

Open Source MANO

Demonstration of Zero-touch Device and L3-VPN Service Management using the TeraFlow Cloud-native SDN Controller



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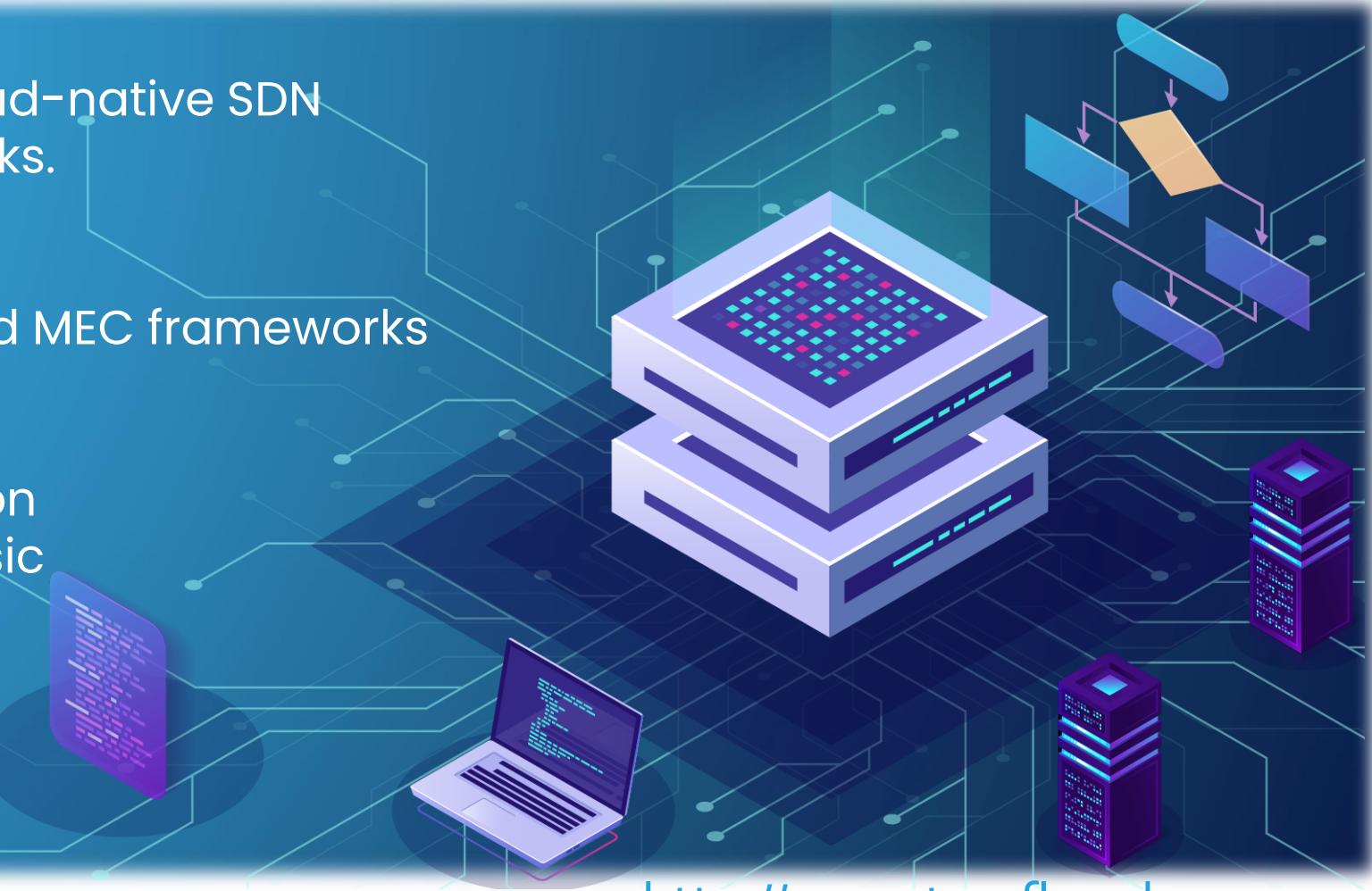
OSM-MR#12 Ecosystem Day, March 9th, 2022



H2020 TeraFlow project

TeraFlow will create a novel cloud-native SDN controller for beyond 5G networks.

- Integrate with current NFV and MEC frameworks
- Flow aggregation
- Service management
- Network equipment integration
- ML-based security and forensic
- Multi-tenancy



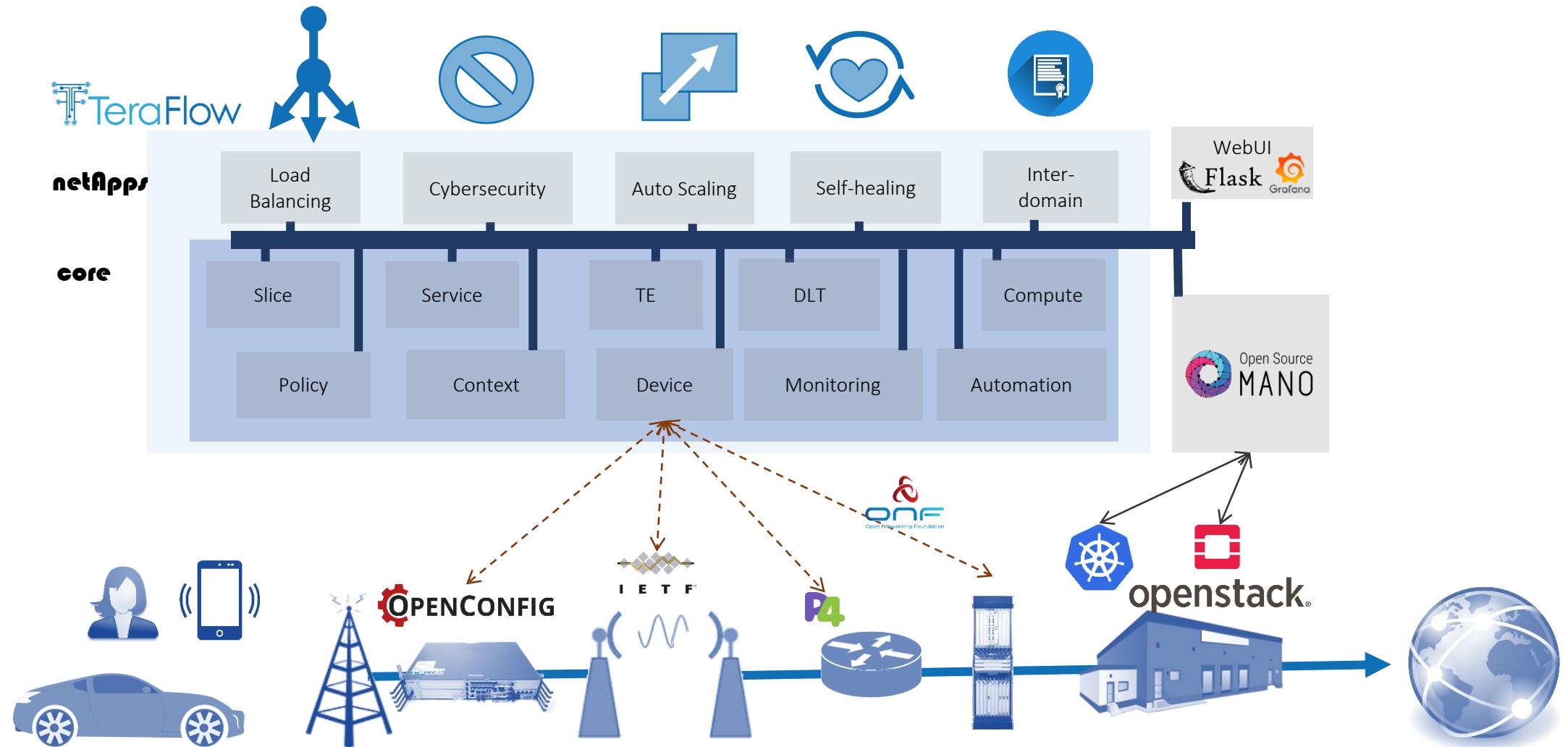
<http://www.teraflo-h2020.eu>

H2020 TeraFlow project

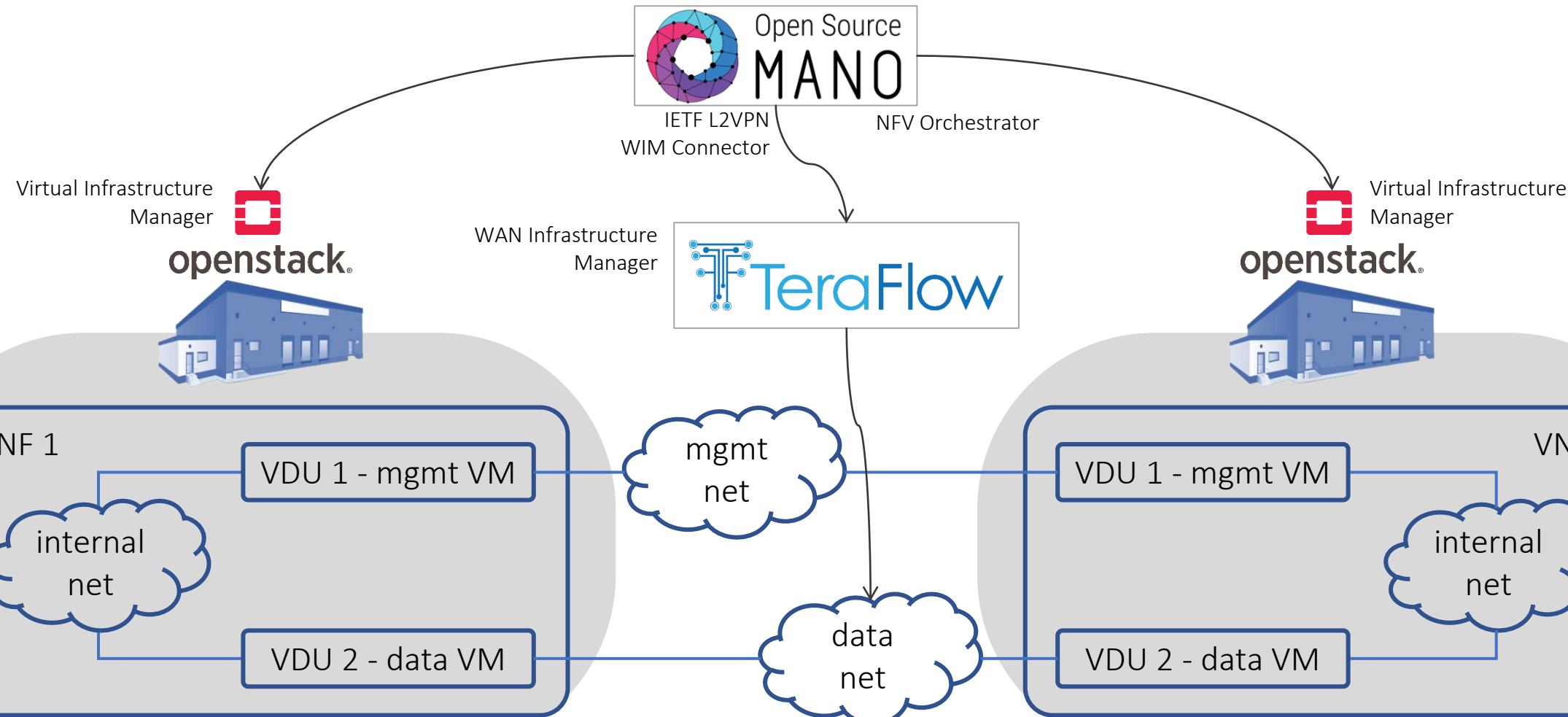


- ETSI TeraFlowSDN OSG (TFS)
 - Creation of OpenSource Group to ensure sustainability of the TeraFlow SDN controller after the H2020 TeraFlow project ends.
 - Collecting support from different ETSI groups that can benefit from the project:
 - OSM, MEC, mWT, ENI, PDL, ZSM, SAI, NFV...

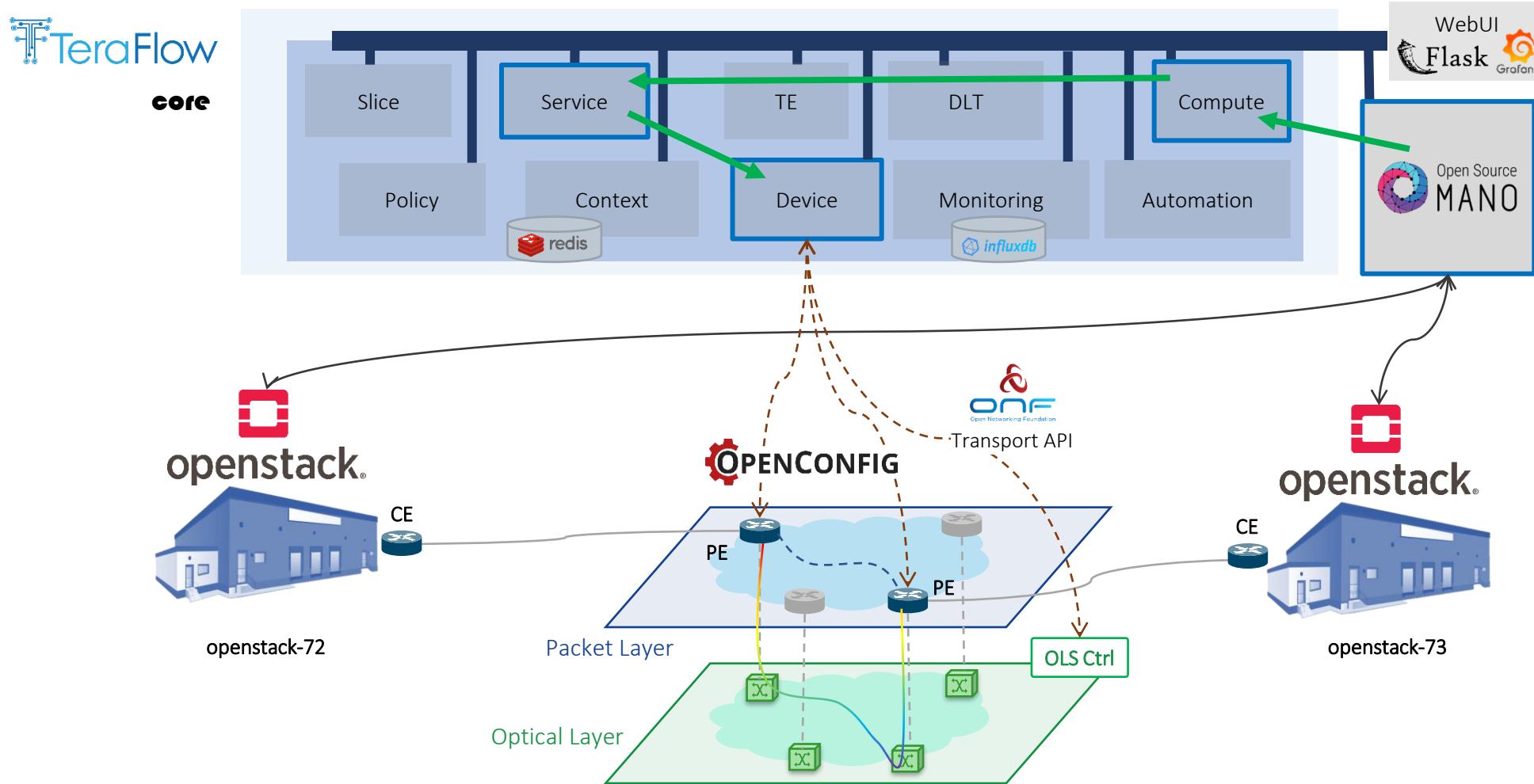
TeraFlow OS Architecture



Network Service



Testbed



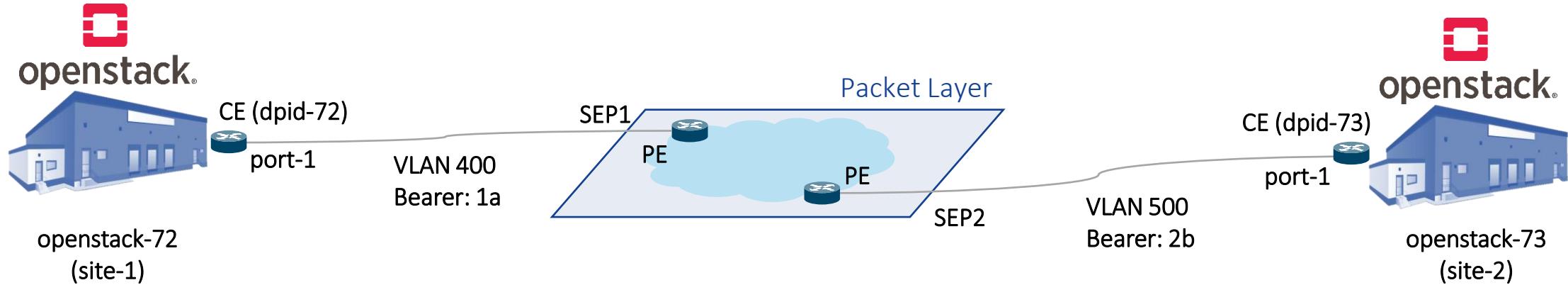
Create Multi-site NS

- **New LCM functionality:**

- Check if multiple VIMs are involved in a NS.
- Find WIM able to interconnect the VIMs.
 - If WIM specified, use specified one, do not infer a WIM.
- Populate RO task with params inferred from WIM port mapping.

```
osm ns-create --ns_name ms-ns --nsd_name hackfest_multivdu-ns --vim_account openstack-72 --config '{  
    vnf:[  
        {member-vnf-index: "1", vim_account: openstack-72},  
        {member-vnf-index: "2", vim_account: openstack-73}  
    ],  
    vld:[  
        {name: mgmtnet, vim-network-name: {openstack-72: mgmt72, openstack-73: mgmt73}},  
        {name: datanet, vim-network-name: {openstack-72: data72, openstack-73: data73}, wim_account: wim }  
    ]}'
```

WIM Port Mapping



- `datacenter_id: "openstack-72"`
- `device_id: "openflow:dpid-72"`
- `device_interface_id: "port-1"`
- `service_endpoint_id: "SEP1"`
- `service_mapping_info:`
- `site-id: "site-1"`
- `encapsulation:`
- `type: "dot1q"`
- `vlan: 400`
- `bearer:`
- `bearer-reference: "1a"`

- `datacenter_id: "openstack-73"`
- `device_id: "openflow:dpid-73"`
- `device_interface_id: "port-1"`
- `service_endpoint_id: "SEP2"`
- `service_mapping_info:`
- `site-id: "site-2"`
- `encapsulation:`
- `type: "dot1q"`
- `vlan: 500`
- `bearer:`
- `bearer-reference: "2b"`

WIM Parameters

RO Tasks:

```
// Tasks for openstack-72: images, flavors, DC networks, VDUs, ...
// Tasks for openstack-73: images, flavors, DC networks, VDUs, ...

// Task for the WIM:
{'action': 'CREATE', 'item': 'sdn_net', 'params': {

    'type': 'ELINE',

    'vlds': ['nsrs:<nsr_id>:vld.datanet'],

    'sdn-ports': [
        {
            'device_id': 'openstack-72', 'switch_id': 'openflow:dpid-72', 'switch_port': 'port-1',
            'service_endpoint_encapsulation_type': 'dot1q', 'service_endpoint_id': 'SEP1', 'vlan': 400},
        {
            'device_id': 'openstack-73', 'switch_id': 'openflow:dpid-73', 'switch_port': 'port-1',
            'service_endpoint_encapsulation_type': 'dot1q', 'service_endpoint_id': 'SEP2', 'vlan': 500}
    ]
}}
```

IETF L2VPN Requests (I)

- Create Connectivity Service

```
POST /restconf/data/ietf-l2vpn-svc:l2vpn-svc/vpn-services?  
{'ietf-l2vpn-svc:vpn-service': [{  
    'vpn-id': '<svc-id>', 'vpn-svc-type': 'vpws', 'svc-topo': 'any-to-any',  
    'customer-name': 'osm'}]}
```

- Add Endpoint to Connectivity Service (site-1, similar for site-2)

```
POST /restconf/data/ietf-l2vpn-svc:l2vpn-svc/sites/site=site-1/site-network-accesses/?  
{'ietf-l2vpn-svc:site-network-access': [{  
    'network-access-id': '<site-net-access-id>',  
    'vpn-attachment': {'vpn-id': '<svc-id>', 'site-role': 'any-to-any-role'},  
    'connection': {  
        'encapsulation-type': 'dot1q-vlan-tagged',  
        'tagged-interface': {'dot1q-vlan-tagged': {'cvlan-id': 400}}},  
    'bearer': {'bearer-reference': '1a'}  
}]}
```

IETF L2VPN Requests (II)



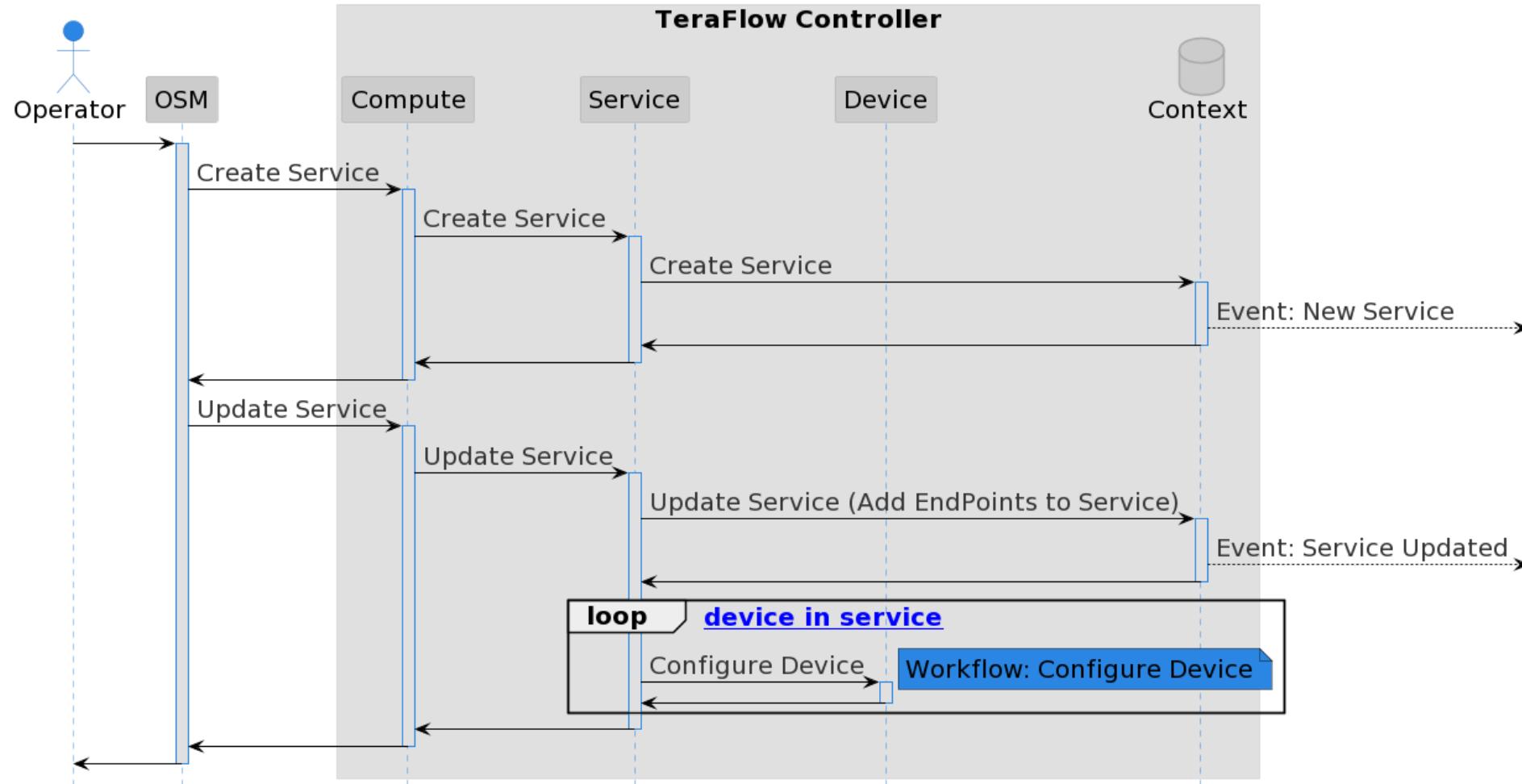
- Get Connectivity Service Status

```
GET /restconf/data/ietf-l2vpn-svc:l2vpn-svc/vpn-services/vpn-service=<svc-id>/?
```

- Delete Connectivity Service

```
DELETE /restconf/data/ietf-l2vpn-svc:l2vpn-svc/vpn-services/vpn-service=<svc-id>/?
```

Workflow: VPN Service Creation



Bug reports and fixes

- [Bug 1886] [OSMClient] Command wim-show shows password in clear.
 - Approved and Merged
- [Bug 1899] [RO] WIM is not properly selected by RO due to multiple issues
 - Under review
- [Bug 1900] [LCM] WIM is not automatically selected and WIM parameters are not populated by the LCM component
 - Under review
- [Bug 1901] [IM-NBI] check_valid_wim_account fails due to wrong parameters and wrong WimAccountTopic password_to_encrypt
 - Under review
- [Bug 1902] [RO] Multiple typos/small issues prevent using IETF L2VPN WIM connector
 - Under review

Open Issues and Future Work



- Enable definition of service constraints for VLDs to feed WIMs:
 - Capacity, latency, jitter, etc.
- Implement other WIM connectors:
 - IETF L3-VPN
 - Transport API for Digital Signal Rate (DSR) connectivity services

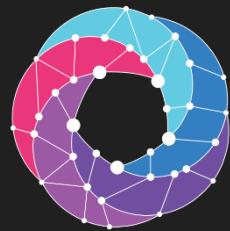


Open Source
MANO

DEMO



Try it yourself: <https://gitlab.com/teraflo-h2020/controller>
TeraFlow OS videos: <https://www.youtube.com/hashtag/terafloos>



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Thank you!



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