Data Models for Network Functions Virtualization
draft-xjz-nfv-model-datamodel-00.txt

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YANG [RFC6020] is a data modeling language used to model configuration and state data manipulated by the Network Configuration Protocol (NETCONF) [RFC6241]. A small set of built-in data types are defined in [RFC6020], a collection of common data types are further defined in [RFC6991]. This document defines a YANG [RFC6020] data model for Network Functions Virtualization (NFV).

2. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].
3. Terminology

CMS: Cloud Management System.

Network Function (NF): A functional building block within an operator’s network infrastructure, which has well-defined external interfaces and a well-defined functional behaviour.

NF set: A collection of NFs with unspecified connectivity between them.

Network Functions Virtualization Orchestrator (NFVO): a function that deploys, operates, manages, and coordinates VNFs and the respective NFVI. The Orchestrator has control and visibility of all VNF running inside the NFVI.

Network Functions Virtualization Infrastructure (NFVI): the totality of all hardware and software components that constitute the environment in which VNFs are deployed, managed and executed. The NFVI includes resources for computation, networking and storage.

Physical Network Function (PNF): An implementation of a NF via a tightly coupled software and hardware system.

Virtual Machine (VM): A program and configuration of part of a host computer server. Note that the Virtual Machine inherits the properties of its host computer server e.g. location, network interfaces.

Virtualised Network Function (VNF): An implementation of an executable software program that constitutes the whole or a part of an NF and can be deployed on a virtualisation infrastructure.

VNF Descriptor (VNFD): A configuration template that describes a VNF in terms of its deployment and operational behavior, and is used in the process of on-boarding and instantiating a VNF. The deployment behavior describes the NFV Infrastructure resources that a VNF instance requires whereas the operational behavior describes the VNF instance topology and VNF instance lifecycle operations.

VNF Forwarding Graph: A graph specified by a Network Service Provider of bi-directional logical links connecting NF nodes where at least one node is a VNF through which network traffic is directed.

NFV Service: A network service utilizing NFs, where at least some NFs are VNFs. A VNF Forwarding Graph is an example of such a service.
4. Virtual Network Function Descriptor (VNFD)

4.1. VNFD Components

The main objective of VNF modeling will include:

- Basic VNF attributes: VNF name, function description, sharing or non-sharing attribute.

- Deployment attributes: environment requirements of VNF deployment such as the number of VMs, virtual CPU, memory and disk requirements, image of each VM, and QoS requirements such as bandwidth and delay of VNF.

- Operational attributes: which defines the operational and management behavior, such as start, stop, pause, migration and etc.

- Interface attributes: external interface, such as interface type, configuration parameters of these interfaces.

4.2. NFV Data Model

NFNode is defined as a basic class of VNF data type.

```
  +--rw NFNode
     +--rw basicProperties
          |  +--rw name  string
          |  +--rw description  string
          |  +--rw producer  string
          +--rw deployment
               |  +--rw VMUsed  enumeration
               |     |  +--rw image  uri
               |  +--rw vResource
```
5. YANG Module for VNFD

Module of ietf-yang-nfv-types will include the following new types.

```yml
container NFNode {
  container basicProperties {
    leaf name { 
      type string;
    }
    leaf description { 
      type string;
    }
    leaf producer { 
      type string;
    }
    leaf sharing { 
      type enumeration {
        enum non-sharing {
          
```
value "0";
description "The NF is shared";
}
enum sharing {
  value "1";
  description "The NF is not shared";
}
}
}

container deployment {
  leaf VMUsed {
    type enumeration {
      enum Single-VM {
        value "0";
        description "Deployed on a single VM";
      }
      enum Multi-VMs {
        value "1";
        description "Deployed on multiple VMs";
      }
    }
  }
}

container vResource {
  leaf vCPU {
    type uint16;
  }
  leaf vMemory {
    type uint64;
  }
}
leaf vDisk {
    type uint64;
}

leaf-list image {
    type uri;
}

container operation {
    leaf-list action {
        type enumeration {
            enum start;
            enum stop;
            enum pause;
            enum migrate;
        }
    }
}

container interfaces {
    container interface {
        leaf name {
            type string;
        }
        leaf type {
            type enumeration {
                enum ethernet {
                    value 1;
                }
            }
        }
    }
}
enum ip {
    value 2;
}

6. Security Considerations

TBD.

7. IANA Considerations

TBD.

8. References

8.1. Normative References


8.2. Informative References

Xu, W., Jiang, Y., Zhou, C., draft-xjz-nfv-model-problem-statement-00
9. Acknowledgments

TBD

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