



H2020 5GASP Project

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5GASP Certification Guideline

Abstract

This document is a guideline for the NetApp Applicant to understand and practice the certification processes of 5GASP NetApp certificate.

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Chapter 1. Introduction

1.1 Scope of the document

The present document describes the essential criteria and guidelines (guiding principles) from the requirement, workflow, and technical perspective on the qualified 5GASP NetApp certification. The certification enables the automated, reproducible validation of NetApps across multiple network infrastructures containing a diverse set of deployed multi-vendor services on testbeds (different MANOs OSM/ONAP, and various 5G solutions). A 5G NetApp meeting all of these criteria and guidelines in any testbed or multiple testbeds may qualify as a 5GASP NetApp.

The certification processes will be described in a separate document. The definition of who can and how to issue a 5GASP certificate will be under further discussion.

1.2 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 Release 16.

[1] 5GASP Propose Section 1-3, Final version, February 2021

[2] 5GASP Leaflet, Draft version, May 2021

[3] H2020 5GASP Project D2.1, Draft version, May 2021

[4] List of 5GASP Tool and Open API, Draft version, May 2021

[5] 3GPP 23.501 System architecture for the 5G System (5GS)

[6] 5GASP Glossary for NetAppCommunity Knowledge Centre, Draft version, May 2021

1.3 Definitions and Abbreviations

1.3.1 Definitions

For the purposes of the present document, the terms and definitions [6] given in the following apply.

NetApp are any 5G-based Network Applications running on one host providing communication to another application running on a different host.

5GASP Facility is tailored to support the specificities of NetApps and acting as their hosts for testing. Each facility will host the following services: i) Testcase Execution Engine; ii) Monitoring repository per facility.

5GASP NetApp marketplace is an open marketplace which will contain validated and tested NetApps for every specified vertical.

Testcase Execution Engine is an engine capable of performing automated test, based on defined test scripts, against the installed NetApp in the facility.

1.3.2 Abbreviations

For the purposes of the present document, the abbreviations given in the following apply

3GPP	3rd Generation Partnership Project
5GASP	5G Application & Services experimentation and certification Platform
5GCore	5G Core Network
5QI	5G QoS Identifier
API	Application Programming Interface
CI/CD	Continuous Integration and Continuous Deployment/Delivery
CN	Core Network
CoAP	Constrained Application Protocol
DNS	Domain Name System
eMBB	Enhanced Mobile Broadband
ETSI	European Telecommunications Standards Institute
K8s	Kubernetes
KPI	Key Performance Indicator
MANO	Management and orchestration
mIoT	Massive Internet of Things
NEST	Network Slice Template
NetApp	Network Application
NR	New Radio
NSA	non-standalone
NSD	Network Service Descriptor
OAI	Open Air Interface
ONAP	Open Network Automation Platform
OSM	Open Source MANO
PCT	Project Coordination Team
PPDR	Public Protection and Disaster Relief
RAN	Radio Access Network
RTT	Round-Trip Time
SA	standalone
SDN	Software Defined Network
SDR	Software Defined Radio
SME	Subject Matter Expert
TC	Technical Committee
TEE	Testcase Execution Engine
UE	User Equipment
URLLC	Ultra-reliable low latency communication
V2X	Vehicle-To-Everything

VNFD

VNF Descriptor

WEB MOS

Web Media Object Server

Chapter 2. 5GASP Overview

5GASP is a project funded by the Horizon 2020 EU's research and innovation programme [2]. 5GASP aims to shorten the idea-to-market process through the creation of a European NetApp deployment, testing, and certification ecosystem primarily developed for SMEs and start-ups, that is fully automated and self-service, in order to foster rapid development and testing of innovative NetApps built using the 5G NFV based reference architecture [1]. Building on top of existing physical infrastructures, 5GASP intends to focus on innovations related to the operation of experiments and tests across several domains, providing software support tools for CI/CD of VNFs in a secure & trusted environment for European SMEs capitalizing in the 5G market [1].

2.1 5GASP Vision

- Innovation for operations and secure/trusted service provisioning taking advantage of experimental facilities featuring virtualized and software implemented functions [2].
- A 5G NetApps ecosystem being an open market where Developers, Verticals, and Network Operators can meet and create added value [2].

2.2 5GASP Objectives

- Acceleration of the development, testing and certification of NetApps, through the creation of a common platform, DevOps tools and a certification roadmap [2].
- Provision of state-of-the-art testbeds where applications for relevant verticals can be tested and validated in a cost-effective way [2].
- Technical innovation by addressing inter-domain use-cases, security and trust aspects associated with NetApp deployment and Operation [2].
- Automation of testing and validation process, lowering cost associated with testing and certification of NetApps in telecommunication environment [2].

Chapter 3. 5GASP General Information

3.1 5GASP Verticals

5GASP demonstrates its testbeds for three verticals at this moment - an Automotive Vertical, a PPDR Vertical, and a Cross Vertical; however, it will also be as generic as possible to deploy, validate and certify NetApps stemming from other verticals. 5GASP defines a Zero-Touch Orchestration [1] as shown in Figure 3.1-1 for the SMEs to quickly develop and deliver their NetApps based on the 5G platform.

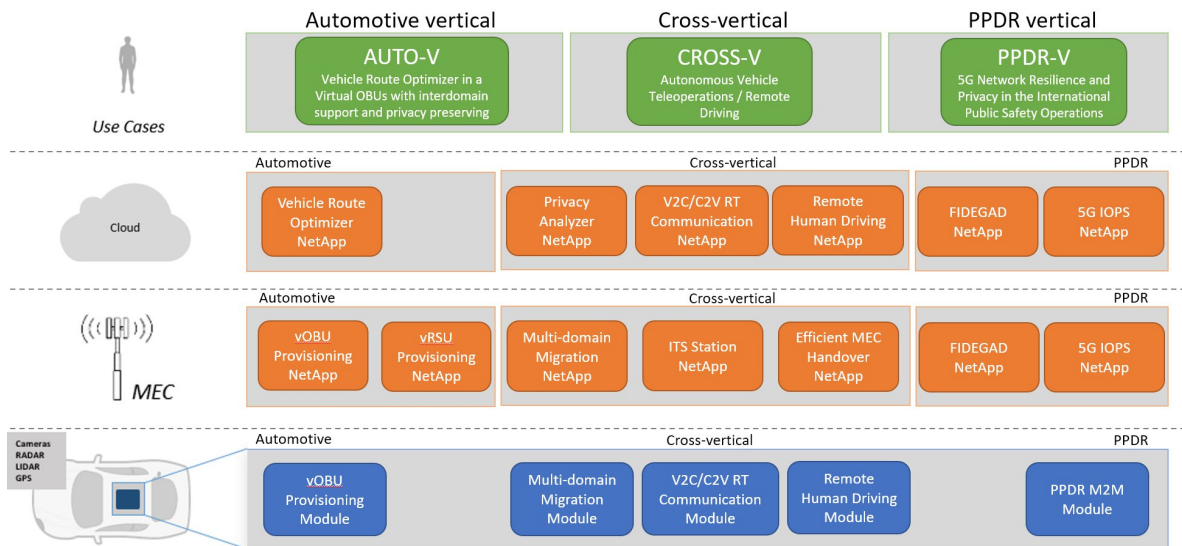


Figure 3.1-1 5GASP NetApps and Orchestrated Use Cases

3.2 5GASP Facilities

Six qualified experimentation facilities are available for certification processes in the 5GASP. These facilities work as testbeds, and 5GASP name the facility after the city of the site locations: Aveiro, Patras, Bristol, Ljubljana, and Bucharest. 5GASP facilities use Open Source Solutions in the virtualized infrastructure implementation [1] as shown in Table 3.2-1.

Solution	Aveiro	Patras	Bristol	Ljubljana	Bucharest	Murcia
OSM	X	X	X	X	X	X
OpenStack	X	X	X	X	X	X
K8s	X	X	X	X	X	X
ONAP		X		X	X	
Testcase Execution Engine	X	X	X	X	X	X
SDN	ODL / OpenFlow switches	Cumulus Linux	ODL controller / OpenFlow enabled switches		ODL controller / OpenFlow enabled switches	ONOS + Delta PicOS powered devices and HPE Openflow Enabled

White box Hardware		Cumulus Express				ONL on top of Barefoot Tofino (P4) devices
5GCore	Huawei	Open5GCore (SA) AMARISOFT 5G CN (SA/NSA)	Nokia NSA MCN18 Sp1	AMARISOFT 5G CN	Open Mosaic5G; Ericsson 5G NSA	AMARISOFT + Open5GCore + Cumucore
RAN	Huawei NR SDR based 5G NR	AMARISOFT, LimeSDR, Ettus SDR (N310)	Nokia 4G, 5G NR (Massive MIMO)	AMARISOFT SDR based 5G NR	Mosaic5G Ettus SDR(N310); Huawei NR	AMARISOFT + Ettus SDR + OAI
Edge	OpenNESS	Akraino, OpenNESS			Ubuntu 18.4 Openstack Unikernel	Ubuntu LX Openstack; Drone with pilot available OpenNESS

Table 3.2-1 Open Source and commercial tools in 5GASP facilities

Below is an example of the infrastructure architecture of the Bucharest facility in Figure 3.2-1.

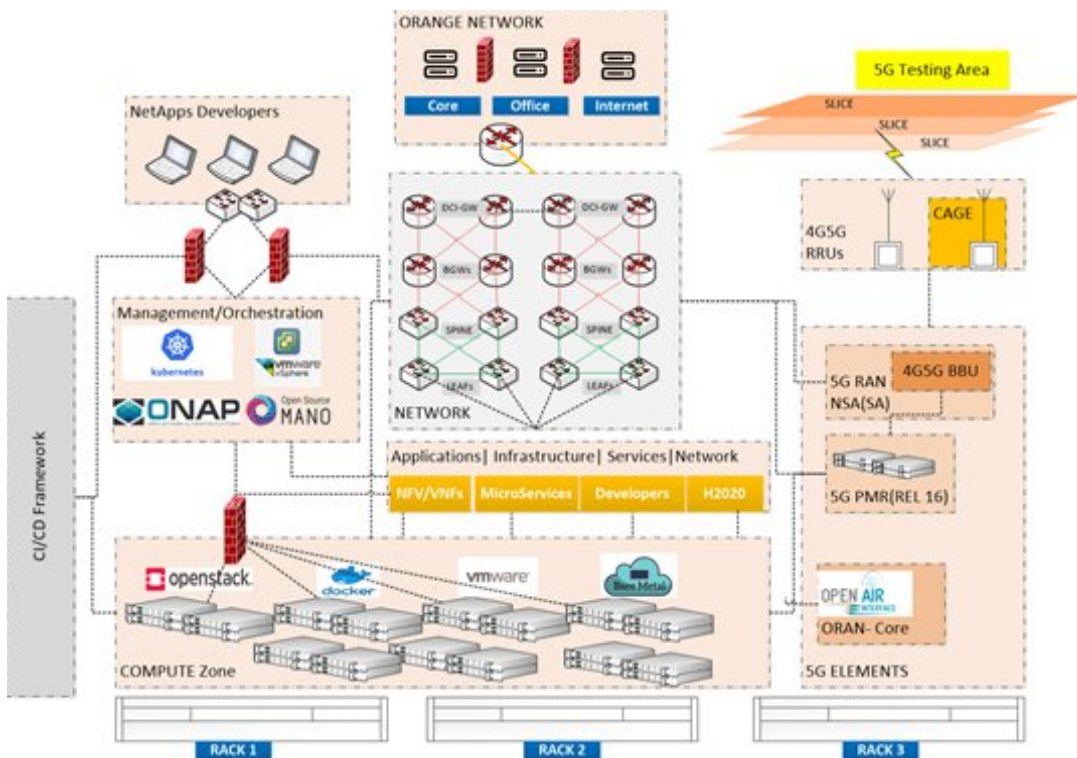


Figure 3.2-1 site infrastructure architecture of 5GASP Bucharest facility

3.3 5GASP Tools

5GASP targets to create an open telecommunication environment. That not only means the Open Source Solutions in the virtualized infrastructure but only the Open Source tools with the Open APIs [4], as shown in Table 3.3-1. All the test tools in the Table are running on the TEE of each facility. The dedicated tools are possible to be installed in any facility when one NetApp needs to be developed and certificated only in one dedicated facility.

Test Tool	Framework /plugin	Test Domain	Description
Jenkins	Robot, Slack	Continuous Integration Test	Jenkins Master in Testbed Aveiro, Slaves in all Testbeds; Robot for CI tests; Slack for the communication
OpenSlice		MANO & NFVI Test	NetApp Onboarding Portal, Service Portal, NF Catalog Management, Service Order, Service Orchestration
OSM		MANO & NFVI Test	Open Source ETSI-hosted MANO
ONAP		MANO & NFVI Test	Open service orchestration and network automation platform
OpenStack		MANO & NFVI Test	Open source cloud computing infrastructure platform
K8S\ Docker		MANO & NFVI Test	Open source containerized application platform
Grafana		MANO & NFVI Test	Infrastructure Dashboard
Prometheus		MANO & NFVI Test	Infrastructure Metrics
AutoTool	Robot	MANO & NFVI Test	Server in EANTC lab with Robot framework, Robot remote libraries in each testbed
qMON		Network Slice & Application Test	NFVI Virtual Resource performance test (RTT,DNS,IP/TCP/UDP); End-2-End traffic performance test (RTT,DNS,HTTP/FTP/WEB MOS,IP/TCP/UDP and 5G NR Radio KPIs)

Table 3.3-1 5GASP Tools

3.4 5GASP Global Infrastructure Architecture

3.4.1 5GASP DevOps Experimentation and Certification Readiness Lifecycle

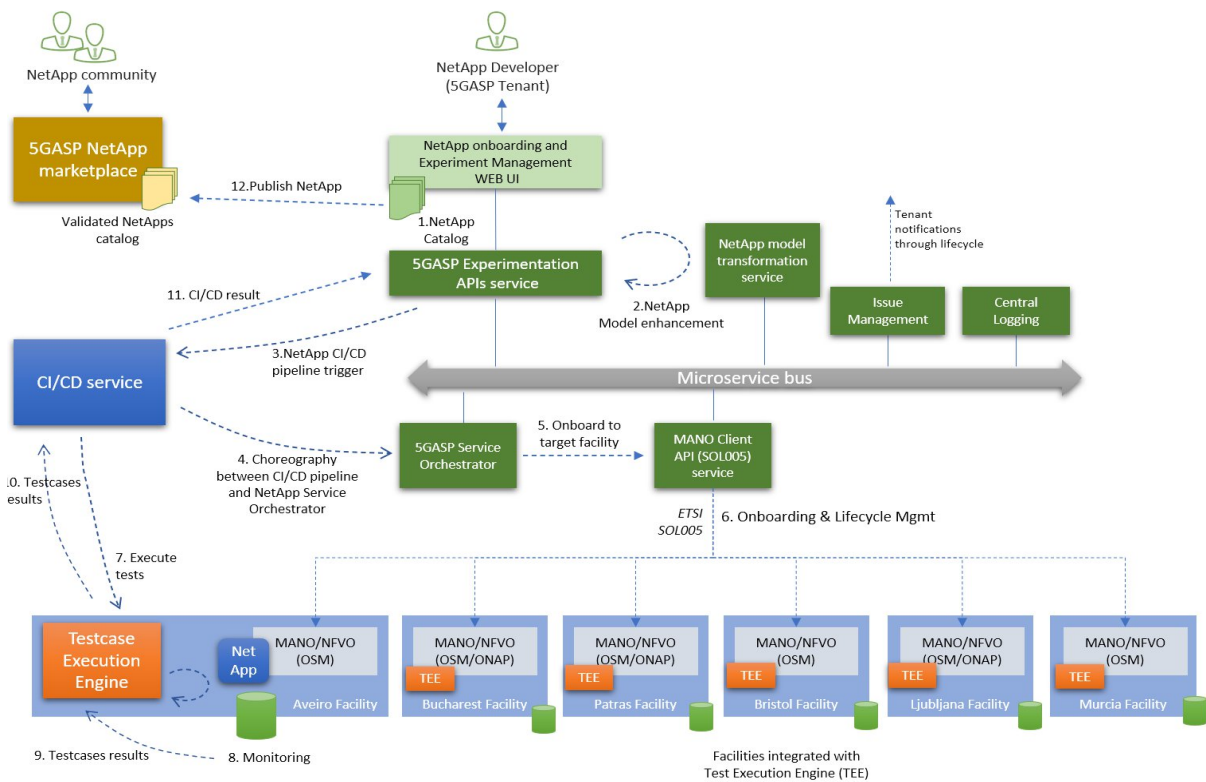


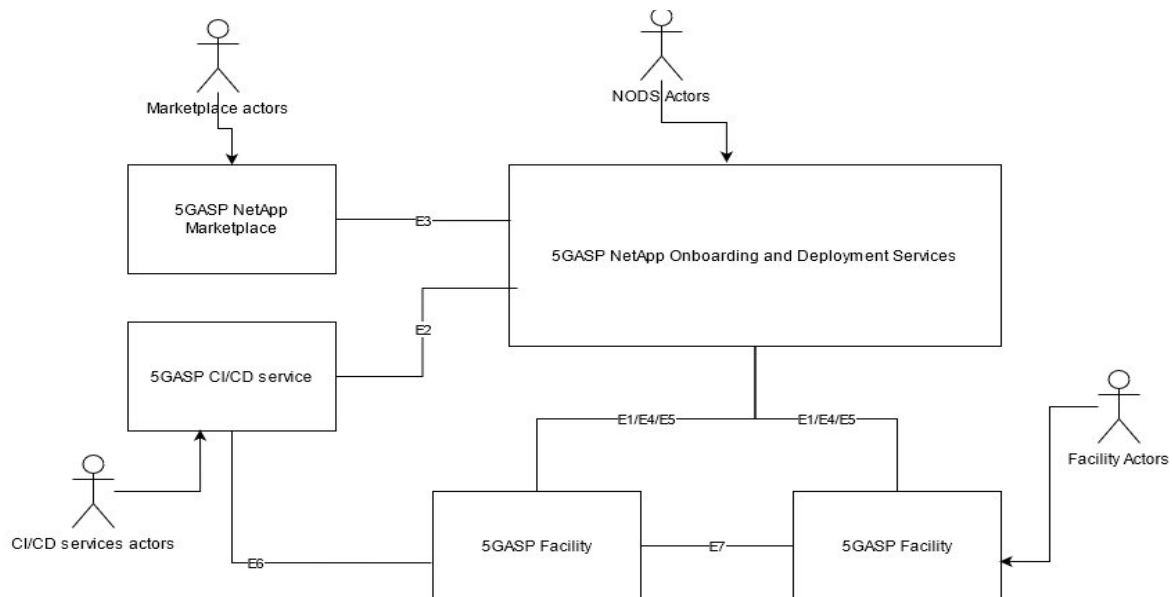
Figure 3.4-1 5GASP approach on DevOps experimentation and certification readiness Lifecycle

The experimentation and certification-readiness Lifecycle [1] is envisaged and will be realized by the following interactions:

1. The NetApp developer (5GASP tenant), via the **NetApp onboarding and Experiment Management UI**, Onboards the NetApp under test to the NetApp Catalogue in **5GASP Experimentation APIs service**.
2. A NetApp Model enhancement follows by the **NetApp model transformation service**.
3. The NetApp CI/CD main testing pipeline is triggered to the **CI/CD service**.
4. A Service Choreography follows between the **CI/CD service** and NetApp **Service Orchestrator** to properly manage the deployment to target facilities.
5. The **Service Orchestrator** resolves dependencies and Onboard NetApps to target facilities NFVO repositories.
6. The Onboarding & Lifecycle Management towards the facilities is realized via the **MANO Client API (SOL005) service**.
7. The **CI/CD service** from information exchanged with the **Service Orchestrator** executes tests via the facility's **Testcase Execution Engine**.
8. During the testing, **Monitoring** takes place.
9. After testing execution, Testcases results from the facility are available.
10. Testcases results are made available to **CI/CD service** for assessment.
11. **CI/CD service** makes available Testcases results to **5GASP Experimentation Service**, so 5GASP tenants are aware of the testing results and assessment.
12. If the NetApp is passed successfully, the entire Lifecycle and all the defined testing pipelines is Publish to **5GASP NetAppStore**.

3.4.2 5GASP High-Level Architecture

5GASP defined a high-level architecture with the Services and the logic Interfaces [3] as shown in Figure 3.4-1.



Heading

- E1: Interface for communication to the NFVO (SOL005 , etc)
- E2: Interface for CI/CD communication
- E3: Interface for NetApp Marketplace interactions
- E4: Interface for Cross Domain Network Orchestration
- E5: Interface for facility and testing services management
- E6: Interface for facility interaction with CI/CD
- E7: Inter-facility interface connectivity

Figure 3.4-2 5GASP high-level architecture

Chapter 4. 5GASP General Requirements

5GASP requires any NetApp that would be under the certification to share the vertical-specific requirements (demonstration environment, NetApp KPIs, and overall integration needs) and the high-level infrastructure architecture.

4.1 5GASP NetApp Vertical-Specific Requirements

4.1.1 Demonstration Environment

The NetApp that would be under the certification needs to share the requirements of the demonstration environment.

- Computing requirement: Edge computing (i.e., Multi-access Edge Computing), or Cloud computing (i.e., Facility Central Computing), or both
- Domain requirement: Single domain, or multiple domains, or both
- Vertical requirement: Automotive Vertical, or PPDR Vertical, or Cross Vertical, or other Vertical
- Is there one recommended facility for the certification? Usually, one NetApp under the certification should be validated in any one of the 5GASP facilities. If yes, please share the detailed reasons.

Below is an example of the demonstration environment requirements of NetApp vOBU [3], one of our approved NetApps.

Our NetApp Virtual On-Board Unit (vOBU) (i.e., NetApp name) works in Automotive Vertical. OdinS (i.e., NetApp Vendor) introduces this solution that provides the necessary vOBUs that are instantiated at the edge of the access network with the purpose of offloading high computational cost tasks to the network following the Multi-Access Edge Computing approach. This single domain NetApp could be validated in any facility.

4.1.2 NetApp KPIs

The NetApp that would be under the certification needs to share the requirements of NetApp KPIs - the generic KPIs and the Network Slice Template (NEST) defined by the GSM Alliance.

Below is an example of NetApp vOBU generic KPIs [3] in Table 4.1-1.

Generic KPI name	Metric Indicator (How)	KPI value	KPI unit
Initial time	<i>Time needed to deploy for first time the entity (vOBU)</i>	<i><5</i>	<i>minutes</i>
Transaction speed	<i>Each message sent from a OBU needs to be redirected to the vOBU</i>	<i>500</i>	<i>milliseconds</i>
Packet Loss Ratio	<i>Ratio of packets loss between the OBU and vOBU. Packets loss above packets sent</i>	<i>1</i>	<i>%</i>
Service response time	<i>Delay ratio while including vOBU instantiation</i>	<i><30</i>	<i>%</i>
Service downtime	<i>Ratio of time the vOBU is not up and running</i>	<i><10</i>	<i>%</i>

Table 4.1-1 Example of Generic NetApp KPIs requirements

Below is an example of the detailed NEST of NetApp vOBU [3] in Table 4.1-2.

vOBU NETAPP's NEST	
Area of service	<u>SP, PT, UK, RO (AUTO-V use case)</u>
Area of service: Region specification	<u>Murcia, Aveiro, Bristol, Bucharest</u>
Downlink maximum throughput per UE	=
Uplink maximum throughput per UE	=
Isolation level	<u>Virtual resources isolation</u>
Mission critical support	<u>1: mission-critical</u>
Mission critical support: Mission-critical capability support	<u>1: inter-user prioritization</u>
Mission critical support: Mission-critical service support	<u>2: MCDData</u>
Slice quality of service parameters: 3GPP 5QI	<u>69</u>
Maximum Packet Loss Rate	<u>1%</u>
Supported device velocity	<u>3: Vehicular: 10 km/h to 120 km/h</u>

Table 4.1-2 Example of NetApp NEST requirements

4.1.3 Overall NetApp Integration Needs

The NetApp that would be under the certification needs to share the overall NetApp integration needs.

- Packaging Info:
 - Component type: VM, or container
 - Component number: how many VMs/containers
 - Descriptors type: NSD/VNFD, or Helm
 - Onboard method: Via MANO, Docker Hub, or Scripts
- Communication method of Health check or (deployment status) Lifecycle: Hooks, or API, or nothing
- Dependencies of the 5G System:
 - Network Slicing is required: No, or Yes (if yes, which slice: eMBB, URLLC, mMTC, V2X)
 - 5G Core functionality: e.g., 5G LAN-Type Service, 5G Location Service, 5G Time Sensitive Communication [5], etc.
- How is it operated? Automated, or Manual
 - Does it require manual interventions: No, or Yes (if yes, which protocol, e.g., CoAP/UDP/IPV6)
- Dependencies of the other NetApps: No, or Yes (if yes, which NetApp)

Below is an example of the overall integration needs of NetApp vOBU [3].

Packaging Info (VM, container, type, etc.): 1 Network Service (NSD), and 3 VM Roles (VNFD): one Manager VM, one Aggregator VM and the vOBUs themselves + onboard software (python based).

Existing Healthcheck or Lifecycle (deployment status) Hooks or APIs: No.

Dependencies of the 5G System (requires slicing, core functionality, etc.): Requires dynamic VM deployment and MANO connectivity to recover deployment status information.

How is it operated (and does it require manual interventions)? Configuration of Mobile device requires human interventions. Right now, configuration with Ansible scripts, adaptation to fully automated deployment planned. Protocol used: CoAP/UDP/IPV6

Dependencies (does it expose or consume services from/to other NetApps): No.

4.2 5GASP NetApp High-Level Infrastructure Architecture

The NetApp under the certification needs to share the high-level infrastructure architecture to show the end-to-end communication and traffic flows.

Below is an example of the high-level infrastructure architecture of NetApp vOBU in Figure 4.5-1.

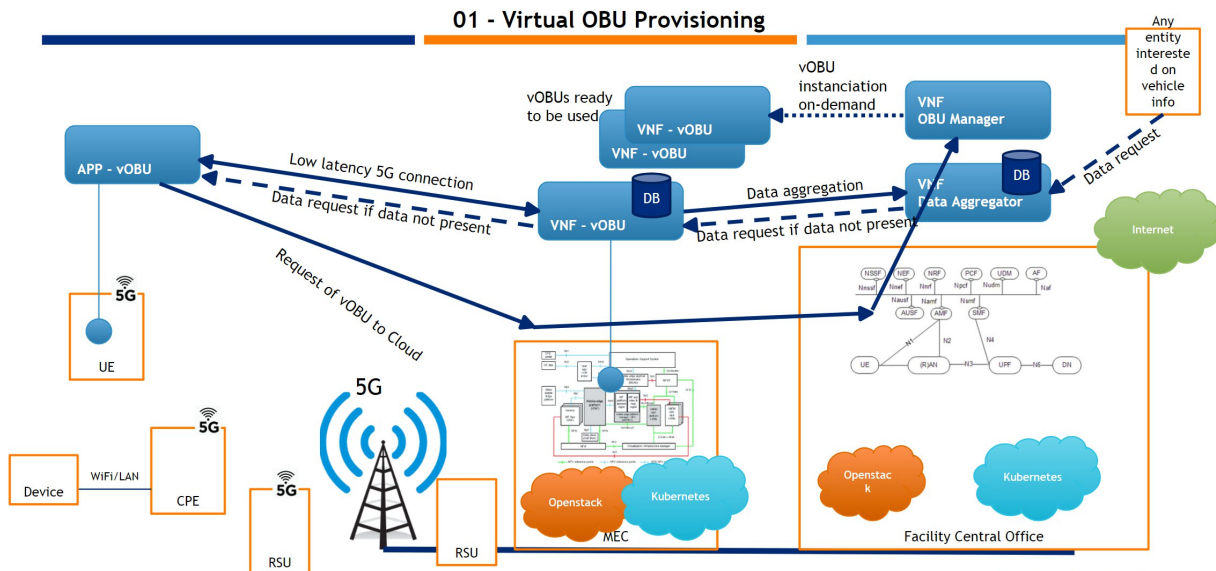


Table 4.2-1 Example of 5GASP NetApp high-level infrastructure architecture

Chapter 5. Certification Workflow

5GASP defines a V-Model Certification Workflow as shown in Figure 5-1. Any NetApp Applicant should follow this workflow in the certification process. After the published 5GASP NetApp certificate, the NetApp use case stakeholders (they may not be the numbers of 5GASP project) could validate the NetApp on the Field of their target 5G facility that may be a testbed or a commercial Cloud.

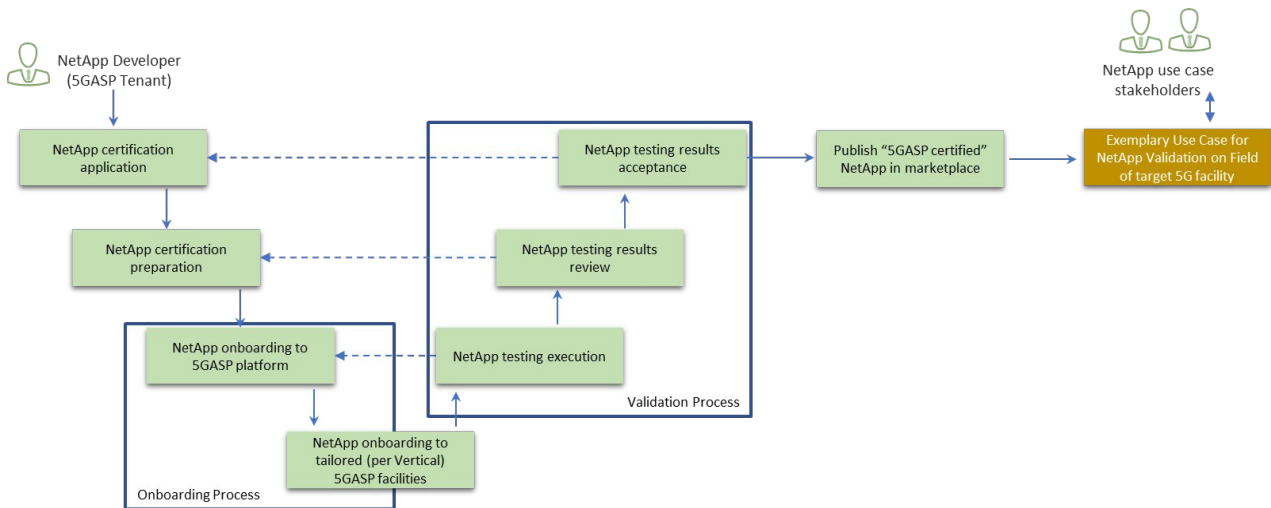


Figure 4.2-1 5GASP NetApp V-Model Certification Workflow

5.1 5GASP NetApp Certification Application Process

5.1.1 Certification Application Requesting

The NetApp Applicant needs to send the complete application form to all@5GASP.eu to start the 5GASP NetApp certification workflow. The NetApp application form can be submitted at any time. The submitted application is received by the 5GASP Project Coordination Team (PCT) and then forwarded to the 5GASP Technical Committee (TC) to handle the review. The approval process is handled by 5GASP PCT. The application form is defined in Annex A, and it contains among others the following information:

- General information about NetApp, incl. NetApp name, NetApp description, vendor name, vendor location (address), and primary contacts
- Information about the general requirements in Chapter 4

5GASP PCT should check the completeness of the mandatory information in the application form before forwarding it to 5GASP TC.

5.1.2 Certification Application Reviewing and Evaluation

Once 5GASP PCT forwards the application form to 5GASP TC, 5GASP TC should assign each application to one reviewer, one Work Package leader, or the technical lead in one Work Package. The applications should be equally distributed to the reviewers.

The reviewer is selected from the list of reviewers, which 5GASP TC maintains. The reviewer list is accessible to all 5GASP members and contributors, and it contains information about the reviewers such as name, e-mail address, phone number, company affiliation, and assigned applications. Any representative of 5GASP members or contributors can be registered in or unregistered from the list of reviewers at his or her request at any time. 5GASP TC can re-select the assigned reviewer if needed.

The assigned reviewer checks the application form to ensure it is complete and in compliance with the requirements. If needed, the reviewer may request the applicant to provide additional information for any missing or unclear information in the application form. The reviewer is designated as the point of contact for all communications with the NetApp Applicant. The reviewer helps the NetApp Applicant to complete the application form. The reviewer guarantees completeness and compliance with the application form. The reviewer does not approve or evaluate the application.

Once the application is completed, the assigned reviewer needs to inform 5GASP TC to schedule a review meeting where the applicant will present and defend the application to 5GASP members. If needed, 5GASP TC can also try to coordinate the application with other NetApps to avoid fragmentation, overlap, etc.

5GASP TC should collect the preliminary favorable or unfavorable recommendations during the review meeting. 5GASP TC should provide the recommendations to the NetApp Applicant after the review meeting. 5GASP TC should also add the recommendations and summary of the review meeting to the NetApp application form. NetApp Applicant has the rights to provide their statements and any necessary information or correction if the unfavorable recommendation is made. The applicant statements and corrections are also added to the application form.

It needs to be noted that the application cannot be approved or rejected by 5GASP TC.

5.1.3 Certification Application Approval

The completed application form with 5GASP TC recommendations and with NetApp Applicant statements, if provided, shall be sent back to the 5GASP PCT for further approvals. The application is handled as a process document and not as a technical specification. NetApp Applicant needs to address any question or inquiry raised during this official approval process.

After passing the 5GASP approval process, the NetApp Applicant must sign the 5GASP Certification Agreement with 5GASP project, defined in Annex B. The qualification process is considered completed after the agreement is signed.

It needs to be noted that 5GASP PCT can terminate the agreement without cause at any time with prior written notice.

5.2 5GASP Certification Environment Preparation

After the application process, NetApp is under certification in 5GASP. The NetApp Applicant should involve NetApp Developers in the certification environment preparation process. In this process, NetApp, Facilities, and Test tools would be ready for the coming processes.

5.2.1 NetApp Developments and Adaptations

NetApp Developers should start the developments of the NetApp under certification according to the approved requirements in the application form if NetApp is not fully developed, or NetApp Developers should make the adaptations if NetApp has been fully developed.

5GASP TC should schedule a set of joint meetings where NetApp Developers will present and report the status of the developments or the adaptations. If needed, 5GASP TC can also try to coordinate the NetApp Developers with other NetApps to avoid fragmentation, overlap, etc.

5GASP TC should collect the preliminary favorable or unfavorable recommendations during the joint meetings. 5GASP TC should provide the recommendations to NetApp Developers after each meeting. 5GASP TC should also support NetApp Developers on the recommendations during their developments or adaptations.

5GASP TC should approve NetApp for the coming processes after all the recommendations are included in NetApp. 5GASP TC should also inform 5GASP PCT for the application approval.

5.2.2 5GASP Facilities Adaptations

Usually, the NetApp under certification should be validated in any 5GASP facility. The Facility Administrator of all 5GASP facilities should make the adaptations according to the approved requirements in the NetApp application form.

If the NetApp under certification recommends one dedicated 5GASP facility, the Facility Administrator of the target 5GASP facility should start the adaptations according to the approved requirements in the NetApp application form.

Facility administrators should present and report the status of the adaptations in the set of joint meetings that 5GASP TC schedules with NetApp Developers.

5GASP TC should collect the preliminary favorable or unfavorable recommendations during the joint meetings. 5GASP TC should provide the recommendations to Facility administrators after each meeting. 5GASP TC should also support Facility administrators on the recommendations during the adaptations.

5GASP TC should approve Facility/Facilities for the coming processes after all the recommendations are included in the Facility/Facilities.

5.2.3 5GASP Tools Adaptations

Usually, the NetApp under certification should be validated under the set of the open source tools in Chapter 3. Tool Administrator of all 5GASP tools should make the adaptation according to the approved requirements in the NetApp application form.

If the NetApp under certification recommends one dedicated tool, the NetApp Developers should share the exact reasons and the tool requirements. 5GASP TC should then schedule a joint meeting with all the Tool Administrators. Tool Administrators should select an existing open source tool if possible or create a new open source tool.

Tool administrators should present and report the status of the adaptations in the set of joint meetings that 5GASP TC schedules with NetApp Developers and Facility administrators.

5GASP TC should collect the preliminary favorable or unfavorable recommendations during the joint meetings. 5GASP TC should provide the recommendations to Tool administrators after each meeting. 5GASP TC should also support Tool administrators on the recommendations during the adaptations.

5GASP TC should approve tools for the coming processes after all the recommendations are included in the tools.

5.3 5GASP NetApp Onboarding Process

In this process, NetApp under certification should be onboarded to the tailored (per Vertical) 5GASP facilities via the 5GASP platform.

5.3.1 NetApp Onboarding to 5GASP platform

NetApp under certification should be onboarded to the 5GASP platform for the Pre-Deployment Validation as shown in Figure 5.3-1.

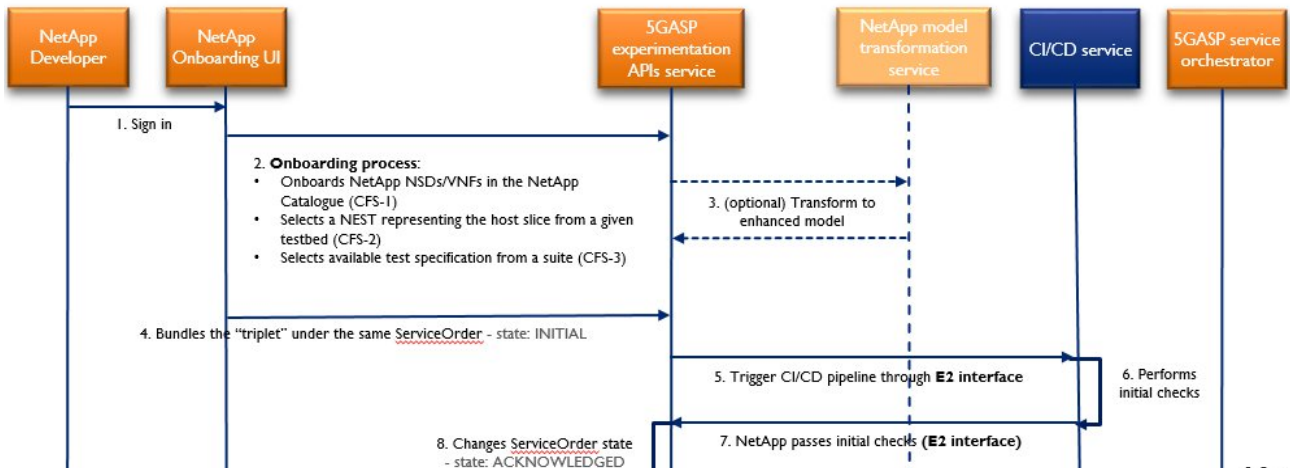


Figure 5.3-1 NetApp onboarding to 5GASP platform

5.3.2 NetApp Onboarding to tailored 5GASP Facilities

After the Pre-Deployment Validation, NetApp under certification should be onboarded to the tailored 5GASP Facility as shown in Figure 5.3-2.

If the NetApp under certification recommends being validated in more than one facility, the NetApp should be onboarded to the facilities one by one.

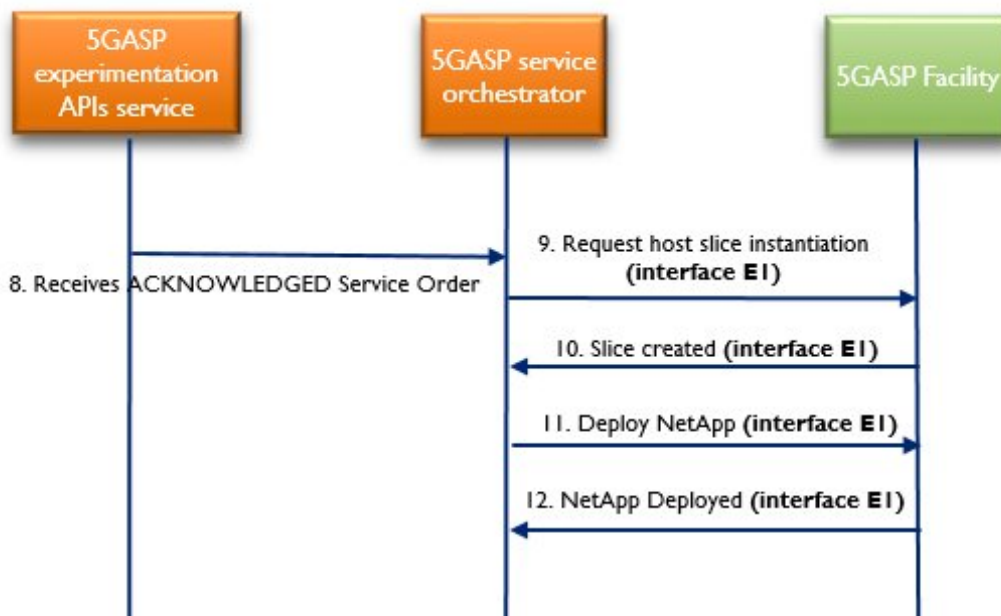


Figure 5.3-2 NetApp onboarding to 5GASP Facility

5.4 5GASP NetApp Validation Process

In this process, NetApp under certification should be tested in 5GASP Facilities. If the NetApp under certification recommends being validated in more than one facility, the NetApp should be tested in the facilities one by one.

5.4.1 NetApp Testing Execution

5GASP defines a test repository per facility that contains the pre-configured tests. The test tools will use this repository for the tests and then store the test logs and results in this repository.

Below is an example of Jenkins with Robot framework in Figure 5.1-1.

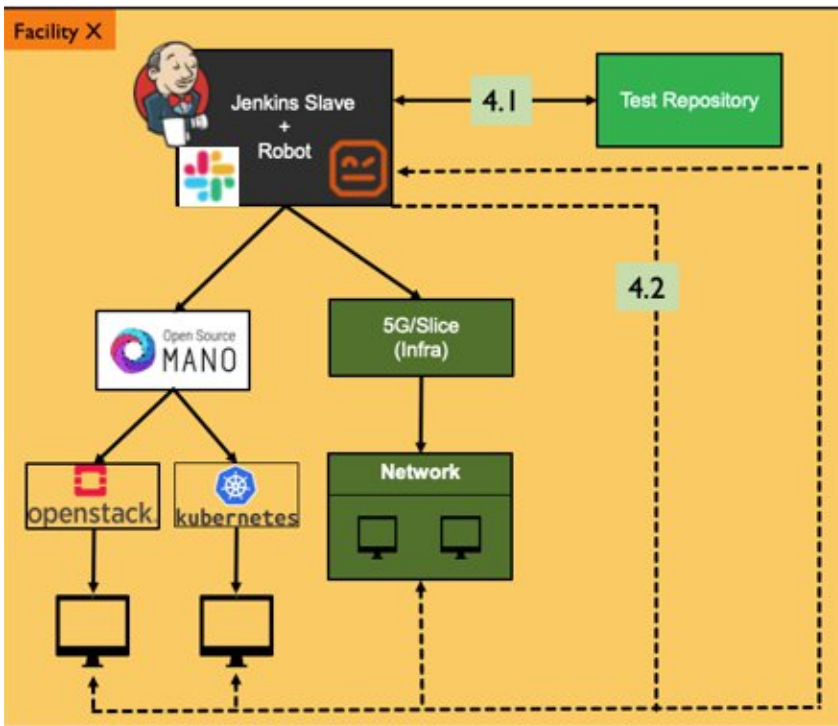


Figure 5.4-1 Example of Jenkins with Robot framework

It needs to be noted that there would be multiple rounds of testing execution for the NetApp under certification.

The details of the tools will be defined in the next coming version 1.0.

5.4.2 NetApp Testing Results Review

The test logs and results are stored in the test repository per facility. During the test execution, the notification messages would be sent via Slack to NetApp Developers in the case that one test case fail. After one round of testing execution of all the test cases, NetApp Tester should schedule a review meeting for the testing results where NetApp Developers, Facility Administrator, and Tool Administrator will present. If needed, NetApp Tester can also try to coordinate the NetApp Developers with other NetApps to avoid fragmentation, overlap, etc.

NetApp Tester should collect the preliminary favorable or unfavorable recommendations during the joint meeting. NetApp Tester should provide the recommendations to NetApp Developers, Facility Administrator, and Tool Administrator. NetApp Tester should also support the recommendations if some adaptations are needed in NetApp under certification, facilities, and tools.

5.4.3 NetApp Testing Results Acceptance

After all the recommendations are included in the NetApp under certification, the facilities, and the tools, the NetApp Tester should execute all the test cases again for the results acceptance.

NetApp Tester should schedule an acceptance meeting for the testing results where 5GASP TC, NetApp Developers, Facility Administrator, and Tool Administrator will present.

It needs to be noted that not NetApp Tester but only 5GASP TC could approve the acceptance after the acceptance meeting.

The details of the acceptance criteria will be defined in the coming version 1.0.

5.5 5GASP NetApp Publish Process

In this process, NetApp is already be certificated in 5GASP. 5GASP NetApp Certificate should be online published in the 5GASP marketplace.

The definition of who can and how to issue a 5GASP certificate will be under further discussion. The details of the definition will be in the future version.

Annex A 5GASP Certification Application Form

The following application form is used during the certification application as described in Chapter 5.

5GASP NetApp Certification Application form

The details of the form will be defined in the coming version 1.0.

Annex B 5GASP Certification Agreement

After passing the approval workflow described in Chapter 5, the NetApp Applicant must sign the legal agreement with the 5GASP project.

The details of the agreement will be defined in the coming version 1.0.