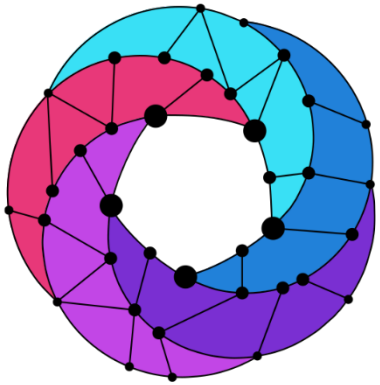


Open Source
MANO

AN UPDATE ON OSM TO THE NFVRG

Diego R. Lopez – Telefónica I+D

ETSI

DICEBAMUS HESTERNA DIE…

- Delivering an open source MANO stack aligned to ETSI NFV (information and data) models
  - Capable of consuming published models for NFV service and deployment (VNFD, NSD, etc.)
  - Extending these models, and recommending back to ETSI NFV
- Assuring predictable behavior of VNF and NS
  - Under these models
- Enabling an eco-system of model-based VNF solutions
  - Ready to be offered to cloud and service providers
  - No need of integration on a per- customer and/or MANO vendor

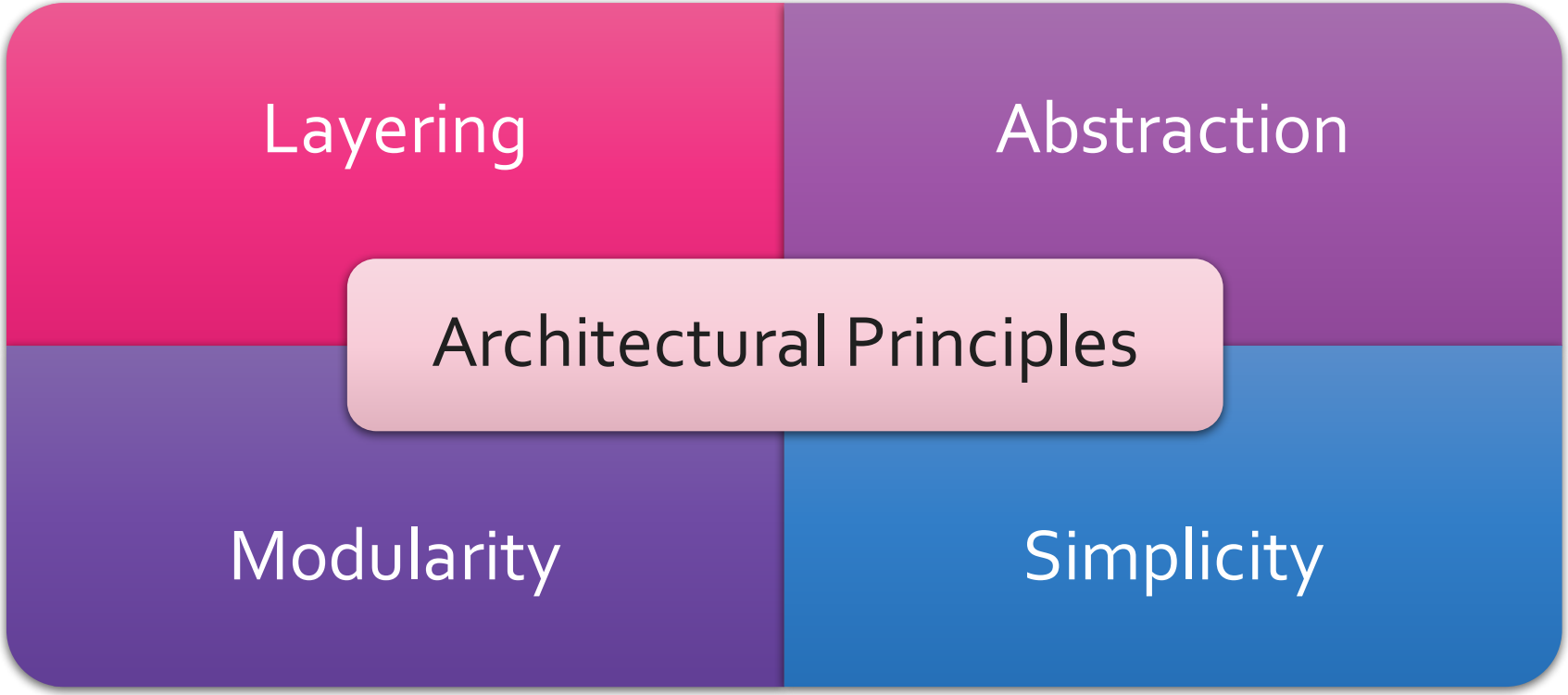
OSM AS OF TODAY

- Open community-based NFVO, founded on these principles:
  - Compliance and feedback to ETSI NFV ISG architecture and specs
  - Base implementation on information model
  - Independent IOP labs to test & integrate in the community
  - Open governance model based on technical meritocracy
- Types of engagement
  - Developers (as you could expect…)
  - Early adopters
  - Testers (modules & IOP)
  - Advisors

- End-User Advisory Board
  - Service providers and other end users of the technology (not integrators or resellers) will become members
  - Produce feature requests to the technical groups

A PRODUCTION-QUALITY NFV MANO STACK

Open Source MANO



- Capturing and automating real production complexity
- Covering e2e lifecycle of network services
- Avoiding complex integration efforts
- Providing a consistent model-based approach

OSM COMPONENTS

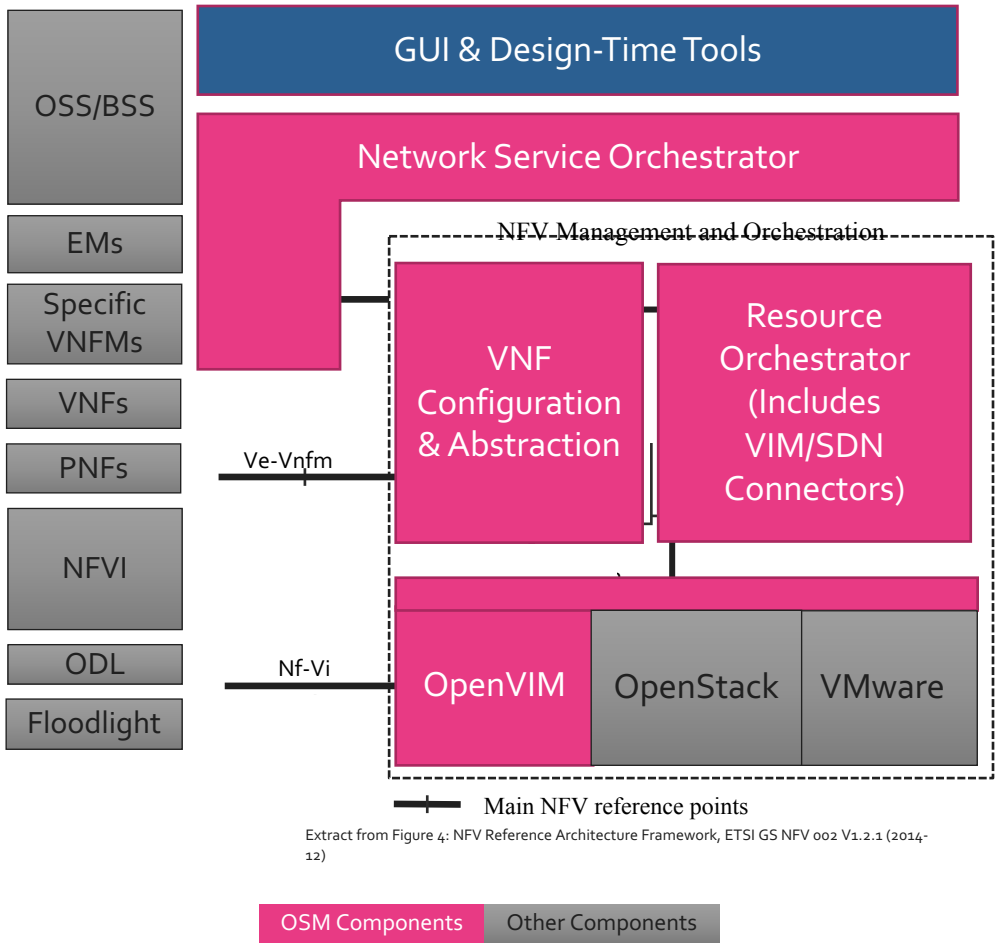
Open Source MANO

Run-Time Scope

- Automated end-to-end Service Orchestration
- Superset of ETSI NFV MANO
- Plugin model for multiple VIMs/SDN Controllers
- Generic VNFM style functionality with support for integrating Specific VNFMs
- PNF integration
- Greenfield and brownfield deployments
- GUI

Design-Time Scope

- Network Service Definition (CRUD operations)
- Model-Driven Environment with Data Models aligned with ETSI NFV
- VNF Package Generation
- GUI



Extract from Figure 4: NFV Reference Architecture Framework, ETSI GS NFV 002 V1.2.1 (2014-12)

OSM DATA MODELS

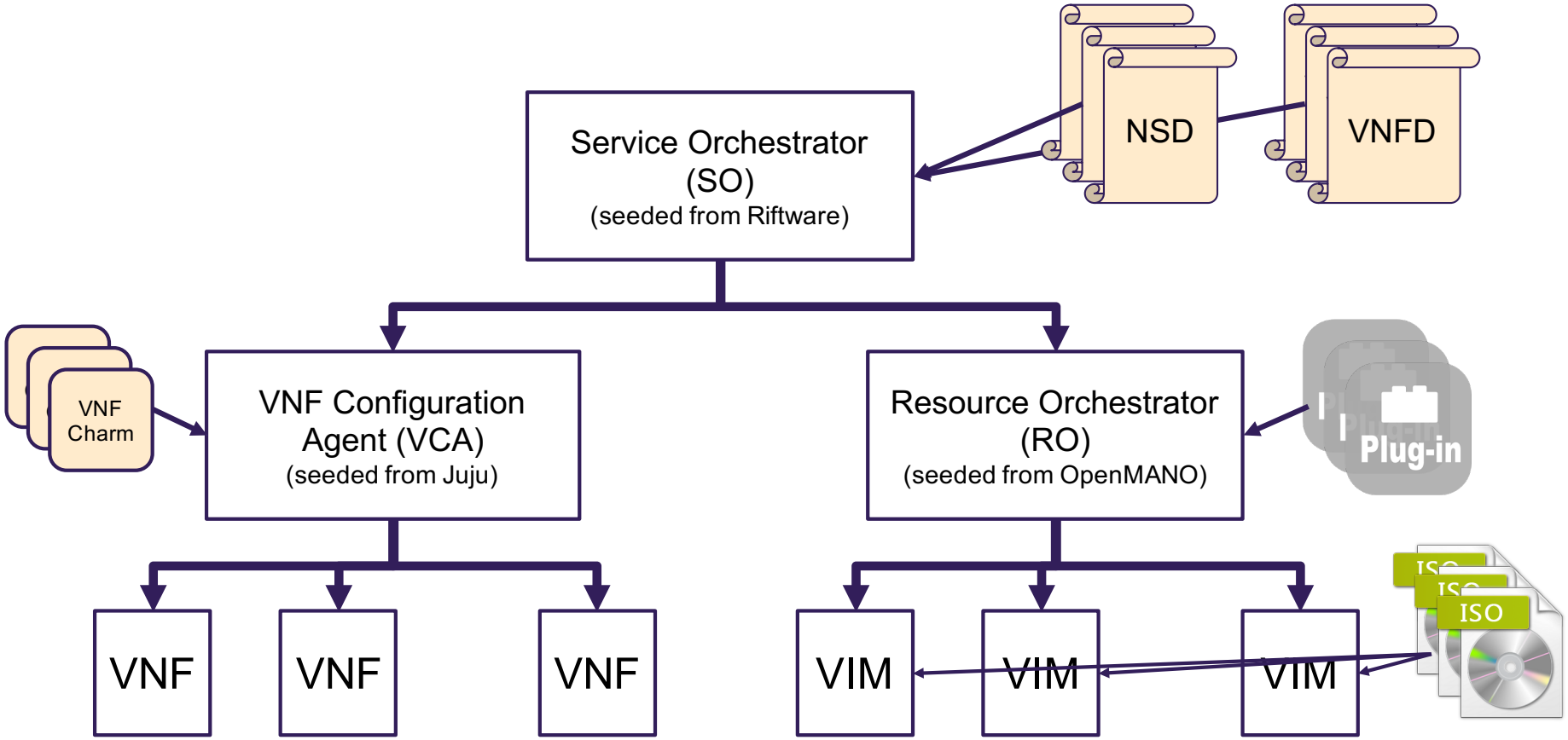
Aligned with ETSI NFV ISG Phase 1 Information Models

- Data Modelled Language: YANG
- Format Encoding: YAML, JSON, XML
- **Note:** Data Model Translator included in the architecture to optionally decouple OSM internals from the user input formats.
- OSM open to supporting multiple input formats to align with industry directions

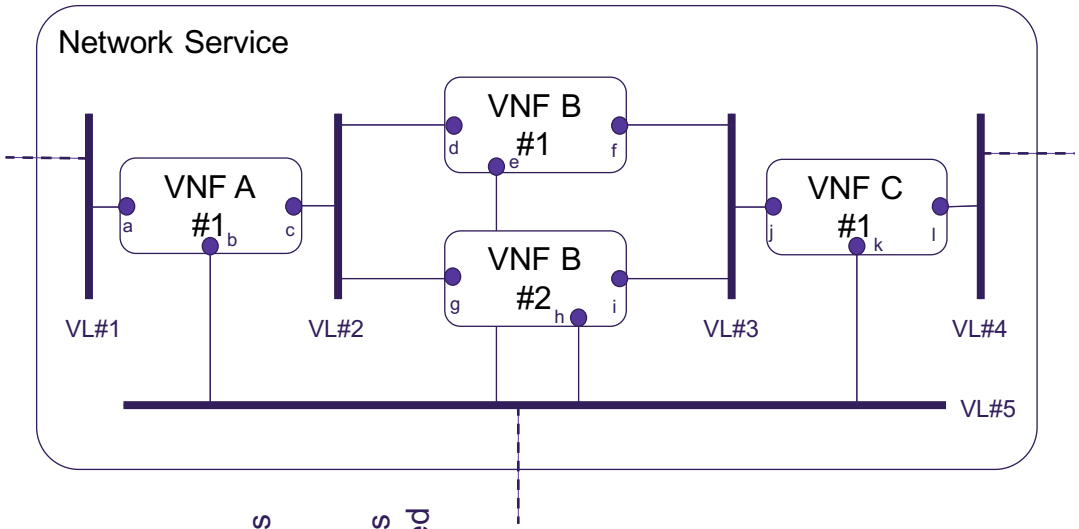
Analysis underway on ETSI NFV ISG Phase 2 Information Models

- Will work with the ETSI NFV ISG community for clarifications, bug fixes (sightings) and feature advances.
- Possible intersect with OSM Release THREE

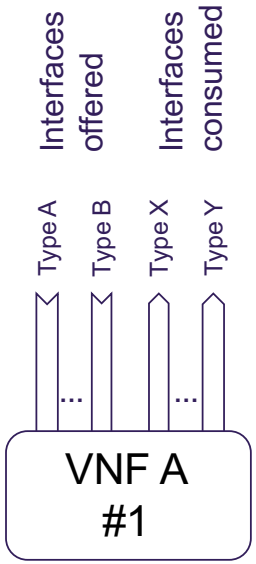
HOW OSM BEHAVES

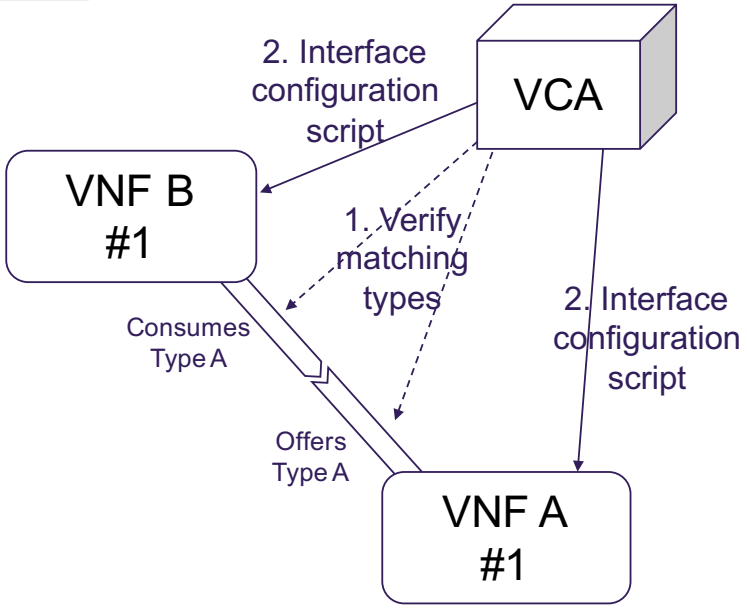


NETWORK AND FUNCTIONAL COMPOSITION



- Need to map functional interfaces to network connection points
  - More on this when talking about **draft-aranda-nfvrg-recursive-vnf**





FROM RELEASE ZERO…

- Simplified on-boarding process
- Human-readable VNF and NS descriptors
- Multi-VIM support: OpenStack, OpenVIM
- EPA Support, assuring predictable performance
- Underlay configuration with SDN
- Web interface
- Documentation
  - Installation guides
  - How-to guides for users and developers
  - Data model in detail
  - Minimal infrastructure requirements
  - Videos
  - …

… TO RELEASE ONE…

Open Source MANO

- Multi-VIM

- Multi-SDN

Available at:
osm.etsi.org

- Plugin model for adding new VIMs and SDN frameworks
- Multi-site network services
- Simplified installation
  - Including support for OpenVIM
- Enhancements to VNF and NS models
  - Contributed to ETSI NFV

… TO WHAT IS BEING DISCUSSED FOR RELEASE TWO…

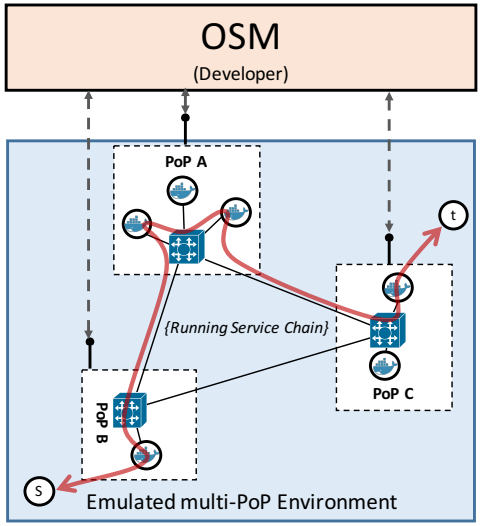
- Interoperability with public clouds
- Service chaining use case
- OSM sandbox
- Auto-scaling VNF with horizontal scale out of VDUs
- Deployment of OSM in reduced environments
- Distribution of OSM SW as container images
- Unified CLI
- Interchangeable PNFs and VNFs

Beware: This is a list of features discussed by the EUAG
Not a commitment from the OSM team

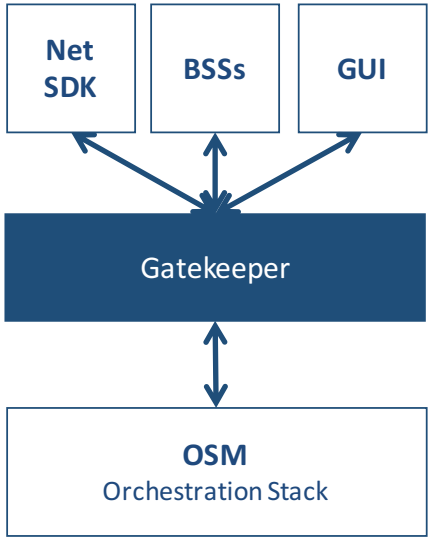
…AND OTHER PROPOSED FEATURES RELATED TO DEVOPS

Open Source MANO

- Emulated multi-PoP environment
  - Facilitate the whole model-driven development cycle
  - Environment based on Mininet/ Containernet
  - Executed on single physical or virtual machine

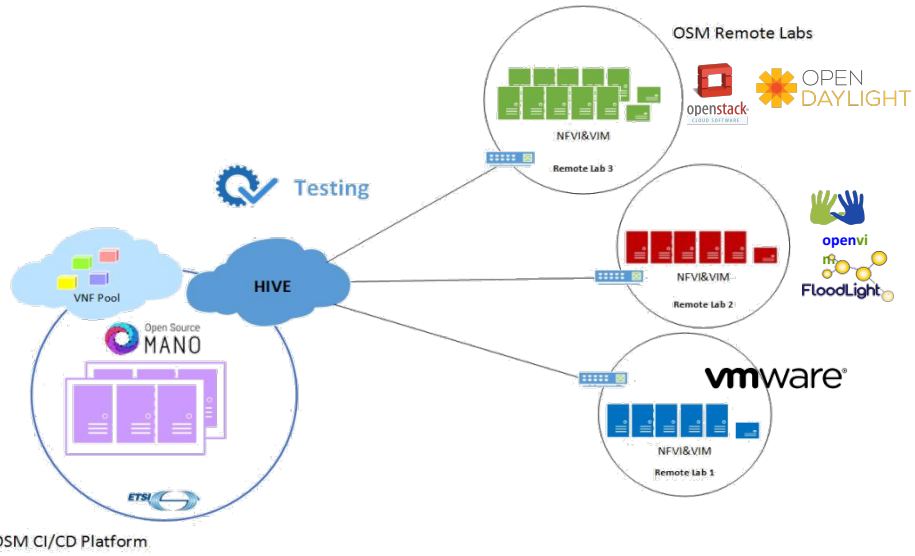


- Mediated interactions
  - Embrace the openness of a NFV Service Platform without compromising security
  - Use AuthN/AuthZ at scale: external systems, package signing…
  - A Gatekeeper as a mediator of all MANO operations
  - Rely on a microservice architecture to guarantee modularity and extensibility



GETTING REAL

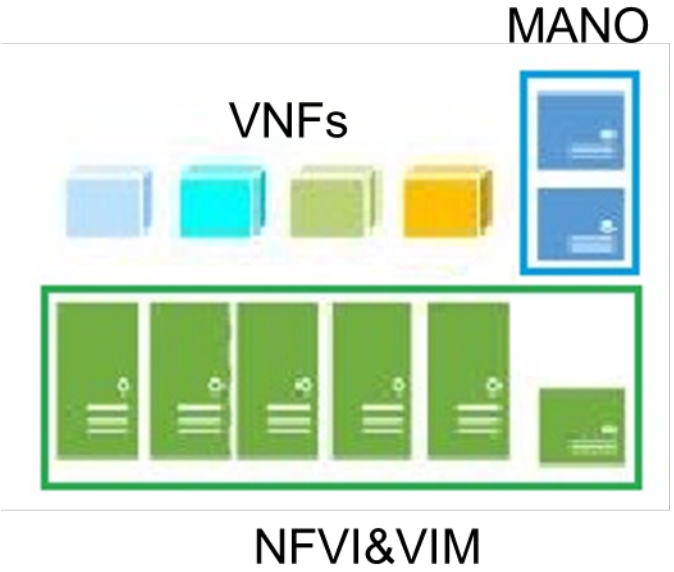
- A network of remote labs enables continuous and automated testing with different VIMs and NFVIs
- Fully integrated with OSM CI/CD pipeline
- Bring realistic conditions to OSM testing
- Minimize barriers for community engagement



- Securely connected over ETSI's HIVE (Hub for Inter-operability and Validation)

ETSI NFV PLUGTESTS

- Interoperability tests, in a combination of 1 MANO + 1 VIM + 1 VNF
  - Objective is to check that they can work together
  - ETSI does not certify NFV solutions
  - 10 VIMs x 15 VNFs = 150 combinations
    - Only a random sample per MANO



- Test sessions randomly scheduled the day before
  - Based on pre-testing activities & daily feedback
  - VIM, VNF and MANO sitting in the same table

- An 8 days event
  - At the 5TONIC lab in Leganés (Spain)
  - 23 January to 3 February
  - See http://www.etsi.org/news-events/events/1104-1st-nfv-plugtests

OSM AT THE PLUGTESTS

- OSM interoperated with all VIMs and VNFs participating in the PlugTests
- Objective: A unique OSM descriptor for all VIMs
  - All OSM VIM plugins were used in the tests: OpenStack, VMware, OpenVIM
  - A wide range of OpenStack platforms were tested successfully
    - From Kilo- to Newton-based
    - Deployment on specific segments: regions, availability zones
    - Access to VMs through both provider external network and tenant network connected to the public/external network
- A total of 32 test sessions in 8 days, all successful
  - Addition/removal of VNF and NS packages into the Catalog
  - Instantiation and termination of NS instances.
  - Update operations on running NS instances (start/stop VNF instance)
- 22 bugs collected, many already fixed

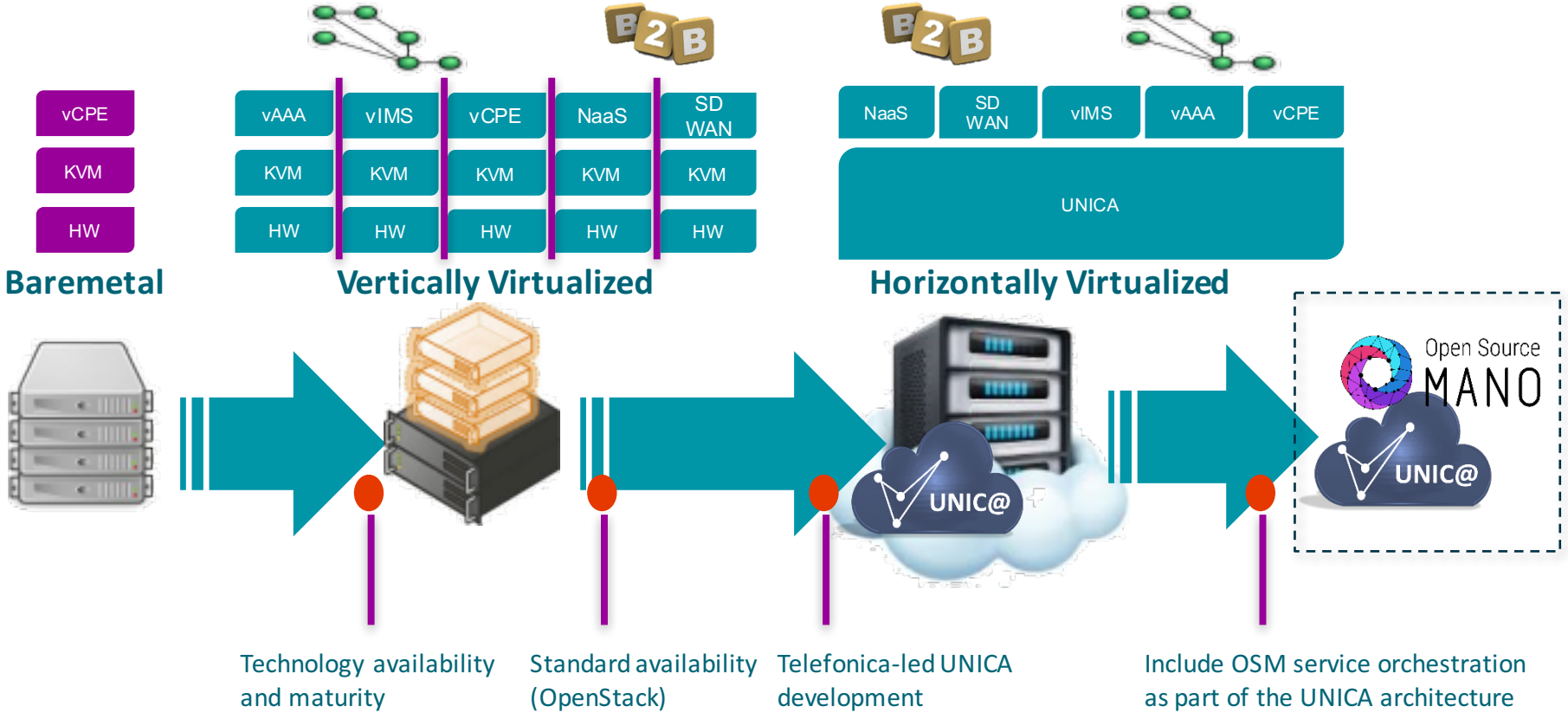
IOP MATRIX

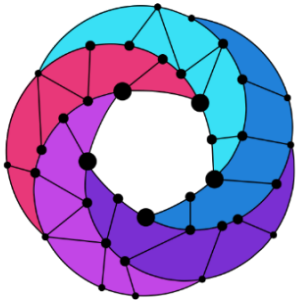
- OSM passed successfully all scheduled tests
  - All VNFs, all VIMs
  - Most time spent on creation and debugging of descriptors

		OpenStack Newton	OpenStack Newton	OpenStack Kilo	OpenVIM	OpenStack+ODL	OpenStack+ODL	OpenStack Mitaka		OpenStack Mitaka w/ regions	OpenStack Mitaka w/ regions	
		VIM 1	VIM 2	VIM 3	VIM 4	VIM 5	VIM 6	VIM 7	VIM 8	VIM 9	VIM 10	
FW	VNF 1		Ok						Ok			2
LB	VNF 2							Ok				1
Probe	VNF 3		Ok	Ok					Ok			3
IMS	VNF 4		Ok									1
FW	VNF 5								Ok	Ok		2
Enterprise Messaging	VNF 6								Ok	Ok		2
Probe	VNF 7		Ok	Ok					Ok (minor issue with LCM update)	Ok	Ok	5
PCRF	VNF 8					Ok						1
FW	VNF 9							Ok				1
Probe/LB	VNF 10						Ok		Ok			2
DPI	VNF 11						Ok					1
SBC	VNF 12	Ok			Ok					Ok		3
Tester	VNF 13					Ok			Ok	Ok		3
Tester	VNF 14							Ok		Ok		2
Probe	VNF 15		Ok						Ok	Ok		3
		1	5	2	1	2	2	3	8	7	1	**32**

  - Blank = combinations not tested during the Plugtests (likely to work)
    - Note that all VNFs and VIMs were assigned at least once

FACILITATING HORIZONTAL VIRTUALIZATION





Open Source
MANO

Find out more and come join the party at

osm.etsi.org