Change Management for life-cycle support from hybrid PNF and VNF management perspective

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Outline

- Status of Change management (CM) in ONAP

- The motivation and proposal

- Casablanca functional requirements

Status of CM in ONA

- From CM Team:
  - They finished a CM use case in Beijing release, taking vCPE as an example.
  - The endorsed functional requirements contains '**5G RAN software upgrade**':
    - **Health check (pre/post)**
    - **Software download, installation and activation**
    - **Roll-back for unsuccessful execution**
    - ....

- From 5G Team:
  - One objective of 5G deployment (in R3) is '**Target software management**'.
  - 'Lifecycle management Support' means '**Enhance change management** and Close Loop Automation (CLAMP) **to support 5G PNF / VNFs**'

- Overlapping!
  - *5Guc-RAN Deployment (SWCfg_Mgmt)-Casablanca-Huawei 04282018v3.pptx*
 - *5Guc-RAN Operations (SW upgrade)-Casablanca-Huawei&CMCC 05112018v1.pptx*

Status of CM in ONAP

- To make a short explanation (need to discussed in both sub-teams), we would like to:
    - In CM use case,
        - define the **basic and generic building blocks** for both PNF and VNF change management support,
        - **design CM work flows** as well,
        - extend and discuss CM requirements as stretch R3 goal (shown later).
    - In 5G use case,
        - **complete SW management**, e.g. 'Expected software version', in PNF PnP
        - Define the **required interfaces** for impacted ONAP projects, e.g. SO, APP-C/SDN-C/VF-C

Motivation and Proposal

- There are some options for CM, e.g. 'Build-and-replace' and 'in-place software upgrade'.

Option 1: 'Build-and-replace'
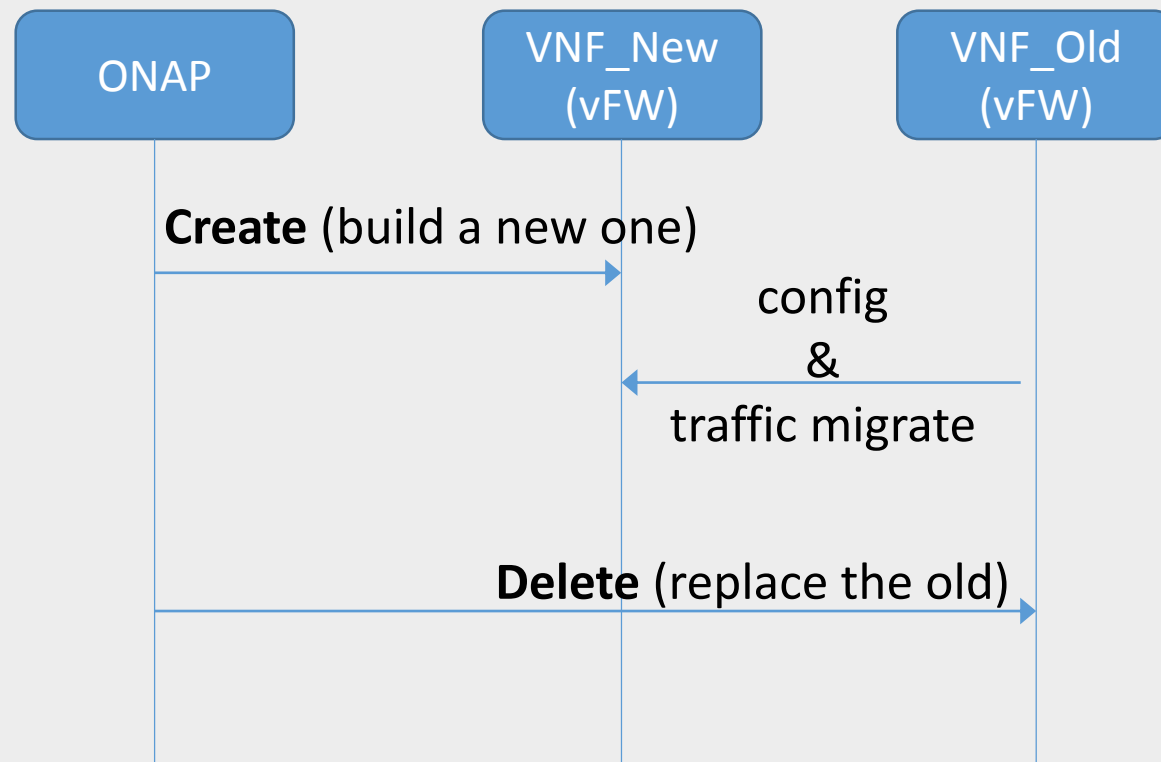
'Build-and-replace' may be suitable for VNF, but not PNF.
There are available resources for creating a new VNF, while PNF is plug-and-played and cannot be 'created' so far.
(Note, many issues need to be resolved in config and traffic migration)

Motivation and Proposal

- There are some options for CM, e.g. 'Build-and-replace' and 'in-place software upgrade'.

Option 2: 'in-place software upgrade'*
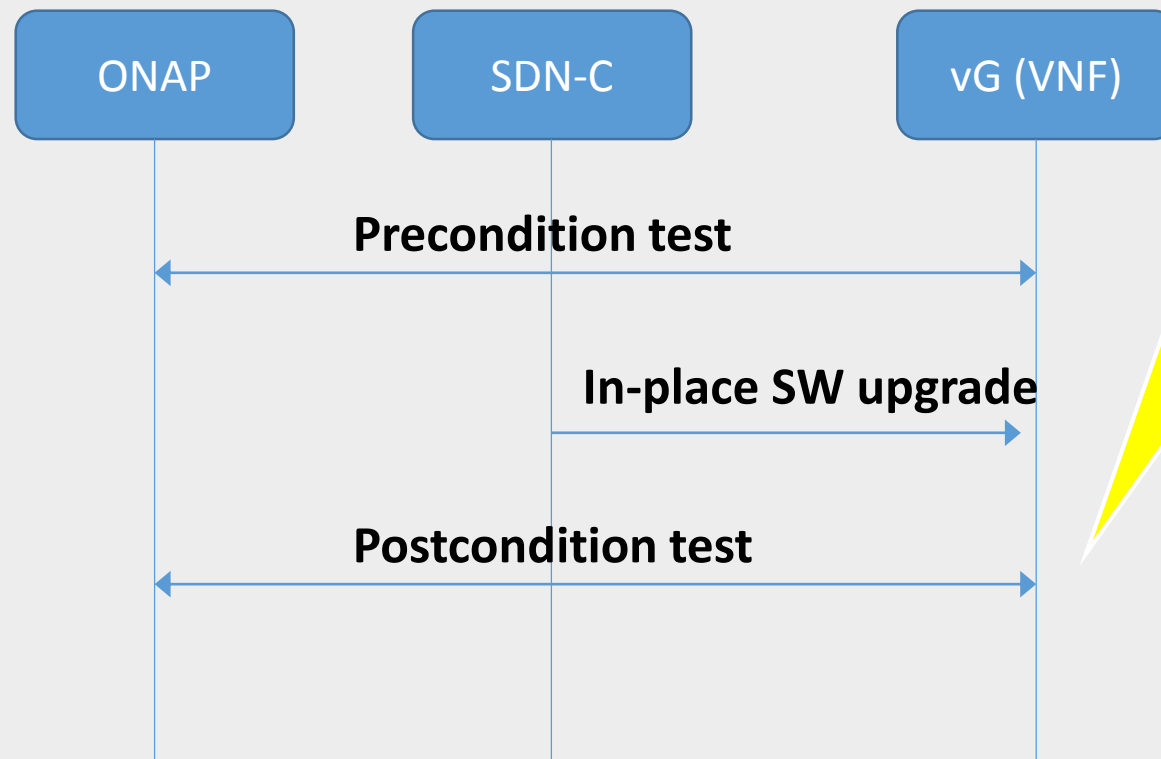
'In-place software upgrade' is suitable for PNF.
Besides, which controller is used to handle this upgrade case depends on the VNF/PNF, but the API could be standardized.
Pre/Post-condition test need to be enhanced. They might be complex, however, they could be customized.
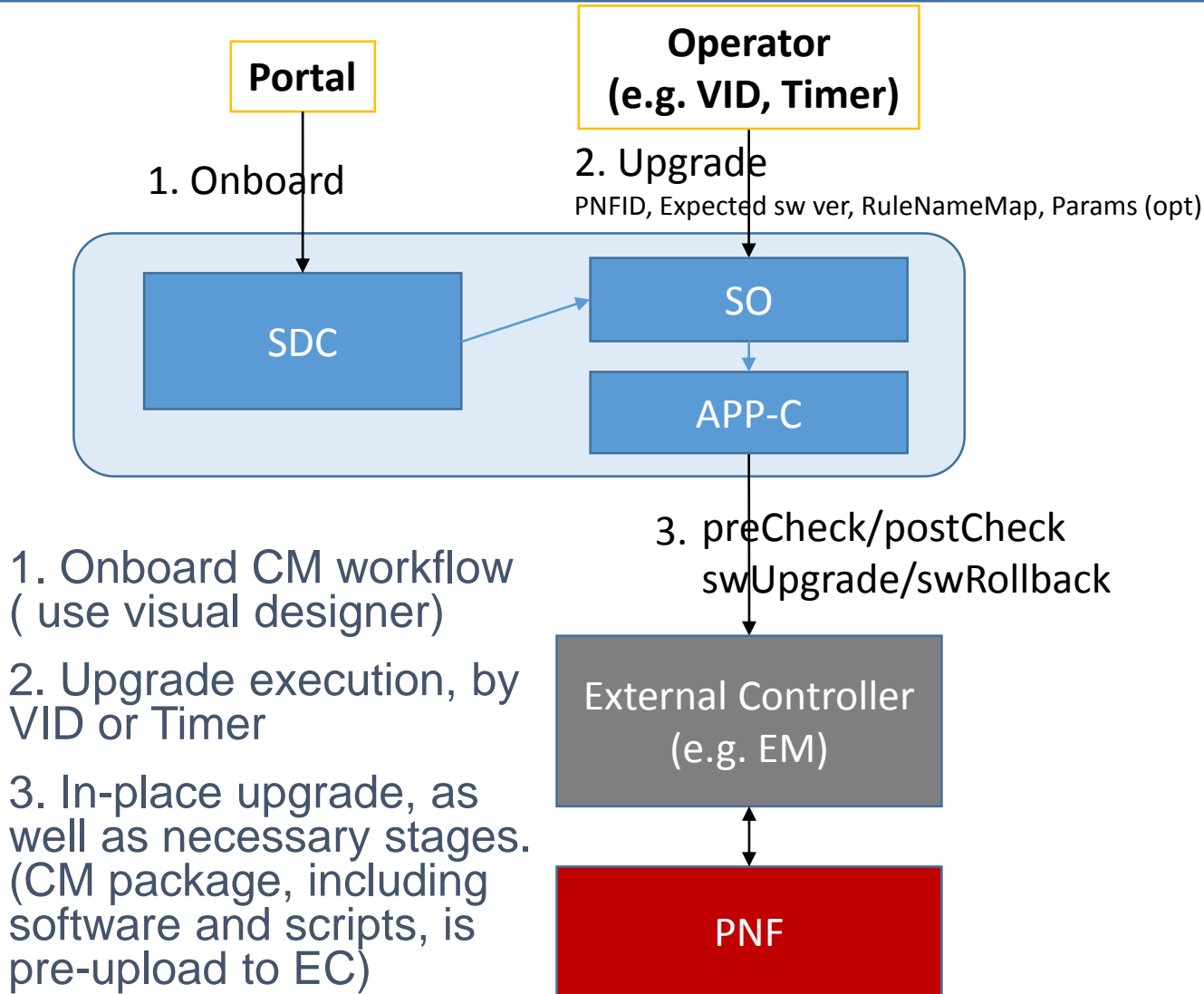
*Note: the full diagram can be found in CM wiki.

Proposal: Stages for RAN SW upgrade
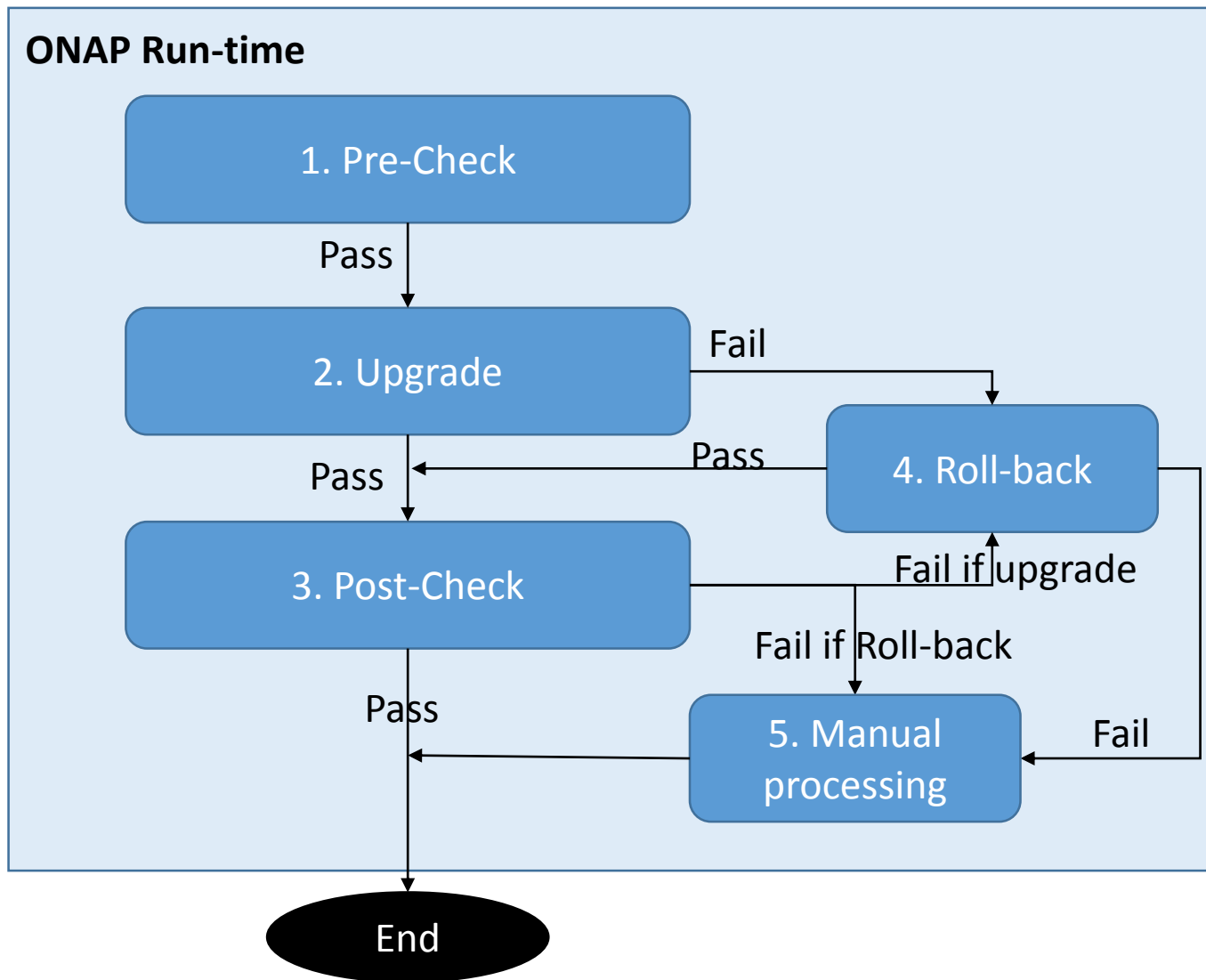
- Generic procedures and basic building blocks.
- For Pre-Check and Post-Check, they will be mapped to one 'rule'.
- Manual processing mechanism (TBD)
 - candidate: indicator of failure.

Proposal: Stages for SW upgrade

Portal

**Operator
(e.g. VID, Timer)**

1. Onboard

2. Upgrade
PNFID, Expected sw ver, RuleNameMap, Params (opt)

SDC

SO

APP-C

3. preCheck/postCheck
swUpgrade/swRollback

1. Onboard CM workflow
(use visual designer)

2. Upgrade execution, by
VID or Timer

3. In-place upgrade, as
well as necessary stages.
(CM package, including
software and scripts, is
pre-upload to EC)

External Controller
(e.g. EM)

PNF

- Use 'in-place upgrade'
- External controller is used to help Pre/Post-Check
  - HealthCheck only is not enough
  - Pre-Check will fetch and store some necessary state information of PNF in the external controller
  - Post-check will also fetch state info, and the controller do some comparison to make decision.

Proposal: sequence diagram for swUpgrade
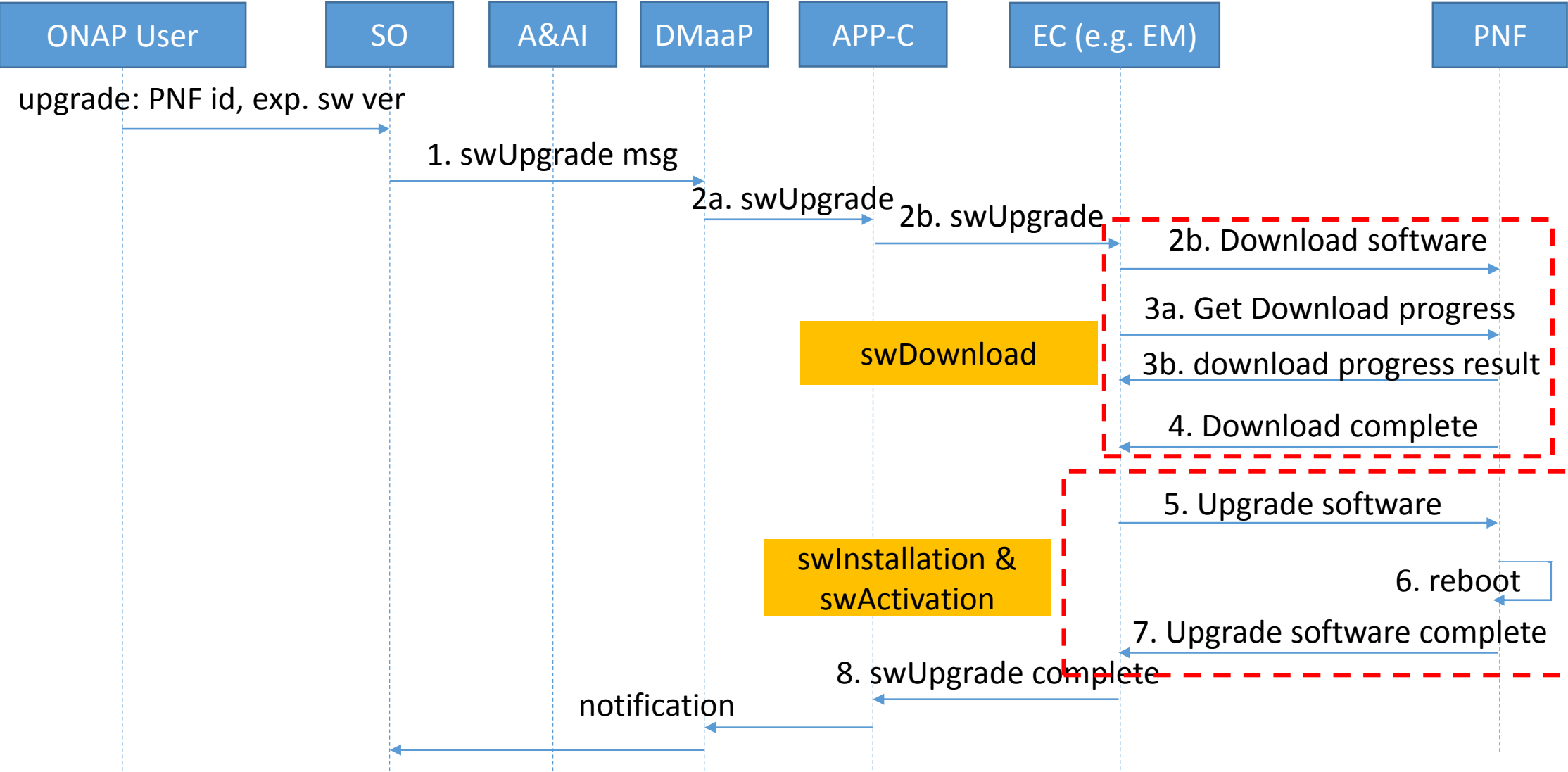
Proposal: Beyond SW upgrade

- For VNF, SW upgrade is just one thing.

- VNFD upgrade (TBD).

- VNF Guest OS upgrade (TBD).

- To reuse the previous stages, there are two options to implement VNFD upgrade and VNF Guest OS upgrade:
  - Option 1: add params to the swUpgrade interface
  - Option 2: add two interfaces

- Recommend:
  - CM-related things could and need to be unified for 5G RAN. Because it has to handle both VNF and PNF.

Casablanca functional requirements

- Support PNF PnP from initial software version to the expected software version

- PNF maintenance can upgrade one software version to the expected software version.

- define the basic and generic building blocks for both PNF and VNF change management support

- design CM work flows

- extend and discuss CM requirements as R3 stretch goals, like VNFD upgrade and VNF Guest OS upgrade.