Use Case Realization

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Nov 06, 2018 version 1

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

Or iPhone one-tap :
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US: +1 669 900 6833 or +1 646 558 8656 or +1 877 369 0926 (Toll Free) or +1 855 880 1246 (Toll Free)
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.*

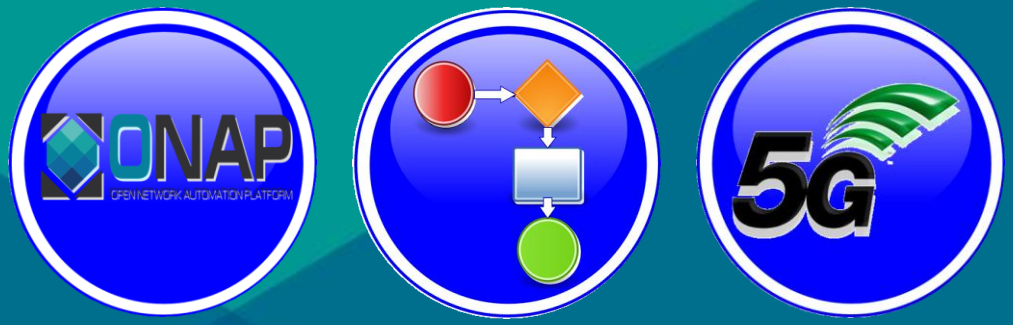
Nov 13, 2018

PNF Software Upgrade – what's already been in CM in VNF in-place upgrade.
code inside for PNF/VNF. Smart to try to reconcile the two.

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

5G Modeling



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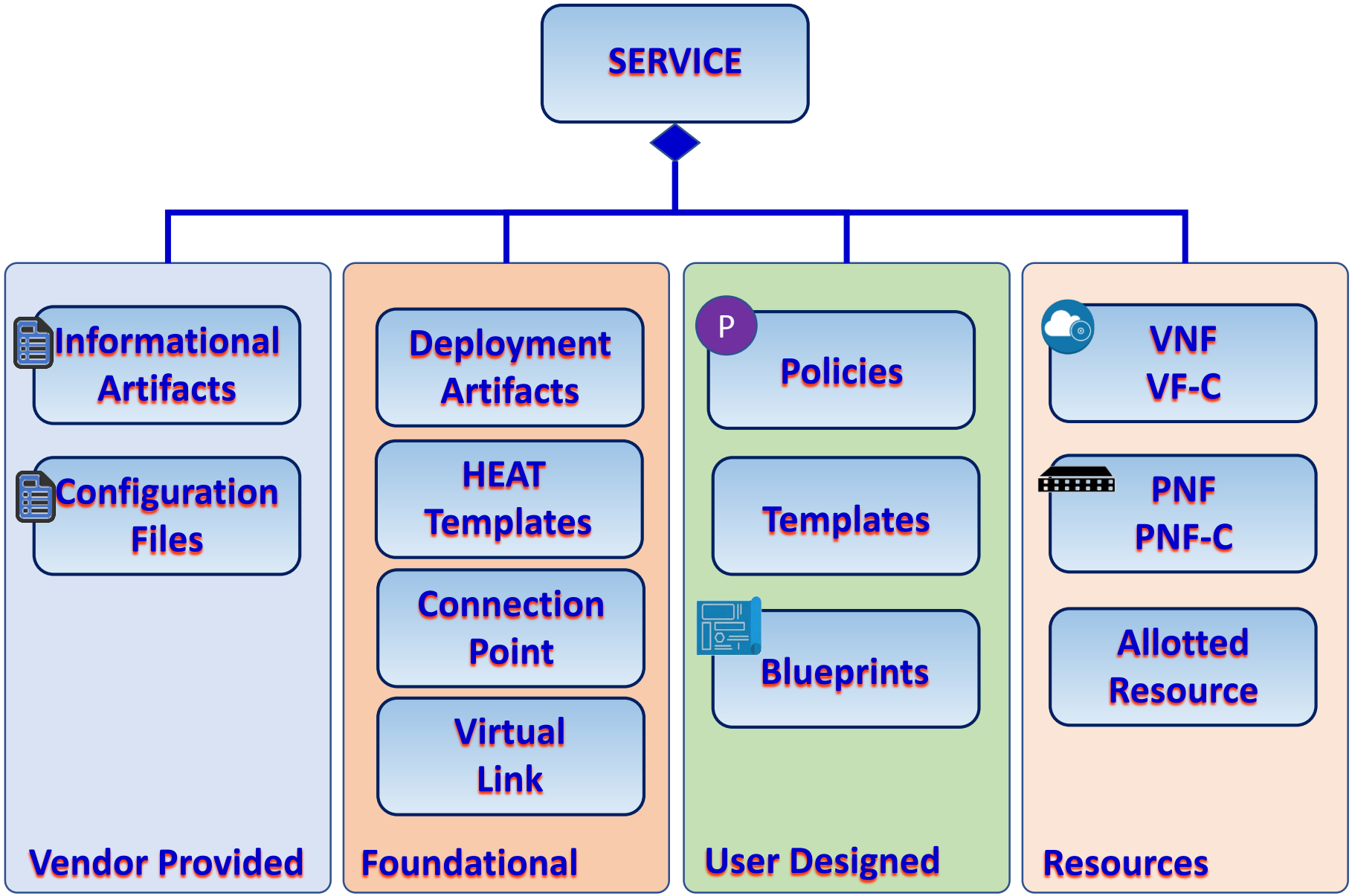
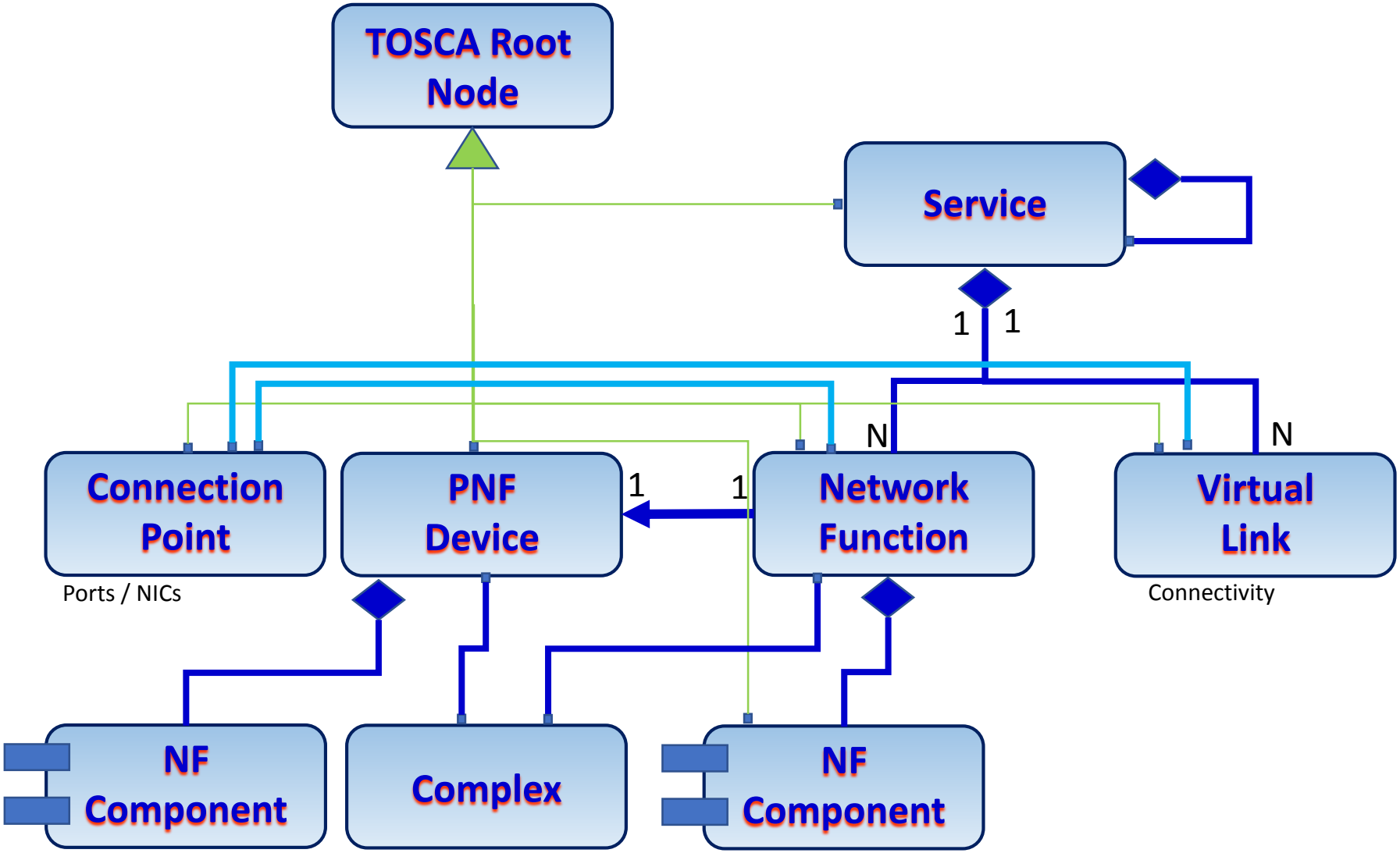
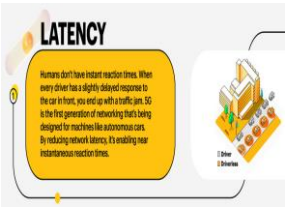
Defining a Service

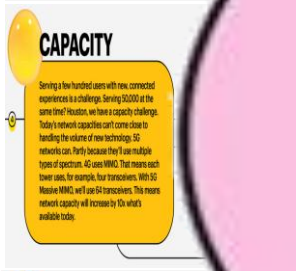


Modeling a Service



3GPP Release 15, IMT-2020 = 5G





eMBB (enhanced Mobile Broadband)

Media Anywhere

Broadband Experience
Everywhere Anytime

Virtual and Augmented Reality

Remote Surgery
and Examination

Smart
Infrastructure

Smart City

5G
USE CASES

Factory Automation
Industry 4.0

Remote Device Control

Smart Automated
Vehicle Control

Internet of Things (IoT)
M2M communications

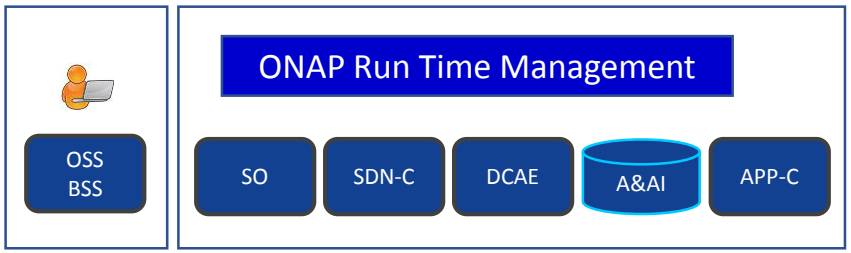
Geographically spread devices

URLLC (Ultra Reliable Low Latency Communications)

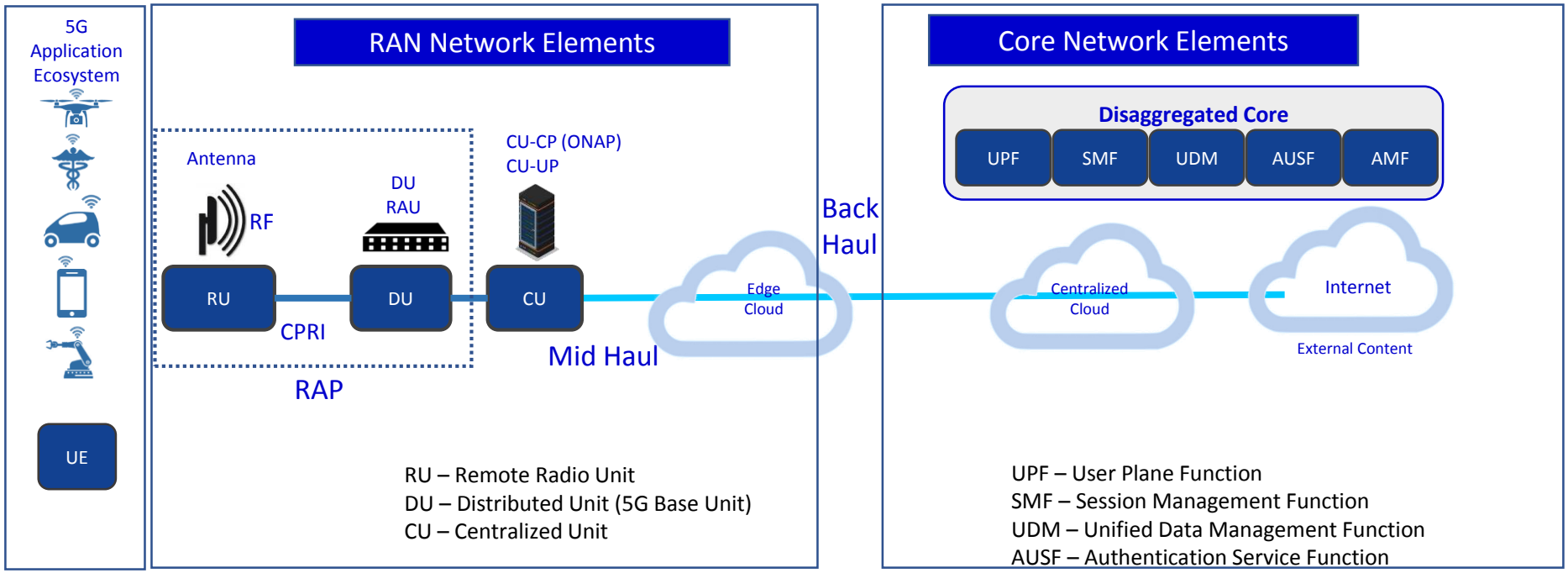
mMTC (massive Machine Type Communications)

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

5G RAN Wireless Network



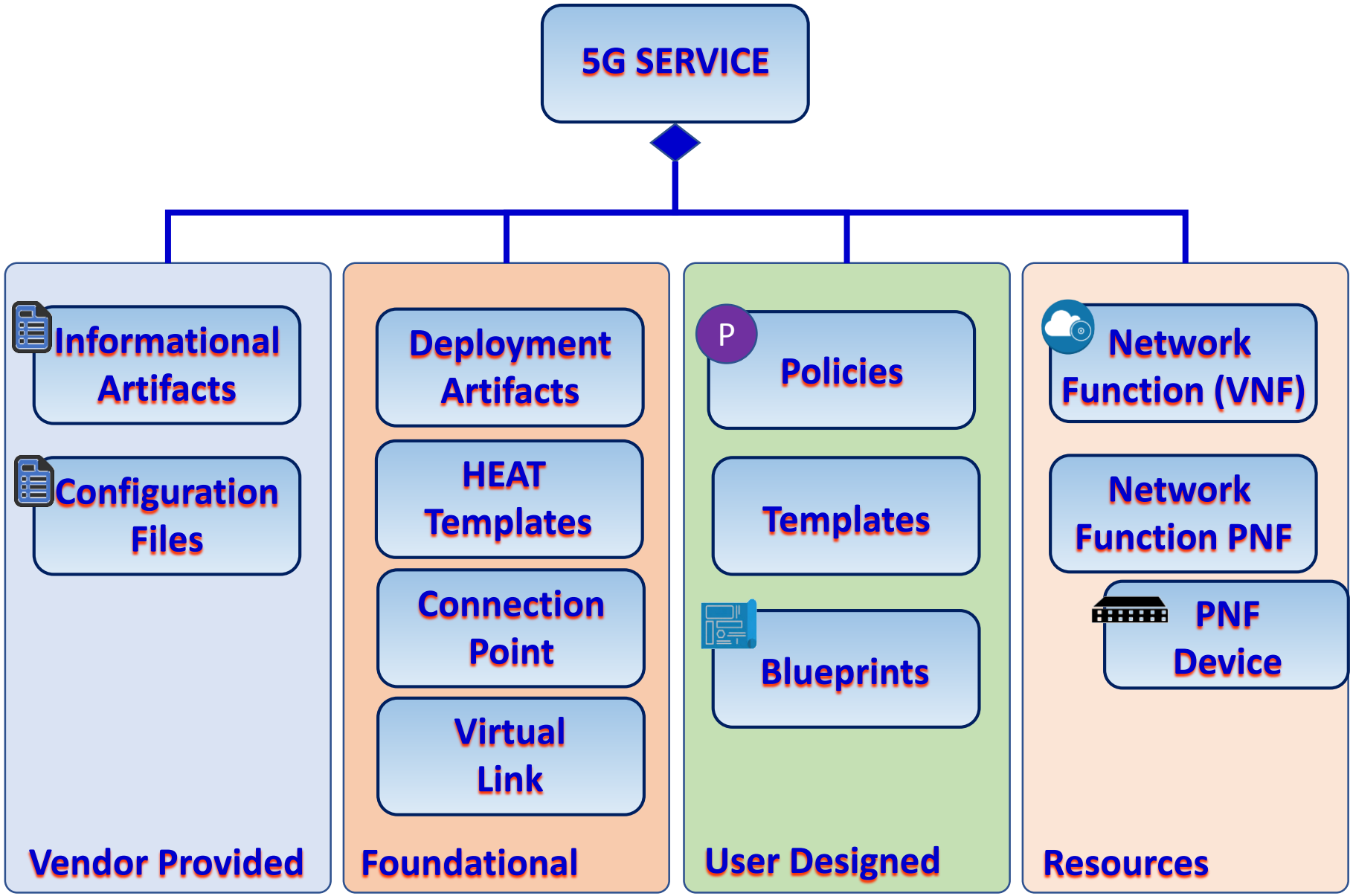
SO – Service Orchestrator
SDN-C – Service Design Network Controller
DCA&E – Data Collection Analytics & Events
A&AI – Available & Active Inventory
APP-C – Application Control



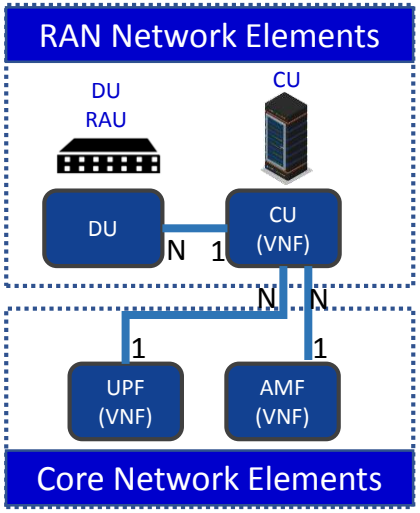
RU – Remote Radio Unit
DU – Distributed Unit (5G Base Unit)
CU – Centralized Unit

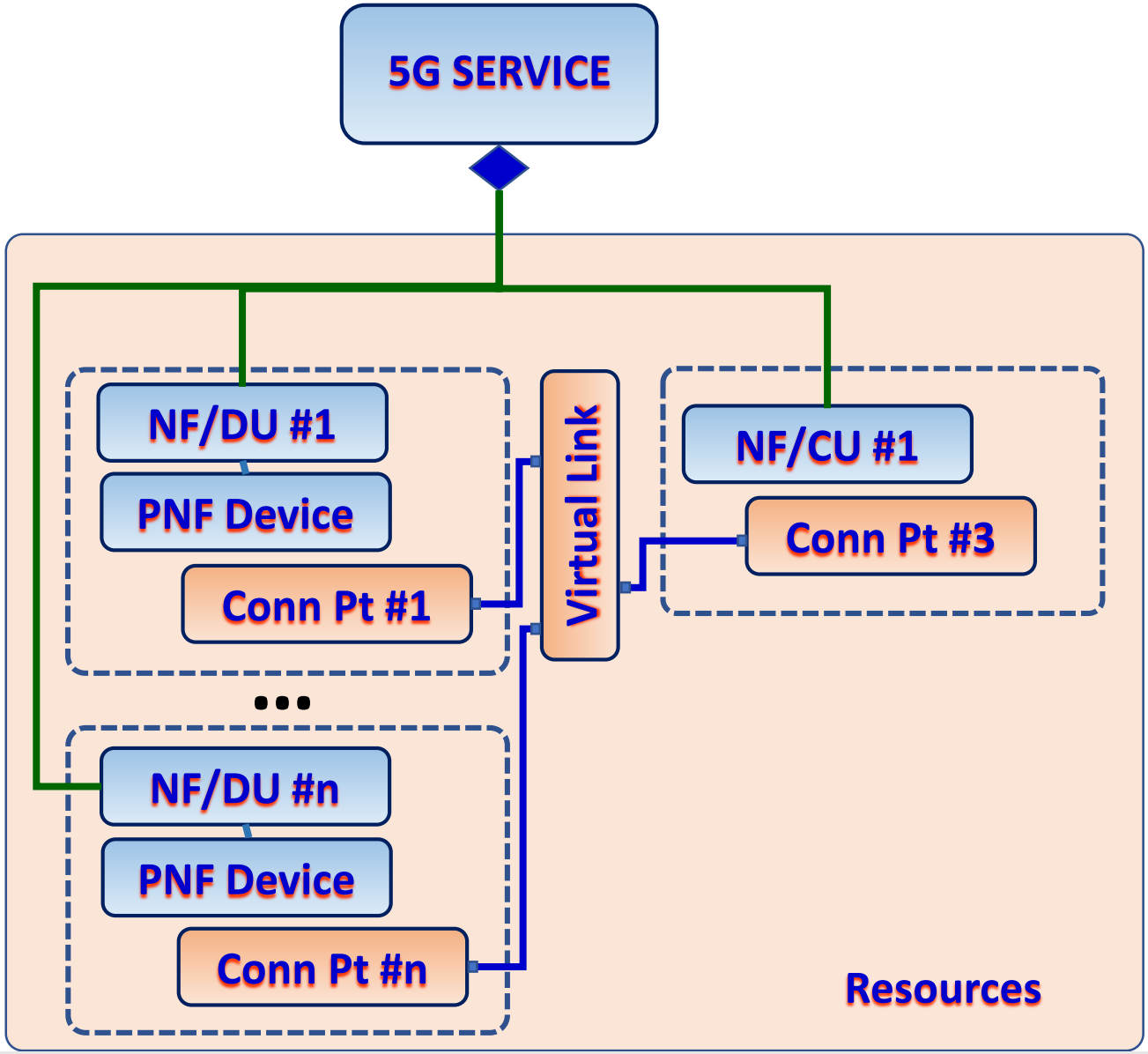
UPF – User Plane Function
SMF – Session Management Function
UDM – Unified Data Management Function
AUSF – Authentication Service Function

R4: Modeling a 5G Service



R4: 5G Base Station (gNodeB)





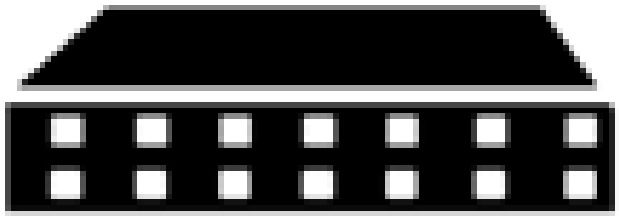
ONAP
OPEN NETWORK AUTOMATION PLATFORM

Configurations

Benjamin Cheung, PhD

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

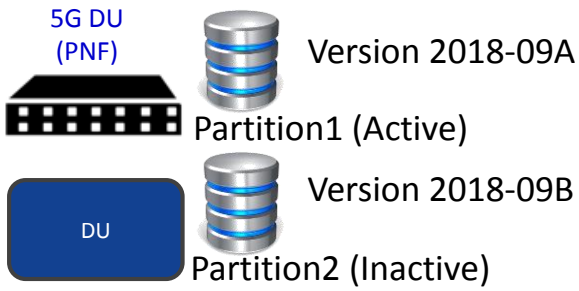
FUTURE

NF Component

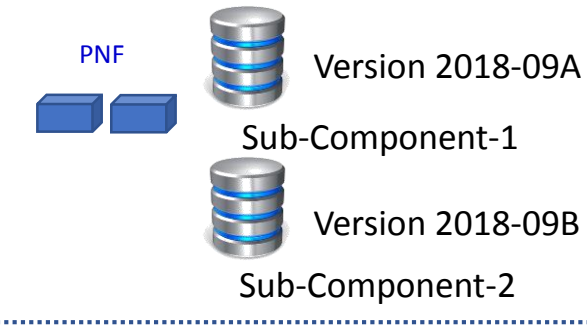
Sub-components within PNF

DU Configurations

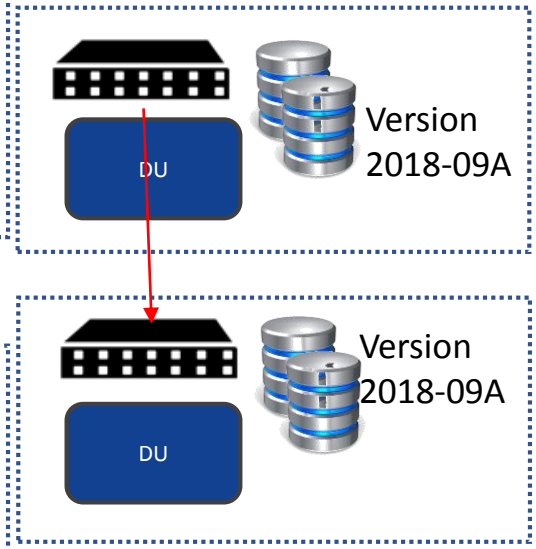
DRIVE PARTITIONS



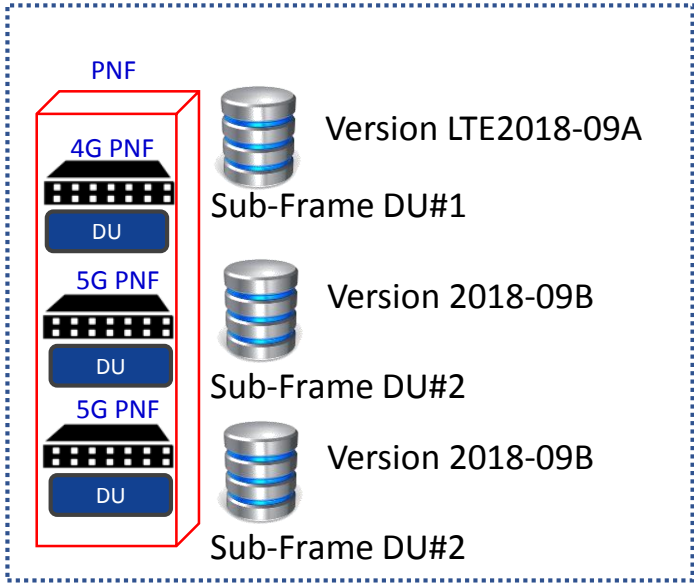
SUBCOMPONENTS (R4+)



MULTI-PNF DAISY CHAIN CONFIG



TANDEM CHASSIS CONFIGURATIONS

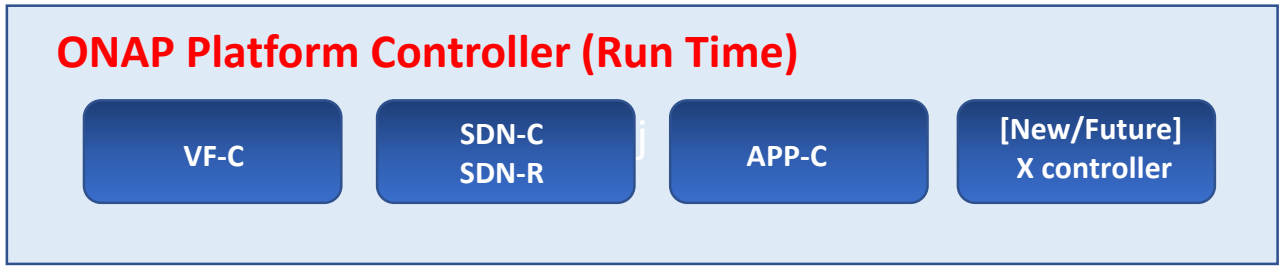


CONTROLLER TO NF ASSOCIATION

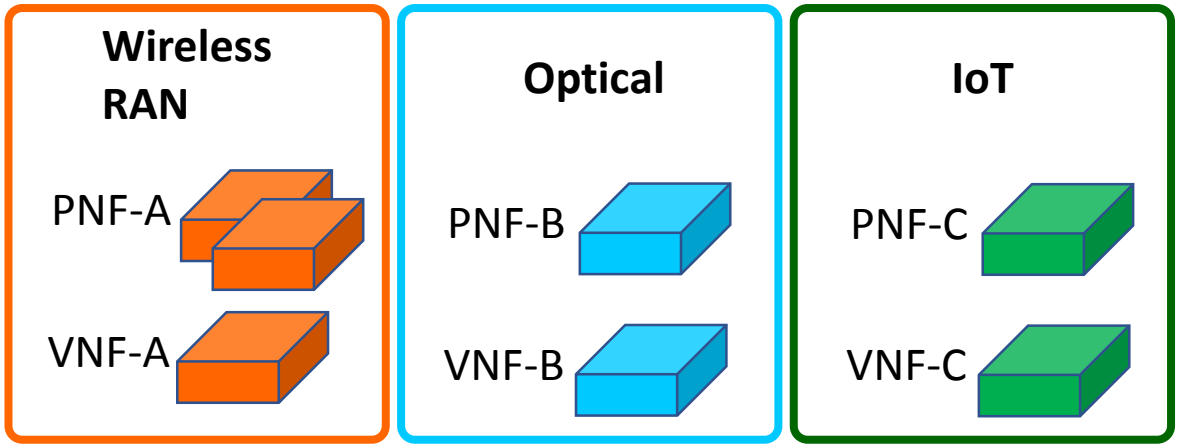
Benjamin Cheung, PhD

TECHNOLOGY DOMAINS

ONAP Deployment



Technology Domain (Service Provider Specified)



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

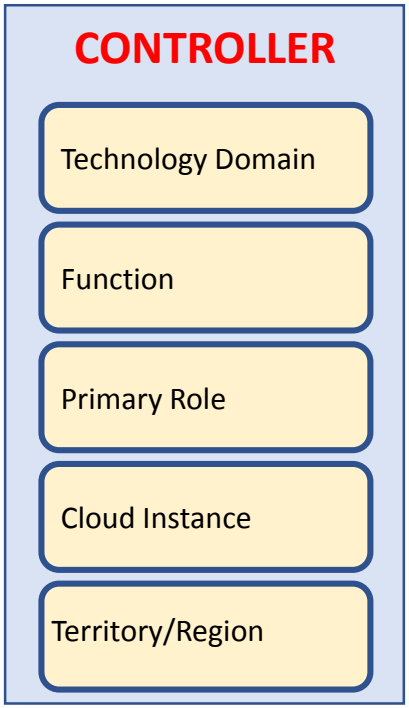
DESIGN TIME:

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)
Wireless	E// 5G DU	SDN-C	Generic API
Wireless	Nokia 5G DU	SDN-C	Generic API
	Huawei 5G DU	SDN-C	Generic API
Wireless	Xyz 5G DU	SDN-C	SDN-C

NF (Type)

- Technology Domain
- Function
- Primary Role
- Cloud Instance
- Territory/Region

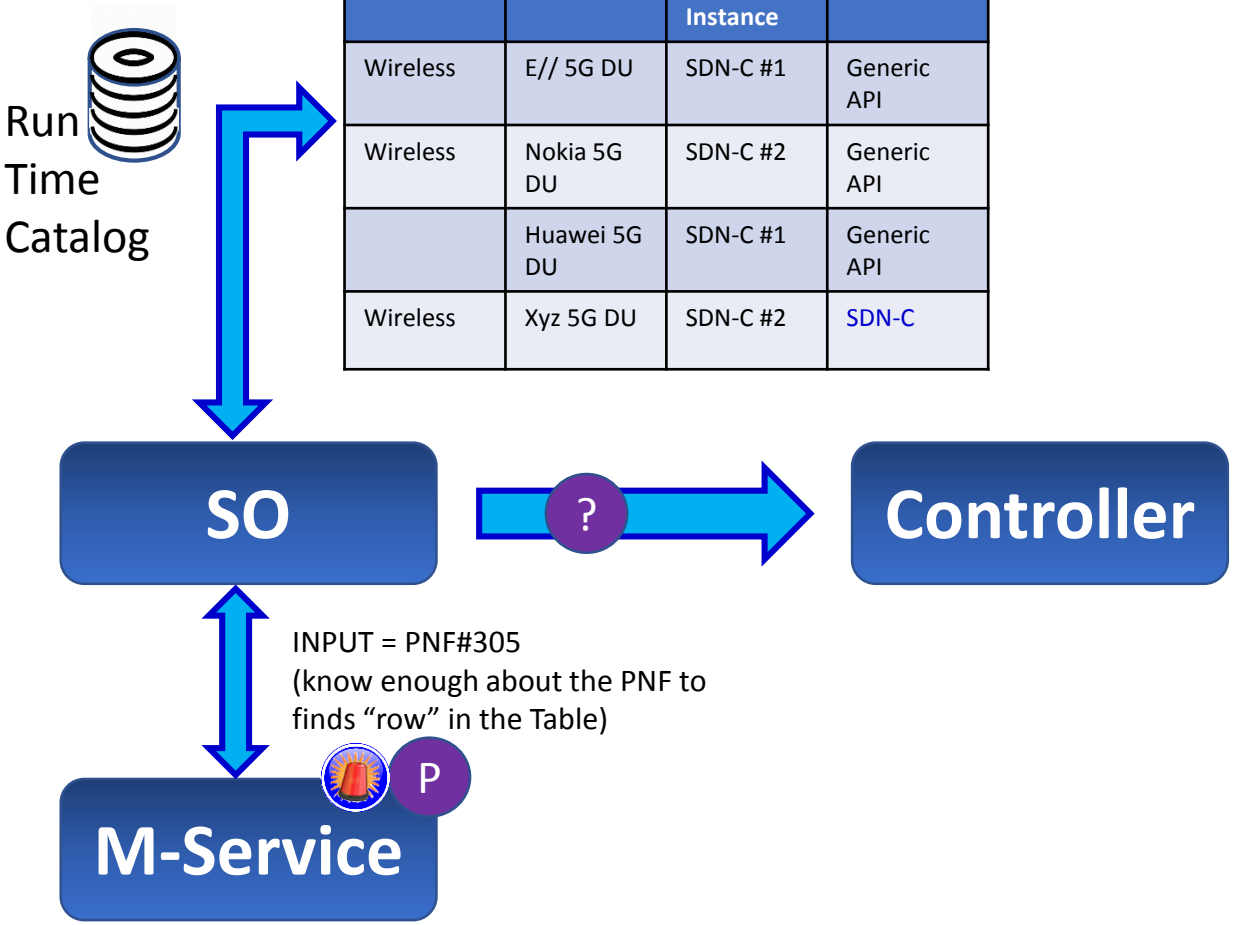
NF PACKAGE

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

- Wireless (Domain)
- Function (?)
- Primary Role
- CLLI = 2
- Morris Cnty, NJ

SDN-C "A"

CONTROLLER

- Wireless, Optical etc
- Function
- Primary
- CLLI = 2
- Morris County, NJ

SDN-C "C"

CONTROLLER

- Wireless etc
- Function
- Primary
- CLLI = 1
- Union, NJ

Nokia PNF Model-Y
Nokia PNF Region-B

Nokia PNF Model 1

- Wireless
- Function
- Primary Role
- CLLI = 2
- Union, NJ

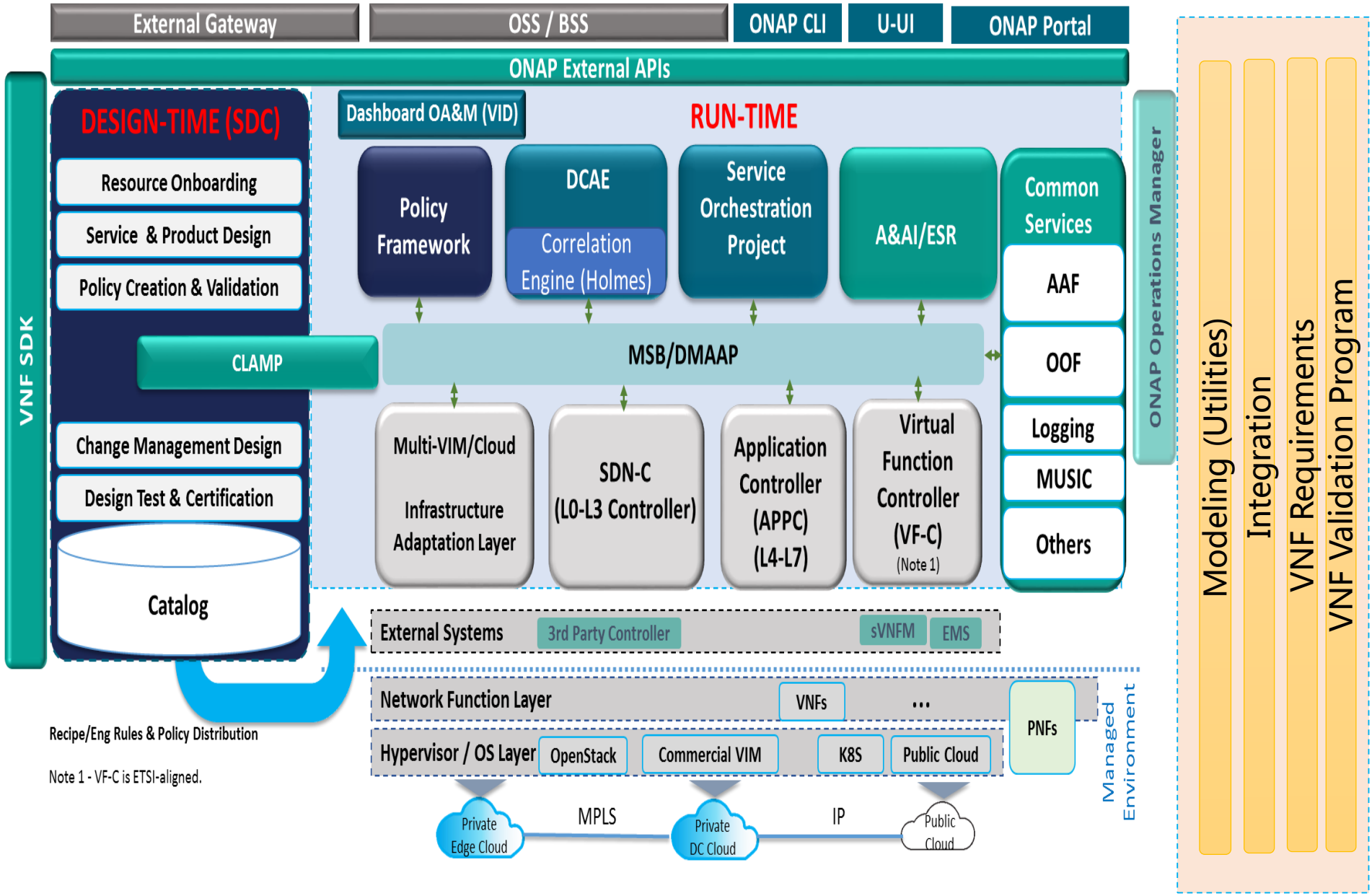
SDN-C "B"

CONTROLLER

- Wireless
- Function
- Secondary
- CLLI=2
- Morris County NJ

Tech Domain	NF (PNF/VNF)	ONAP Platform Controller Instance	Function (API)
Wireless	PNF: Wireless, Function, Primary Role, CLLI = 2, Morris Cnty, NJ	CONTROLLER: Wireless, Function, Secondary, CLLI = 2, Morris Cnty, NJ	

ONAP Architecture



Nov 6,

ATTENDEES – Ben Cheung, Chesla Wechsler, Oskar Malm, Rebecca Lantz, Li Xiang, Peter McCann, William Diego, Guobiao Mo, Min Yoon, Ning Zhu, Martin Skorupski, Scott Blandford, Gil Hellmann, John, Lukasz Grech, Zu Qiang, Yan, Ahmad Khalil, David Smith, Gerard Hynes, Yao Guang