

# ONAP xNF software upgrade

**status of art and extension points**

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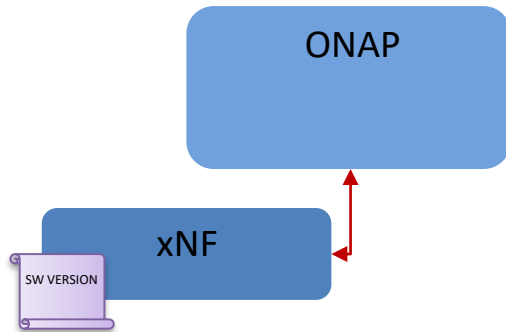
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- xNF service upgrade use cases
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# xNF Sw Upgrade Use Cases

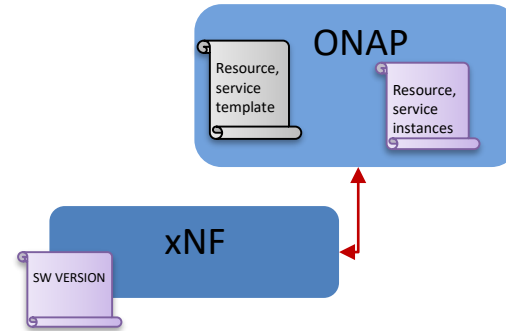
A new xNF software version, with/without interface changes, is available.

## xNF Resource Software Upgrade Use Case



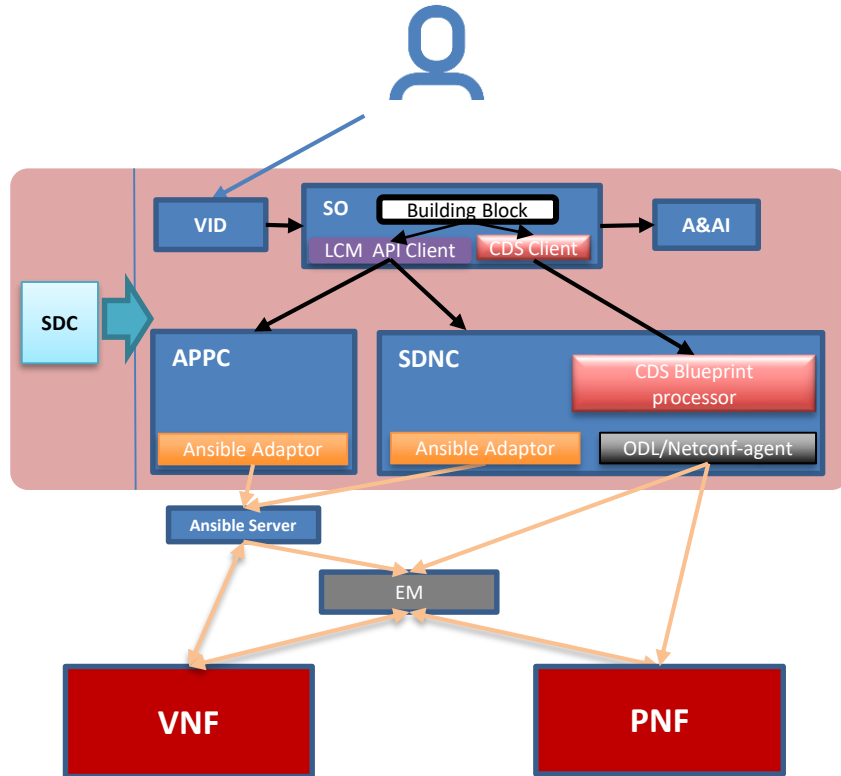
Upgrade the software version of the xNF instance

## Network Service Software Upgrade Use Case



In addition to sw version upgrade of the xNF instance, an ONAP schema update is required to support new interface capabilities

# xNF Software Upgrade Implementations



## PNF Resource Sw upgrade (in-place) scenarios:

- ✓ Using direct Netconf/Yang interface with PNF
- ✓ Using Ansible protocol with EM
- ✓ Using Netconf/Yang interface with EM

## VNF Resource Sw upgrade (in-place) :

- ✓ New VNF in-place software upgrade procedure is planned (CDS based)
- ✓ Existing (APPC based) VNF in-place software upgrade procedure to be discontinued

## CNF software upgrade, under discussion

# xNF Software Upgrade Workflows

- SO Workflows can be customized (i.e. add/remove Building Blocks)
- Building block actions are xNF independent
- Building block execution invokes controller blueprint script
- Blueprint script per xNF type
- xNF specific protocol, data model, and actions managed by blueprint

PNF HealthCheck

preCheck

PNF Preparation

preCheck

downloadNESw

PNF Software Upgrade

preCheck

downloadNESw

activateNESw

postCheck

VNF Software Upgrade

UpgradePreCheck

UpgradeSoftware

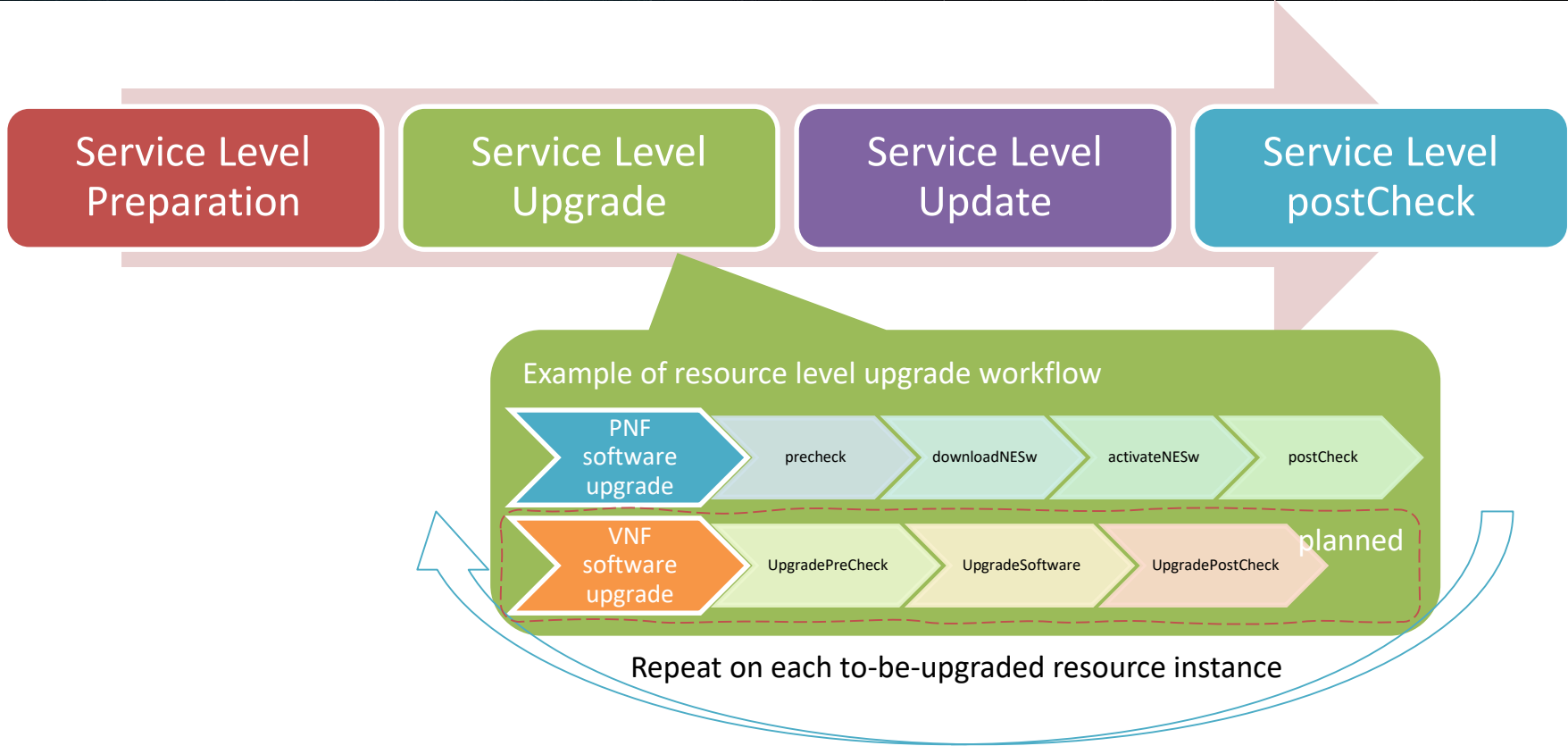
UpgradePostCheck

planned

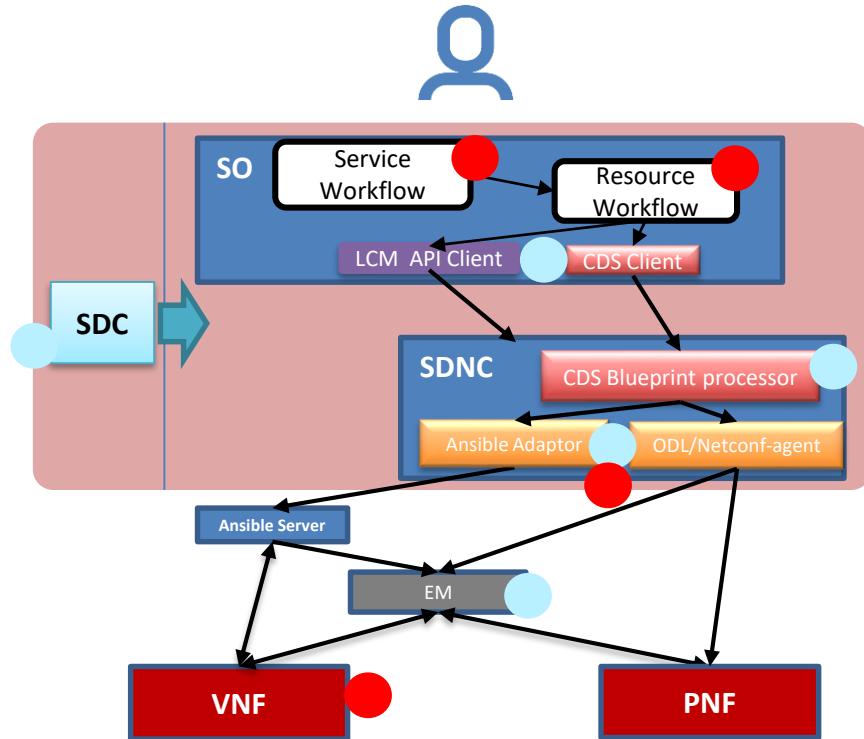
Workflow

Building Block

# Service level upgrade workflow



# Extensibility



## Execution Time Extension points (No ONAP code changes needed)

- ❑ Onboard New PNF type with new artifacts
- ❑ Generic Service software upgrade workflow with customized subtasks, including xNF protocol and model, with/without EM, API selection, etc.

## Sw Development Extension Points (Extensions of current xNF sw upgrade)

- ❑ Support of VNF/CNF type: New SO resource workflow reusing SO Generic service sw upgrade workflow
- ❑ Customized Service software upgrade workflow based on operators' needs, e.g. adding/removing xNF/service tasks
- ❑ Support additional xNF protocols (other than Netconf/Ansible) without impacts on Service software upgrade workflow

# O-RAN O1 Requirements and ONAP implementations

## PNF Software Management Services Requirements in O1

**Software Inventory:** retrieves information about the software packages on the PNF

**Software Download:** triggers software package downloading onto PNF

- to specify the location of software
- to verify if a software download is in progress
- to deny download of software if request is not valid
- to download needed files from specified location
- to perform integrity checks on downloaded software.
- to install the software into the software slot

**Software Activation Pre-Check:** (optional), confirms that PNF is in a good state to activate the software.

- to confirm that the software in the passive slot targeted for activation is good.
- to determine whether the activation of the targeted software requires a reset and/or data migration

**Software Activation:** triggers activation of a software package on the PNF.

- to allow its authorized consumer to activate valid software in a specific softwarePackage
- to verify whether a software activation is in progress and deny a concurrent activation of software
- to deny in invalid activation request
- to activate the softwarePackage
- to reset and send a reset reason notification
- to perform data migration
- to fallback to previously version and factory set

Realized by

Realized by

## PNF sw upgrade procedure in

**Pre-Check:** verify PNF is in good condition before any upgrade actions

**DownloadNESw:** Triggers a download of a software package into the PNF, including:

- package downloading if needed,
- package integrity check,
- progress report,
- etc.

**ActivateNESw :** Triggers activation of a software package on the PNF, including:

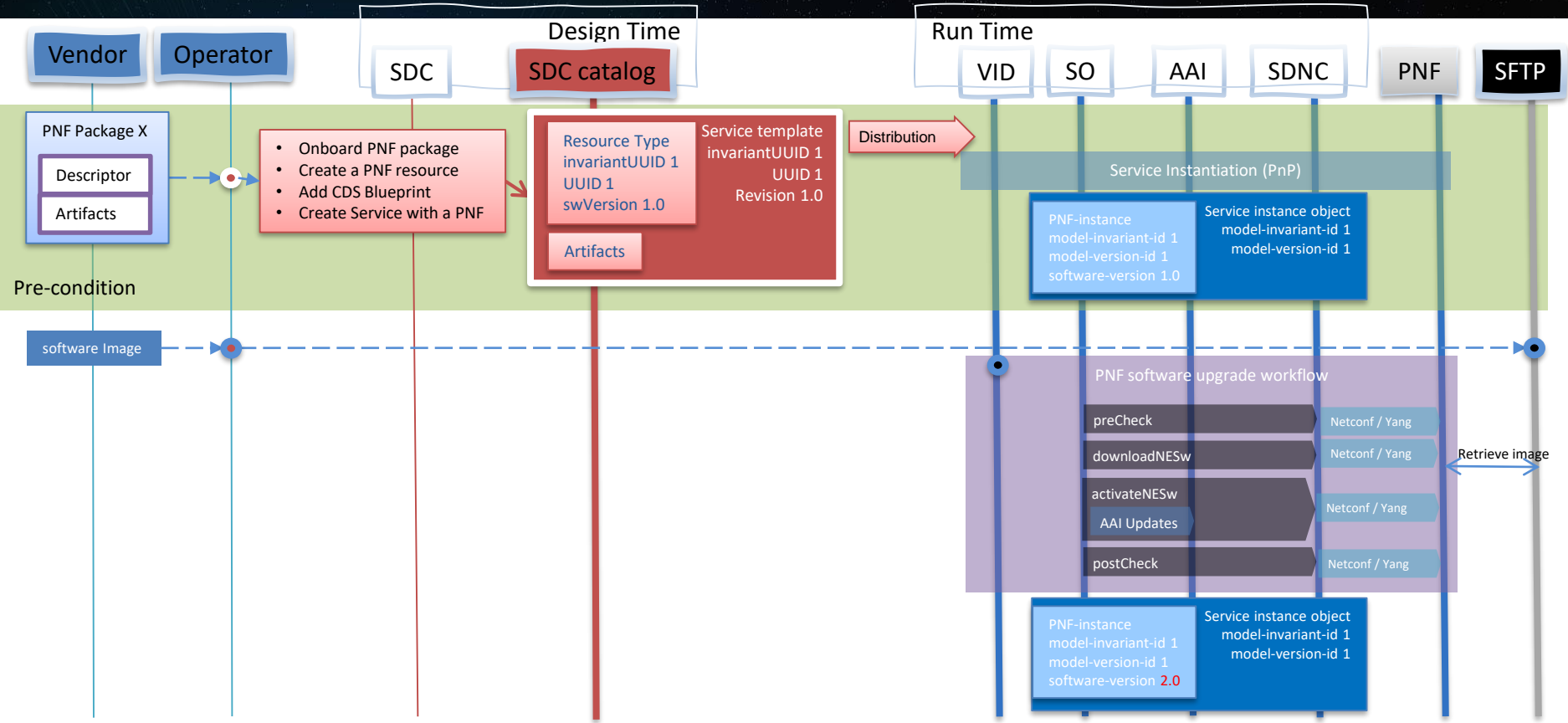
- activation,
- data migration,
- fallback in case of activation failure,
- etc.

**Post-Check:** verify PNF is in good condition after upgrade

ONAP defines only generic upgrade workflow and basic building blocks. Building block implementation (including definition of xNF actions / protocols / interface) is realized by blueprint script, and the blueprint script is onboarded per PNF type

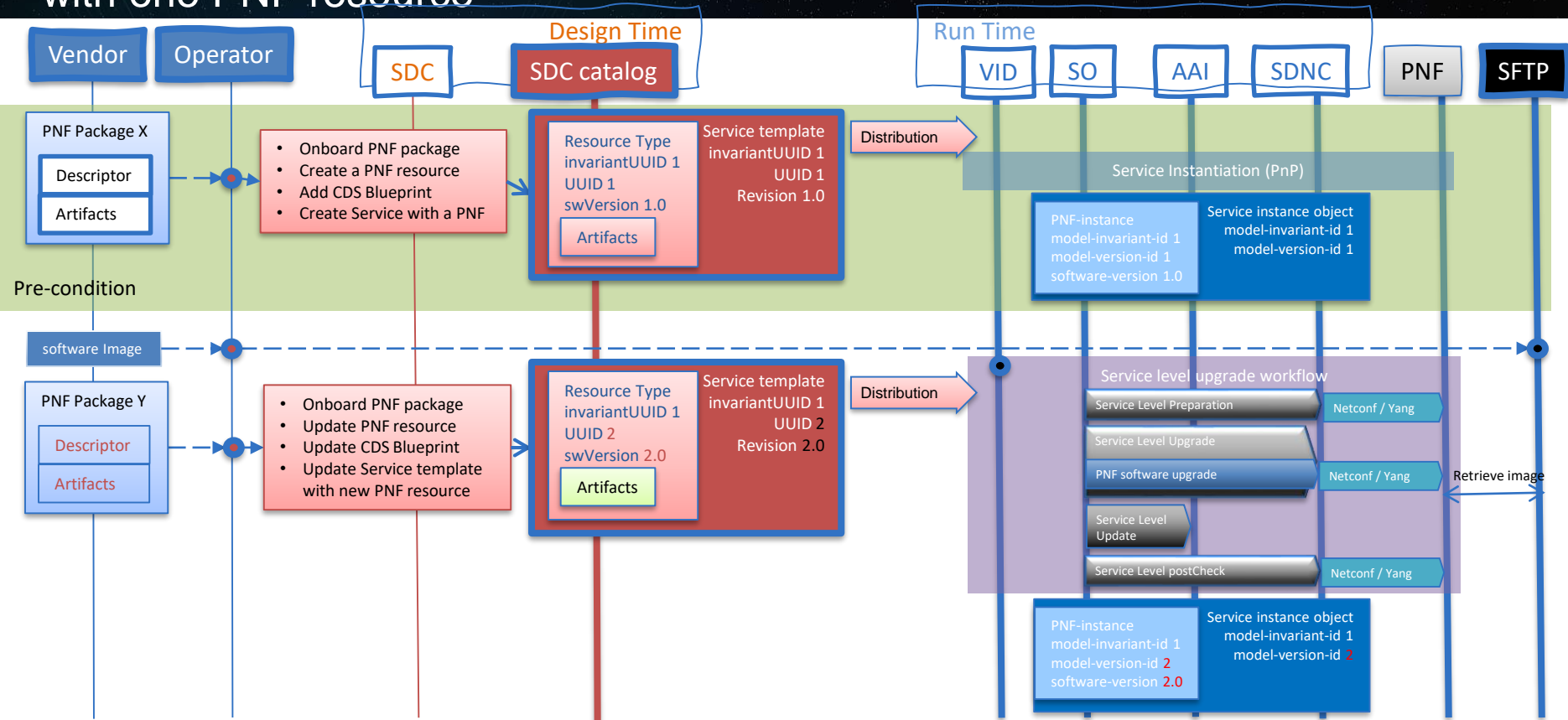


# Update one PNF instance without schema update



# Service upgrade example

with one PNF resource



# Demo: Service level software upgrade one service instance with two PNF instances

Part 1: Before software upgrade, query the service instance (Service\_ETE in v1.0) and two PNF instances (PNFDemo1 instance is v1.0.0 and PNFDemo is v3.0.0) from AAI

Part 2: Demo of Service template Upgrade with a new PNF onboarding package

Onboard a new PNF package with new software version and new artifacts

Update the PNF resource template to a new version including new CDS blueprint

Update the service template to a new version

Distribution the new service template

Part 3: Demo of Service level Software Upgrade workflow with two PNF instances

Service Level Preparation

Service Level Upgrade

Service Level Update

Service Level postCheck

PNF software upgrade

precheck

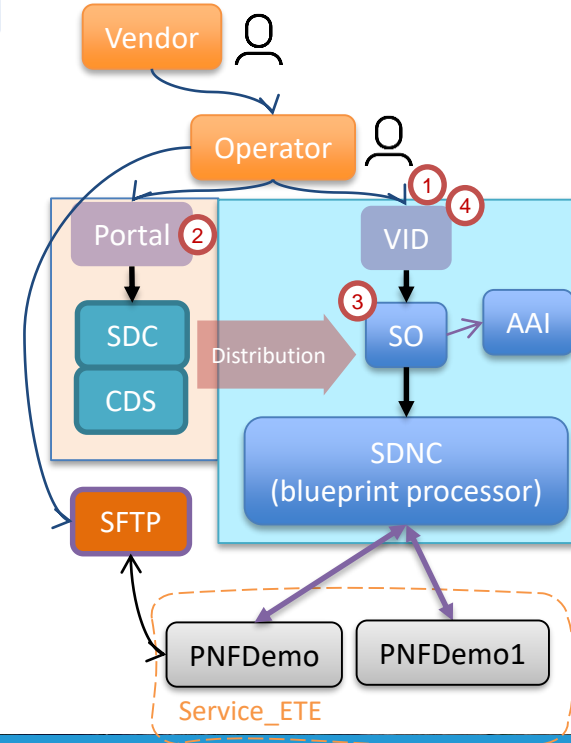
downloadNESw

activateNESw

postCheck

Part 4: After software upgrade, query the service instance (in v2.0) and PNF instances (both PNF instances are in v4.0.0) from AAI

[Demo link](#)





# OLF NETWORKING

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