

ETSI NFV ISG – TST WG

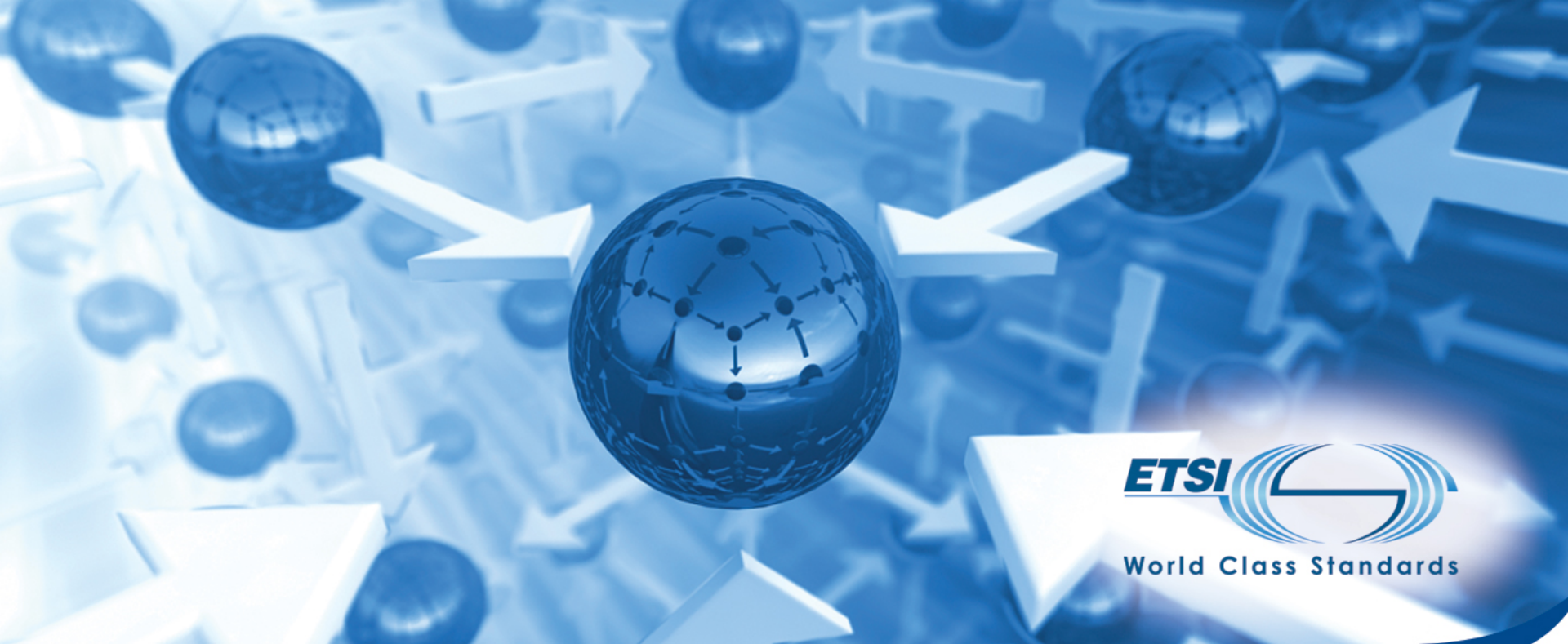
PIERRE LYNCH, TST WG CHAIR

LEAD TECHNOLOGIST – IXIA/KEYSIGHT TECHNOLOGIES



AGENDA

- TST WG Activity Overview
- Plugtest Overview and Results

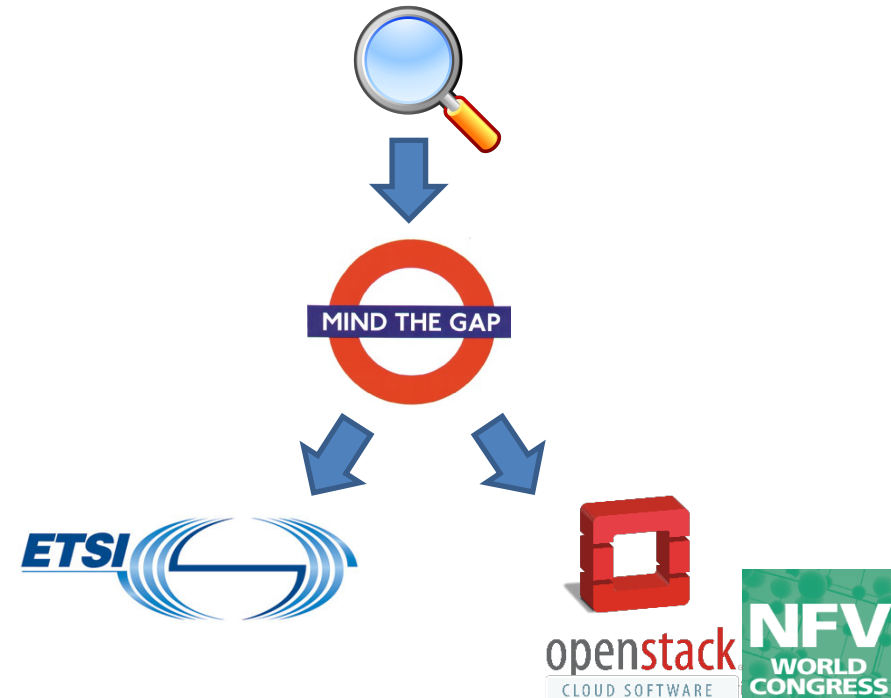
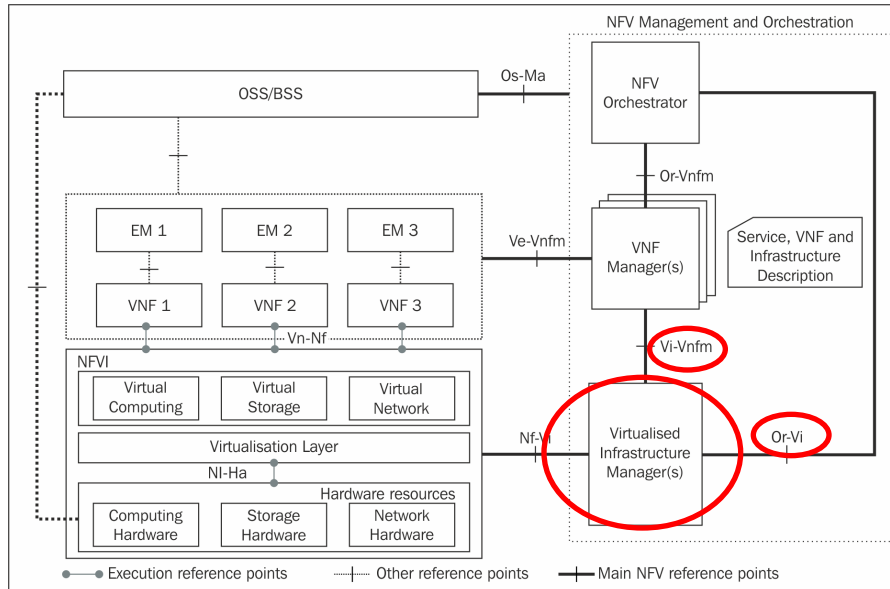


TST WG ACTIVITY OVERVIEW



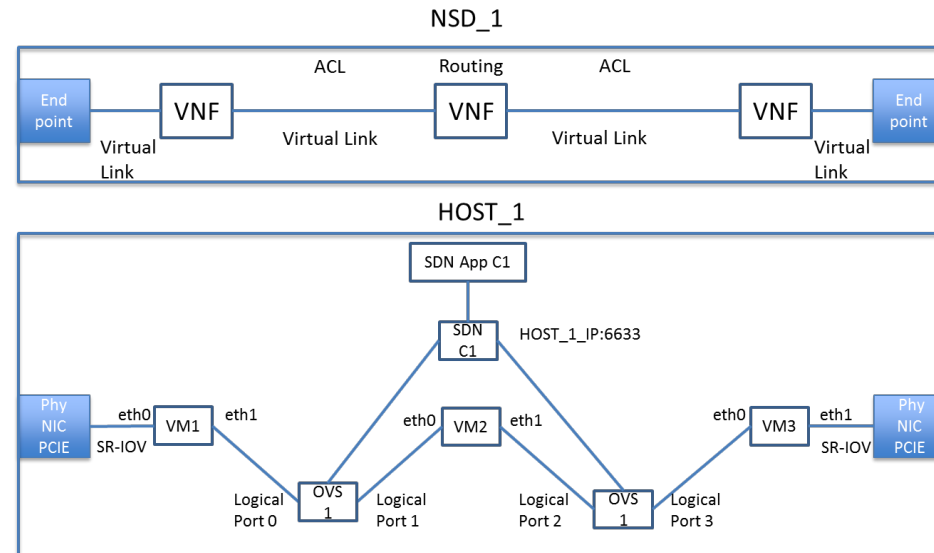
TST003 – OPEN SOURCE COMPONENTS

Identifying gaps between OpenStack NBI and IFA005/IFA006



TST004 – PATH IMPLEMENTATION TESTING

- Guidelines for test plan onpath implementation through NFVI
- SUT options
 - Fct placement
 - SDN application type
 - SDN controller type
- Metrics
 - VNFC instantiation time
 - Path instantiation
 - 1st packet latency
 - Std pkt transfer measurements
- Procedures
- Examples

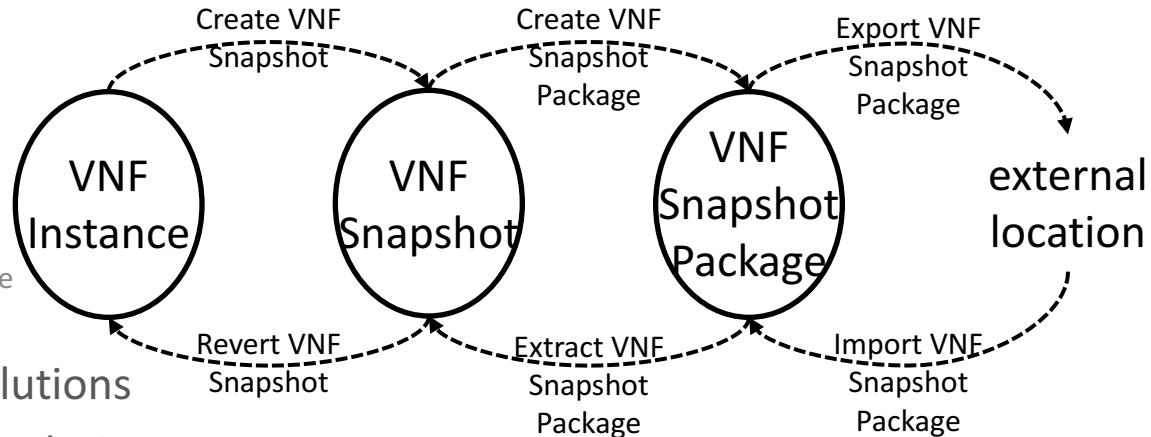


TST005 – VNF SNAPSHOT

- Report on use cases and recommendations for VNF Snapshot

- Use cases:

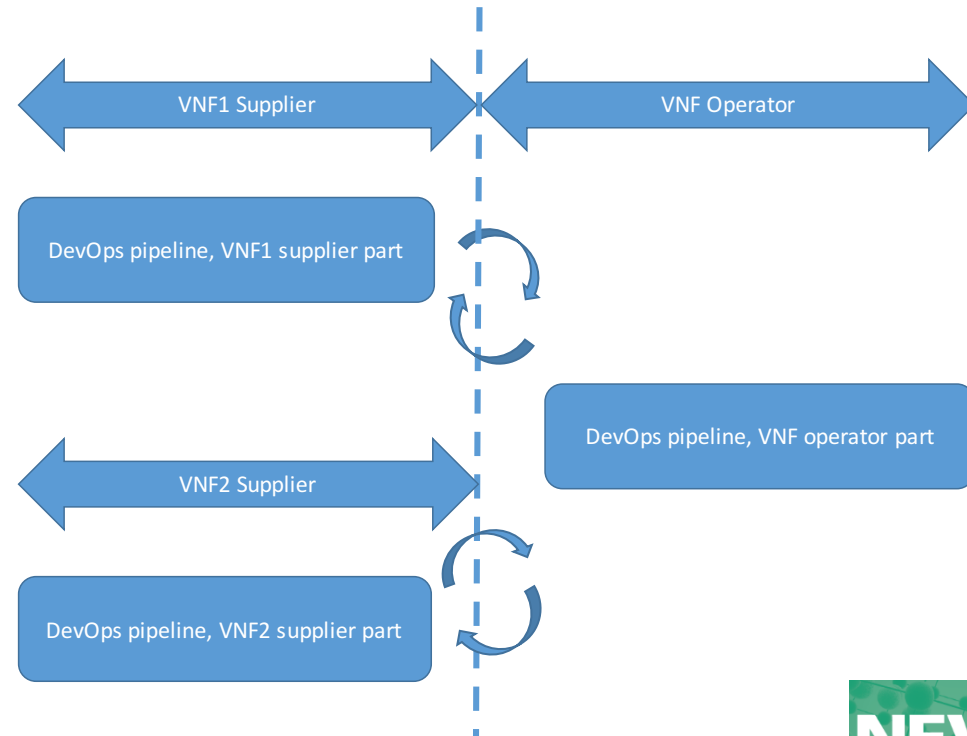
- Testing
- Troubleshooting
- Lifecycle management
 - During VNF lifecycle procedure
 - Quick VNF recovery



- Gap Analysis with existing solutions
- Framework, procedures and solutions
- Recommendations to IFA specifications
 - Policies, Fct Reqs on MANO, Ref Points

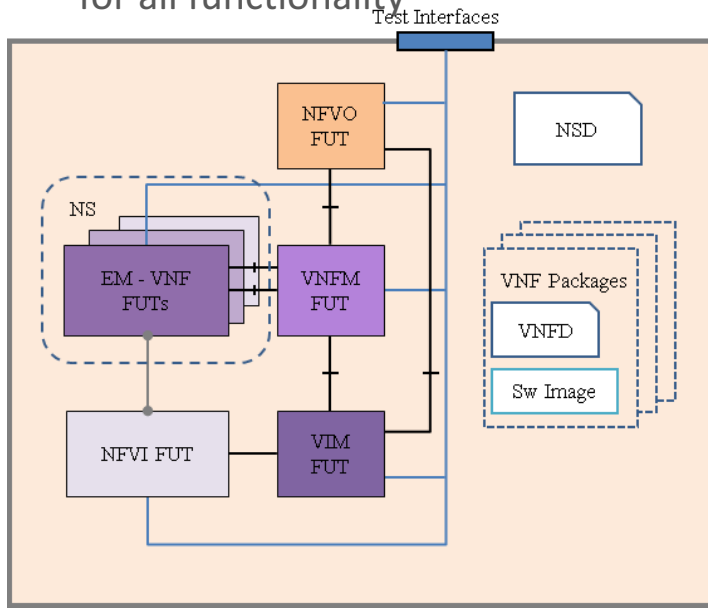
TST006 – DEVOPS AND CI/CD

- Usage of DevOps and CI/CD in Telco environment
 - Focus on the handoff of VNF
- Background and overview
- Use cases
 - Supplier
 - Operator
 - Validator
- Test procedures
- Recommendations for package description enhancements



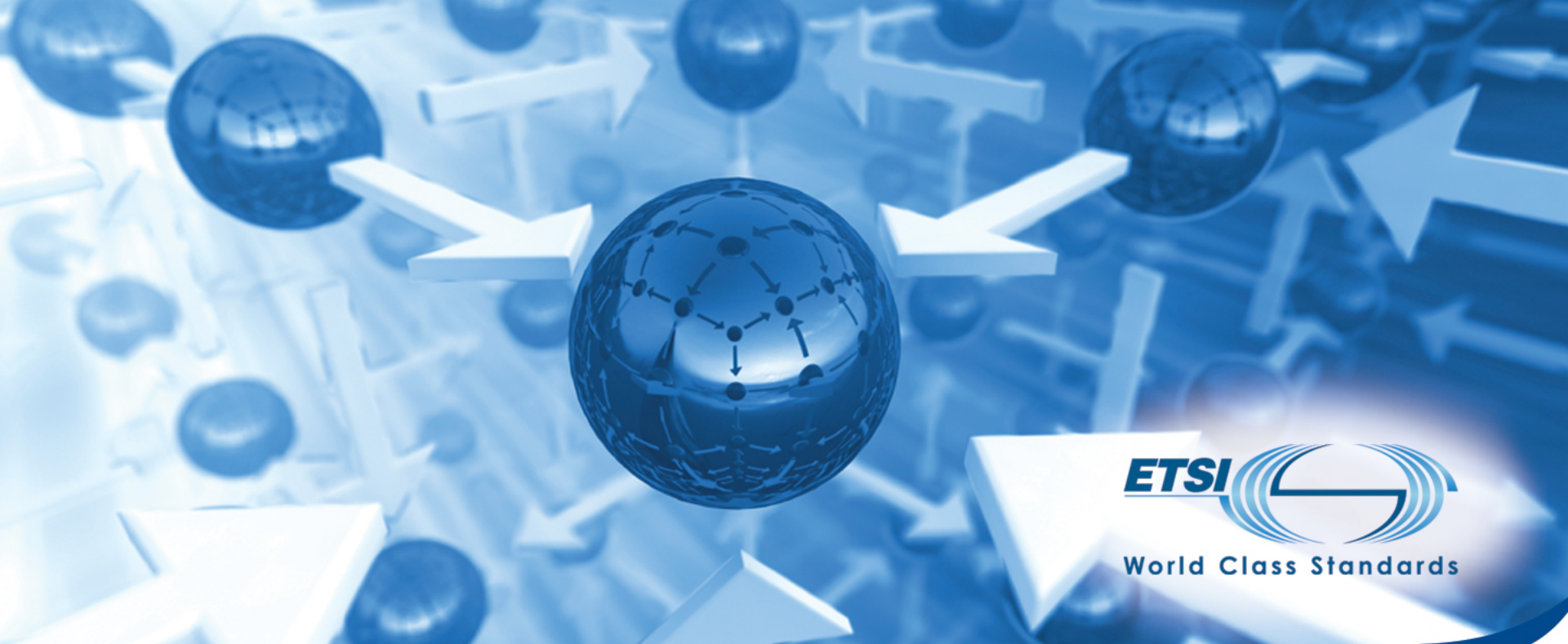
TST007 – GUIDELINES FOR INTEROP

- Interoperability Testing Guidelines for NFVI-VIM, MANO and VNF
- Detailed collection of test descriptions for all functionality



Test Description: NS scale out with an operator action				
Identifier	TD_NFV_NS_LCM_SCALE_OUT_001			
Test Purpose	Verify that the NS can be successfully scaled out by adding VNF instances triggered by an operator action			
Configuration	SUT Configuration 1			
References	IFA005, IFA006[1], IFA007, IFA008, IFA010, IFA013			
Applicability	<ul style="list-style-type: none"> • NFVO/VNFM can request VIM to allocate virtualised resources • VIM supports allocating virtualised resources • NFVO supports triggering scale out with an operator's action • NFVO supports scale out by adding VNF instances • NS/VNF supports scale out by adding VNF instances 			
Pre-test conditions	<ul style="list-style-type: none"> • NS is instantiated (TD_NFV_NS_LCM_INSTANTIATE_001) • NFVI has the required amount of consumable virtual resources to run the scaled-out NS 			
Test Sequence	Step	Type	Description	Result
	1	Stimulus	Trigger NS scale out by adding VNF instances to the NS in NFVO with an operator action	
	2	IOP Check	Verify that the additional VNF instance(s) have been deployed by querying the VNFM	
	3	IOP Check	Verify that the additional resources have been allocated by the VIM according to the descriptors	
	4	IOP Check	Verify that the additional VNF instance(s) are running and reachable via their management network	
	5	IOP Check	Verify that the additional VNF instances(s) have been configured according to the descriptors by querying the VNFM	
	6	IOP Check	Verify that the additional VNF instances(s), VL(s) and VNFFG(s) are connected according to the descriptors	
	7	IOP Check	Verify that the NFVO indicates the scaling	

- Compute, Networking and Memory metrics for NFVI
- Each Metric:
 - Name & Background
 - Parameters & Scope
 - Units & Method of Measurement
 - Definition
 - Sources of Error, Discussion
- Will be referenced by IFA027
- Compute: Processor usage, utilization
- Network: Packet, Octet, Dropped Packet, Errored Packet Counts
- Memory: Buffered, Cached, Free, Slab



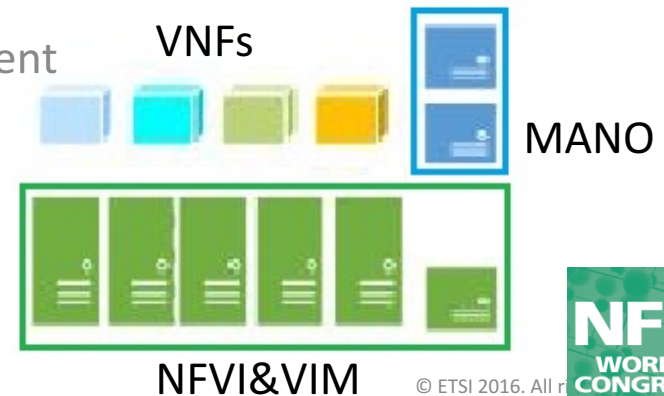
PLUGTEST OVERVIEW AND RESULTS

WHERE & WHEN?

- In Leganes, near Madrid, Spain
- 23rd January to 3rd February 2017
 - Preceded by a remote integration phase
- Hosted by 5TONIC Laboratory, with technical support from Telefonica
- Organised by ETSI Centre for Testing and Interoperability (CTI)
 - ETSI does not certify or endorse participating companies or products
 - We provide the framework, the means, the methodology, the procedures, the test plan...
 - Actual testing is run collaboratively by participants



- **Interoperability Test Sessions**
 - Among different combinations of Functions Under Test (FUTs)
 - 3 types of FUTs: VNFs, MANO, NFVI&VIM
 - At a functional level (conformance not enforced)
- **Validate basic NFV Rel 2 capabilities:**
 - NSD, VNF Package and SW Image Management
 - NS and VNF Life Cycle Management, VR Management
- **“Early” Plugtest**
 - Stage 3 incomplete
 - IOP through open APIs, plugins, ...
 - ...and remote integration



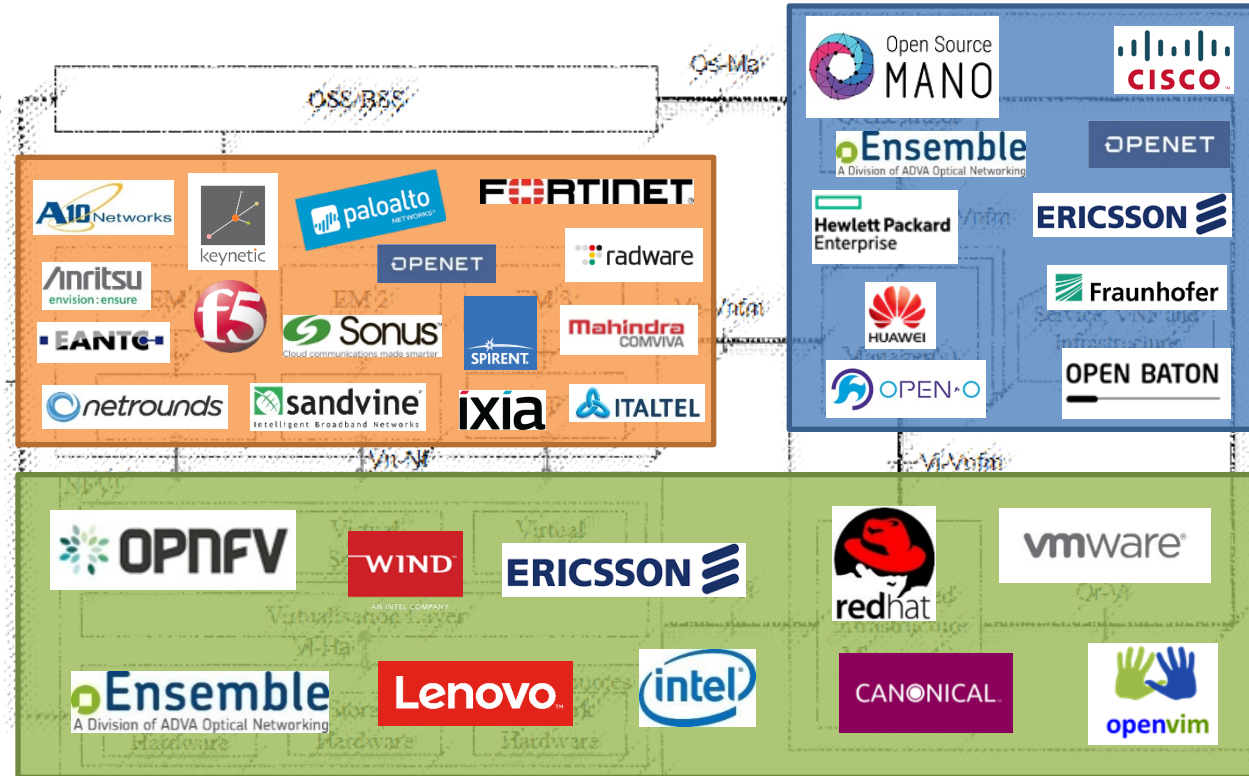
WHO?

- 31 participating companies
- 35 Functions Under Test (commercial and open source):

- 15 VNFs,
- 9 MANOs,
- 11 NFVI&VIM

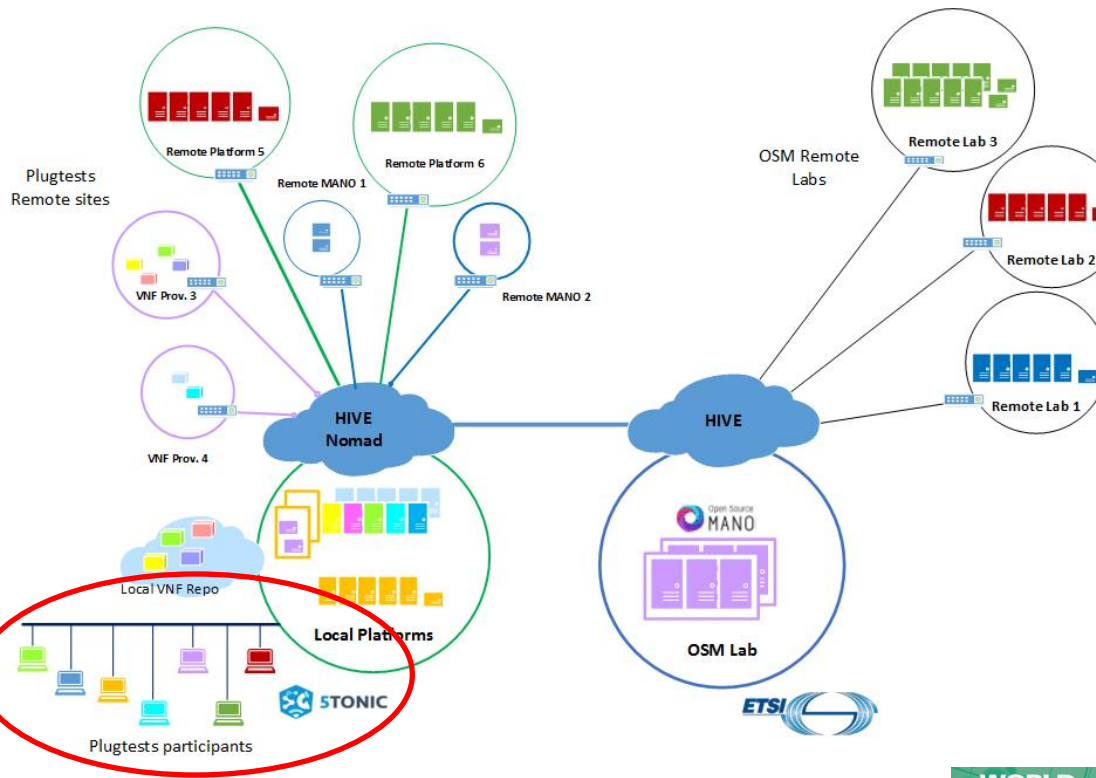
- Several supporting open source communities:

- ETSI OSM,
- Open Baton,
- OPNFV,
- Open-O



PLUGTESTS

- On-site setup
- Access to Remote Labs network (HIVE)
- + Some additional local instances (FUTs) tools, support functions
- + 1-2 representatives per FUT, max 64 people at a time

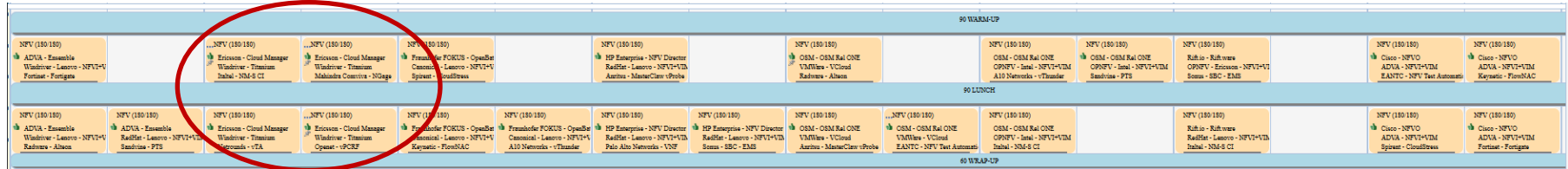


ON-SITE PLANNING

1ST NFV PLUGTESTS Agenda (23 JAN - 03 FEB 2017)												
Time	Monday 23	Tuesday 24	Wednesday 25	Thursday 26	Friday 27	Saturday 28	Sunday 29	Monday 30	Tuesday 31	Wednesday 1	Thursday 2	Friday 3
08:30 10:00			WELCOME & WARM UP	WARM UP	WARM UP			WARM UP	WARM UP	WARM UP	WARM UP	WARM UP
10:00 13:00	LOCAL SW/HW INSTALLATION & PRE-TESTING	LOCAL SW/HW INSTALLATION & PRE-TESTING	TEST SESSIONS	TEST SESSIONS	TEST SESSIONS			TEST SESSIONS	TEST SESSIONS	TEST SESSIONS	TEST SESSIONS	TEST SESSIONS
13:00 14:30	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK			LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK	LUNCH BREAK
14:30 17:30	LOCAL SW/HW INSTALLATION & PRE-TESTING	LOCAL SW/HW INSTALLATION & PRE-TESTING	TEST SESSIONS	TEST SESSIONS	TEST SESSIONS			TEST SESSIONS	TEST SESSIONS	TEST SESSIONS	TEST SESSIONS	TEAR DOWN
17:30 18:30		BRIEFING	WRAP UP	WRAP UP	WRAP UP			WRAP UP	WRAP UP	WRAP UP	WRAP UP	

- 2 days of local installation and pre-testing
- 7,5 days of testing
- 35 Functions Under Test: 1485 possible combinations
- Schedule built daily with the Plugtests Scheduler:
- Maximise number of Test Sessions
- Fair and balanced combinations of FUTs
- Taking into account major (in-)compatibilities
- All participants busy all the time!**

DAILY SCHEDULE



- 10 parallel tracks, an average of 22 Test Sessions per day
 - 1 MANO + 1 VIM&NFVI + 1-2 VNFs on each track anytime
- Warm-up 1,5 h
 - Sanity check SUT for the day
 - MANO to VIM connectivity, credentials, descriptors, images...
- Morning / Afternoon Test Sessions (2 x 3h)
 - 1 Test Session Report per MANO/VIM/VNF
- Wrap-up 1h
 - Among all participants and organisers
 - Findings of the day, schedule for the next day
- “Freestyle” test sessions also possible



TEST SESSION REPORTS



ETSI Test Reporting Tool



Settings Reports Statistics Session Plan

Silvia Almagia (Manager) Event timezone (Europe/N) NFV#1 logout

Add free report

Export all reports

id	status	date	duration	area	config	participants	commands
2038	🟢	2017-01-25 14:30	180	Track 1	NFV	ADVA - Ensemble RedHat - Lenovo - NFVI+VIM Auritsu - MasterClaw vProbe	📄 📄 📄
2039	🟢	2017-01-25 10:00	180	Track 2	NFV	Ericsson - Cloud Manager Windriver - Titanium Itahel - NM-S CI	📄 📄 📄
2041	🟢	2017-01-25 10:00	180	New Area	NFV	OSM - OSM Rel ONE Windriver - Lenovo - NFVI+VIM Keymatic - FlowNAC	📄 📄 📄
2042	🟢	Freestyle			NFV	Rift.io - RiftWare OPNFV - Ericsson - NFVI+VIM Spirant - CloudStress	📄 📄 📄

Test groups:

- NFV
- Setup & Instantiation
- Scale
- Scale VNF
- Update
- Terminate & Teardown

Test ID	Summary	Result	Comment
TD_NFV_SETUP_ONBOARD_VNF_PKG_001	To on-board a VNF Package	OK NO NA	
TD_NFV_SETUP_ONBOARD_NSD_001	To onboard a NSD	OK NO NA	
TD_NFV_NS_LCM_INSTANTIATE_001	To verify that an NS can be successfully instantiated	OK NO NA	VNF required networking configuration (bump- -include VNF)

2053	🟢	Freestyle			NFV	RedHat - Lenovo - NFVI+VIM FS - vADC	📄 📄 📄
2054	🟢	2017-01-25 14:30	180	Track 2	NFV	Ericsson - Cloud Manager Windriver - Titanium Openset - vPCRF	📄 📄 📄
2056	🟢	Freestyle			NFV	Cisco - NFVO RedHat - Lenovo - NFVI+VIM Spirant - CloudStress	📄 📄 📄



OVERALL RESULTS

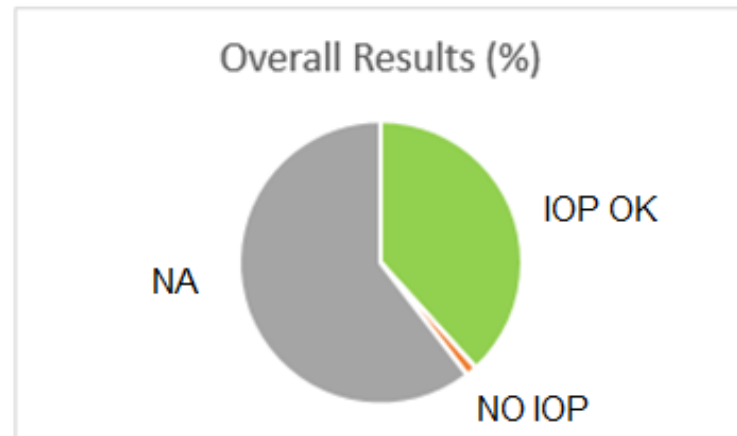
160 Interop Test Sessions

Number of Sessions: 160

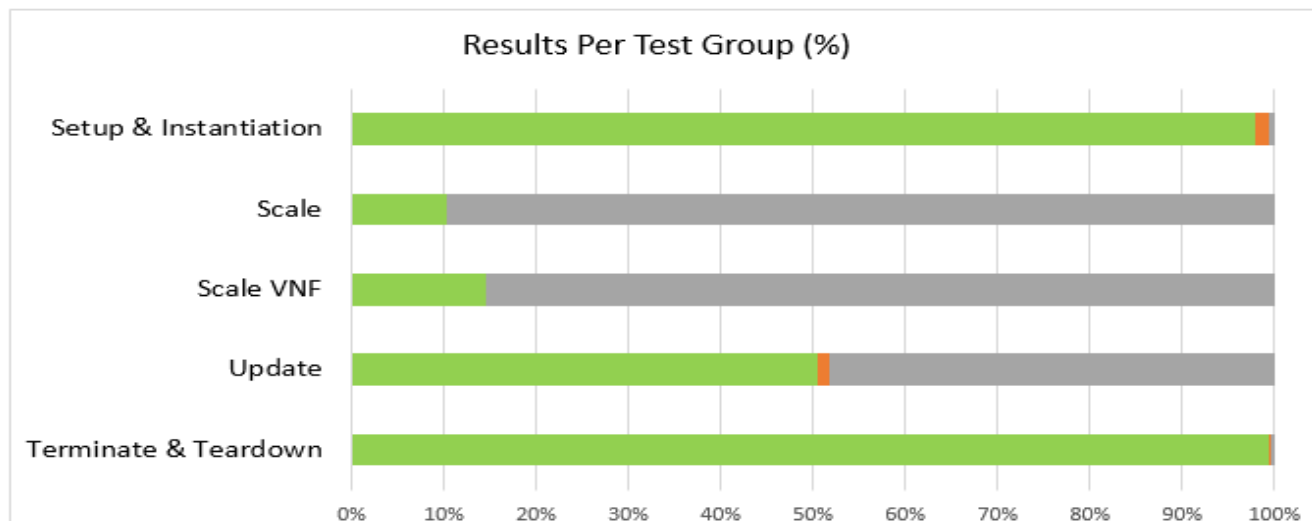
Of the 160 reported sessions 160 were agreed (100.0 %)

Interoperability		Not Executed		Totals	
OK	NO	NA	OT	Run	Results
1539 (99.0%)	15 (1.0%)	2431 (61.0%)	(0.0%)	1554 (39.0%)	3985

1554 Test Cases Run



RESULTS PER TEST GROUP



	Interoperability		Not Executed		Totals	
	OK	NO	NA	OT	Run	Results
Setup & Instantiation	468 (98.5%)	7 (1.5%)	3 (0.6%)	0 (0.0%)	475 (99.4%)	478
Scale	126 (100.0%)	0 (0.0%)	1096 (89.7%)	0 (0.0%)	126 (10.3%)	1222
Scale VNF	178 (100.0%)	0 (0.0%)	1038 (85.4%)	0 (0.0%)	178 (14.6%)	1216
Update	305 (97.8%)	7 (2.2%)	292 (48.3%)	0 (0.0%)	312 (51.7%)	604
Terminate & Teardown	462 (99.8%)	1 (0.2%)	2 (0.4%)	0 (0.0%)	463 (99.6%)	465

RESULTS PER TEST CASE

Results per Test Case (%)

Setup & Instantiation

- TD_NFV_SETUP_ONBOARD_VNF_PKG_001
- TD_NFV_SETUP_ONBOARD_NSD_001
- TD_NFV_NS_LCM_INSTANTIATE_001

Scale (+/- VNF i)

- TD_NFV_NS_LCM_SCALE_OUT_001
- TD_NFV_NS_LCM_SCALE_IN_001
- TD_NFV_NS_LCM_SCALE_OUT_002
- TD_NFV_NS_LCM_SCALE_IN_002
- TD_NFV_NS_LCM_SCALE_OUT_003
- TD_NFV_NS_LCM_SCALE_IN_003
- TD_NFV_NS_LCM_SCALE_OUT_004
- TD_NFV_NS_LCM_SCALE_IN_004

Scale VNF (+/- VNFC i)

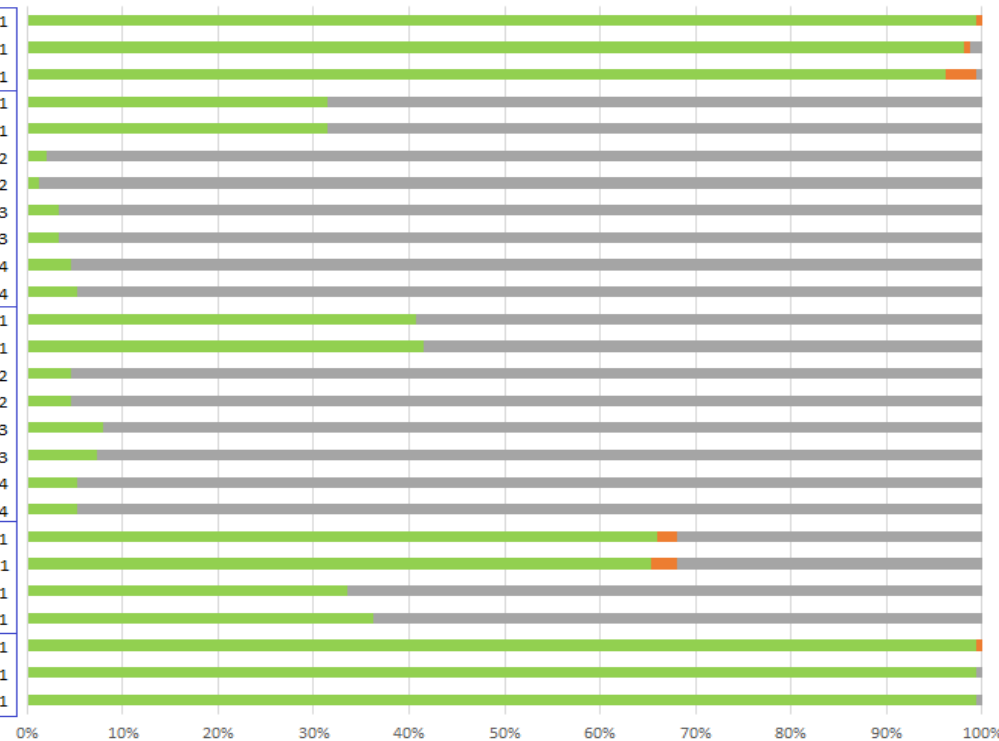
- TD_NFV_NS_LCM_SCALE_OUT_VNF_001
- TD_NFV_NS_LCM_SCALE_IN_VNF_001
- TD_NFV_NS_LCM_SCALE_OUT_VNF_002
- TD_NFV_NS_LCM_SCALE_IN_VNF_002
- TD_NFV_NS_LCM_SCALE_OUT_VNF_003
- TD_NFV_NS_LCM_SCALE_IN_VNF_003
- TD_NFV_NS_LCM_SCALE_OUT_VNF_004
- TD_NFV_NS_LCM_SCALE_IN_VNF_004

NS Update

- TD_NFV_NS_LCM_UPDATE_STOP_VNF_001
- TD_NFV_NS_LCM_UPDATE_START_VNF_001
- TD_NFV_NS_LCM_UPDATE_ADD_VNF_VL_001
- TD_NFV_NS_LCM_UPDATE_REM_VNF_VL_001

Terminate & Teardown

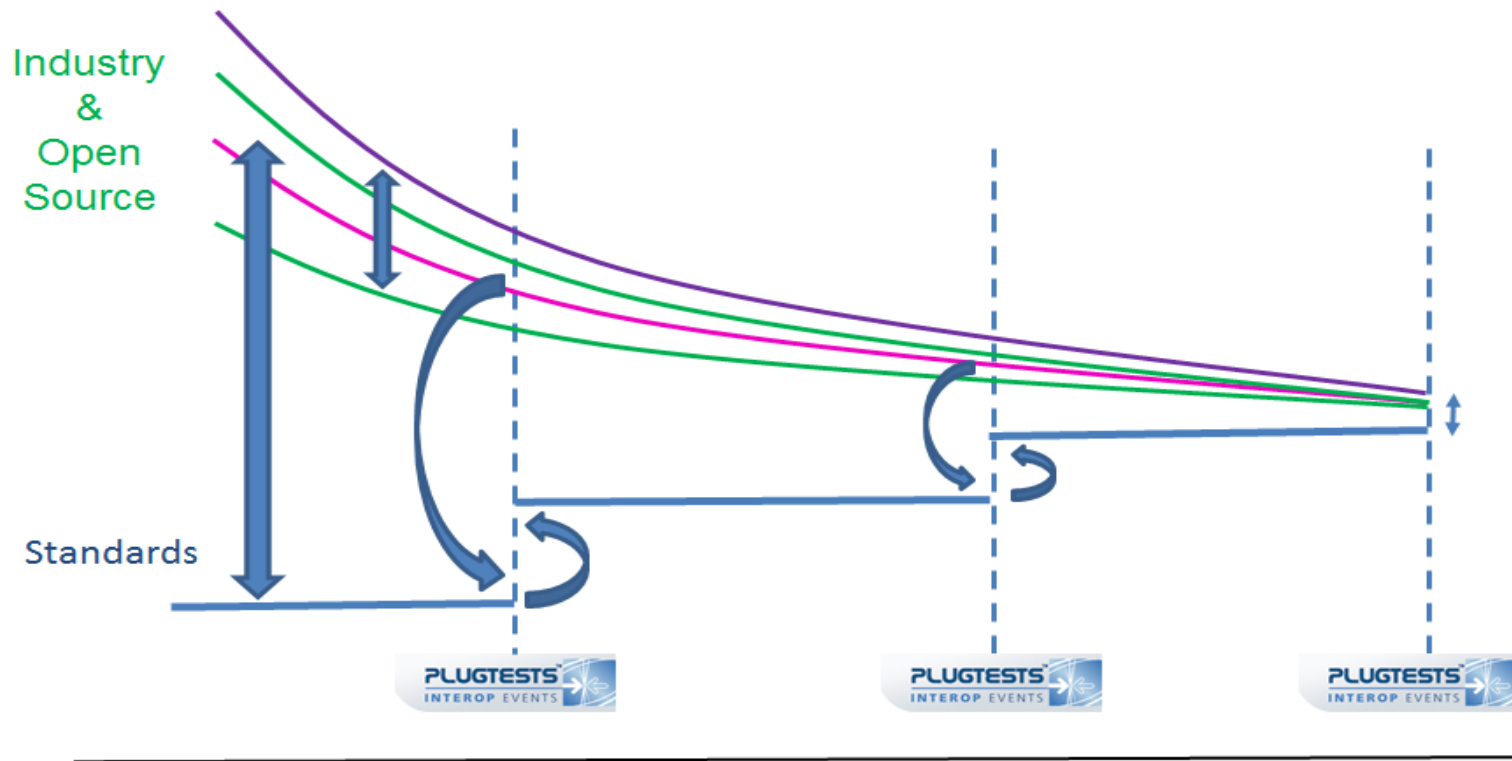
- TD_NFV_NS_LCM_TERMINATE_001
- TD_NFV_TEARDOWN_DELETE_NSD_001
- TD_NFV_TEARDOWN_DELETE_VNF_PKG_001



PLUGTESTS OUTCOME

- The NFV Plugtests was a great opportunity for vendors and open source projects:
 - Reality check: align expectations
 - Hands-on collaboration to make NFV work
 - Meet and test with many other players in the NFV Ecosystem
 - Understand usage of own product by 3rd parties, fix a lot of bugs!!
 - Provide consolidated feedback to ETSI NFV
- More information:
 - 1st NFV Plugtests [Test Plan](#)
 - 1st NFV Plugtests [Report](#)

NFV PLUGTESTS PROGRAM



Silvia Almagia

Centre for Testing and Interoperability, ETSI

silvia.almagia@etsi.org

www.etsi.org/nfvplugtest

Thank you!