

PNF Pre-Onboarding / Onboarding & Modeling to Support 5G RAN



- ONAP Modeling
- PNF Onboarding

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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



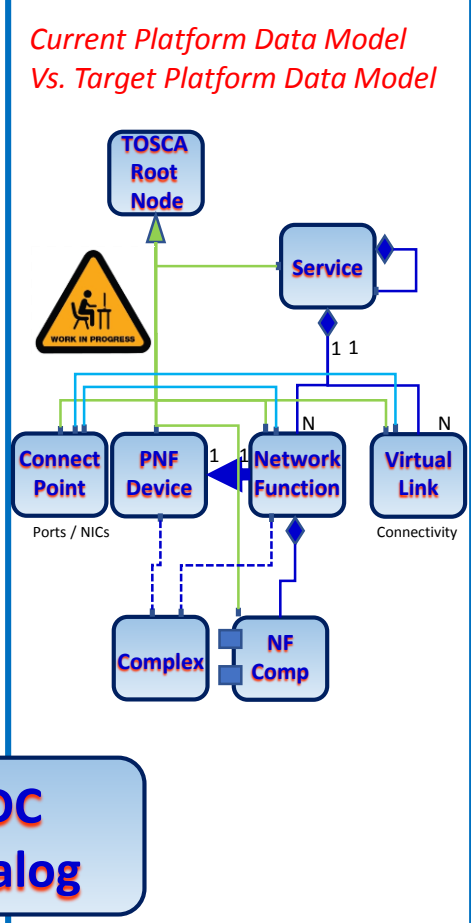
Onboarding Package	
Pre/Onboarding	
Vendor	

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

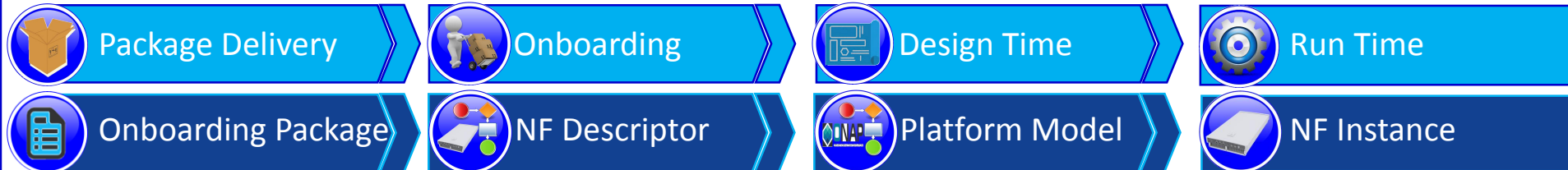
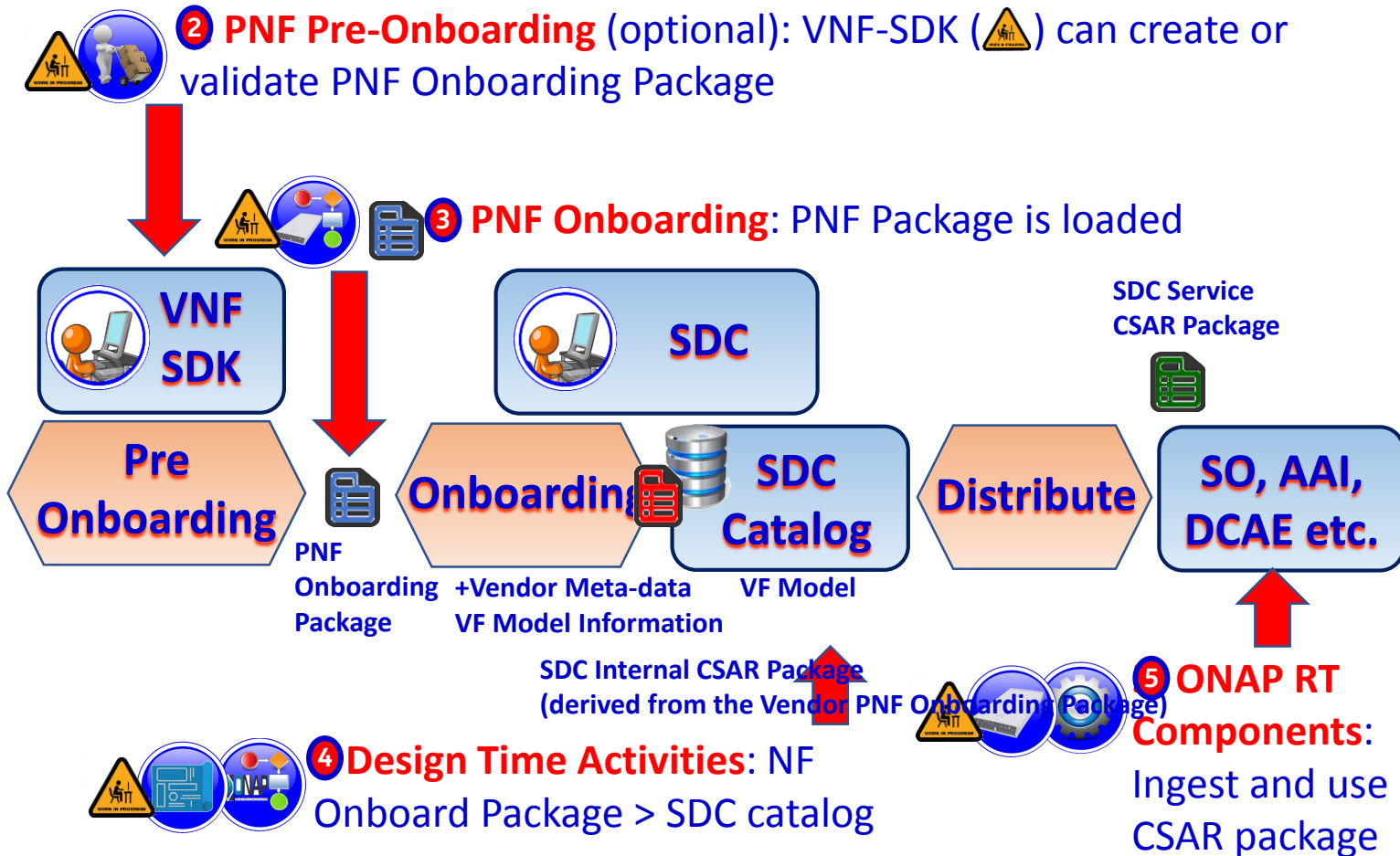
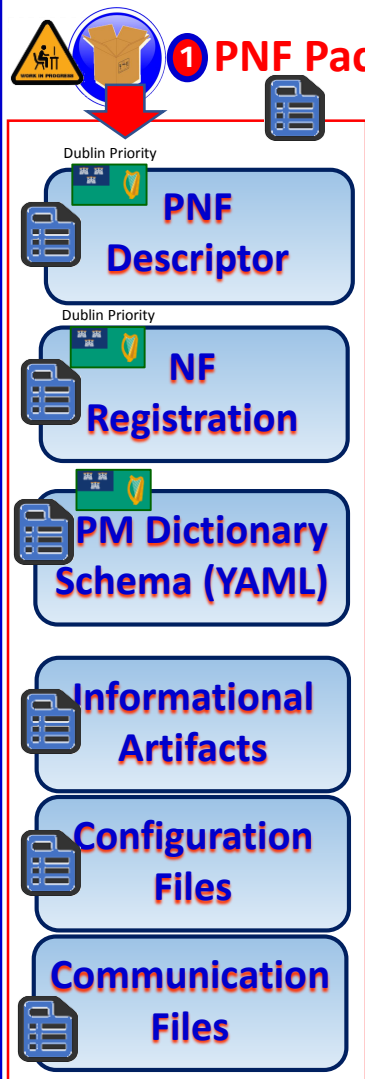
1 PNF Package Delivery: Vendor creates & delivers PNF Package with PNF artifacts

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



DUBLIN DEVELOPMENT STATUS



COMPONENT	IMPACTS DESCRIPTION	JIRA TICKETS
SDC	<p>PNF PACKAGE FORMAT Identify current VNF package format constraints in SDC Propose a PNF Package format Evaluate VNF and PNF package alignment</p> <p>PACKAGE MAPPING - Onboarding PNF package to internal PNF package mapping</p> <p>PNFD MAPPING - Onboarding PNFD to internal PNFD mapping A new flow to map ETSI SOL001 PNFD in SDC AID model.</p> <p>ARTIFACT MANAGEMENT Design-time catalog update to associate artifacts to a PNF Run-time catalog update to associate artifacts to a PNF</p>	<p>SDC-1970, SDC-1973, SDC-1974, SDC-1975, SDC-1976, SDC-1977, SDC-1978, SDC-1979, SDC-1980</p>
VNF SDK	<p>PACKAGE VERIFICATION - PNF package format verification</p> <p>PNF PACKAGE FORMAT</p> <p>PACKAGE USAGE - Package for PNF Onboarding Package for use in VNF SDK</p>	<p>VNFSDK-337, VNFSDK-338, VNFSDK-339, VNFSDK-340, VNFSDK-341, VNFSDK-342, VNFSDK-343</p>
Modelling	<p>PNFD MAPPING – Mapping Onboarded PNFD to platform PNFD mapping SDC SW task but PNFD mapping & part of ONAP Resource Data Model.</p>	
VNF Requirements	<p>PACKAGE, DESCRIPTOR, ARTIFACTS - VNF requirements to cover PNF package contents and directory structures and mandatory elements.</p> <p>PNF DESCRIPTOR - Requirements for the PNF Descriptor</p> <p>ARTIFACTS - Requirements for Artifacts of PNF and PNF Package</p>	<p>VNFQTS-506, VNFQTS-496, VNFQTS-497, VNFQTS-498, VNFQTS-499, VNFQTS-505, VNFQTS-507, VNFQTS-508</p>
RT Comp	<p>Grant backward compatibility use cases on ONAP RT Components</p>	

HealthVF

⚠ V1.0

CERTIFIED

Switch to the latest version

Upgrade Services



General

Deployment Artifact

Information Artifact

TOSCA Artifacts

Composition

Operation

Activity Log

Deployment




Properties Assignment

Deployment Artifact

Name	Type	Deployment timeout	Version	UUID	
VF License	VF_LICENSE		1	0e724709-4382-4dab-a824-581488f5f6fd	↓
base_health	HEAT	60	2	a89ce4c4-c81e-45d2-800c-3b67bd888225	↓
VF HEAT ENV	HEAT_ENV		0		↓
Vendor License	<u>VENDOR_LICENSE</u>		1	abe0861c-994b-4018-929a-5a0c7039139d	↓ Magnifier
healthcheck_server_config	<u>HEAT_ARTIFACT</u>		1	de22a326-928c-4fae-9f46-8a5474898af3	↓ Magnifier

PNF PACKAGE CREATION & DELIVERY





- Onboarding Package 
- Onboarding 
- Vendor 



PNF ONBOARDING PACKAGE




Definition Files


Dublin Priority 


PNF-D  **NF Descriptor**


TOSCA Metadata  Manifest File 


PNF Package Artifacts


Dublin Priority 

VES Event Registration  **NF Registration**

PM Dictionary
PM Schema  **PM Dictionary**

Ansible Playbooks
Netconf Yang model
Chef Cookbooks  **Communication Files**

Manuals, Help files
CustDoc Products
Test files  **Informational Artifacts**

Licensing agreement
Resource
Configuration Info  **Configuration Files**

Vendor Provided

PNF Onboarding Package



 **TOSCA Metadata (SDC)**

 **TOSCA Descriptor (SDC)**

 **X License Model Files**

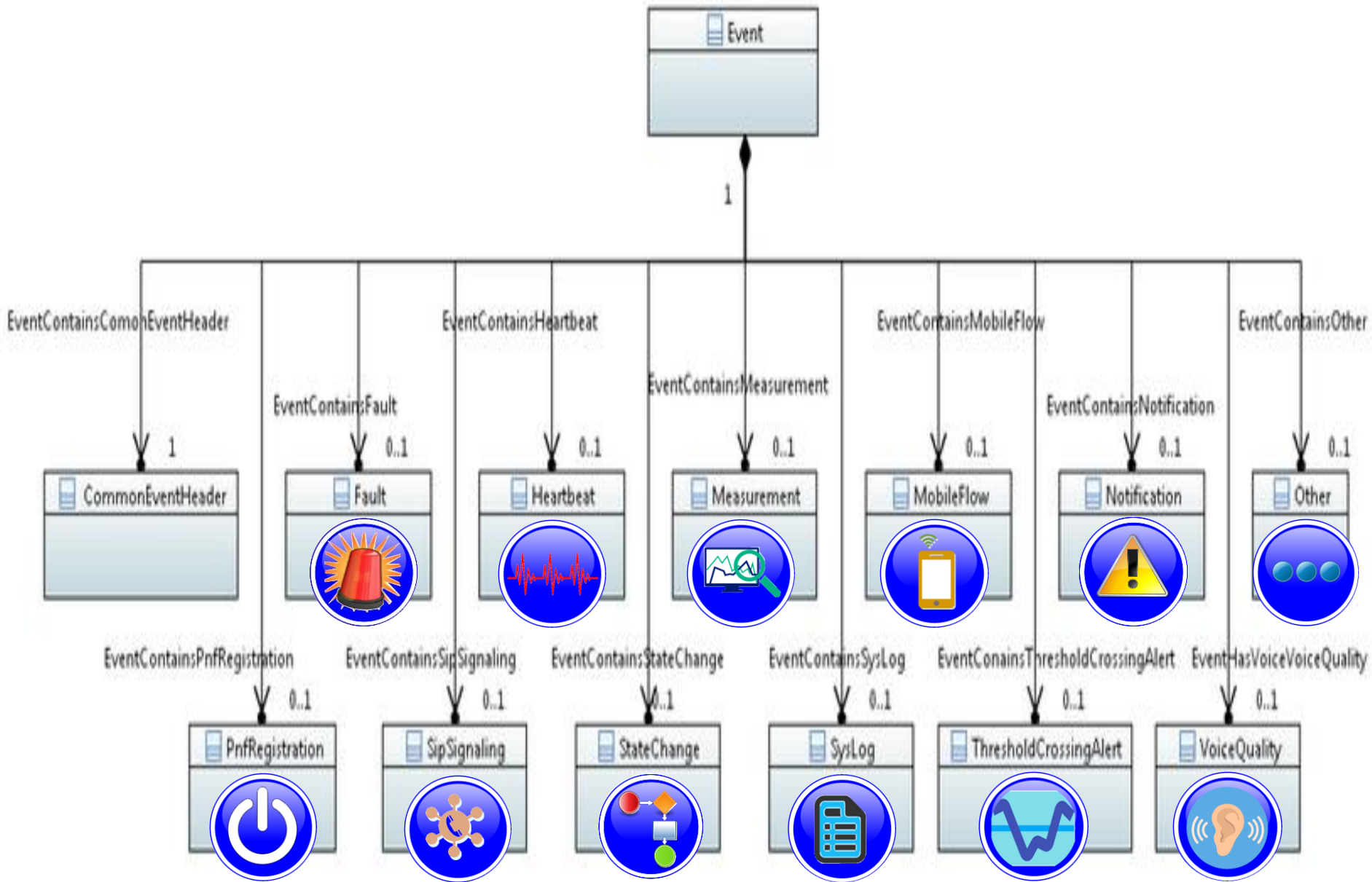
SDC Added Files

SDC Service CSAR Package



SDC Design Time

R4: Modelling VES Events



SDK VALIDATION - PNF ONBOARDING PACKAGE



Definition Files

PNF Package Artifacts

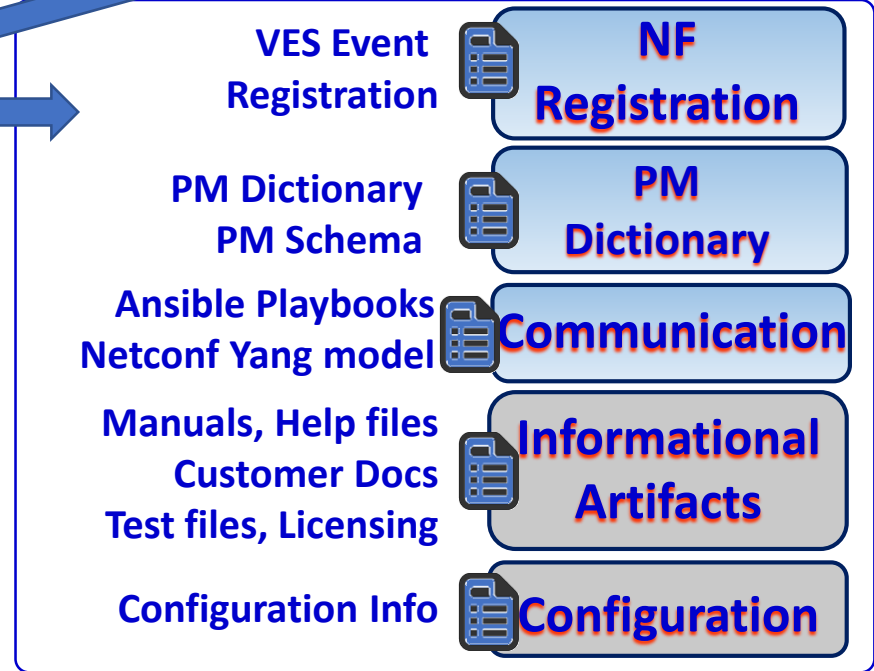
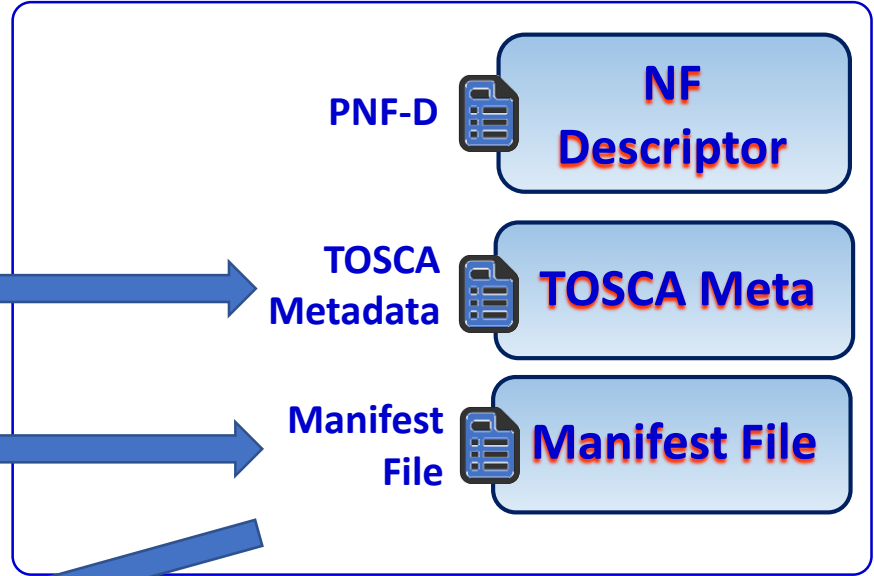
5 ETSI SOL004 Validation for Meta-Data file (*TOSCA.meta*) in PNF Package. New checks for "Entry definition, Entry-manifest, Entry-change-log, Entry-tests, Entry-certificates" would be new VNF SDK development work.

4 VNF SDK to check the PNF keywords in the MainServiceTemplate.mf (manifest) New tags are pnf_product_name and pnf_provider_id, pnf_package_version, pnf_release_date_time and non_mano_artifact_sets.

1 VNF-SDK Checks that files defined in the Manifest file (specify files & directory locations) actually exist where they have been specified in the Manifest File.

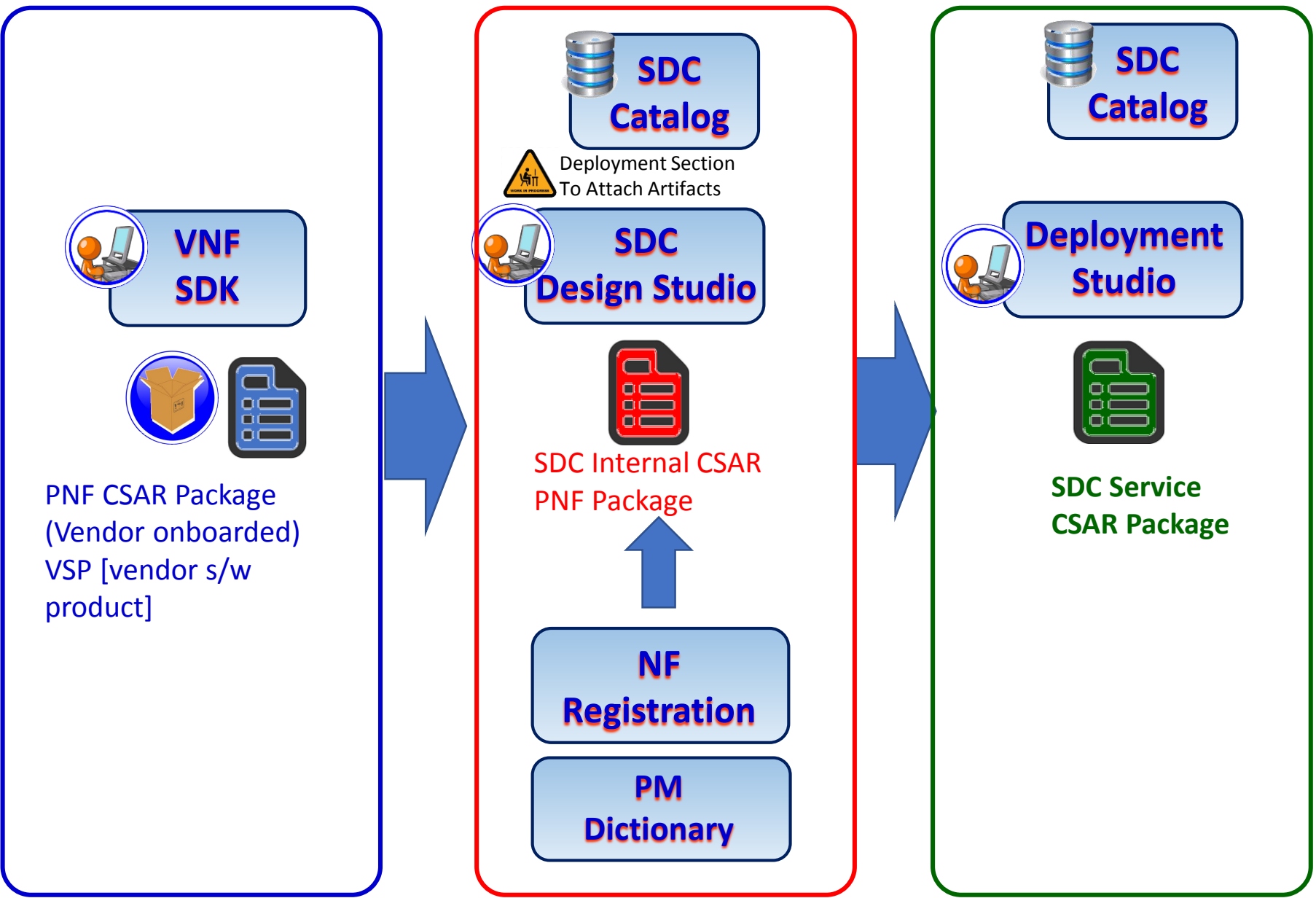
2 License File Check
This is a license term file

3 Certificate File Check



Vendor Provided – PNF Onboarding Package

PNF PACKAGES



PNF PACKAGES

VNF SDK

PNF Package (Vendor onboarded)
VSP [vendor s/w product]

PNF Onboarding (CSAR file)

Note:

- Package Example
- Not all files are listed.
- Folder / file name in blue is requested by SOLO4.
- Folder / file name in black is example only.

TOSCA-Meta-Version: 1.0
 CSAR-Version: 1.1
 CreatedBy: Ericsson (Du Quang 2018-12-03)

Entry-Definitions: Definitions/DefinitionsTemplate.yml
 Entry-Interfaces: Interfaces/InterfaceTemplate.yml
 Entry-Change-Log: Artifacts/ChangeLog.txt
 Entry-Terms: Artifacts/Terms
 Entry-Certificate: Artifacts/CertificateTemplate.yml

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- MainServiceTemplate.yml

TOSCA.meta

- MainServiceTemplate.yml
- Images
- Deployment
- Scripts
- Tests
- ChangeLog.txt
- MainServiceTemplate.yml
- License_term.txt

Configuration

- yang-module.yang
- pm-dictionary.yml
- ves-dictionary.yml

Not supported by ONAP Casablanca

Not used yet

SDC Catalog

SDC Design Studio

SDC Internal CSAR PNF Package

CSAR file

TOSCA-Meta-Version: 1.0
 CSAR-Version: 1.1
 CreatedBy: Ericsson (Du Quang 2018-12-03)

Entry-Definitions: Definitions/DefinitionsTemplate.yml
 Entry-Interfaces: Interfaces/InterfaceTemplate.yml
 Entry-Change-Log: Artifacts/ChangeLog.txt
 Entry-Terms: Artifacts/Terms
 Entry-Certificate: Artifacts/CertificateTemplate.yml

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- CSAR.meta

TOSCA.meta

- Annotations.yml
- Artifacts.yml
- Capabilities.yml
- Data.yml
- Groups.yml
- Interfaces.yml
- Nodes.yml
- Policies.yml
- Relationships.yml
- Resource-ZNF-template.yml
- Resource-ZNF-template-interface.yml

Deployment

- Informational
- Other
- PNF_ONBOARDED_PACKAGE

SDC Catalog

Deployment Studio

SDC Service CSAR Package

CSAR file

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- MainServiceTemplate.yml

TOSCA.meta

- MainServiceTemplate.yml
- Images
- Deployment
- Informational
- NE_ONBOARDED_PACKAGE
- Other
- VFC(name)
- Tests
- ChangeLog.txt
- MainServiceTemplate.yml

Directory list under review

- HEAT
- HEAT_VCL
- HEAT_META
- HEAT_ENV
- HEAT_ARTIFACT
- HEAT_METADATA
- YANG_YML
- MODEL_INVENTORY_PROFILE
- VNF_CATALOG
- VNF_LICENSE
- VENDOR_LICENSE
- APPC_CONFIG
- VF_MODULES_METADATA
- DCAT_TOSCA
- DCAT_SOON
- PLAN

Not supported by ONAP Casablanca

Copy of NF descriptor

Directory list under review

VFC(name) Deployment (can we move it in Deployment_dir?)

VFC(name) Information

Not supported by ONAP Casablanca

PNF Onboarding Package (CSAR)



PNF Onboarding (CSAR file)

Note:

- Package Example
- Not all files are listed.
- Folder / file name in blue is requested by SOL004.
- Folder / file name in black is example only.

TOSCA-Meta-Version: 1.0
CSAR-Version: 1.1
Created-By: Ericsson (Zu Qiang 2018-12-03)
Entry-Definitions:
Definitions/MainServiceTemplate.yaml
Entry-Manifest: MainServiceTemplate.mf
Entry-Change-Log: Artifacts/ChangLog.txt
Entry-Tests: Artifacts/Tests
Entry-Certificate: Artifacts/License_term.txt

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- MainServiceTemplate.mf

TOSCA.meta

NF descriptor

MainServiceTemplate.yaml

Not supported by ONAP Casablanca

Images

Deployment

Scripts

Tests

ChangeLog.txt

MainServiceTemplate.cert

License_term.txt

Not used yet

Configuration

Yang_module

Measurements

Events

...

yang-module.yang

pm-dictionary.yaml

ves-dictionary.yaml

Install.csh

...

metadata:

pnf_product_name: gNB
pnf_provider_id: Ericsson
pnf_package_version:1.0
pnf_release_date_time:2018-12-03T08:44:00-05:00
non_mano_artifact_sets:
Events:
source:
Artifacts/Deployment/Events/VES_registration.yaml

SOL004 required PNF manifest file



PNF ONBOARDING FILES – Manifest file Example



```
metadata:                                     ##### New key Name to be supported by SDC
pnf_product_name: gNB
pnf_provider_id: Ericsson
pnf_package_version:1.0
pnf_release_date_time:2018-12-03T08:44:00-05:00

##### non mano artifact sets to be supported by SDC
non_mano_artifact_sets:
Events:
    source: Artifacts/Deployment/Events/VES_registration.yaml
Measurements:
    source: Artifacts/Deployment/Measurements/PM_Dictionary.yaml
Yang_module:
    Source: Artifacts/Deployment/Yang_module/Yang_module.yaml
Others:
    Source: Artifacts/Informational/scripts/install.sh
    Source: Artifacts/Informational/user_guide.txt
    Source: Artifacts/Other/installation_guide.txt
    Source: Artifacts/Other/review_log.txt
```

VNFSDK #4 Manifest file: new PNF tags



PNF ONBOARDING FILES – Main Service Template manifest (.mf) file

VNF SDK to check the PNF keywords in the MainServiceTemplate.mf
New tags are
pnf_product_name and
pnf_provider_id,
pnf_package_version,
pnf_release_date_time
and
non_mano_artifact_sets.

```
metadata:  
  pnf_product_name: gNB  
  pnf_provider_id: CompanyXYZ  
  pnf_package_version: 1.0  
  pnf_release_date_time: 2019-02-11T09:10:00-05:00  
  non_mano_artifact_sets:  
    Events:  
      source: Artifacts/Deployment/Events/VES_registration.yaml  
    Measurements:  
      source:  
        Artifacts/Deployment/Measurements/PM_Dictionary.yaml  
    Yang_module:  
      Source:  
        Artifacts/Deployment/Yang_module/Yang_module.yaml  
    Others:  
      Source: Artifacts/Informational/scripts/install.sh  
      Source: Artifacts/Informational/user_guide.txt  
      Source: Artifacts/Other/installation_guide.txt  
      Source: Artifacts/Other/review_log.txt
```

SOL004 required TOSCA.meta file



PNF ONBOARDING FILES – Tosca Metadata File



TOSCA-Meta-File-Version: 1.0



CSAR-Version: 1.1



Created-By: Ericsson



Entry-Definitions: Definitions/resource-Ericssongnodeb-template.yml



Entry-Manifest: resource-Ericssongnodeb-template.mf



Entry-Certificate: Artifacts/resource-Ericssongnodeb-template.cert



Entry-Tests: Artifacts/Tests

Entry-Licenses: Artifacts/Licenses/license_term.txt

Entry-Change-Log: Artifacts/ChangeLog.txt

VNFSDK Task #5 TOSCA Meta file checks



PNF ONBOARDING FILES – TOSCA Meta File Checks

"*TOSCA-Meta-Version*" and "*CSAR-Version*" and "*Created by*" checks are already supported.

ETSI SOL004 Validation for Meta-Data file & Manufacturer file (***TOSCA.meta*** file) in PNF Package. New checks for "*Entry definition, Entry-manifest, Entry-change-log, Entry-tests, Entry-certificates*" would be new VNF SDK development work.

TOSCA-Meta-Version: 1.0
CSAR-Version: 1.1
Created-By: CompanyXYZ (User123 2019-02-11)

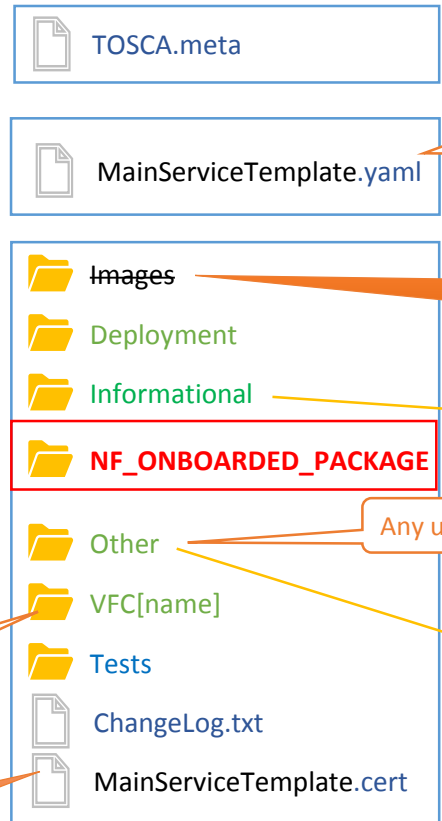
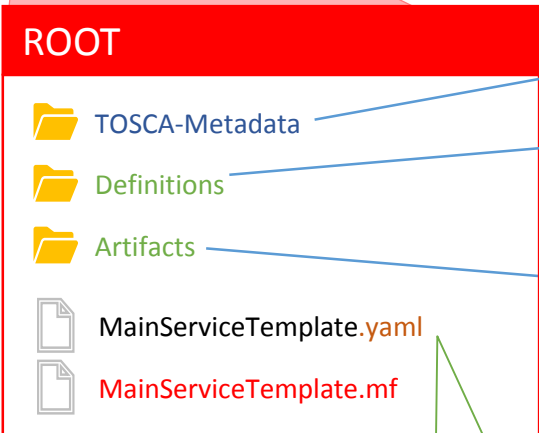
Entry-Definitions: Definitions/MainServiceTemplate.yaml
Entry-Manifest: MainServiceTemplate.mf
Entry-Change-Log: Artifacts/ChangLog.txt
Entry-Tests: Artifacts/Tests
Entry-Certificate: Artifacts/License_term.txt

SDC Service CSAR Package



CSAR file

Directory list under review



NF descriptor created by SDC

Not supported by ONAP Casablanca

Any unrecognized artifacts

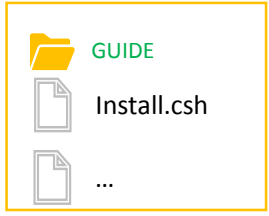
Copy of NF descriptor

Directory list under review

VFC[name]/Deployment
VFC[name]/Information
(can we move it in Deployment dir ?)

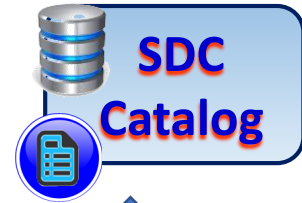
Not supported by ONAP Casablanca

- HEAT
- HEAT_VOL
- HEAT_NET
- HEAT_ENV
- HEAT_ARTIFACT
- HEAT_NESTED
- YANG_XML
- MODEL_INVENTORY_PROFILE
- VNF_CATALOG
- VNF_LICENSE
- VENDOR_LICENSE
- APPC_CONFIG
- VF_MODULES_METADATA
- DCAE_TOSCA
- DCAE_JSON
- PLAN



SDC adds files
 SDC add vendor meta-data
 Internal CSAR file
 Structure change
 Information missing
 Metadata file changed (generated by SDC) not have info on left side
 Manufactured metafile is lost
 Certain artifacts is lost.
 CSAR.meta (added by SDC) ... what is it for?
 Definition File (define policies) added by SDC
 Resource UUID
 WHAT WOULD BE A PROBLEM
 WHAT DOES THE VENDOR NEEDS TO PROVIDE
 WHAT DOES SDC need
 Today in PNF descriptor more than 3 properties
 In SDC PNF CSAR only 3 properties NF function, NF role, NF type, SWVersions
 PNF onboarding package from SOL001 MANY properties
 ARTIFACTS SOL004 MANY artifacts add
 In Current PNF CSAR file no place to hold it.

Heat File
 OPENO TOSCA



PNF Package Version 2019-1.1



Resource CSAR File (PNF)
 onboarded

Vendor provided



PNF
 Onboarding
 (CSAR file)

Note:

- Package Example
- Not all files are listed.
- Folder / file name in blue is requested by SOL004.
- Folder / file name in black is example only.

TOSCA-Meta-Version: 1.0
 CSAR-Version: 1.1
 Created-By: Ericsson (Zu Qiang 2018-12-03)
 Entry-Definitions: Definitions/MainServiceTemplate.yaml
 Entry-Manifest: MainServiceTemplate.mf
 Entry-Change-Log: Artifacts/ChangLog.txt
 Entry-Tests: Artifacts/Tests
 Entry-Certificate: Artifacts/License_term.txt

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- MainServiceTemplate.mf

TOSCA meta

NF descriptor

MainServiceTemplate.yaml

Not supported by ONAP Casablanca

Images

Deployment

Scripts

Tests

ChangeLog.txt

MainServiceTemplate.cert

License_term.txt

Configuration

Yang_module

Measurements

Events

...

Install.csh

yang-module.yang

pm-dictionary.yaml

ves-dictionary.yaml

Not used yet

metadata:
 pnf_product_name: s118
 pnf_provider_id: Ericsson
 pnf_package_version: 1.0
 pnf_release_date_time: 2018-12-08T08:44:00-05:00
 non_memo_artifact_sets:
 Events:
 source:
 Artifacts/Deployment/Events/VEE_registration.yaml

SDC

CSAR file

ROOT

- TOSCA-Metadata
- Definitions
- Artifacts
- csar.meta

TOSCA-Meta-File-Version: 1.0
 CSAR-Version: 1.1
 Created-By: Carlos Santana
 Entry-Definitions: Definitions/resource-ZPnf1-template.yaml
 Name: csar.meta
 Content-Type: text/plain

SDC-TOSCA-Meta-File-Version: 1.0
 SDC-TOSCA-Definitions-Version: 9.0

Deployment

Informational

Other

PNF_ONBOARDED_PACKAGE

TOSCA meta

annotations.yaml

artifacts.yaml

capabilities.yaml

data.yaml

groups.yaml

interfaces.yaml

nodes.yaml

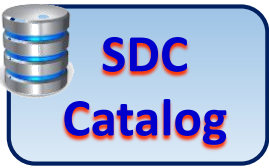
policies.yaml

relationships.yaml

resource-ZPnf1-template.yaml

resource-ZPnf1-template-interface.yaml

```
tosca_definitions_version: tosa_simple_yaml_1_1
metadata:
  irvariantUUID: 3f244798-e083-41af-915c-908663da4634
  UUID: 2310095-584a-466a-8012-4243ced4076
name: Z_PNF_1
descriptions: Z_PNF_1
type: PNF
category: Application L4+
subcategory: Application Server
resourceVendor: Ericsson
resourceName: Release: "1.0"
resourceVersion: "1.0"
resourceUUID: "3f244798-e083-41af-915c-908663da4634"
imports:
  - nodes:
    - file: nodes.yaml
    - datatype:
    - file: data.yaml
    - capabilities:
    - capabilities.yaml
    - relationships:
    - file: relationships.yaml
    - groups:
    - file: groups.yaml
    - policies:
    - file: policies.yaml
    - annotations:
    - file: annotations.yaml
topology_templates:
  of function:
    required: false
  software_versions:
    type: string
    required: false
  entry schema:
    type: string
    required: false
  of role:
    type: string
    required: false
  of type:
    type: string
    required: false
  subscription_macro_refs:
    type: string
    required: false
  of type:
    type: string
    required: false
```



Resource CSAR File (VF) generated from VSP



Resource CSAR File (VF) generated from VSP

NF Descriptor
Descriptor (Interface connections)
Artifacts (incl. Onboarded Package)

- resource-Zu Servicemodel-template.yml
 - resource-Zu Servicemodel-template-interface.yml
 - org.openecomp.resource.vf.Zu Servicemodel_v1.0
-
- resource-Zu Servicemodel-template.yml
 - resource-Zu Servicemodel-template-interface.yml
 - org.openecomp.resource.vf.Zu Servicemodel_v1.0

SDC Service Package Version 1.5



SDC Service CSAR File

(SDC distributes to other ONAP RT components)

PNF Package Version 2019-1.1



Resource CSAR File (PNF) onboarded (SDC)



Resource CSAR File (PNF) onboarded (SDC)



Resource CSAR File (PNF) onboarded (SDC)

SDC PNF Package Version 2.6

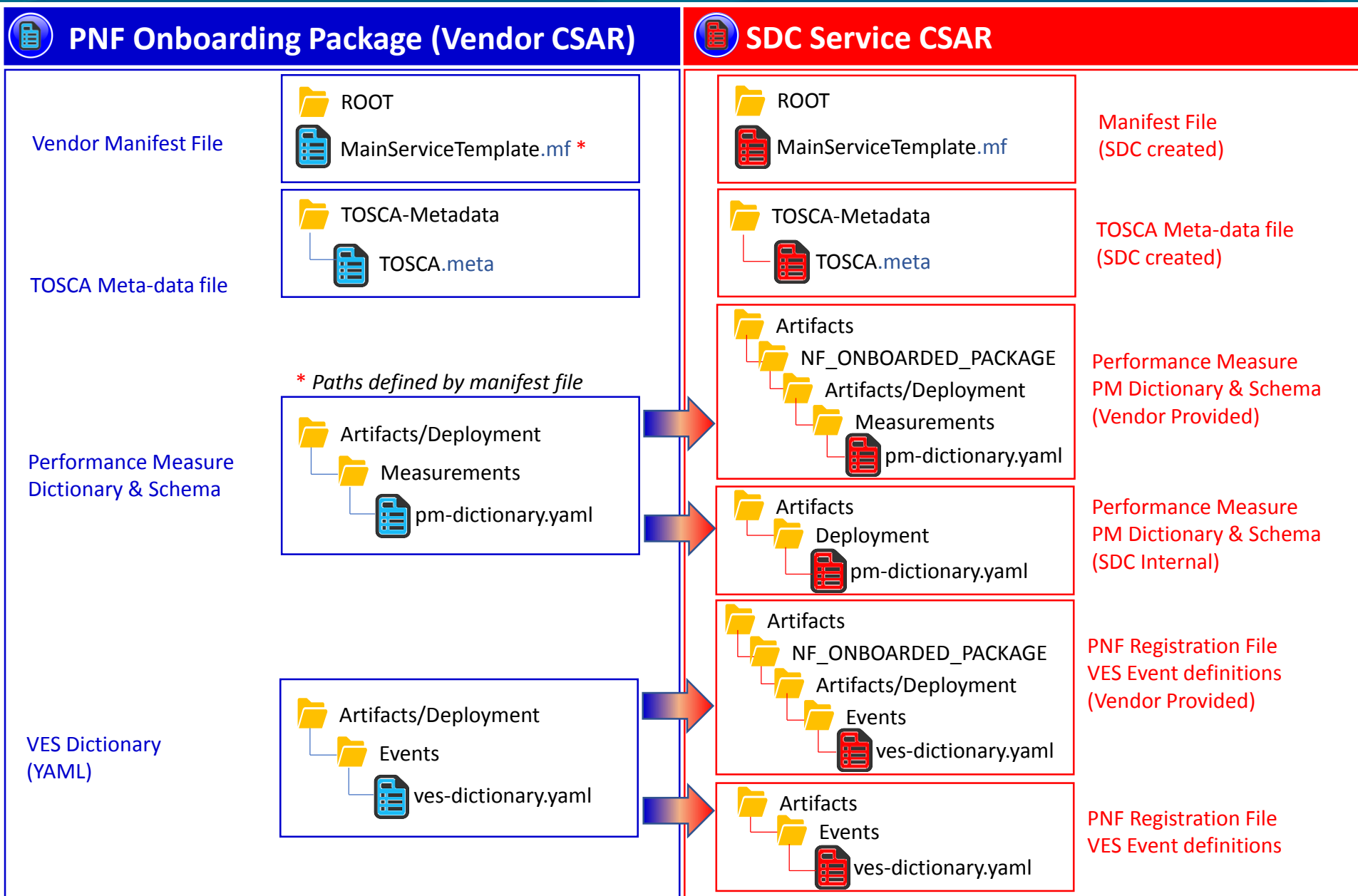
- resource-Zu Servicemodel-template.yml
 - resource-Zu Servicemodel-template-interface.yml
 - org.openecomp.resource.vf.Zu Servicemodel_v1.0
-
- resource-Zu Servicemodel-template.yml
 - resource-Zu Servicemodel-template-interface.yml
 - org.openecomp.resource.vf.Zu Servicemodel_v1.0
-
- resource-Zu Servicemodel-template.yml
 - resource-Zu Servicemodel-template-interface.yml
 - org.openecomp.resource.vf.Zu Servicemodel_v1.0

SDC doesn't recognize SOL001 Modeling vs Platform Data Model
SOL004 artifacts some artifacts dropped by SDC
name NF (naming policy)

TOSCA API to ingest CSAR package > same APIs to have clients ingest PNFs > onboarding of PNF packages.

NETWORK ASSIGNMENTS VLAN tag assignment,, IP assignments > Plug & play

Onboarded Package to SDC Internal Mapping



PRE-ONBOARDING PROCESSES



ONBOARDING PROCESSES



NF Descriptor



Pre Onboarding



Asset Manager



Platform Model



Onboarding



Asset Manager




PRE-ONBOARDING: VNF SDK DEVELOPMENT



PNF-D

 **NF Descriptor**

VES Event Registration Specification

 **NF Registration**

PM Dictionary
PM Schema

 **PM Dictionary
PM Schema**

Manuals, Help files
CustDoc Products
Test files


Informational Artifacts

Licensing agreement


Configuration Info

Configuration Files

Ansible Playbooks
Netconf Yang model
Chef Cookbooks

 **Communication Files**



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

 **VNF SDK**

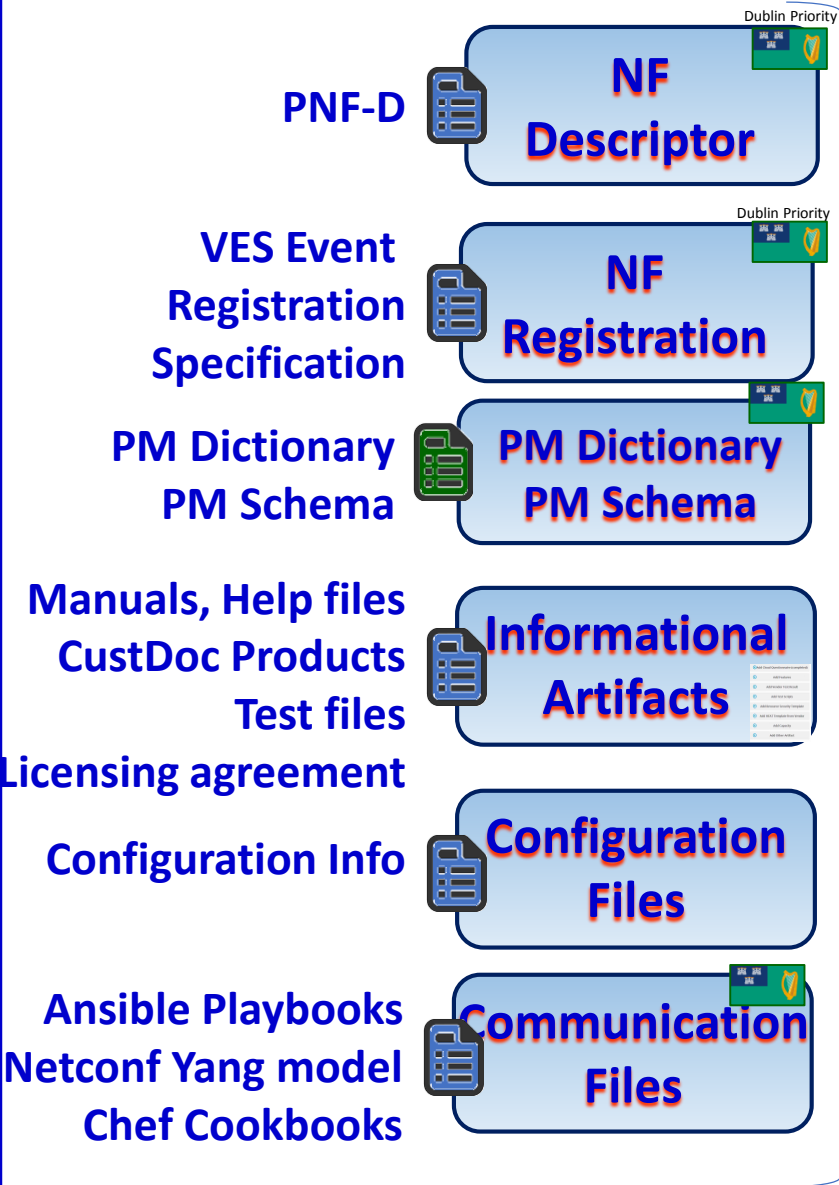
Package creation

WinZIP
Validating Content

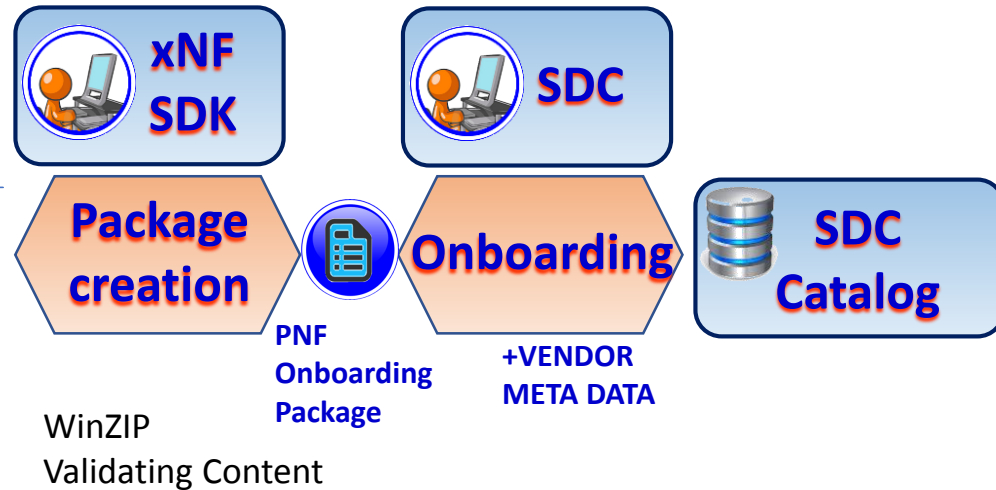


PNF Onboarding Package

PNF ONBOARDING: SDC Catalog



   **3 PNF Onboarding:** PNF Package is loaded



xNF ONBOARDING Dependencies R3



Pre-onboarding



Onboarding Design Time



VNF SDK

SDC

SO

SDNC/APPC Multi-VIM

VFC

VNFD ETSI SOL001 based

VNF SOL001

VOLTE workflow

Vendor VNF CSAR

Heat template

vCPE CreateVcpeWorkflow

VNF heat template

TOSCA AID VNF

PNF defined by UI

vCPE Create&ActivateWorkflow

TOSCA AID PNF

AID



xNF ONBOARDING Dependencies R4



Pre-onboarding



Onboarding Design Time

VNF SDK

SDC

SO

SDNC/APPC Multi-VIM

VFC

VNFD, **PNFD** ETSI SOL001 

VNF SOL001 
PNF SOL001 

VOLTE workflow 

Vendor **VNF** CSAR 
Vendor **PNF** CSAR 

Heat template

vCPE CreateVcpeWorkflow 

VNF heat template 

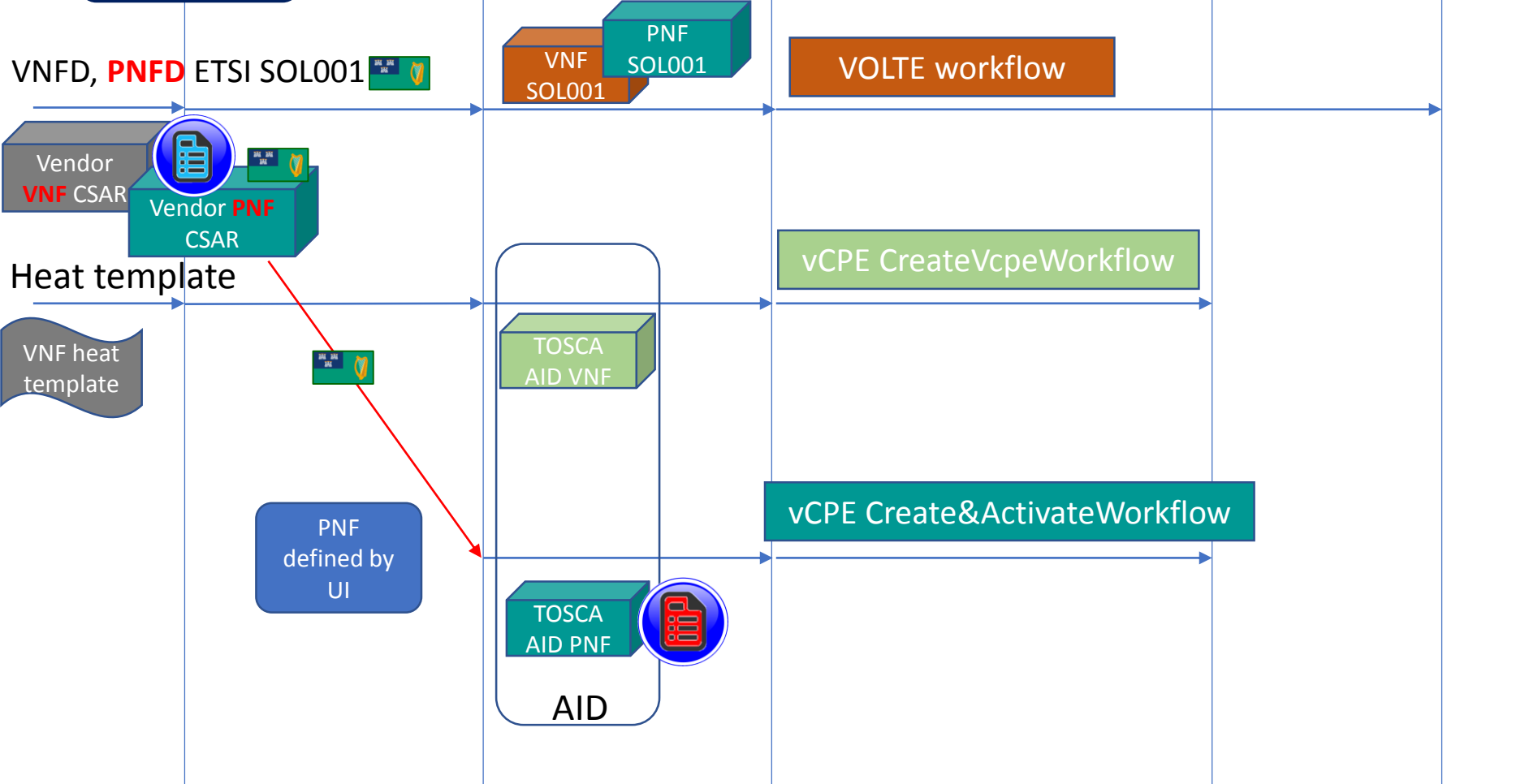
TOSCA AID VNF 

PNF defined by UI 

vCPE Create&ActivateWorkflow 

TOSCA AID PNF 

AID 



DESIGN TIME & SDC



SDC CSAR Pkg	
Design Time	
Service Designer	

NFV Release 2: stage 2 and stage 3 specification summary

(*) Release 2 Stage 3 work items in "green"

Status as of Apr. 2018

NFV-IFA 015
(NFV Information Model Report)

- + **NFV-IFA 016** (Papyrus Guidelines),
- **NFV-IFA 017** (UML Modeling Guidelines),
- **NFV-IFA 024** (NFV Information Model External Touchpoints)

NFV-TST 008
(NFVI metrics)

NFV-IFA 002
(Acceleration)

NFV-IFA 003
(Acceleration)

NFV-IFA 010
(NFV-MANO Functional Reqs)

NFV-IFA 013
NFV-SOL005

SOL004
(VNF Packaging)
NFV-IFA 011
(VNF Pkg)

NFV-SOL007
(NSD file structure)
NFV-IFA 014
(NS templates)

NFV-SOL 001
NFV-SOL 006
(VNF and NS Descriptors)

NFV-IFA 007
NFV-SOL 003

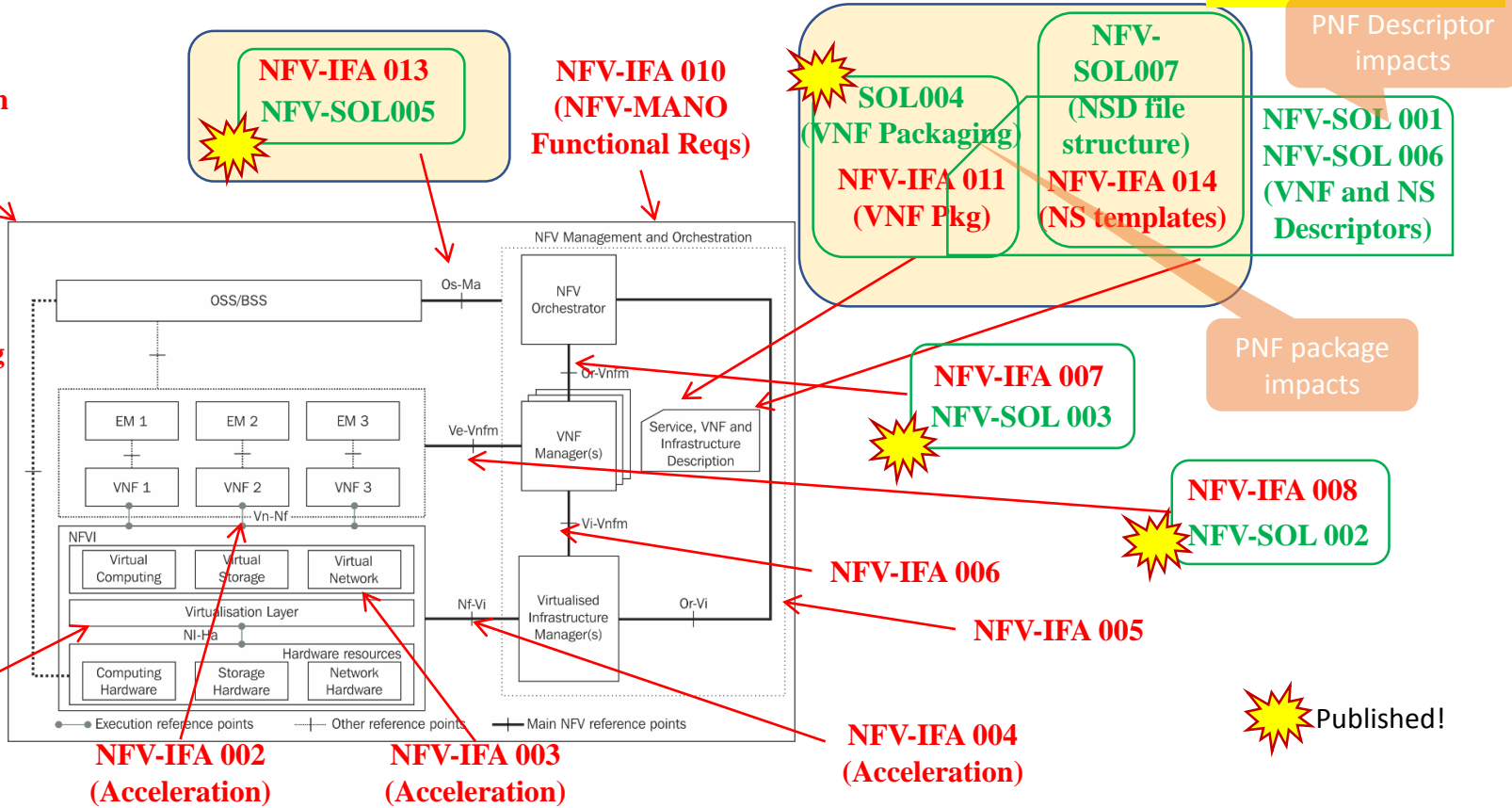
NFV-IFA 008
NFV-SOL 002

NFV-IFA 006

NFV-IFA 005

NFV-IFA 004
(Acceleration)

Published!



PNF Descriptor (ETSI SOL 001)



PNFD Service Template

Substituted by

**PNFD
Abstract**

VirtualLinkable

DependsOn



PNF

Properties:

NODE

Application (NF)
Infrastructure (H/W)

PnfExtCp

NODE

VirtualLinkable

NsVirtualLink

VirtualLinkable

LEGEND:

Capabilities

Requirements

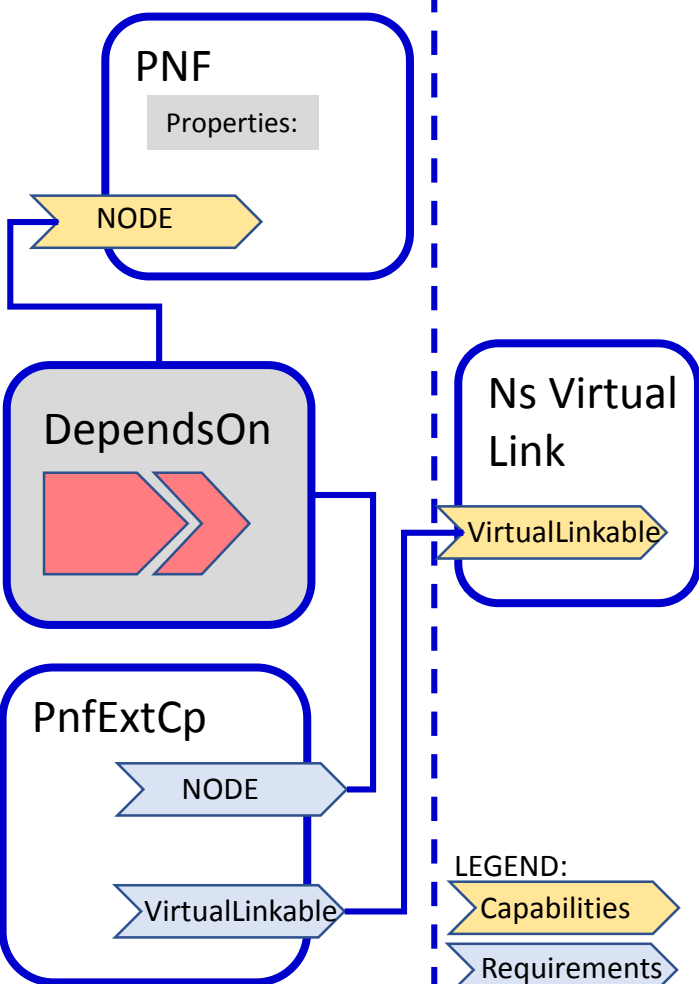
DsnTm: PNFD > ONAP Platform Model



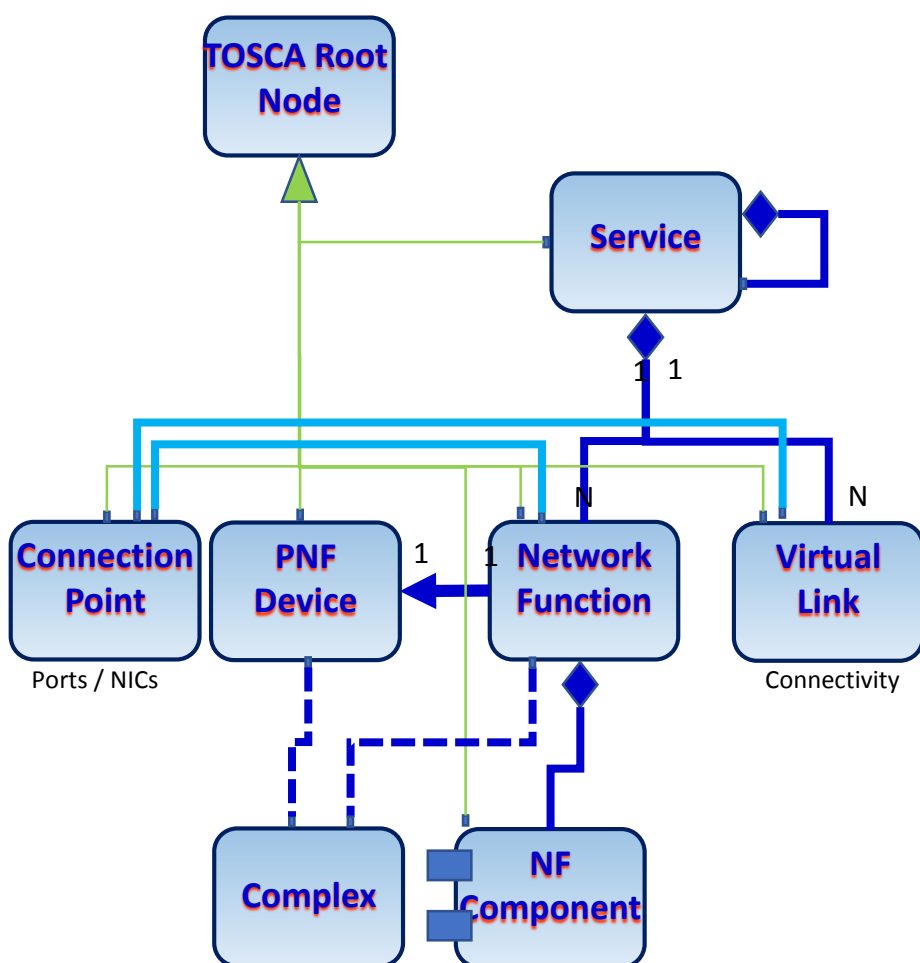
4 Design Time Activities: NF

Onboard Package > SDC catalog

PNFD DESCRIPTOR



PLATFORM MODEL (INTERNAL MODEL)



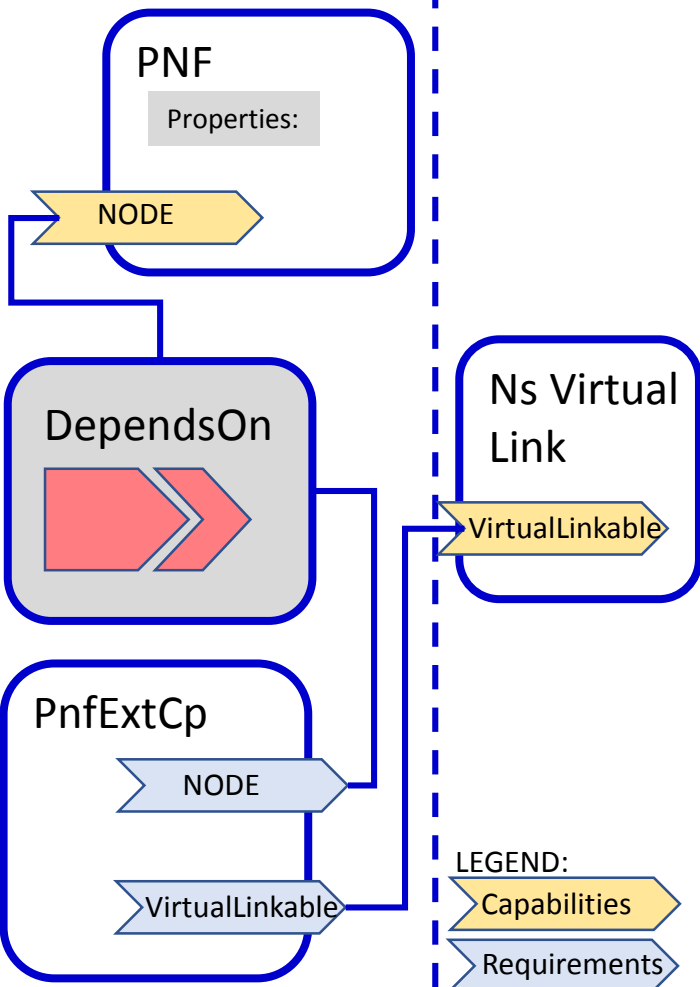
DsnTm: PNFD > SDC AID



4 Design Time Activities: NF

Onboard Package > SDC catalog

PNFD DESCRIPTOR



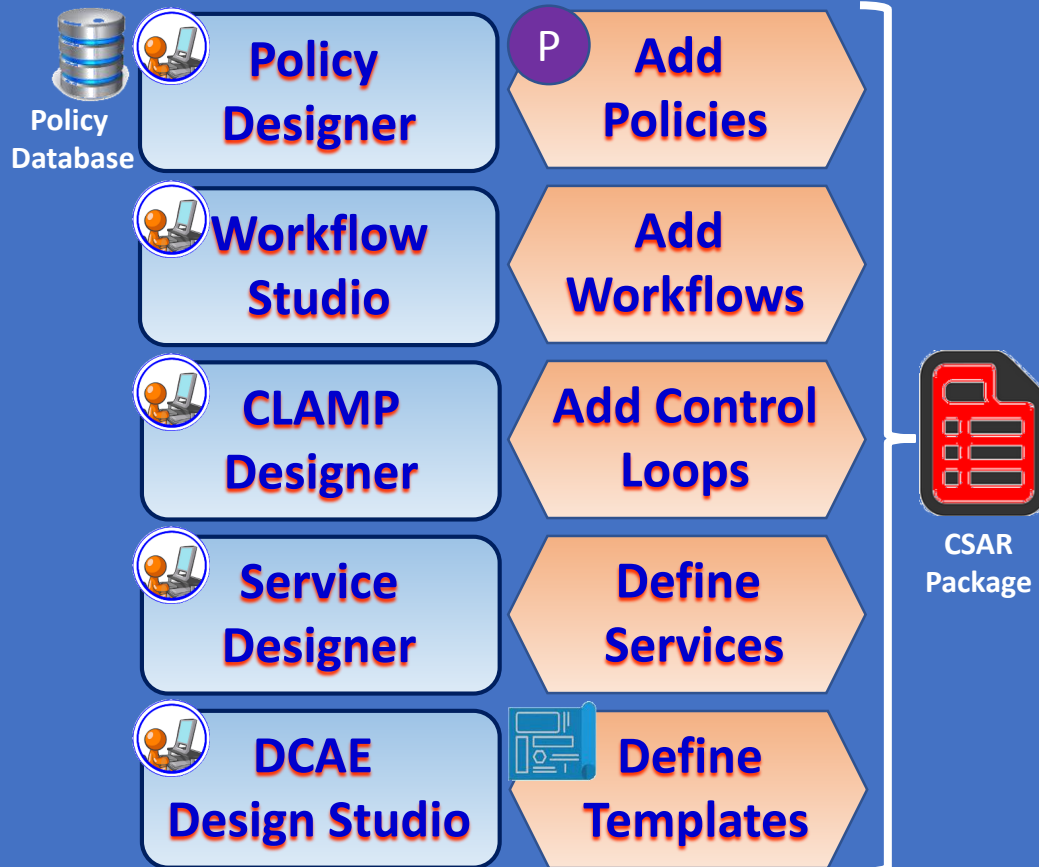
SDC AID (Architecture Integration Document) Internal Model



Design-Time Process



DESIGN-TIME (SDC)



ONAP RUN-TIME



Defining a Service

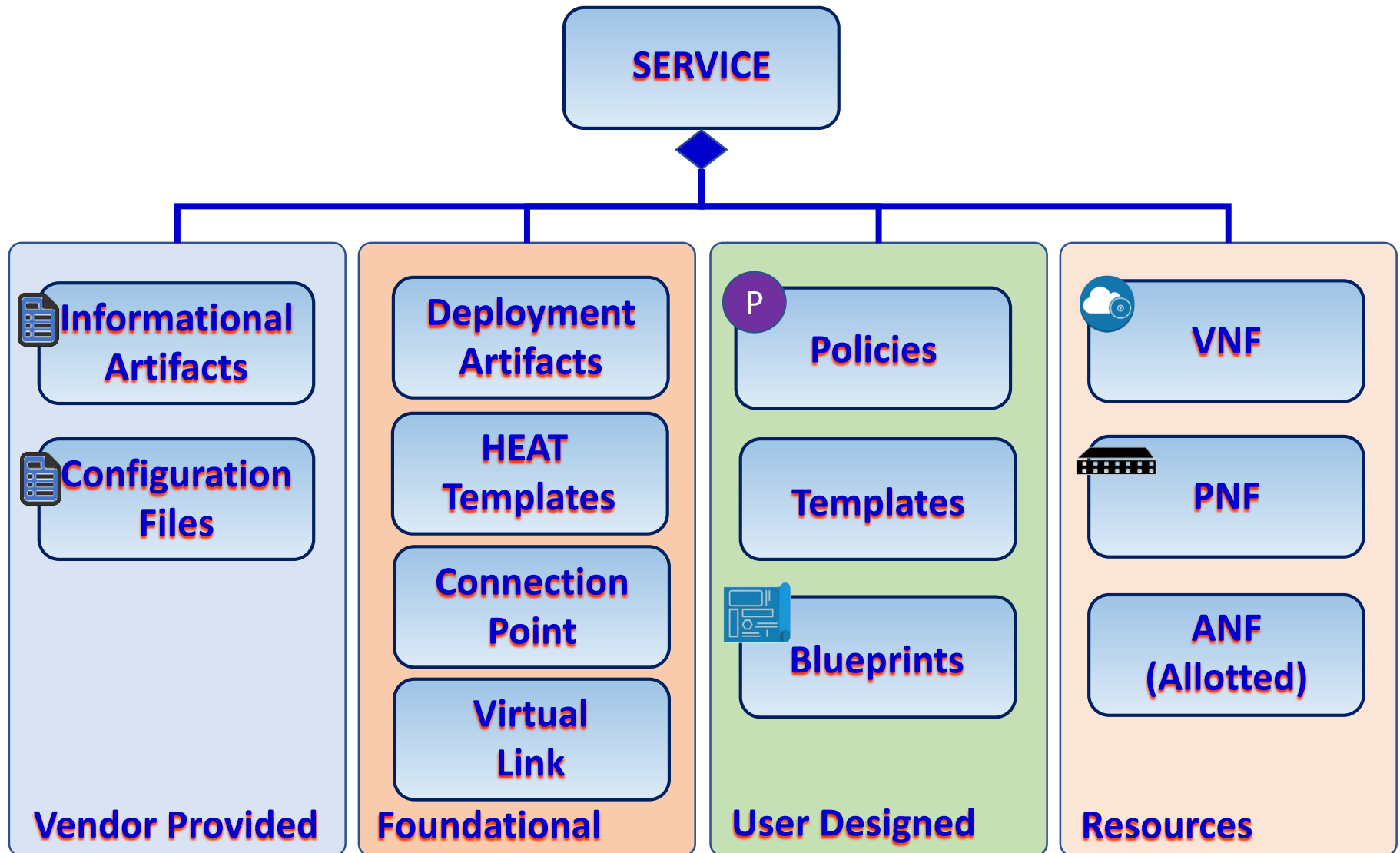


4 Design Time Activities:
Designing a Service

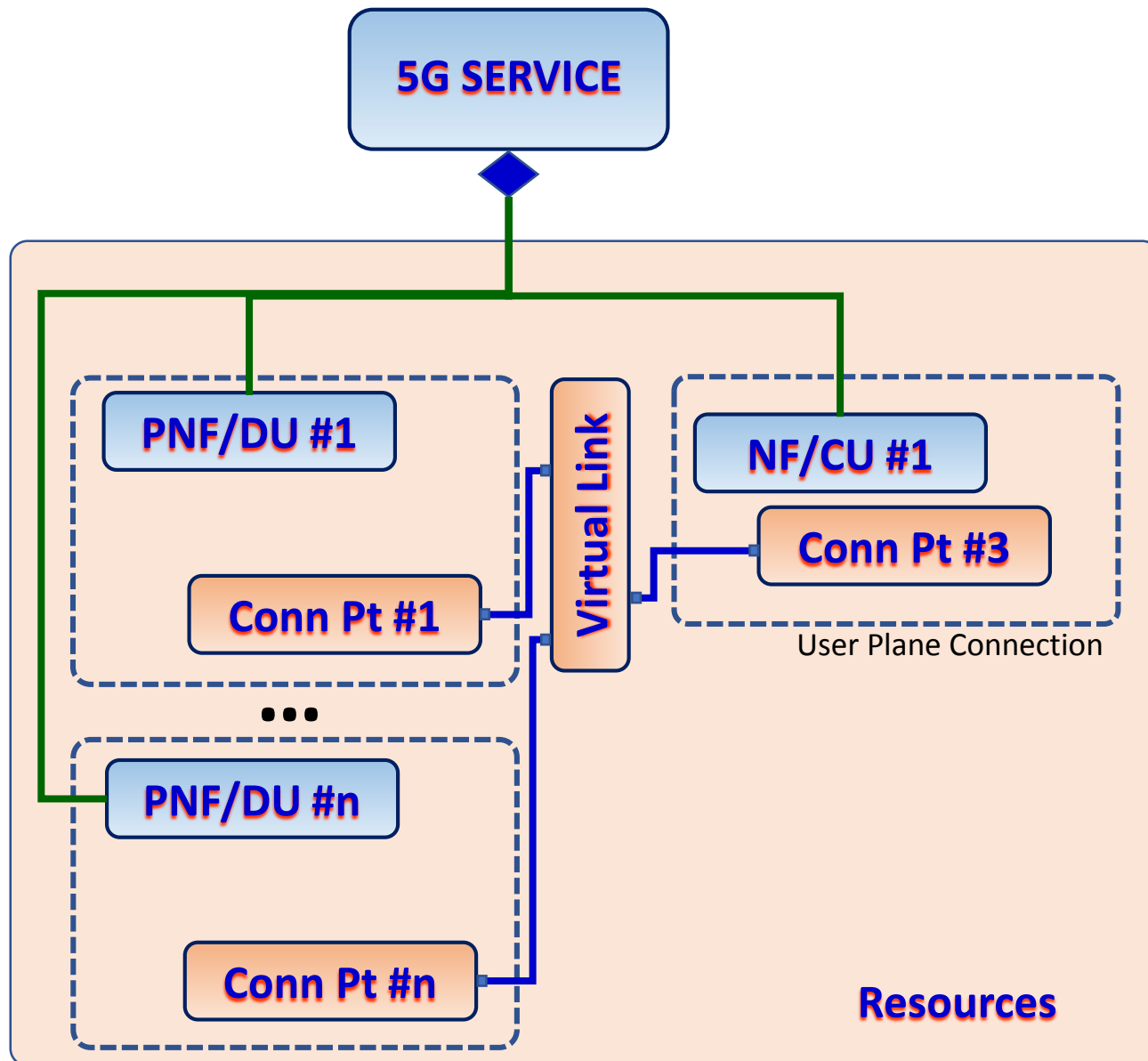
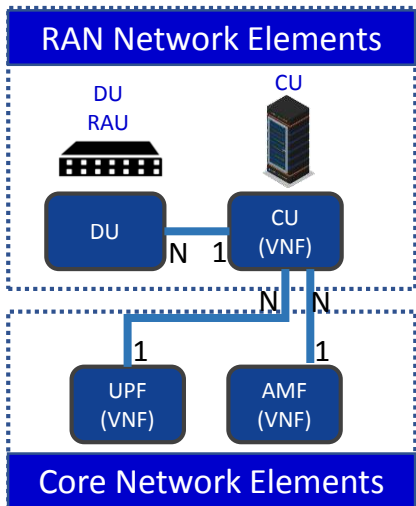
Distribute



SDC Service CSAR
Package






R4: 5G Base Station (gNodeB)



VNF Requirements



- NF Descriptor 
- Onboarding 
- Asset Manager 

VNF Requirement extension for PNF

- [VNFRQTS-506](#): [Supporting PNF package onboarding](#)
 - [VNFRQTS-507](#): Project scope to include **PNF**
 - [VNFRQTS-508](#): Add **PNFD** requirements
 - Section 5.1.6:
 - [VNFRQTS-499](#): **PNF** onboarding CSAR package structure based SOL004
 - [VNFRQTS-497](#): Adding package security requirements
 - Section 7.2:
 - Clarifications on the documentation requirements
 - [VNFRQTS-505](#): **PNF** onboarding package artifacts
 - [VNFRQTS-498](#): Add VES Event Registration requirement to **PNF** package
 - Clarifications on artifacts structure requirements
 - [VNFRQTS-496](#): supporting Ansible protocol in **PNF**

ONAP VNF Descriptor (5.1.9) Requirements

R number	Description	Comments
R-35854	The VNF Descriptor (VNFD) provided by VNF vendor MUST comply with TOSCA/YAML based Service template for VNF descriptor specified in ETSI NFV-SOL001.	Shall applicable to PNFD
R-65486	The VNFD MUST comply with ETSI GS NFV-SOL001 document endorsing the above mentioned NFV Profile and maintaining the gaps with the requirements specified in ETSI GS NFV-IFA011 standard.	Shall applicable to PNFD
R-17852	The VNFD MAY include TOSCA/YAML definitions that are not part of NFV Profile. If provided, these definitions MUST comply with TOSCA Simple Profile in YAML v.1.2.	Shall applicable to PND
R-46527	A VNFD is a deployment template which describes a VNF in terms of deployment and operational behavior requirements. ... including topology, deployment aspect, and VNF lifecycle management (LCM) operations	PNF LCM is not defined yet
R-15837	The major TOSCA Types specified in ETSI NFV-SOL001 standard draft	
R-54356 R-54876	VNF Data Types	CpProtocolData AddressData L2AddressData L3AddressData LocationInformation CivicAddressElement
R-67895	VNF Capability Types	VirtualLinkable
R-95321	VNF Relationship Types	VirtualLinksTo
R-32155	VNF Interface Types	
		PNF Node Types: PNF, PnfExtCp, Cp
		PBF Policy Types

ONAP VNF CSAR Package (5.1.6) Requirements

R number	Description	Comments
R-51347	The VNF package MUST be arranged as a CSAR archive as specified in TOSCA Simple Profile in YAML 1.2.	Shall applicable to PNF package
R-87234	The VNF package provided by a VNF vendor MAY be either with TOSCA-Metadata directory (CSAR Option 1) or without TOSCA-Metadata directory (CSAR Option 2) as specified in ETSI GS NFV-SOL004. On-boarding entity (ONAP SDC) must support both options. Note: SDC supports only the CSAR Option 1 in Casablanca. The Option 2 will be considered in future ONAP releases,	Shall applicable to PNF package
R-10087	The VNF package MUST contain all standard artifacts as specified in ETSI GS NFV-SOL004 including Manifest file, VNFD (or Main TOSCA/YAML based Service Template) and other optional artifacts. CSAR Manifest file as per SOL004 - for example ROOT\ MainServiceTemplate.mf	Shall applicable to PNF package
R-01123	The VNF package Manifest file MUST contain: VNF package meta-data, a list of all artifacts (both internal and external) entry's including their respected URI's, an algorithm to calculate a digest and a digest result calculated on the content of each artifacts, as specified in ETSI GS NFV-SOL004. The VNF Package MUST include VNF Identification Data to uniquely identify the resource for a given VNF provider. The identification data must include: an identifier for the VNF, the name of the VNF as was given by the VNF provider, VNF description, VNF provider, and version.	Shall applicable to PNF package With new valid names/values <ul style="list-style-type: none"> - pnf_provider_id - pnf_product_name - pnf_release_date_time - pnf_package_version
R-21322	The VNF provider MUST provide their testing scripts to support testing as specified in ETSI NFV-SOL004 - Testing directory in CSAR	Should applicable to PNF package
R-26885	The VNF provider MUST provide the binaries and images needed to instantiate the VNF (VNF and VNFC images) either as: <ul style="list-style-type: none"> • Local artifact in CSAR: ROOT\Artifacts\VNF_Image.bin • externally referred (by URI) artifact in Manifest file (also may be referred by VNF Descriptor) Note: Currently, ONAP doesn't have the capability of Image management, we upload the image into VIM/VNFM manually.	May applicable to PNF package Not supported with current release
R-40820	The VNF provider MUST enumerate all of the open source licenses their VNF(s) incorporate. CSAR License directory as per ETSI SOL004. for example ROOT\Licenses\ License_term.txt	May applicable to PNF package
R-xxxxx	VNF Package Authenticity	May applicable to PNF package

PNF on-boarding requirements (7.2)

R number	Description	Comments
R-77707	The xNF provider MUST include a Manifest File that contains a list of all the components in the xNF package	OK . Overlapped with R-10087 in section 5.1.6.3
R-66070	The xNF Package MUST include xNF Identification Data to uniquely identify the resource for a given xNF provider. The identification data must include: an identifier for the xNF, the name of the xNF as was given by the xNF provider, xNF description, xNF provider, and version.	Part of the descriptor
R-98617	The xNF provider MUST provide information regarding any dependency (e.g., affinity, anti-affinity) with other xNFs and resources.	Part of the descriptor
R-22346	The VNF package MUST provide VES Event Registration for all VES events provided by that xNF.	VES event Registration Should be applicable to PNF
R-89571	The xNF MUST support and provide artifacts for configuration management using at least one of the following technologies; a) Netconf/YANG, b) Chef, or c) Ansible.	
R-30278	The xNF provider MUST provide a Resource/Device YANG model as a foundation for creating the YANG model for configuration. This will include xNF attributes/parameters and valid values/attributes configurable by policy.	
R-27711	The xNF provider MUST provide an XML file that contains a list of xNF error codes, descriptions of the error, and possible causes/corrective action	Not the proposed FM dictionary
R-74763	The xNF provider MUST provide an artifact per xNF that contains all of the xNF Event Records supported. The artifact should include reference to the specific release of the xNF Event Stream Common Event Data Model document it is based on. (e.g., VES Event Listener)	VES event Listener
R-35851	The xNF Package MUST include xNF topology that describes basic network and application connectivity internal and external to the xNF including Link type, KPIs, Bandwidth, latency, jitter, QoS (if applicable) for each interface.	Part of the descriptor?
R-26881	The xNF provider MUST provide the binaries and images needed to instantiate the xNF (xNF and VNFC images).	Not supported by Casablanca
R-96634	The xNF provider MUST describe scaling capabilities to manage scaling characteristics of the xNF.	Not supported by PNF
R-04298	The xNF provider MUST provide their testing scripts to support testing.	Testing Requirements.
R-58775	The xNF provider MUST provide software components that can be packaged with/near the xNF, if needed, to simulate any functions or systems that connect to the xNF system under test. This component is necessary only if the existing testing environment does not have the necessary simulators.	
R-85653	The xNF MUST provide metrics (e.g., number of sessions, number of subscribers, number of seats, etc.) to ONAP for tracking every license.	Only if Licensing is needed
R-40827	The xNF provider MUST enumerate all of the open source licenses their xNF(s) incorporate.	
R-85991	The xNF provider MUST provide a universal license key per xNF to be used as needed by services (i.e., not tied to a VM instance) as the recommended solution. The xNF provider may provide pools of Unique xNF License Keys, where there is a unique key for each xNF instance as an alternate solution. Licensing issues should be resolved without interrupting in-service xNFs.	
R-47849	The xNF provider MUST support the metadata about licenses (and their applicable entitlements) as defined in this document for xNF software, and any license keys required to authorize use of the xNF software. This metadata will be used to facilitate onboarding the xNF into the ONAP environment and automating processes for putting the licenses into use and managing the full lifecycle of the licenses.	



Q&A



REFERENCES / APPENDIX / BACKUP SLIDES

Benjamin Cheung, PhD

VNF SDK Updates



Benjamin Cheung, PhD

NF Descriptor



Onboarding



Asset Manager



SDK ENHANCEMENTS



sdsc.api.fe.simplifiedemo.onap.org:30206/sdc1/portal#/dash-board

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-aaf5-48ff-a33f-0aaa307e016 Version: 1.0 Modifier: Carlos Santana		
6077b558-4f67-4dc7-8cce	c94dfaad-d116-41d8-8178	Generic Abstract
774350dc-b0df-48c0-bc12	a9236f3b-9b13-45b2-a172	Generic Abstract
7ad18697-c393-4841-85f9	fcc57795-7368-4600-98d5	Generic Abstract
934d85cd-01ff-493c-bcbe	07599e05-7cea-4a40-b978	Generic Abstract
ac743abf-b255-44ef-8493	4cedaece-7762-4395-adcc	Generic Abstract
afb1efb7-90b9-419f-9a43	ed8e0862-e6a8-4bef-b2aa	Generic Abstract
e18314f7-91ff-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: bleib

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




VNF SDK Impacts

- [VNFSDK-337](#): Supporting PNF package onboarding
 - [VNFSDK-338](#): Project scope to include PNF
 - [VNFSDK-339](#): PNF CSAR structure based SOL004
 - [VNFSDK-340](#): PNF manifest file
 - [VNFSDK-341](#): PNFD validation based on SOL001
 - [VNFSDK-342](#): Support packaging security
 - [VNFSDK-343](#): Enhancement of the test on PNF package

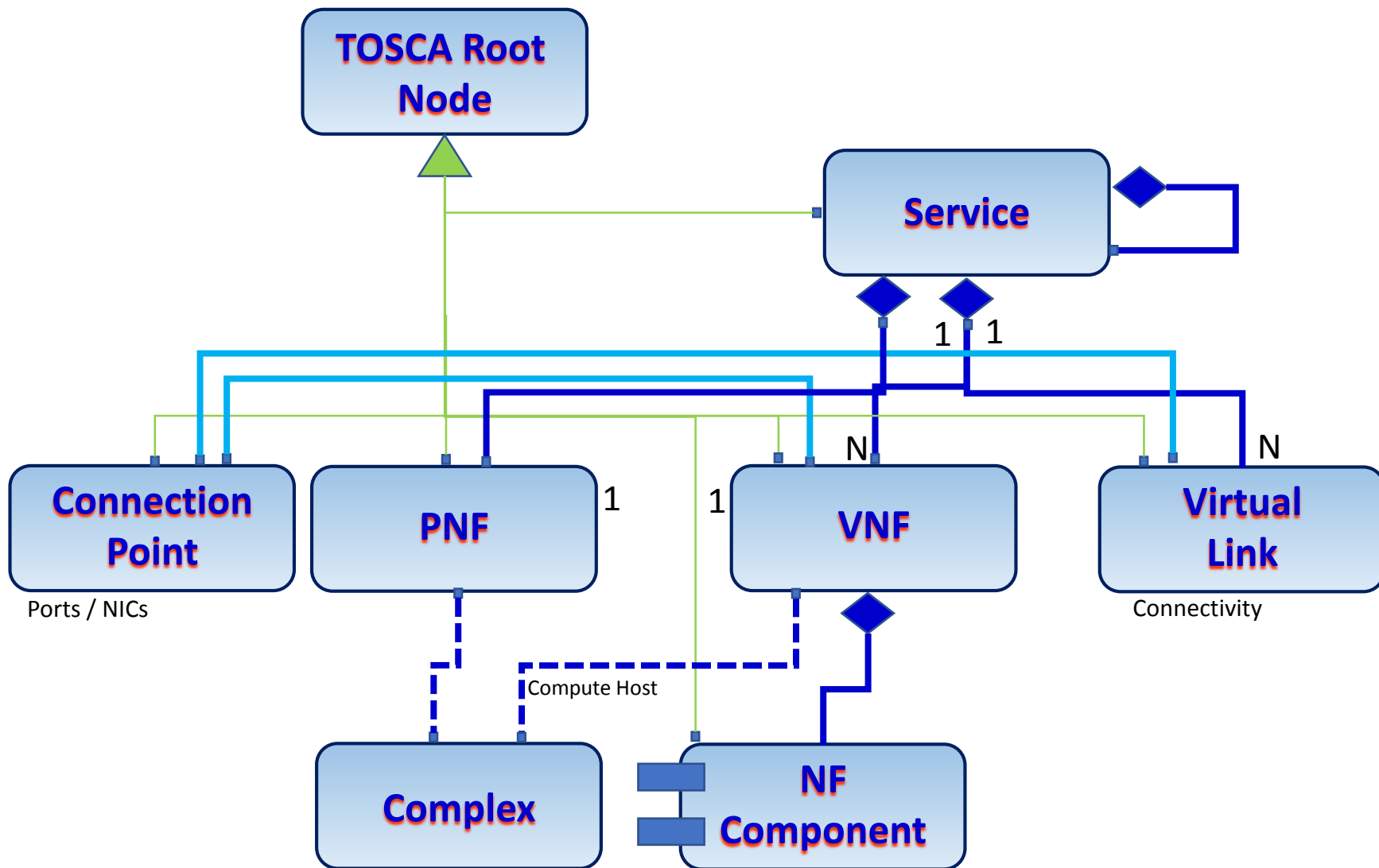
PLATFORM MODEL / MODELING A SERVICE



Benjamin Cheung, PhD

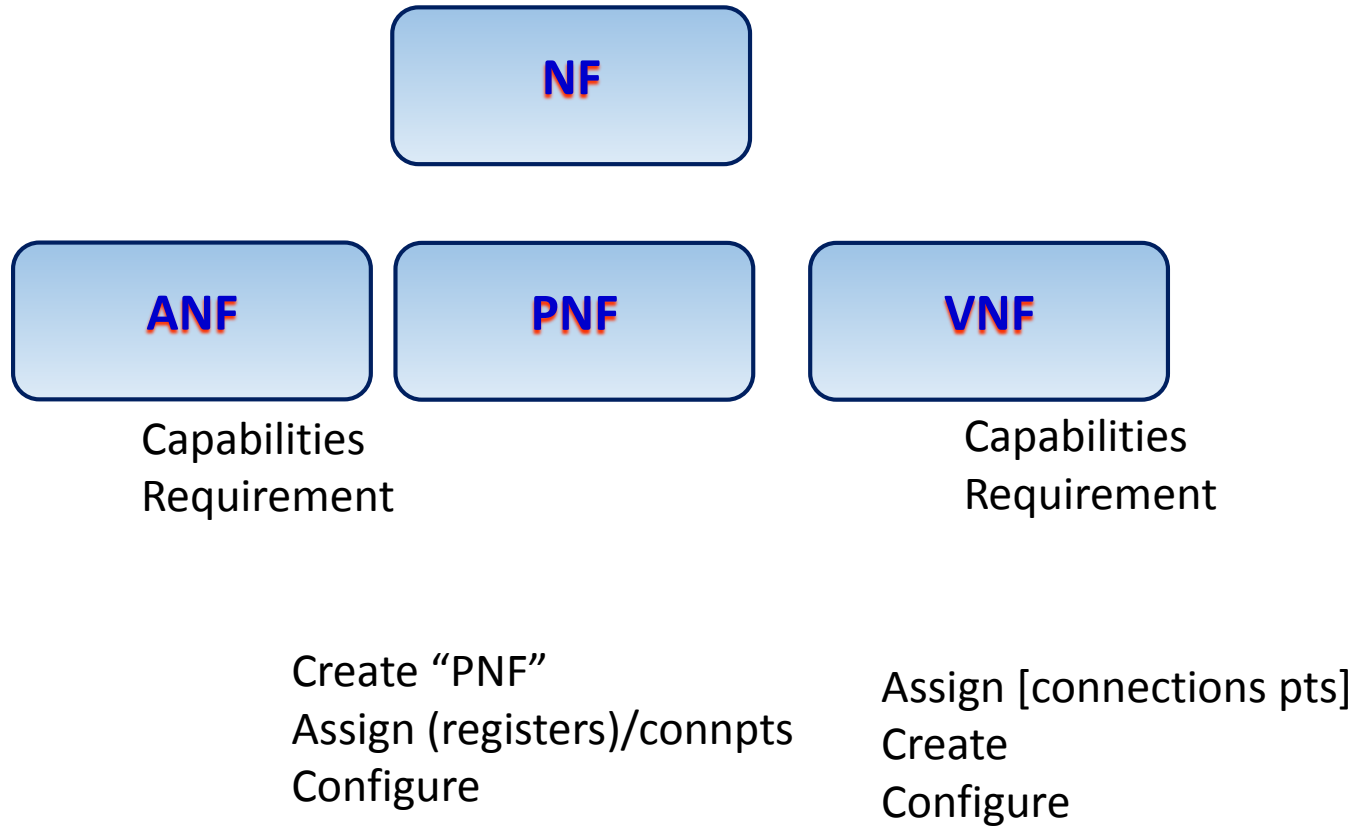
Platform Model	
Design Time	
Service Designer	

Platform Data Model



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

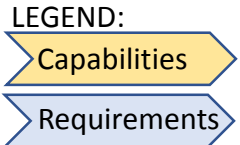
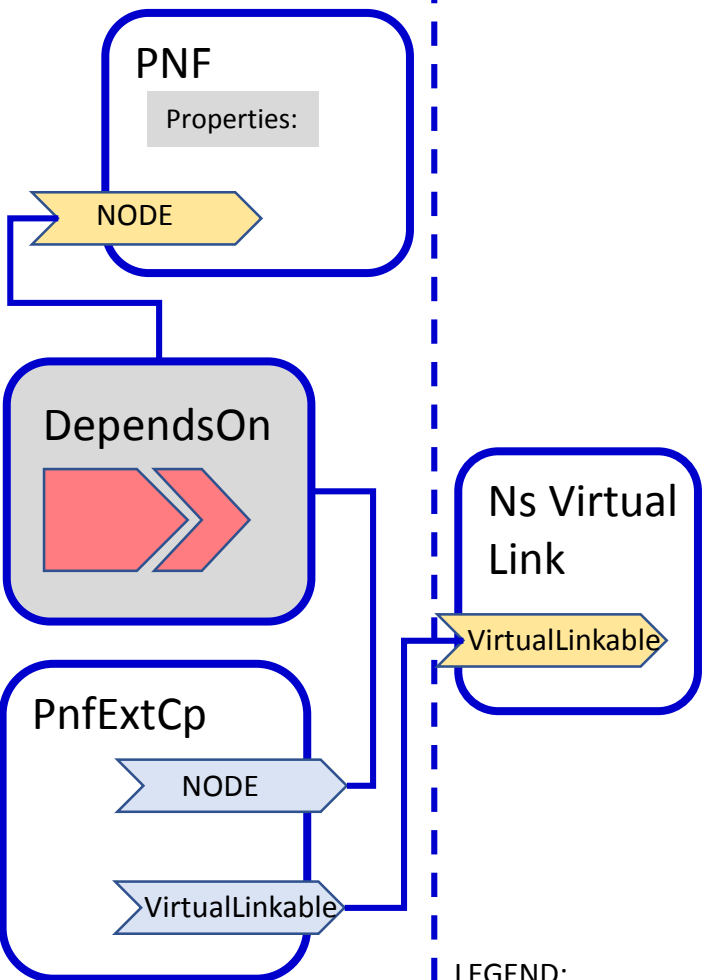
Platform (Internal) Information Model



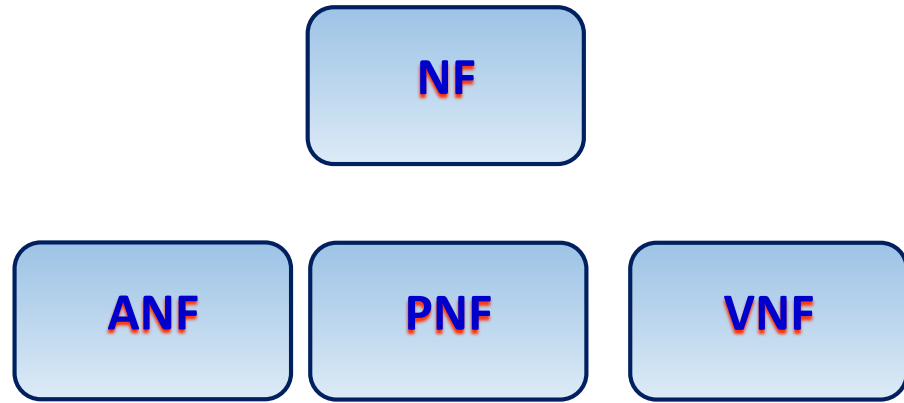
PNF Descriptor > ONAP Platform Model



PNFD DESCRIPTOR



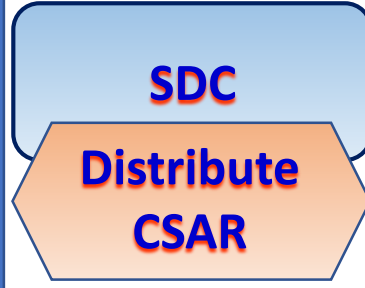
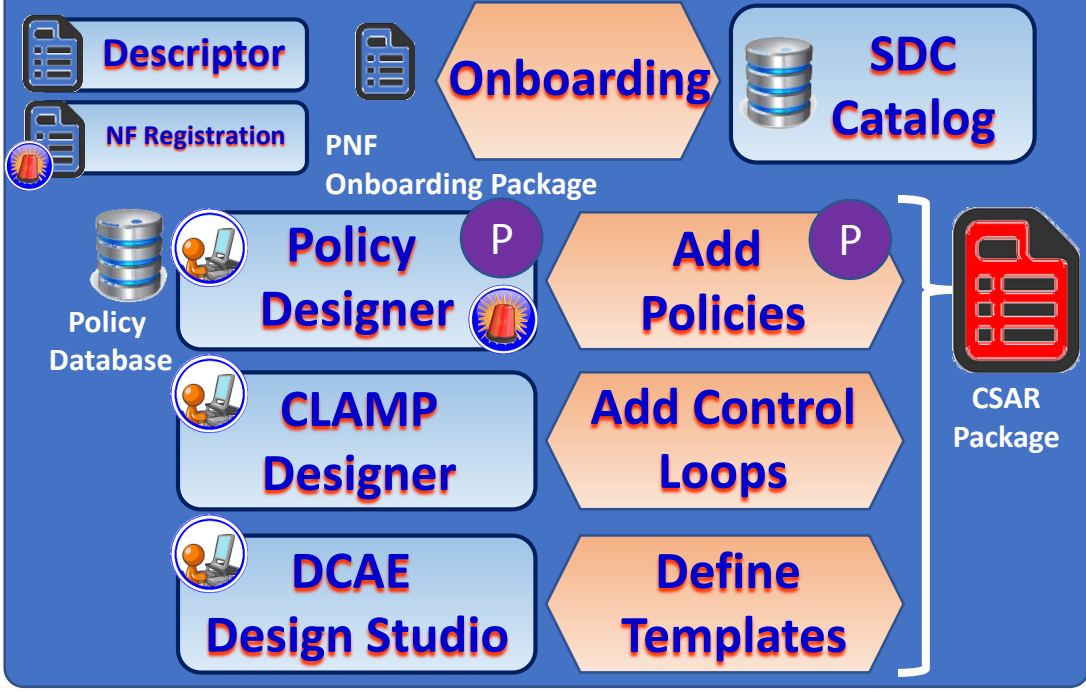
PLATFORM MODEL (INTERNAL MODEL)



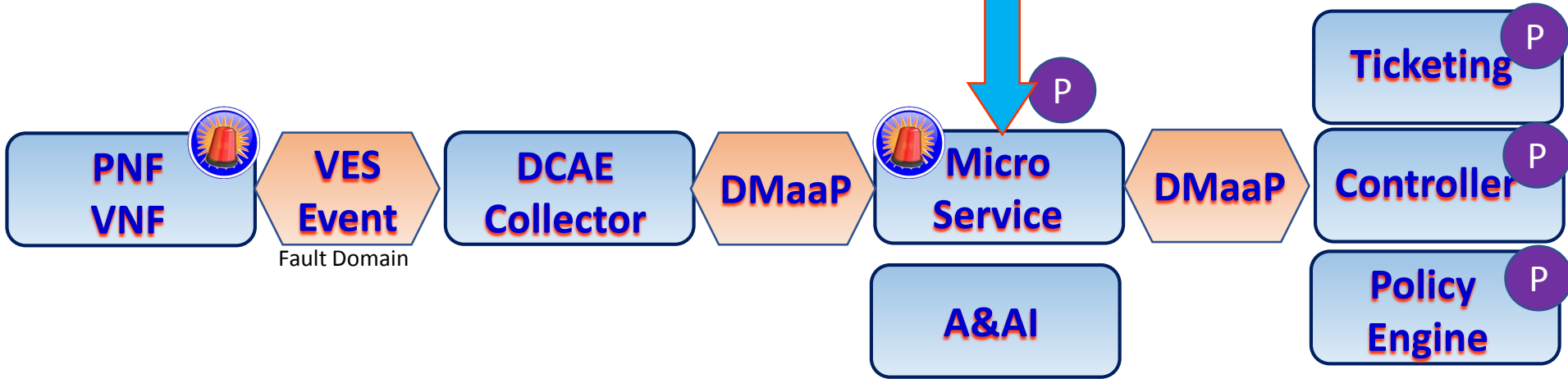
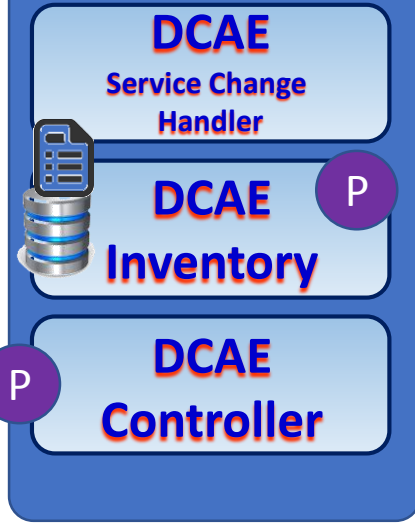
Policy Example



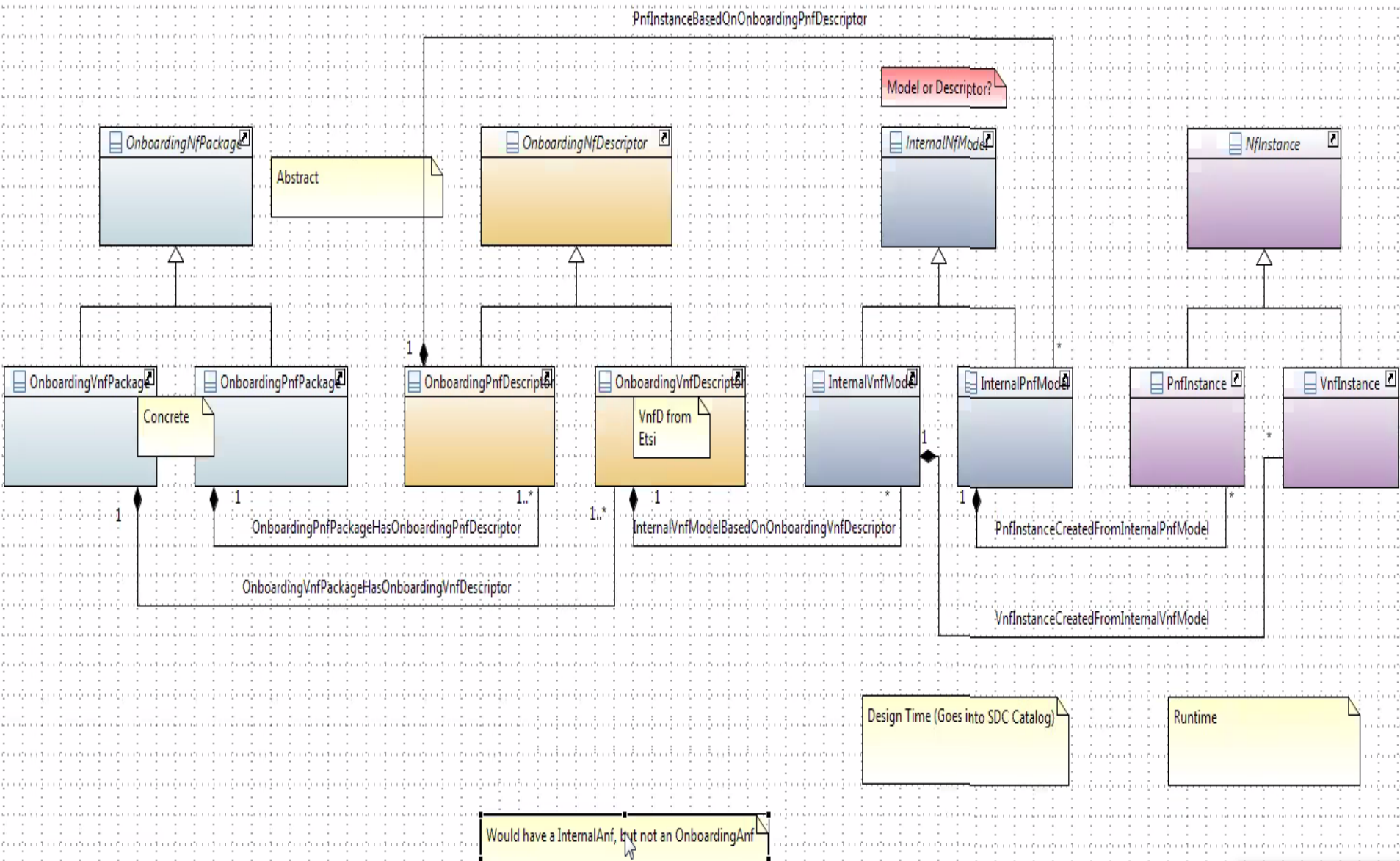
DESIGN-TIME (SDC)



DCAE (Run Time)



Onboarding and Design Time



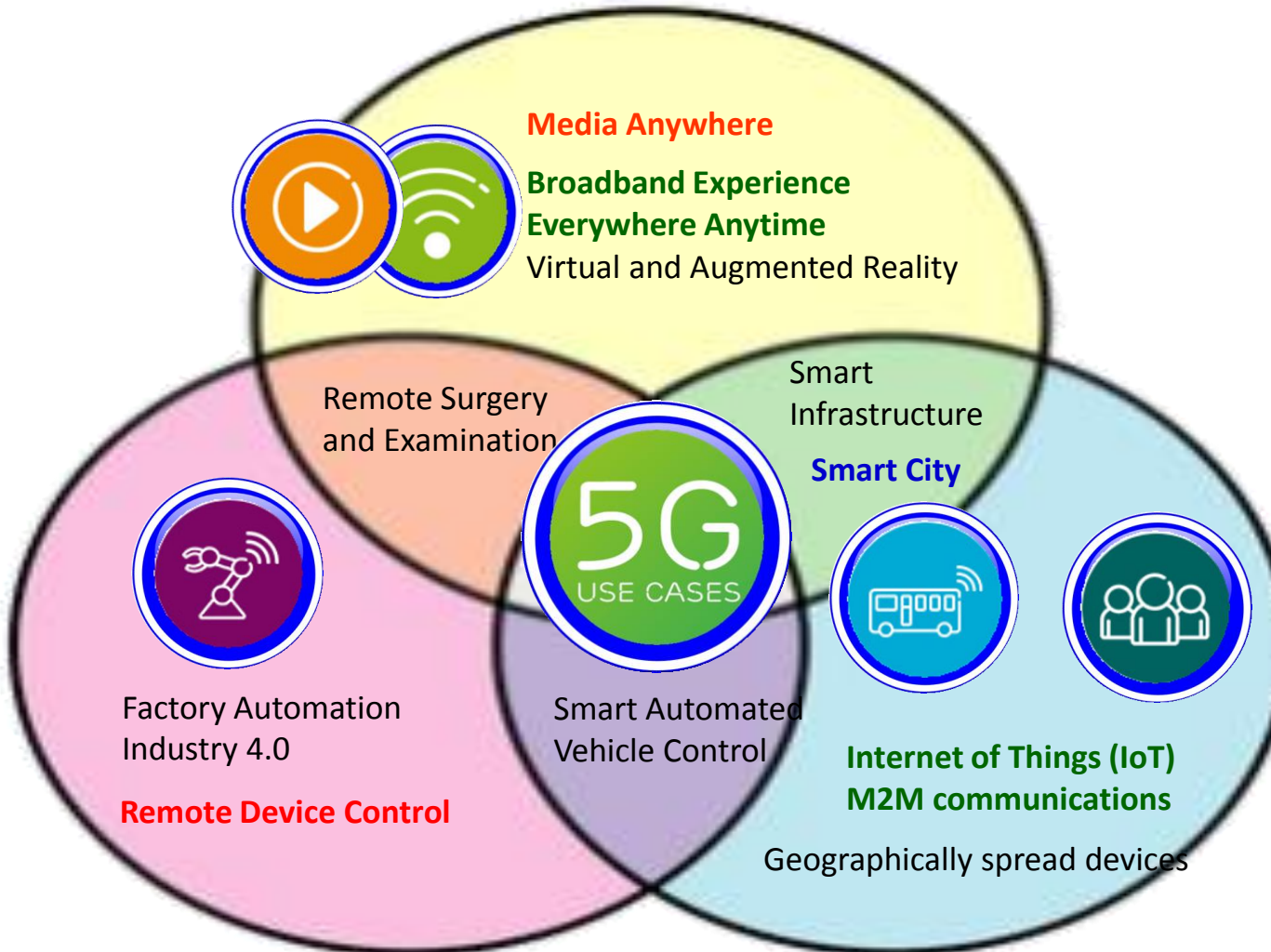
5G RAN Wireless Systems



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)



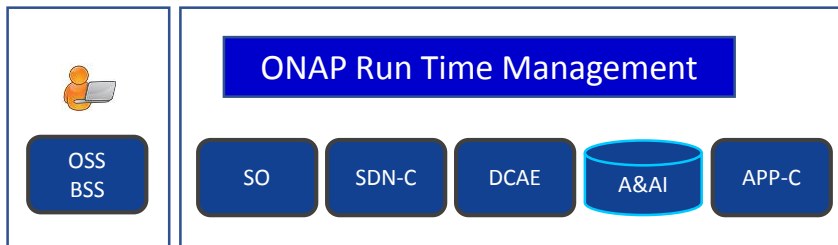
**Fog Computing (FC)
Mobile Edge Computing (MEC)**



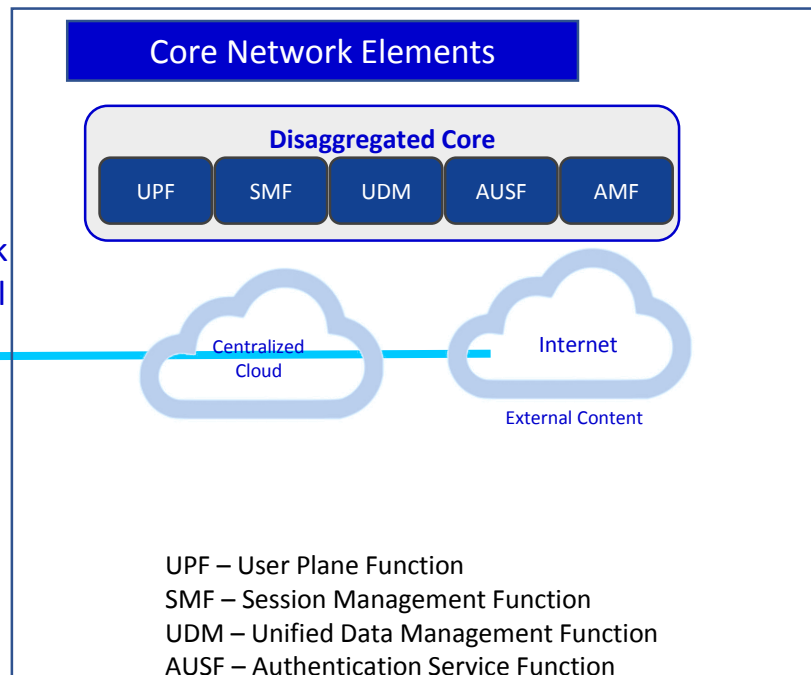
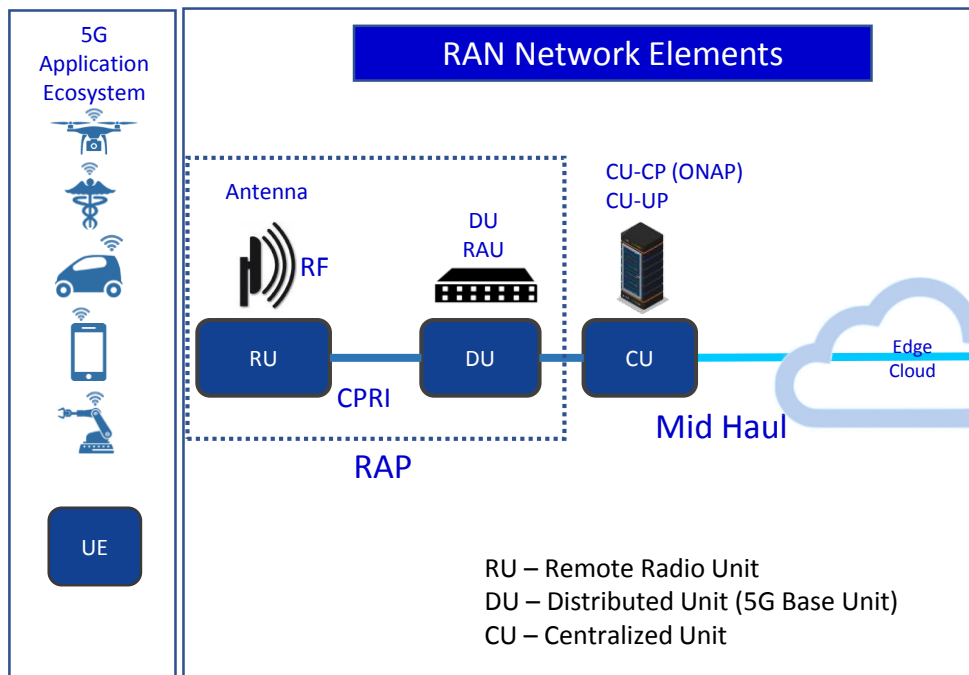
5G RAN Wireless Systems & ONAP



5G RAN Wireless Network

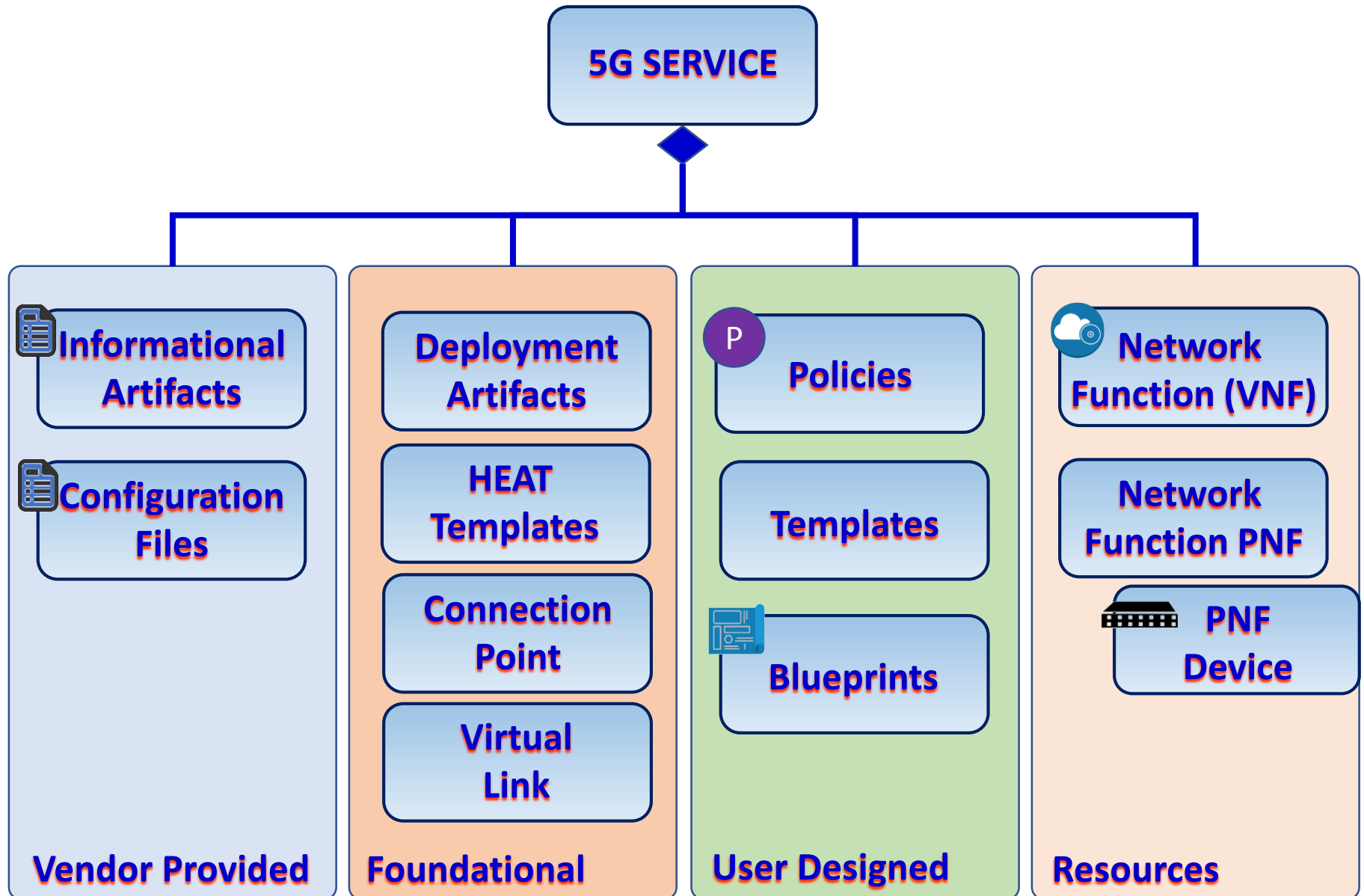


SO – Service Orchestrator
 SDN-C – Service Design Network Controller
 DCA&E – Data Collection Analytics & Events
 A&AI – Available & Active Inventory
 APP-C – Application Control

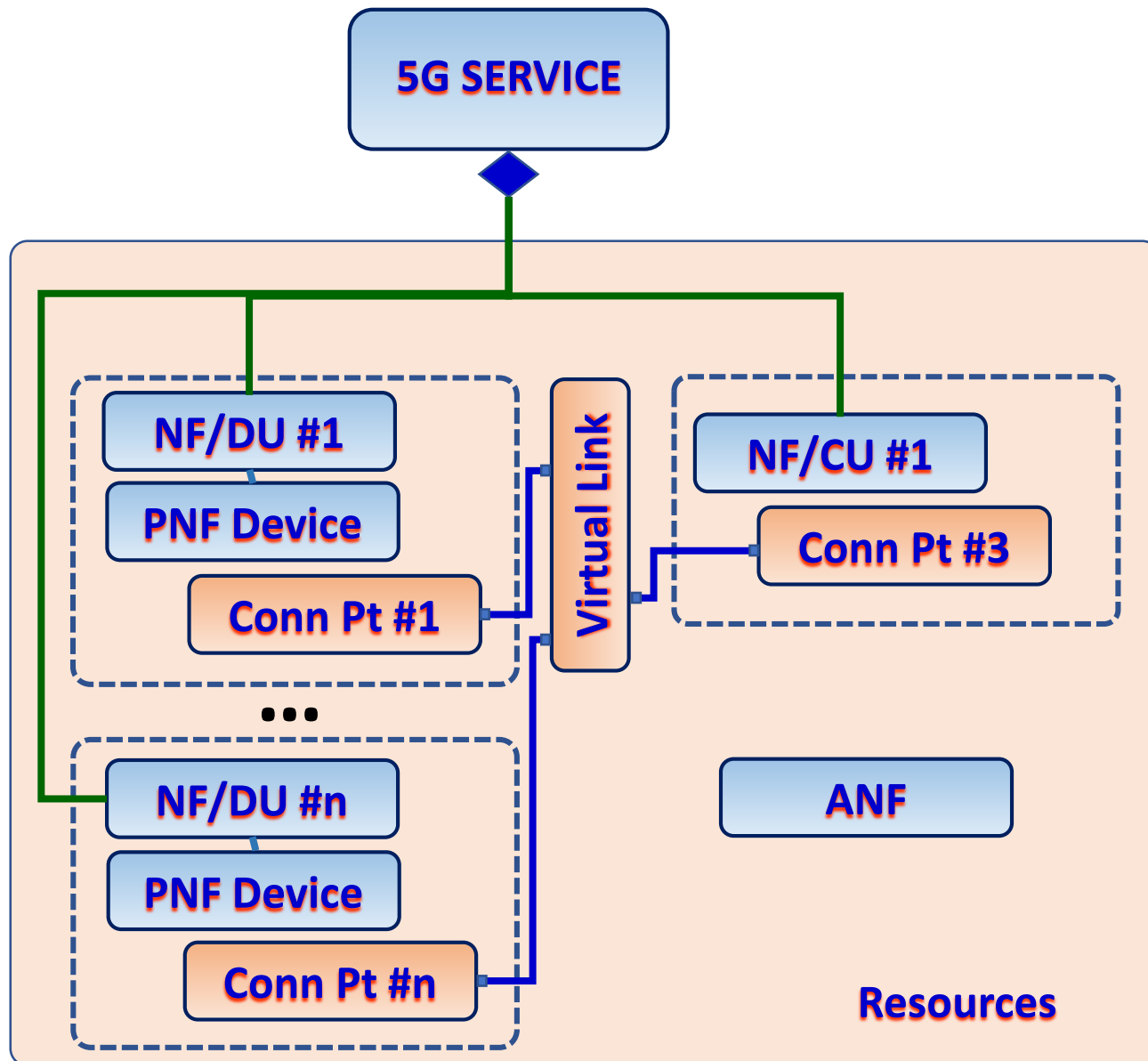
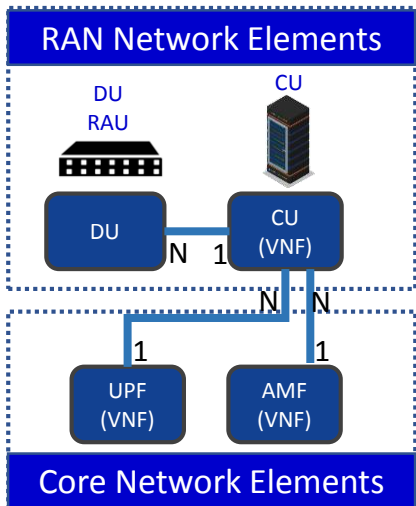


Back Haul

R4: Modeling a 5G Service



R4: 5G Base Station (gNodeB)



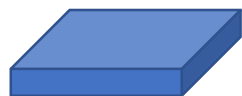
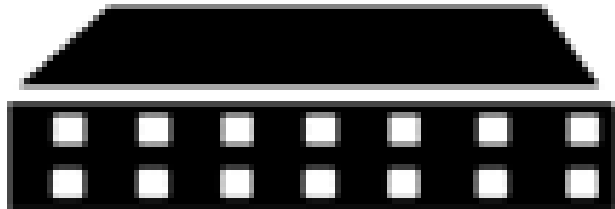
Configurations



MODELING WITHIN A PNF (DU)

5G DU (PNF)

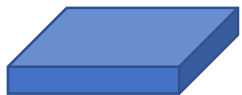
NF PNF – “Application” S/W does 5G voice/data
N/F Node Type
Hardware PNF - Modem (5G DU) [Hardware]
H/W Node Type



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

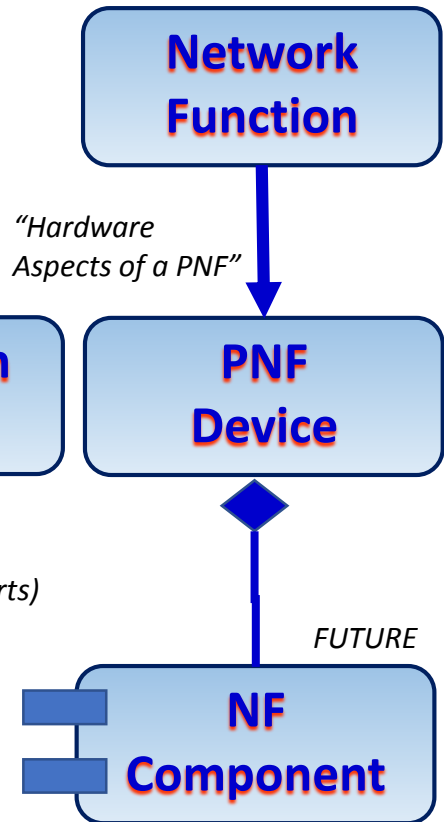
The hardware Ports
(e.g. SFP/Backhaul Ports)

PNF Device

FUTURE

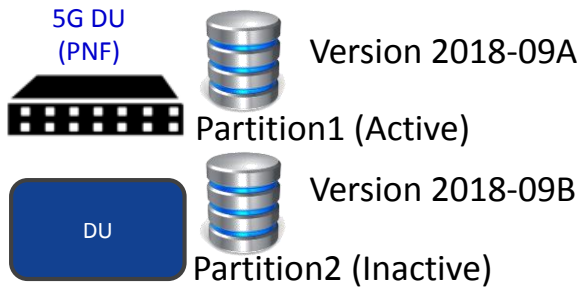
NF Component

Sub-components within PNF

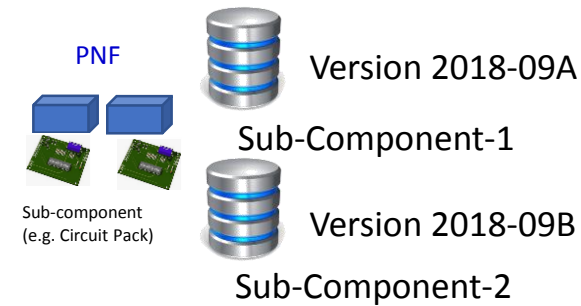


DU Configurations

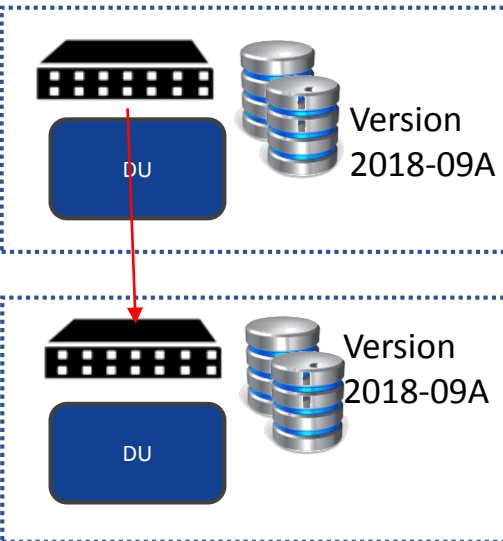
DRIVE PARTITIONS



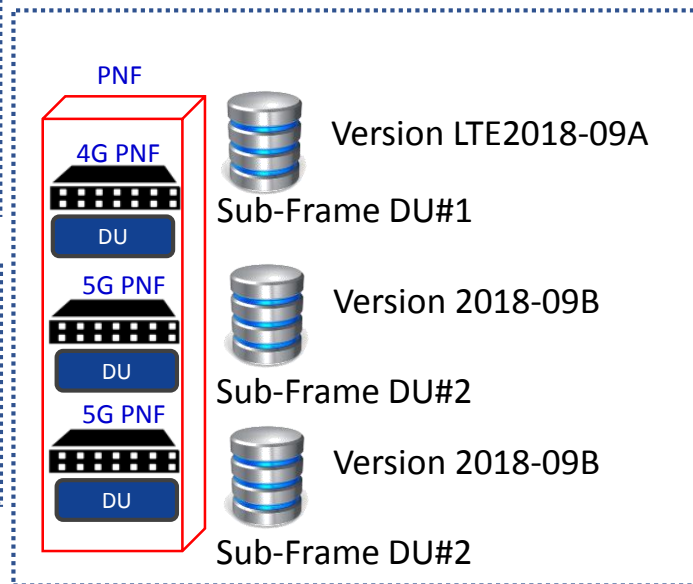
SUBCOMPONENTS (R4+)



MULTI-PNF DAISY CHAIN CONFIG



TANDEM CHASSIS CONFIGURATIONS



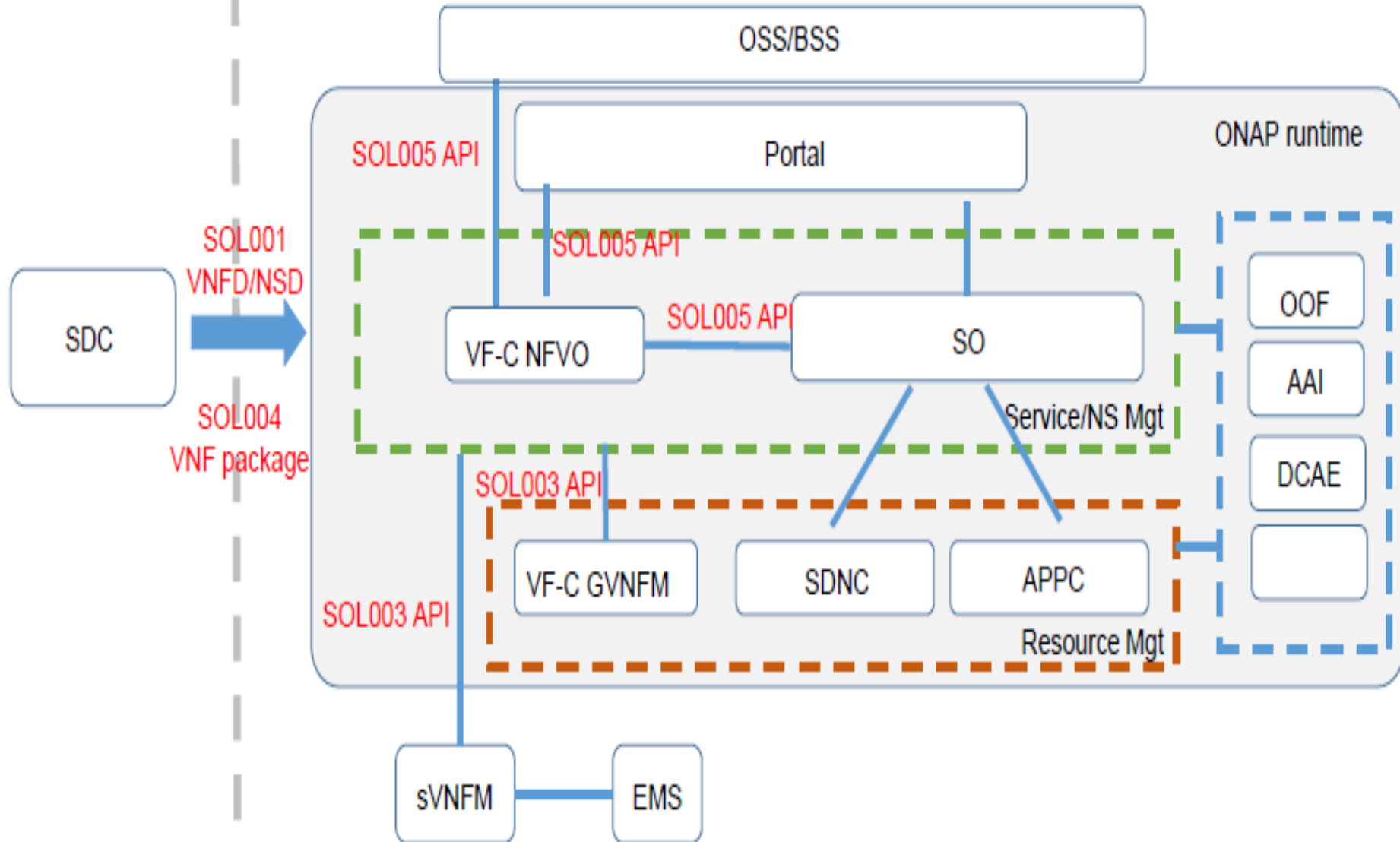
ETSI (SOL 001, SOL 004, SOL005, SOL 007)



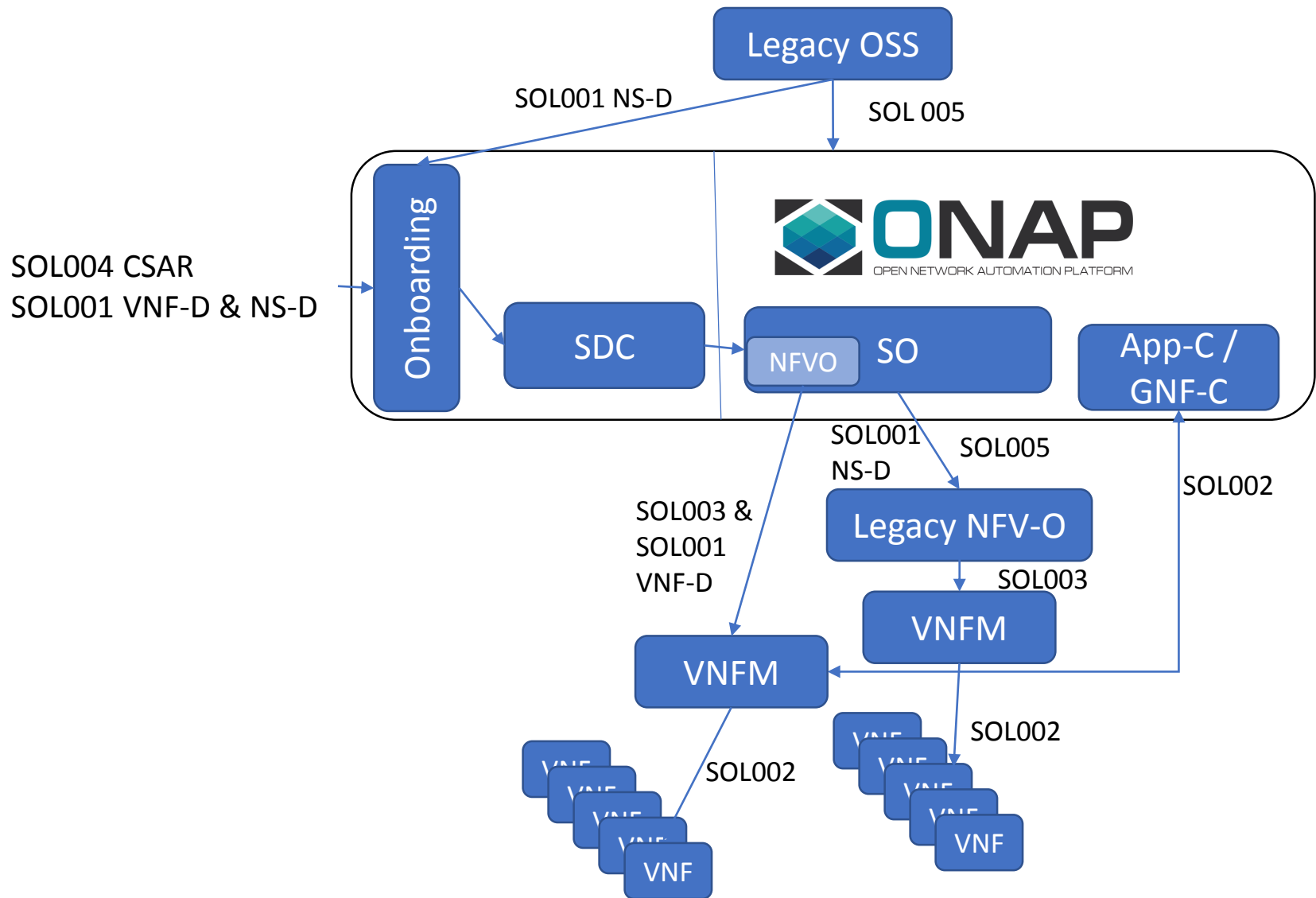
ETSI SOL Standards

Design Time

Run Time



ETSI SOL Standards Alignment



VNFD/PNFD/NSD PROPERTIES ALIGNMENT

On-going ETSI discussion

PNFD	VNFD	NSD	Comments
descriptor_id	descriptor_id	descriptor_id	
version	descriptor_version	descriptor_version	Proposed new name in PNFD: descriptor_version
provider	provider	provider	
name	product_info_name	name	Better to be aligned. Proposed new name in VNFD: name
-	software_version	software_version	<p>New in PNFD</p> <ol style="list-style-type: none"> Better to align with VNFD. VNFD uses software_version for only software change. descriptor_id might be changed only due to descriptor evolution itself like security adding. Long-term view, it would be useful to upgrade PNF software. It is also useful for service provider to get such information for OAM view like trouble-shooting, service checking, PNF packability checking and so on Align with ONAP model
function_description	product_info_description	-	Proposed new name in VNFD: function_description .
descriptor_invariant_id	product_name	invariant_id	Add function_description into NSD
geographical_location_info	-	-	Proposed new name in VNFD / PNFD: invariant_id

SOL004 EXPANDED SCOPE OPTION

On-going ETSI discussion

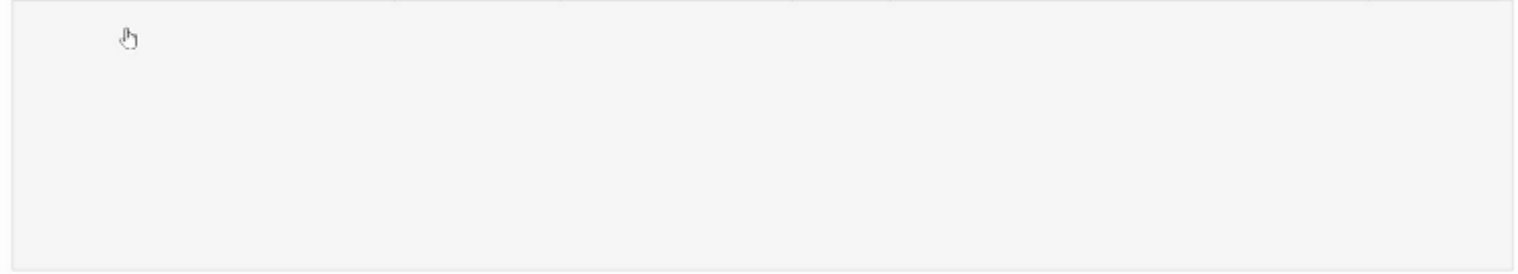
- Tentative updated SOL004 title :
“Network Functions Virtualisation (NFV) Release 2; Protocols and Data Models; VNF Package specification **and PNF file specification**”
- Tentative updated scope:
The present document specifies the structure and format of a **VNF** package file and its constituents, fulfilling the requirements specified in ETSI GS NFV-IFA 011 [1] for a VNF package **and in ETSI GS NFV-IFA 014 [x] for a PNFD.**
- Working schedule:

<u>Milestone name</u>	<u>Target date</u>
• CR approval with expanded scope of 2.6.1	2018/12/07
• Functional CRs approved	2018/12/13
• WG approval	2018/12/31
• TB approval	2019/01/31

- General
- Deployment Artifact
- Information Artifact
- TOSCA Artifacts
- Composition
- Operation
- Activity Log
- Deployment
- Properties Assignment

Deployment Artifact

Name	Type	Deployment timeout	Version	UUID	
VF License	VF_LICENSE		1	e6e2400c-a2de-483f-acd1-c31acba7ef46	↓
base_vfw	HEAT	60	2	1622eb22-0902-4468-079e-23f4dfed4c4f	↓
VF HEAT ENV	HEAT_ENV		0		↓
Vendor License	VENDOR_LICENSE		1	08c22b3a-6087-46ee-0192-af9399491239	↓



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General

Deployment Artifact

Information Artifact

TOSCA Artifacts

Composition

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Properties Assignment

```

171 networks:
172 - network: { get_param: public_net_id }
173 - port: { get_resource: vfw_private_0_port }
174 - port: { get_resource: vfw_private_1_port }
175 - port: { get_resource: vfw_private_2_port }
176 metadata: {vnf_id: { get_param: vnf_id }, vf_module_id: { get_param: vf_module_id }}
177 user_data format: RAM
178 user_data:
179 str_replace:
180 params:
181   __dcae_collector_ip__ : { get_param: dcae_collector_ip }
182   __dcae_collector_port__ : { get_param: dcae_collector_port }
183   __repo_url_blob__ : { get_param: repo_url_blob }
184   __repo_url_artifacts__ : { get_param: repo_url_artifacts }
185   __demo_artifacts_version__ : { get_param: demo_artifacts_version }
186 template: |
187   #!/bin/bash
188
189   DCAE_COLLECTOR_IP=__dcae_collector_ip__
190   DCAE_COLLECTOR_PORT=__dcae_collector_port__
191   REPO_URL_BLOB=__repo_url_blob__
192   REPO_URL_ARTIFACTS=__repo_url_artifacts__
193   DEMO_ARTIFACTS_VERSION=__demo_artifacts_version__
194
195   # Download required dependencies
196   add-apt-repository -y ppa:openjdk-r/ppa
197   apt-get update
198   apt-get install -y make wget openjdk-8-jdk gcc libcurl4
199   apt-get install -y maven
200   pip install jsonschema
201
202   # Download vFirewall code for virtual firewall
203   mkdir /opt/config
204   mkdir /opt/honeycomb
205   cd /opt
206   wget $REPO_URL_BLOB/org.openecomp.demo/vnfs/vfw/$DEMO_ARTIFACTS_VERSION/v firewall_init.sh
207   wget $REPO_URL_BLOB/org.openecomp.demo/vnfs/vfw/$DEMO_ARTIFACTS_VERSION/vfirewall.sh
208
209   mvn org.apache.maven.plugins:maven-dependency-plugin:2.10:get -DremoteRepositories=$REPO_URL_ARTIFACTS
210   -Dartifact=org.openecomp.demo.vnf:sample-distribution:$DEMO_ARTIFACTS_VERSION:tar.gz:hc -Dtransitive=false -Ddest=.
211   mvn org.apache.maven.plugins:maven-dependency-plugin:2.10:get -DremoteRepositories=$REPO_URL_ARTIFACTS -Dartifact=org.openecomp.demo.vnf:ves:ves:$DEMO_ARTIFACTS_VERSION:tar.gz:
212   -Dtransitive=false -Ddest=.
213   mvn org.apache.maven.plugins:maven-dependency-plugin:2.10:get -DremoteRepositories=$REPO_URL_ARTIFACTS
214   -Dartifact=org.openecomp.demo.vnf:ves:ves_vfw_reporting:$DEMO_ARTIFACTS_VERSION:tar.gz:demo -Dtransitive=false -Ddest=.
215
216   tar -zxvf ves-$DEMO_ARTIFACTS_VERSION-demo.tar.gz
217   mv ves-$DEMO_ARTIFACTS_VERSION VES
218   tar -zxvf ves_vfw_reporting-$DEMO_ARTIFACTS_VERSION-demo.tar.gz
219   mv ves_vfw_reporting-$DEMO_ARTIFACTS_VERSION VESreporting_vfw
220   tar -zxvf sample-distribution-$DEMO_ARTIFACTS_VERSION-hc.tar.gz
221   mv sample-distribution-$DEMO_ARTIFACTS_VERSION honeycomb

```

Find

Find Replace Find in Files Mark

Find what:

Find Next

Count

Find All in All Opened Documents

Find All in Current Document

Close

Match whole word only

Match case

Wrap around

Search Mode

Normal

Extended (/n, /r, /s, /w, /x...)

Regular expression matches newline

Direction

Up

Down

Transparency

De losing focus

Always

Find: Found the 1st occurrence from the top. The end of the document has been reached.

certificates

Just in time instantiation of resources

VNFD

U/C deploy VNFC in K8S dynamically provision the platform.

NFaaS

Inventory; order, capacity

RACK of H/W

redfishAPI, RestFUL API envelope of specification (TOSCA)

Declarative,

Physical infrastructure manager


















Multicloud layer

IaaS , Service based style-guide

AWS Azure

PNF Box, NF, composition API dynamically created.

Scarce res composable infrastructure multi-tenancy. Compose/r

-   Ben Cheung (me)
-   YURIY MALAKOV (Host)
-   Alexis de Talhouët
-   Call-in User_2
-   DAN TIMONEY
-   Lalena Aria
-   Marc-Alexandre Choquette
-   Ofir Sonsino
-  Oskar Malm