



Use Case Realization



- Use Case Realization

<https://wiki.onap.org/pages/viewpage.action?pageId=45298907>

[Platform Evolution for Use Case Realization w/ SO, AAI, DCAE, SDC, VID, SDNC](#)

ONAP10, Tue UTC 15:00 / China 22:00 / Eastern 10:00 / Pacific 07:00

Meeting Owner: [Benjamin Cheung](#)

Created Nov. 3, 2018

ONAP Meeting 10 is inviting you to a scheduled Zoom meeting.

Join from PC, Mac, Linux, iOS or Android: <https://zoom.us/j/723094623>

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Meeting ID: 723 094 623

International numbers available: <https://zoom.us/u/aBoSd2UTS>

There are many Use Cases (VCPE, PNF SW Upgrade, 5G Use Cases etc) that require coordination across multiple Platform components and teams.

This meeting will be focused on technical discussions for realizing and delivering Use Cases.

Sample topics would be: *Controller to NF Association, Bulk PM Mapper development, 5G gNB service creation, PNF software upgrade evolution, Model evolution to support 5G Service etc.*

DATE	U/C REALIZATION - KEY TOPICS / PRESENTATIONS
Nov 6, 2018	Defining a 5G Service, Controller to NF Association
Nov 14, 2018	ONAP Platform Data & Information Model
Nov 21, 2018	NETCONF Use Case (for R4/Dublin)
Nov 28, 2018	Enhanced Inventory Management, Golden Inventory & Configuration
Dec 5, 2018	PLUG AND PLAY Use Case (for R4/Dublin)
Dec 26, 2018	Overview of 5G Use Cases (for R4/Dublin)
Jan 2, 2019	Preparing for R4/Dublin DDF (Paris France)
Jan 16, 2019	U/C Cross-Interaction Spreadsheet, M1 Milestone, PNF S/W Upgrade
Jan 23, 2019	
Jan 30, 2019	
Feb 6, 2019	
Feb 13, 2019	
Feb 20, 2019	
Feb 27, 2019	
Mar 6, 2019	

[5G Use Case Sub Team Wiki \(Dublin\)](#)

[CCVPN Use Case Extension \(Dublin\)](#)

[Change Management Dublin Extensions](#)

[Consistent ID of a Cloud Region \(Dublin\)](#)

[Edge Automation Functional Requirements for Dublin](#)

[K8S based Cloud-region support](#)

[Scaling Use Case \(Dublin\)](#)

[SP priorities for Dublin](#)

[Use case proposal: BBS Broadband Service \(Dublin\)](#)

[5G - Bulk PM \(Casablanca carry-over items\)](#)

[5G - OOF and PCI \(Casablanca carry-over items\)](#)

[5G - PNF Plug and Play \(Casablanca carry-over items\)](#)

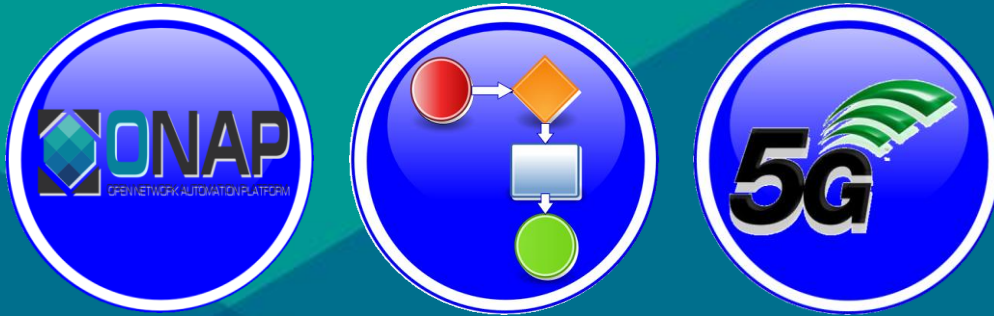
[5G - PNF SW Upgrade \(Casablanca carry-over items\)](#)

[5G - Real time PM \(Casablanca carry-over items\)](#)

[5G - Slicing](#)

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5G Pre-Onboarding & Onboarding



- Use Case Realization Call – Nov 14, 2018

Onboarding and Design Time



	Onboarding Package	Onboarding Descriptor	Platform ONAP Model	SDC CSAR Artifacts	NF Instance
WHAT	 PNF Package Artifacts (CSAR)	 PNF Descriptor Model	 Platform Information Model Platform Data Model	 CSAR (VSP, VF, Service)	 NF Discovery, Instantiation Run time Catalog
WHEN	 Package Delivery	 Pre-Onboarding	 Onboarding	 Design Time	 Run Time
WHO	Vendor 	Technology Specialist Asset Manager 	Technology Specialist Asset Manager 	Service Designer Operations Specialist 	Operations Specialist 
	SOL 001 PNFD	SOL 004 Package	SOL 004 Package	SOL 007 NFV NSD	-

Onboarding and Design Time



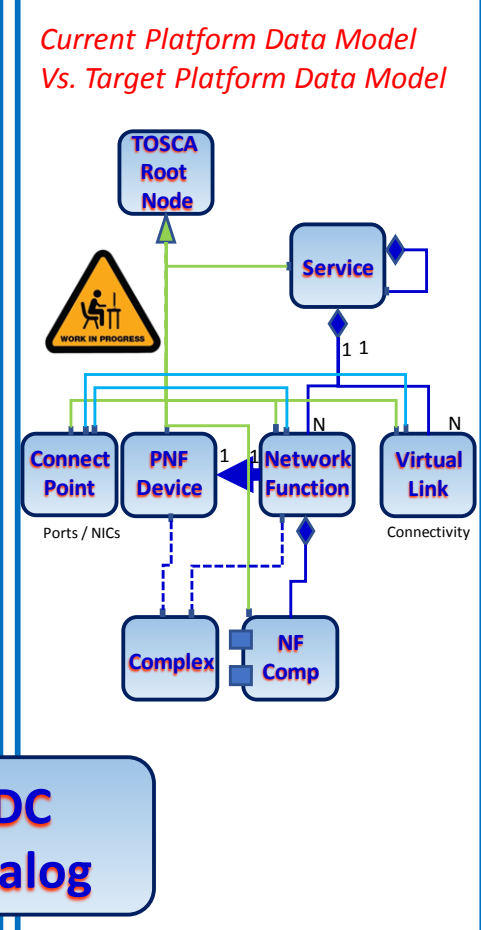
Onboarding Package	
Pre/Onboarding	
Vendor	

NF Descriptor	
Pre/Onboarding	
Asset Manager	

Platform Model	
Design Time	
Service Designer	

NF Instance	
Run Time	
Operations	

- NF Descriptor**
- NF Registration**
- PM Dictionary**
PM Schema
- Communication Files**
- Informational Artifacts**
- Configuration Files**



PNF PRE-ONBOARDING/ONBOARDING U/C OVERVIEW

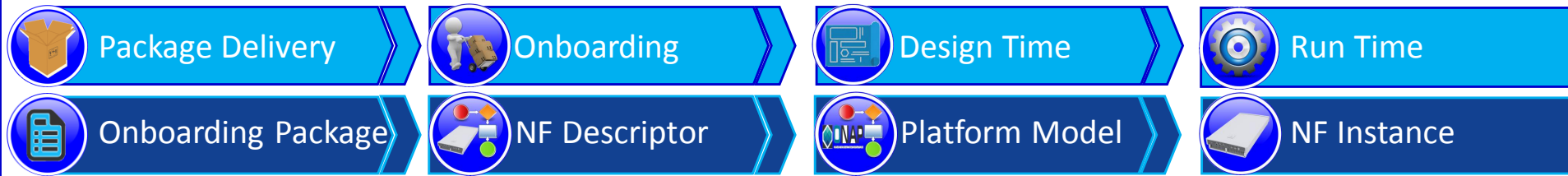
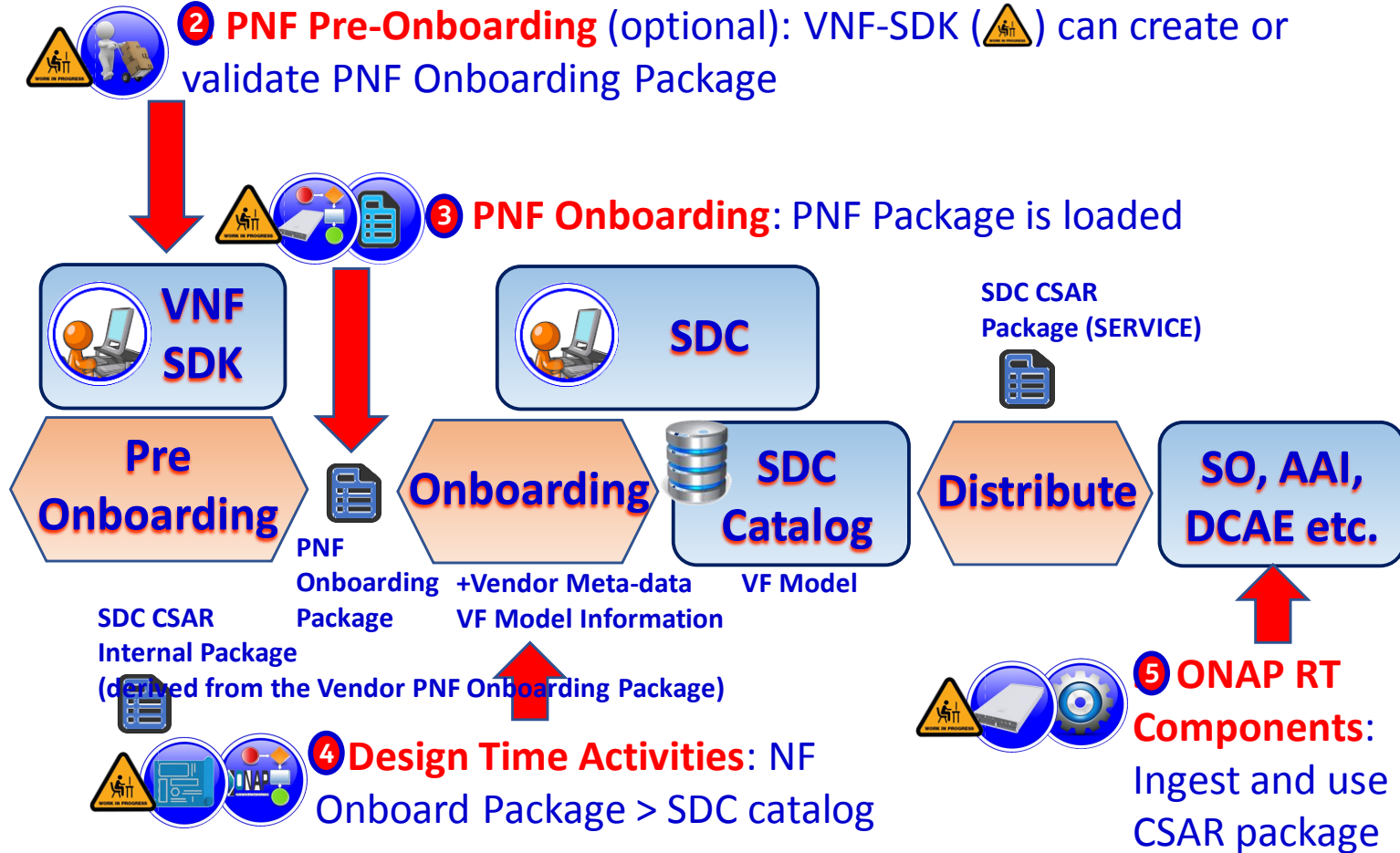
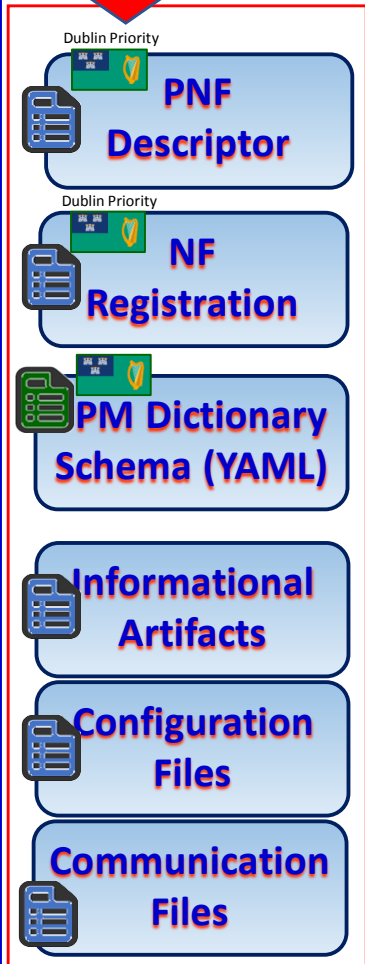
1 PNF Package Delivery: Vendor creates & delivers PNF Package with PNF artifacts

2 PNF Pre-Onboarding (optional): VNF-SDK (🚧) can create or validate PNF Onboarding Package

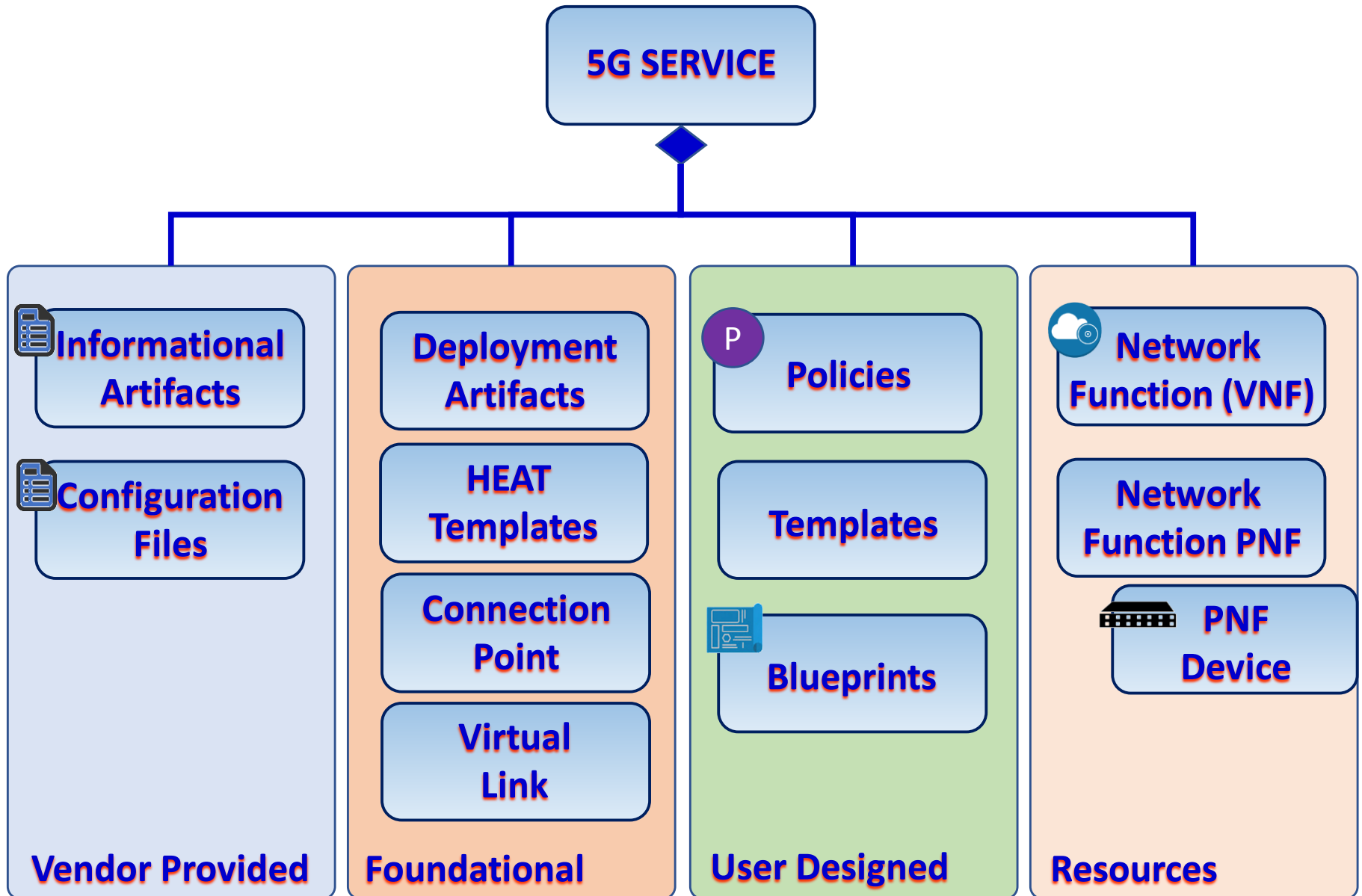
3 PNF Onboarding: PNF Package is loaded

4 Design Time Activities: NF Onboard Package > SDC catalog

5 ONAP RT Components: Ingest and use CSAR package



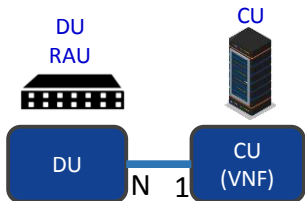
R4: Modeling a 5G Service



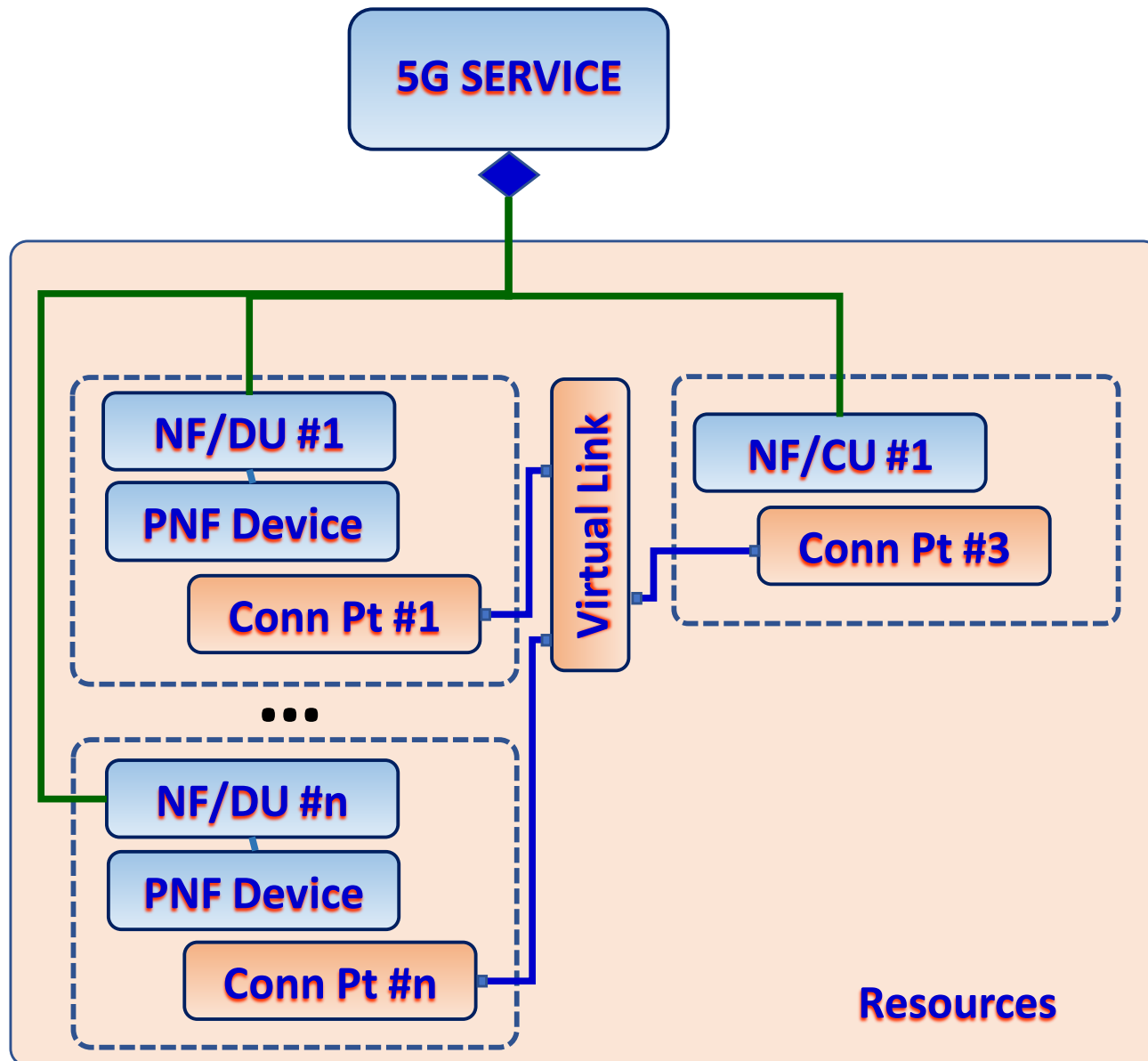
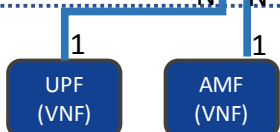
R4: 5G Base Station (gNodeB)



RAN Network Elements



Core Network Elements





CONTROLLER TO NF ASSOCIATION



Benjamin Cheung (Nokia)

TECHNOLOGY DOMAINS

ONAP Deployment

ONAP Platform Controller (Run Time)

VF-C

SDN-C
SDN-R

APP-C

[New/Future]
X controller

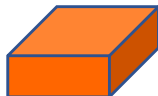
Technology Domain
(Service Provider Specified)

Wireless RAN

PNF-A



VNF-A



Optical

PNF-B



VNF-B



IoT

PNF-C



VNF-C



PROBLEM DESCRIPTION

Pictured above are three different kinds of PNFs. In orange are wireless (RAN) base stations, such as 5G DU units and their corresponding 5G VNFs. For Optical, there are SOTN PNFs for example as used in the CCVPN use case. Then pictured in green are IoT PNFs. These might include things like smart home units, smart doorbells and the like. Each of these PNFs fall into a domain category, Wireless, Optical, IoT. These categories are just example categories. There will be many other divisions. Each of these categories of PNFs & VNFs will have attending Controllers. For any service provider, (w/ a mix of different vendor NFs, they will have the same Controller)

DYNAMIC ASSOCIATION APPROACH

Tech Domain	NF (PNF/VNF)	ONAP Platform Controller	Function (API)
Wireless	E// 5G DU	SDN-C	SDN-C Generic API
Wireless	Nokia 5G DU	SDN-C	SDN-C Generic API
Wireless	Huawei 5G DU	SDN-C	SDN-C Generic API
Wireless (Vendor xyz)	Xyz 5G DU	SDN-C	SDN-C
Wireless Subdomain 1	Xyz 5G DU	VF-C	VF-C
Wireline	Wireline PNF	APP-C	APP-C Assign > APP-C Modify Config Restart Stop/Start

INSTANTIATION / ONBOARDING



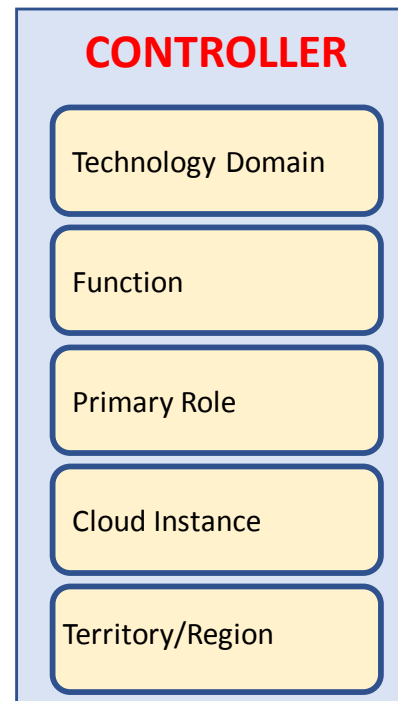
DESIGN TIME:

INSTANTIATE CONTROLLER (ONAP Installation)

WHO: Capacity/Network Planning Team (Service Provider),
ONAP Installation Team (Service Provider)

1. **EMPTY TABLE** – In ONAP Build, an Empty Table is Created with no values
2. **ONAP INSTANCE** - SP provisioning/setup of ONAP instance/installation. i.e. SO, SDN-C, APP-C configuration
3. **CONTROLLER INSTANCES** - SP Create instances of ONAP Platforms Controller (SDN-C, APP-C, VF-C)
4. **ONBOARD CONTROLLERS** - Onboard Profile Controller (tech domain, function, role, cloud instance, territory/region)
5. **CONTROLLER PART OF TABLE** - Fill in the Controller part of Table.
6. **SO** - SO spins up, **Controller Registration MSvc**, Controller spins up it uses the Controller Registration Micro-Service (CRMS).

Tech Domain	NF (PNF/VNF)	ONAP Platform Controller Instance	Function (API)



DESIGN TIME : SDC

STEP 1: DESIGN TIME

WHO: SDC Design Studio, Service Operator

INSTANTIATE CONTROLLER (Design Time)

1. **xNF-SDK** - Input to SDC TOSCA template from xNF-SDK (or manual) that specifies what the NF needs from a controller and NF properties. VNF SDK describe attribute functionalities needed within the TOSCA model those capabilities are mapped into a controller based on the table.
2. **Onboard** – Onboard xNF-D, Defining Models & Artifacts, Updating SDC Catalog
3. **CSAR** - NF information put into the SDC artifacts/CSAR Package
4. **SDC UPDATES** - (optional) SDC could also update the Controller section of the table (by specifying controller information). Tool/Script to controller information if necessary (due to typos, adaptations for congestion, migrations, new technology domains, etc).
5. **DISTRIBUTE** - SDC distributes Artifacts (CSAR) to ONAP components & listeners
6. **INGEST MODEL** - ONAP Components ingesting the model (SDC artifacts), **SO populates the table** (NF part of the table “new”, UPDATES the rest of the table from Optional updates [in step 1d.]).

STEP 2: DESIGN TIME

NF MODEL (Design Time)

NF Model ingestion/onboarding

NF part of table updated (Vendor Class of NF)

CSAR > VNF SDK

Tech Domain	NF (PNF/VNF)	ONAP Platform Controller Instance	Function (API)	NF (Type)
Wireless	E// 5G DU	SDN-C	Generic API	Technology Domain
Wireless	Nokia 5G DU	SDN-C	Generic API	Function
	Huawei 5G DU	SDN-C	Generic API	Primary Role
Wireless	Xyz 5G DU	SDN-C	SDN-C	Cloud Instance
				Territory/Region

NF PACKAGE

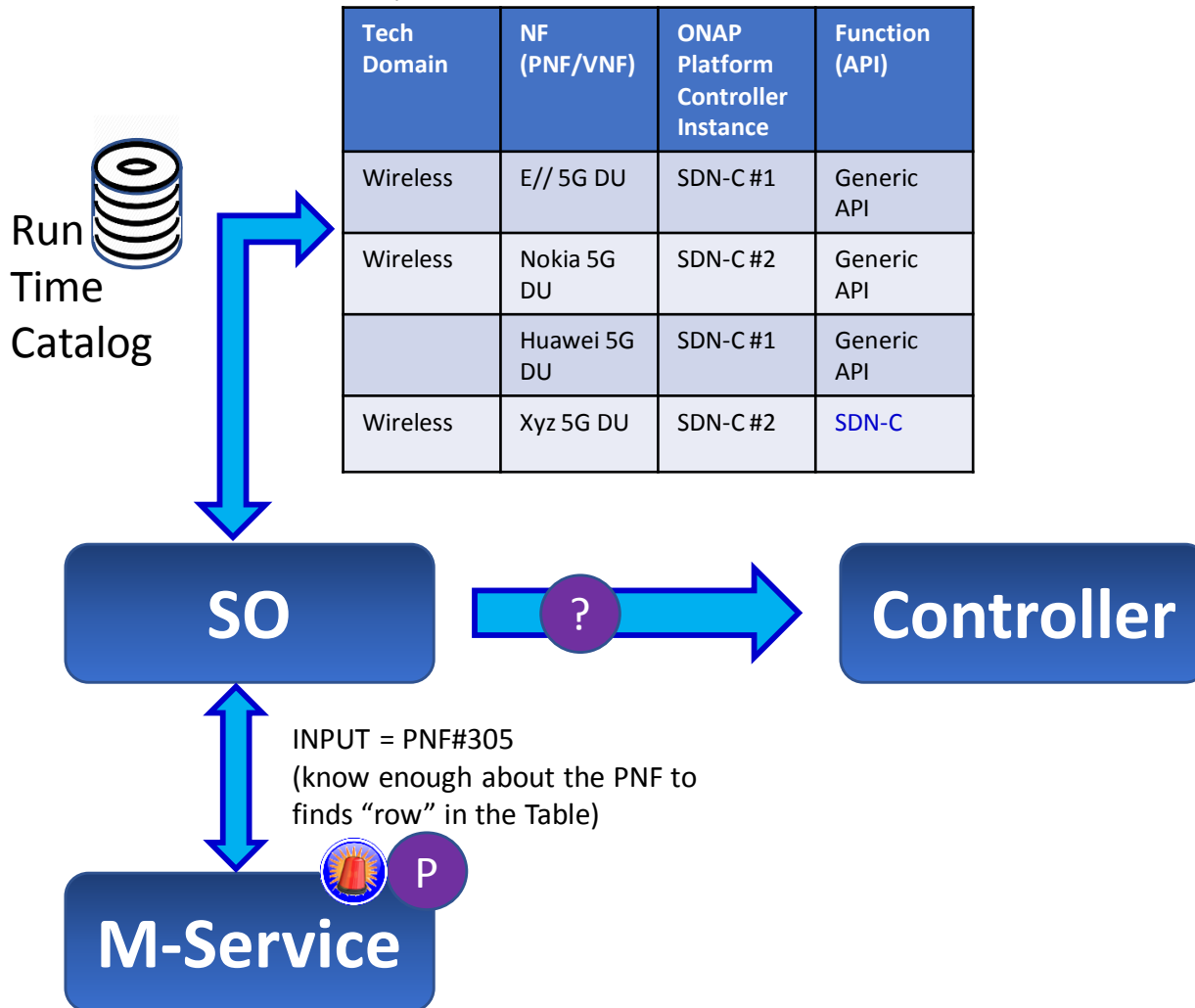
CSAR file



RUN TIME

STEP 3: (RUN TIME OPERATION)

1. **USE TABLE** - Components in ONAP (e.g. SO, policy) USE the table to find the appropriate controller & APIs for a NF.
2. **POLICY ACTION** - When policy's action require a controller look at the table. When policy's action is to consult w/ SO it knows how to talk to SO. EXAMPLE: Message from NF, executing a Use Case. e.g. Threshold > NF > DCAE > Policy > Action > SO: Controller to interact w/ NF



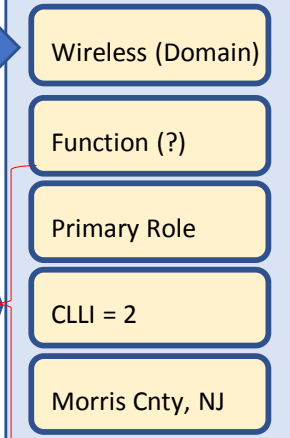
RUN TIME

Nokia PNF Model-X
Nokia PNF Region-A

Vendor →

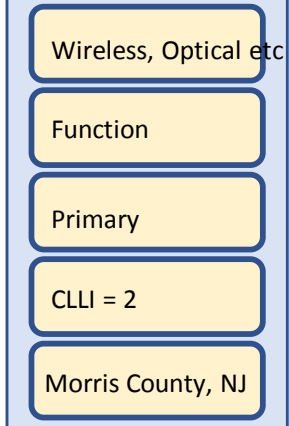
Service Provider
Network Planner →

Nokia PNF Model 1



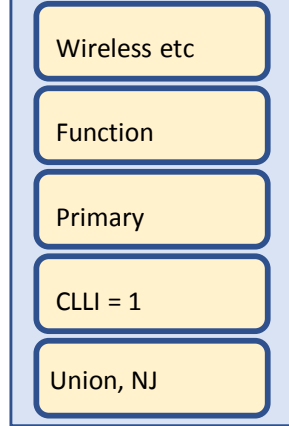
SDN-C "A"

CONTROLLER



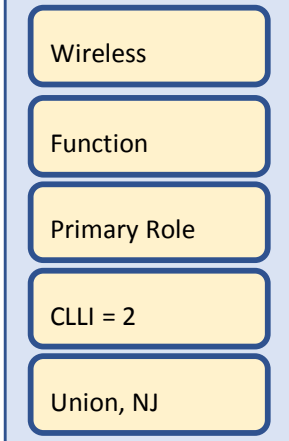
SDN-C "C"

CONTROLLER



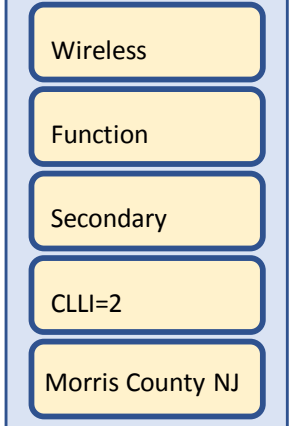
Nokia PNF Model-Y
Nokia PNF Region-B

Nokia PNF Model 1



SDN-C "B"

CONTROLLER



Tech Domain	NF (PNF/VNF)	ONAP Platform Controller Instance	Function (API)
Wireless	<p>PNF</p>	<p>CONTROLLER</p>	



<https://wiki.onap.org/display/DW/5G+-+Configuration+with+NETCONF>

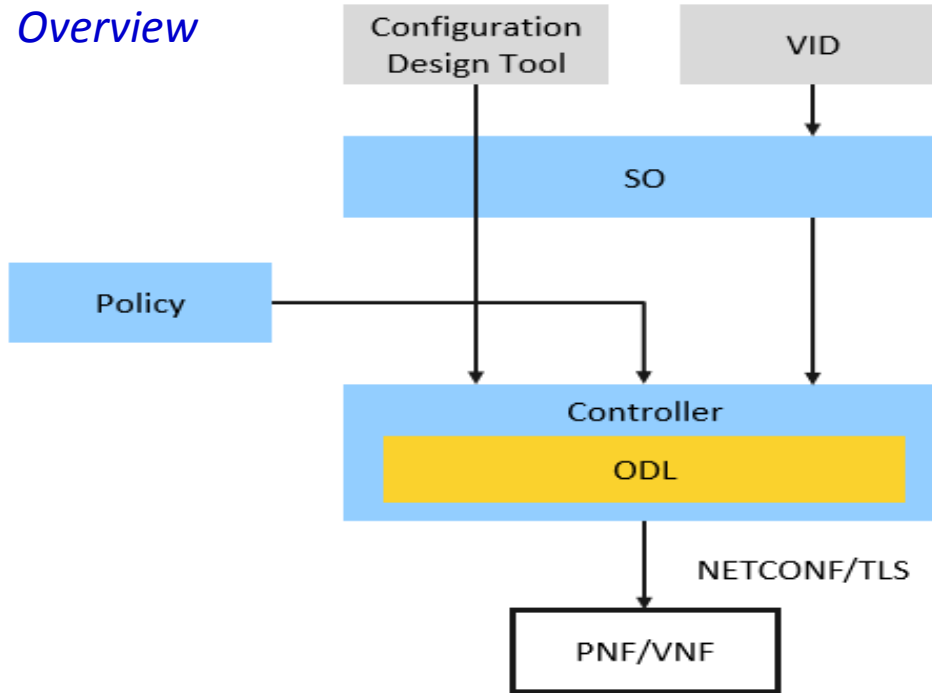
Configuration with NetConf

- Use Case Realization Call – November 21, 2018

Oskar Malm (Ericsson)

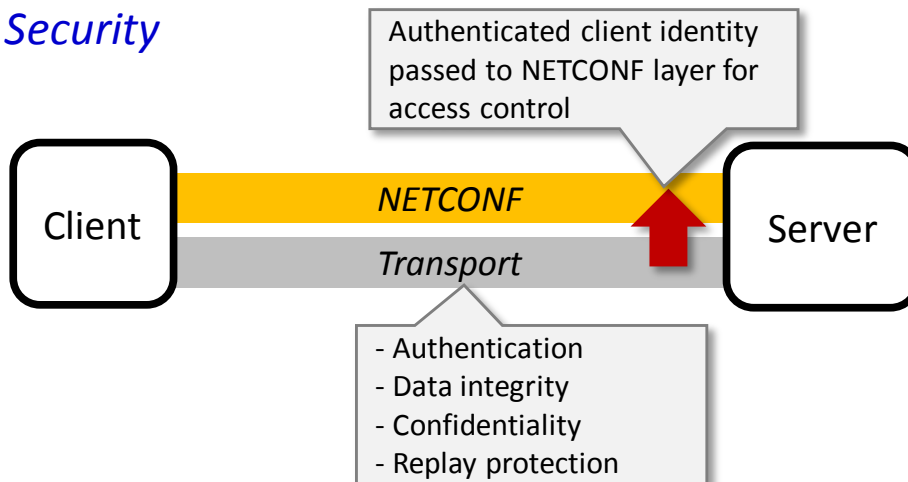
NETCONF Overview

Overview



- NETCONF (RFC6241) is an RPC-based protocol to manipulate and monitor configuration and state of network devices
- It is one of the options included in ONAP xNF requirements for configuration management
- It is expected to be used for management of PNFs and VNFs in 5G networks
 - YANG solution set has been defined by 3GPP for the 5G NRM (28.541)

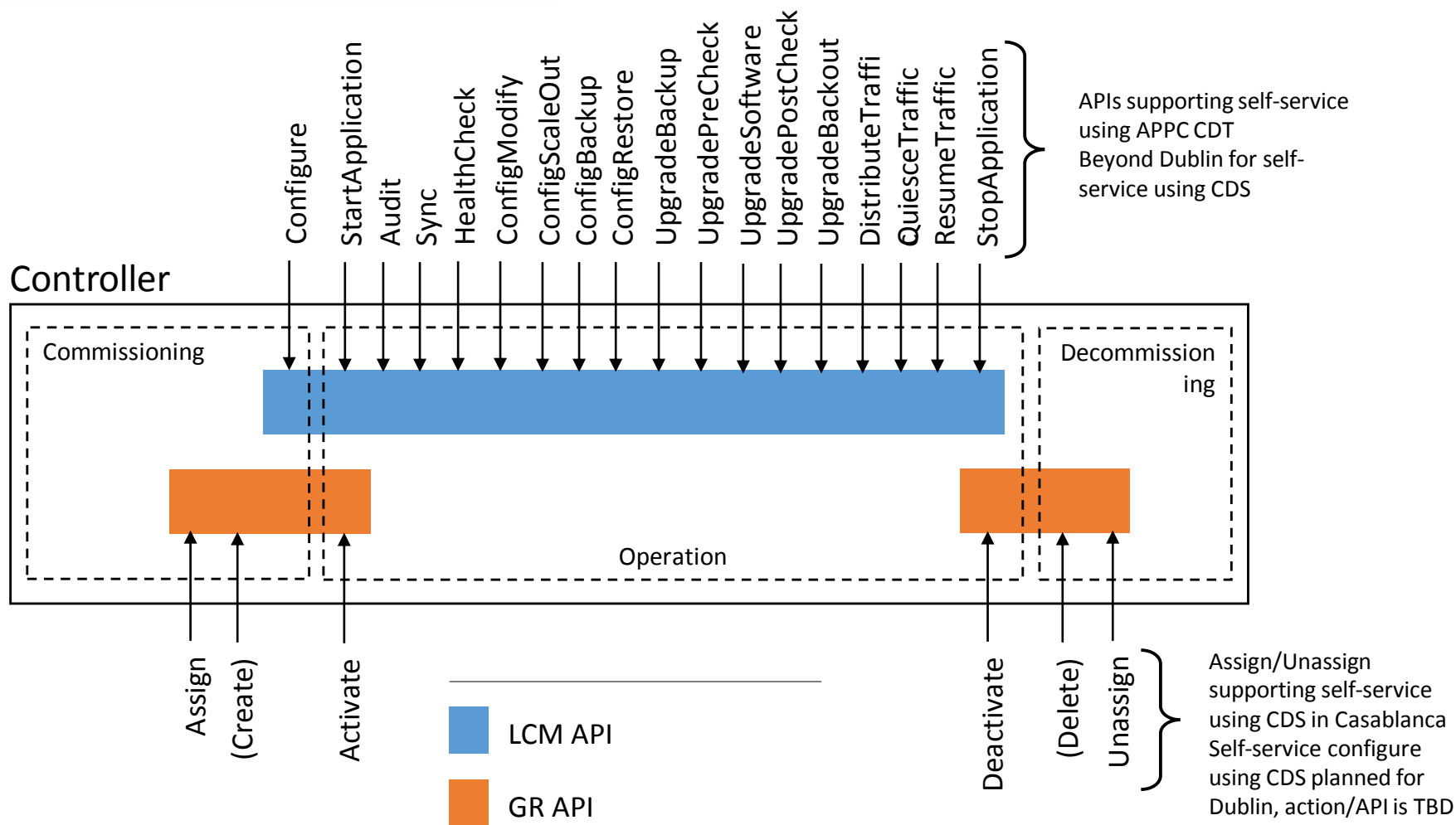
Security



- NETCONF assumes that security is provided by the chosen transport protocol
- NETCONF over SSH (RFC6242) is mandatory but other options exist
- ONAP security sub-committee has recommended NETCONF/TLS (RFC7589):
[Secure Communication to Network Functions](#)

Controller APIs (VNF level)

Most APIs would also be applicable for PNFs as well



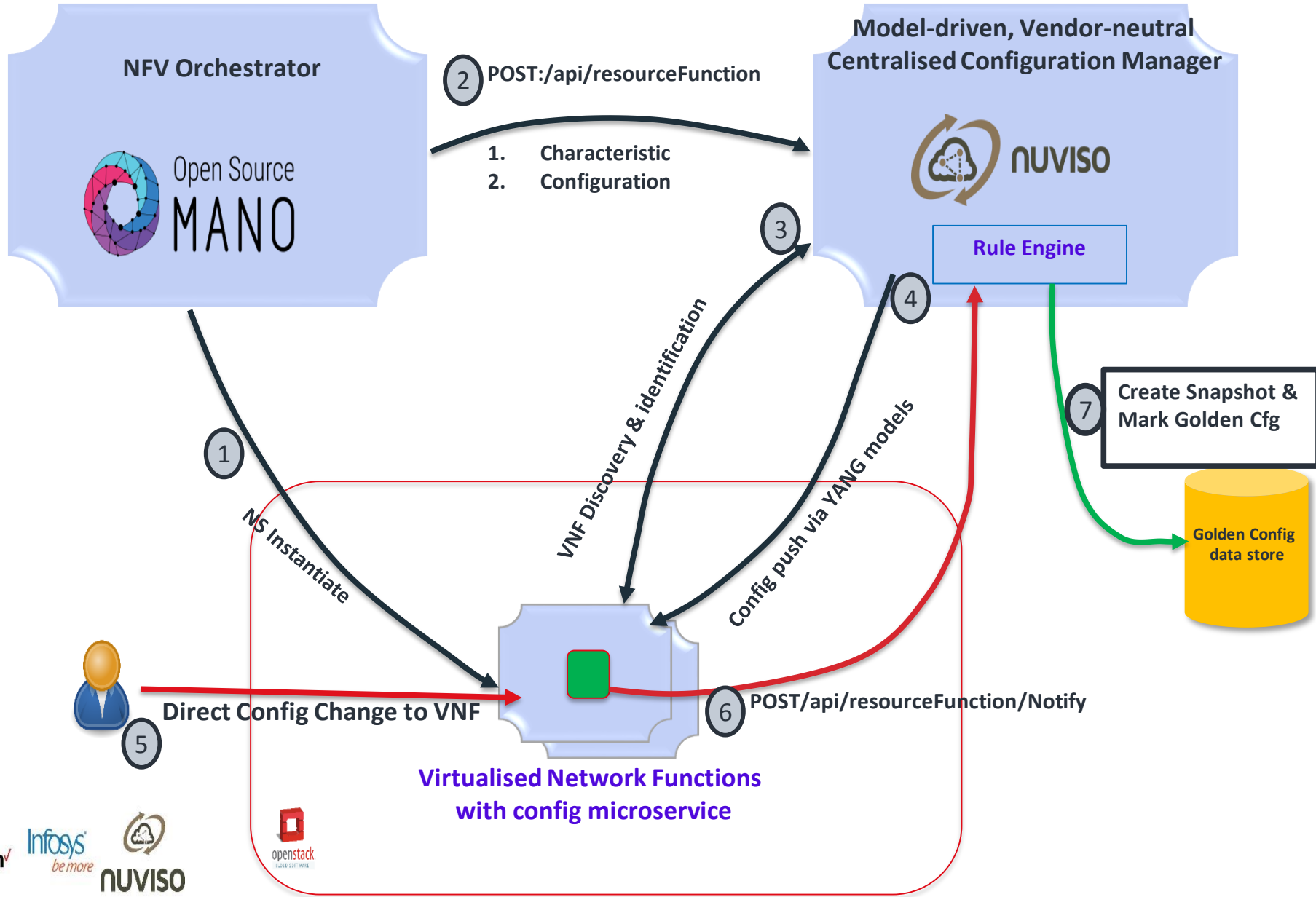


Golden Configuration for A&AI

- Use Case Realization Call – November 28, 2018

Fred Fusselin (Verizon)

Golden Configuration – Workflow



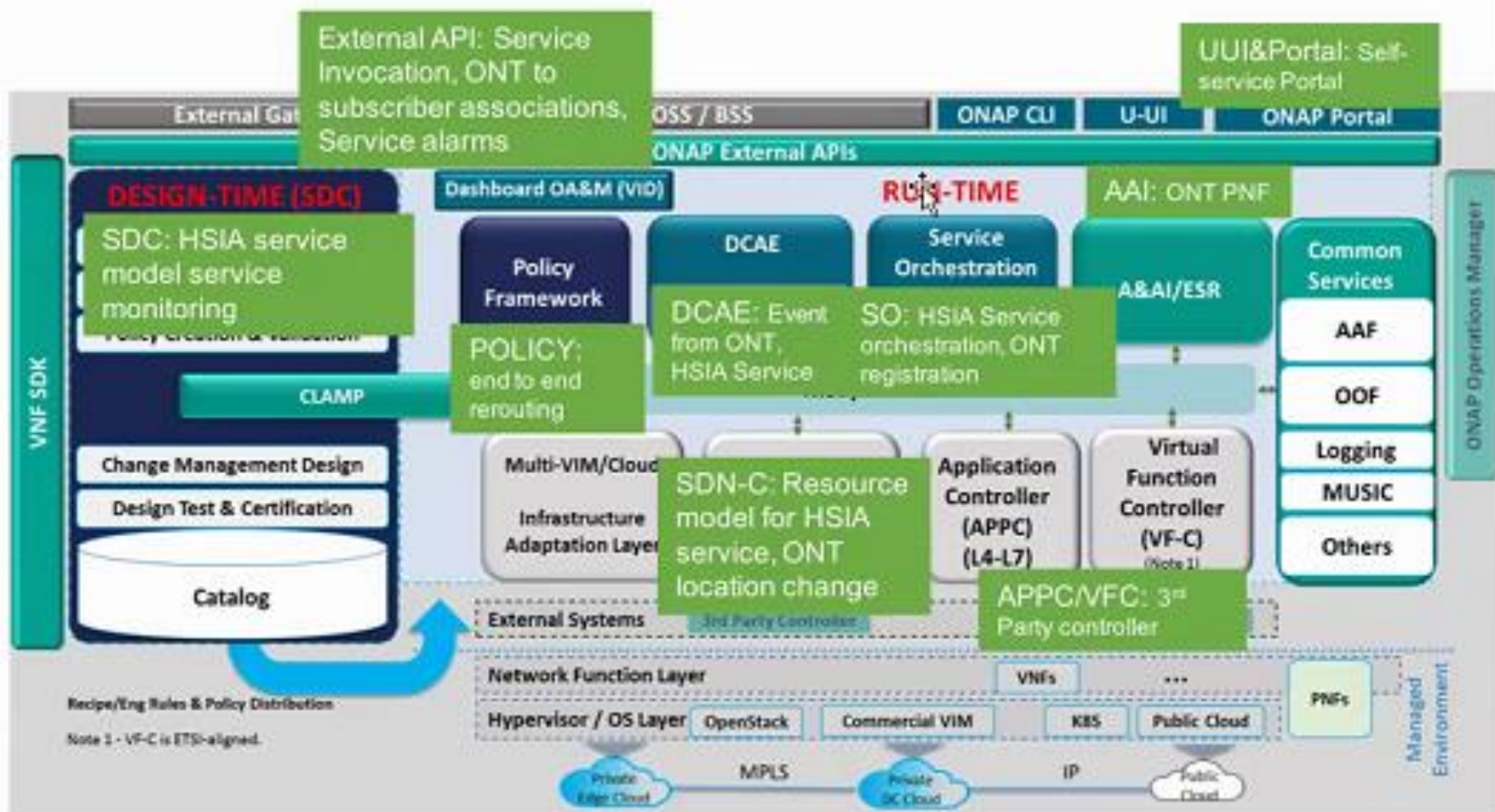


Golden Configuration for A&AI

- Use Case Realization Call – November 28, 2018

Fred Fusselin (Verizon)

ONAP Components: Impacts



5G Use Case Overview & PTL Commitments (Slide Pack Review) Preparing for R4 Dublin DDF (Paris, France)

- Use Case Realization Call – Dec 26, 2018

<https://wiki.onap.org/pages/viewpage.action?pageId=48531738>

Action items

SUPPORTING DOCUMENTS

5G U/C for R4 Dublin DDF (Paris FR) - PPTX



https://wiki.onap.org/download/attachments/48531738/5GUseCases_09Jan2019v2.pptx?version=1&modificationDate=1545840793000&api=v2

5G U/C for R4 Dublin DDF (Paris FR) - PDF



https://wiki.onap.org/download/attachments/48531738/5GUseCases_09Jan2019v2.pdf?version=1&modificationDate=1545840793000&api=v2



M1, Dublin DDF, Cross U/C Interaction, Platform Components

- Use Case Realization Call – Jan 16, 2019

Ben Cheung (Nokia)



M1 MILESTONE (Jan 17, 2019)

Planning process complete, all **Project Deliverables** are defined (including functional architecture, scope, dependencies,...)

Integration Team has defined the vendor Equipments list and the End 2 End Release Test Cases are fully defined.

The Document and Training teams have defined their plans. The packaging and installation strategy is defined.

initial impacts to VNF Requirements (**EPICs**) identified by use cases and ONAP platform component projects.

To pass the M1 milestones, all approved projects have to:

Fill out the [Release Planning Template](#)

Fill out the [Deliverables for Planning Milestone Checklist Template](#)

Post these 2 project deliverables in wiki.

USE CASE INTERACTION SPREADSHEET

Available at:

<https://wiki.onap.org/pages/viewpage.action?pageId=50203585>

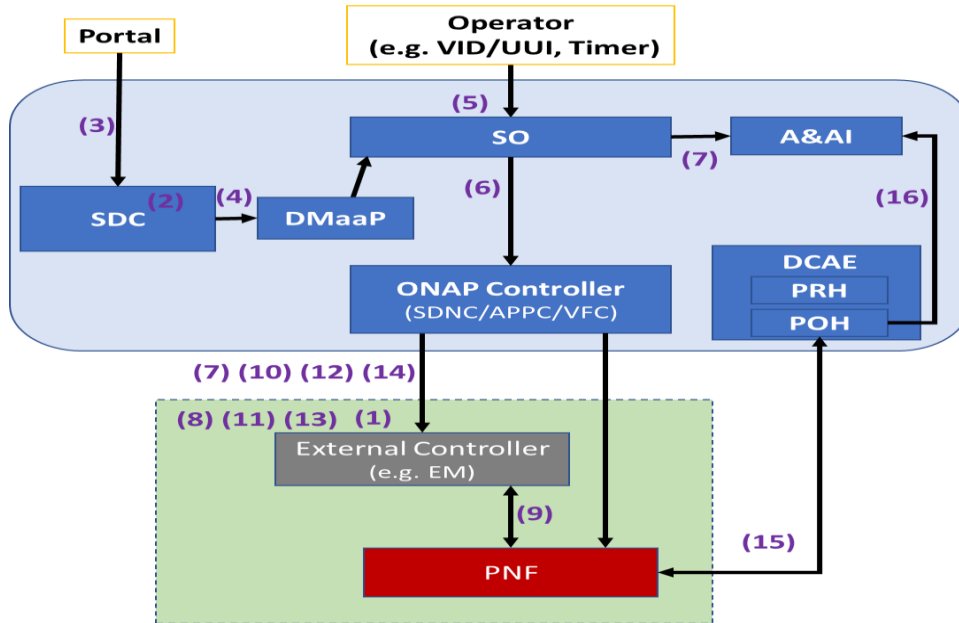




Platform Evolution Initiative	Description
Controller to NF Association	Nov 6 (UCR)
Configuration Database (MariaDB) Multi-site distributed database	Jan xx
Golden Parameters Inventory	Nov 28
Control Loop	
K8S based Cloud Region Support	
Edge Automation Functional	
Consistent ID of Cloud Region	
Change Management	
HPA	
Scaling	

PNF S/W Upgrade

S/W upgrade w/ External Controller



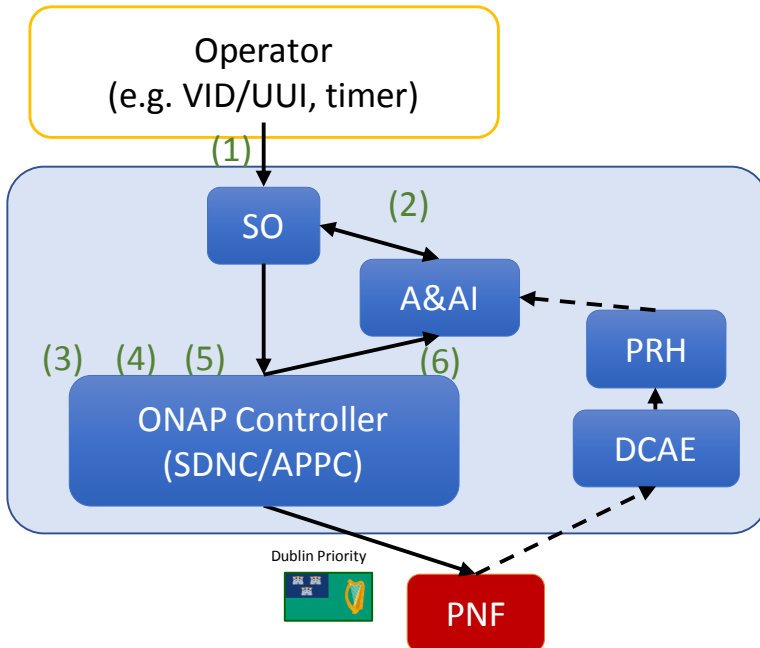
Some additional ideas and variants have been proposed

- Perform upgrade with help of external EM
 - This was demonstrated in R3 (only with SDNC, not integrated with SO)
- Reporting event from PNF after upgrade
- Inclusion of design-time environment and onboarded data

See also R3 Casablanca UC wiki page:

<https://wiki.onap.org/display/DW/5G+-+PNF+Software+Update>

S/W upgrade wo/ External Controller



1. Operator requests execution of PNF SW upgrade workflow
2. SO checks the PNF entry and identifies the appropriate Controller
3. SO requests SW upgrade pre-check
 - Controller performs all necessary upgrade pre-checks
4. SO requests SW upgrade
 - Controller performs software upgrade steps including download of SW to the PNF and then activating it
5. SO requests SW upgrade post-check
 - Controller performs all necessary upgrade post-checks
6. Controller updates A&AI

In steps (3), (4) and (5), the controller behavior is PNF-specific, and could use e.g. NETCONF or Ansible

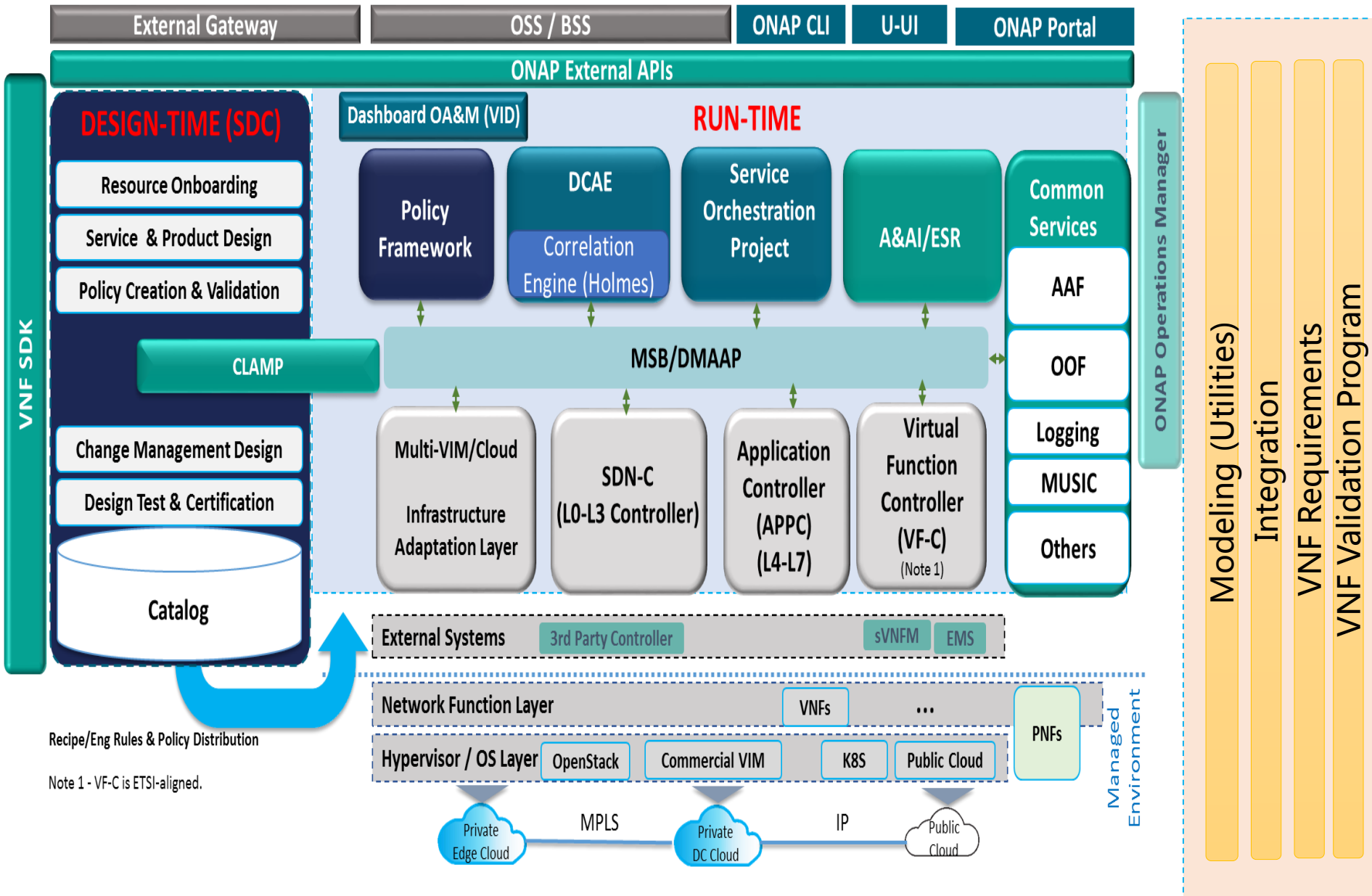




APPENDIX – A&AI BACKUP SLIDES



ONAP Architecture



Recipe/Eng Rules & Policy Distribution

Note 1 - VF-C is ETSI-aligned.