

ETSI IFA011 v3.3.1 & v4.1.1 Changes to ONAP Resource Model.

3.3.1 changes bring support for VNF Package Change and VNF Snapshot

4.1.1 changes bring support for OsContainer based VNFs

Changes from v3.3.1

New Classes/Types:

- New Class **VnfPackageChangeInfo**: A VnfPackageChangeInfo information element describes the processes and rules to be used for performing the resource related tasks while assisting the "change current VNF Package" to change a VNF instance to a different VNF Package (destination package). When creating a VNF package, the VNF vendor can include VnfPackageChangeInfo information elements in the package which allow the package to act as a source package or as a destination package for a modification in relation to another package, which has been created earlier or at the same time. To populate a VnfPackageChangeInfo information element and the underlying related information elements, knowledge of both the source package and the destination package is required.

Attribute	Qualifier	Cardinality	Content	Description
selector	M	1	VersionSelector	Information to identify the source and destination VNFD for the change, and the related deployment flavours.
additionalParamsId	M	0..1	Identifier (Reference to ChangeCurrentVnfPackageOpConfig)	References the ChangeCurrentVnfPackageOpConfig information element that defines the valid additional parameters for the change.
modificationQualifier	M	1	Enum	Specifies the type of modification resulting from transitioning from srcVnfId to dstVnfId. The possible values are: UP - indicating that the destination VNF version is newer than the source version, DOWN - indicating that the destination VNF version is older than the source version.
additionalModificationDescription	M	0..N	String	A VNF provider may define additional information to qualify further the change between the two versions, such as "VNF upgrade", "VNF update", "VNF downgrade", etc.
componentMapping	M	0..N	ComponentMapping	Mapping information related to identifiers of components in source VNFD and destination VNFD that concern to the change process.
lcmScriptId	M	TBD	Identifier (Reference to LifeCycleManagementScript)	References a lifecycle management script that is executed as part of this "change current VNF Package" process.
coordinationId	M	0..N	Identifier (Reference to VnfLcmOperationCoordination)	References applicable VNF LCM operation coordination actions.
dstFlavourId	M	1	Identifier	Identifies the deployment flavour in the destination VNF package for which this change applies. The flavour ID is defined in the destination VNF package.

- New Class **VersionSelector**: The VersionSelector information element allows to identify the source and destination VNFDs (and implicitly, VNF packages) for a "change current VNF Package", as well as the applicable source deployment flavour. The triplet (srcVnfId, srcFlavourId, dstVnfId) uniquely determines a change.

Attribute	Qualifier	Cardinality	Content	Description
srcVnfId	M	1	Identifier	Identifier of the source VNFD and the source VNF package. See note 1.
dstVnfId	M	1	Identifier	Identifier of the destination VNFD and the destination VNF package. See note 1.
srcFlavourId	M	1	Identifier	Identifier of the deployment flavour in the source VNF package for which this modification applies. See note 2.

NOTE 1: Either the srcVnfId or the dstVnfId shall be equal to the vnfId of the VNFD containing this version selector.

NOTE 2: It is up to protocol design stage to decide whether there is further optimization potential to apply one modification for multiple srcFlavourIds.

- New Class **ComponentMapping**: With respect to a "change current VNF Package" process, a ComponentMapping information element defines a mapping between the identifier of a components or property in the source VNFD and the identifier of the corresponding component or property in the destination VNFD. Examples for components are VDUs, VLDs, etc., and an example for a property is a scaling aspect of the VNF.

Attribute	Qualifier	Cardinality	Content	Description
componentType	M	1	Not specified	The type of component or property. Possible values differentiate whether changes concern to some VNF component (e.g. VDU, internal VLD, etc.) or property (e.g. a Scaling Aspect, etc.).
sourceDescId	M	1	Identifier	Identifier of the component or property in the source VNFD. See note.
dstDescId	M	1	Identifier	Identifier of the component or property in the destination VNFD. See note.
description	M	0..1	String	Human readable description of the component changes.

NOTE: The attribute's content, an identifier value, references to the relevant descriptor parts in the VNFD.

- New Class **VnfLcmOperationCoordination**: This information element defines the sets of information needed for a coordination action in a VNF lifecycle management operation.

Attribute	Qualifier	Cardinality	Content	Description
vnfLcmOpCoordinationId	M	1	Identifier	Identifies the specific VNF LCM operation coordination action.
description	M	0..1	String	Human readable description of the coordination action.
endpointType	M	1	Enum	Specifies the type of the endpoint exposing the LCM operation coordination such as other operations supporting or management systems (e.g. an EM) or the VNF instance. Allowed values: <ul style="list-style-type: none"> • MGMT: coordination with other operation supporting management systems. • VNF: coordination with the VNF instance.
coordinationStage	M	0..1	Not specified	Indicates the coordination stage during the VNF LCM operation.
coordinationParams	M	0..1	Not specified	Input information needed by the external coordinating entity. See note.

NOTE: These attributes relate to the corresponding parameters used in the VNF LCM coordination operations (refer to clause 6.4.2.2 of ETSI GS NFV-IFA 008 [i.4]).

Other Changes:

- New Property **Vnfd:vnfpackagechangeinfo** of type **VnfPackageChangeInfo** with cardinality 0..N - Information used for performing the change of the current VNF Package. More than one VNF Package Change Info construct is possible to cater the possibility that changes of the current VNF Package can be performed for different source VNFDs.
- New Property **Vnfd:lcmOperationCoordination** of type **VnfLcmOperationCoordination** with cardinality 0..N - Provides information used for the coordination in VNF LCM operations.

VNFD Types:

bootData	M	0..1	Not specified	Contains a string or a URL to a file contained in the VNF package used to customize a container resource at boot time. The bootData may contain variable parts that are replaced by deployment specific values before being sent.
virtualStorageDesc	M	0..N	Identifier (Reference to VirtualStorageDesc)	Links to virtualStorageDesc-s of the Vdu. The storages represented by the linked VirtualStorageDesc-s are attached to the OS Container as volumes. Shall be present in case the OS container requires storage resources.
monitoringParameters	M	0..N	MonitoringParameter	Specifies the virtualised resource related performance metrics on the OsContainerDesc level to be tracked by the VNFM. MonitoringParameter is defined in clause 7.1.11.3.

NOTE: Extended resources are to describe any type of resource provided by the container infrastructure. One example implementation of extended resources are "Extended Resources" in case the container infrastructure service is a Kubernetes® instance.

2. New Class **MciopProfile** which describes properties of the Managed Container Infrastructure Object Package (MCIOP) which are used during deployment of containerized workloads based on a MCIOP, associated to a VNF deployment flavour. An MCIOP is a hierarchical aggregate of information objects for OS container management and orchestration. Multiple MCIOPs can be included in a VNF Package. The MCIOP is expected to be realized by a Helm chart.
- a. Each VnfDf in the VNF Descriptor would list the appropriate mciopProfiles.

Attribute	Qualifier	Cardinality	Content	Description
mciopId	M	1	Identifier	Identifies the MCIOP in the VNF package.
deploymentOrder	M	0..1	Integer	Indicates the order in which this MCIOP shall be deployed in relation to other MCIOPs. A lower value specifies an earlier deployment.
affinityOrAntiAffinityGroupId	M	0..N	Identifier (Reference to AffinityOrAntiAffinityGroup)	References the affinity or anti-affinity group(s) the MCIOP belongs to. See note.
associatedVdu	M	0..N	Identifier (Reference to Vdu)	List of VDUs which are associated to this MCIOP and which are deployed using this MCIOP.

NOTE: Each identifier references an affinity or anti-affinity group which expresses affinity or anti-affinity relationships between the containerized workloads to be created using this MCIOP and the containerized workloads to be created using other MCIOP(s) in the same group.

3. New Class **VirtualCpd**. New datatypes **AdditionalServiceData** and **ServicePortData**

- a. **VirtualCpd** - A type of Cpd that describes a requirement to create a virtual connection point allowing the access to a number of VNFC instances (based on their respective VDUs).

Attribute	Qualifier	Cardinality	Content	Description
vdu	M	1..N	Identifier (Reference to Vdu)	References the VDU(s) which implement this service.
additionalServiceData	M	0..N	AdditionalServiceData	Additional service identification data of the VirtualCp exposed to NFV-MANO.
(inherited attributes)				All attributes inherited from Cpd. See note.

NOTE: If this VirtualCp represents a load balancing virtual IP address of a VNFC realized by one or a set of OS containers and the IP address is configurable in the declarative descriptor of the corresponding MCIOP, the attribute iPAddressAssignment shall be set to value=true in the L3AddressData.

- b. **AdditionalServiceData**

Attribute	Qualifier	Cardinality	Content	Description
portData	M	1..N	ServicePortData	Service port numbers exposed by the VirtualCp.
serviceData	M	0..1	Not specified	Service matching information exposed by the VirtualCp. See note.

NOTE: This attribute shall only be present if additional information is needed to identify the service termination within the VNF, such as for example a url path information in an HTTP request required to allow a single VirtualCp IP address to be used for several HTTP based services that use the same portnumber.

- c. **ServicePortData**

Attribute	Qualifier	Cardinality	Content	Description
name	M	1	String	The name of the port exposed by the VirtualCp.
protocol	M	1	Enum	The L4 protocol for this port exposed by the VirtualCp. VALUES: · TCP · UDP · SCTP
port	M	1	Integer	The L4 port number exposed by the VirtualCp.

portConfigurable	M	1	Boolean	Specifies whether the port attribute value is allowed to be configurable.
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Other changes:

1. New property **vnfd::osContainerDesc** of type **OsContainerDesc** with cardinality 0..N which defines descriptors of container compute resources to be used by the VNF when the VDUs of the VNF are realized by a set of OS Containers sharing the same host and same networking namespace. Only one of **virtualComputeDesc** or **osContainerDesc** may be present in the **vnfd**
2. New property **vnfd::virtualCpd** which describes a virtual connection point(s) allowing to access a set of VNFC instances (based on their respective VDUs).
3. New property **VnfExtCpd::virtualCpd** which references the Virtual CPD which is used to describe a virtual connection point allowing to access a set of VNFC instances (based on their respective VDUs).
4. New property **vdu::osContainerDesc** of type **identifier** (Reference to **osContainerDesc**) with cardinality 0..N which describes CPU, memory requirements and limits, and software images of the OS Containers realizing this Vdu corresponding to OS Containers sharing the same host and same network namespace. Each unique identifier is referenced only once within one VDU.
5. Modification of **VduCpd::vnictype** to include several new types (BRIDGE, IPVLAN, LOOPBACK, MACVLAN, PTP, VLAN, HOST-DEVICE)
6. Modification to the cardinality of **SwImageDesc::diskFormat**, **SwImageDesc::minDisk** to allow cardinality of 0..N
7. New property **VndDf::mciopProfile** of type **mciopProfile** with cardinality 0..N which describes additional instantiation data for the MCIOPs used in this deployment flavour. This attribute shall be present if the DF references containerized workloads based on a MCIOP.
8. New property **VirtualStorageDesc::volumeTemplate** of type Boolean with cardinality 0..1 which indicates whether the virtual storage descriptor shall be used as template, i.e. if the virtual storage resource shall be instantiated per VNFC instance. If the value is true (default), a persistent virtual storage resource shall be instantiated for each VNFC instance that is based on a VDU referring to this virtual storage descriptor. If the value is false, a single persistent virtual storage resource shall be instantiated with a lifetime independent of the lifetime of individual VNFC instances based on a VDU referring to this virtual storage descriptor.

GenDoc Output:

