

Modeling to Support 5G RAN



- ONAP Modeling


Onboarding and Design Time





| WHAT | Onboarding Package | Onboarding Descriptor | Platform ONAP Model | NF Instance |
|------|---|---|--|---|
| |  |  <p>PNF Descriptor Model</p> |  <p>Platform Information Model Platform Data Model</p> |  |
| WHEN | <p>Package Delivery</p>  | <p>Onboarding Process</p>  | <p>Design Time</p>  | <p>Run Time</p>  |
| WHO | <p>Vendor</p>  <p>SOL 001 PNFD</p> | <p>Technology Specialist Asset Manager</p>  <p>SOL 004 Package</p> | <p>Service Designer Operations Specialist</p>  <p>-</p> | <p>Operations Specialist</p>  <p>-</p> |






Onboarding and Design Time




Onboarding Package 

Onboarding 

Vendor 


-  **NF Descriptor**
-  **NF Registration**
- PM Schema**
-  **Informational Artifacts**
-  **Configuration Files**
-  **Ansible Playbooks**


NF Descriptor 


Onboarding 


Asset Manager 

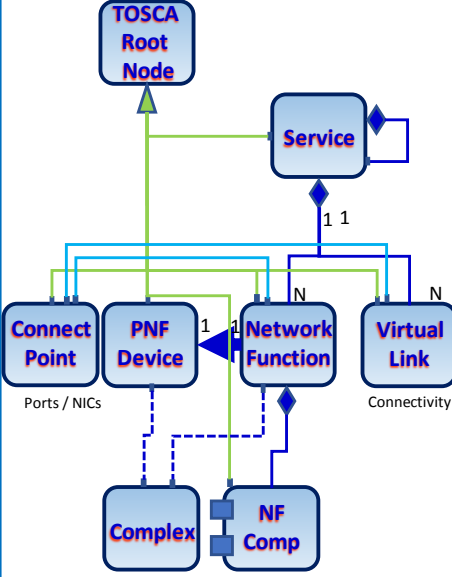

PNF Onboarding Package

 **SDC Catalog**

Platform Model 

Design Time 


Service Designer 




The diagram illustrates the relationships between various components in the design time phase. A **TOSCA Root Node** is connected to a **Service**. The **Service** is associated with **Connect Point** (Ports / NICs), **PNF Device**, **Network Function**, and **Virtual Link** (Connectivity). The **PNF Device** is associated with **Complex** and **NF Comp**. The **Network Function** is associated with **NF Comp**. The **Service** has a 1:1 relationship with **Network Function**. The **PNF Device** has a 1:1 relationship with **Network Function**. The **Network Function** has an N:1 relationship with **Virtual Link**. The **Connect Point** has an N:1 relationship with **Network Function**.

NF Instance 

Run Time 

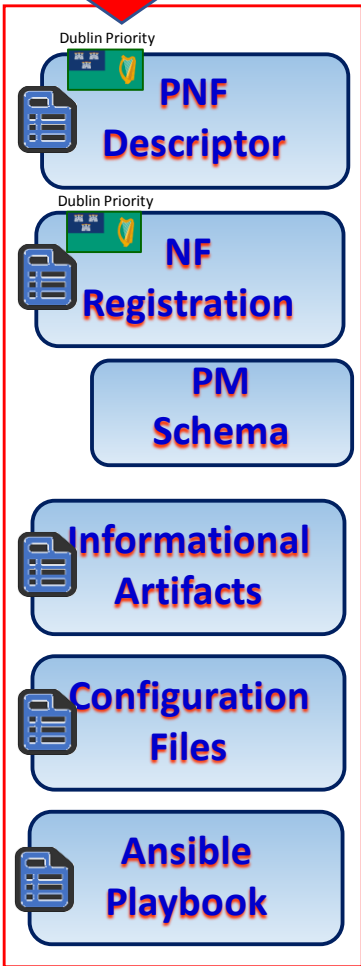
Operations 

 **A&AI**

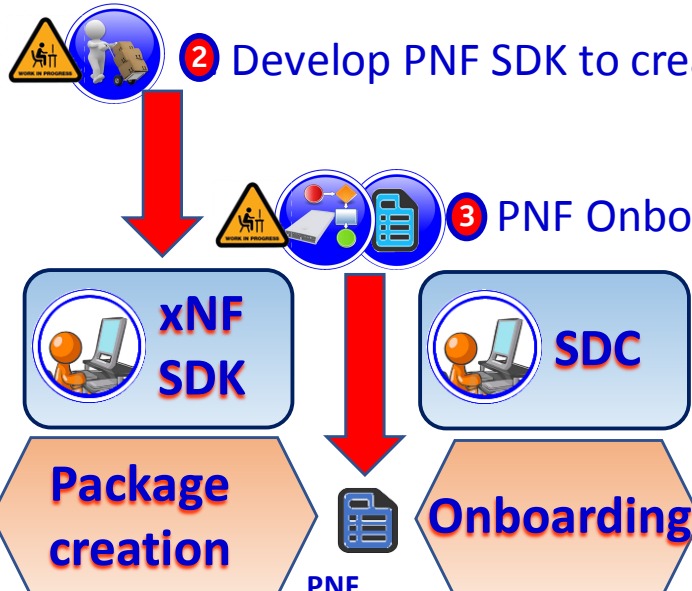
PNF Instance

PNF ONBOARDING DUBLIN ACTIVITIES

1 Create PNF artifacts (PNF descriptor, NF Registration)

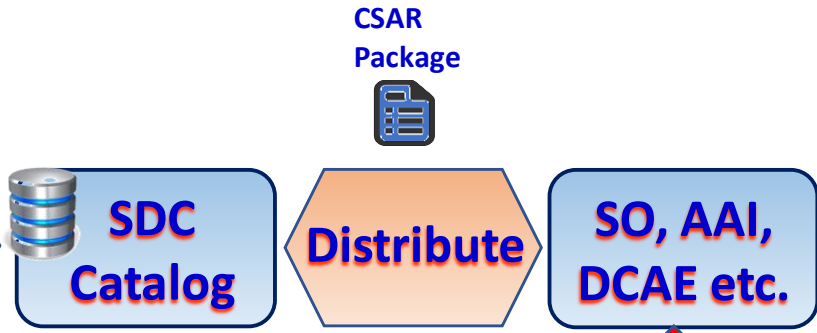


2 Develop PNF SDK to create PNF Onboarding Package



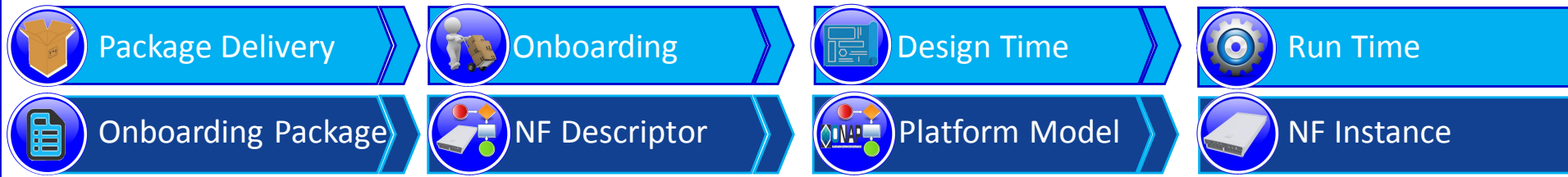
3 PNF Onboarding package created

PNF Onboarding Package +VENDOR META DATA



4 SDC: NF OB Package > SDC catalog




5 ONAP RT Components Ingest and use CSAR package



PNF PACKAGE CREATION



Benjamin Cheung, PhD

| | |
|--------------------|---|
| Onboarding Package |  |
| Onboarding |  |
| Vendor |  |

PNF ONBOARDING PACKAGE



Dublin Priority

PNF-D

**NF
Descriptor**

Dublin Priority

VES Event
Registration
Specification

**NF
Registration**

PM Schema

**PM
Schema**

Manuals, Help files
CuDo Products

**Informational
Artifacts**

Configuration Info

**Configuration
Files**

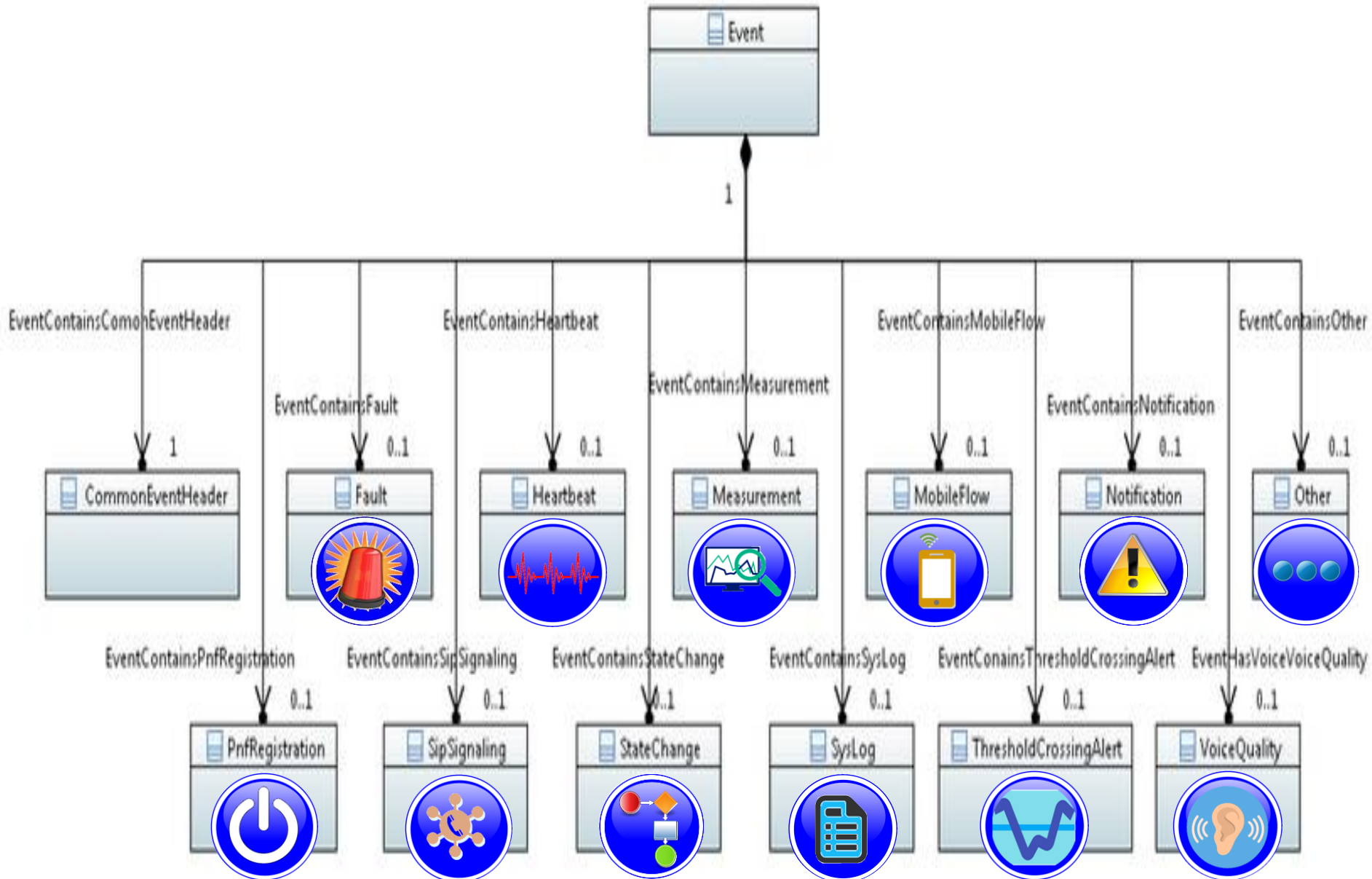
Ansible Playbooks

**Ansible
Playbooks**



Onboarding Package

R4: Modelling VES Events



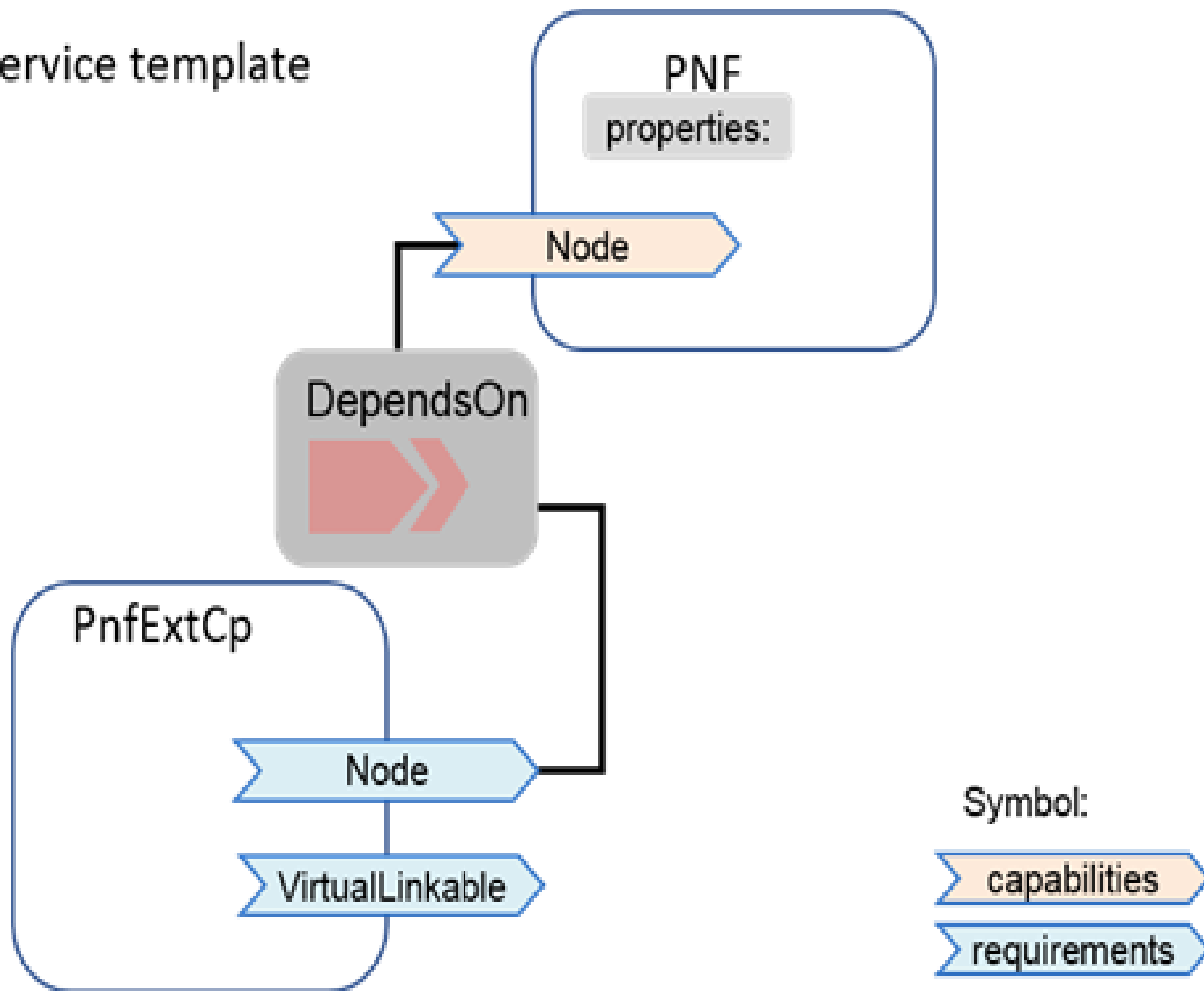
NF Registration (YAML) Onboarding



PNF Descriptor (ETSI SOL 001)



PNFD service template



NF ONBOARDING ARTIFACTS



DEPLOYMENT ARTIFACT

The screenshot shows the ONAP interface with the 'Deployment Artifact' menu open. The menu lists various artifact types, with 'DCAE_POLICY' highlighted. A dialog box is also visible, showing a 'Browse' button and a 'Description' field.

Deployment Artifact Menu:

- Choose Type
- YANG_XML
- VNF_CATALOG
- VF_LICENSE
- VENDOR_LICENSE
- MODEL_INVENTORY_PROFILE
- MODEL_QUERY_SPEC
- LIFECYCLE_OPERATIONS
- VES_EVENTS
- PERFORMANCE_COUNTER
- APPC_CONFIG
- DCAE_TOSCA
- DCAE_JSON
- DCAE_POLICY**
- DCAE_DOC
- DCAE_EVENT
- OTHER
- SNMP_POLL
- SNMP_TRAP
- PLAN

Dialog Box:

- Close (X)
- Browse
- Description
- Done
- Add Another



INFORMATION ARTIFACT

- Cloud Questionnaire
- Features
- Vendor Test Scripts
- Resource Security Template
- HEAT Template (Vendor)
- Capacity Descriptive
- Other Informational Artifacts

ONBOARDING PROCESS



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NF Descriptor



Onboarding



Asset Manager



PNF SDK DEVELOPMENT



PNF-D   **NF
Descriptor**

VES Event
Registration
Specification   **NF
Registration**

PM Schema **PM
Schema**

Manuals, Help files
CuDo Products  **Informational
Artifacts**

Configuration Info  **Configuration
Files**

Ansible Playbooks  **Ansible
Playbooks**

 **xNF
SDK**

**Package
creation**

WinZIP
Validating Content



**PNF
Onboarding
Package**

SDK ENHANCEMENTS



sdsc.api.fe.simplifiedemo.onap.org:30206/sdc1/portal#/dashboard

SDC v.1.3.3-SNAPSHOT

HOME CATALOG ONBOARD DCAE-DS WORKFLOW

ACTIVE PROJECTS 4

- Check Out 4
- Check In 0

FOLLOWED PROJECTS 16

- Ready For Testing 0
- In Testing 0
- Certified 16

ADD

Import VFC

Import VSP

Import DCAE asset

Import VF

Select one of the software product component below:

| Name | Vendor | Category |
|---|-------------------------|------------------|
| 1541f87b-cf09-4597-8076 | cd18cbda-7af7-41d5-9df4 | Generic Abstract |
| VSP Description: vendor software product | | |
| VSP's Meta Data: Name: 1541f87b-cf09-4597-8076 Lifecycle: CERTIFIED Creator: Carlos Santana | | |
| UUID: c988a8d5-aaf5-481f-a33f-0aaa307e016 Version: 1.0 Modifier: Carlos Santana | | |
| 6077b558-4f67-4dc7-8cce | c94dfaad-d116-41db-8178 | Generic Abstract |
| 774350dc-b0df-48c0-bc12 | a9236f3b-9b13-45b2-a172 | Generic Abstract |
| 7ad18697-c393-4841-8599 | fcc57795-7368-4600-98d5 | Generic Abstract |
| 934d85cd-01ff-493c-bcbe | 07599e05-7cea-4a40-b978 | Generic Abstract |
| ac743abf-b235-44ef-8493 | 4cedaeca-7762-4395-adcc | Generic Abstract |
| afb1efb7-90b9-419f-9a43 | ed8e0862-e6a8-4bef-b2aa | Generic Abstract |
| e183147f-91ff-4e56-a55d | b7265786-80f5-4c39-adf5 | Generic Abstract |

Opening 1743e162775491394bcc77f62ec64d6.csar

You have chosen to open:

- 1743e162775491394bcc77f62ec64d6.csar which is csar File (43.7 KB) from blob

What should Firefox do with this file?

- Open with - Save File
- Do this automatically for files like this from now on.

OK Cancel

SDK ENHANCEMENTS



Demo1

V0.1 IN DESIGN CHECK OUT

Certify

Check

General

Information Artifact

TOSCA Artifacts

Composition

Activity Log

Properties Assignment



TOSCA Artifacts

| Name | Type | Version |
|------------------|----------------|---------|
| ↳ Tosca Model | TOSCA_CSAR | 0 |
| ↳ Tosca Template | TOSCA_TEMPLATE | 0 |

PNF ONBOARDING



PNF-D   **NF Descriptor**

VES Event Registration Specification   **NF Registration**

PM Schema **PM Schema**

Manuals, Help files
CuDo Products  **Informational Artifacts**

Configuration Info  **Configuration Files**


Ansible Playbooks  **Ansible Playbooks**

 **xNF SDK**

 **SDC**

Package creation

Onboarding

 **SDC Catalog**

WinZIP
Validating Content




 PNF Onboarding Package

+VENDOR META DATA

PLATFORM MODEL / MODELING A SERVICE



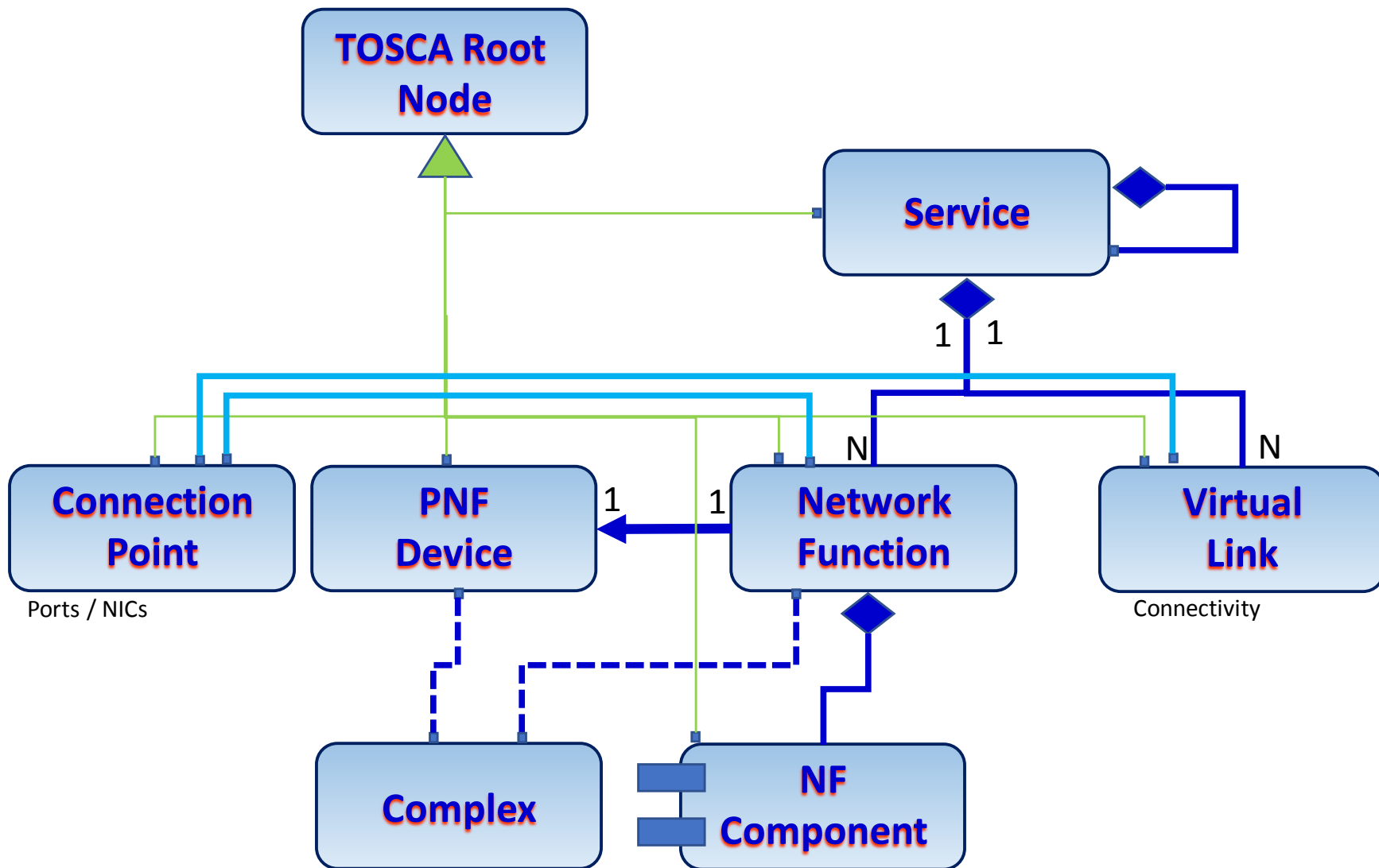
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| | |
|------------------|---|
| Platform Model |  |
| Design Time |  |
| Service Designer |  |

Platform Data Model

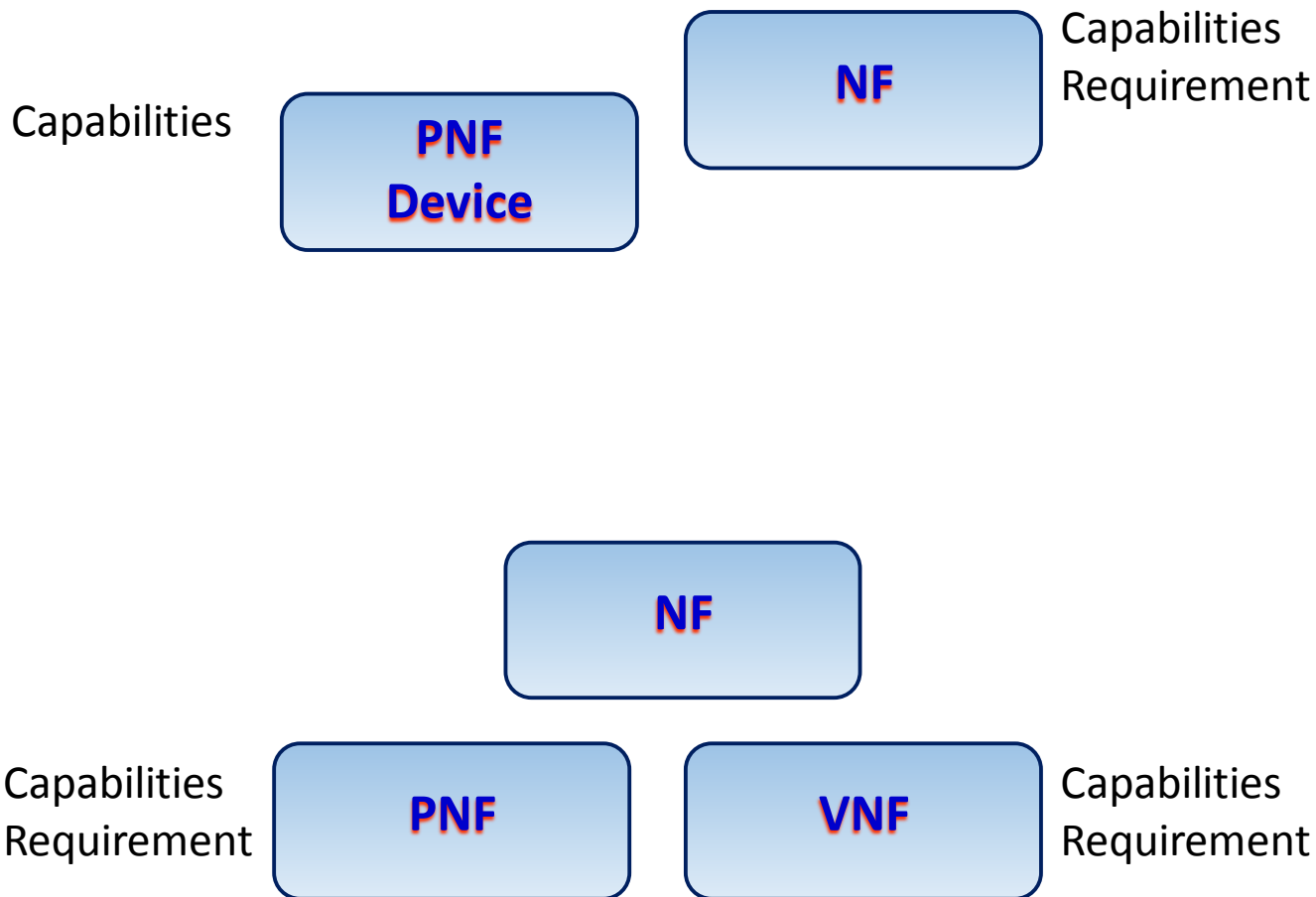


Difference PNF vs
VDU compute?
(VDU compute refactoring?)

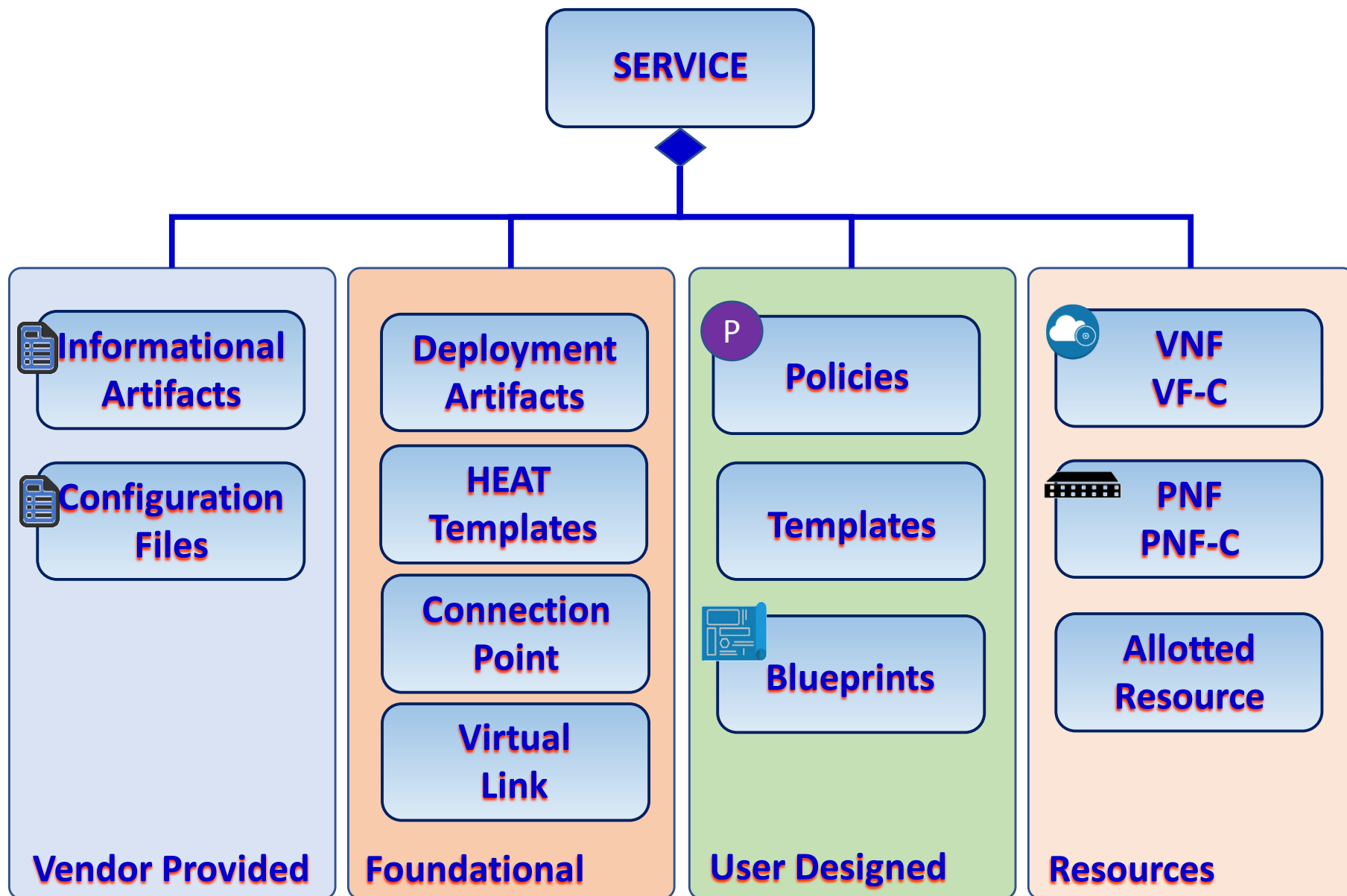


Design time view of a service
Internal representation of a model
Onboarding Model > SDC produces

Platform Information Model



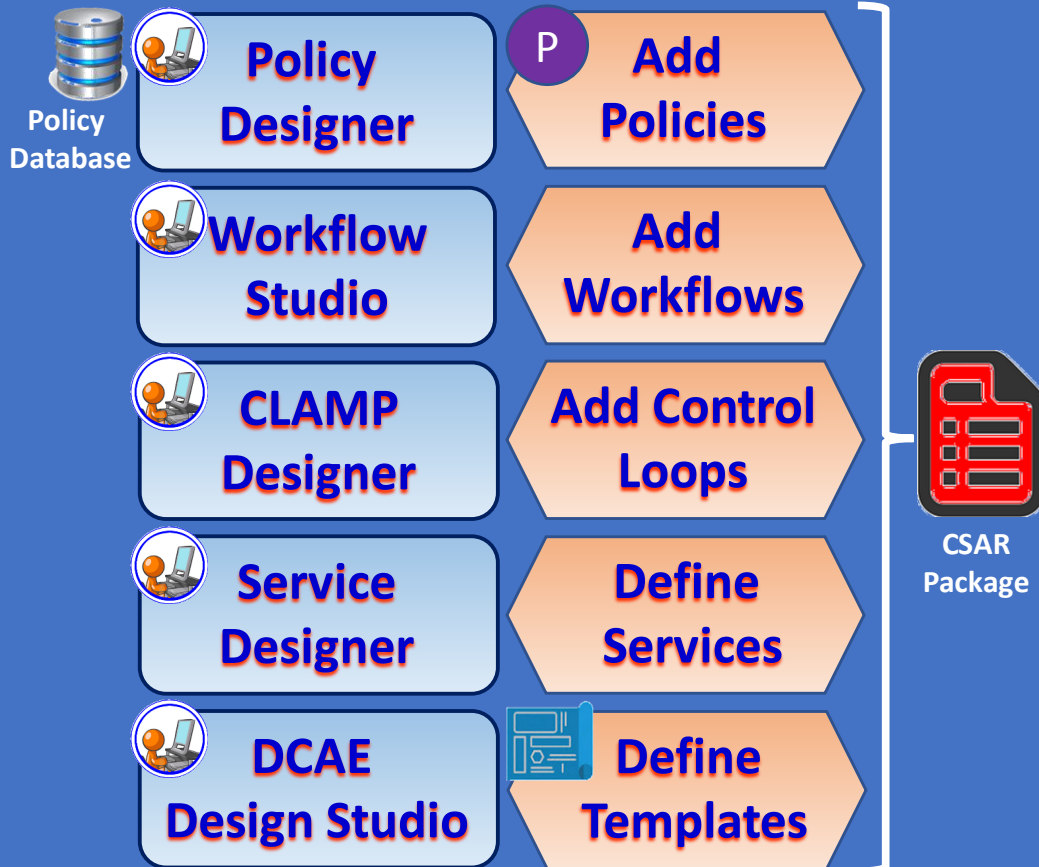
Defining a Service



Design-Time Process



DESIGN-TIME (SDC)



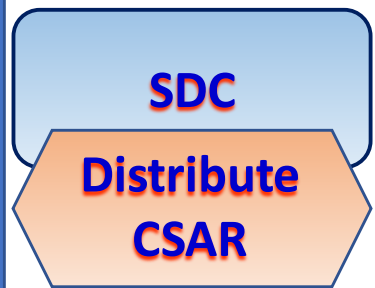
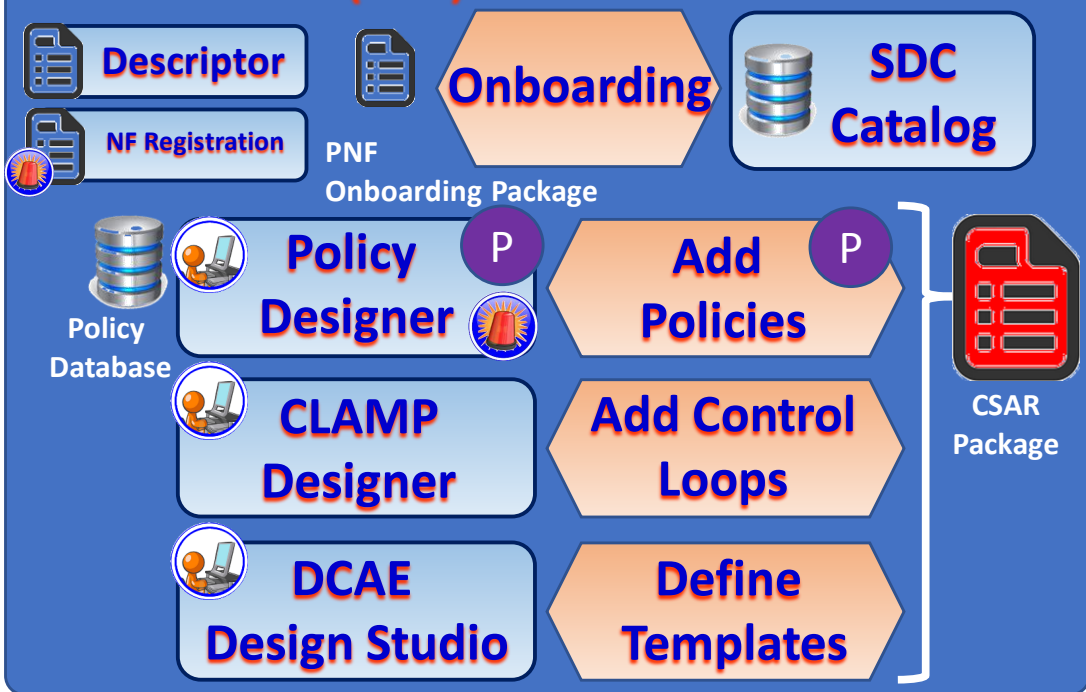
ONAP RUN-TIME



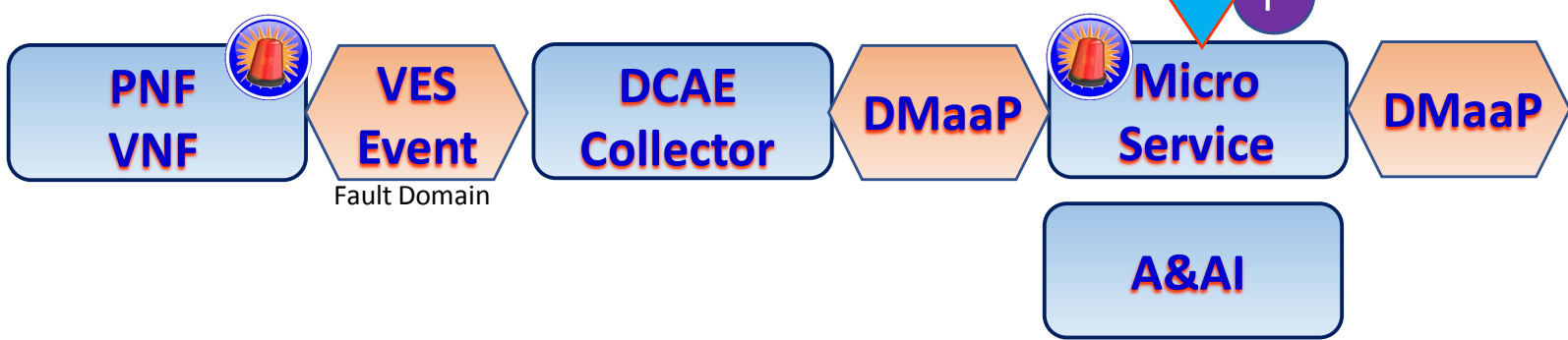
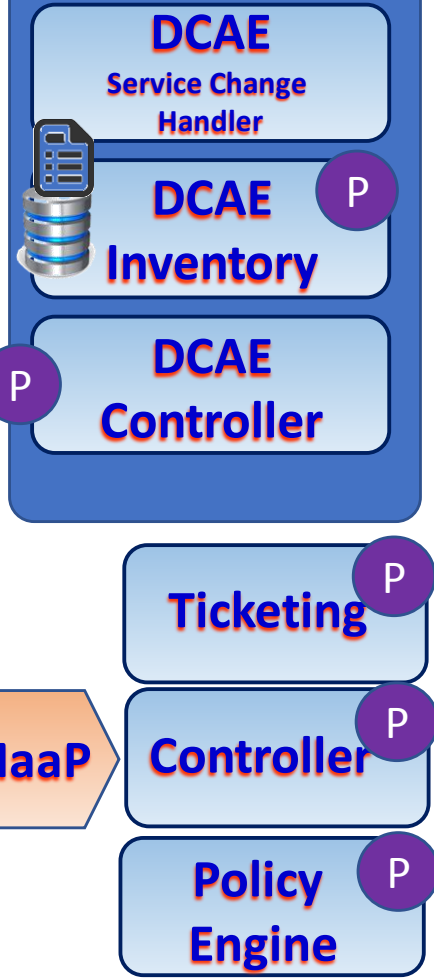
Policy Example



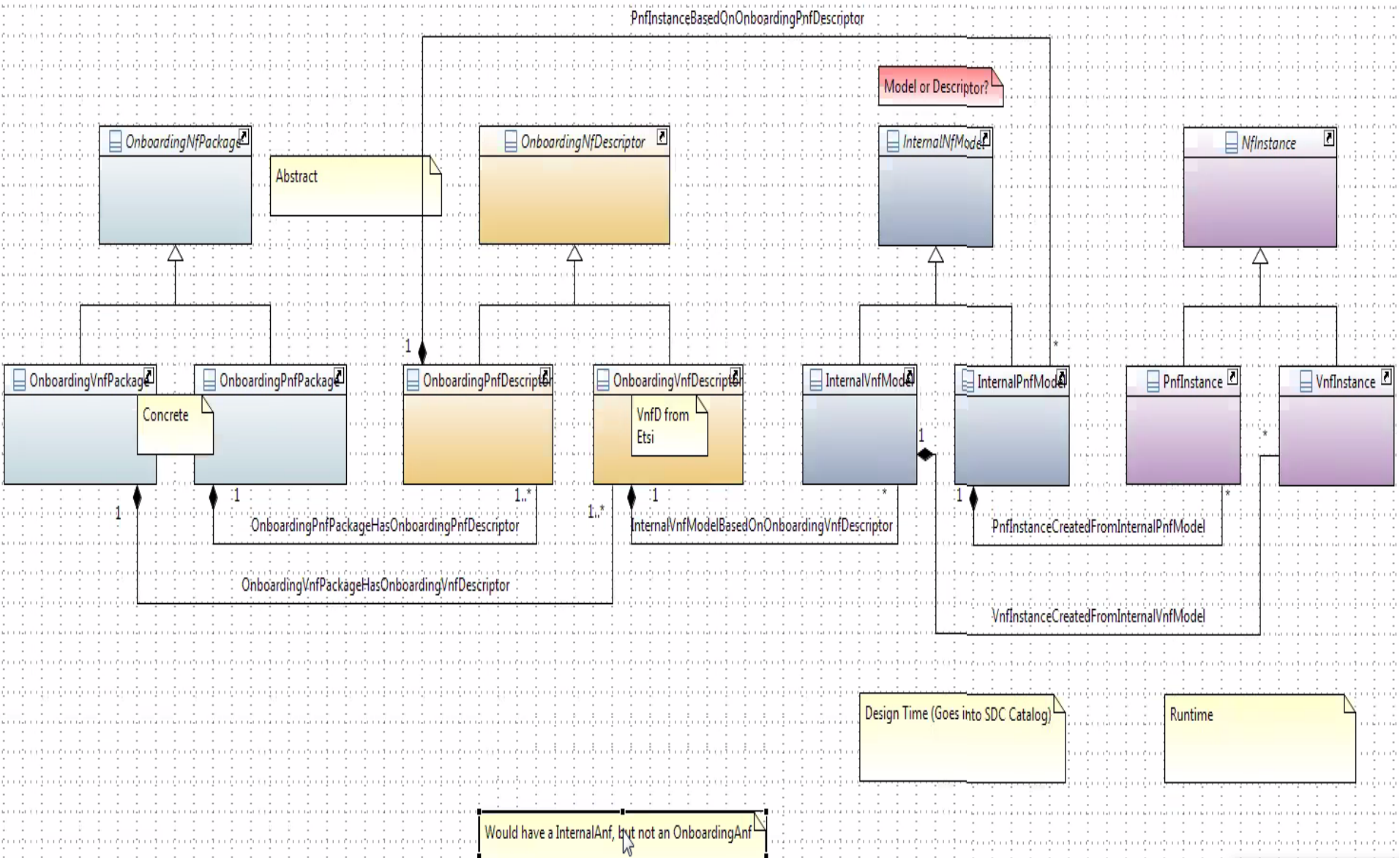
DESIGN-TIME (SDC)



DCAE (Run Time)



Onboarding and Design Time



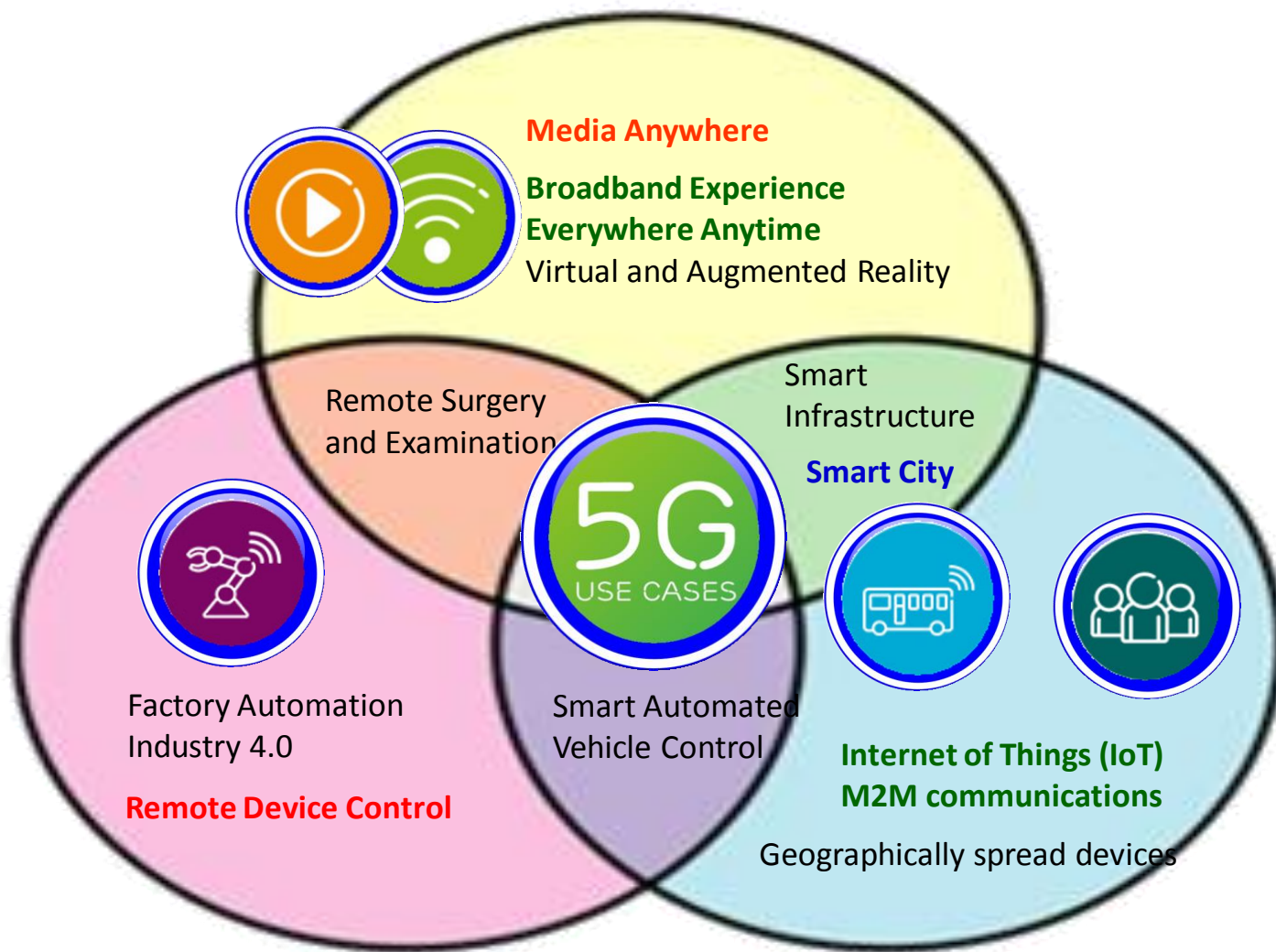
5G RAN Wireless Systems



3GPP Release 15, IMT-2020 = 5G



eMBB (enhanced Mobile Broadband)



Smart



Connected



Collaborate



Access



Interactive



Aware

URLLC (Ultra Reliable Low Latency Communications)

mMTC (massive Machine Type Communications)

5G Key Technology Components



New Spectrum (Rel 15, 52.6 GHz/39 GHz, Rel 16 > 52.6 GHz)



Advanced Beamforming



Multi-Connectivity (NSA, SA, Option 3, 4, 7)



Network Slicing



Edge Computing



Software Defined Networking (SDN)



Network Functions Virtualization (NFV)



**Fog Computing (FC)
Mobile Edge Computing (MEC)**

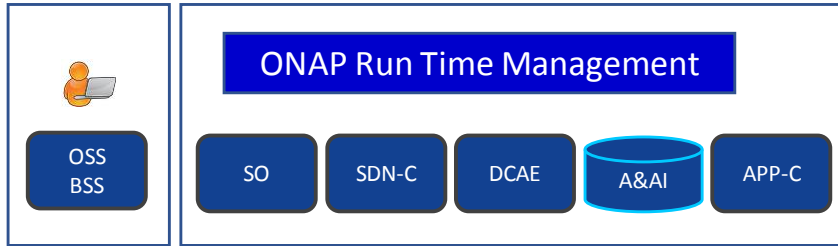


5G RAN Wireless Systems & ONAP

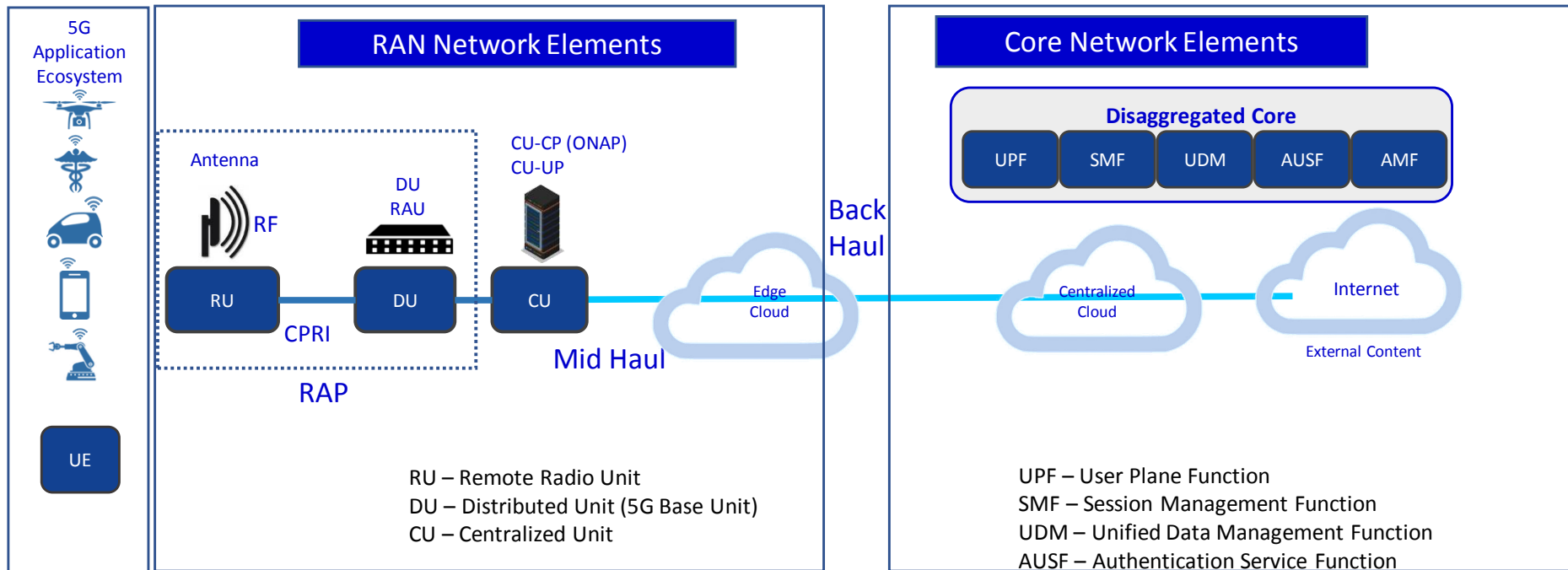


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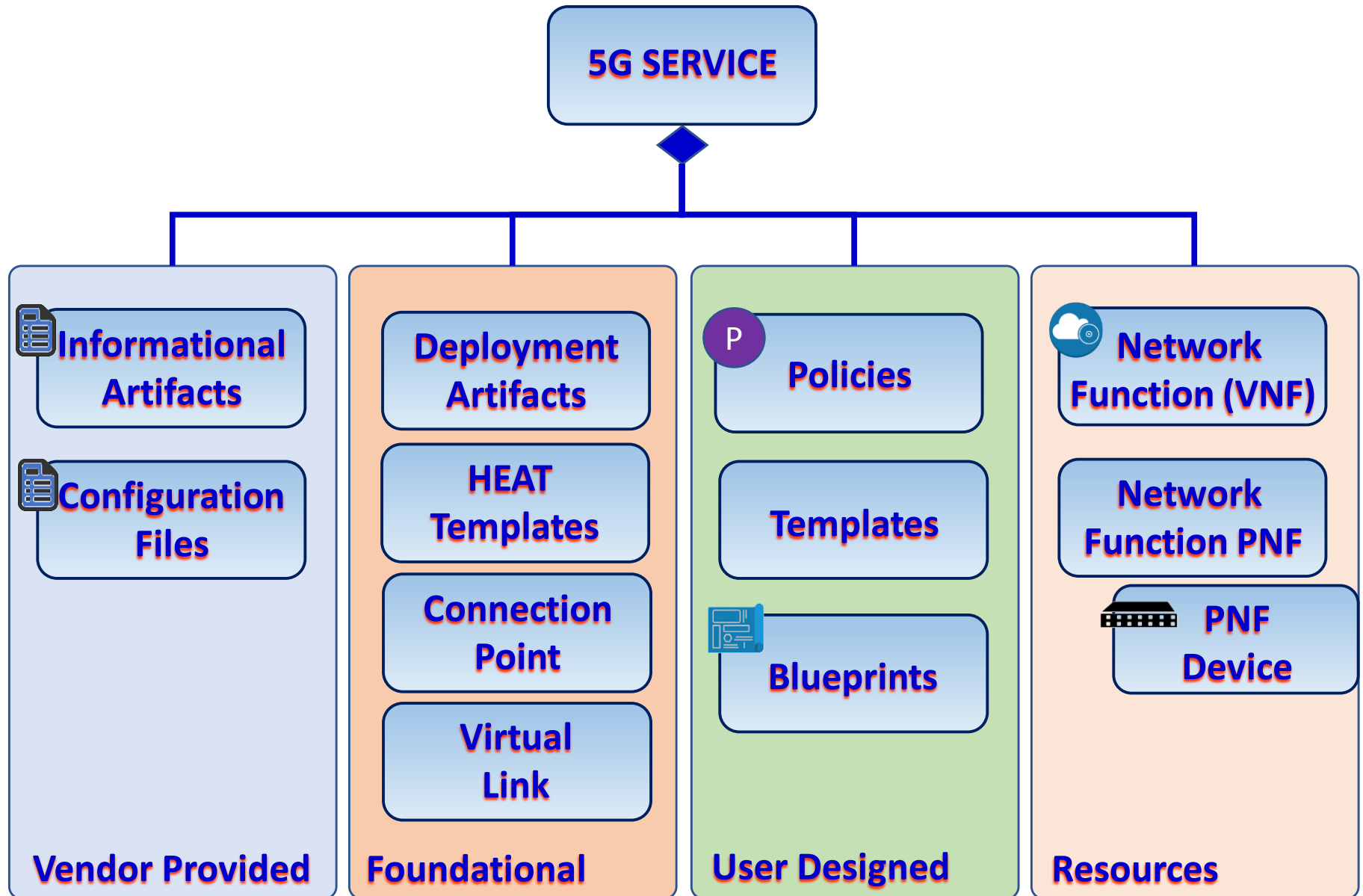
5G RAN Wireless Network



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



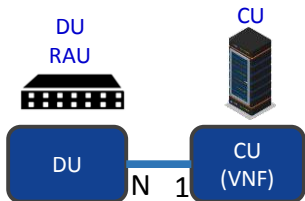
R4: Modeling a 5G Service



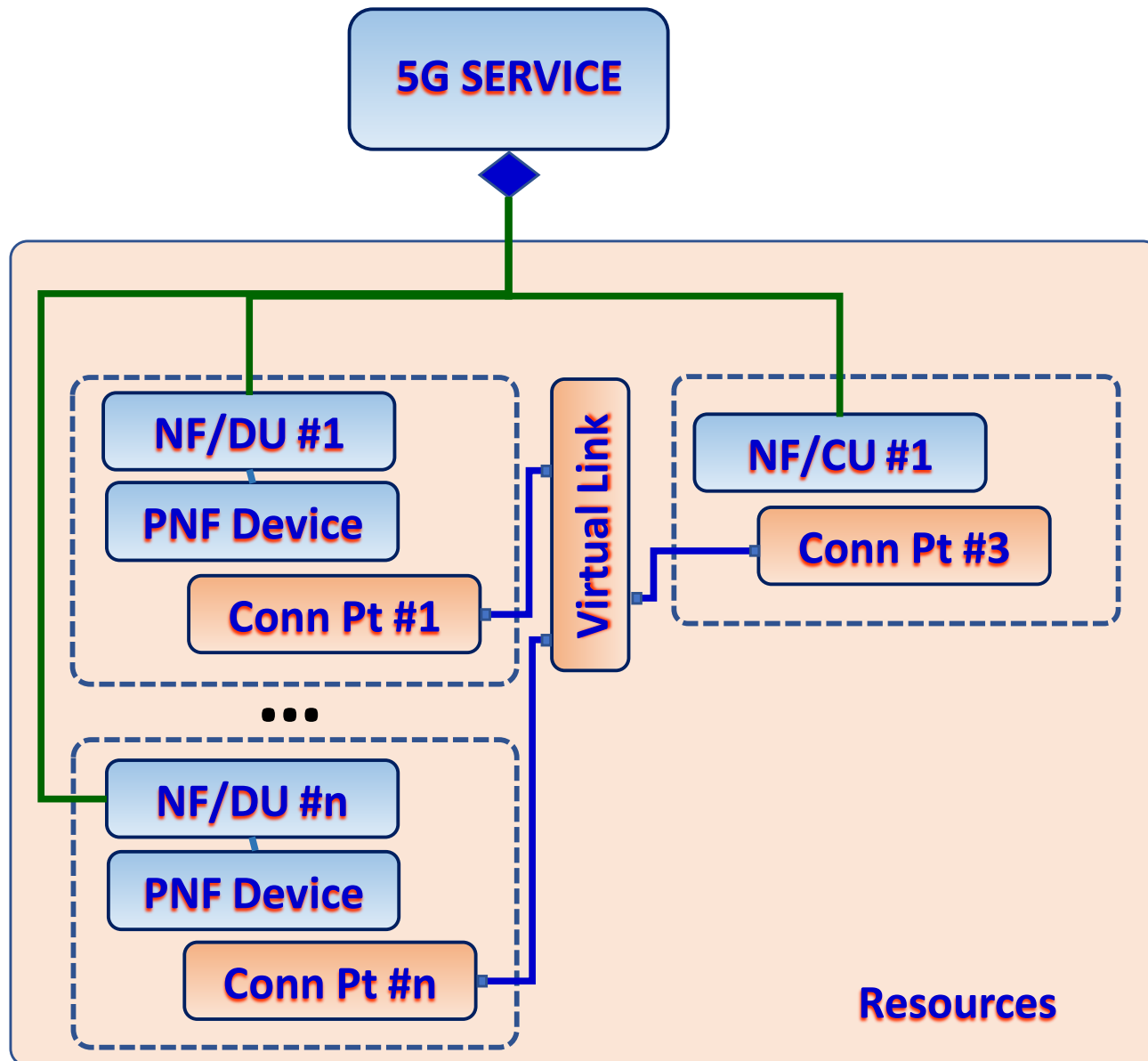
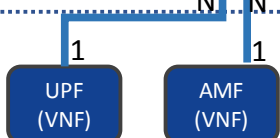
R4: 5G Base Station (gNodeB)



RAN Network Elements



Core Network Elements

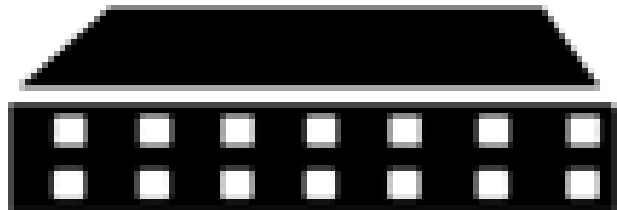


Configurations

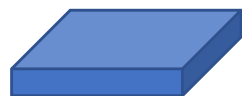


MODELING WITHIN A PNF (DU)

5G DU (PNF)



Sub-Component #1



Sub-Component #2



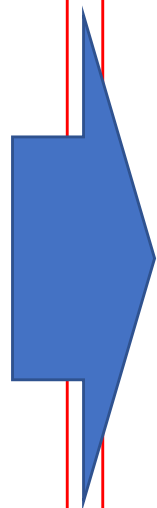
Sub-Component #n



SFP #1 = Port #1



SFP #n = Port #n



Software Function of a DU

**Network
Function**

*“Hardware
Aspects of a PNF”*

**Connection
Point**

Ports / NICs

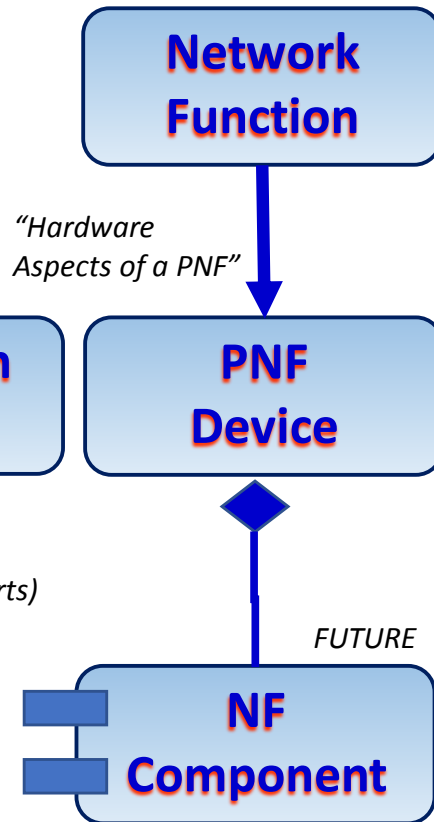
*The hardware Ports
(e.g. SFP/Backhaul Ports)*

**PNF
Device**

FUTURE

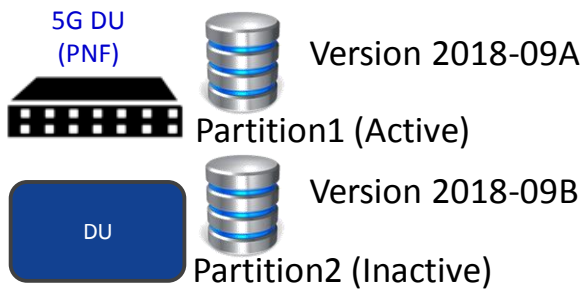
**NF
Component**

Sub-components within PNF

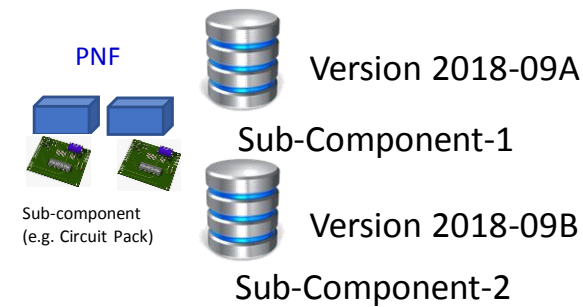


DU Configurations

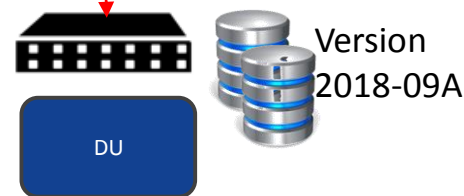
DRIVE PARTITIONS



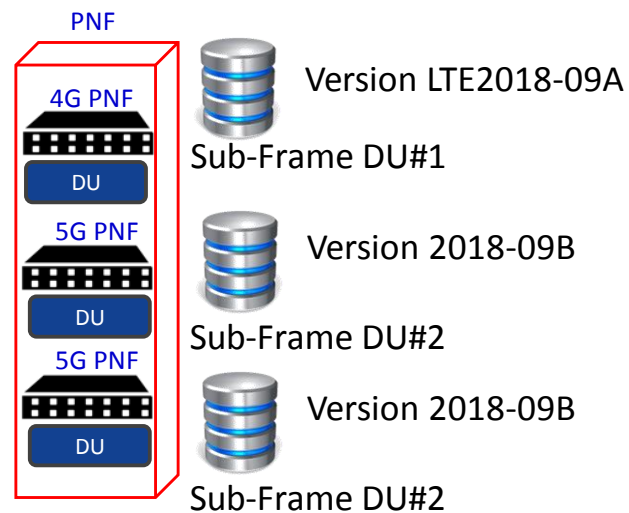
SUBCOMPONENTS (R4+)



MULTI-PNF DAISY CHAIN CONFIG



TANDEM CHASSIS CONFIGURATIONS



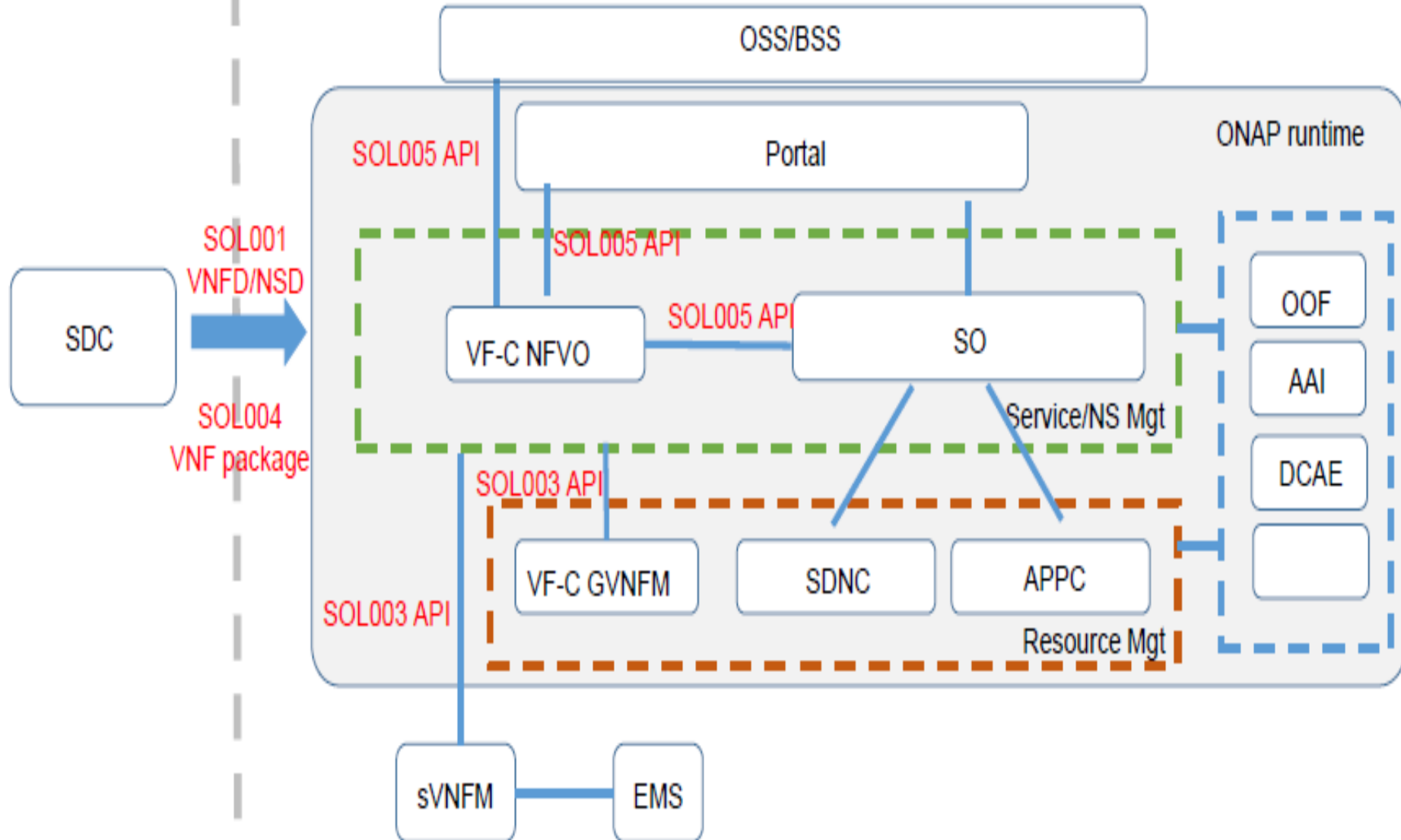
ETSI (SOL 001, SOL 004, SOL005, SOL 007)



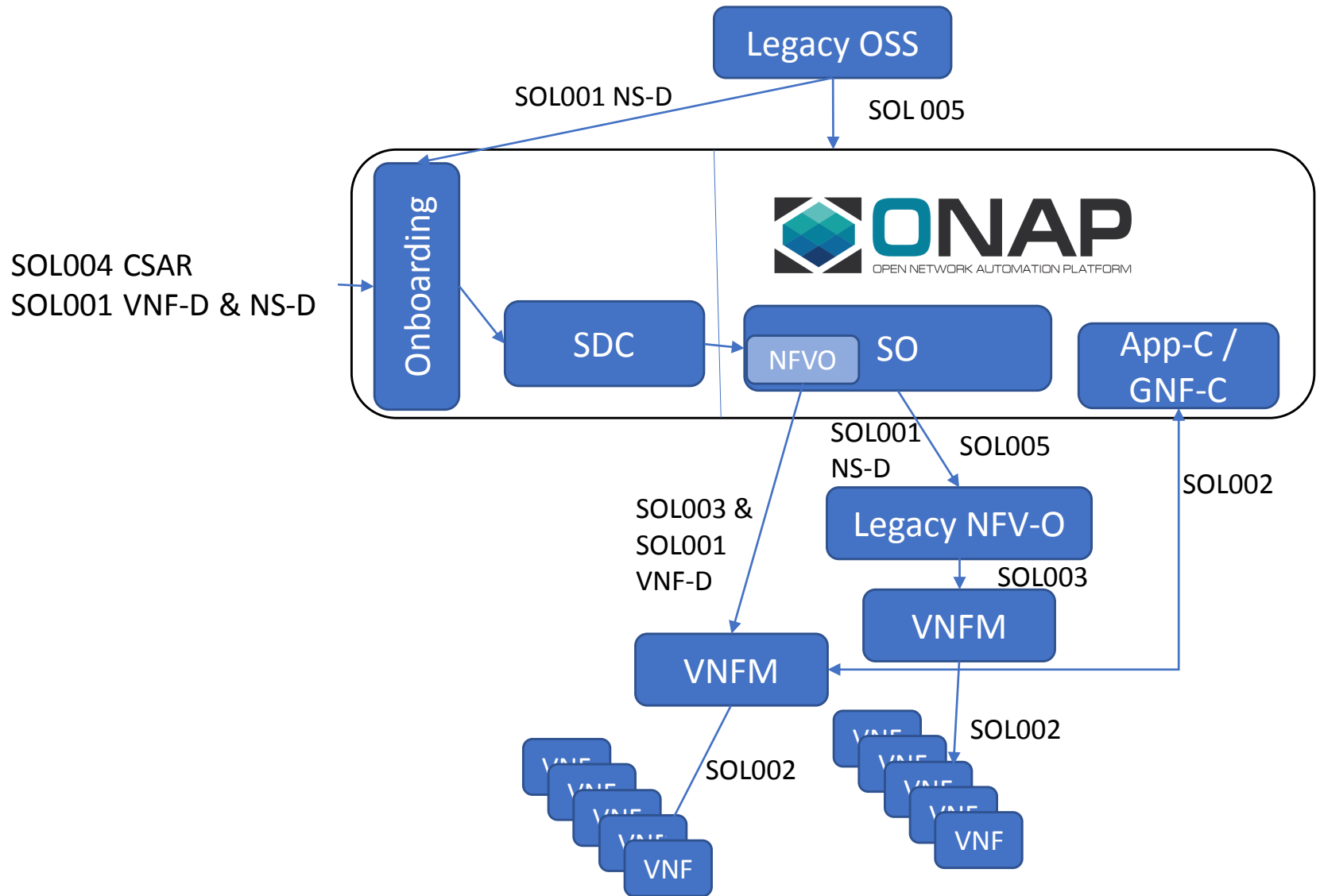
ETSI SOL Standards

Design Time

Run Time

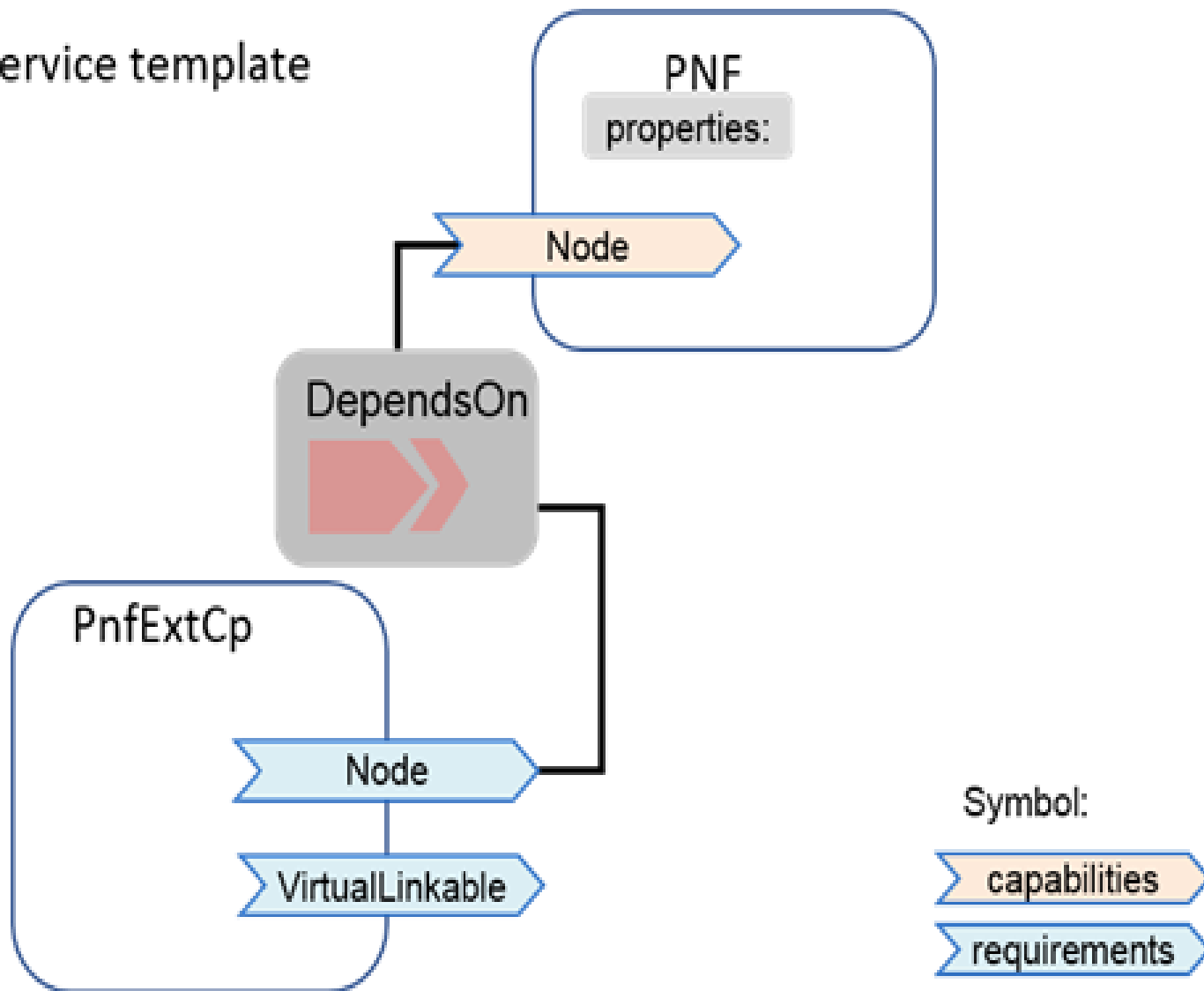


ETSI SOL Standards Alignment

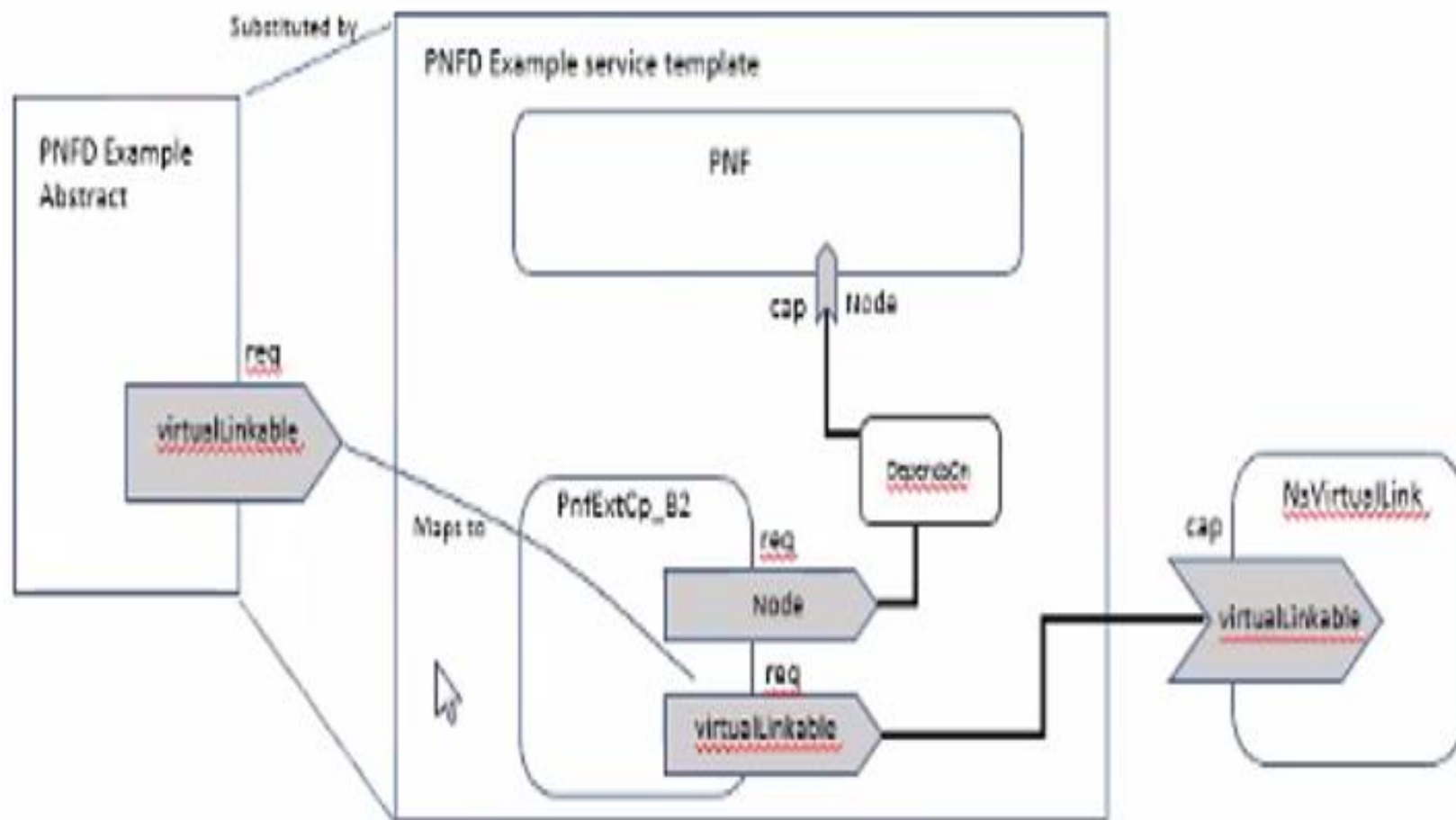


ETSI (SOL 1) PNF Descriptor Model

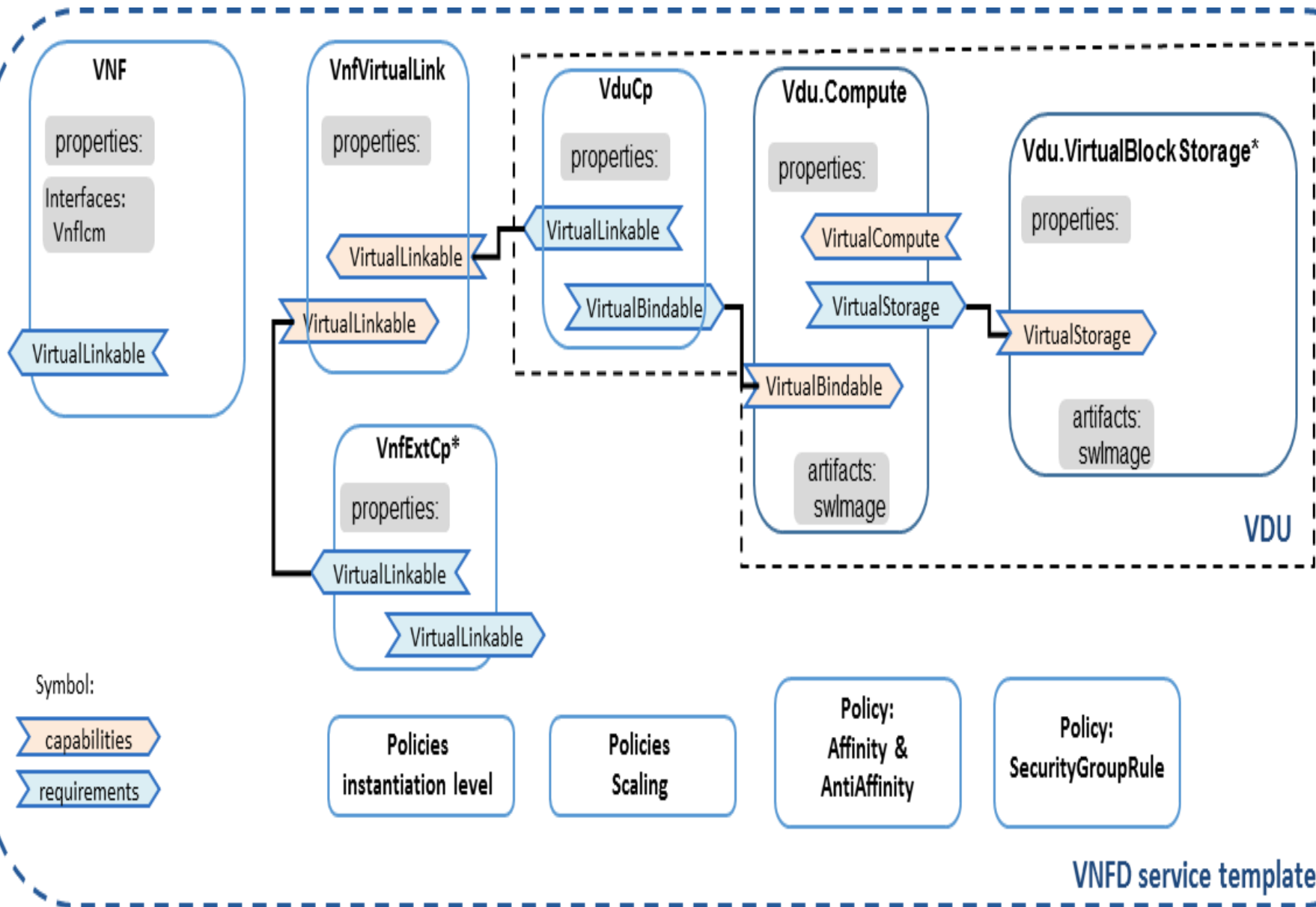
PNFD service template



ETSI (SOL 1) PNF Descriptor Model



ETSI (SOL 1) VNF Descriptor Model





REFERENCES / APPENDIX / BACKUP SLIDES

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