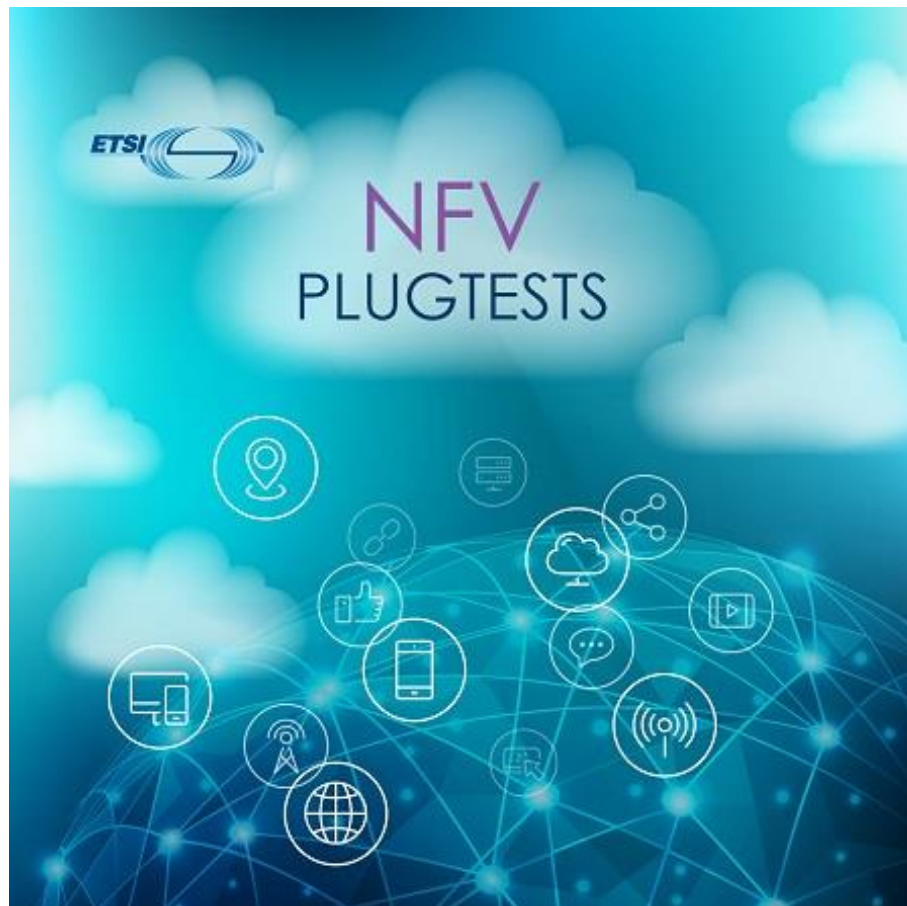


The background of the slide features a close-up of a person's hand holding a transparent, futuristic device. The device displays a glowing blue globe with a world map, overlaid with a grid of white lines and dots, suggesting a digital or networked environment. The overall color palette is dominated by blues and whites, with a soft, ethereal glow.

Testing and Interoperability for Real NFV Plugtests Programme

WHAT?



Neutral and **coordinated** framework for **collaborative testing** and **validation** activities among different organizations

- ✓ Continuous and ubiquitous environment
- ✓ Periodic face to face events

ETSI does **not certify** or endorse participating companies or products:

- ✓ We provide the framework, the means, the methodology, the procedures, the test plan, the venue ...
- ✓ Actual testing is run collaboratively by participants

Free and **open** to any organisation providing an implementation to test or to support the testing

www.etsi.org/NFVplugtestsProgramme

WHY?



- ✓ Foster **interoperability**
- ✓ Gather **feedback**
- ✓ Validate and improve the **quality** of standards ..
- ✓ .. and implementations

HOW? ... HIVE

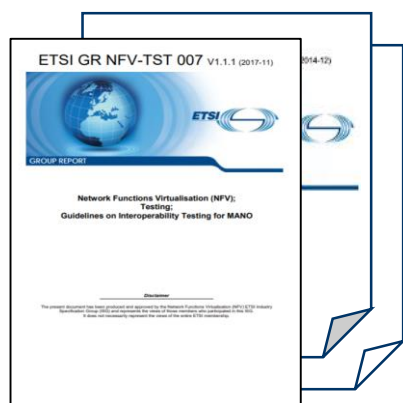


HIVE: Hub for Interoperability and Validation at ETSI

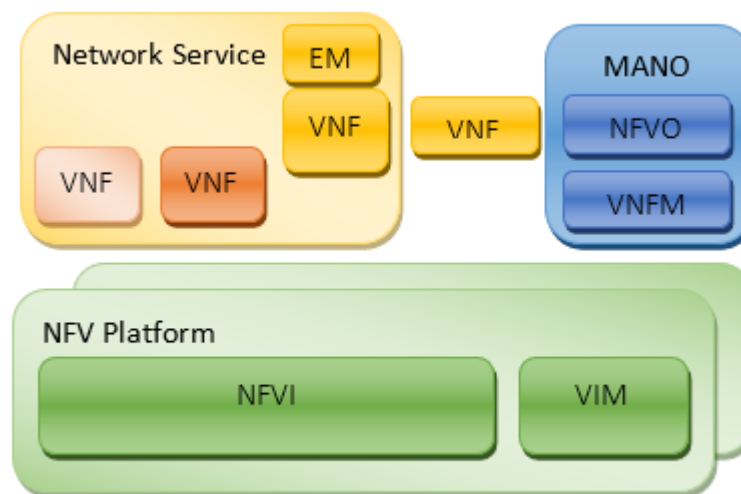
NFV HIVE: 45+ remote sites, 60+ organisations, +250 people

HOW: Test Plan development .. and validation

Open and continuous process



© ETSI 2019



Test plan:

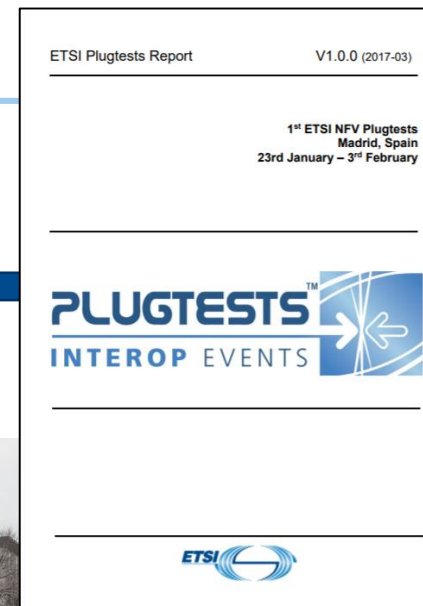
- Implementation agnostic
- Functional level

Interoperability			
Identifier	TD_NFV_NS_LCM_SCALE		
Test Purpose	To verify that a VNF in a NS is scaled out (VMs) when triggered		
Configuration	SUT_1_NS_1_ENDPOINT SUT_1_NS_1_MIDDLEP		
References	ETSI GS NFV-IFA005 V2.1.1 ETSI GS NFV-IFA006 V2.1.1 ETSI GS NFV-IFA013 V2.1.1 ETSI GS NFV-IFA010 V2.1.1		
Applicability	* MANO can request VIM_N * VIM_NFVI supports allocat * MANO supports triggering * MANO supports scale out * NS/VNF supports scale o		
Pre-test conditions	* NS is instantiated (TD_N		
Test Sequence	Step	Type	
	1	Stimulus	Trigger NS s to a VNF in t
	2	IOP Check	Verify that the requested resources have been allocated by the VIM according to the descriptors
	3	IOP Check	Verify that the additional VM(s) have been deployed (i.e by querying the VIM)
	4	IOP Check	Verify that the additional VM(s) are running and are reachable through the management network
	5	IOP Check	Verify that the additional VM(s) are connected to the VL(s) according to the descriptors
	6	IOP Check	Verify that NS has been scaled out by running the end-to-end functional test
IOP Verdict			



A bit of history ...

January 2017: 1st NFV Plugtests



Scope

- ✓ Experimental Interop Testing
- ✓ early Plugtests
- ✓ Single-VNF Network Services

31 participating organisations

29 remote sites

35 Functions Under Test

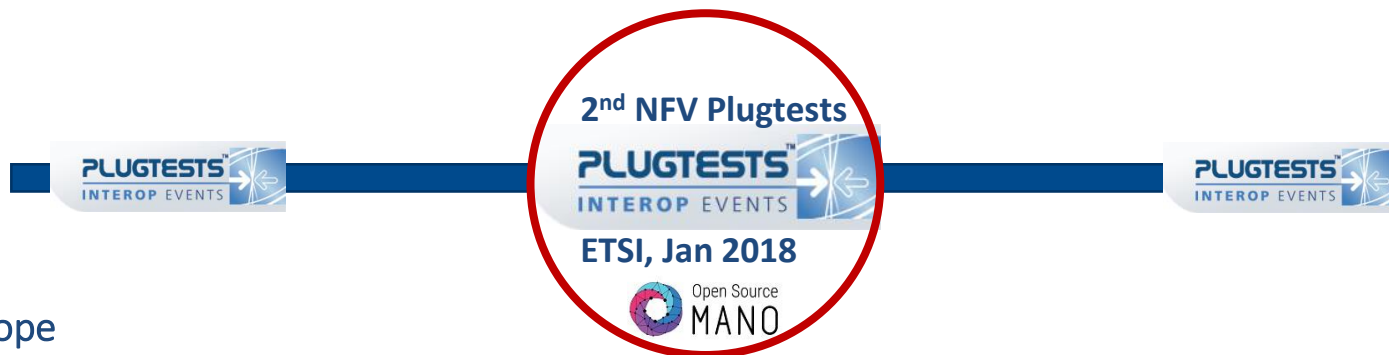
80 engineers on-site + 80 remote

4 supporting open source communities

www.etsi.org/nfvplugtest



January 2018: 2nd NFV Plugtests



Scope

♥ Interop Testing: Single & Multi –VFN Network Services

♥ Experimental API Track

♥ Co-located with 1st OSM Hackfest

45 participating organisations

38 remote sites

41 Functions Under Test

100 engineers on-site + 100 remote

4 supporting open source communities

www.etsi.org/nfvplugtests2



ETSI Plugtests Report

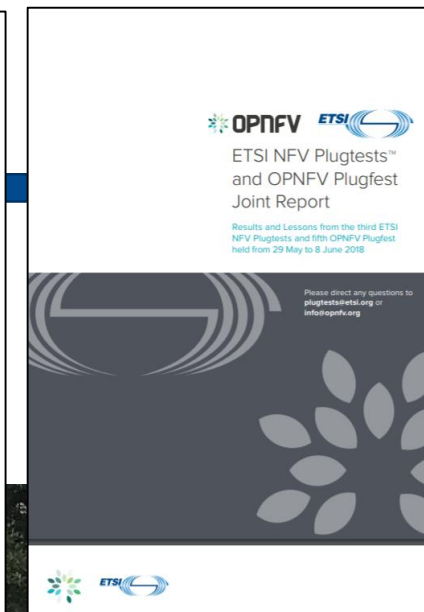
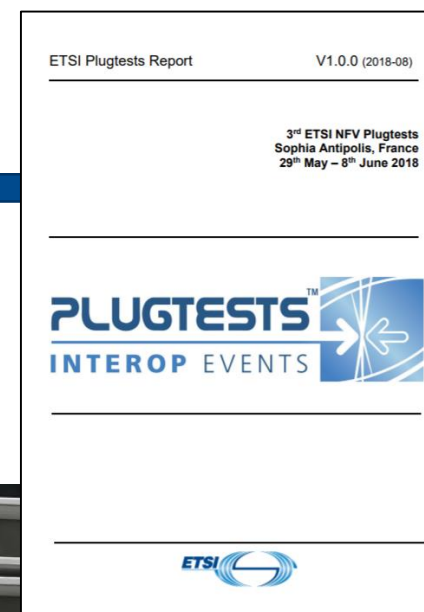
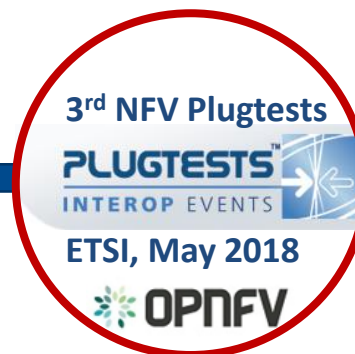
V1.0.0 (2018-02)

2nd ETSI NFV Plugtests
Sophia Antipolis, France
15th – 19th January 2018

PLUGTESTS™
INTEROP EVENTS



May 2018: 3rd NFV Plugtests



Scope

✓ Interop Testing : Multi –VFN Network Services / Test Session Automation

✓ API Track

✓ Multi-vendor demos

✓ Co-located with OPNFV Hackfest

45 participating organisations

40 remote sites

46 Functions Under Test

100 engineers on-site + 100 remote

6 supporting open source communities

www.etsi.org/nfvplugtests3

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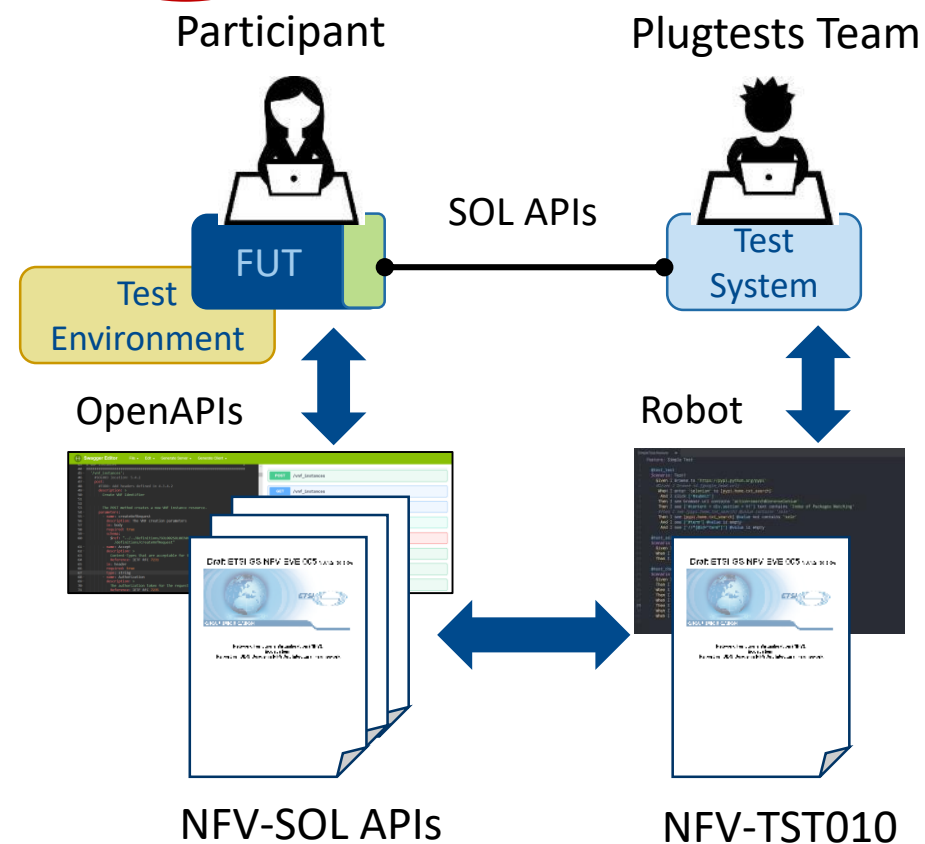
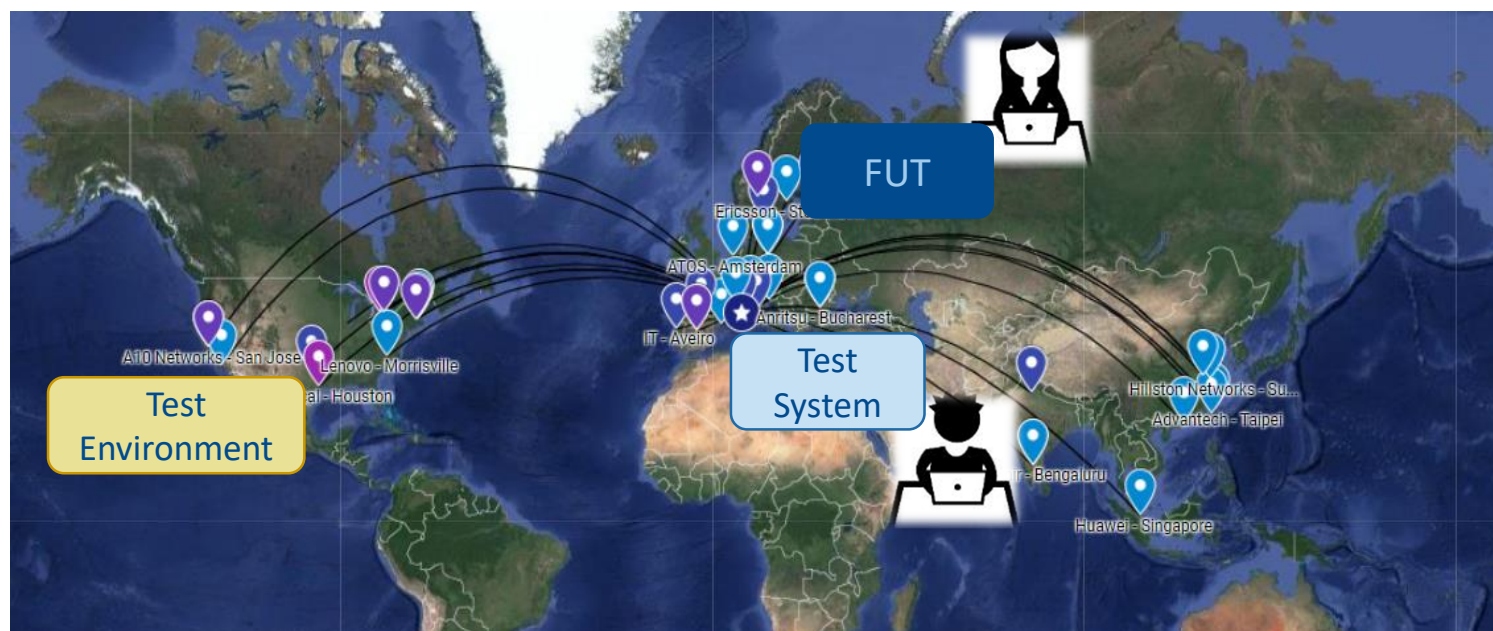
And now?

Feb-March 2019 - Remote NFV API Plugtests

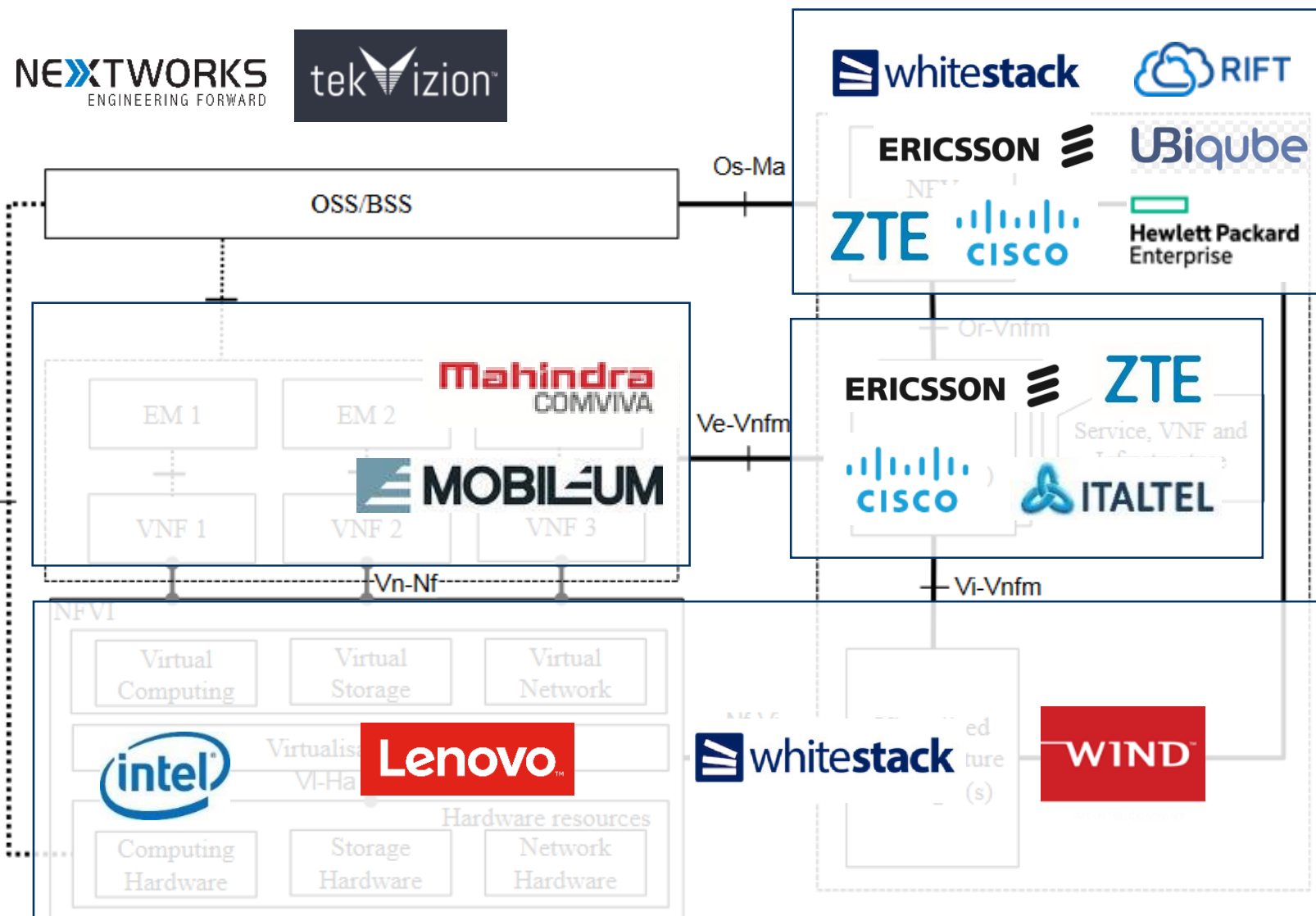


Individual (fully remote) Test Sessions to:

- 1) Validate and improve the quality of **NFV TST010 – NFV API Conformance Specs** and (Robot) [Test Suites](#)
- 2) Validate participants' implementations of **NFV SOL APIs** : SOL002, SOL003, SOL005



Remote NFV API Plugtests – Participation & Scope



14 participating organisations

13 Functions Under Test

20 Test Sessions

500+ Test Cases run

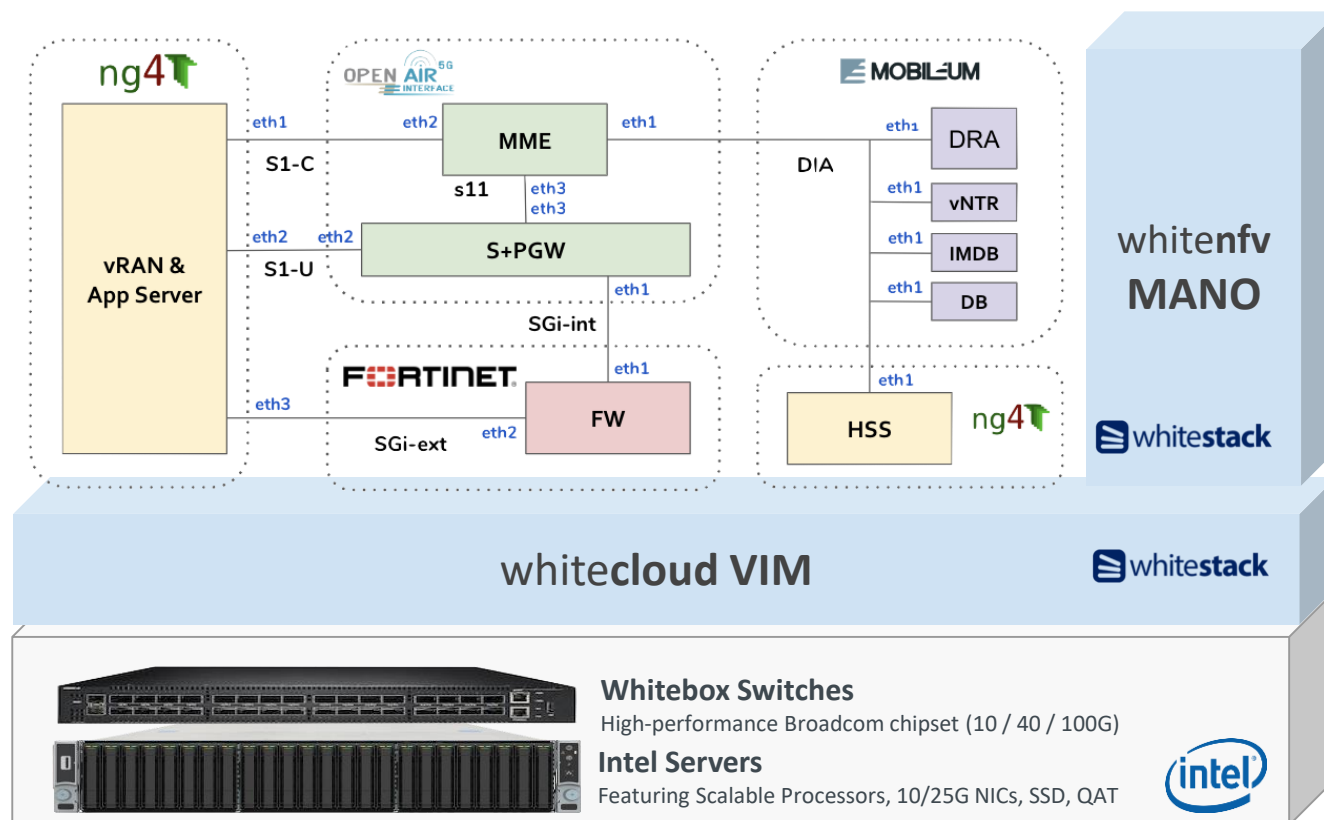
50+ Issues found (& fixed) in TST010 Test Specifications

✓ Several issues and inconsistencies identified in SOL Specs

www.etsi.org/nfvApiPlugtests



April 2019 – 1st Open Multi-vendor NFV Showcase



- ✔ To demonstrate the NFV vision
- ✔ Combining vendor and open-source components
- ✔ Supported by the ETSI NFV Plugtests Programme and the OpenStack Foundation
- ✔ Building from the demos set-up during last NFV Plugtests
- ✔ Integration, automation, performance...
- ✔ Public Report & Results to be presented May 1st at:





Coming up next...

4th NFV Plugtests



3 – 7 June 2019, ETSI, Sophia Antipolis

Scope

- ✓ NFV Interoperability
- ✓ NFV API Conformance
- ✓ MEC & MEC-in-NFV Interoperability

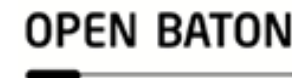
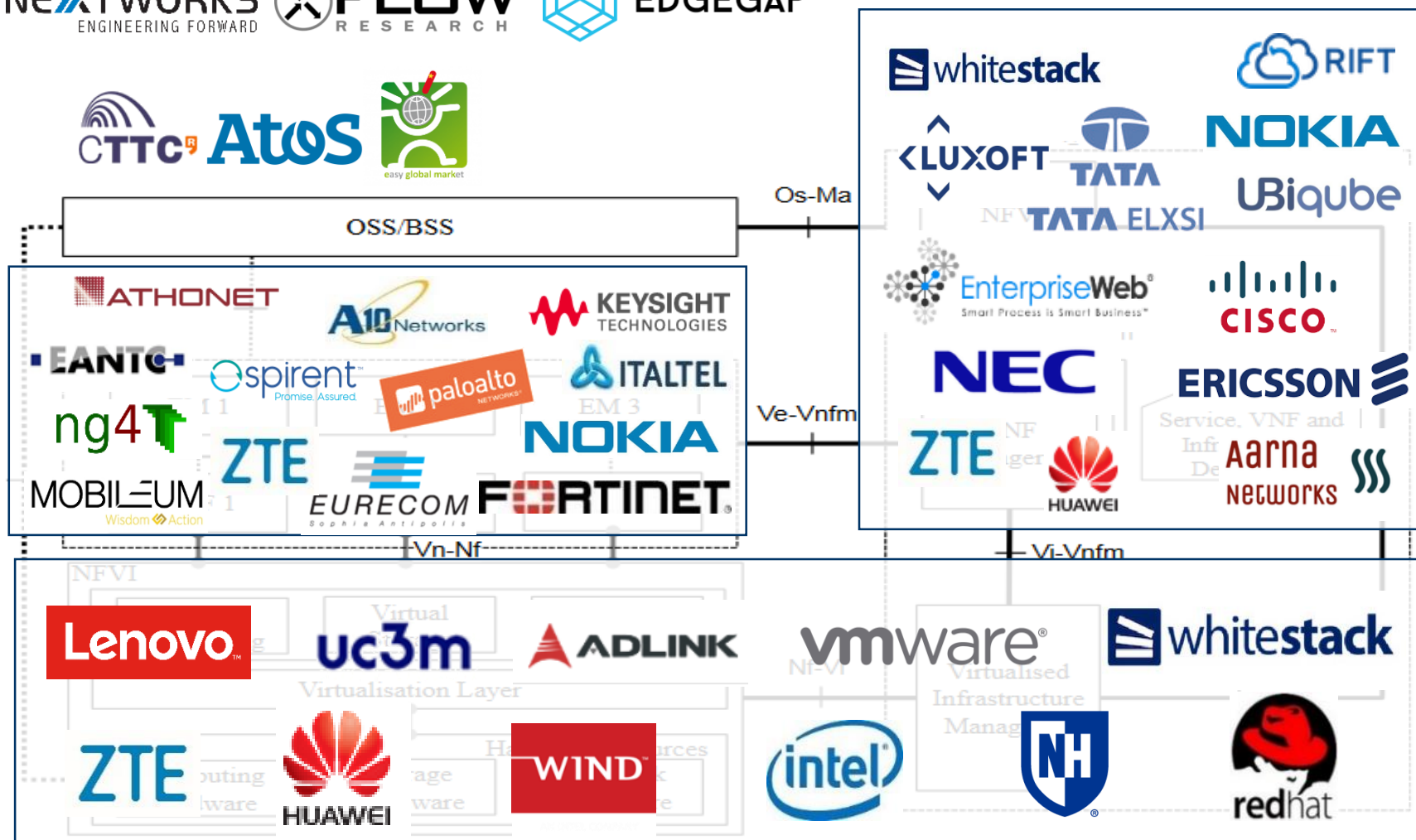
39 participating organisations

10 supporting open source communities

www.etsi.org/nfvplugtests4



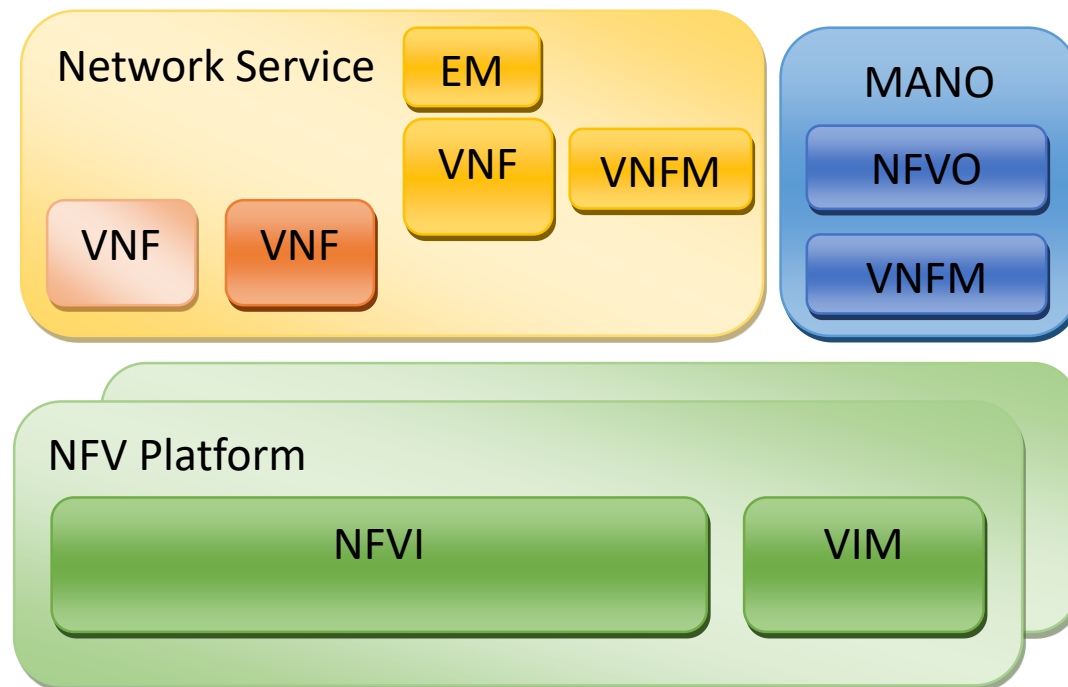
4th NFV Plugtests – Participation



Scope (1) NFV Interoperability Testing

Main Focus: multi-vendor NS

- ✓ Several parallel Test Sessions, 1 per MANO solution
- ✓ 1 MANO, 1+ VIM&NFVI, 2+ VNFs from different providers
- ✓ Automation: align triggers and checks with NFV SOL005



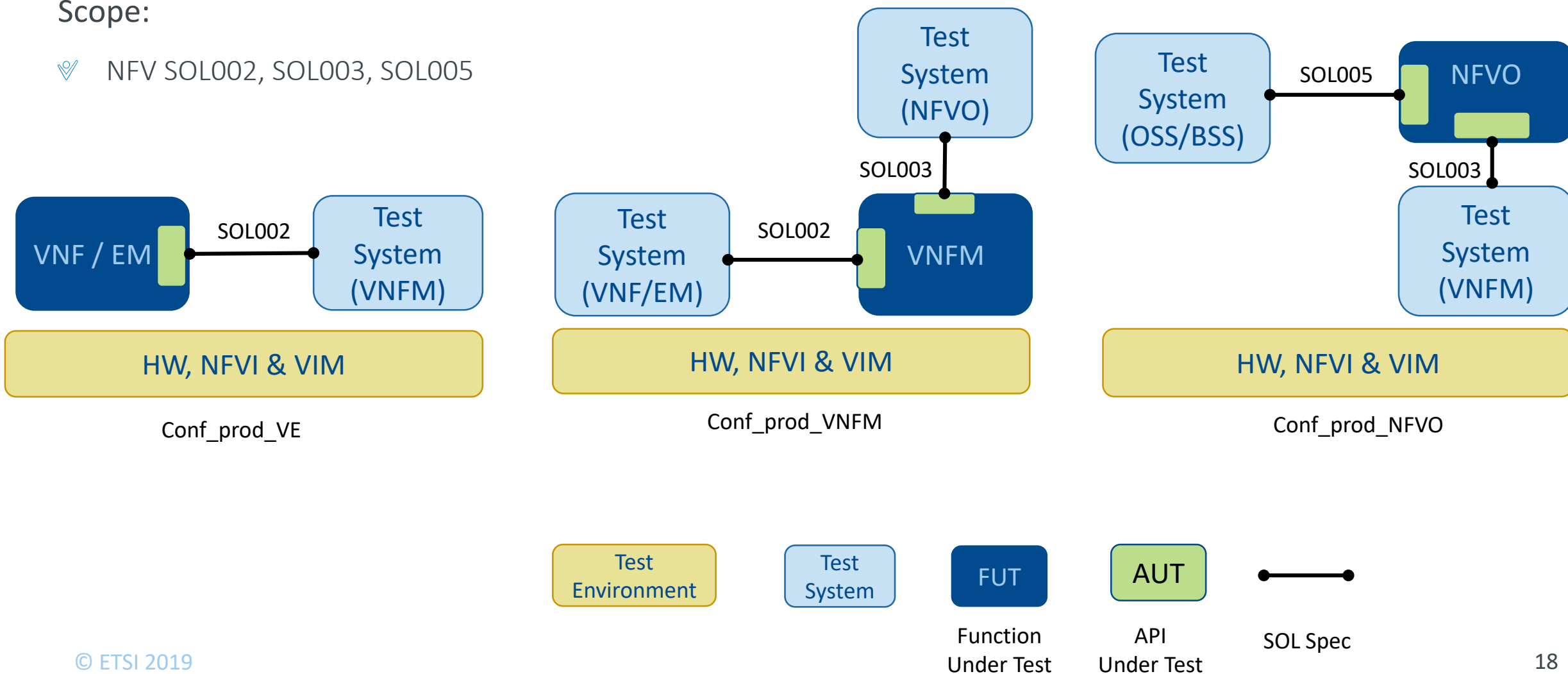
Scope:

- ✓ NS on-boarding, instantiation, termination
- ✓ NS updates: stop/re-start VNF
- ✓ NS & VNF scaling (on request)
- ✓ NS & VNF auto scaling from several triggers
 - ✓ VIM metrics
 - ✓ VNF indicators – notification
 - ✓ VNF indicators – query
 - ✓ VNF request
- ✓ Fault and Performance Management
- ✓ Multi-site
- ✓ EPA, SFC
- ✓ ...

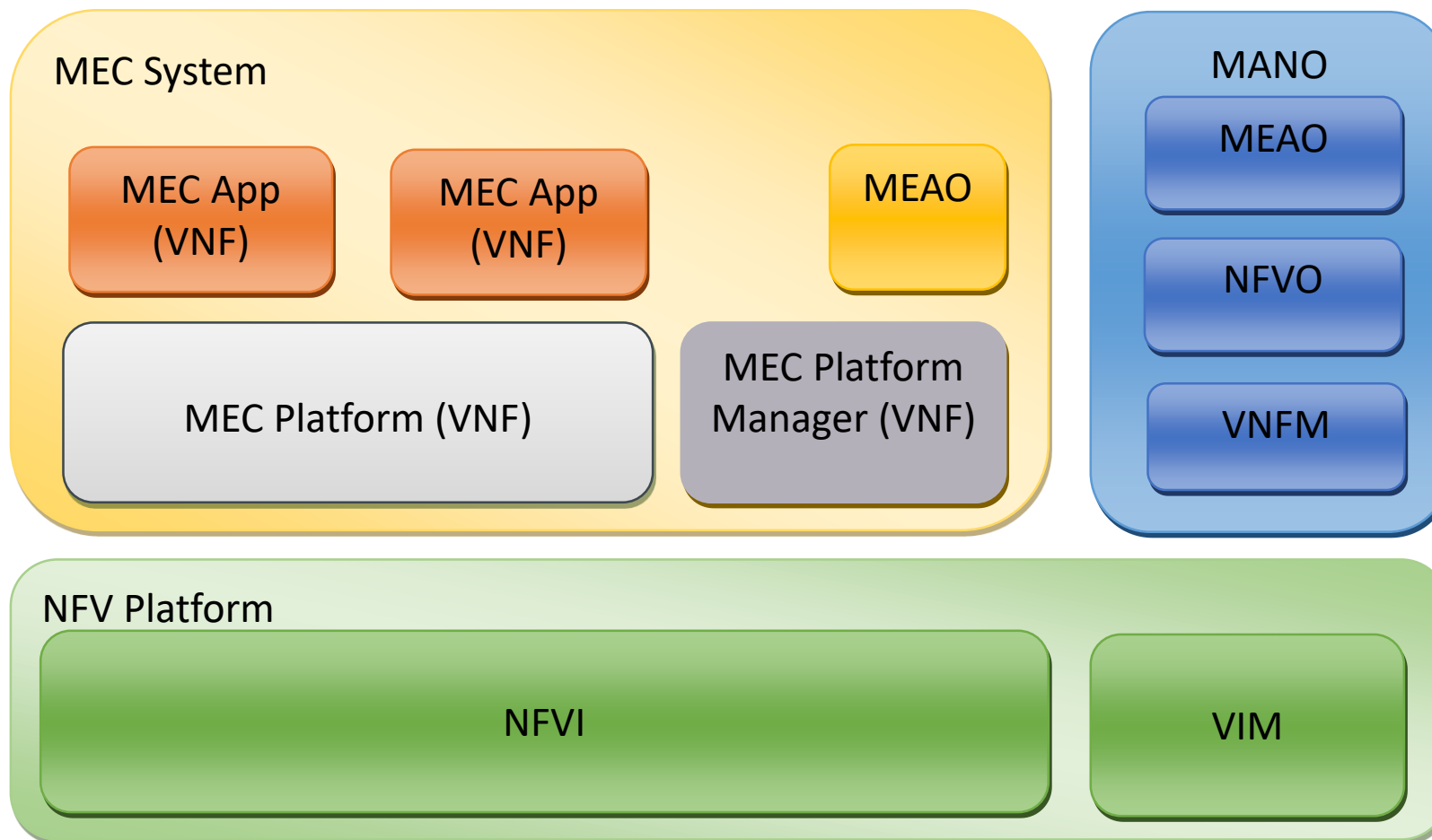
Scope (2) NFV API Conformance Testing

Scope:

✓ NFV SOL002, SOL003, SOL005



Scope (3) MEC & MEC-in-NFV Interoperability



Scope:

- ✓ On-boarding and instantiation of MEC applications
- ✓ Local traffic steering capabilities
- ✓ Exposure/usage of access network information
- ✓ MEC003, MEC017

NFV Plugtests Programme - Key takeaways

- ✓ Neutral and continuous framework for collaborative testing, experimentation, validation, PoCs, demos, showcases..
 - ✓ Remote testing activities
 - ✓ Regular face to face events
 - ✓ Periodic technical reports
- ✓ Free and Open to all:
 - ✓ Vendors, open source communities, operators, academia ...
- ✓ Originally in support of ETSI NFV ISG:
 - ✓ Fostering NFV interoperability
 - ✓ Validating and improving the quality of NFV Specifications
- ✓ Flexible scope to experiment and collaborate with groups working in related technologies
 - ✓ MEC, ZSM ... different open source initiatives

Thank you!

Silvia Almagia

ETSI Centre for Testing and Interoperability

plugtests@etsi.org

 #NFVplugtests