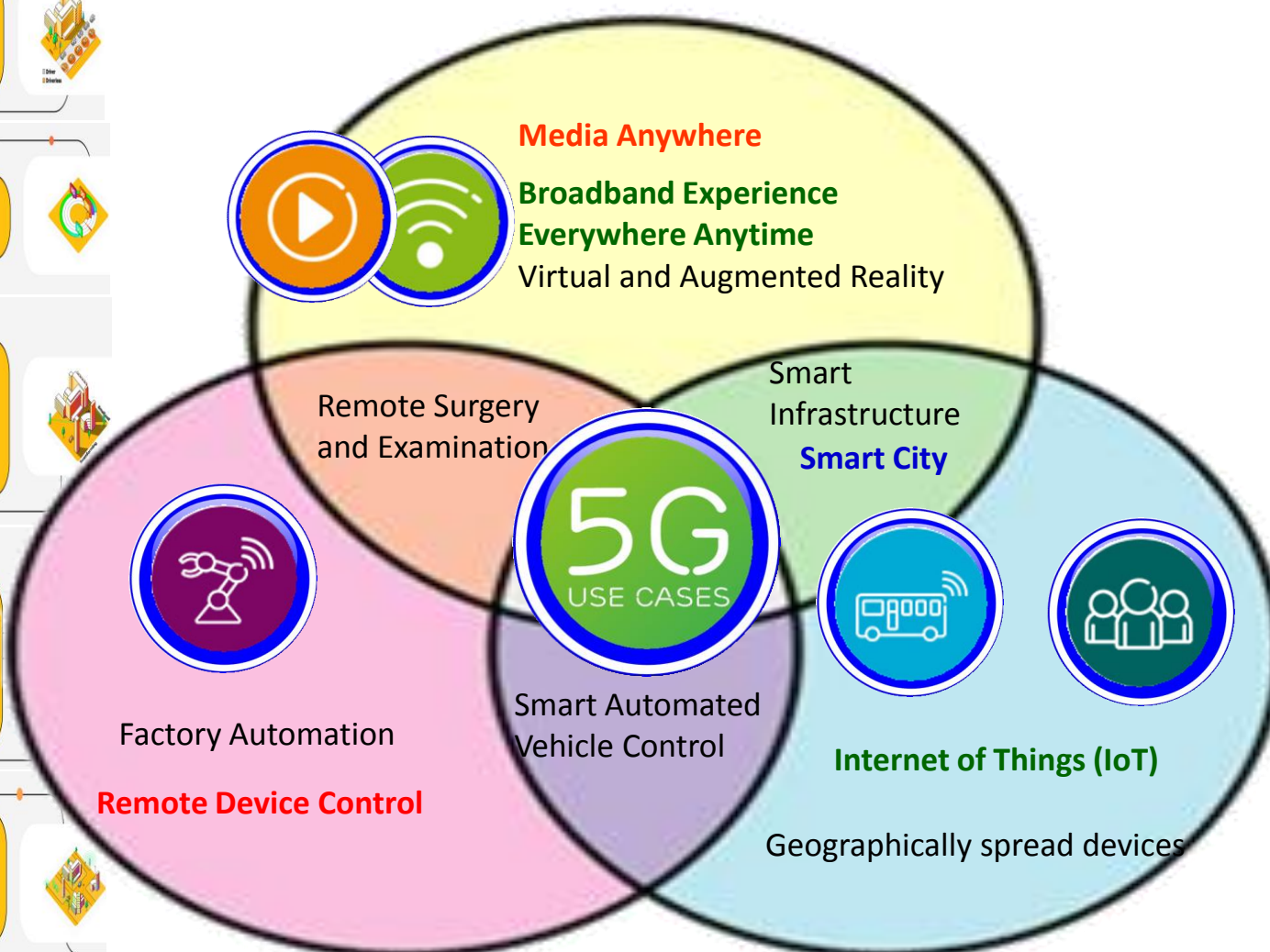
LATENCY
Humans don't have instant reaction times. When every driver has a slightly delayed response to their vehicle, you end up with traffic jams. 5G is the first generation of networking that's being designed for machines like autonomous cars. By reducing network latency, it's enabling near instantaneous reaction times.

SPEED
5G isn't just faster than 4G; it's at least ten times faster. Think about what your business does for customers today. And then think about what it could do with a 10x uplift in speed.

COVERAGE
Small, new, network coverage strategies were optimized for one primary use case: people with smartphones, moving around. 5G will combine new technologies in new ways to provide better coverage. Smaller antennas in massive arrays will make a single base station last like months, and beamforming techniques will focus data streams at specific users, locking them as they move—even bouncing signals off walls to maintain the connection.

CAPACITY
Serving a few hundred users with new, connected experiences is a challenge. Serving 20,000 at the same time? That's a real, real capacity challenge. Today's network operators can't come close to handling the volume of new technology. 5G networks can. Partly because they'll use multiple types of spectrum. 4G uses NR. That means each tower can, for example, host four transmitters. With 5G Massive MIMO, it can host 64 transmitters. The more network capacity will increase by 10x which is available today.

DENSITY
People and IoT devices are never evenly distributed. They cluster in places like cities, stadiums, airports, and airports. 5G can handle that because it's being designed to connect a world with hundreds of thousands—even millions—of devices per square mile. In a 5G world, every streetlight, road sign, car, parking space, shipping container, and crosswalk can be connected.

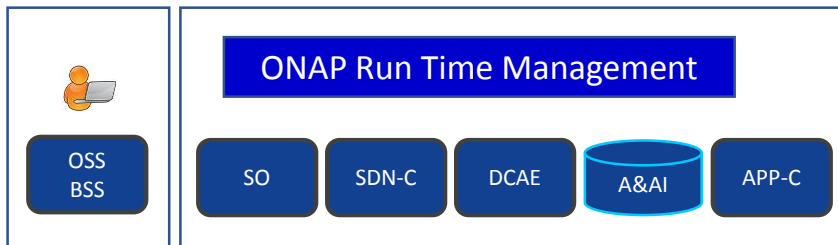


URLLC (Ultra Reliable Low Latency Communications)

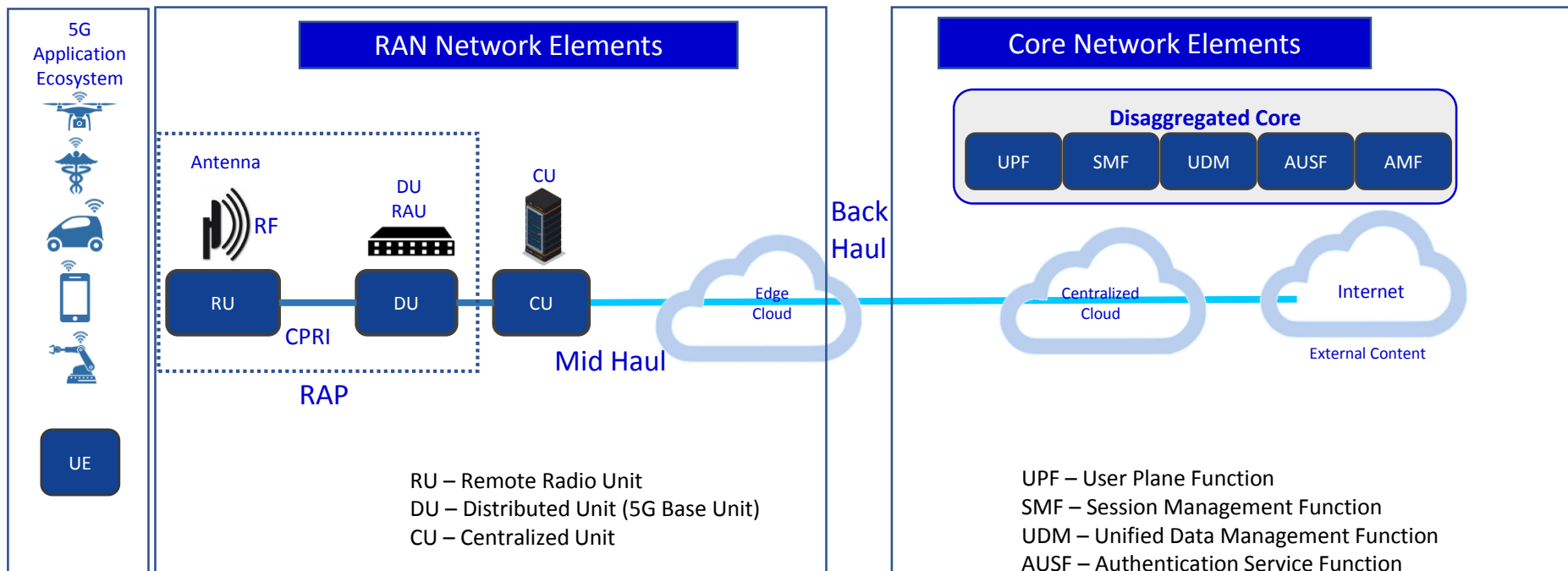
mMTC (massive Machine Type Communications)

- Smart**
- Connected**
- Collaborate**
- Access**
- Interactive**
- Aware**

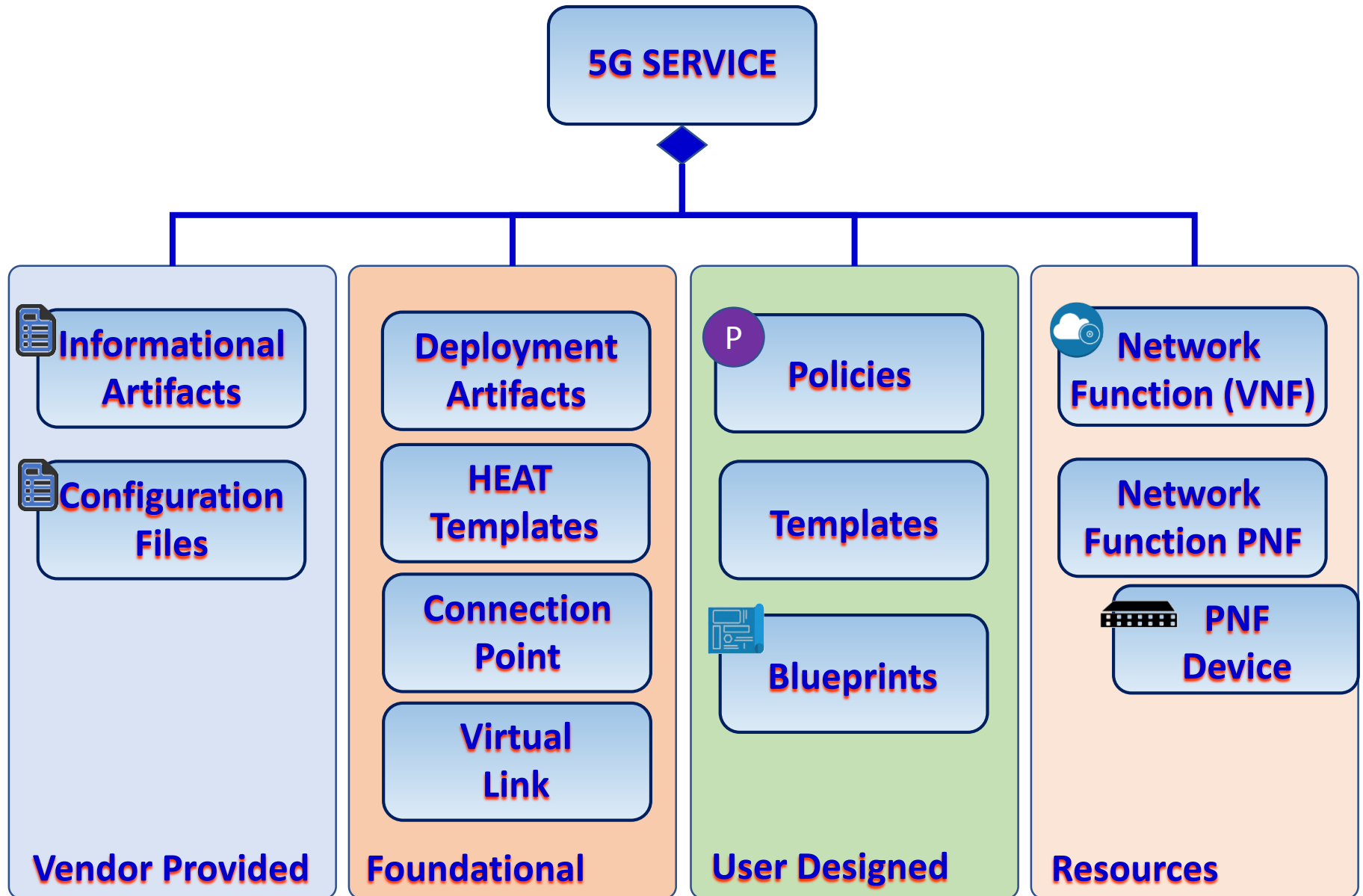
5G RAN Wireless Network



SO – Service Orchestrator
 SDN-C – Service Design Network Controller
 DCA&E – Data Collection Analytics & Events
 A&AI – Available & Active Inventory
 APP-C – Application Control



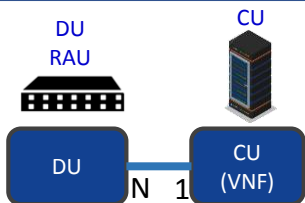
R4: Modeling a 5G Service



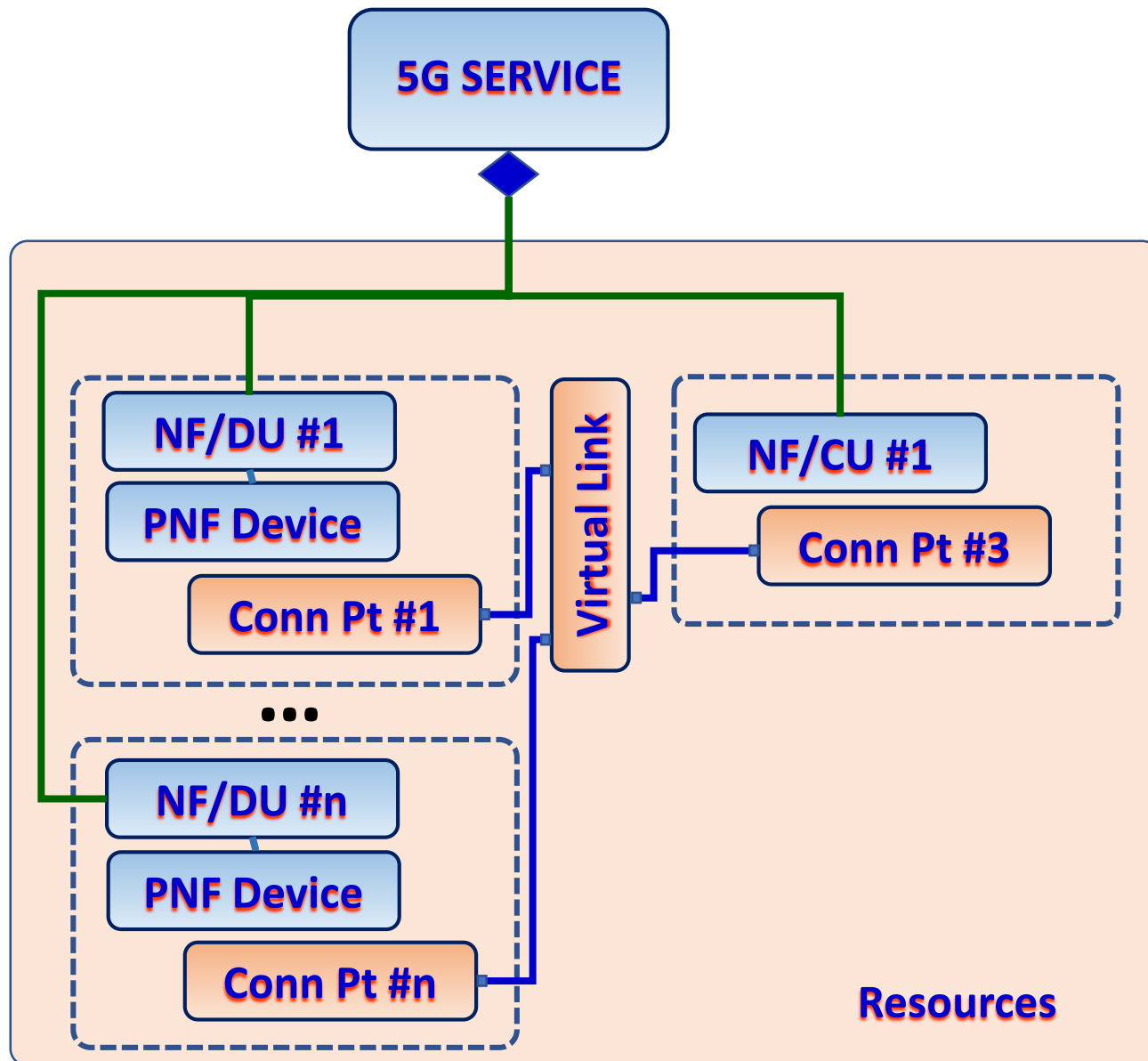
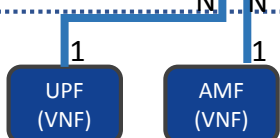
R4: 5G Base Station (gNodeB)



RAN Network Elements



Core Network Elements

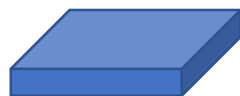
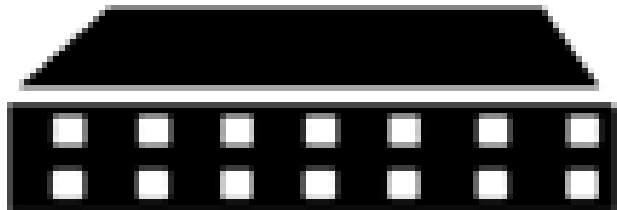


Configurations



MODELING WITHIN A PNF (DU)

5G DU (PNF)



Sub-Component #1



Sub-Component #2



Sub-Component #n



SFP #1 = Port #1



SFP #n = Port #n



Software Function of a DU

**Network
Function**

*"Hardware
Aspects of a PNF"*

**Connection
Point**

Ports / NICs

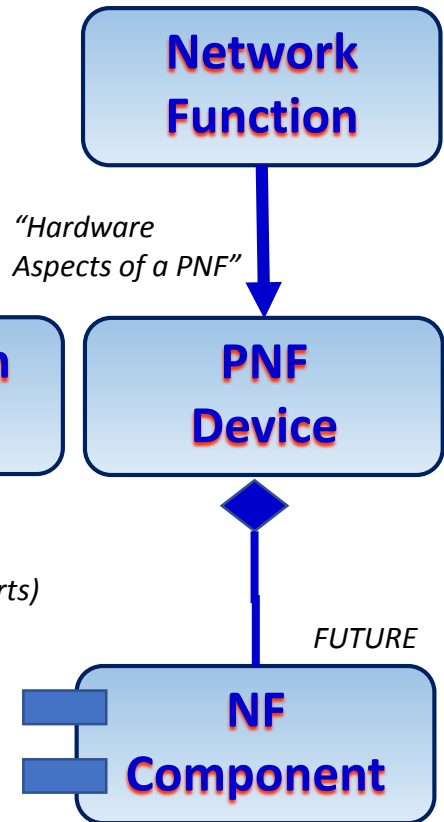
*The hardware Ports
(e.g. SFP/Backhaul Ports)*

**PNF
Device**

FUTURE

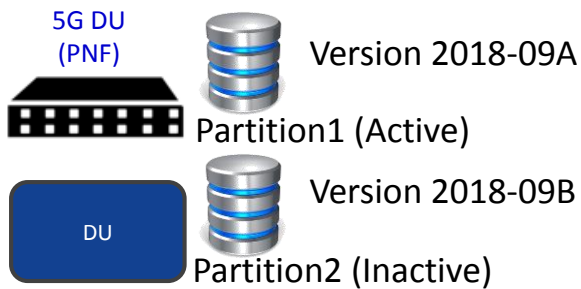
**NF
Component**

Sub-components within PNF

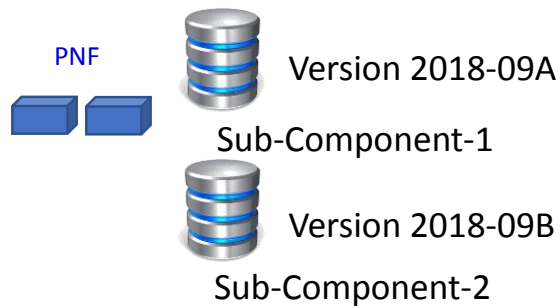


DU Configurations

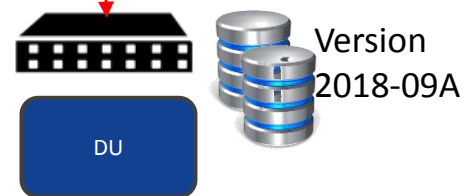
DRIVE PARTITIONS



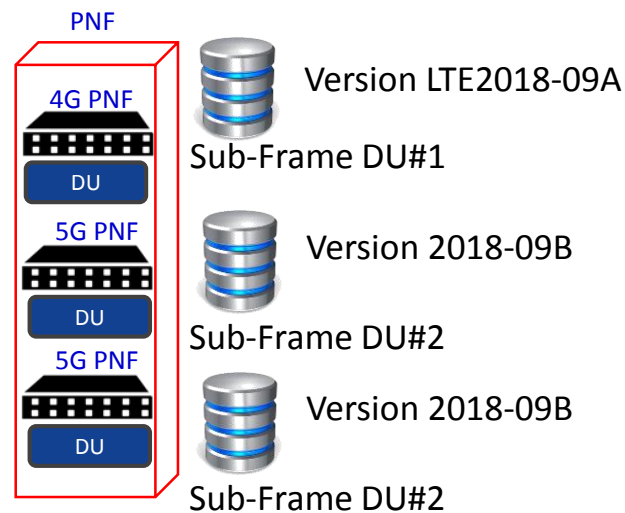
SUBCOMPONENTS (R4+)



MULTI-PNF DAISY CHAIN CONFIG



TANDEM CHASSIS CONFIGURATIONS

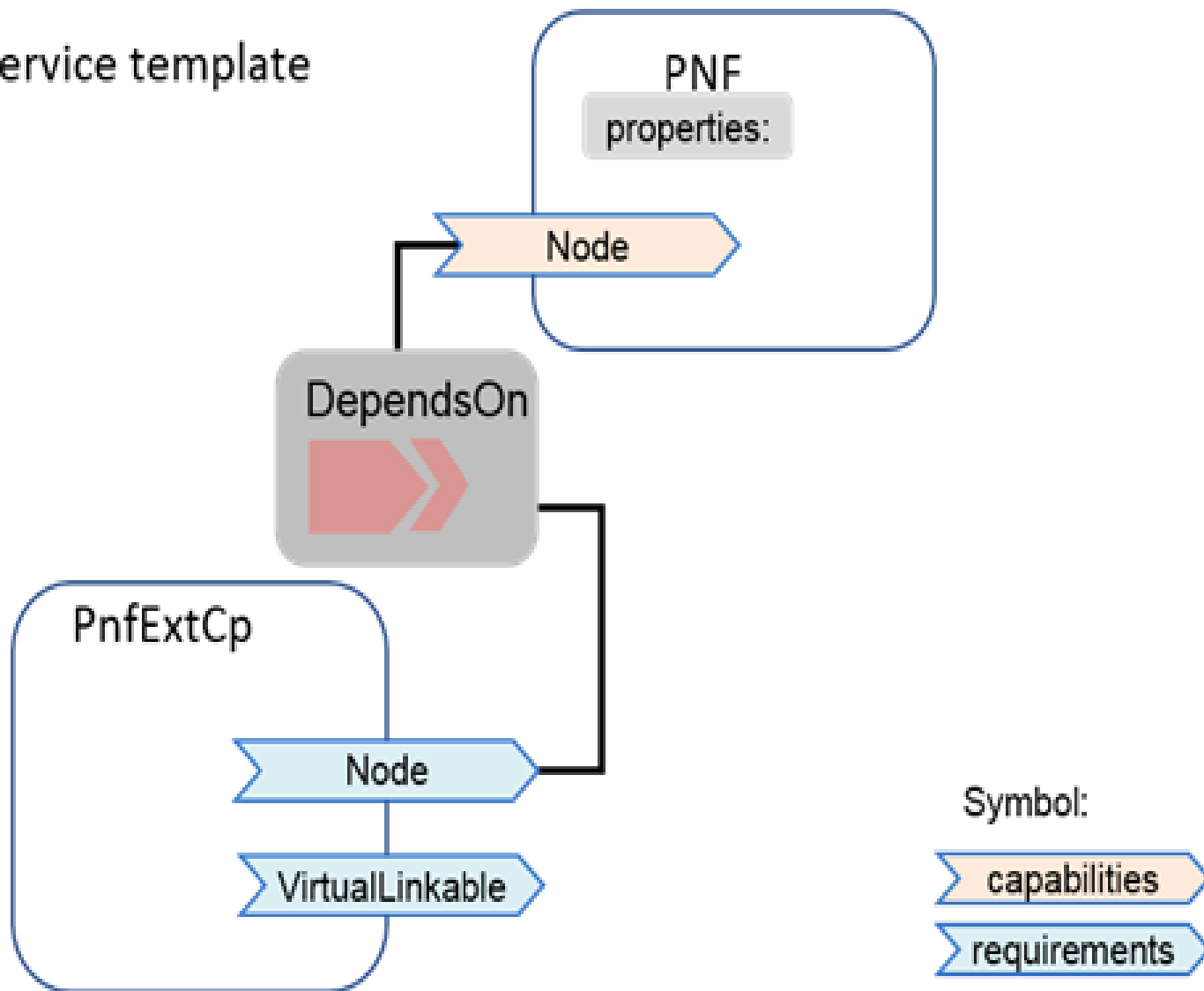


ETSI (SOL 1)

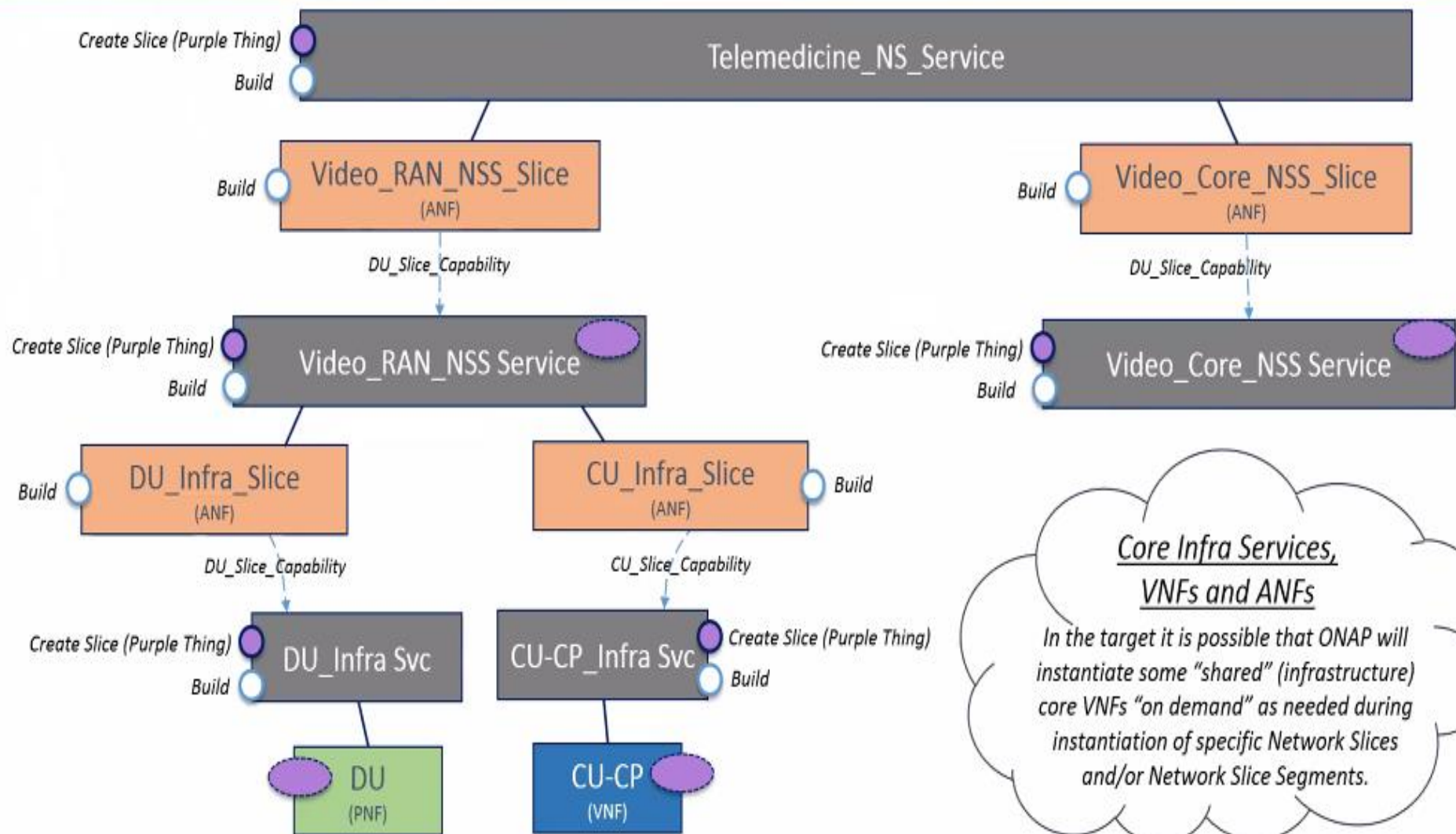


ETSI (SOL 1)

PNFD service template



5G Slicing Nested Services



Core Infra Services, VNFs and ANFs

In the target it is possible that ONAP will instantiate some "shared" (infrastructure) core VNFs "on demand" as needed during instantiation of specific Network Slices and/or Network Slice Segments.



REFERENCES



<https://wiki.onap.org/display/DW/Modeling+sub-committee+Contributions>

