



An Interoperable Test Platform For Network Services and VNFs

5GTANGO V&V integration with ONAP

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ONAP DDF/ OPNFV Plugfest
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In this Session...

- Talk about the overlapping/competing VNF Test platforms
- Learn about 5GTANGO
 - Validation & Verification (V&V) Platform is important
 - How is compares with ONAP and OPNFV test platforms
 - 2019 Roadmap for V&V
- Discuss our planned integration with ONAP with V&V Platform

Too many competing approaches in NFV test?

OPNFV

- Dovetail
- FuncTest
- Yardstick

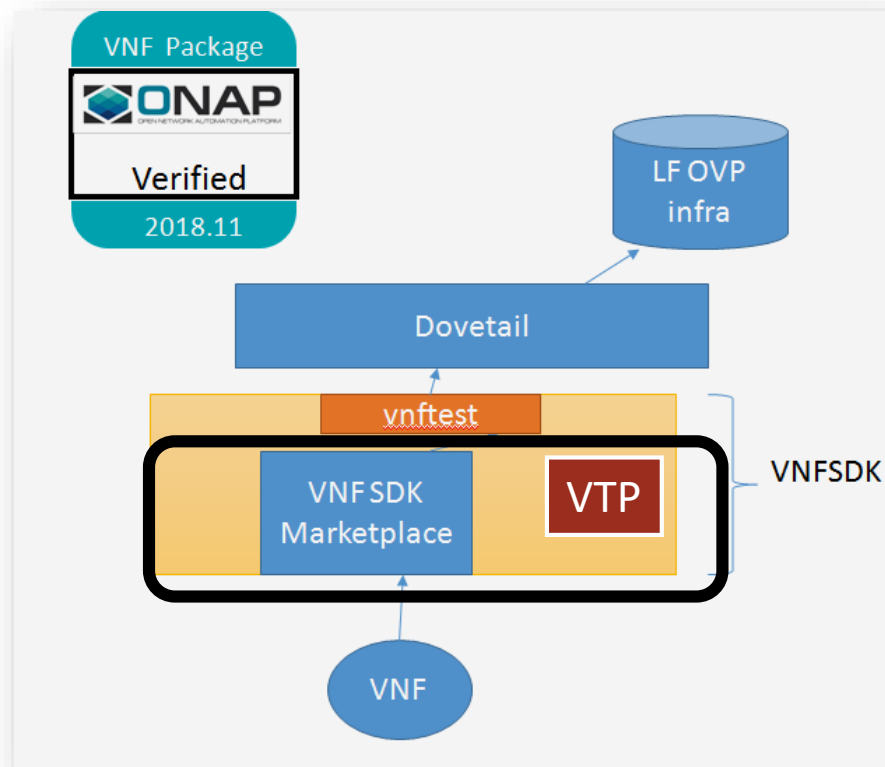
ONAP

- VVP
- VNFSDK
- VTP

ETSI



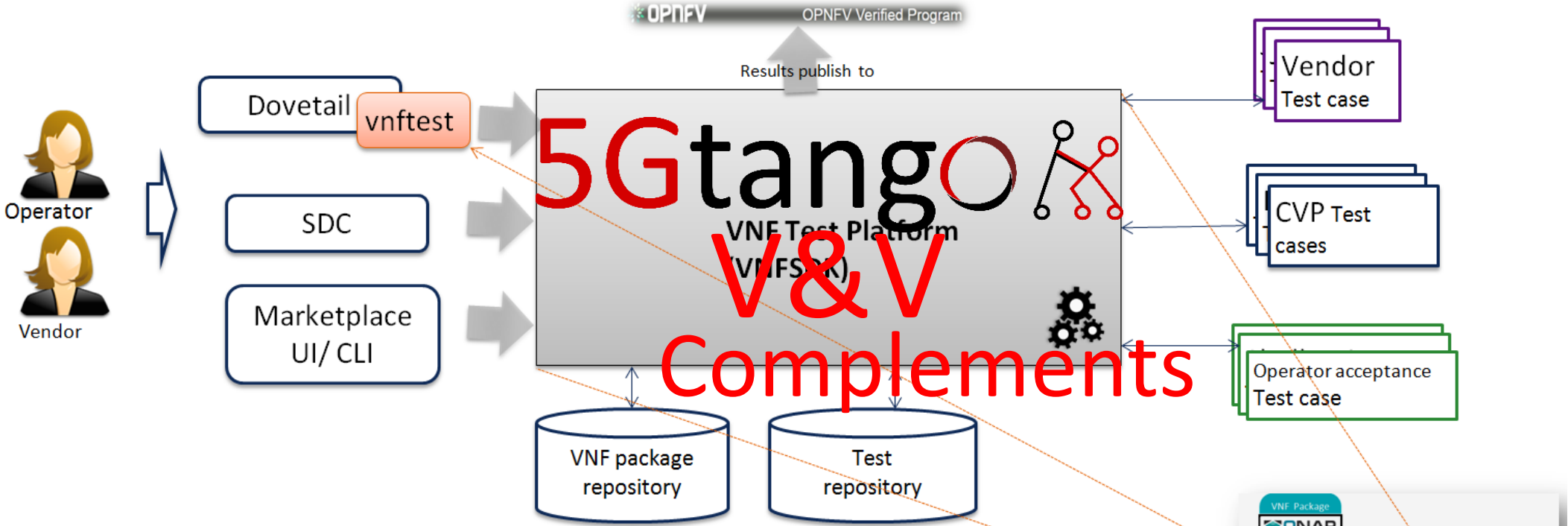
The Big Picture



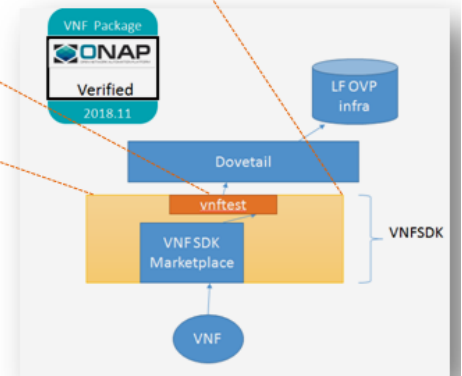
It's complicated!



ONAP VTP



A platform to automate and manage different kind of VNF test cases for given VNF package(s) and provides unified accessibility over CLI, REST API and UI portal for operating the test cases.
 Allows to write test cases in different languages like java, perl, shell scripts, python.etc.



5GTANGO Youtube

- Please watch Video (3 Minutes)
- <https://www.youtube.com/watch?v=YBgUxOA4ymo>

1. What is 5GTANGO?

- 5Gtango is an EU-funded project (Horizon 2020) and part of the 5G-PPP initiative
- 30 month work plan, started in June 2017
- 17 partners representing telecom operators, manufacturers, system integrators, service providers, SME developers, research and academic institutes



Reduce the time-to-market for networked services by **shortening the service development cycle** and by qualifying those network services to be adopted.



Reduce the entry barrier to 3rd party developers and support the creation and composition of Virtual Network Functions (VNFs) and application elements as "Network Services".



Enable new business opportunities with the customisation and adaptation of the network to vertical application's requirements.



Accelerate the NFV uptake in industry via an **'extended' DevOps model and the validation at scale of Network Service capabilities** of the 5GTANGO platform in vertical show cases.

Automation in the NFV Environment

- Service view
 - As the unit for development, deployment, management...
- Integrated lifecycle
 - Development, validation, operation
 - Model-based consistency
- DevOps for critical services
 - **Automated verification and validation**
 - Mediated lifecycle management
- Provide run-time support
 - Policy enforcement
 - SLA verifiability



Service-Oriented Lifecycle

A holistic, E2E view of the elements needs to be considered

3 phases in the service lifecycle

- Coordinated by a shared catalogue

1. Development  Service Developer

- Supported by a SDK
- Service is initially published at the catalogue

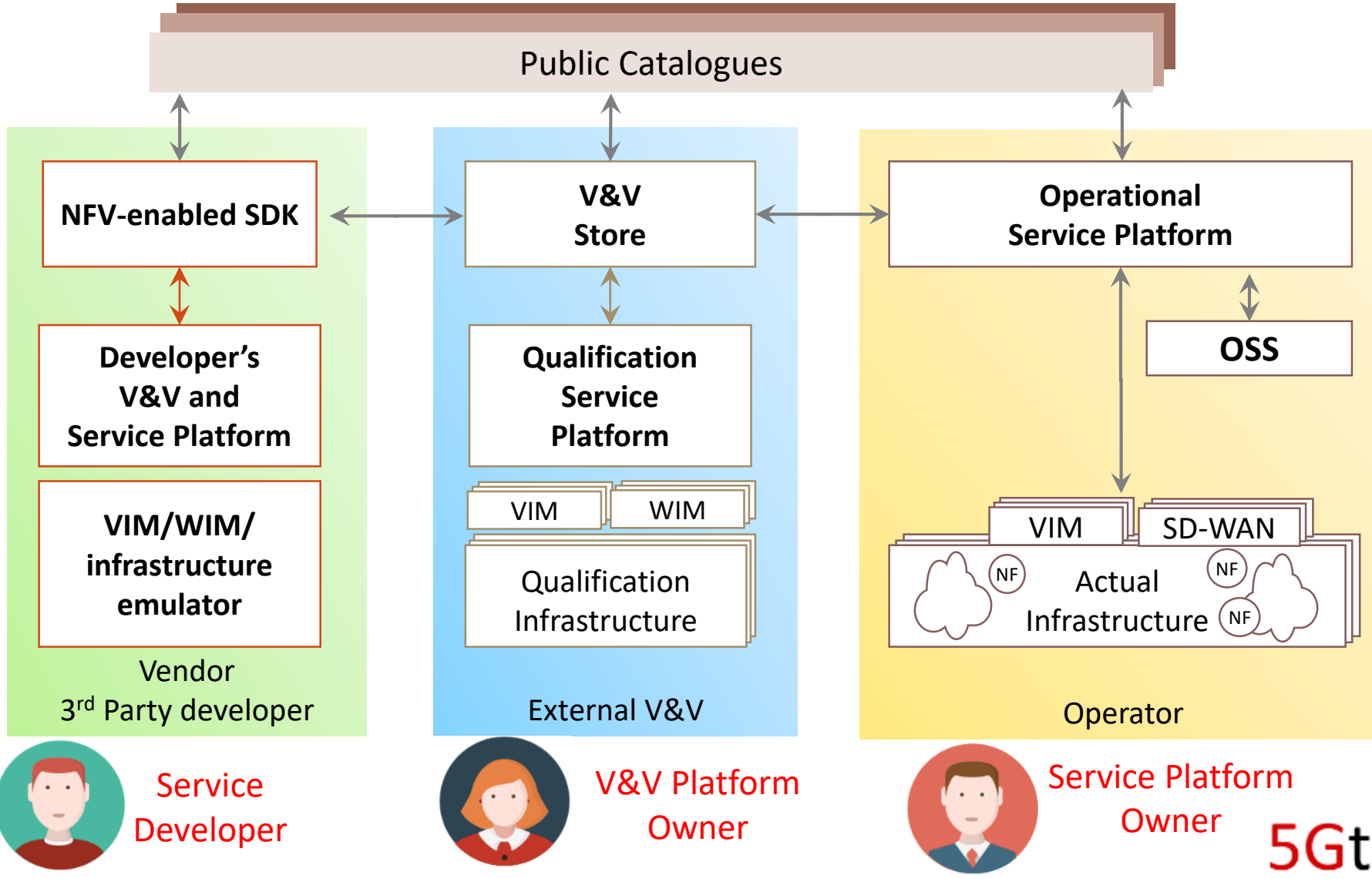
2. Validation and Verification (V&V)  VaV Provider

- Automated VnV (Test)platform
- Results published on the catalogue

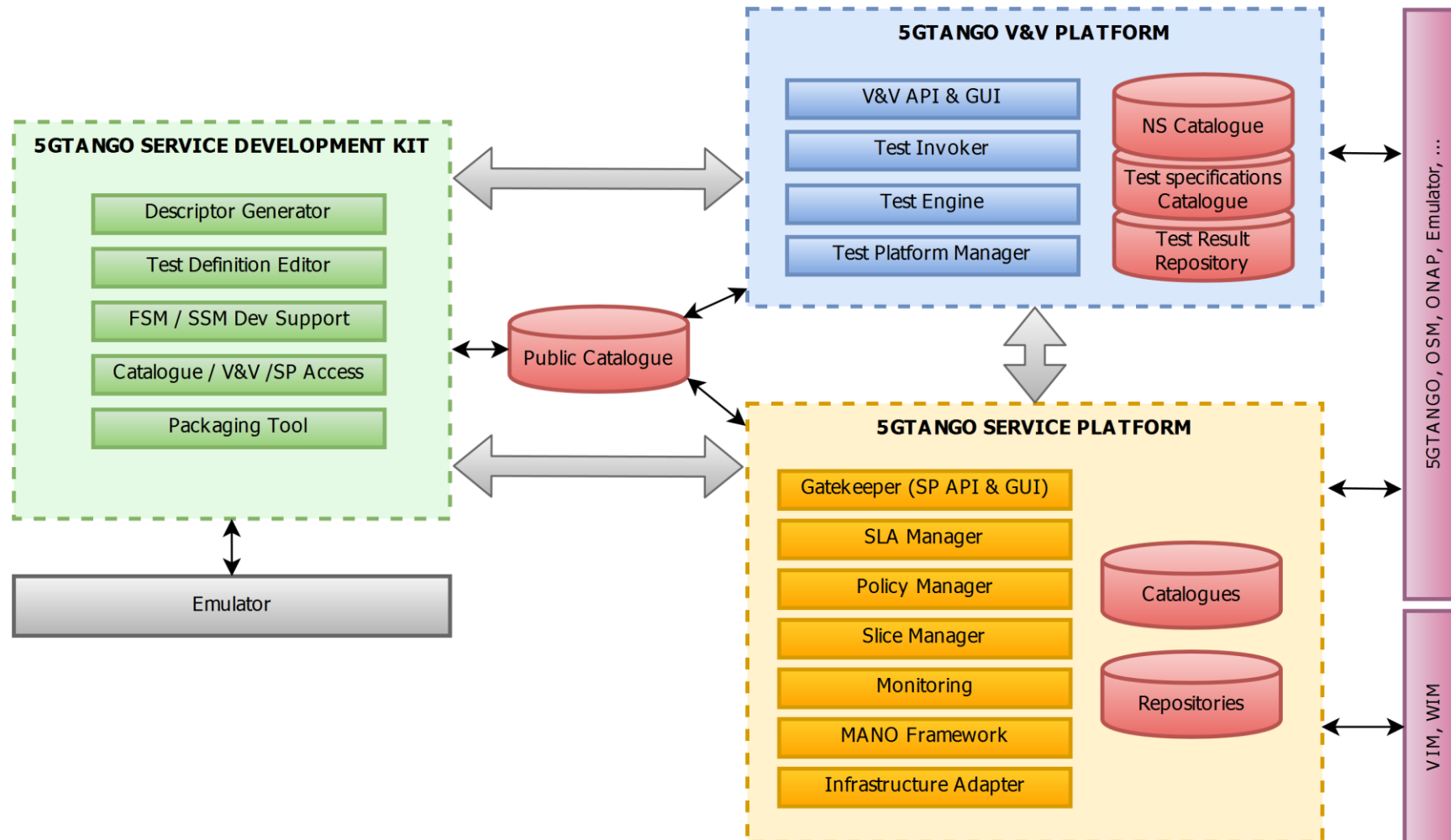
3. Deployment and Operation  Operator

- Selected from the catalogue
- Mediated platform
- Policy and SLA enforcement

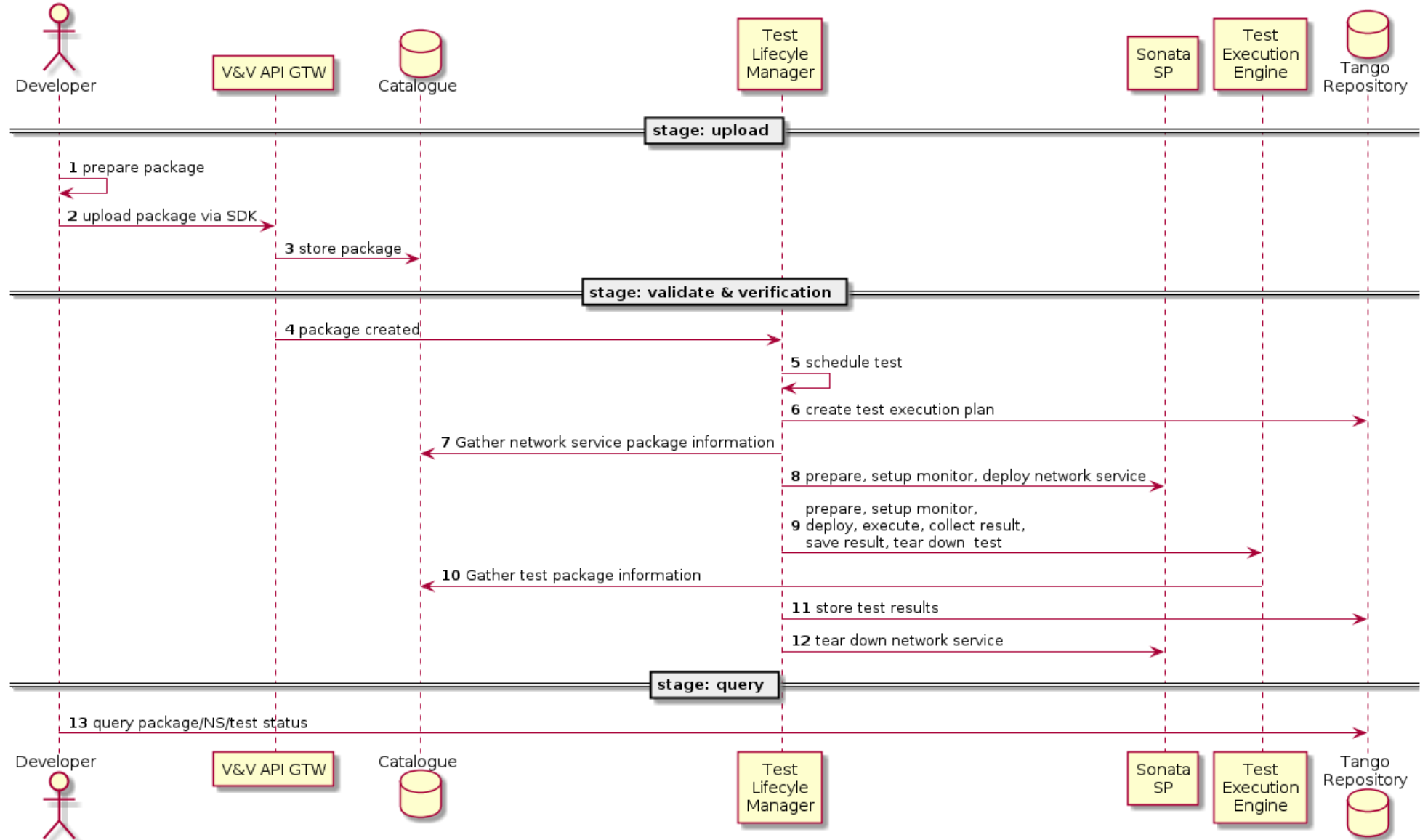
5GTANGO High level architecture



The 5GTANGO Architecture

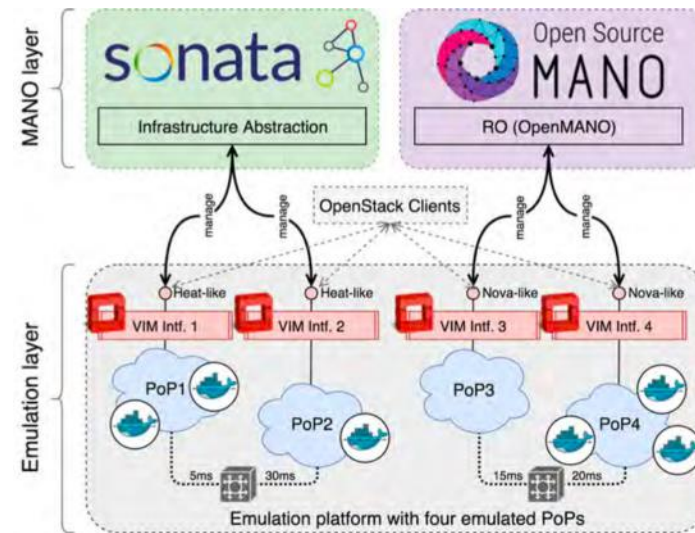
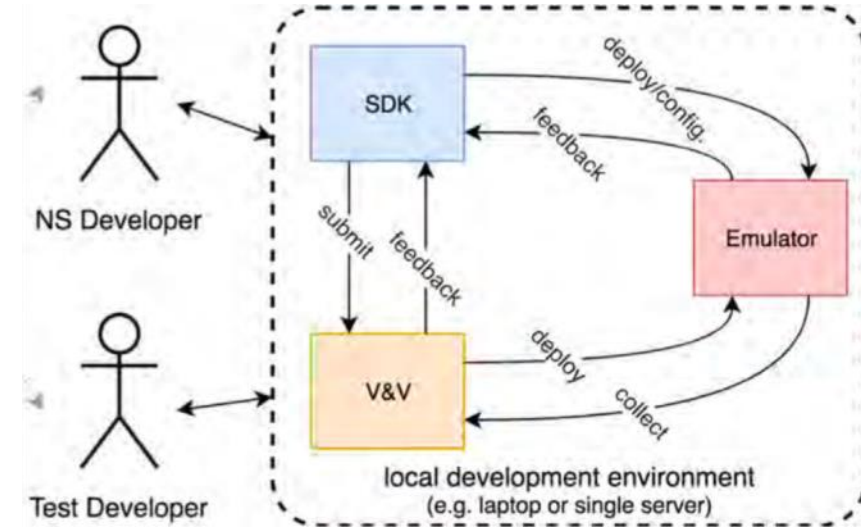


V&V End-to-end Flow



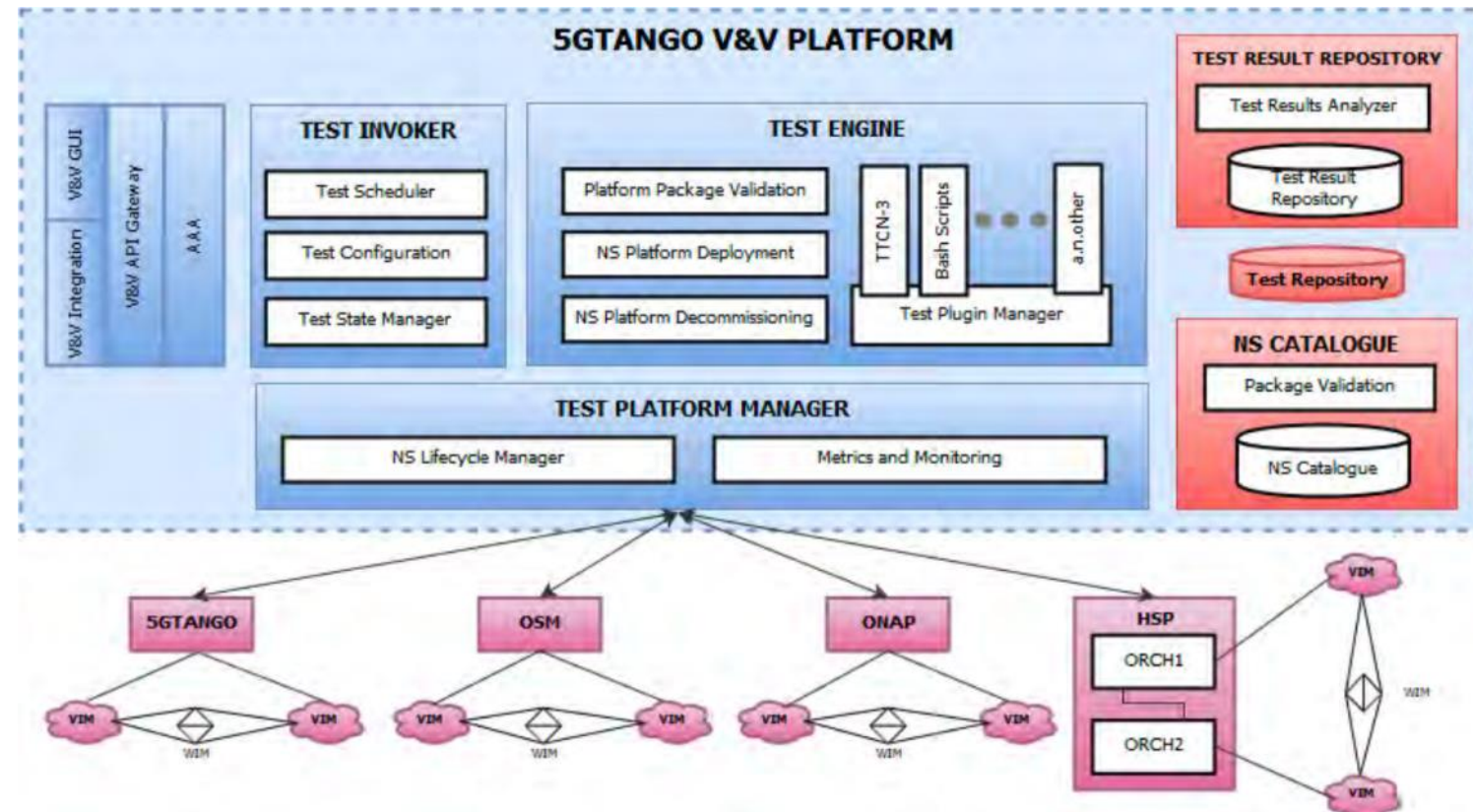
The SDK and the Emulator

- Automate as much as possible service description
 - References, composition...
 - Plus policies and monitoring
- Packaging
 - And catalogue access
- Initial validation
 - Through emulation
 - Connected with the VaV process
- Shaping a DevOps loop suitable for critical infrastructures

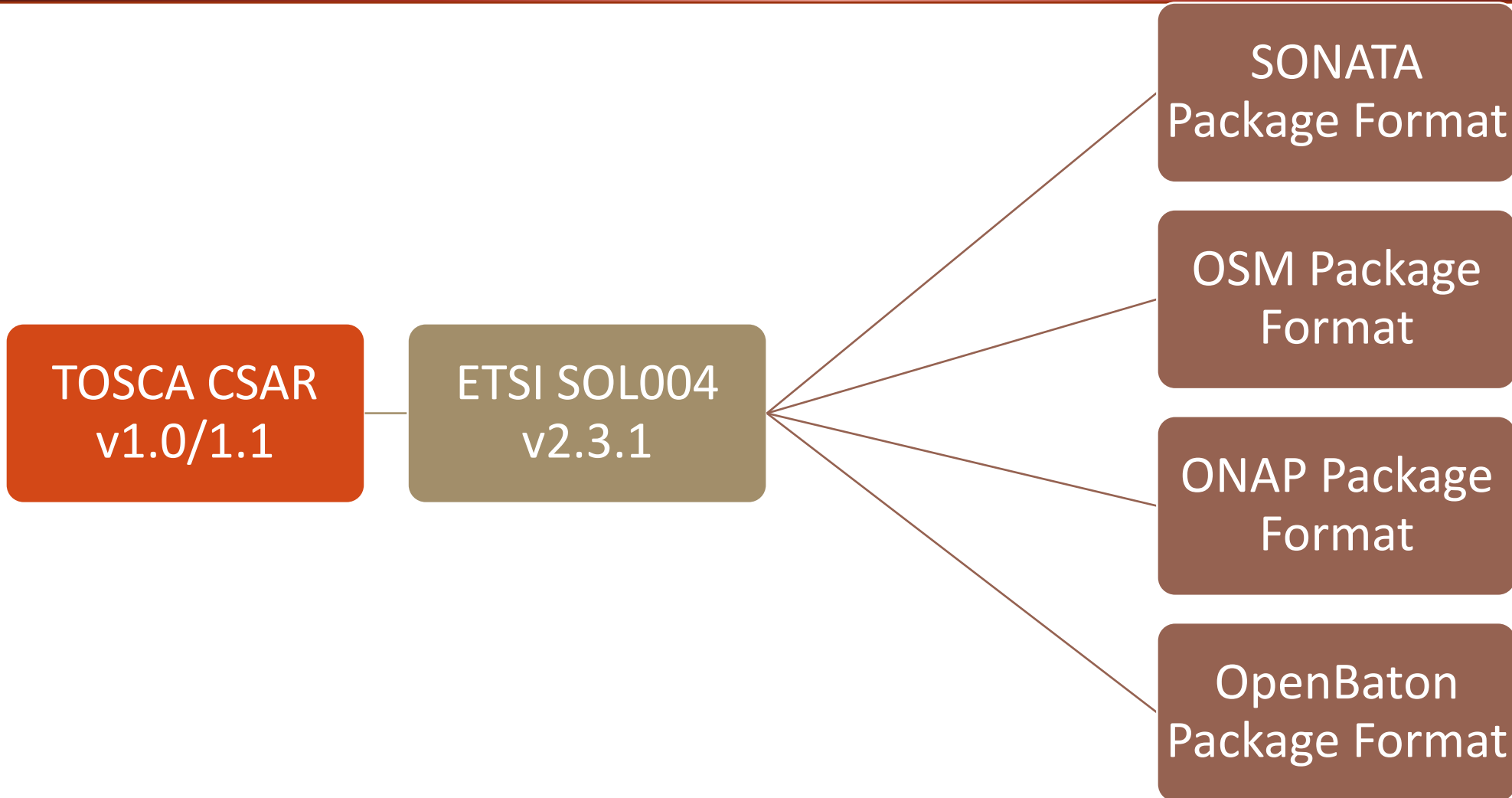


Verifying and Validating

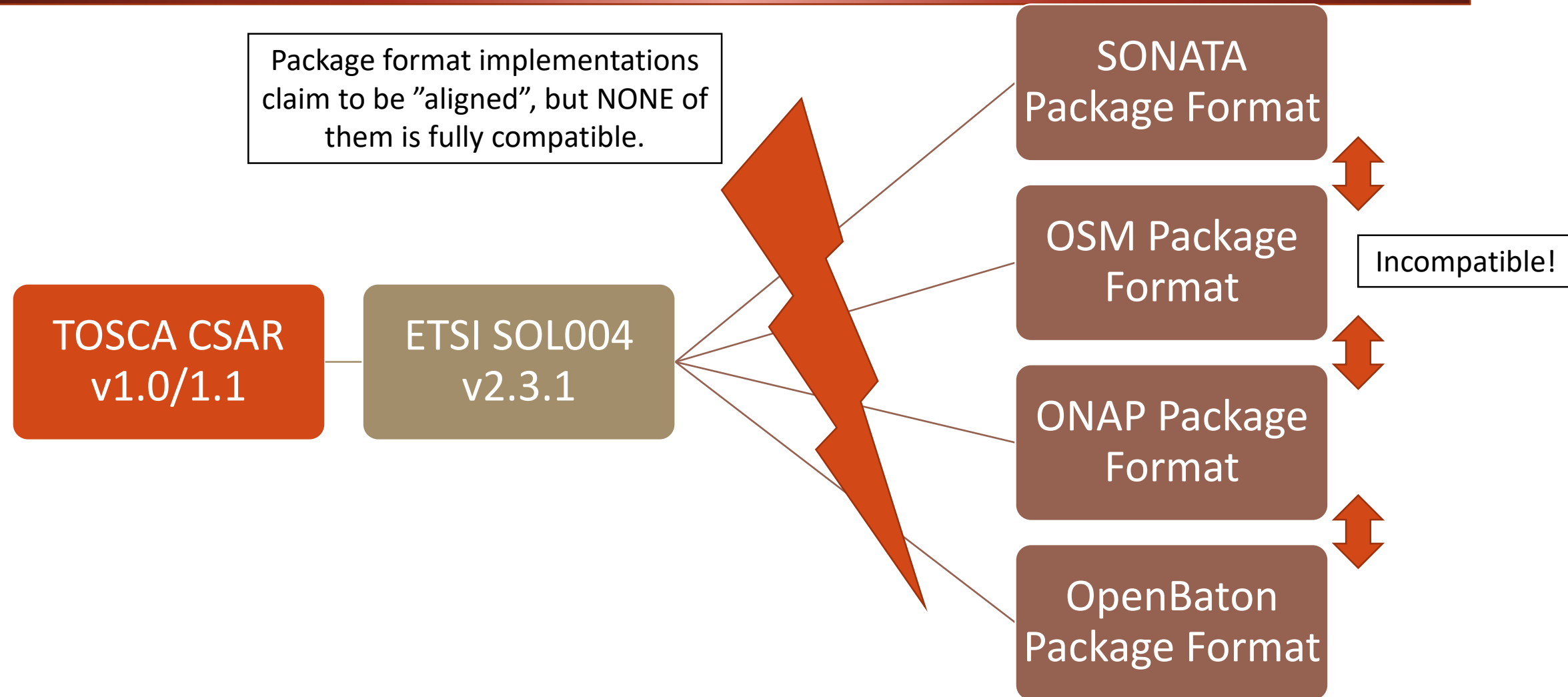
- Support for
 - Different test specification sources
 - Automated test execution
 - Linked test results
- Enabling Continuous Testing
 - Model-based
 - As an essential part of the automation loop



Problem: Industry NFV Package Formats



NFV Package Formats Don't Align!



5GTANGO V&V – Keys Concepts

1. VNF Package

- Supports ETSI SOL004 But Also Handles Extensions (e.g. Supports OSM and SONATO Packages)

2. Test Descriptor

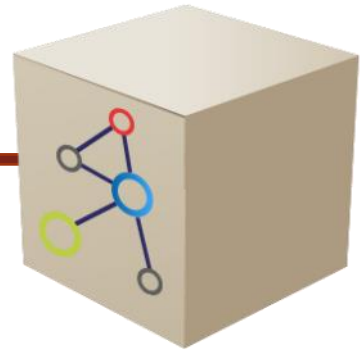
3. Test Plugins

4. Test Classification

5. DevOps-Integrated Lifecycle

- Persona and Role Based; Focused on E2E testing Lifecycle
- Automated verification and validation

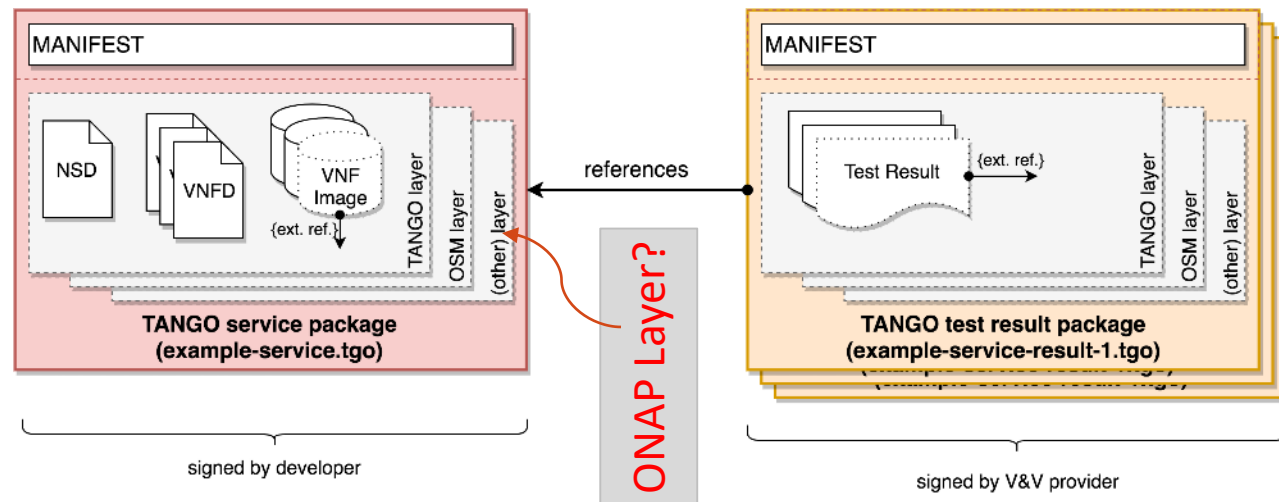
Packages



5GTANGO package

- A concept we have brought from SONATA
- A .zip file containing related assets, that can be signed, verified, etc.
- Uniquely identified by a triplet of fields: vendor, name, version
 - This is independent of Catalogues where the package gets onboarded to
- 5GTANGO package format aims to support different descriptor types (OSM, 5GTANGO, SONATA, ...and ONAP)
- All additional features are optional and implemented in a way that keeps the package format backwards compatible to ETSI SOL004
- 5GTANGO SDK provides a set of tools to generate standard compliant packages from existing artifacts and descriptors

Package Details



- Descriptors define function and services
 - Used in all phases
- Package layering
 - Support integrity checks
 - Consistent updating at the different phases
 - Integrate V&V processes

- **Compatible** to ETSI SOL004 (and thus to TOSCA CSAR)
- Concept: Allow to package almost anything
 - (packages are just containers, we don't care about semantics of their contents)
- Innovations: Layering (tagging), References (slim packages), tooling
- Goal: Design the most generic, reusable, feature complete, and compatible package format in the NFV landscape!
- https://github.com/sonata-nfv/tng-schema/wiki/PkgSpec_LATEST

Test Descriptor

General
Vendor/name/version/reference

Global pre-config
Test type/Test exec files/Test pre-requisite list/Test config parameter/Test Category

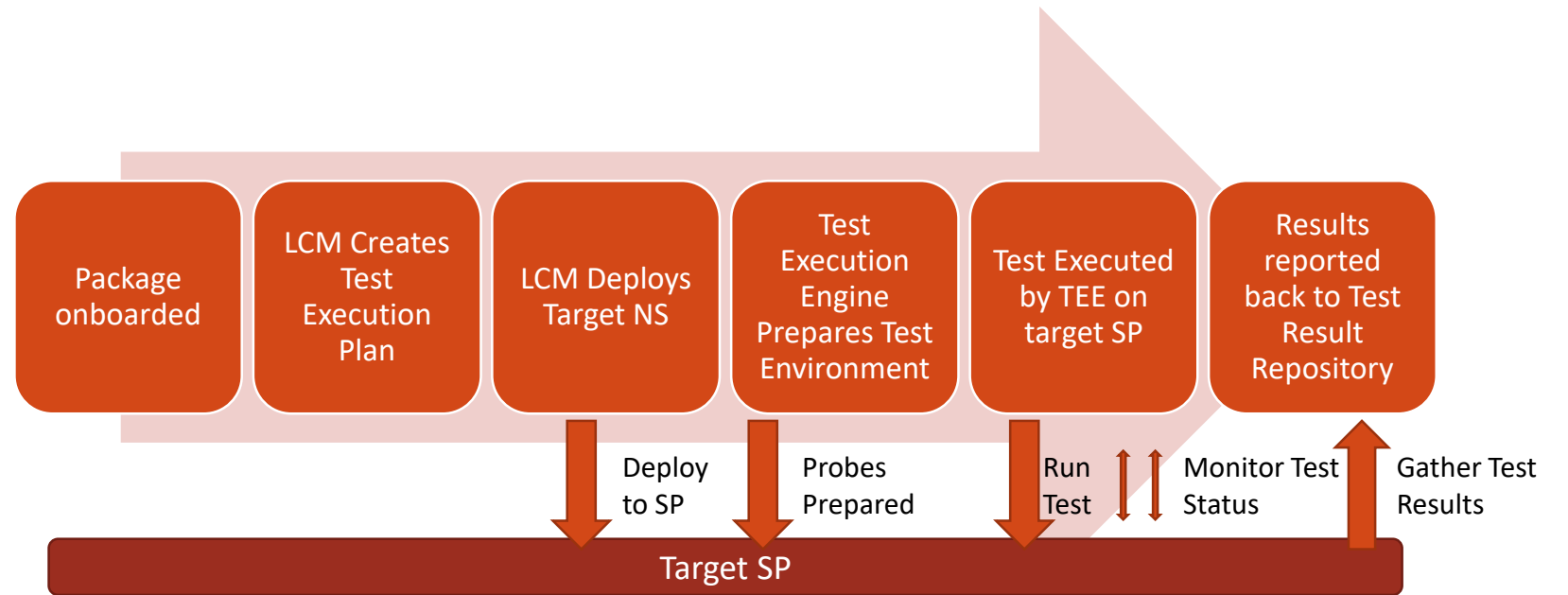
Test Execution Step (1..N)
Test Execution Step (1..N)
Test Execution Step (1..N)
Test step pre-requisite/Test config parameter/test execution step/Post execution step

Global post-test
Test type/Test exec files/Test pre-requisite list/Test config parameter/Test Category

Report
Report KPI/Report formula

What it is: Definition of the core test flow

Current Functionality: supporting single execution path basic probe deployment and basic report KPIs



2019 Functionality: will support multiple execution paths (breakdown of VNF/NS tests automatically)

Generic Probe deployment

Resource targeting for Service Platforms

More generic KPI targets

Test Descriptors Compared

ONAP VTP

- 15 Open_cli_schema_version: 1.0
- 16
- 17 name: csar-validate
- 18
- 19 description: validate csar package formats
- 20
- 21 info:
- 22 product: onap-vtp
- 23 version: 1.0
- 24 service: validation
- 25 author: ONAP VTP team onap-discuss@lists.Onap.Org
- 26
- 27 parameters:
- 28 - name: csar
- 29 description: CSAR file path
- 30 long_option: csar
- 31 short_option: b
- 32 type: binary
- 33 is_optional: false
- 34
- 35 results:
- 36 direction: landscape
- 37 attributes:
- 38 - name: error
- 39 description: validation error details
- 40 scope: short
- 41 type: string

More of a generic Test Case

V&V

```
descriptor_schema: "https://raw.githubusercontent.com/sonata-nfv/tng-schema/master/test-descriptor/testdescriptor-schema.yml"
vendor: "eu.5gtango.atos"
name: "test-http-benchmark"
version: "0.1"
author: "Felipe Vicens, ATOS"
description: >
  "Test descriptor for http benchmarking"
test_type: bash
test_configuration_parameters:
  - parameter_name: "config_file"
    parameter_definition: "location of the test file"
    parameter_value: "config.cfg"
    content_type: "text/plain"
  - parameter_name: "runner_file"
    parameter_definition: "bash script to run the http benchmark test within docker container"
    parameter_value: "runner.sh"
    content_type: "text/plain"
test_category:
  - category_type: performance

#test tags are
test_execution:
  - test_tag: http
    tag_id: tag_001
```

More of a generic Test Configuration

Test Classification

V&V Test Types

Benchmarking

Validation

Profiling

Dataplane
Performance

Interoperability

Functional

Policies/KPIs

various service specific tests for profiling against certain conditions/traffic profiles/ testing scenarios

Specific dataplane performance (IETF 2544, 2889 etc)

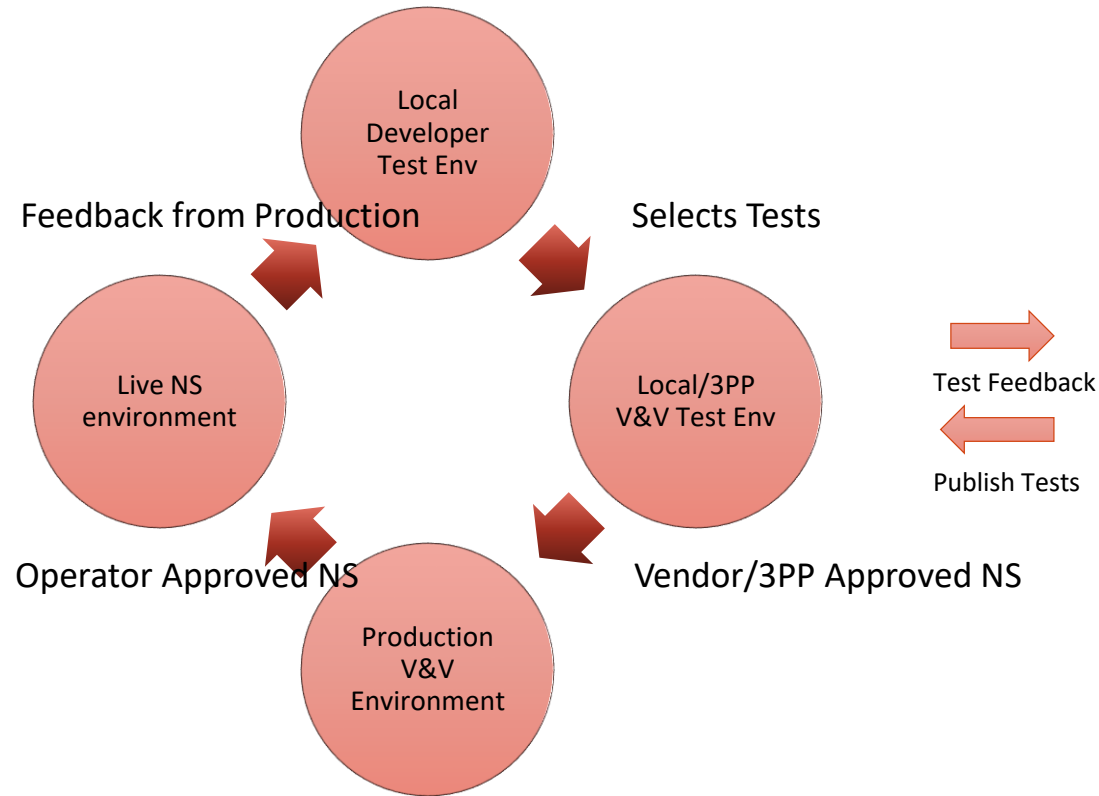
Various SP deployments / simple lifecycle (start/stop)

VNFM, SSM, Policy events, scaling

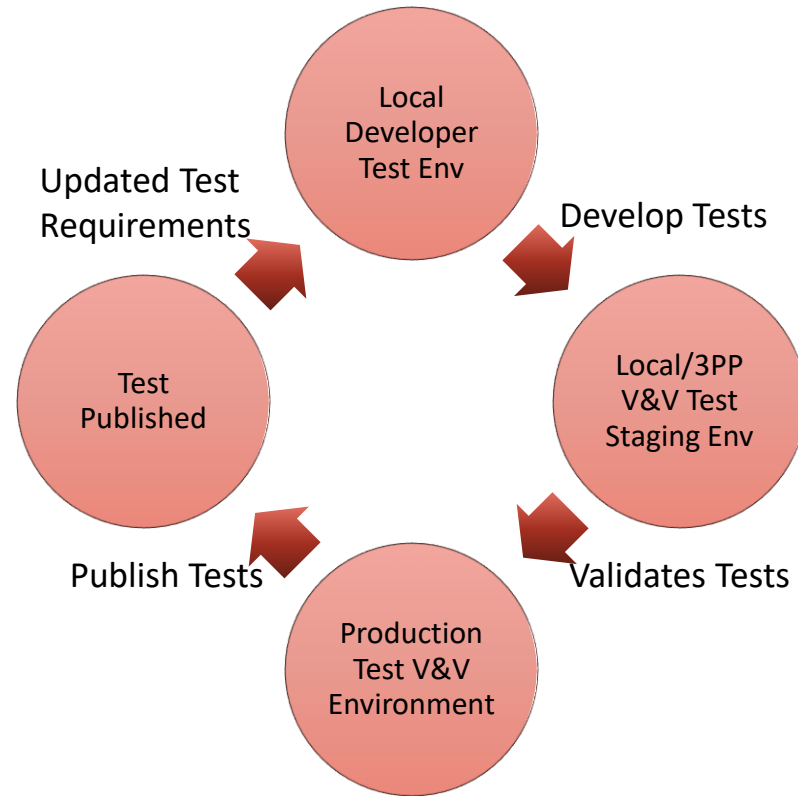
SLA policies validation

Test Management

Service Developer View of V&V



Test Developer View



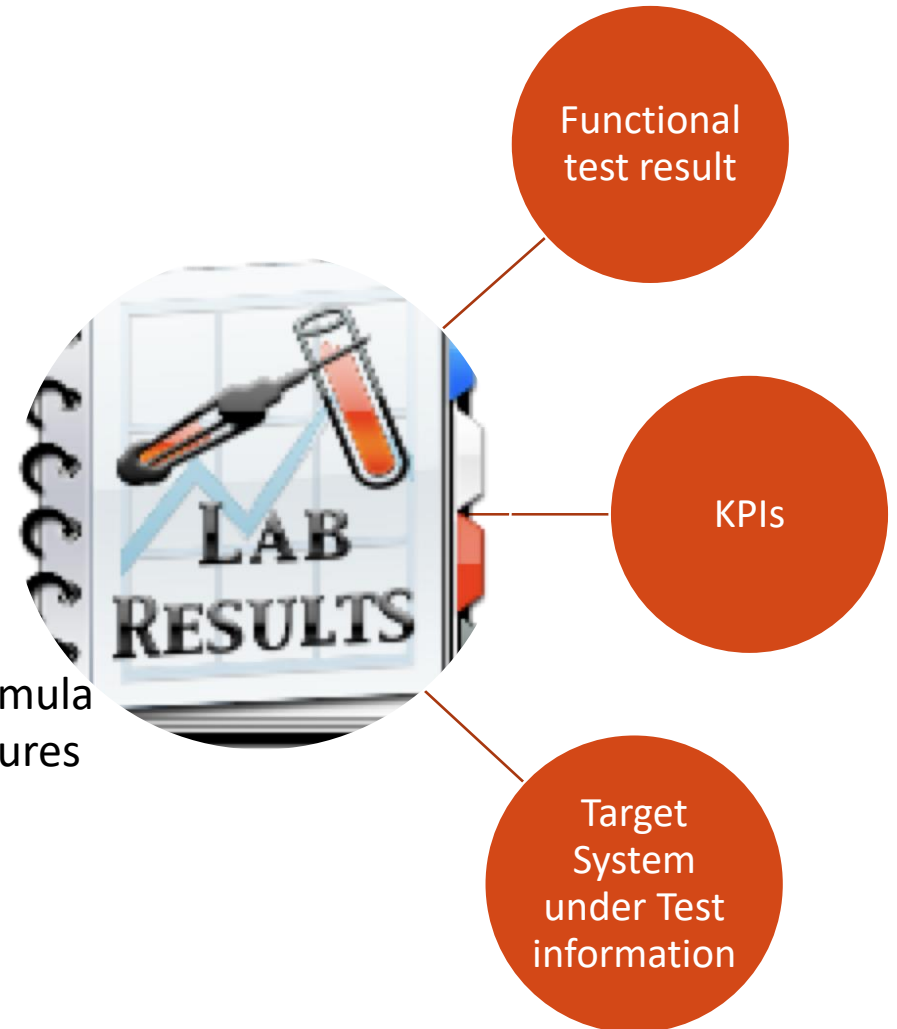
Test Result Management

The V&V must have all relevant metadata for proper result Analysis

- Flexibility to define own KPIs
- Full details of the Target system & Resources
- The result!

Results allow test designer to present results in graphical form

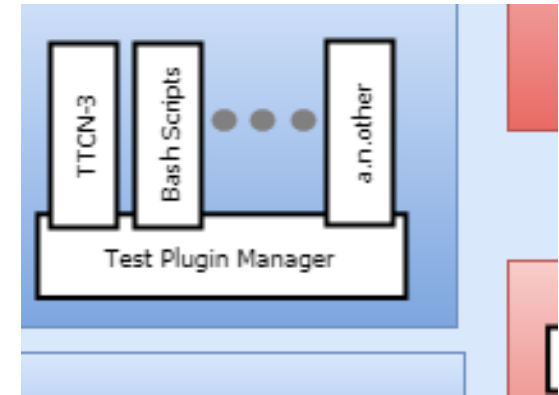
2019 Focus will be on framework to allow KPI and basic result analysis formula
To be exposed to the V&V for use in feedback loops and optimization features



Test Plugins

We have developed 3 plugin types

- TTCN3
- Bash
- WRK2



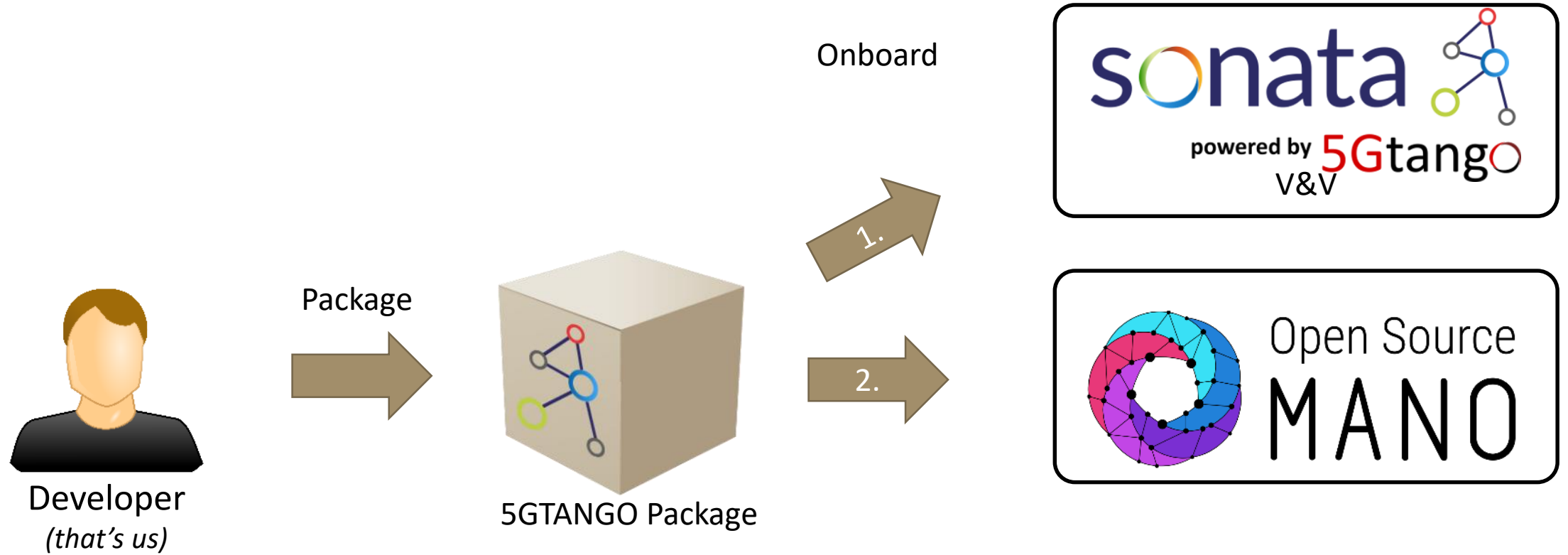
Using a **docker** mechanism for spawning test execution environment and gathering results

We have **several** tests written in Bash and WRK2 and have trialled TTCN3 tests.

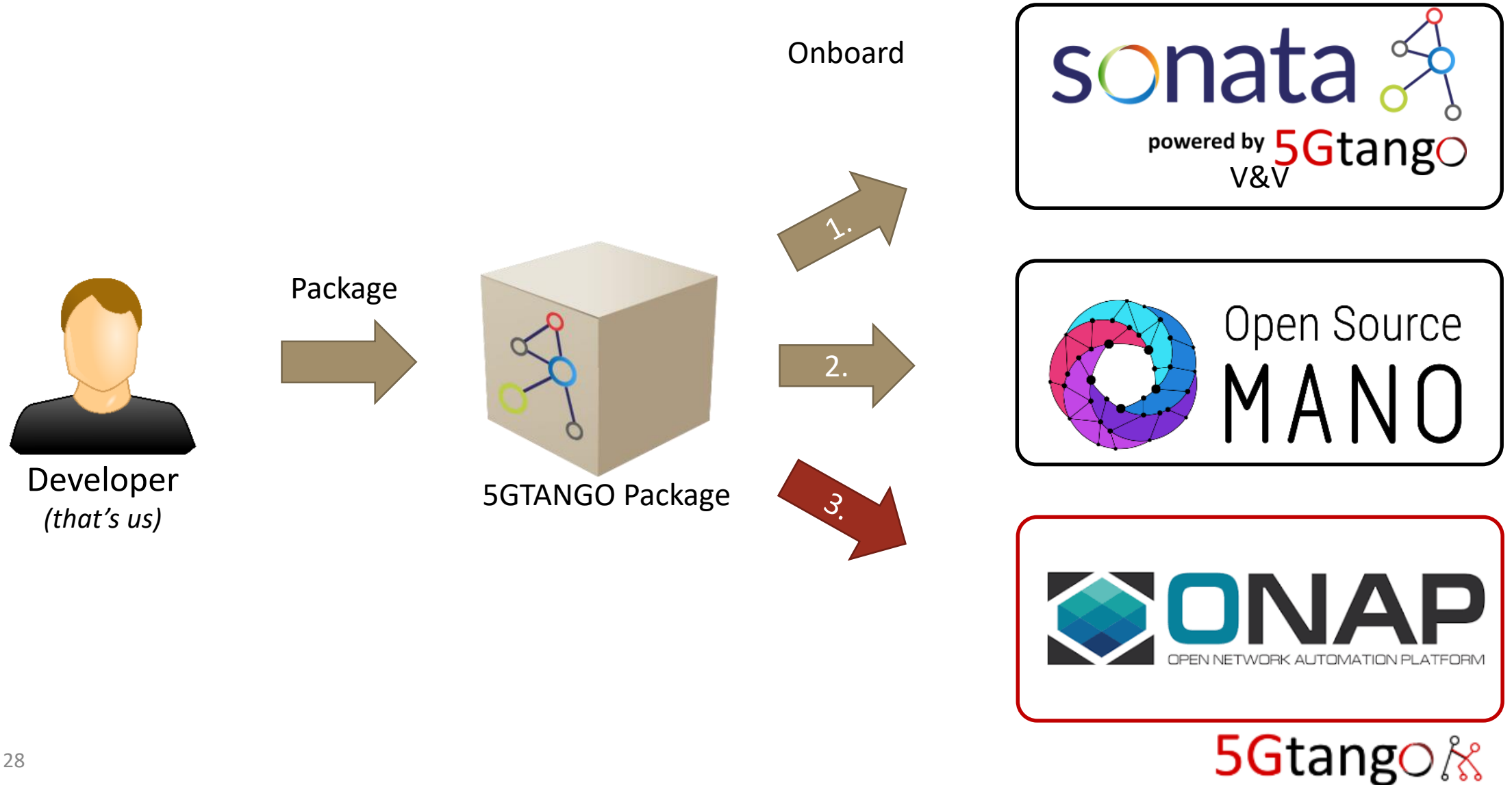
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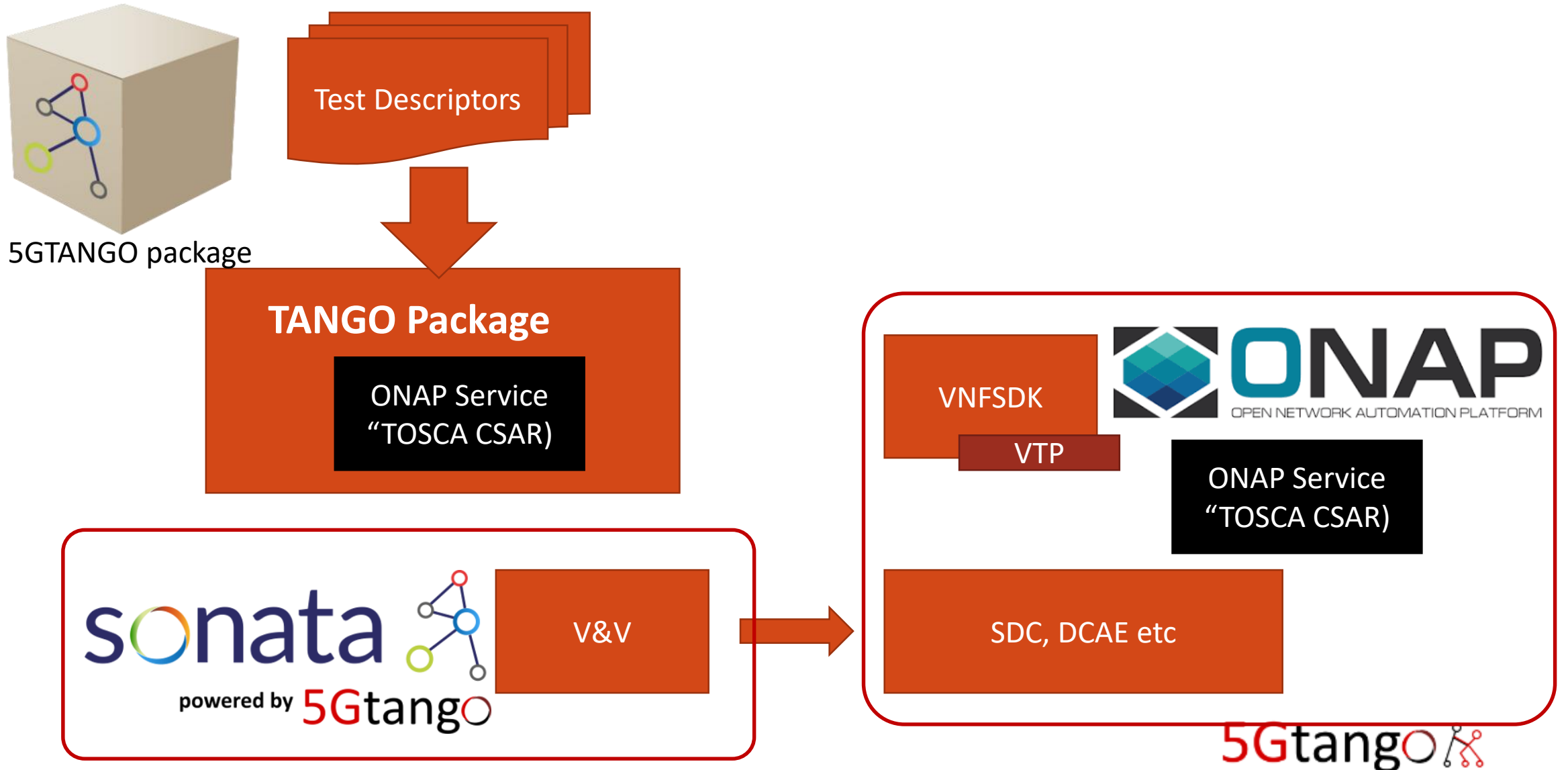
Onboard Package to 5GTANGO and OSM



2019: Onboard Package to ONAP

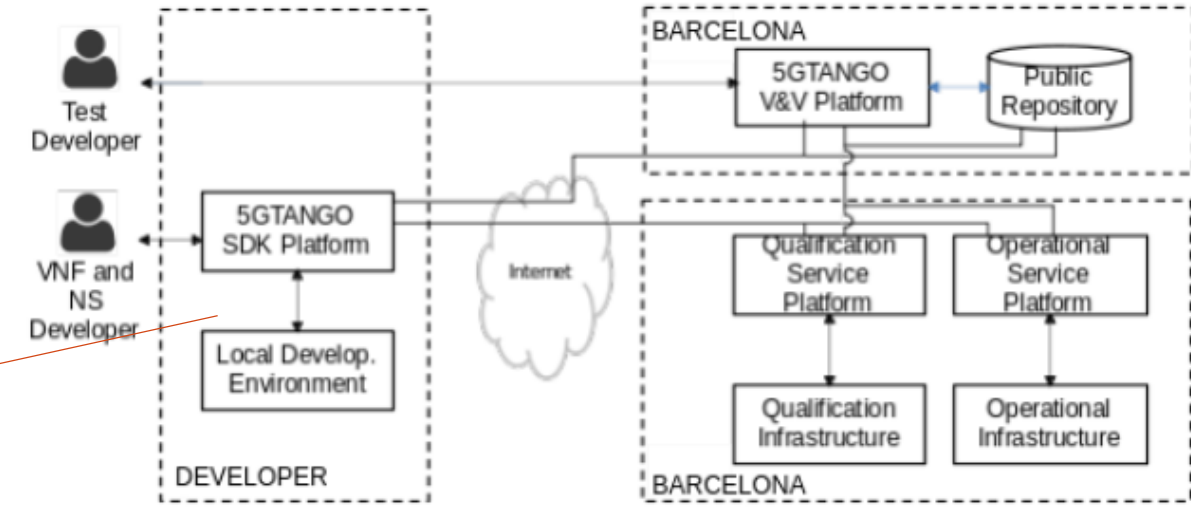
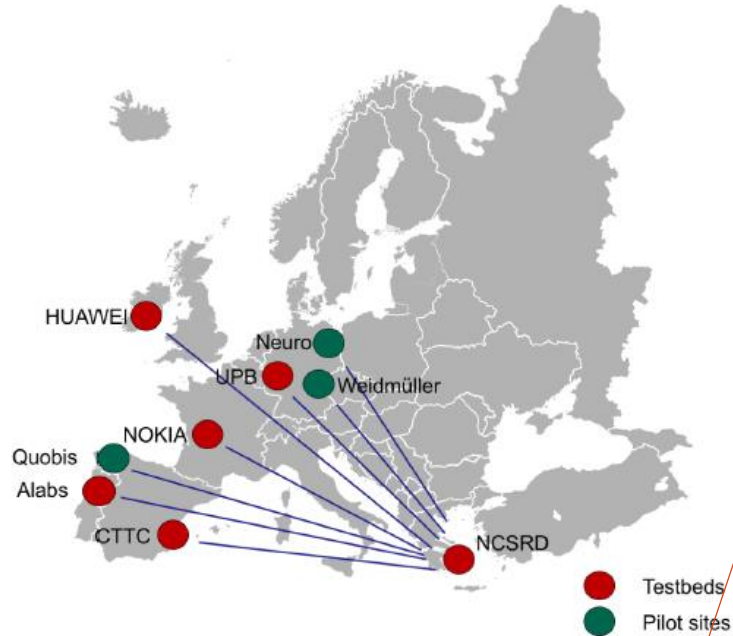


Embed ONAP Package in TANGO Package

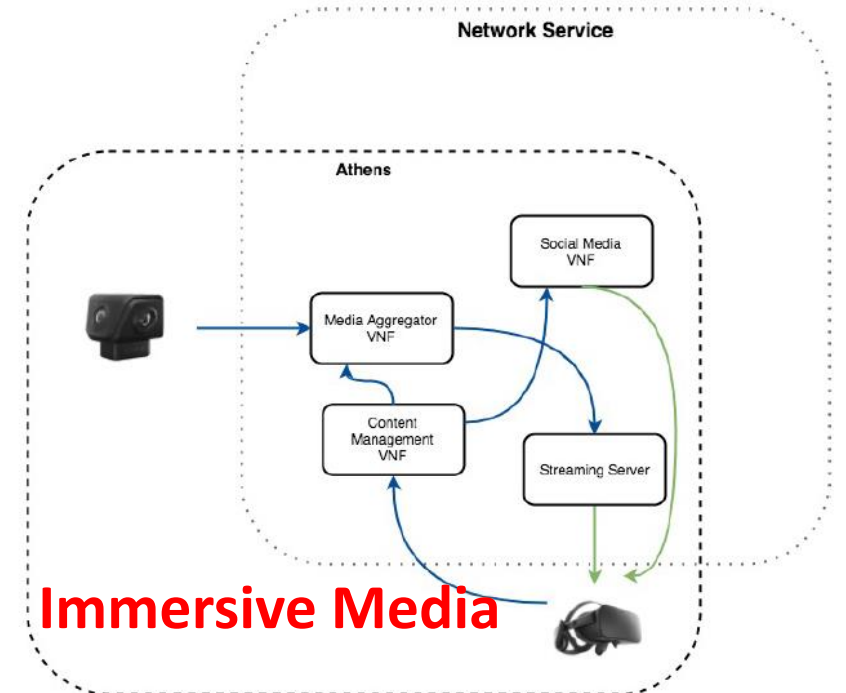
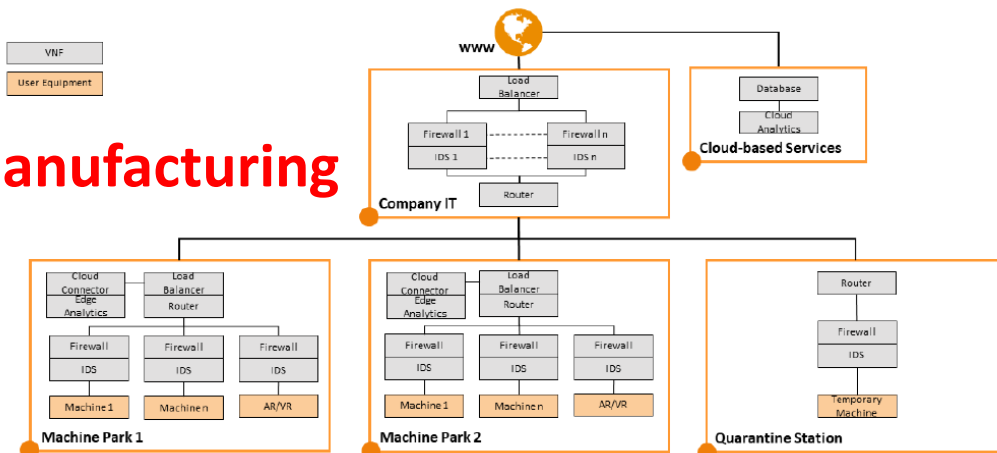


3 Real-world Use Cases

Communications Suite

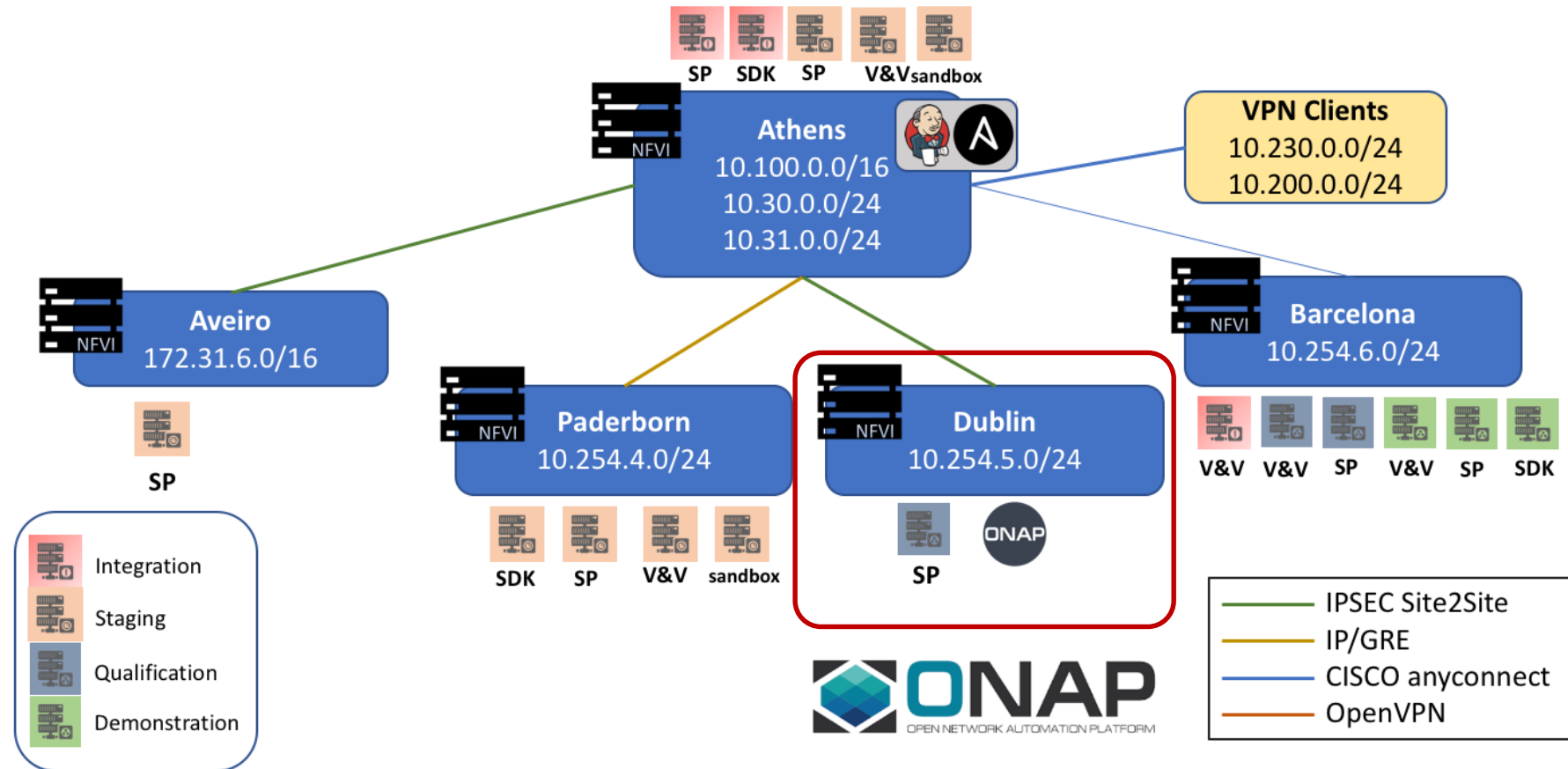


Smart Manufacturing



Immersive Media

Testbed for 5GTANGO and ONAP



Test NS'es against ONAP "Service Platform"

Target Date: March 2019

Why LFN should consider 5GTANGO?

- Working Code – Open Source - Works with OSM today
- Complementary to ONAP/OPNFV! – no changes downstream
- Real 5G Use Case Scenarios
- 5GTANGO will do ONAP integration work and testing
- We want to promote Interoperability
 - Use these components within ONAP VTP/VNFSDK if appropriate.

Conclusions

- VNF Test Platforms overlap but **complement** each other
 - Consolidate our open source initiatives to build an Interoperable Test Platform that will work for ONAP, OSM and Others.
- **5GTANGO V&V is a suitable Test Platform** to test VNFs across ONAP and OPNFV. Currently supports OSM and SONATA
 - Propose **5GTANGO Package** Approach that ONAP Package can also use
 - Huawei will commit to getting a particular real world VNF tested E2E using ONAP (Casablanca). (Precise VNF is TBD)
 - 5GTANGO project will report back on progress and demonstrate V&V integration with ONAP.
 - TANGO package can become the ETSI SOL004 “Reference Implementation” but also accommodate other SDO extensions
- 5GTANGO interested in LFN Certification Umbrella program





5Gtango 

Thank You!

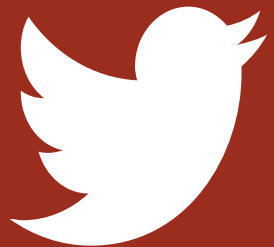
Any questions?

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