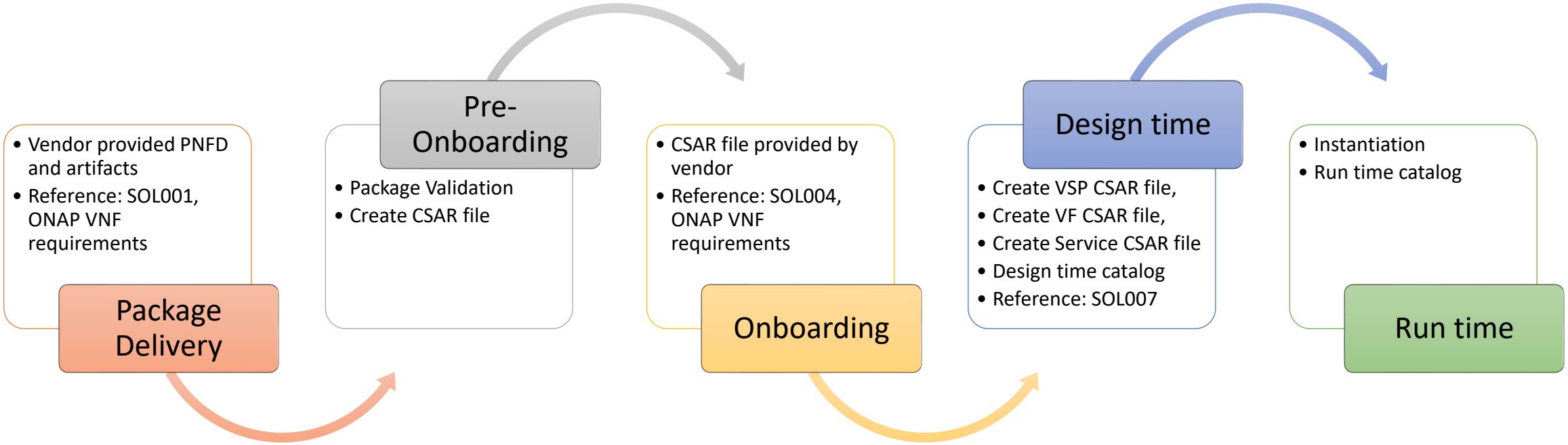
PNF Package Discussion

Ericsson

PNF Package

- ✓ ETSI
  - ✓Introduce PNF package into ETSI NFV
  - ✓PNF / VNF package format should be aligned
- ✓ ONAP
  - ✓Defining the PNF Descriptor / Package in ONAP Dublin release based on the proposed ETSI NFV PNF package format.
  - ✓Improve the ONAP VNFSDK to support PNF package
  - ✓Update the ONAP VNF requirements for PNF package
  - ✓Improve ONAP SDC to support PNF package onboarding

Proposed ONAP onboarding procedure



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-IFA 013
NFV-SOL005

NFV-IFA 010 (NFV-MANO Functional Reqs)

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)

PNF Descriptor impacts

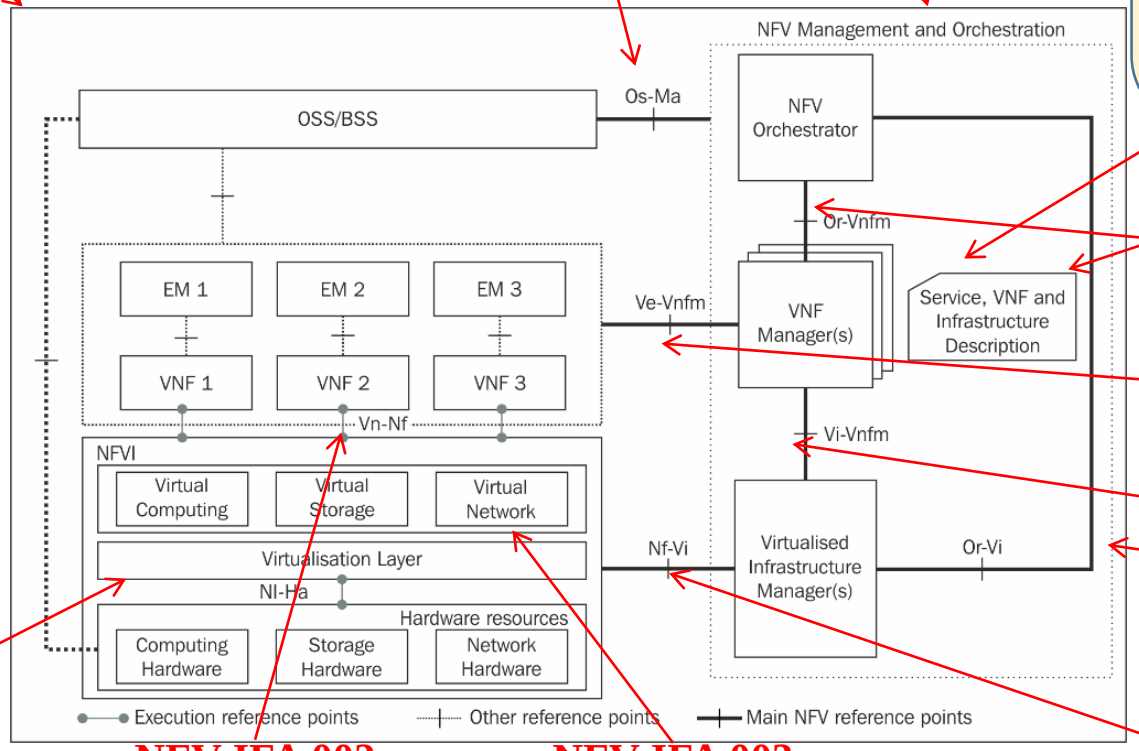
PNF package impacts

NFV-IFA 007
NFV-SOL 003

NFV-IFA 008
NFV-SOL 002

NFV-IFA 006

NFV-IFA 005



NFV-TST 008 (NFVI metrics)

NFV-IFA 002 (Acceleration)

NFV-IFA 003 (Acceleration)

NFV-IFA 004 (Acceleration)

Published!

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	**New in PNFD** 1. 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. 2. Long-term view, it would be useful to upgrade PNF software. 3. 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 4. Align with ONAP model
function_description	product_info_description	-	Proposed new name in VNFD: function_description. Add function_description into NSD
descriptor_invariant_id	product_name	invariant_id	Proposed new name in VNFD / PNFD: invariant_id
geographical_location_info	-	-	

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 ~~V~~NF 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:

Milestone name	Target date
• 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

Current VNF package patterns

- Onboarding csar → VSP csar → VF csar → Service csar
  - TOSCA_Metadata (TOSCA.Meta)
    - TOSCA_Metadata/Tosca.meta is created by SDC with Entry-Definitions only
    - onboarded TOSCA_Metadata/Tosca.meta moved to Artifacts folder in VSP csar and removed in VF csar
    - Missing artifacts entry points in the Onboarding Tosca.meta file
  - Manifest file
    - onboarded manifest file is moved under Artifacts folder in VSP csar and removed in VF csar
    - non-mano-artifact-sets is not supported in onboarded csar
    - No manifest file in the SDC created VSP/VF CSAR
  - Tosca descriptor:
    - Definitions/MainServiceTemplate.yaml is created by SDC,
    - original yaml is deleted
  - Artifacts
    - onboarded artifacts are copied in the Artifacts directory of VSP CSAR file
    - Only artifacts under Artifacts/Deployment or Artifacts/Informational or Artifacts/Other folder in the onboard package will be moved into VF csar under Artifacts/Deployment/Other or Artifacts/Informational/Other folder. Other Artifacts files are lost
  - X_license_model files are added in the Artifacts directory in VSP/VF csar
  - Artifacts type: All following directories in Deployment are created by SDC YANG_XML / Model_Inventory_Profile / VNF_Catalog / VNF_License / Vendor_License / APPC_Config / VF_Modules_Metadata / DCAE_TOSCA / DCAE_JSON / PLAN
    - The wiki pagae needs to be updated

ONAP vender provided VNF packaging (according to wiki)

CSAR file

Note:

- This is an example of the current vendor provided VNF package to SDC for onboarding.
- The files listed in the folder is example only. And not all files are listed here.
- Folder / file name in blue is requested by SOL004.
- Folder / file name in green is expected by ONAP.
- 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

ROOT

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

Copy of NF descriptor

metadata:
vnf_product_name: gNB
vnf_provider_id: Ericsson
vnf_package_version:1.0
vnf_release_date_time:2018-11-07T08:44-05:00
source: MainServiceTemplate.yaml

TOSCA.meta

VNF descriptor

MainServiceTemplate.yaml

- Images
- Deployment
- Informational
- Other
- <VFC TOSCA name>

Not supported by ONAP Casablanca

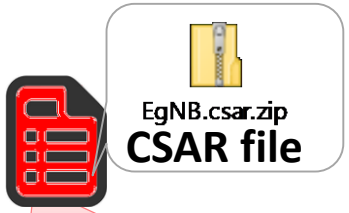
Any unrecognized artifacts

Informational\ [will hold all informative artifacts on VFC level]
\Deployment\ [will hold all deployment artifacts on VFC level]

- 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

- GUIDE
  - Install.csh
  - …

PNF packaging with TOSCA-Metadata proposed for Dublin



EgNB.csar.zip
CSAR file

Note:
- This is an example of the package.
- The files listed in the folder is example only. And not all files are listed here.
- Folder / file name in blue is requested by SOL004.
- Folder / file name in black is example only.

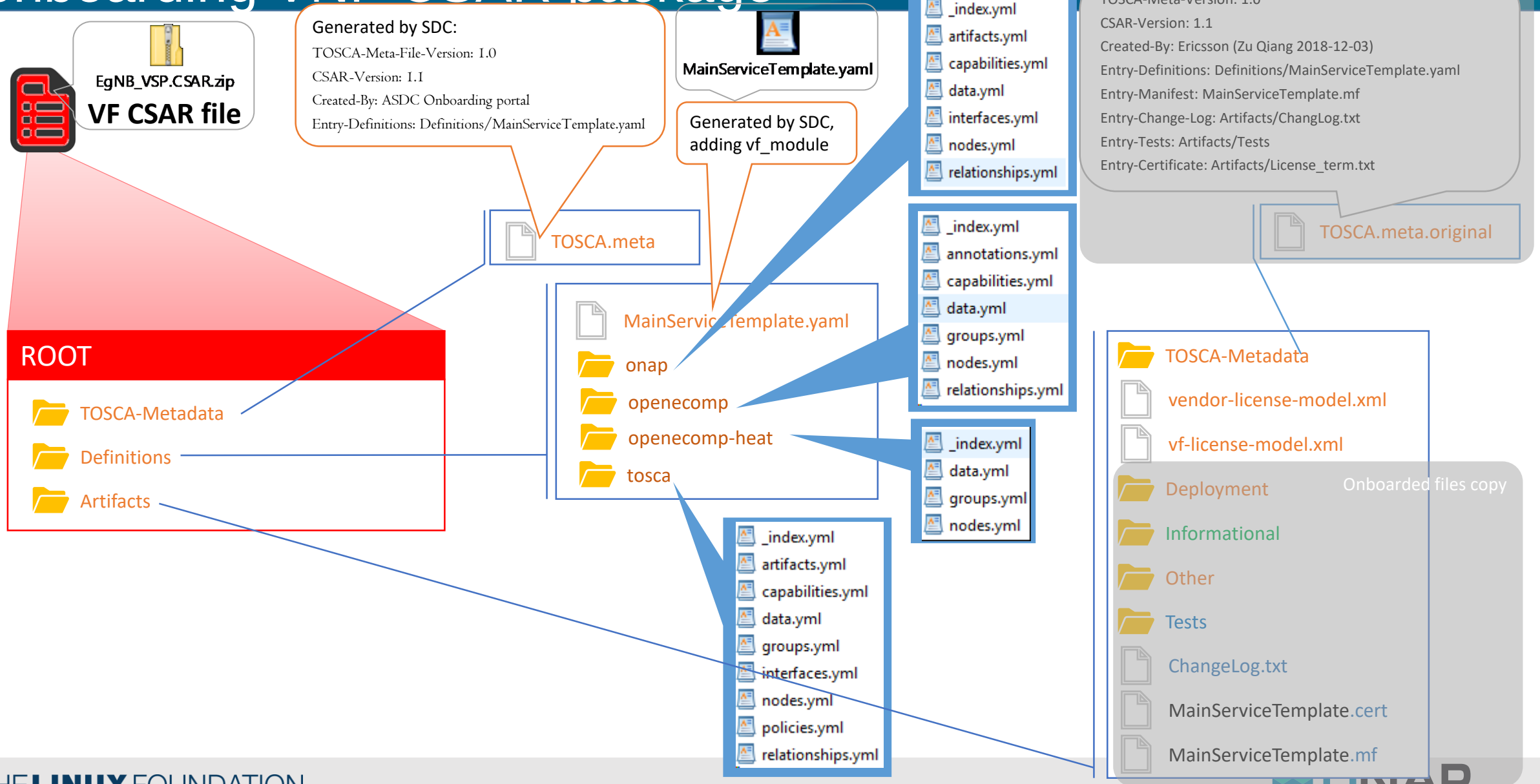
TOSCA-Meta-Version: 1.0
CSAR-Version: 1.1
Created-By: Ericsson (Zu Qiang 2018-12-03)
Entry-Definitions: Definitions/MainServiceTemplate.yaml
Entry-Manifest: MainServiceTemplate.mf
Entry-Change-Log: Artifacts/ChangLog.txt
Entry-Tests: Artifacts/Tests
Entry-Certificate: Artifacts/License_term.txt

ROOT

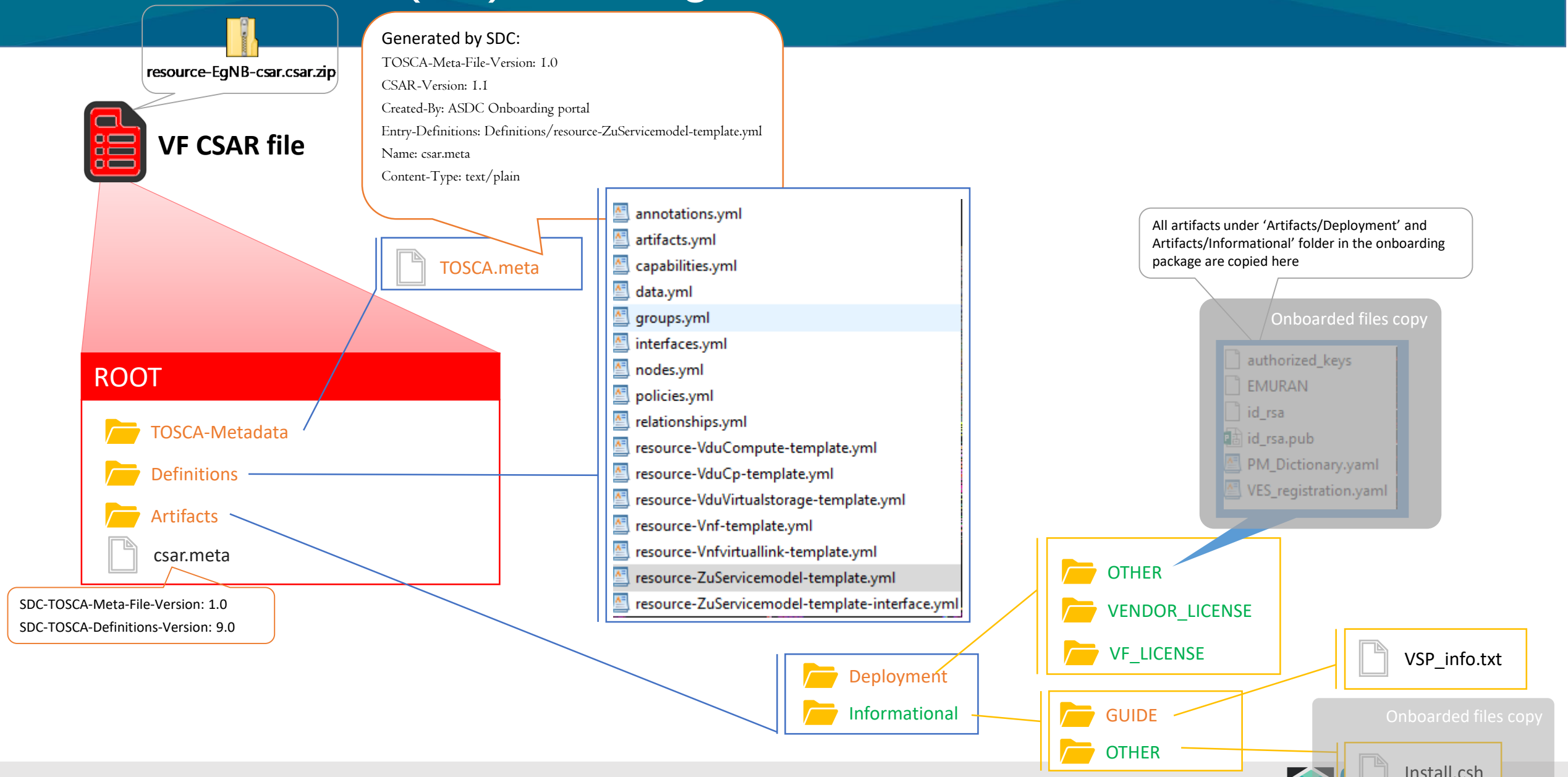
- TOSCA-Metadata
  - TOSCA.meta
- Definitions
  - MainServiceTemplate.yaml
  - NF descriptor
- Artifacts
  - Images
    - Not supported by ONAP Casablanca
  - Deployment
    - Configuration
    - Yang_module
      - yang-module.yang
    - Measurements
      - pm-dictionary.yaml
    - Events
      - ves-dictionary.yaml
    - …
  - Scripts
    - Install.csh
    - …
  - Tests
  - ChangeLog.txt
  - MainServiceTemplate.cert
    - No ONAP requirement yet
  - License_term.txt
- MainServiceTemplate.mf

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

SDC VSP CSAR generated from onboarding VNF CSAR package



SDC resource (VF) CSAR generated from VSP



SDC Service CSAR with one VF

service-EgNBServicemodel-csar.csar.zip

VF CSAR file

Generated by SDC:

TOSCA-Meta-File-Version: 1.0

CSAR-Version: 1.1

Created-By: ASDC Onboarding portal

Entry-Definitions: Definitions/resource-ZuServicemodel3-template.yml

Name: csar.meta

Content-Type: text/plain

TOSCA.meta

ROOT

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

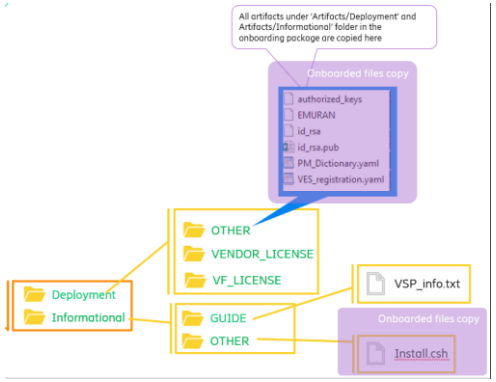
SDC-TOSCA-Meta-File-Version: 1.0

SDC-TOSCA-Definitions-Version: 9.0

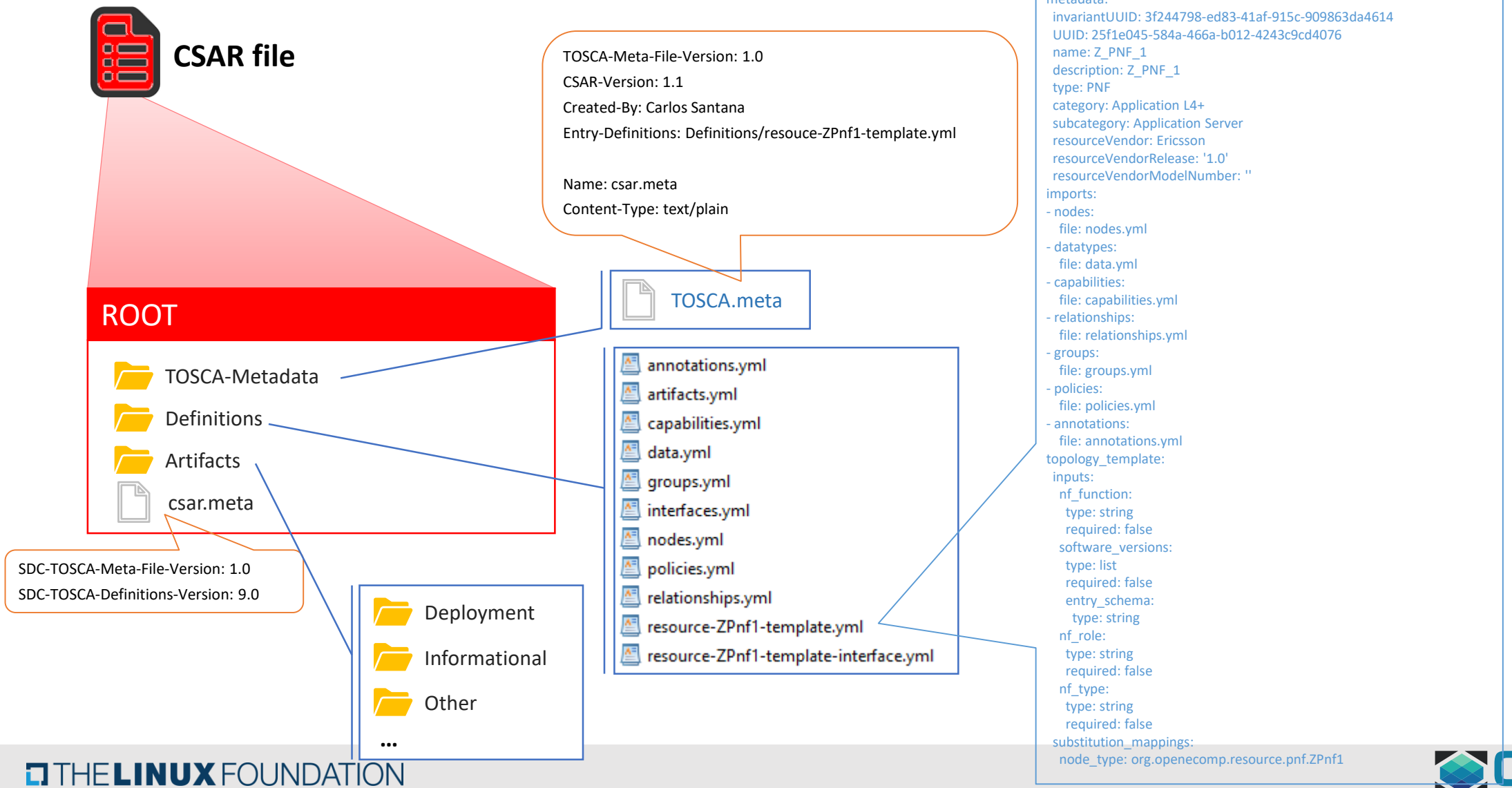
- annotations.yml
- artifacts.yml
- capabilities.yml
- data.yml
- groups.yml
- interfaces.yml
- nodes.yml
- policies.yml
- relationships.yml
- resource-VduCompute-template.yml
- resource-VduCp-template.yml
- resource-VduVirtualstorage-template.yml
- resource-Vnf-template.yml
- resource-Vnfvirtuallink-template.yml
- resource-ZuServicemodel-template.yml
- resource-ZuServicemodel-template-interface.yml
- service-ZuServicemodel3-template.yml
- service-ZuServicemodel3-template-interface.yml

org.openecomp.resource.vf.ZuServicemodel_v1.0

Artifacts in the VSP Artifacts folder



SDC PNF CSAR from manually onboarding



Valid onboarding SDC TOSCA manifest file

metadata: ### no evidence used in SDC
vnf_product_name: gNB
vnf_provider_id: Ericsson
vnf_package_version:1.0
vnf_release_date_time:2018-12-03T08:44:00-05:00

source: MainServiceTemplate.yaml ### it´s mandatory for SDC even if not required by SOL004
source : Definitions/GlobalSubstitutionTypesServiceTemplate.yaml
source : Artifacts/install.sh
source : Artifacts/create_stack.sh
source : Licenses/license.xml

SOL004 required PNF manifest file

```
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
```

Valid onboarding SDC TOSCA.meta file

TOSCA-Meta-File-Version: 1.0
CSAR-Version: 1.1
Created-By: Ericsson
Entry-Definitions: Definitions/resource-Ericssongnodeb-template.yml

Name: Definitions/openovnf__vCSCF.yaml
Content-Type: application/vnd.oasis.tosca.definitions

Name: Definitions/openonfv__tosca.capabilities.nfv.ext.LocalAttachment.yaml
Content-Type: application/vnd.oasis.tosca.definitions

Name: Definitions/openonfv__tosca.capabilities.Scalable.yaml
Content-Type: application/vnd.oasis.tosca.definitions

SOL004 required TOSCA.meta 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

SDC Requirements

- SDC-1970: Support PNF package onboarding
- Package
  - SDC-1973: (H) Supporting PNF onboarding CSAR package based SOL004
    - Keep the original files in the onboarding package and move to Artifacts folder (under a single dir) for both VNF and PNF
- Files in package
  - SDC-1974: (H) Supporting PNF manifest file
    - Onboarding package
      - Support onboarding PNF keywords in manifest file
      - Support onboarding Non-mano-artifact-sets in manifest file for both VNF and PNF
    - Internal Package
      - Introduce the use of the manifest file in the SDC generated package to identify the path of the onboarded original files or any internal dir/files in a dynamic way
  - SDC-1976: (H) Supporting PNFD (SOL001) mapping to AID model
  - SDC-1977: (M) Removing folder name dependence
  - SDC-1978: (M) Removing the duplicate descriptor yaml file
  - SDC-1979: (M) Allowing the dedicated artifact folder with Entry-point in TOSCA.meta
    - Onboarding package
      - Support artifacts entry points in Tosca.meta file
      - Support entry point of MainServiceTemplate.yaml in Tosca.meta file
    - Internal Package
      - Add SOL004 Entry points to the SDC generated TOSCA.meta file
- Catalog
  - SDC-1975: (H) Design time catalog to associate artifacts with PNF
- Lower req piorities
  - SDC-1980: (M) Supporting packaging security

SDC impacts consideration

- Backward compatibility:
  - A new keyword may be needed in metadata to distinguish onboarding package versions
- Provide a PNF package Mokup associated to the EPIC
- Support the new onboard flow for both VNF and PNF

SDC Next step before M1

- SDC team: Estimation of the activities & resources
- Ericsson: call follow up before M1 on
  - Nokia/Ericsson work split
  - Information required for M1
  - at&t/Amdocs share the info about backward compatibility
- AP to Vitaly: sharing the developer onboarding info
- Ericsson/Anatoly K.: Follow-up discussion on PNFD mapping

PNF descriptor

- Map SOL004 module to AID module

PNF Package Structure

- CSAR with *TOSCA-Metadata*
- Package requirements shall be same as VNF Package, except that the valid name in manifest file shall be:
  - pnf_provider_id
  - pnf_product_name
  - pnf_release_date_time
  - pnf_package_version
- Support Non-mano-artifact-sets in manifest file for both VNF and PNF

PNF Package artifacts

- VES Event Registration File
- PM dictionary
- Resource Configuration
  - If Netconf, YANG model
  - If Ansible, Ansible playbook, JSON file for each supported action, configuration scripts
  - If Chef, cookbooks, JSON file for each supported action
- Test files
- Licensing agreement (human readable text)
- Images (not support yet)
- Security certificate files (not support yet)
- Others:
  - Documentations
  - Scripts

VNFSDK 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

ONAP VNF Descrriptor(5.1.9)

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 PNFD
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)

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 - 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: • 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.	

VNF requirements impacts

- 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: Adding VES Event Registration requirement to PNF package
    - Clarifications on artifacts structure requirements
    - VNFRQTS-496: supporting Ansible protocol in PNF

Impacts

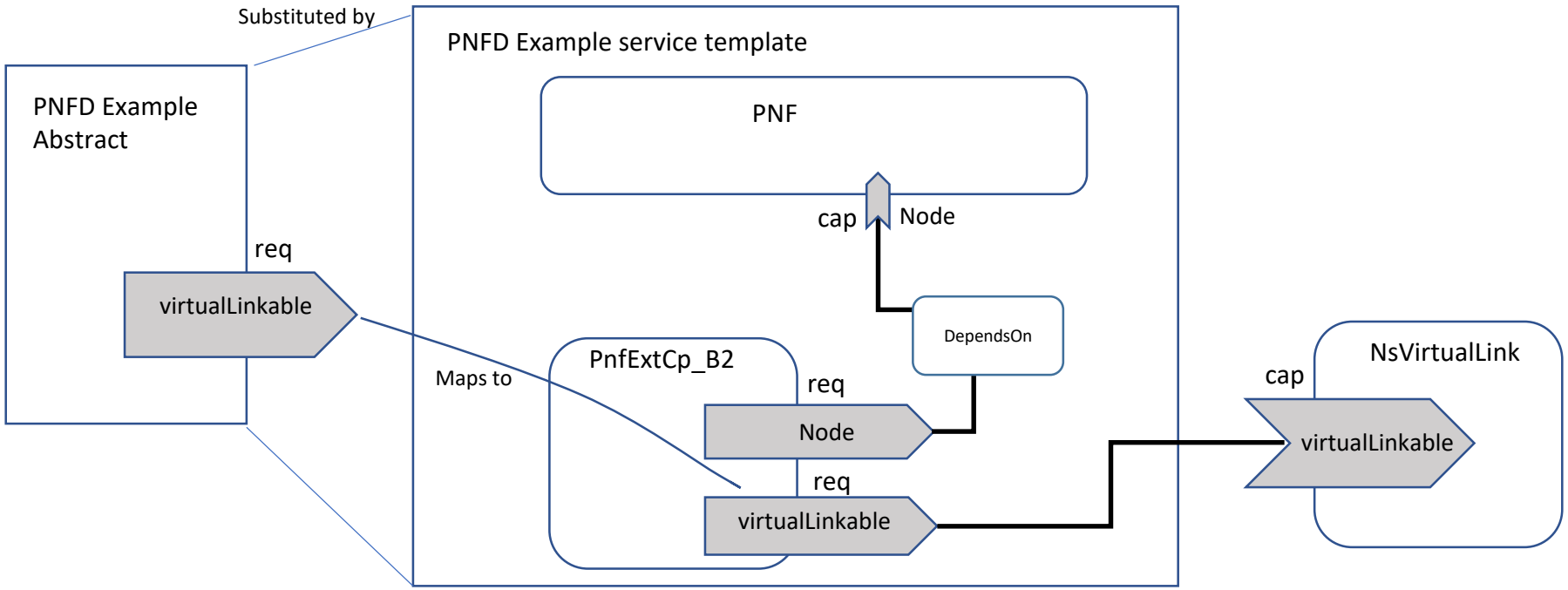
- Proposed changes to ONAP
  - Update VNFSDK tool to include PNF
    - VNFSDK-337: Supporting PNF package onboarding
  - Update VNF requirement documentation to include PNF package
    - VNFRQTS-506: Supporting PNF package onboarding
  - Update SDC to adopt PNF package requirements
    - SDC-1970: Support PNF package onboarding
- Proposed changes to ETSI NFV
  - Adding PNF package requirements to SOL004
    - Extend SOL004 WI proposed: Specification of PNF Package file structure
    - Adding PNF Package Support in SOL004 CR
  - Update PNFD in SOL001

Working in progress

- Technical discussion to be finalized in ONAP:
  - Public Non-mano-artifact event name to be agreed: ONAP VNF PACKAGE group (mail involve companies working in ETSI)
  - PNFD mapping to be agreed : ONAP Resource Data model group
  - Check which VNF SDK package security options are implemented: Victor Gao/Andrej
- SDC work breakdown
  - PNF/ETSI onboarding flow (with VSP) as a new flow to maintain back comp,
    - Including add manifest file with new key words
    - Including add metadata file with new key words
    - Package security to be supported (starting with option 2)
    - Add a copy of the package under artifact folder
  - PNFD mapping
  - Investigate VSP mapping options (could we provide from a single onboarding TOSCA ETSI SOL001 PNFD, two different internal models/ 2 internal PNFD (AID and ETSI based ?)
  - Association of artifacts to PNF in the catalog
  - Investigation on run time microservice impacts


ONAP
OPEN NETWORK AUTOMATION PLATFORM

ETSI PNFD latest proposal (not yet approved)



PNFD with LCM, min add classes with separation – Modeling and files