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UPB — Computer Networks Group

Management of ServiCes Across MultipLE clouds

SCrAMbLE — Work Packages Demo

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Agenda

1. Introduction
2. Adaptor Demo
3. Translator Demo
4. Splitter Demo
5. Conclusion

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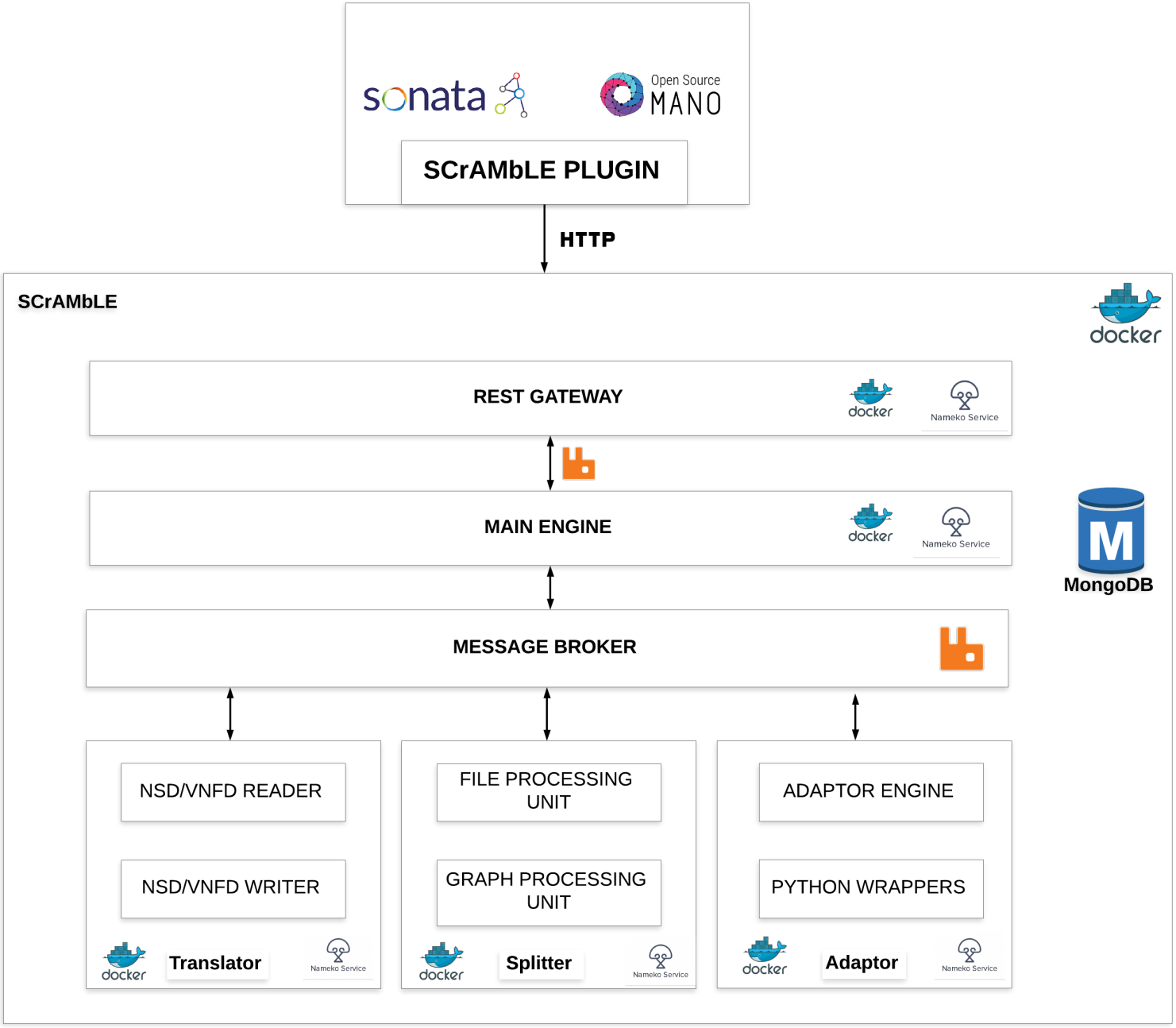
SCrAMbLE - Requirements and Architecture

- Service descriptor translator
  - Translate between MANO frameworks
- Service descriptor splitter
  - Translate between MANO frameworks
- MANO adaptor
  - Scalability support


sonata
Open Source MANO
SCrAMbLE PLUGIN
HTTP
SCrAMbLE
docker
REST GATEWAY
docker
Nameko Service
MAIN ENGINE
docker
Nameko Service
MongoDB
MESSAGE BROKER
NSD/VNFD READER
NSD/VNFD WRITER
docker
Translator
Nameko Service
FILE PROCESSING UNIT
GRAPH PROCESSING UNIT
docker
Splitter
Nameko Service
ADAPTOR ENGINE
PYTHON WRAPPERS
docker
Adaptor
Nameko Service

ADAPTOR

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Adaptor Design

- Common Interface

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Adaptor Design

- Common Interface
  - Python Base Class

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Adaptor Design

- Common Interface
  - Python Base Class
  - Semi-automated generation from ETSI Document

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A

210 lines (154 sloc) | 5.05 KB

Raw Blame History

```python
""" Common Interface - nsd

Reference interface to implement REST API Wrappers
for MANO Frameworks Defined according to the
ETSI GS NFV-SOL 005  V2.4.1 (2018-02).

Defines abstract methods which are to be implemented
by the wrappers.
"""

from abc import ABC, abstractmethod


class CommonInterfaceNsd(ABC):
    """
    NSD Management Interfaces

    Base: {apiRoot}/nsd/v1
    """

    @abstractmethod
    def get_ns_descriptors(self):
        """ NSD Management Interface - NS Descriptors

        /ns_descriptors
            GET - Query information about multiple
                    NS descriptor resources.
        """
        pass

```

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Adaptor Design

- Common Interface
  - Python Base Class
  - Semi-automated generation from ETSI Document
  - ...
- Highly Documented

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Adaptor Design

- Common Interface
  - Python Base Class
  - Semi-automated generation from ETSI Document
  - ...
- Highly Documented
  - Very important aspect of Adaptor

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Adaptor Design

- Common Interface
  - Python Base Class
  - Semi-automated generation from ETSI Document
  - ...
- Highly Documented
  - Very important aspect of Adaptor
  - Tracked on excel sheet

Adaptor Design

VNF PACKAGE MANAGEMENT INTERFACE								
Resource name	**HTTP method**	**Meaning**	**SCrAMbLE common interface methods**	**OSM-R5 endpoint**	**SONATA-3 endpoint**	**SCrAMbLE endpoint**	**OSM-R5 Adaptor**	**SONATA-3 Adaptor**
VNF packages	GET	Query VNF packages information	get_vnf_packages	/vnfpkgm/v1/vnf_packages_content	/catalogues/api/v2/vnfs	/vnfpkgm/v1/vnf_packages		
	POST	Create a new individual VNF package resource	post_vnf_packages	/vnfpkgm/v1/vnf_packages_content	/catalogues/api/v2/vnfs	/vnfpkgm/v1/vnf_packages		
Individual VNF package	GET	Read information about an individual VNF package	get_vnf_packages_vnfpkgid	/vnfpkgm/v1/vnf_packages_content/{vnfpkgid}	/catalogues/api/v2/vnfs{vnfpkgid}			
	PATCH	Update information about an individual VNF package	patch_vnf_packages_vnfpkgid					
	DELETE	Delete an individual VNF package	delete_vnf_packages_vnfpkgid	/vnfpkgm/v1/vnf_packages_content/vnfpkgid	/catalogues/api/v2/vnfs{vnfpkgid}			
VNFD of an individual VNF	GET	Read VNFD of an on-boarded VNF package	get_vnf_packages_vnfpkgid_vnfd	/vnfpkgm/v1/vnf_packages/{vnfpkgid}/vnfd				
VNF package content	GET	Fetch an on-boarded VNF package	get_vnf_packages_vnfpkgid_package_content	/vnfpkgm/v1/vnf_packages/{vnfpkgid}/package_content				
	PUT	Upload a VNF package by providing the content of the VNF	put_vnf_packages_vnfpkgid_package_content	/vnfpkgm/v1/vnf_packages/{vnfpkgid}/package_content				
Upload VNF package from URI	POST	Upload a VNF package by providing the address information of	post_vnf_packages_vnfpkgid_package_content					
IndividualVNF package artifact	GET	Fetch individual VNF package artifact	get_vnf_packages_vnfpkgid_artifacts_artifactpat	/vnfpkgm/v1/vnf_packages/{vnfpkgid}/artifacts				
Subscriptions	POST	Subscribe to notifications related to on-boarding and/or changes of VNF	post_vnf_packages_subscriptions					
	GET	Query multiple subscriptions	get_vnf_packages_subscriptions					

Implemented in Mano Adaptor

- ...

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Adaptor REST API

- Adaptor follows ETSI endpoints

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- Adaptor follows ETSI endpoints
  - Unified access to MANO instances

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  - Enforce if a MANO is using non-standard endpoint

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Adaptor REST API

- Adaptor follows ETSI endpoints
  - Unified access to MANO instances
  - Enforce if a MANO is using non-standard endpoint
- **MANO**: parameter sent with each request

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Adaptor REST API

- Adaptor follows ETSI endpoints
  - Unified access to MANO instances
  - Enforce if a MANO is using non-standard endpoint
- **MANO**: parameter sent with each request
  - Currently supports **OSM** and **Sonata**

DEMO —>

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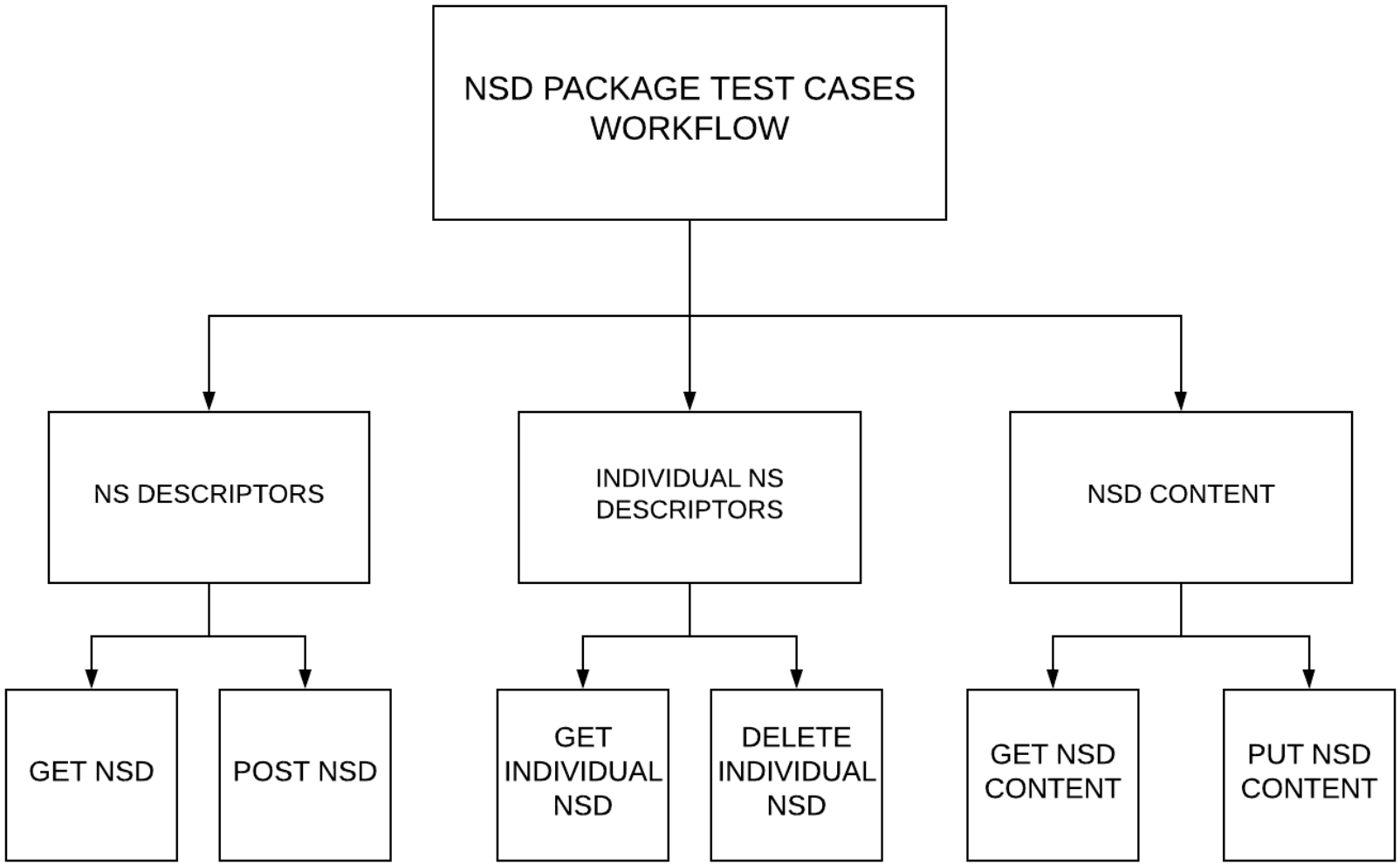
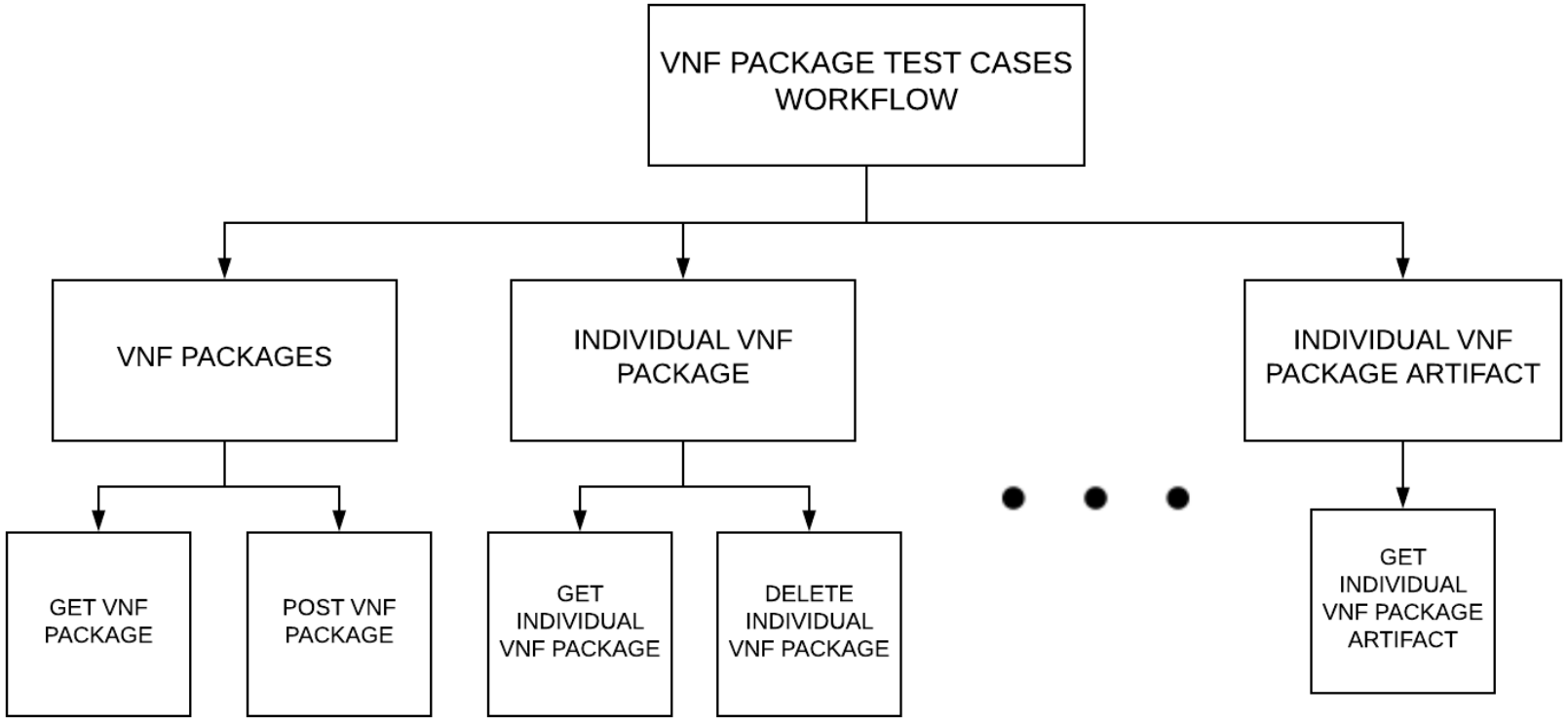
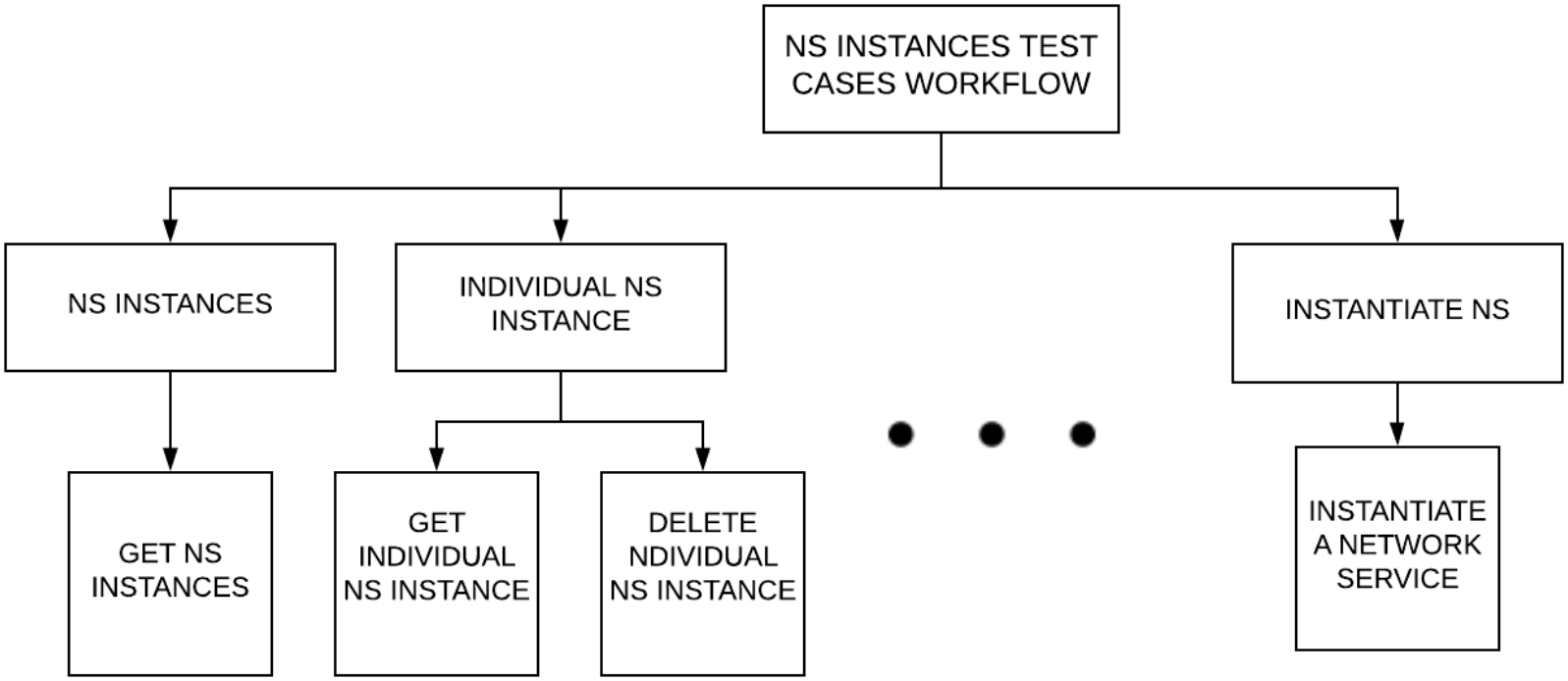
Test cases

- Test-driven development
- Around 60 test cases are running

DEMO —>


NSD PACKAGE TEST CASES WORKFLOW
NS DESCRIPTORS
INDIVIDUAL NS DESCRIPTORS
NSD CONTENT
GET NSD
POST NSD
GET INDIVIDUAL NSD
DELETE INDIVIDUAL NSD
GET NSD CONTENT
PUT NSD CONTENT


VNF PACKAGE TEST CASES WORKFLOW
VNF PACKAGES
INDIVIDUAL VNF PACKAGE
INDIVIDUAL VNF PACKAGE ARTIFACT
GET VNF PACKAGE
POST VNF PACKAGE
GET INDIVIDUAL VNF PACKAGE
DELETE INDIVIDUAL VNF PACKAGE
GET INDIVIDUAL VNF PACKAGE ARTIFACT


NS INSTANCES TEST CASES WORKFLOW
NS INSTANCES
INDIVIDUAL NS INSTANCE
INSTANTIATE NS
GET NS INSTANCES
GET INDIVIDUAL NS INSTANCE
DELETE NDIVIDUAL NS INSTANCE
INSTANTIATE A NETWORK SERVICE

MANO Scalability Investigation

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Scalability of a system

- Scaling Approaches
  - Service Replication
  - Proactive and Reactive Scaling
  - Heirarchical scaling

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Scalability of a system

- Scaling Approaches
  - Service Replication
  - Proactive and Reactive Scaling
  - Heirarchical scaling
- Scaling effects
  - Reliability
  - Availability
  - Heterogeneity

What Next?

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What next?

Work in progress

- MANO as a NS — **25%**
- Scalability Investigation — **25%**
- Code review and bug fixes — **50%**

Next in pipeline

- Co-ordinate with OSM, 5G Tango, OpenBaton...
- Scalability Manager

TRANSLATOR

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Aim of Translator Service

Translator receives as input descriptor files to be translated and parameters, such as ”Osm-to-Sonata” if OSM descriptor has to be translated to Sonata or ”Sonata-to-osm” if Sonata descriptor has to be translated to OSM. The output of the translator is a translated descriptor as per the parameter

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Working of Translator Service

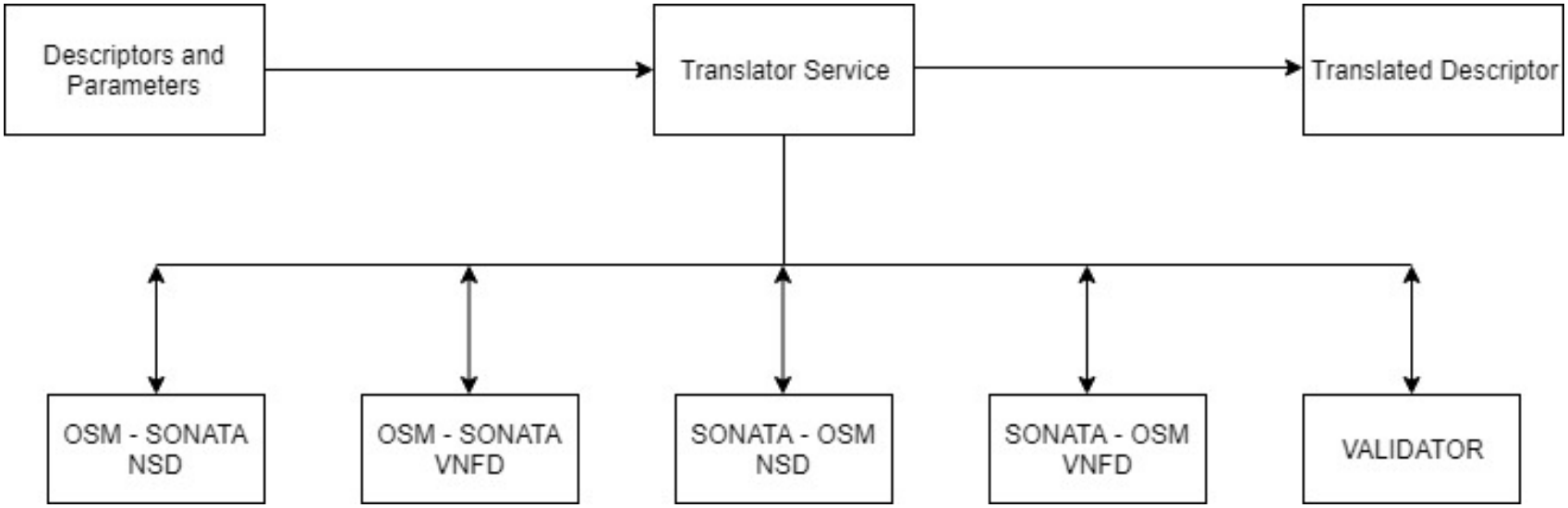

Figure: processing of descriptor file within translator

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Milestone and challenges

Milestone:

- The translator can successfully translate simple NSD and VNFD descriptors and validate them.

Challenges:

- Translation: have to work on additional properties such as ”monitoring parameters”, ”forwarding graphs”.
- Validation: Issue with OSM descriptor validation

SPLITTER

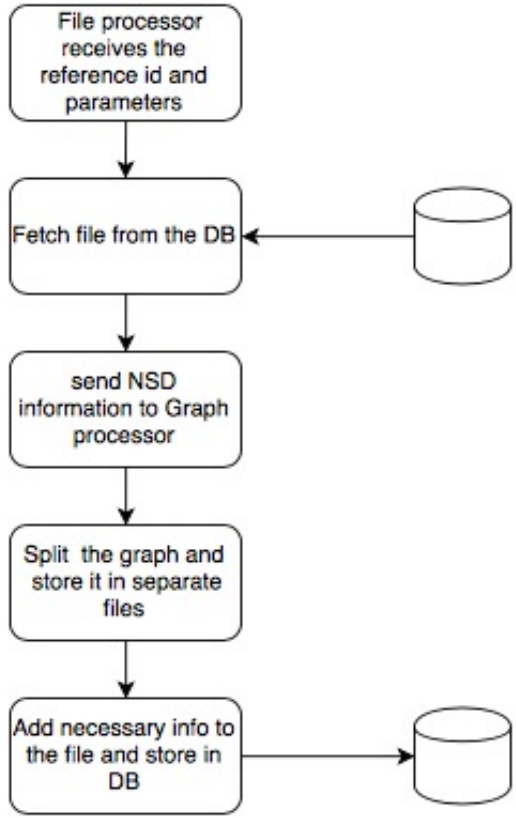

Figure: Work-flow of Service Descriptor Splitter

Splitting of SONATA NSD

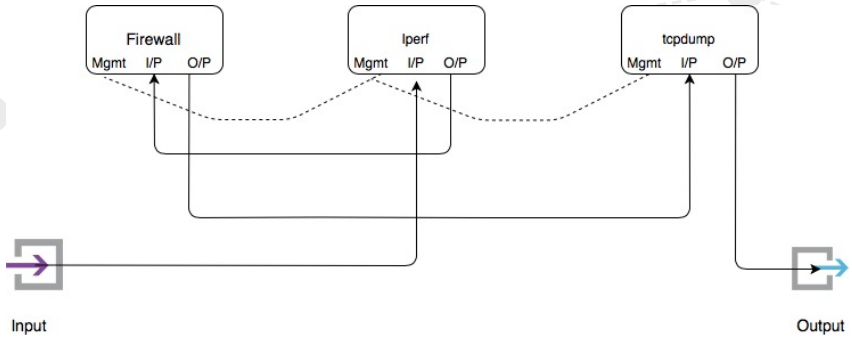

Figure: Forwarding-Graph of Sonata NSD

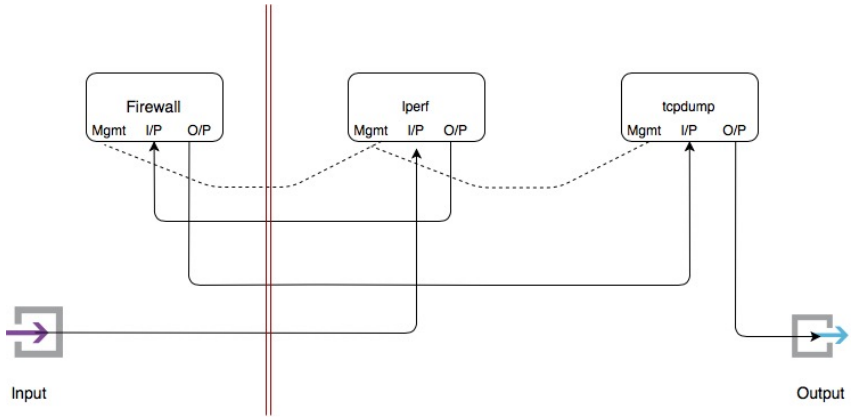

Figure: Splitting criteria

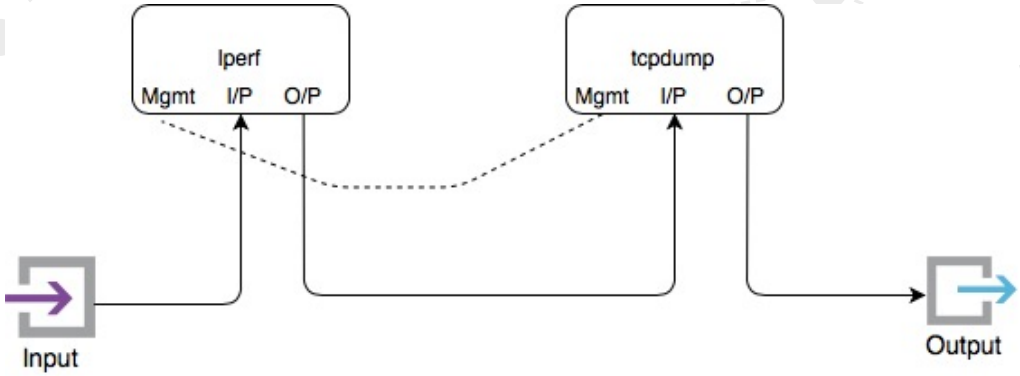

Figure: Graph of iperf and tcpdump NSD

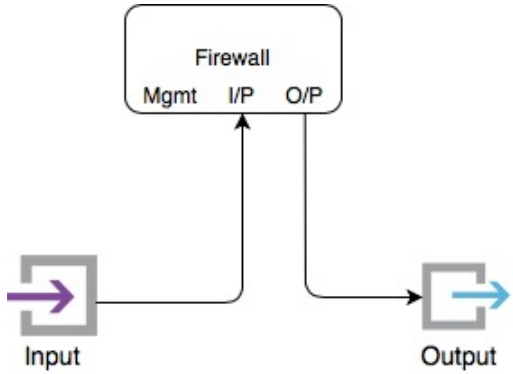

Figure: Graph of Firewall NSD

DEMO —>

Splitting of OSM NSD

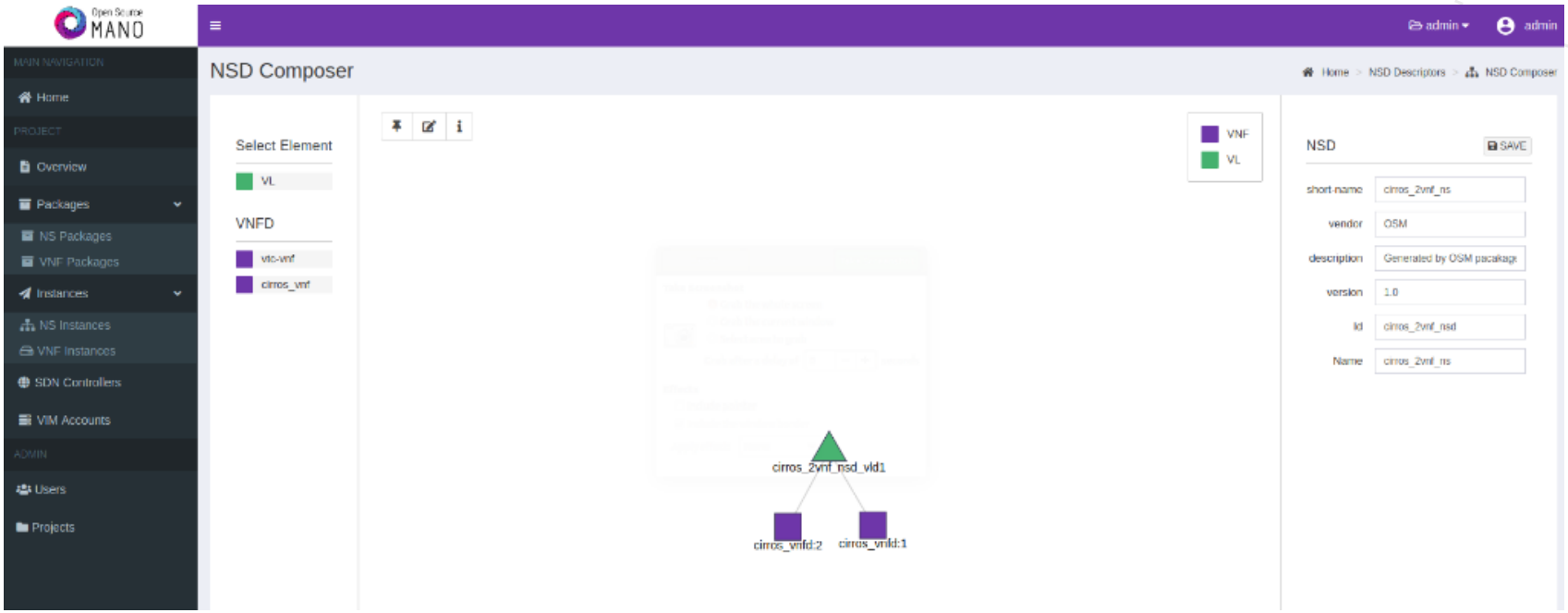

Figure: Forwarding Graph with two VNFs

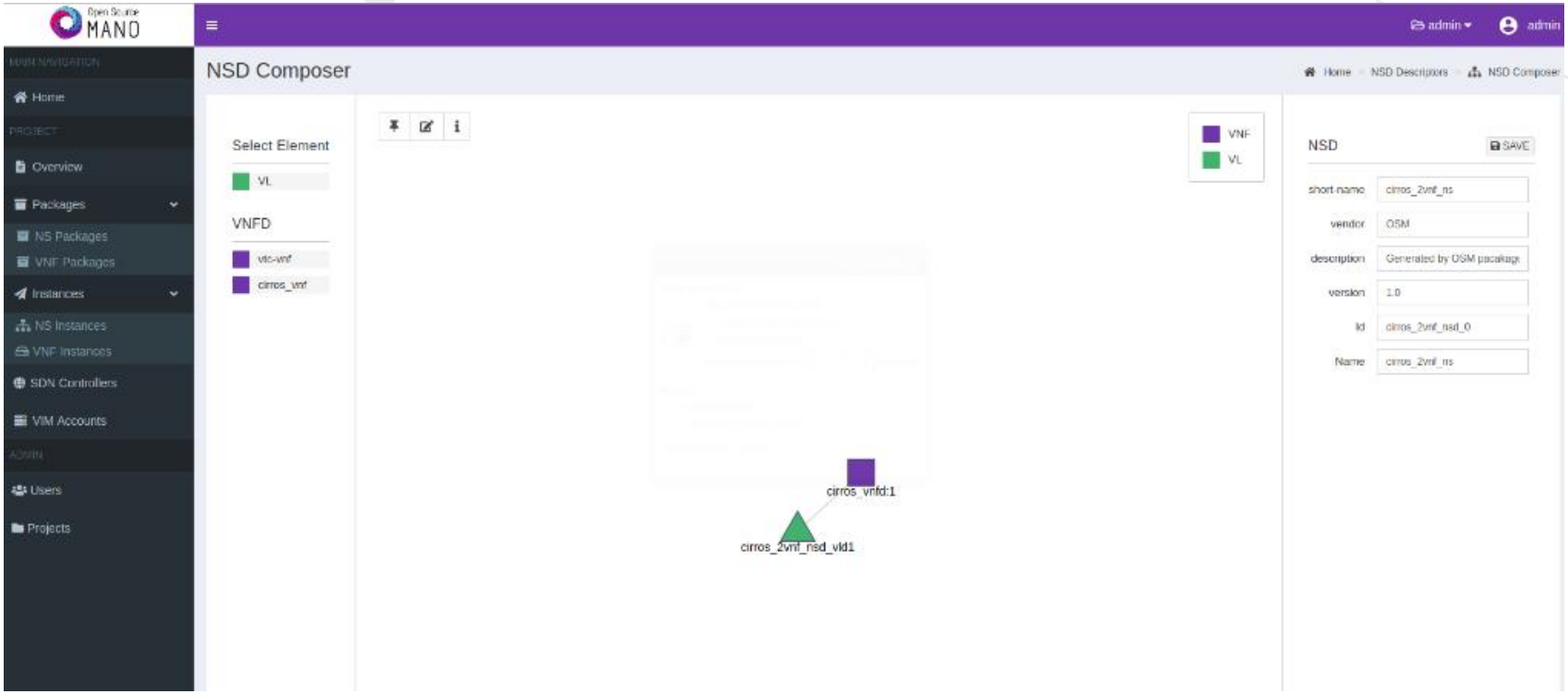

Figure: Graph of cirros_vnfd:1

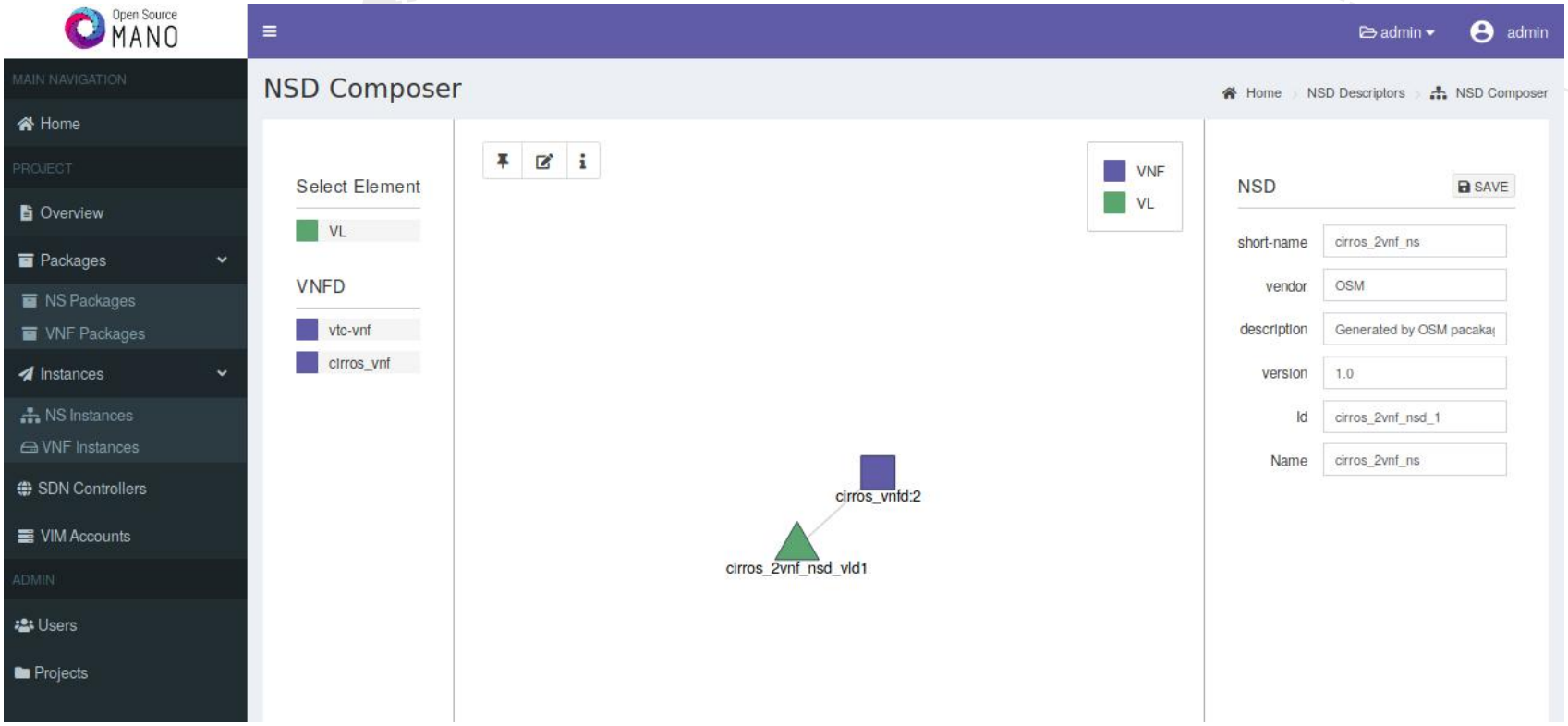

Figure: Graph of cirros_vnfd:2

DEMO —>

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Conclusion

- Code review and bug fixes
- Integration of all WPs
- Plug-in development for SONATA and OSM