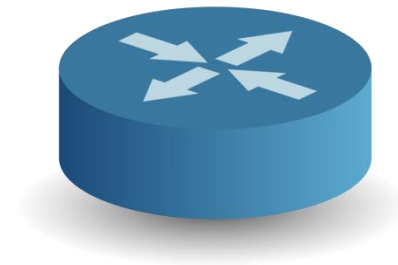


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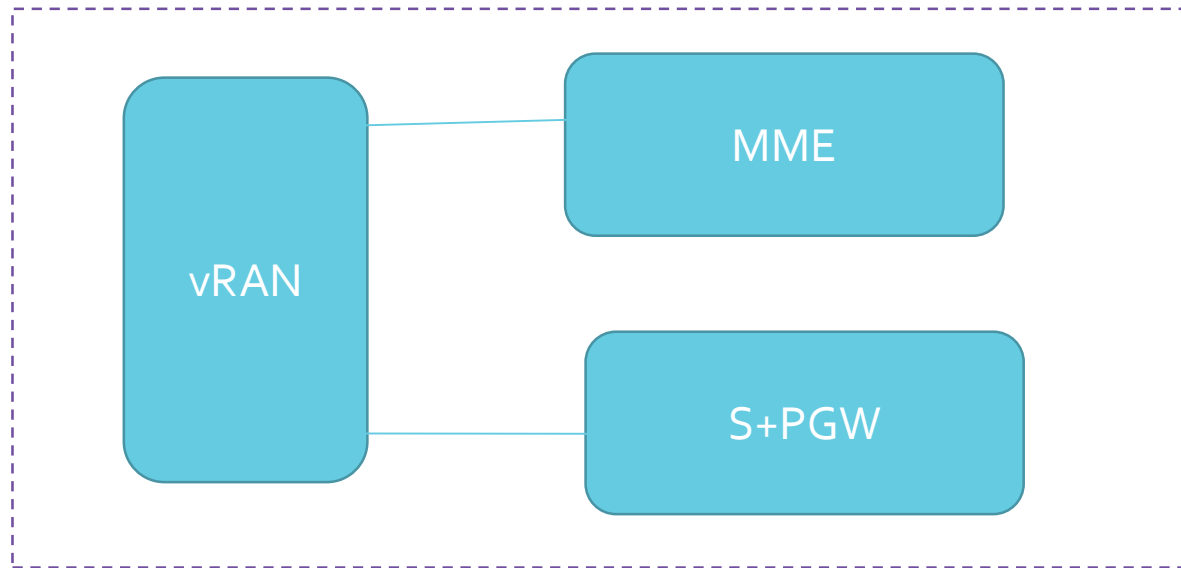
Overview of Network Service and Network Function models

Vijay R S(Tata Elxsi)

- One or many nodes in a Network Infrastructure that has well defined interfaces and functional networking capability.
- Examples: Firewall, Router, EPC, IMS, etc
- Different Flavours of Network Functions
 - Virtual Network Function
 - Cloud Native/Container Network Function
 - Physical Network Function



- Network Service is one or more NFs which are cumulated, logically and structurally placed to provide a service.
- Example: LTE, VPN, LAN internet, etc.



LTE as a
Service

How do NS deployment happens?

- In order to provision a End-to-End service the NFs are modelled together as a single Network Service.
- This NF modelling are often described in templating format.
- These templates are a primary input to any NS-Orchestrator to deploy and configure the service in any target VIM(Virtual Infrastructure Manager).



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OSM – Information Model

What is OSM - IM

- Information model to define the NS and VNF topology template.
- OSM IM is YANG based modeling.
- OSM IM derived from IFA011 and IFA014.
- IFA011 describes the VNF descriptor specification whereas IFA014 on NS descriptor.
- #Work in progress – Sol006 alignment in OSM next release

Design Time

- Building VNF descriptor by referencing the OSM Information Model.

Run Time

- Onboarding phase: Descriptor syntax correction and onboarding.
- Deployment phase: See your VNFs in action.



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OSM Network Service Modelling

VNF -> VNFD

- VNF instances are modelled in VNFD package.
- VNFD constitute of Deployment template with Day-0, 1, 2 configurations files.
- Deployment template can be defined in YAML or JSON formats.
- Descriptor contains deployment of VDU(virtual deployment unit) and inter-networking inside the VNFs.

```
1  vnfd-catalog:
2    vnfd:
3      - id: hackfest_magma-agw-enb_vnfd
4        name: hackfest_magma-agw-enb_vnfd
5        short-name: hackfest_magma-agw-enb_vnfd
6        description: Magma AGW v1.0.0 with tools & srsLTE VDU
7        vendor: Whitestack
8        version: "1.0"
9        mgmt-interface:
10          cp: agw-mgmt
11        vdu:
12          - id: magma-agw-vdu
13            name: magma-agw-vdu
14            description: magma-agw-vdu
15            count: 1
16            cloud-init-file: magmaagw_init
17            vm-flavor:
18              vcpu-count: 1
19              memory-mb: 4096
```

Package Structure

- A typical VNFD package looks like below,

`/hackfest_magma-agw-enb_vnfd`

```
.
├── charms
│   ├── enodeb
│   └── magmagw
├── checksums.txt
├── cloud_init
│   ├── magmaagw_init
│   └── srslte_init
├── helm-charts
│   └── eechart
└── magma-agw-enb_vnfd.yaml
```

NS -> NSD

- An E2E network functions are modeled together in a Network Service Descriptor.
- NSD contains deployment information of its constituent VNFDs and inter-networking between the VNFs as well as to the external world.

```
1 nsd-catalog:
2   nsd:
3     - id: hackfest_magma-agw-enb_nsd
4       name: hackfest_magma-agw-enb_nsd
5       short-name: hackfest_magma-agw-enb_nsd
6       description: Magma AGW 1.0.0 with tools & srsLTE connected to PNF Gateway
7       vendor: Whitestack
8       version: '1.0'
9       constituent-vnfd:
10        - member-vnf-index: 'MagmaAGWsrsLTE'
11          vnf-id-ref: hackfest_magma-agw-enb_vnfd
12        - member-vnf-index: 'VYOS-PNF'
13          vnf-id-ref: hackfest_gateway_vnfd
14       connection-point:
15        - name: nsd_cp_mgmt
16          vld-id-ref: mgmt
17        - name: nsd_cp_sgi
18          vld-id-ref: sgi
19       vld:
```

- An NSD package would look like below,

```
/hackfest_magma-agw-enb_nsd
├── README
└── magma-agw-enb_nsd.yaml
```

- Once packages are built then our Network Service is ready to be deployed.

KNF -> VNFD

- Kubernetes-based Network Functions are the cloud-native lightweight network functions.
- KNF deployment will be done on operational K8s cluster.
- OSM does support both helm-chart or juju-bundles based KNF deployment.

```
2  schema-version: '3.0'
3  vnfd:
4  - id: fb_magma_knf
5    name: fb_magma_knf
6    short-name: fb_magma_knf
7    description: KNF with KDU using a helm-chart for Facebook magma orc8r
8    vendor: ATOS
9    version: '1.0'
10   mgmt-interface:
11     cp: mgmt
12   connection-point:
13     - name: mgmt
14   k8s-cluster:
15     nets:
16       - id: mgmtnet
17         external-connection-point-ref: mgmt
18   kdu:
19     - name: orc8r
20       helm-chart: magma/orc8r
```

PNF -> VNFD

- PNFs are Physically running NFs which were deployed outside the scope of an Orchestrator and managed as a NF in an E2E NS.
- PNFs are still modeled under the construct of VNFD.
- OSM does understand and react upon based on the inputs given as part of VNFD as either VNFs or PNFs or KNFs.

```
1  vnfd-catalog:
2    vnfd:
3      - connection-point:
4        - name: gateway_public
5          type: VPORT
6        description: Gateway PNF
7        id: hackfest_gateway_vnfd
8        mgmt-interface:
9          cp: gateway_public
10       name: hackfest_gateway_vnfd
11       short-name: hackfest_gateway_vnfd
12       vdu:
13         - description: gateway_pdu
14           id: gateway_pdu
15           interface:
16             - external-connection-point-ref: gateway_public
17               name: eth0
18               type: EXTERNAL
19             pdu-type: gateway
```



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Network Slice Modelling

Netslice -> NST

- Network Slicing is inevitable when we talk 5G.

- Just like VNF and NS, NetSlice can be modeled in Network Slicing Template(NST).
- NST does an internal reference to its constituent NSDs.

```
1  nst:
2  -  id: magma_slice_hackfest_nst
3     name: magma_slice_hackfest_nst
4     SNSSAI-identifier:
5         slice-service-type: eMBB
6     quality-of-service:
7         id: 1
8
9     netslice-subnet:
10 -   id: slice_hackfest_nsd_epc
11      is-shared-nss: false
12      description: NetSlice Subnet (service) with magma agw
13      nsd-ref: hackfest_magma-agw-enb_nsd
14 -   id: slice_hackfest_nsd_epcmgmt
15      is-shared-nss: true
16      description: NetSlice Subnet (service) with magma orch and nms
17      nsd-ref: fb_magma_ns
18
19  netslice-vld:
```


Package Dev - Modes

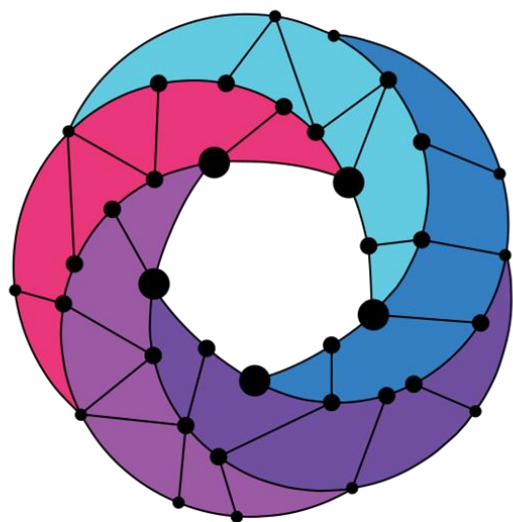
- Packages can be developed in three different modes CLI, GUI, OSM VS Code Extension You name it.

```
ubuntu@ubuntu18:~$ osm package-create vnf myFirstVNF
Creating the VNF structure: ./myFirstVNF
Creating folder:      myFirstVNF_vnf
Creating folder:      ./myFirstVNF_vnf/charms
Creating folder:      ./myFirstVNF_vnf/cloud_init
Creating folder:      ./myFirstVNF_vnf/images
Creating folder:      ./myFirstVNF_vnf/icons
Creating folder:      ./myFirstVNF_vnf/scripts
Creating file:         ./myFirstVNF_vnf/myFirstVNF_vnfd.yaml
Creating file:         ./myFirstVNF_vnf/cloud_init/cloud-config.txt
Creating file:         ./myFirstVNF_vnf/README.md
Created
```

osm cli tool

NG-UI easy drag and drop





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Thank you

Find us at:

osm.etsi.org
osm.etsi.org/wikipub

