Exploration and Practice in Automated Testing
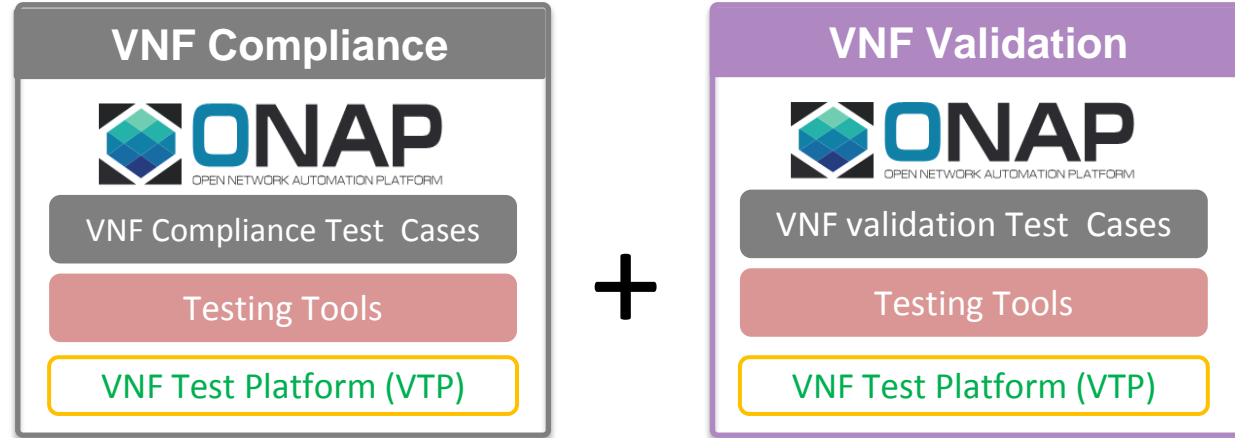
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LFN 2020 June Virtual Developer & Testing Forum

Part 1:   Exploration and Practice of Automated Testing in LFN

OVP VNF Compliance and Validation Testing with ONAP
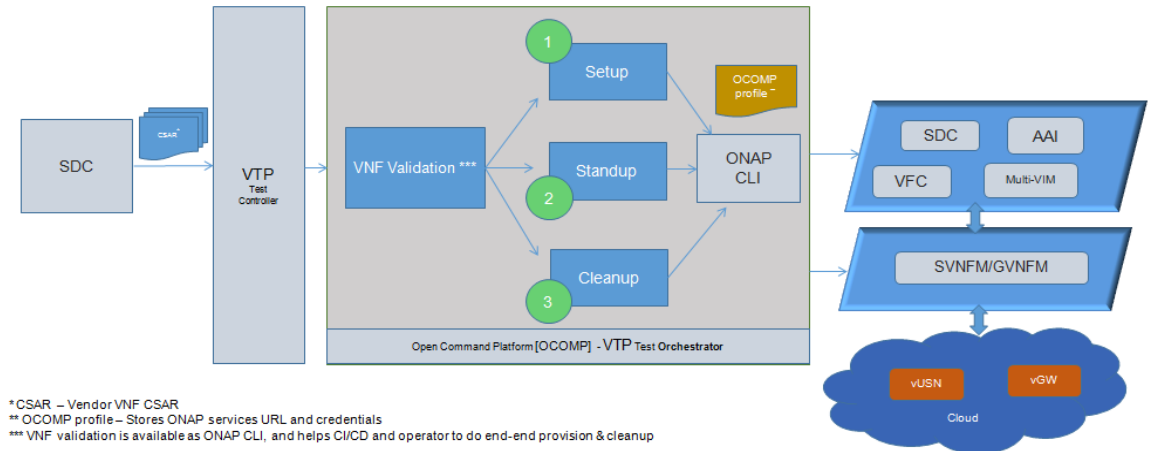
The demo shown on 2019 ONS EU

NFV Testing Automation Survey in EUAG

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- **Participants**：EUAG Group
- **Response**：5 participants，anonymous
- **Design of survey : 34** Questions
- **Content Category:** 1. Testing process and content 2.Testing Participants and Collaboration 3.Test Restrictions 4.Changes of NFV Network Element Access Test 5. Status and Requirements of Test Automation 6. Community Work Requirements

Changes of NFV network element access test
- Increased test types and frequency
  Resource pool tests and network element tests are usually conducted separately and pairing tests are needed
- Shorter upgrade cycle:
  Upgrade cycle is shortened from half-year to 2 ~ 3 weeks (1 ~ 2 months)

Limiting factors for NFV access test
- Test environment in short supply
- Long approval process for access test
- Insufficient stability of the production environment

Optimization of NFV access test
- The functional testing and performance testing of Testbed/lab test are usually necessary
- Specific optimization measures can include:
  Establish common test resource pool
  Introduce automated tools and DevOps technology
  Provide integrated standards for third-party test tools and test scripts

Status and requirements of test automation
- Test environment setup is the highest priority of automation requirements
- Automatic configuration of network element is the most urgent problems to be solved in life cycle test and business function test

DevOps application status and cooperation mode
- Some operators have introduced DevOps tools, and all operators hope to achieve full-automatic DevOps closed loop
- The DevOps cooperation mode is VNF vendors provide VNF software packages and operators implement CI/CD in their own DevOps environment.

Significance of LFN OVP certification project for operators
- The value of the LFN OVP certification program to operators is mainly reflected in building the automated test framework and test case executors together
- For the enhancement of OVP automated test functions, the top priorities are topology design, test environment setup. test execution , Test analysis

Testing Automation DevOps Prototype with OVP+ONAP

Function mapping with ONAP components

- Test Topology Design - ONAP SDC
- Test Environment Deploy - ONAP Orchestrator(SO、VF-C、APPC)
- Test Task Execution - ONAP VTP(VNFSDK, VVP)
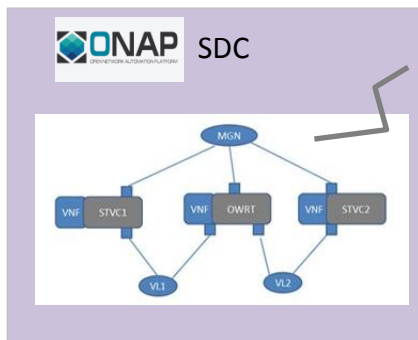- Test Result Certificate - OVP
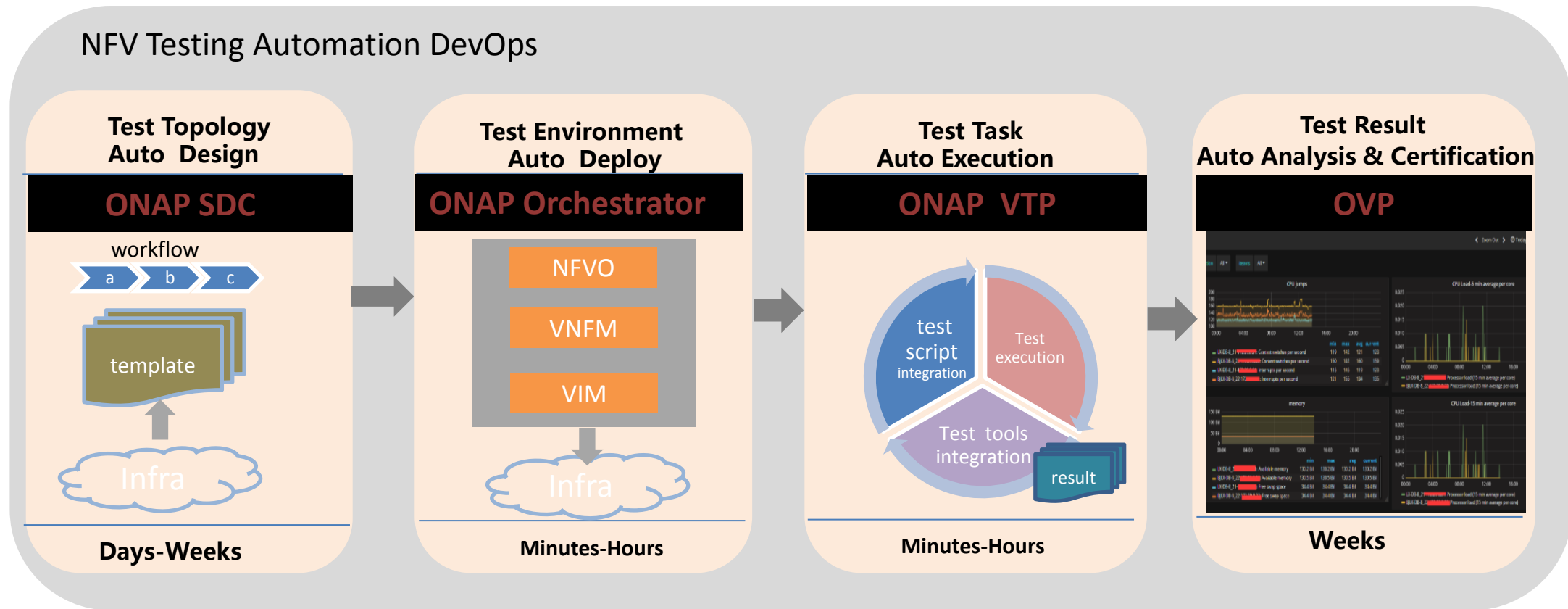
Role-based VNF End to End Testing Workflow

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Step1 Test topology design

Test Designer

Test designer either uses the existing test case models from VTP or create new test cases model and uses them for creating test flow, finally upload them to VTP with NS ID tag

Step2 Test Case Model Definition and Development

Test Case Developer

Test developer implements the required test cases based model designed by test designer. And maintain it with VTP

```
class SimpleRunTest(object):
    def __init__(self, labserver_ip,
                 dut_left_ip, dut_right_ip):
        self.labserver_ip = labserver_ip
        self.west_stcv = {
            "mgmt_ip": stcv_west_mgmt_ip,
            "test_port_ip": stcv_west_test_port_ip,
            "gw_ip": dut_left_ip,
            "port_location": "//" + stcv_west_mgmt_ip + "/1/1".
            "result": None
        }
        self.east_stcv = {
            "mgmt_ip": stcv_east_mgmt_ip,
            "test_port_ip": stcv_east_test_port_ip,
            "gw_ip": dut_right_ip,
            "port_location": "//" + stcv_east_mgmt_ip + "/1/1".
            "result": None
        }
```
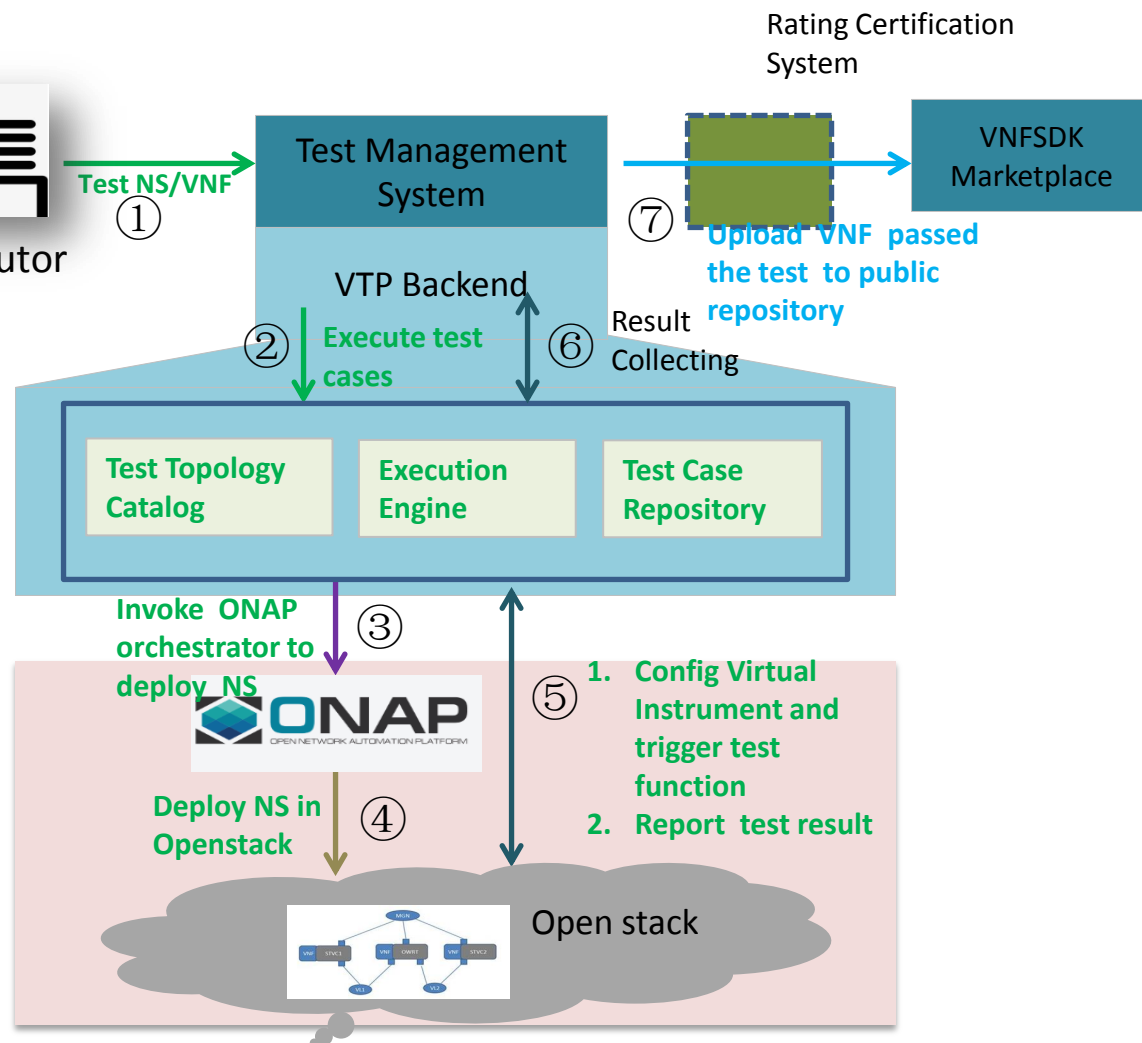
ONAP SDC

SDC Sync NS Topology with VFC (onboard to VF-C catalog)

Upload NS test flow to VTP

Import Test Case to VTP

Step3 Test Case Execution

Rating Certification System

Test Executor

Test NS/VNF ①

Test Management System

⑦ Upload VNF passed the test to public repository

VNFSDK Marketplace

VTP Backend

② Execute test cases

Result Collecting ⑥

Test Topology Catalog | Execution Engine | Test Case Repository

Invoke ONAP orchestrator to deploy NS ③

ONAP

⑤
1. Config Virtual Instrument and trigger test function
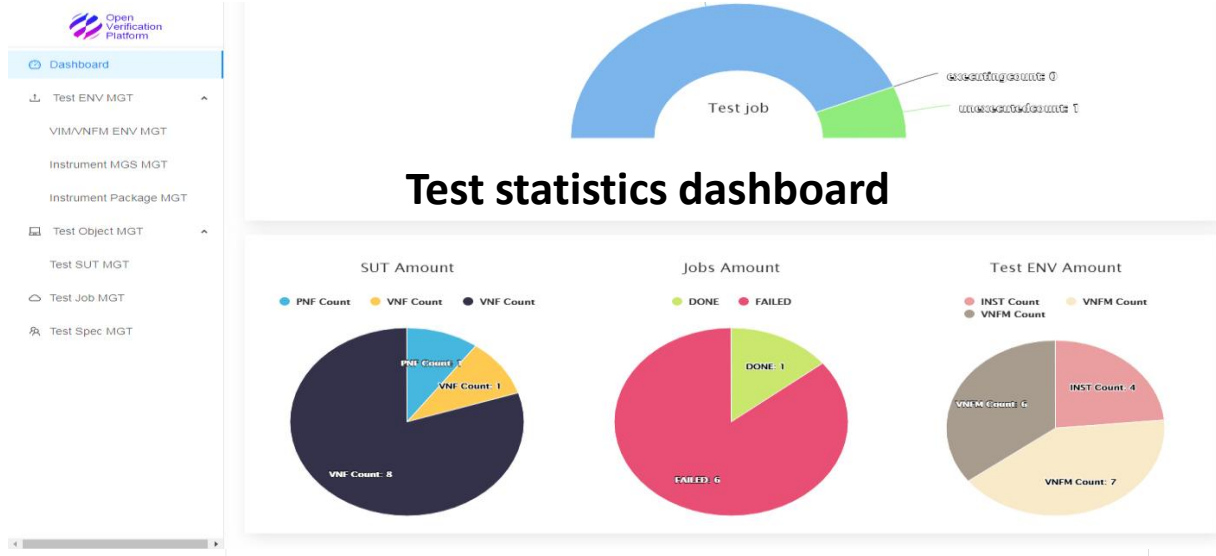2. Report test result

Deploy NS in Openstack ④

Open stack

Standalone Test Management System

Developing independent test management system to improve the usability of VTP test framework

Test statistics dashboard

Test case and specification management

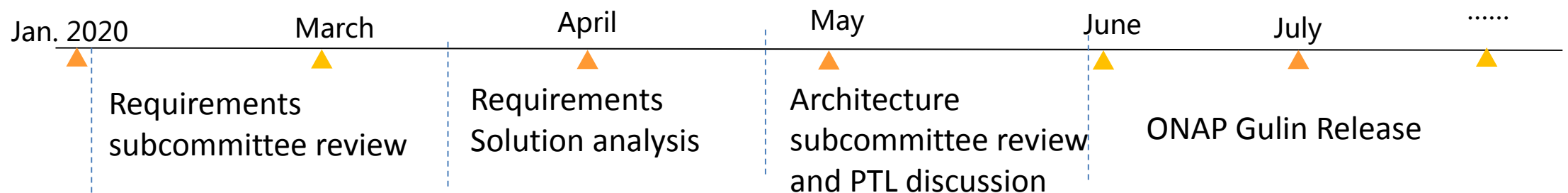Test Job Management

Test Result Show

Testing Automation Requirements in ONAP Gulin Release

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Goal : Provide common test platform through the augment of ONAP components to support VNF/CNF/Service automated testing.

https://wiki.onap.org/display/DW/Guilin+release+-+functional+requirements+proposed+list

TimeLine:

| Jan. 2020 | March | April | May | June | July | ...... |

Requirements subcommittee review

Requirements Solution analysis

Architecture subcommittee review and PTL discussion
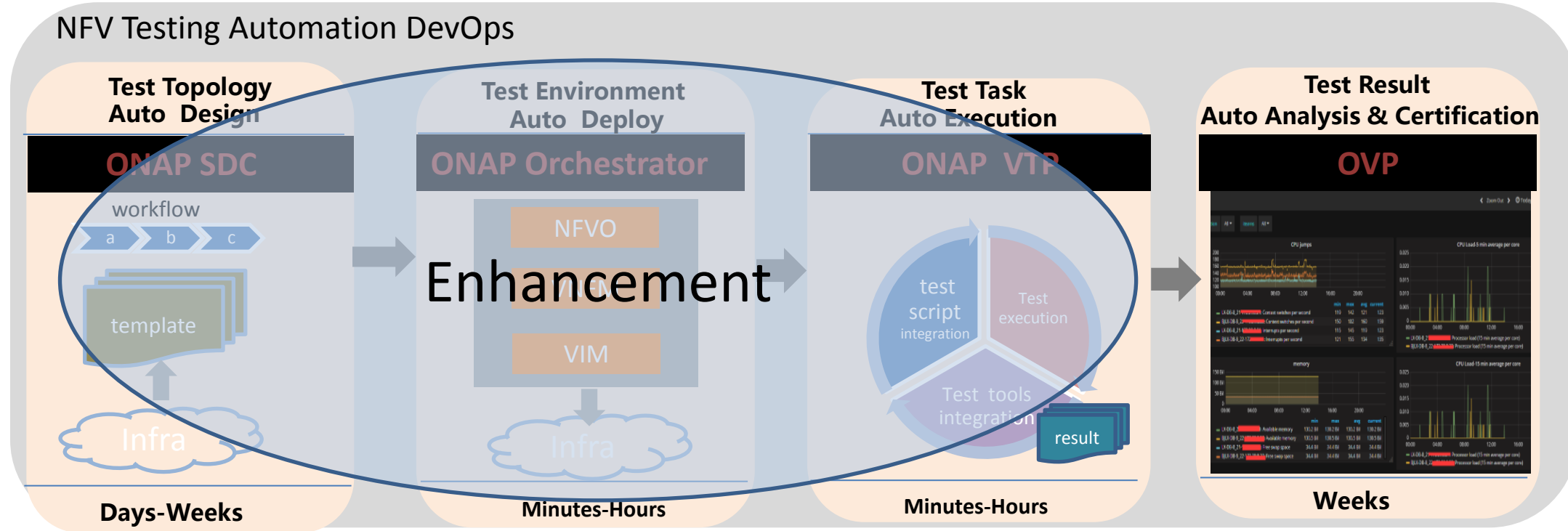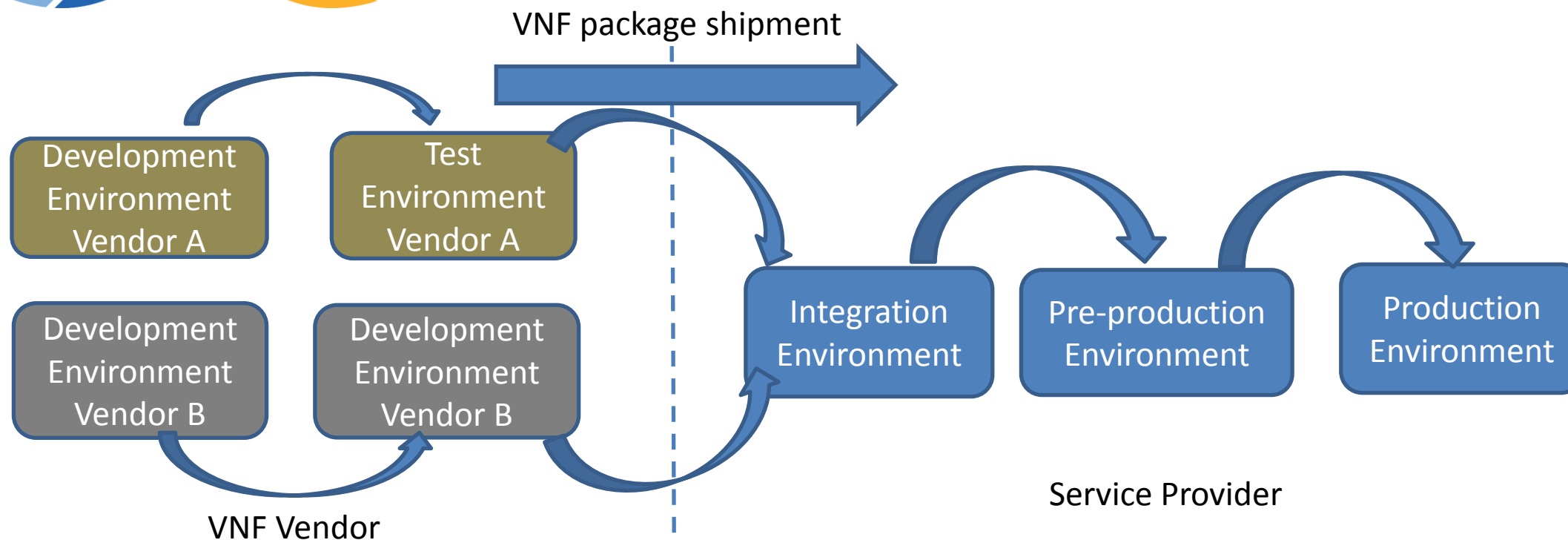
ONAP Gulin Release

Part 2: Exploration and Efforts of Automated Testing in ETSI NFV

Joint CI/CD Pipeline in NFV Context

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DevOps represents a cultural shift that stresses collaboration between the business, developers, and IT professionals. Software test automation can enhance these connections and help organizations achieve desired SDLC acceleration.
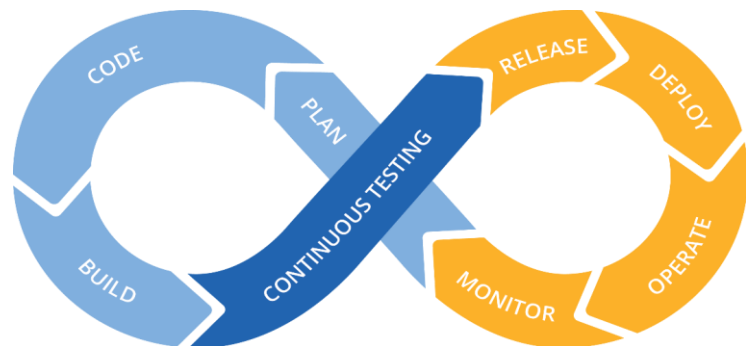

Establishing DevOps joint pipeline between NFV software provider and operator to achieve joint agile development and delivery is the trend of cooperation between provider and operator in future.

VNF package shipment

Development Environment Vendor A	Test Environment Vendor A

Development Environment Vendor B	Development Environment Vendor B

Integration Environment

Pre-production Environment

Production Environment

VNF Vendor

Service Provider

ETSI NFV TST NWI: Standardised Test Case Description Template

- Standardize the input and output information used for automatic test execution and result analysis.
- Ensure test controller performs unified and effective test control of test cases from different providers.
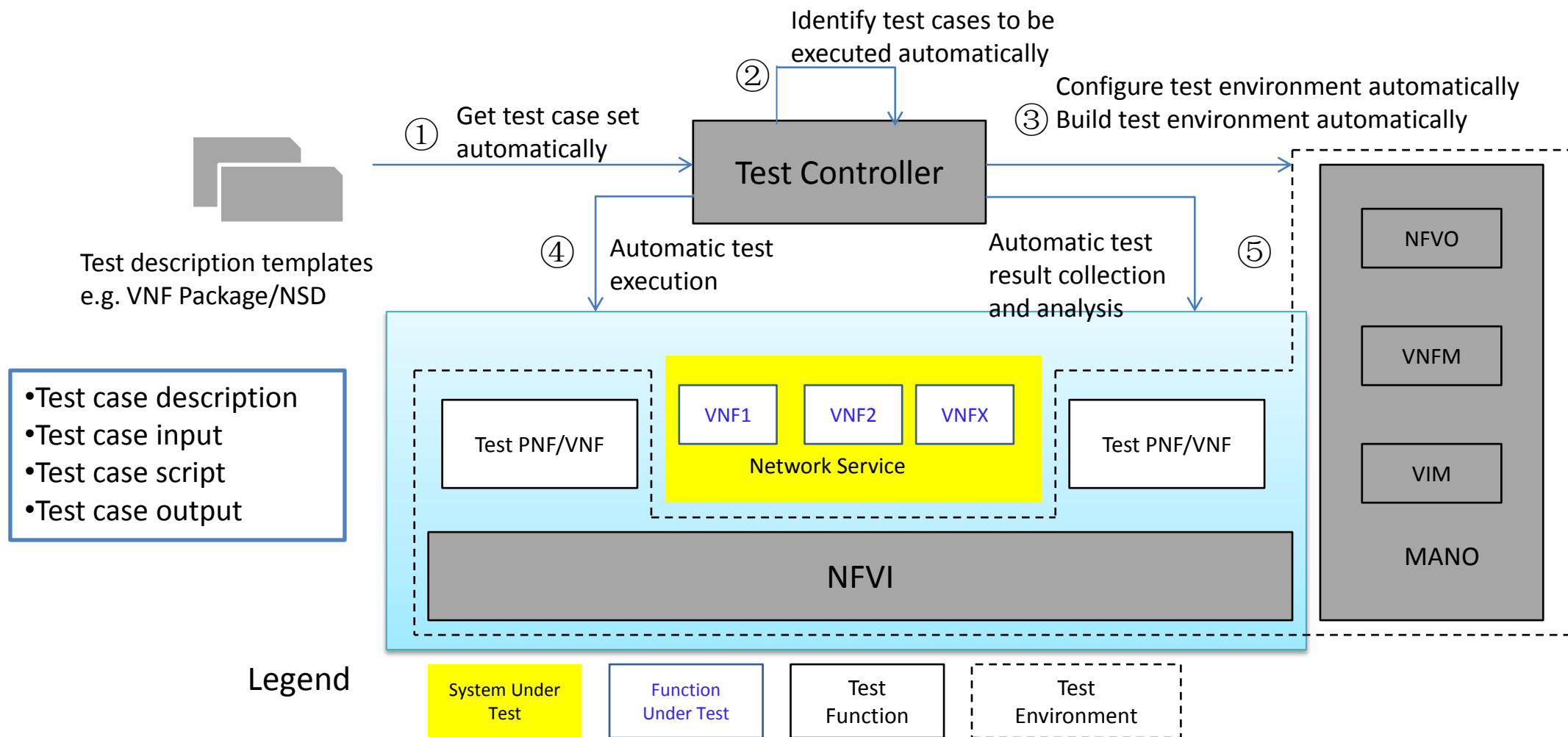
Automatic test execution flow under the control of a unified test controller

Feature Prime for ETSI NFV Rel4 Feat25 CI

Feat25 focuses on Cross-organizational Continuous VNF Delivery
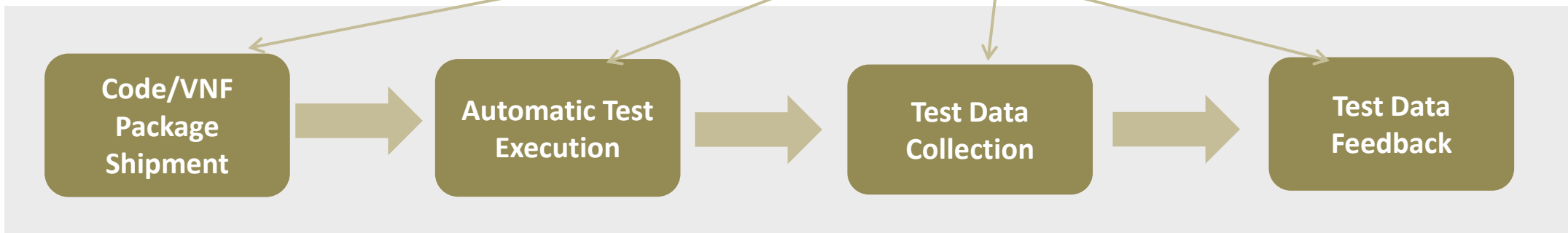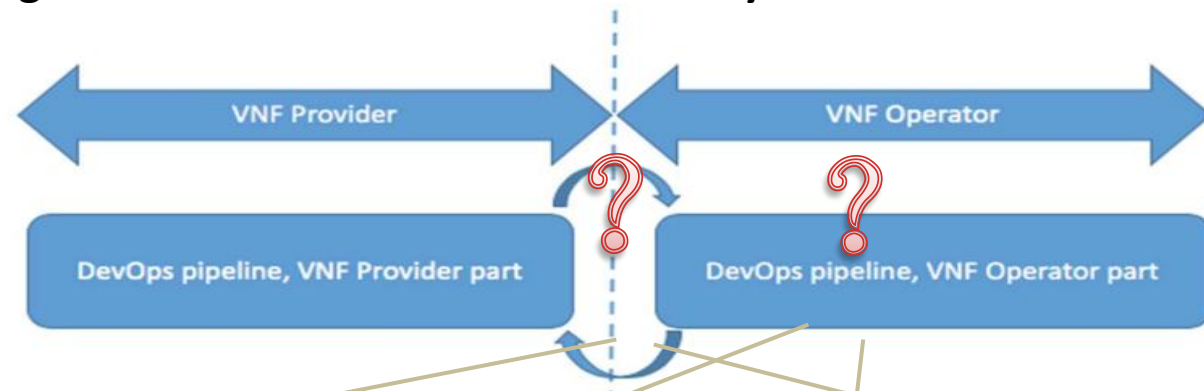

The following content needs to be standardized to realize Joint Pipeline

- Structure of a VNF Package including automated testing functionality
- Interface specification between a VNF provider and an VNF Operator for VNF delivery
- Extensions to the MANO stack for automatic testing and test data collection
- The feedback on test data from the VNF operator to the VNF provider

VNF CI DevOps Scenarios

Two DevOps scenarios and processes integrated with NFV MANO.
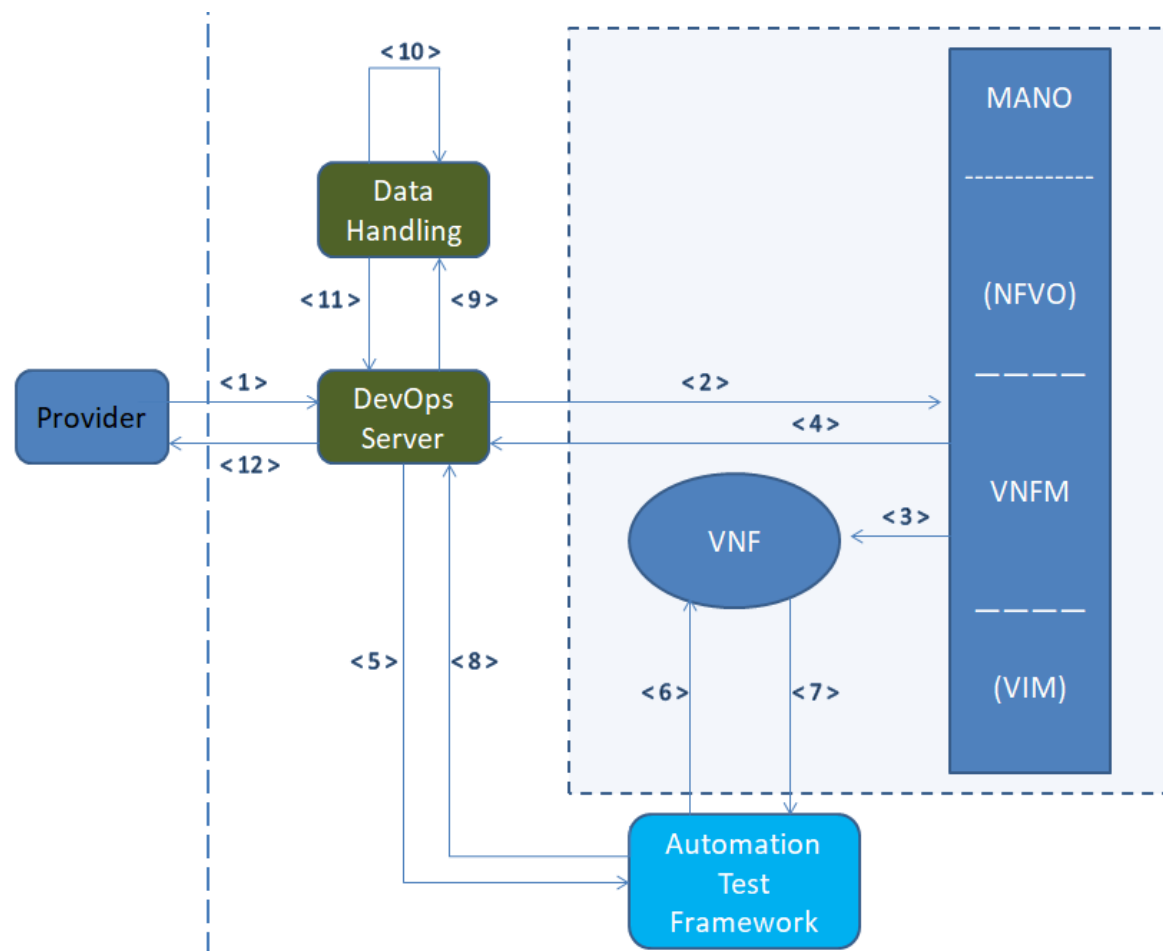
Scenario 1
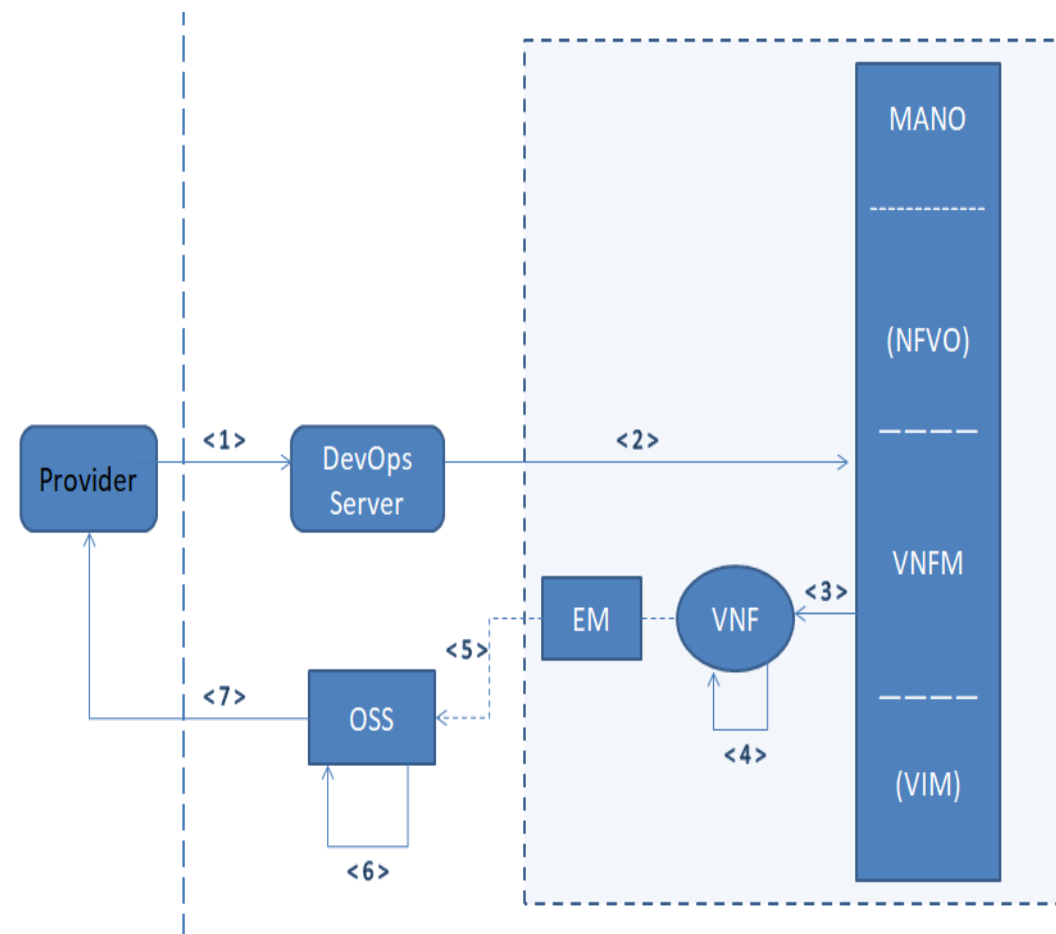
Scenario 2

LFN Internship Projects : ONAP ETSI NFV APIs conformance test for OVP VTP
(https://wiki.lfnetworking.org/pages/viewpage.action?pageId=33423631)

Integrate ETSI NFV APIs conformance test cases with LFN testing framework VTP

Thank You!

If you have more expertise for automated testing , continuous testing , DevOps & CI/CD, or you are interested in any of the above aspects, welcome to discuss with us.

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