SOL001: VNF DESCRIPTOR (VNFD) OVERVIEW

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Topics

- VNF Descriptor (VNFD) overview
- VNFD informational model to data model (TOSCA based)
- Example: VNFD: single deployment flavour.
The **VNFD** defines **VNF properties**, such as:

- Resources needed (amount and type of Virtual Compute, Storage, Networking),
- Software metadata,
- Connectivity (descriptors for):
  - External Connection Points
  - Internal Virtual Links
  - Internal Connection Points
- Lifecycle management behavior (e.g. scaling, instantiation),
- Supported lifecycle management operations, and their configuration,
- Supported VNF specific parameters, and
- Affinity / anti-affinity rules.

The VNFD defines **deployment flavours** (size-bounded deployment configurations, e.g. related to capacity).

**Reference:**
- ETSI GS NFV-IFA 011
- ETSI GS NFV-SOL 001*

* Pre-publication stage – drafts available
VNF Descriptor (VNFD)

**VDU**
- Compute
- Storage
- Internal Cp
- Sw Image

**Internal VLD**

**External CPD**

**Deployment Flavour**

**VNFD**

**Logical View**
- **VNF**
  - VNFC1
  - VNFC2
- **Logical**
  - **IVL1**
  - **IVL2**
- **ECPL**
  - **ICP1**
  - **ICP2**
  - **ICP3**
  - **ICP4**
- **ECP2**

**Instantiation Level**
- describes additional instantiation data for a given VDU. Compute used in the a specific deployment flavour.

**VDU Profile**
- level of resources to be instantiated within a deployment flavour in term of the number VNFC instances to be created for each VDU

**VL Profile**
- additional instantiation data for a given VL used in a specific deployment flavour

**VNF LCM Op Config**
- represents information to configure lifecycle management operations

**Scaling Aspect**
- describes the details of an aspect used for horizontal scaling

Note: simplified view and contents, some information elements are not illustrated
Mapping IFA 011 elements with TOSCA types

<table>
<thead>
<tr>
<th>IFA 011 Elements</th>
<th>VNFD TOSCA types</th>
<th>Derived from</th>
</tr>
</thead>
<tbody>
<tr>
<td>VNFD</td>
<td>tosca.nodes.nfv.VNF</td>
<td>tosca.nodes.Root</td>
</tr>
<tr>
<td>Vdu</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Cpd (Connection Point)</td>
<td>tosca.nodes.nfv.Cp</td>
<td>tosca.nodes.Root</td>
</tr>
<tr>
<td>VduCpd (internal connection point)</td>
<td>tosca.nodes.nfv.VduCp</td>
<td>tosca.nodes.nfv.Cp</td>
</tr>
<tr>
<td>VnfVirtualLinkDesc (Virtual Link)</td>
<td>tosca.nodes.nfv.VnfVirtualLink</td>
<td>tosca.nodes.Root</td>
</tr>
<tr>
<td>VnfExtCpd (External Connection Point)</td>
<td>tosca.nodes.nfv.VnfExtCp</td>
<td>tosca.nodes.nfv.Cp</td>
</tr>
<tr>
<td>Virtual Storage</td>
<td>tosca.nodes.nfv.Vdu.VirtualStorage</td>
<td>tosca.nodes.Root</td>
</tr>
<tr>
<td>Virtual Compute</td>
<td>tosca.nodes.nfv.Vdu.Compute</td>
<td>tosca.capabilities.Root</td>
</tr>
<tr>
<td>Deployment Flavour</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Scaling Aspect</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Element Group</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Instantiation Level</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

IFA 011 information model

- SOL001 (v0.6.0): based on TOSCA Simple YAML Profile v1.2.
- In the case of single deployment flavour, SOL001 support both TOSCA Simple YAML Profile v1.1 and 1.2.

SOL001 (v0.6.0) is working draft, expecting a stable draft (VNFD part) by mid May 2018.
https://docbox.etsi.org/ISG/NFV/Open/Drafts/SOL001_TOSCA_desc/NFV-SOL001v060.zip
The content of this presentation is based on SOL011 v0.6.0
Note 1: In the case of re-exposing a VduCp as external connection point (VnfExtCp).

Note 2: A node template of this type is used to represent a VNF external connection point only in the case the VnfExtCp is connected to an internal virtual link.
- internal_virtual_link requirement to allow to connect it to an internal virtual link
- external_virtual_link requirement to allow to connect it to an external virtual link

Namespace Prefix | Specification Description
---|---
toscafv | The reserved TOSCA prefix that can be associated with the TOSCA Namespace URI as declared in the present document.
VNFD: Example

tosca_definitions_version: tosca_simple_profile_yml v 1.1

node_types:
  MyCompany.SunshineDB.1_0.1_0:
    derived_from: tosca.nodes.nfv.VNF
    properties:
      descriptor_id:
      provider:
      product_name:
      software_version:
      descriptor_version:
      flavour_id:
      ...
    interfaces:
      Nfv:
    topology_template:
      substitution_mappings:
        node_type: MyCompany.SunshineDB.1_0.1_0
        requirements:
          - virtual_link: [dbBackendIpv4, external_virtual_link] # IPv4 for SQL

node_templates:
  dbBackend:
    type: tosca.nodes.nfv.VDU.Compute
    ...
    capabilities:
      virtual_compute:
      ...
    requirements:
      - virtual_storage: mariaDbStorage

  mariaDbStorage:
    type: tosca.nodes.nfv.VDU.VirtualStorage
    ...
    artifacts:
      sw_image:

  dbBackendInternalCp:
    type: tosca.nodes.nfv.Cpd
    ...
    requirements:
      - virtual_binding: dbBackend
      - virtual_link: internalVl

  internalVl:
    type: tosca.nodes.nfv.VL
    ...

  dbBackendIpv4:
    type: tosca.nodes.nfv.VduCpd
    ...
    requirements:
      - virtual_link:
      - virtual_binding: dbBackend

- One deployment flavour
- Vdu.Compute node: dbBackend
- Two connection points: internal (dbBackendInternalCp); external (dbBackendIpv4)
- Two virtual links: internalVl and externalVl
tosca_definitions_version:
tosca_simple_profile_yml v 1.1

node_types:
  MyCompany.SunshineDB.1_0.1_0:
    derived_from: tosca.nodes.nfv.VNF
... 

topology_template:
... 

  node_templates:
    dbBackend:
      type: tosca.nodes.nfv.VDU.Compute
      properties:
        name: ..
        description: ..
        boot_order: ..
        nfvi_constraints:..
        configurable_properties: 
      additional_vnfc_configurable_properties: {}
    min_number_of_instances: 1
    max_number_of_instances: 4

capabilities:
  virtual_compute:
    properties:
      virtual_memory:
        virtual_mem_size: 8096 MB
      virtual_cpu:
        cpu_architecture: x86
        num_virtual_cpu: 2
        virtual_cpu_clock: 1800 MHz
    requirements:
      - virtual_storage: mariaDbStorage

maryDbStorage:
  type: tosca.nodes.nfv.VDU.VirtualStorage
  properties:
    type_of_storage: ..
    size_of_storage: ..
    rdma_enabled: ..
  artifacts:
    sw_image:
      name: Software of Maria Db
      version: 1.0
      checksum: 9af30fcej37a4c5c831e095745744d6d2
      container_format: qcow2
      disk_format: bare
      min_disk: 2 GB
      min_ram: 8096 MB
      size: 2 GB
      sw_image: maria.db.image.v1.0.qcow2
      operating_system: Linux
      supported_virtualisation_environments:
        - KVM
    dbBackendInternalCp:
      type: tosca.nodes.nfv.Cpd
      properties:
        layer_protocol: ipv4
        role: leaf
        description: Internal connection point on an VL
        requirements:
          - virtual_binding: dbBackend
          - virtual_link: internalVl
tosca_definitions_version: tosca_simple_profile_yaml v 1.1

definitions:
  node_types:
    MyCompany.SunshineDB.1_0.1_0:
      derived_from: tosca.nodes.nfv.VNF

topology_template:

  node_templates:
    dbBackendInternalCp:
      type: tosca.nodes.nfv.Cpd
      properties:
        layer_protocol: ipv4
        role: leaf
        description: Internal connection point on an VL
        requirements:
          - virtual_binding: dbBackend
          - virtual_link: internalVl

    internalVl:
      type: tosca.nodes.nfv.VnfVirtualLink
      properties:
        connectivity_type:
          layer_protocol: ipv4
          flow_pattern: mesh
          test_access: []
          description: ..
          vl_profile:
            qos:
              maxBitRateRequirements:
              minBitRateRequirements:
tosca_definitions_version: tosca_simple_profile_yaml v 1.1

node_types:
  MyCompany.SunshineDB.1_0.1_0:
    derived_from: tosca.nodes.nfv.VNF

topology_template:

  node_templates:

    dbBackendIpv4:
      type: tosca.nodes.nfv.VduCpd
      properties:
        layer_protocol: ipv4
        role: leaf
        description: External connection point to access the DB on IPv4
      requirements:
        - virtual_link:
        - virtual_binding: dbBackend
tosca_definitions_version: tosca_simple_profile_yang
v 1.1

node_types:
  MyCompany.SunshineDB.1_0.1_0:
    derived_from: tosca.nodes.nfv.VNF
    properties:
      interfaces:
        Nfv:
          instantiate:
            inputs:
              parameter_1:
                type: string
                required: false
                default: value_1
              parameter_2:
                type: string
                required: false
                default: value_2
          terminate:
            implementation:
              terminate.workbook.mistral.yaml

topology_template:

  substitution_mappings:
    node_type: MyCompany.SunshineDB.1_0.1_0
    requirements:
      - virtual_link: [ dbBackendIpv4, external_virtual_link ] # IPv4 for SQL
Conclusions

- **VNFD specification ongoing in ETSI NFV SOL WG (SOL001)**

Work in progress:

- deploymentFlavour: instantiationLevel, ScaleInfo
- elementGroup
- vnflIndicator and monitoring
- autoScale
- Network Service Descriptor (NSD)

<table>
<thead>
<tr>
<th>Work plan schedule</th>
<th>Stable Draft</th>
<th>Final Draft</th>
<th>WG App</th>
<th>TB App</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOL001 &quot;TOSCA-based NFV descriptors spec&quot;</td>
<td>2018.07.01</td>
<td>2018.08.26</td>
<td>2018.08.31</td>
<td>2018.09.30</td>
</tr>
</tbody>
</table>

- Stable Draft milestone for the VNFD part of SOL001 = **2018.05.17**

- **Way forward: join forces in standardization (ETSI NFV & OASIS TOSCA) and open source (ONAP)**
More information:

NFV Technology Page (information)
http://www.etsi.org/nfv

NFV Portal (working area)
http://portal.etsi.org/nfv

NFV Proofs of Concept (information)
http://www.etsi.org/nfv-poc

NFV Plugtest (information & registration)
http://www.etsi.org/nfvplugtest

Open Area:

Drafts http://docbox.etsi.org/ISG/NFV/Open/Drafts/