**3GPP TSG-SA5 Meeting #143-e *S5-223444rev1***

**e-meeting, 9 - 13 May 2022**

**Source: Microsoft**

**Title: pCR 28.834 Add Use Case on Cloud-native VNF Deployment**

**Document for: Approval**

**Agenda Item: 6.5.12.1**

# 1 Decision/action requested

***The group is asked to discuss and approve.***

# 2 References

[1] 3GPP TR 28.834-000 “Study on Management of Cloud Native Virtualized Network Funciton”.

# 3 Rationale

This contribution proposes to add the use case and potential requirements on deployment of cloud native VNFs.

# 4 Detailed proposal

It proposes to make the following changes to TR 28.834.

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| **1st Change** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications"

[x1] NGMN Cloud Native Enabling Future Telco Platforms v5.2. 17. May 2021

[x2] ETSI GR NFV-IFA029: “Report on the Enhancements of the NFV architecture towards cloud-native and Paas”

[x3] ETSI GR NFV-EVE019: “Report on VNF generic OAM functions”

[x4] ETSI GR NFV-IFA037: “Report on further NFV support for 5G”

[x5] ETSI GS NFV-IFA040: “Requirements for service interfaces and object models for OS container management and orchestration specification”

[x6] <https://12factor.net/>

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| **2nd Change** |

# 4 Concepts and background

*Editor's note: this clause will contain concepts and background of relevant studies in other SDOs or industry parties.*

Cloud-native refers to the ability of realising economy at scale by use of applications that follow the 12-factor software design methodology [x6]. A VNF that follows these 12-factor code development and integration methodology is considered a cloud-native VNF.

Application of cloud-native design rules to telecommunication technologies has been extensively studied:

In [x1] transformation toward cloud-native in the main domains of the telecommunication infrastructure is analyzed as an important driver for internal opitimziation, cost saving, and enablement of vertical solutions.

Potential impact of supporting VNFs which follow cloud-native design principles on the NFV architecture is studied in [x2]. Annex A in [x2] also provides a comprehensive overview of the cloud-native related industry initiatives.

Requirements on the list of services offered by architectural elements providing the container management related functions described in [x2] are specified in [x5].

In [x3] the types of VNF management functions which can be generalized and provided as “generic functions” are analyzed and defined. Possible solutions for realizing such generic functions are also described.

In [x4] NFV architectural capabilities and features are profiled based on their utility in addressing the 5G network capabilities and features and enhancmenets to NFV architectural framework are recommended to further support 5G network characteristics.

# 5 Potential use cases and requirements

*Editor's note: this clause will contain the use cases and potential requirements.*

## 5.X Use case# Num: Deployment of cloud-native virtualized network functions

### 5.X.1 Description

Deployment of a cloud-native virtualized network function includes the following management operations:

1. Onboarding of the cloud-native VNF Package

Onboarding of the cloud-native VNF package to the management system of cloud infrastructure needs to have been completed prior to instantiation of the NF. ~~The cloud infrastructure management maintains a mapping between the NF types, software packages and the deployment sites.~~ In this operation the cloud-native VNF Package is uploaded and enabled for use; however, it is not yet in use.

The triggering of onboarding of the packages can be initiated by the NM but also other authorized consumers outside of the NM. From NM point of view the knowledge of whether cloud-native VNF Package is onboarded to the cloud infrastructure management and its operational status is sufficient.

1. Instantiation of the cloud-native VNF

Instantiation is part of LCM of an NF and results in creation of a particular instance of NF using the onboarded cloud-native VNF Package and creation of an MOI for the created NF instance. The instantiation of a cloud-native VNF is initiated by an authorized consumer in NM for a specific geographical serving area. For the authorized consumer to request the instantiation of the NF in a location best suited to service a specific serving area, the management system in charge of the LCM of cloud-native VNFs need to have the information regarding the available locations, i.e., data centres, or sites as well as their characteristics, i.e., capability, available capacity, serving area, etc.

1. Configuration of the cloud-native VNF

Configuration of an NF allows updating the attributes in an MOI and maintaining its operational state. The initial configuration data can be provided as part of instantiation or may be provided later.

While the standardization activities to provide a full management solution for cloud-native applications are on-going in 3GPP and ETSI, today’s deployments rely on existing de-facto standards such as Kubernetes/Docker, Helm Charts, etc. The use case described here includes deployment of the cloud-native virtualized NFs by NM utilizing the various existing de-facto standards for LCM of cloud-native VNFs, in addition to ETSI NFV-MANO when deployed.

1. X.2 Requirements

**REQ-CNF\_LCM-CON-1** Management system in charge of LCM of cloud-native VNFs shall have the capability allowing NM to request instantiation of a cloud-native virtualized network function.

**REQ-CNF\_LCM-CON-2** Management system in charge of LCM of cloud-native VNFs shall have the capability allowing NM to configure a cloud-native virtualized network function.

**REQ-DPLY\_CNF-CON-3** Management system in charge of LCM of cloud-native VNFs should have the capability allowing NM to request information on the availability of the cloud-native VNFs Packages and their status, i.e., onboarded, enabled, etc.

**REQ-CNF\_LCM-CON-4** Management solution for cloud-native VNFs should interoperate and integrate seamlessly with either ETSI NFV-MANO, if deployed, or the existing de-facto standards.

**REQ-CNF\_LCM-CON-5** Management system in charge of LCM of cloud-native VNFs should have the capability allowing NM to request information on the available deployment sites including their characteristics and status.

**REQ-CNF\_LCM-CON-6** Management system in charge of LCM of cloud-native VNFs should have the capability to select a specific deployment site based on the NF serving area and NF requirements.

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| **End of Changes** |