

# ESC ETSI API

5.9.0.74

OAS3

[/esc-etsi-api](#)

This documentation is based upon V3.3.1 of the ETSI SOL002 and SOL003 specifications. For V2.7.1 documentations please click [here](#)

Documentation :

## ETSI-MANO REST Northbound API

This REST API is another programmatic interface to ESC that uses a REST architecture. The API accepts and returns HTTP or HTTPS messages that contain JavaScript Object Notation (JSON).

It is the payloads for these request/responses that are defined by the European Telecommunications Standards Institute (ETSI), specifically around Management and Orchestration (MANO). It contains its own data model, designed around the ETSI-MANO specification (ETSI GS NFV-SOL 003 V2.4.1), that abstracts away from the ESC core data model.

This initial implementation of the ETSI-MANO standards for NFV is to address the Or-Vnfm reference point, i.e. the interface between the Network Function Virtualisation Orchestrator (NFVO) and the Virtual Network Function Manager (VNFM).

The Or-Vnfm reference point details the interactions to onboard ETSI-compliant VNF packages, manage resources, and VNF lifecycle management (LCM) operations.

During the lifespan of a VNF Instance, it moves between INSTANTIATED and NOT\_INSTANTIATED states, whereas operations that perform LCM operations have a more complex state machine, as per the diagram below.

The ETSI-MANO specification considers provisioning of many components of a network service outside the remit of the VNFM, namely:

- Tenants
- Images
- Flavours
- External Networks/Virtual Link
- Externally Managed Internal Virtual Link
- Subnets

This means that LCM operations on an instance of a VNF submitted to the ETSI-MANO REST API expect these resources to be created out-of-band (OOB) as far as the VNFM is concerned. It is likely that these resources are created via the NFVO, either at the time of onboarding the VNF package or onboarding the tenant, and will be represented by VIM (Virtual Infrastructure Manager) identifiers in the request to ESC.

# Managing Resources

Managing Resources via the ETSI-MANO API The ETSI-MANO API communicates with NFVO for lifecycle management. A configuration template, the Virtual Network Function Descriptor (VNFD) file describes the deployment parameters and operational behaviors of a VNF type. The VNFD is used in the process of deploying a VNF and managing the lifecycle of a VNF instance. The flow of operations to deploy a VNF instance is:

1. Create VNF Identifier
2. Instantiate VNF The flow of operations to fully undeploy (and release resources used by a VNF instance) is:
3. Terminate VNF
4. Delete VNF Identifier

The other LCM operations are applicable once the VNF has been instantiated, except from Query which is applicable at any time since it does not modify the VNF.

## LCM Operations

Here is an overview of the operations that can affect a VNF instance.

- Create VNF Identifier: Generate a new VNF Instance Id (a universally unique identifier) that is subsequently used as a handle to reference the instance upon which to execute further operations.
- Instantiate VNF: Deploy a new VNF instance in the VIM. The Instantiate request will contain instance-specific values and this, coupled with the VNFD and the Grant information will provide all the information required by the VIM to deploy the VNF. The VNFD is retrieved from the NFVO as part of this call flow which provides the resource requirements for the VNF to be instantiated. This data set is then further supplemented by requesting permission from the NFVO to continue with the request which returns Grant information that converts some of these resource requirements to actual resources that are reserved in the VIM.
- Operate VNF: Allow a VNF instance to be started or stopped. The resources are not released or changed, but the VNF instance in the VIM is toggled between these two states.
- Query VNF: Query one or more VNF instances known to ESC. This is a specific REST endpoint that can be filtered to find specific instances. In this initial release, the instances can be filtered by the VNF Instance Id.
- Scale VNF: Scale VNF instance incrementally.
- Scale VNF to Level: Scale VNF instance to target level.
- Terminate VNF: Undeploy the VNF instance in the VIM. The resources themselves remain reserved for the VNF instance, however the VNF itself is undeployed.
- Delete VNF Identifier: The resources are fully released in the VIM and in ESC and the associated VNF instance identifier is also released.
- Heal VNF: Recover a VNF.
- Modify VNF: Modify a VNF resource.
- Change External VNF Connectivity: Change the deployment flavour of a VNF instance.
- Change VNF Flavour: Change the deployment flavour of a VNF instance.

Authentication: At the time of publication, only Basic Authentication is supported using the ETSI Swagger API. Cisco ESC does support OAUTH 2.0 authentication. Please see the user guide for details.

Attribute Selectors: REST endpoints which are used to query multiple results support attribute selectors (see the ETSI-MANO specification for more details).

- `all_fields`: This URI query parameter requests that all complex attributes are included in the response, including those suppressed by `exclude_default`. It is inverse to the "exclude\_default" parameter.
- `fields`: This URI query parameter requests that only the listed complex attributes are included in the response.
- `exclude_fields`: This URI query parameter requests that the listed complex attributes are excluded from the response.
- `exclude_default`: Presence of this URI query parameter requests that a default set of complex attributes shall be excluded from the response.

If no attribute selector is supplied then the default behaviour is the same as `exclude_default` (this can be changed to `all_fields` by setting the property `attribute.selector.default.all_fields` to true).

## Note on API Versioning

This API supports both v1 and v2 calls to manage VNFs. However you cannot mix v1 and v2 calls for the same VNF. If the VNF has been created using a v1 endpoint, then all subsequent calls must continue using v1 for the lifetime of the VNF. If the version does not match a previous call for the same VNF, an error will be raised.

Server

### Or-Vnfm api\_versions

This resource supports retrieval of the versions of each SOL003 API supported by the VNFM, including whether they are deprecated and when they will be retired. Where the major version is supplied, minor or patch versions for that version are returned.



### Or-Vnfm vnf\_instances

This resource represents VNF instances for the Or-Vnfm Reference Point. The client can use this resource to create individual VNF instance resources, and to query VNF instances.



POST

`/or_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/instantiate` Instantiate a VNF

**POST**/or\_vnfm/vnflcm/v2/vnf\_instances **Create a VNF Instance resource****GET**/or\_vnfm/vnflcm/v2/vnf\_instances **Query multiple VNF instances****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/change\_flavour **Change the VNF Flavour****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/operate **Operate a VNF Instance****PATCH**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId} **Modify an individual VNF Instance****GET**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId} **Read an individual VNF resource****DELETE**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId} **Delete a VNF instance resource****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/scale **Scale a VNF Instance****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/change\_ext\_conn **Change the external VNF connectivity****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/scale\_to\_level **Scale a VNF Instance to Level****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/heal **Heal a VNF Instance****POST**/or\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId}/terminate **Terminate a VNF Instance**

## Ve-Vnfm vnf\_instances

This resource represents VNF instances for the Ve-Vnfm Reference Point. The client can use this resource to create individual VNF instance resources, and to query VNF instances.

**PATCH**/ve\_vnfm/vnflcm/v2/vnf\_instances/{vnfInstanceId} **Modify an individual VNF Instance**

GET	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}	Read an individual VNF resource
DELETE	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}	Delete a VNF instance resource
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/heal	Heal a VNF Instance
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/scale_to_level	Scale a VNF Instance to Level
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/change_flavour	Change the VNF Flavour
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/operate	Operate a VNF Instance
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/instantiate	Instantiate a VNF
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/change_ext_conn	Change the external VNF connectivity
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/scale	Scale a VNF Instance
POST	/ve_vnfm/vnflcm/v2/vnf_instances/{vnfInstanceId}/terminate	Terminate a VNF Instance
POST	/ve_vnfm/vnflcm/v2/vnf_instances	Create a VNF Instance resource
GET	/ve_vnfm/vnflcm/v2/vnf_instances	Query multiple VNF instances

## Or-Vnfm vnf\_instances extensions

This resource represents extensions to VNF instances for the Or-Vnfm Reference Point.



POST	/or_vnfm/vnflcm/v2/ext/vnf_instances/{vnfInstanceId}/monitoring/migrate	Migrate monitoring for a VNF
POST	/or_vnfm/vnflcm/v2/ext/vnf_instances/{vnfInstanceId}/monitoring/operations	Enable/disable monitoring for

VNF/particular VMs

## Ve-Vnfm vnf\_instances extensions

This resource represents extensions to VNF instances for the Ve-Vnfm Reference Point..



POST

/ve\_vnfm/vnflcm/v2/ext/vnf\_instances/{vnfInstanceId}/monitoring/operations

Enable/disable monitoring VNF/particular VMs

POST

/ve\_vnfm/vnflcm/v2/ext/vnf\_instances/{vnfInstanceId}/monitoring/migrate

Migrate monitoring for a VNF

## Or-Vnfm vnf\_lcm\_op\_occs

This resource represents VNF lifecycle management operation occurrences for the Or-Vnfm Reference Point. The client can use this resource to query status information about multiple VNF lifecycle management operation occurrences.



GET

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOpOccId}

Read an individual VNF lifecycle management operation occurrence

POST

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOpOccId}/retry

Retry a VNF lifecycle management operation occurrence

POST

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOpOccId}/cancel

Cancel a VNF lifecycle management operation occurrence

GET

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs

Query multiple VNF lifecycle management operation occurrences

POST

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOpOccId}/fail

Mark a VNF lifecycle management operation occurrence as failed

POST

/or\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOpOccId}/rollback

Rollback a VNF lifecycle management operation occurrence

## Ve-Vnfm vnf\_lcm\_op\_occs

This resource represents VNF lifecycle management operation occurrences for the Ve-Vnfm Reference Point. The client can use this resource to query status information about multiple VNF lifecycle management operation occurrences.



**POST**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOp0ccId}/rollback

Rollback a VNF lifecycle management operation occurrence

**POST**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOp0ccId}/retry

Retry a VNF lifecycle management operation occurrence

**POST**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOp0ccId}/cancel

Cancel a VNF lifecycle management operation occurrence

**GET**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOp0ccId}

Read an individual VNF lifecycle management operation occurrence

**GET**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs

Query multiple VNF lifecycle management operation occurrences

**POST**

/ve\_vnfm/vnflcm/v2/vnf\_lcm\_op\_occs/{vnfLcmOp0ccId}/fail

Mark a VNF lifecycle management operation occurrence as failed

## Or-Vnfm lcn\_subscriptions

This resource represents VNF lifecycle management notification subscriptions for the Or-Vnfm Reference Point. The client can use this resource to subscribe to notifications related to VNF lifecycle management, and to query its subscriptions.



**POST**

/or\_vnfm/vnflcm/v2/subscriptions Create a new subscription

**GET**

/or\_vnfm/vnflcm/v2/subscriptions

Queries the list of active VNF lifecycle management subscriptions

**GET**

/or\_vnfm/vnflcm/v2/subscriptions/{subscriptionId}

Read an individual VNF lifecycle management subscription resource

**DELETE**

/or\_vnfm/vnflcm/v2/subscriptions/{subscriptionId}

Terminate an individual VNF lifecycle management subscription

## Ve-Vnfm lccn\_subscriptions

This resource represents VNF lifecycle management notification subscriptions for the Ve-Vnfm Reference Point. The client can use this resource to subscribe to notifications related to VNF lifecycle management, and to query its subscriptions.

**GET**

/ve\_vnfm/vnflcm/v2/subscriptions/{subscriptionId}

Read an individual VNF lifecycle management subscription resource

**DELETE**

/ve\_vnfm/vnflcm/v2/subscriptions/{subscriptionId}

Terminate an individual VNF lifecycle management subscription

**POST**

/ve\_vnfm/vnflcm/v2/subscriptions Create a new subscription

**GET**

/ve\_vnfm/vnflcm/v2/subscriptions

Queries the list of active VNF lifecycle management subscriptions

## Or-Vnfm fm\_subscriptions

This resource represents VNF alarm subscriptions for the Or-Vnfm Reference Point. The client can use this resource to subscribe to notifications related to VNF alarms and to query its subscriptions.

**POST**

/or\_vnfm/vnffm/v1/subscriptions Create a new VNF alarm subscription

**GET**

/or\_vnfm/vnffm/v1/subscriptions Queries the list of active VNF alarm subscriptions

**GET**

/or\_vnfm/vnffm/v1/subscriptions/{subscriptionId}

Read an individual VNF alarm subscription resource

**DELETE**

/or\_vnfm/vnffm/v1/subscriptions/{subscriptionId}

Terminate an individual VNF alarm subscription



## Ve-Vnfm fm\_subscriptions

This resource represents VNF alarm subscriptions for the Ve-Vnfm Reference Point. The client can use this resource to subscribe to notifications related to VNF alarms and to query its subscriptions.



**POST**

/ve\_vnfm/vnffm/v1/subscriptions Create a new VNF alarm subscription

**GET**

/ve\_vnfm/vnffm/v1/subscriptions Queries the list of active VNF alarm subscriptions

**GET**

/ve\_vnfm/vnffm/v1/subscriptions/{subscriptionId} Read an individual VNF alarm subscription resource

**DELETE**

/ve\_vnfm/vnffm/v1/subscriptions/{subscriptionId} Terminate an individual VNF alarm subscription

## Or-Vnfm alarms

These are all the resources and methods provided for the VNF fault management interface for the Or-Vnfm Reference Point.



**GET**

/or\_vnfm/vnffm/v1/alarms Get all alarm resource

**PATCH**

/or\_vnfm/vnffm/v1/alarms/{alarmId} This can be used to change the acknowledgement status of an alarm

**GET**

/or\_vnfm/vnffm/v1/alarms/{alarmId} Get an individual alarm resource

## Ve-Vnfm alarms

These are all the resources and methods provided for the VNF fault management interface for the Ve-Vnfm Reference Point.



**GET**

/ve\_vnfm/vnffm/v1/alarms Get all alarm resource

**PATCH**

/ve\_vnfm/vnffm/v1/alarms/{alarmId} This can be used to change the acknowledgement status of an alarm

**GET**

/ve\_vnfm/vnffm/v1/alarms/{alarmId} Get an individual alarm resource

## Or-Vnfm pm\_jobs

These are all the resources and methods provided for the VNF Performance Management interface for the Or-Vnfm Reference Point.



**POST**

/or\_vnfm/vnfpm/v2/pm\_jobs Create a PM Job

**GET**

/or\_vnfm/vnfpm/v2/pm\_jobs Query multiple PM Jobs

**POST**

/or\_vnfm/vnfpm/v2/ext/pm\_jobs/{pmJobId}/reports Extension endpoint to create a Performance Report

**GET**

/or\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId}/reports/{reportId} Read an individual Performance Report

**GET**

/or\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId} Read an individual PM Job

**DELETE**

/or\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId} Delete a PM Job

## Ve-Vnfm pm\_jobs

These are all the resources and methods provided for the VNF Performance Management interface for the Ve-Vnfm Reference Point.



**POST**

/ve\_vnfm/vnfpm/v2/ext/pm\_jobs/{pmJobId}/reports Extension endpoint to create a Performance Report

**GET**

/ve\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId}/reports/{reportId} Read an individual Performance Report

**POST**

/ve\_vnfm/vnfpm/v2/pm\_jobs Create a PM Job

**GET**

/ve\_vnfm/vnfpm/v2/pm\_jobs Query multiple PM Jobs

**GET**

/ve\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId} Read an individual PM Job

**DELETE**

/ve\_vnfm/vnfpm/v2/pm\_jobs/{pmJobId} Delete a PM Job

## Or-Vnfm thresholds

These are all the resources and methods provided for the VNF thresholds interface for the Or-Vnfm Reference Point.



**POST**

/or\_vnfm/vnfpm/v2/thresholds Create a new threshold

**GET**

/or\_vnfm/vnfpm/v2/thresholds Query the list of thresholds

**GET**

/or\_vnfm/vnfpm/v2/thresholds/{thresholdId} Read an individual threshold resource

**DELETE**

/or\_vnfm/vnfpm/v2/thresholds/{thresholdId} Delete an individual threshold

## Ve-Vnfm thresholds

These are all the resources and methods provided for the VNF thresholds interface for the Ve-Vnfm Reference Point.



**GET**

/ve\_vnfm/vnfpm/v2/thresholds/{thresholdId} Read an individual threshold resource

**DELETE**

/ve\_vnfm/vnfpm/v2/thresholds/{thresholdId} Delete an individual threshold

**POST**

/ve\_vnfm/vnfpm/v2/thresholds Create a new threshold

**GET**

/ve\_vnfm/vnfpm/v2/thresholds Query the list of thresholds

## Maintenance Operations

This resource represents ETSI Maintenance Operations



**POST**

/etsi/operationmode/{operationMode} Sets the Operation Mode of ETSI

**GET**

/etsi/operationmode Returns the ETSI Operation Mode

## api\_versions

GET

/or\_vnfm/{apiName}/{apiMajorVersion}/api\_versions

Query API version information for a given major version

GET

/or\_vnfm/{apiName}/api\_versions

Query API version information

### Models

#### FmNotificationsFilter {

*description:*

*This type represents a subscription filter related to notifications about VNF faults.*

perceivedSeverities > [...]

faultyResourceTypes > [...]

probableCauses > [...]

vnfInstanceSubscriptionFilter **VnfInstanceSubscriptionFilter** > {...}

notificationTypes > [...]

eventTypes > [...]

}

#### OperateVnfRequestSol2 {

*description:*

*This type represents request parameters for the "Operate VNF" operation.*

vnfcInstanceId string(\$uuid)  
Identifier of VNFC instances. Cardinality can be "0" to denote that the request applies to the whole VNF and not a specific VNFC instance.

additionalParams **KeyValuePairs** > {...}

stopType string  
It signals whether forceful or graceful stop is requested. Ignored if changeStateTo=STARTED.

Enum:

> Array [ 1 ]

changeStateTo\* VnfOperationalStateType string

Enum:

> Array [ 2 ]

}

### HealVnfRequestSol2 ▾ {

*description:* This type represents request parameters for the "Heal VNF" operation.

healScript string  
Provides link to a script that should be executed as part of the healing action or a set of rules for healing procedure.

vnfcInstanceId > [...]

additionalParams **KeyValuePairs** > {...}

cause string  
Indicates the reason why a healing procedure is required.

}

### AffectedVirtualStorage ▾ {

*description:* This type provides information about added, deleted, modified and temporary virtual storage resources

changeType\* string  
Signals the type of change.  
  
Enum:

virtualLinkDescId\* > Array [ 4 ]  
string(\$uuid)  
Identifier of the related VirtualStorage descriptor in the VNFD.

id\* string(\$uuid)  
Identifier of the storage instance, identifying the applicable "virtualStorageResourceInfo" entry in the "VnfInstance" data type

storageResource\* **ResourceHandle** > {...}

}

### VimConnectionInfo ▾ {

*description:* This type represents parameters needed to connect to a VIM for managing the resources of a VNF instance.

vimType\* string  
Discriminator for the different types of the VIM information.

vimId string(\$uuid)  
The identifier of the VIM instance. This identifier is managed by the NFVO.

extra **KeyValuePairs** > {...}

interfaceInfo **KeyValuePairs** > {...}

accessInfo **KeyValuePairs** > {...}

}

## CancelModeType `string`

Enum:

➤ Array [ 2 ]

## TerminateVnfRequest `{`

*description:* This type represents request parameters for the "Terminate VNF" operation.

`gracefulTerminationTimeout` `integer($int32)`  
This attribute is only applicable in case of graceful termination. It defines the time to wait for the VNF to be taken out of service before shutting down the VNF and releasing the resources. The unit is seconds.

`additionalParams` **KeyValuePairs** ➤ {...}

`terminationType*` `string`  
Indicates whether forceful or graceful termination is requested.

Enum:

➤ Array [ 2 ]

`}`

## PmJobModifications `{`

*description:* This type represents modifications to a PM job

`callbackUri*` `string($uri)`  
The URI of the endpoint to send the notification to.

`authentication` **SubscriptionAuthentication** ➤ {...}

`}`

## CreatePmJobRequest `{`

*description:* This type represents a request to create a PM job

`subObjectInstanceIds*` ➤ [...]

`objectInstanceIds*` ➤ [...]

`criteria*` **PmJobCriteria** ➤ {...}

`callbackUri*` `string($uri)`  
The URI of the endpoint to send the notification to.

`authentication` **SubscriptionAuthentication** ➤ {...}

`objectType*` `string`  
Type of the measured object.

`}`

## LifecycleChangeNotificationsFilter `{`

*description:* This type represents a subscription filter related to

*notifications about VNF lifecycle changes*

```
operationStates > [...]
vnfInstanceSubscriptionFilter VnfInstanceSubscriptionFilter > {...}
notificationTypes > [...]
operationTypes > [...]
}
```

### **LccnLinks** ▾ {

*description:* *This type represents the links to resources that a notification can contain*

```
subscription* Link > {...}
vnfLcmOpOcc Link > {...}
vnfInstance* Link > {...}
}
```

### **VnfExtCpConfig** ▾ {

*description:* *This type represents an externally provided link port or network address information per instance of an external connection point.*

```
linkPortId string($uuid)
Identifier of a pre-configured link port to which the external CP will be associated.

cpProtocolData > [...]
parentCpConfigId string($uuid)
Value of the key that identifies the "VnfExtCpConfig" map entry which corresponds to the parent port of the trunk. Only present in "VnfExtCpConfig" structures that provide configuration information for a CP which represents a sub-port in a trunk, and if parent ports are supported.

}
```

### **HealVnfRequest** ▾ {

*description:* *This type represents request parameters for the "Heal VNF" operation.*

```
vnfcInstanceId > [...]
additionalParams KeyValuePairs > {...}
cause string
Indicates the reason why a healing procedure is required.

}
```

### **ChangeVnfFlavourRequest** ▾ {

```

description: This type represents request parameters for the "Change VNF
flavour" operation.

extManagedVirtualLinks > [...]
instantiationLevelId string($uuid)
Identifier of the instantiation level of the deployment
flavour to be instantiated. If not present, the default
instantiation level as declared in the VNFD is instantiated.

vimConnectionInfo > {...}
additionalParams KeyValuePairs > {...}
extVirtualLinks > [...]
newFlavourId* string($uuid)
Identifier of the VNF deployment flavour to be instantiated.

}

```

**PerceivedSeverityType** string

Enum:

> Array [ 6 ]

**MonitoringMigrateRequest** ▾ {

*description:* This type represents request parameters for the operate operation available on ext API.

key\* string  
This is the key in which the value for the monitoring agent should be stored.

monitoringAgent\* string  
Deployment identifier of the monitoring agent. In the event the agent is local to ESC, the string should be set to "dmonaName://local\_mona".

}

**Threshold** ▾ {

*description:* This type represents a threshold

objectInstanceId\* string(\$uuid)  
Identifier of the VNF instance associated with the threshold.

\_links\* > {...}

subObjectInstanceIds\* > [...]

criteria\* **ThresholdCriteria** > {...}

callbackUri\* string(\$uri)  
The URI of the endpoint to send the notification to.

id\* string(\$uuid)  
Identifier of this threshold resource.



```
objectType*      string
                  Type of the measured object.

}
```

### ApiVersionInformation ▾ {

*description:* This type represents API version information.

```
apiVersions*    > {...}
```

```
uriPrefix*      string
                  Specifies the URI prefix for the API, in the following form
                  {apiRoot}/{apiName}/{apiMajorVersion}/.
```

```
}
```

### LccnSubscription ▾ {

*description:* This type represents a subscription related to notifications about VNF lifecycle changes.

```
filter          LifecycleChangeNotificationsFilter > {...}
```

```
_links*        > {...}
```

```
callbackUri*    string($uri)
                  The URI of the endpoint to send the notification to.
```

```
id*             string($uuid)
                  Identifier of this subscription resource.
```

```
}
```

### AffectedVirtualLink ▾ {

*description:* This type provides information about added, deleted, modified and temporary VLS

```
networkResource* ResourceHandle > {...}
```

```
changeType*     string
                  Signals the type of change.
```

Enum:

```
> Array [ 6 ]
```

```
virtualLinkDescId* string($uuid)
                  Identifier of the related VLD in the VNFD.
```

```
id*             string($uuid)
                  Identifier of the virtual link instance, identifying the
                  applicable "vnfVirtualLinkResourceInfo" entry in the
                  "VnfInstance" data type
```

```
}
```

```
LcmOperationStateType string
```

Enum:

➤ Array [ 7 ]

**VnfOperationalStateType** string

Enum:

➤ Array [ 2 ]

**CreateVnfRequest** ▼ {

*description:* This type represents request parameters for the "Create VNF identifier" operation.

**vnfdId\*** string(\$uuid)  
Identifier that identifies the VNFD which defines the VNF instance to be created.

**vnfInstanceName** string  
Human-readable name of the VNF instance to be created.

**vnfInstanceDescription** string  
Human-readable description of the VNF instance to be created.

}

**VnfIdentifierCreationNotification** ▼ {

*description:* This type represents a VNF identifier creation notification, which informs the receiver of the creation of a new VNF instance resource and the associated VNF instance identifier

**timeStamp\*** string(\$date-time)  
Date-time of the generation of the notification.

**vnfInstanceId\*** string(\$uuid)  
The created VNF instance identifier

**\_links\*** **LccnLinks** ➤ {...}

**id\*** string(\$uuid)  
Identifier of this notification

**notificationType\*** string  
Discriminator for the different notification types.

**subscriptionId** string(\$uuid)  
Identifier of the subscription that this notification relates to.

}

**MacAddress** string

**PmNotificationsFilter** ▼ {

*description:* This type represents a filter that can be used to subscribe for notifications related to performance

*management events.*

```
vnfInstanceSubscriptionFilter VnfInstanceSubscriptionFilter > {...}
notificationTypes
  > [...]
}
```

### **PmJobCriteria** ▾ {

*description:* *This type represents collection criteria for PM jobs*

collectionPeriod\* **integer**(\$int32)  
Specifies the periodicity at which the producer will collect performance information.

reportingPeriod\* **integer**(\$int32)  
Specifies the periodicity at which the producer will report to the consumer about performance information.

reportingBoundary **string**(\$date-time)  
Identifies a time boundary after which the reporting will stop. The boundary shall allow a single reporting as well as periodic reporting up to the boundary.

performanceMetricGroup > [...]

performanceMetric > [...]

}

### **CpProtocolData** ▾ {

*description:* *This type represents network protocol data.*

ipOverEthernet > [...]

layerProtocol **string**  
Identifier of layer(s) and protocol(s). Permitted values: IP\_OVER\_ETHERNET

Enum:  
> Array [ 1 ]

}

### **VirtualStorageResourceInfo** ▾ {

*description:* *This type represents the information that allows addressing a virtualised resource that is used by a VNF instance*

metadata **KeyValuePairs** > {...}

reservationId **string**(\$uuid)  
The reservation identifier applicable to the resource. It shall be present when an applicable reservation exists.

virtualStorageDescId\* **string**(\$uuid)  
Identifier of the VirtualStorageDesc in the VNFD.

id\* **string**(\$uuid)  
Identifier of this VirtualStorageResourceInfo instance.

storageResource

**ResourceHandle** > {...}

}

### FmSubscription **▼** {

*description:* This type represents a subscription related to notifications about VNF faults.

filter

**FmNotificationsFilter** > {...}

\_links\*

> {...}

callbackUri\*

string(\$uri)

The URI of the endpoint to send the notification to.

id\*

string(\$uuid)

Identifier of this subscription resource.

}

### AlarmSol2 **▼** {

*description:* The alarm data type encapsulates information about an alarm.

isRootCause\*

boolean

Attribute indicating if this fault is the root for other correlated alarms. If TRUE, then the alarms listed in the attribute CorrelatedAlarmId are caused by this fault.

rootCauseFaultyResource\*

**FaultyResourceInfo** > {...}

alarmRaisedTime\*

string(\$date-time)

Time stamp indicating when the alarm is raised by the managed object.

alarmClearedTime

string(\$date-time)

Time stamp indicating when the alarm was cleared. It shall be present if the alarm has been cleared

eventType\*

EventType string

Enum:

> Array [ 5 ]

alarmChangedTime

string(\$date-time)

Time stamp indicating when the alarm was last changed. It shall be present if the alarm has been updated.

ackState\*

string

Acknowledgement state of the alarm.

Enum:

> Array [ 2 ]

managedObjectId\*

string(\$uuid)

Identifier of the affected VNF instance.

perceivedSeverity\*

PerceivedSeverityType string

Enum:

> Array [ 6 ]

probableCause\*

string

Information about the probable cause of the fault.

```

eventTime*          string($date-time)
                    Time stamp indicating when the fault was observed.

faultType           string
                    Additional information to clarify the type of the fault.

correlatedAlarmIds > [...]

faultDetails        > [...]

id*                string($uuid)
                    Identifier of this Alarm information element.

vnfcInstanceIds*   > [...]

}

```

### ThresholdModifications ▼ {

```

description:        This type represents modifications to a threshold

callbackUri*       string($uri)
                    The URI of the endpoint to send the notification to.

authentication      SubscriptionAuthentication > {...}

}

```

### CancelMode ▼ {

```

description:        This type represents a parameter to select the mode of
                    cancelling an ongoing VNF LCM operation occurrence.

cancelMode*        CancelModeType string
                    Enum:
                    > Array [ 2 ]

}

```

### VnfIdentifierDeletionNotification ▼ {

```

description:        This type represents a VNF identifier deletion notification,
                    which informs the receiver of the deletion of a new VNF
                    instance resource and the associated VNF instance identifier.

timeStamp*         string($date-time)
                    Date-time of the generation of the notification.

vnfInstanceId*     string($uuid)
                    The deleted VNF instance identifier

_links*            LccnLinks > {...}

id*                string($uuid)
                    Identifier of this notification

notificationType* string
                    Discriminator for the different notification types.

subscriptionId     string($uuid)
                    Identifier of the subscription that this notification relates
                    to.

```

```
}
```

### Link ▾ {

*description:* This type represents a link to a resource.

href\* string(\$uri)  
URI of the referenced resource.

```
}
```

### VnfcResourceInfo ▾ {

*description:* This type represents the information on virtualised compute and storage resources used by a VNFC in a VNF instance

metadata

**KeyValuePairs** > {...}

storageResourceIds

> [...]

reservationId

string(\$uuid)

The reservation identifier applicable to the resource. It shall be present when an applicable reservation exists.

vnfcCpInfo

> {...}

id\*

string(\$uuid)

Identifier of this VnfcResourceInfo instance

vduId\*

string(\$uuid)

Reference to the applicable VDU in the VNFD.

computeResource

**ResourceHandle** > {...}

```
}
```

### ExtManagedVirtualLinkData ▾ {

*description:* This type represents an externally-managed internal VL.

resourceId\*

string(\$uuid)

The identifier of the resource in the scope of the VIM or the resource provider.

vimConnectionId

string(\$uuid)

Identifier of the VIM connection to manage this resource. This attribute shall only be supported and present if VNF-related resource management in direct mode is applicable.

virtualLinkDescId\*

string(\$uuid)

The identifier of the VLD in the VNFD for this VL.

vnfLinkPort

> [...]

id\*

string(\$uuid)

The identifier of the externally-managed internal VL instance.

```

resourceProviderId      string($uuid)
                        Identifies the entity responsible for the
                        management of this resource. This attribute shall
                        only be supported and present if VNF-related
                        resource management in indirect mode is
                        applicable.

extManagedMultisiteVirtualLinkId string($uuid)
                        Identifier of the externally-managed multi-site VL
                        instance. The identifier is assigned by the NFV-
                        MANO entity that manages the externally managed
                        multi-site VL instance. It shall be present when
                        the present externally-managed internal VL
                        (indicated by extManagedVirtualLinkId) is part of
                        a multi-site VL, e.g. in support of multi-site VNF
                        spanning several VIMs. All externally-managed
                        internal VL instances corresponding to an internal
                        VL created based on the same virtualLinkId
                        shall refer to the same
                        extManagedMultisiteVirtualLinkId.

}

```

### VnfLcmOpOccGeneric ▾ {

*description:* This type represents a VNF lifecycle management operation occurrence.

**grantId** string(\$uuid)  
Identifier of the grant related to this VNF LCM operation occurrence, if such grant exists.

**\_links\*** > {...}  
**operationState\*** LcmOperationStateType string  
Enum:

**error** > Array [ 7 ]  
**ProblemDetails** > {...}

**vnfInstanceId\*** string(\$uuid)  
Identifier of the VNF instance to which the operation applies.

**resourceChanges** > {...}  
**cancelMode** CancelModeType string  
Enum:

**operationParams\*** > Array [ 2 ]  
> {...}  
**stateEnteredTime\*** string(\$date-time)  
Date-time when the current state was entered.

**changedExtConnectivity** > [...]  
**startTime\*** string(\$date-time)  
Date-time of the start of the operation.

**id\*** string(\$uuid)  
Identifier of this VNF lifecycle management operation occurrence.

```

isAutomaticInvocation* boolean
    Set to true if this VNF LCM operation occurrence has been
    triggered by an automated procedure inside the VNFM (i.e.
    ScaleVnf / ScaleVnfToLevel triggered by auto-scale, or
    HealVnf triggered by auto-heal). Set to false otherwise.

operation* LcmOperationType string
    The enumeration LcmOperationType represents those lifecycle
    operations that trigger a VNF lifecycle management operation
    occurrence notification.

    Enum:
        > Array [ 9 ]
isCancelPending* boolean
    If the VNF LCM operation occurrence is in "STARTING",
    "PROCESSING" or "ROLLING_BACK" state and the operation is
    being cancelled, this attribute shall be set to true.
    Otherwise, it shall be set to false.
}

```

### ExtManagedVirtualLinkInfo {

```

description: This type provides information about an externally-managed
virtual link.

networkResource* ResourceHandle > {...}

id* string($uuid)
    Identifier of the externally-managed internal VL and the
    related externally-managed VL information instance.

vnfVirtualLinkDescId* string($uuid)
    Identifier of the VNF Virtual Link Descriptor (VLD) in the
    VNFD.

vnfLinkPorts > [...]

}

```

### VnfLcmOperationOccurrenceNotification {

```

description: This type represents a VNF lifecycle management operation
occurrence notification, which informs the receiver of
changes in the VNF lifecycle caused by a VNF LCM operation
occurrence.

notificationStatus* string
    Indicates whether this notification reports about the start
    of a lifecycle operation or the result of a lifecycle
    operation.

    Enum:
        > Array [ 2 ]
affectedVirtualLinks > [...]
affectedVirtualStorages > [...]
affectedVnfcs > [...]
_links* LccnLinks > {...}

```



```

operationState*      LcmOperationStateType  string
                    Enum:
                        > Array [ 7 ]
notificationType*   string
                    Discriminator for the different notification types.

error               > [...]
timeStamp*         string($date-time)
                    Date-time of the generation of the notification.

vnfInstanceId*     string($uuid)
                    The identifier of the VNF instance affected

vnfLcmOpOccId*     string($uuid)
                    The identifier of the VNF lifecycle management operation
                    occurrence associated to the notification.

changedInfo        VnfInfoModifications > {...}
changedExtConnectivity > [...]
id*                string($uuid)
                    Identifier of this notification

subscriptionId     string($uuid)
                    Identifier of the subscription that this notification
                    relates to.

isAutomaticInvocation* string($boolean)
                    Set to true if this VNF LCM operation occurrence has been
                    triggered by an automated procedure inside the VNFM (i.e.
                    ScaleVnf / ScaleVnfToLevel triggered by auto-scale, or
                    HealVnf triggered by auto-heal).

operation*         LcmOperationType  string
                    The enumeration LcmOperationType represents those lifecycle
                    operations that trigger a VNF lifecycle management
                    operation occurrence notification.

                    Enum:
                        > Array [ 9 ]
}

```

### VnfLcmOpOccSol2 ▾ {

```

description:        This type represents a VNF lifecycle management operation
                    occurrence.

grantId            string($uuid)
                    Identifier of the grant related to this VNF LCM operation
                    occurrence, if such grant exists.

_links*           > {...}
operationState*   LcmOperationStateType  string
                    Enum:
                        > Array [ 7 ]

error             ProblemDetails > {...}
vnfInstanceId*   string($uuid)
                    Identifier of the VNF instance to which the operation
                    applies.

```

```

resourceChanges      > {...}
cancelMode           CancelModeType string
                    Enum:
                    > Array [ 2 ]
operationParams*    > {...}
stateEnteredTime*   string($date-time)
                    Date-time when the current state was entered.

changedExtConnectivity > [...]
startTime*          string($date-time)
                    Date-time of the start of the operation.

id*                 string($uuid)
                    Identifier of this VNF lifecycle management operation
                    occurrence.

isAutomaticInvocation* boolean
                    Set to true if this VNF LCM operation occurrence has been
                    triggered by an automated procedure inside the VNFM (i.e.
                    ScaleVnf / ScaleVnfToLevel triggered by auto-scale, or
                    HealVnf triggered by auto-heal). Set to false otherwise.

operation*          LcmOperationType string
                    The enumeration LcmOperationType represents those lifecycle
                    operations that trigger a VNF lifecycle management operation
                    occurrence notification.

                    Enum:
                    > Array [ 9 ]
isCancelPending*    boolean
                    If the VNF LCM operation occurrence is in "STARTING",
                    "PROCESSING" or "ROLLING_BACK" state and the operation is
                    being cancelled, this attribute shall be set to true.
                    Otherwise, it shall be set to false.

changedInfo         VnfInfoModificationsSol2 > {...}
}

```

```

NetworkAddressInfo ▾ {
  description:      This type represents information about a network address that
                      has been assigned

  macAddress*        MacAddress string
  subnetIpRanges     > [...]
  ipAddress          IPAddress string
}

```

```

VnfInfoModifications ▾ {
  description:      This type represents attribute modifications that were
                      performed on an "Individual VNF instance" resource. The
                      attributes that can be included consist of those
                      requested to be modified explicitly in the
                      "VnfInfoModificationRequest" data structure, and
                      additional attributes of the "VnfInstance" data structure
                      that were modified implicitly e.g. when modifying the

```

*referenced VNF package.*

```
vnfProductName      string
                    If present, this attribute signals modifications of the
                    "vnfProductName" attribute in "VnfInstance".

metadata            KeyValuePairs > {...}

extensions          KeyValuePairs > {...}

vimConnectionInfo  > {...}

vnfdVersion         string
                    If present, this attribute signals modifications of the
                    "vnfdVersion" attribute in "VnfInstance".

vnfProvider        string
                    If present, this attribute signals modifications of the
                    "vnfProvider" attribute in "VnfInstance".

vnfConfigurableProperties KeyValuePairs > {...}

vnfPkgId           string($uuid)
                    If present, this attribute signals modifications of the
                    "vnfPkgId" attribute in "VnfInstance".

vnfdId             string($uuid)
                    If present, this attribute signals modifications of the
                    "vnfdId" attribute in "VnfInstance".

vnfInstanceName    string
                    If present, this attribute signals modifications of the
                    "vnfInstanceName" attribute in "VnfInstance".

vnfInstanceDescription string
                    If present, this attribute signals modifications of the
                    "vnfInstanceDescription" attribute in "VnfInstance".

vnfSoftwareVersion string
                    If present, this attribute signals modifications of the
                    "vnfSoftwareVersion" attribute in "VnfInstance".

}
```

### **IpOverEthernetAddressData** ▾ {

*description:*      *This type represents network address data for IP over Ethernet.*

macAddress          string(\$mac)  
MAC address.

ipAddresses          > [...]

segmentationId      string  
Identification of the network segment to which the Cp instance connects to.

}

### **Entry** ▾ {

*description:*      *Performance information entry*

```

objectInstanceId*  string
                   The object instance (i.e. VNF instance) for which the
                   performance metric is reported.

performanceMetric* string
                   Name of the metric collected.

performanceValues* > [...]

objectType*       string
                   Defines the object type for which performance information is
                   reported
}

```

### VnfInstanceSubscriptionFilter ▾ {

*description:* This type represents subscription filter criteria to match VNF instances.

```

vnfdIds           > [...]
vnfProductsFromProviders > [...]
vnfInstanceNames > [...]
vnfInstanceIds   > [...]
}

```

### AlarmModifications ▾ {

*description:* This type represents attribute modifications for an "Individual alarm" resource

```

ackState*        string
                  New value of the "ackState" attribute in "Alarm".

                  Enum:
                  > Array [ 1 ]
}

```

### ExtVirtualLinkData ▾ {

*description:* This type represents an external VL.

```

resourceId*      string($uuid)
                  The identifier of the resource in the scope of the VIM or the
                  resource provider.

vimConnectionId string($uuid)
                  Identifier of the VIM connection to manage this resource.
                  This attribute shall only be supported and present if VNF-
                  related resource management in direct mode is applicable.

id*              string($uuid)
                  The identifier of the external VL instance.

resourceProviderId string($uuid)
                  Identifies the entity responsible for the management of this
                  resource. This attribute shall only be supported and present
                  if VNF-related resource management in indirect mode is

```

```
    applicable.  
    extCps > [...] }  
}
```

### ChangeVnfFlavourRequestSol2 ▾ {

*description:* This type represents request parameters for the "Change VNF flavour" operation.

```
    extManagedVirtualLinks > [...]  
    instantiationLevelId string($uuid)  
                        Identifier of the instantiation level of the deployment  
                        flavour to be instantiated. If not present, the default  
                        instantiation level as declared in the VNFD is instantiated.  
    additionalParams KeyValuePairs > {...}  
    extVirtualLinks > [...]  
    newFlavourId* string($uuid)  
                  Identifier of the VNF deployment flavour to be instantiated.  
}
```

### VnfExtCpData ▾ {

*description:* This type represents an external CP.

```
    cpdId* string($uuid)  
          The identifier of the CPD in the VNFD.  
    cpConfig* > {...}  
}
```

### StopType string

Enum:

> Array [ 2 ]

### OperateRequest ▾ {

*description:* This type represents request parameters for the operate operation available on ext API.

```
    additionalParams KeyValuePairs > {...}  
    vnfcInstanceIds > [...]  
    operation* > {...}  
}
```

### SubscriptionAuthentication ▾ {

*description:* A data structure that defines the authorization requirements.

```
paramsOauth2ClientCredentials > {...}
paramsBasic > {...}
authType* > [...]
```

```
}
```

### LccnSubscriptionRequest ▾ {

*description:* This type represents a subscription request related to notifications about VNF lifecycle changes.

filter **LifecycleChangeNotificationsFilter** > {...}

callbackUri\* string(\$uri)  
The URI of the endpoint to send the notification to.

authentication **SubscriptionAuthentication** > {...}

```
}
```

### FaultyResourceType string

Enum:

> Array [ 3 ]

### ExtVirtualLinkInfo ▾ {

*description:* This type represents information about an external VL.

resourceHandle\* **ResourceHandle** > {...}

linkPorts > [...]

id\* string(\$uuid)  
Identifier of the external VL and the related external VL information instance

```
}
```

### IpAddress string

### PerformanceValue ▾ {

*description:* Performance value with associated timestamp

value\* > {...}

timestamp\* string(\$date-time)  
Time stamp indicating when the data was collected.

```
}
```

### EventType string

Enum:

› Array [ 5 ]

### ScaleInfo ▾ {

*description:* This type represents the scale level of a VNF instance related to a scaling aspect.

scaleLevel\* integer(\$int32)  
Indicates the scale level. The minimum value shall be 0 and the maximum value shall be <= maxScaleLevel as described in the VNFD.

aspectId\* string(\$uuid)  
Identifier of the scaling aspect

}

### InstantiateVnfRequest ▾ {

*description:* This type represents request parameters for the "Instantiate VNF" operation.

extManagedVirtualLinks › [...]

flavourId\* string(\$uuid)  
Identifier of the VNF deployment flavour to be instantiated.

instantiationLevelId string(\$uuid)  
Identifier of the instantiation level of the deployment flavour to be instantiated. If not present, the default instantiation level as declared in the VNFD is instantiated.

vimConnectionInfo › {...}

additionalParams **KeyValuePairs** › {...}

extVirtualLinks › [...]

localizationLanguage string  
Localization language of the VNF to be instantiated.

}

### VnfInfoModificationRequest ▾ {

*description:* This type represents attribute modifications for an "Individual VNF instance" resource, i.e. modifications to a resource representation based on the "VnfInstance" data type.

metadata **KeyValuePairs** › {...}

extensions **KeyValuePairs** › {...}

vimConnectionInfo › {...}

vnfPkgId string(\$uuid)  
New value of the "vnfPkgId" attribute in "VnfInstance". The value "null" is not permitted.

vnfConfigurableProperties **KeyValuePairs** › {...}

```

vnfInstanceName      string
                    New value of the "vnfInstanceName" attribute in
                    "VnfInstance", or "null" to remove the attribute.

vnfInstanceDescription string
                    New value of the "vnfInstanceDescription" attribute in
                    "VnfInstance", or "null" to remove the attribute.

}

```

### ChangeExtVnfConnectivityRequestSol2 ▼ {

*description:* This type represents request parameters for the "Change external VNF connectivity" operation to modify the external connectivity of a VNF instance.

```

additionalParams      KeyValuePairs > {...}
extVirtualLinks*     > [...]

}

```

### VnfInstanceSol2 ▼ {

*description:* This type represents a VNF instance as per Ve-Vnfm Reference Point.

```

vnfProductName*      string
                    Name to identify the VNF Product. The value is copied
                    from the VNFD.

vnfdVersion*         string
                    Identifies the version of the VNFD. The value is copied
                    from the VNFD.

metadata              KeyValuePairs > {...}
vnfProvider*         string
                    Provider of the VNF and the VNFD. The value is copied
                    from the VNFD.

_links*              > {...}
vnfPkgId*            string($uuid)
                    Identifier of information held by the NFVO about the
                    specific VNF package on which the VNF is based. This
                    identifier was allocated by the NFVO.

vnfConfigurableProperties KeyValuePairs > {...}
vnfdId*              string($uuid)
                    Identifier of the VNFD on which the VNF instance is
                    based.

instantiationState*  string
                    The instantiation state of the VNF.

                    Enum:
                    > Array [ 2 ]

vnfInstanceDescription string
                    Human-readable description of the VNF instance.

```



```

extensions
instantiatedVnfInfo
vnfInstanceName

id*
vnfSoftwareVersion*

}

```

**KeyValuePairs** > {...}

> {...}

string  
Name of the VNF instance.

string(\$uuid)  
Identifier of the VNF instance.

string  
Software version of the VNF. The value is copied from the VNFD.

### ScaleVnfToLevelRequest ▾ {

*description:* This type represents request parameters for the "Scale VNF to Level" operation.

```

instantiationLevelId
scaleInfo
additionalParams

}

```

string(\$uuid)  
Identifier of the target instantiation level of the current deployment flavour to which the VNF is requested to be scaled.

> [...]

**KeyValuePairs** > {...}

### LcmOperationType string

The enumeration LcmOperationType represents those lifecycle operations that trigger a VNF lifecycle management operation occurrence notification.

Enum:

> Array [ 9 ]

### ThresholdCriteria ▾ {

*description:* This type represents criteria that define a threshold.

```

simpleThresholdDetails
performanceMetric*
thresholdType*

}

```

> {...}

string  
Defines the performance metric associated with the threshold, as specified in an external measurement specification.

string  
Type of threshold. This attribute determines which other attributes are present in the data structure.

Enum:  
> Array [ 1 ]

## OperationMode `string`

This type includes the Operation Mode of ETSI

### PmSubscriptionRequest **▼** {

*description:* This type represents a subscription request related to notifications about VNF performance.

filter

**PmNotificationsFilter** **>** {...}

callbackUri\*

`string($uri)`

The URI of the endpoint to send the notification to.

authentication

**SubscriptionAuthentication** **>** {...}

}

### VnfcInfoModifications **▼** {

*description:* This type represents modifications of an entry in an array of "VnfcInfo" objects.

vnfcConfigurableProperties\*

**KeyValuePairs** **>** {...}

id\*

`string($uuid)`

Identifier of the VNFC instance of which the information is to be modified.

}

### VnfInfoModificationRequestSol2 **▼** {

*description:* This type represents attribute modifications for an "Individual VNF instance" resource, i.e. modifications to a resource representation based on the "VnfInstance" data type.

vnfcInfoModifications

**>** [...]

metadata

**KeyValuePairs** **>** {...}

extensions

**KeyValuePairs** **>** {...}

vnfcInfoModificationsDeleteIds

`string($uuid)`

List of identifiers entries to be deleted from the "vnfcInfoModifications" attribute array to be used as "deleteIdList".

vnfPkgId

`string($uuid)`

New value of the "vnfPkgId" attribute in "VnfInstance". The value "null" is not permitted.

vnfcConfigurableProperties

**KeyValuePairs** **>** {...}

vnfInstanceName

`string`

New value of the "vnfInstanceName" attribute in "VnfInstance", or "null" to remove the attribute.

```
vnfInstanceDescription      string
                             New value of the "vnfInstanceDescription" attribute
                             in "VnfInstance", or "null" to remove the attribute.
}
```

### ExtLinkPort ▼ {

*description:* This type represents a link port of an external VL, i.e. a port providing connectivity for the VNF to an NS VL.

```
resourceHandle*            ResourceHandle > {...}
id*                         string($uuid)
                             Identifier of this link port as provided by the entity that
                             has created the link port.
cpInstanceId                string($uuid)
                             Identifier of the external CP of the VNF to be connected to
                             this link port.
```

```
}
```

### ChangeExtVnfConnectivityRequest ▼ {

*description:* This type represents request parameters for the "Change external VNF connectivity" operation to modify the external connectivity of a VNF instance.

```
vimConnectionInfo          > {...}
additionalParams            KeyValuePairs > {...}
extVirtualLinks*           > [...]
```

```
}
```

### PerformanceReport ▼ {

*description:* This type defines the format of a performance report provided by the VNFM to the NFVO as a result of collecting performance information as part of a PM job.

```
entries*                   > [...]
```

```
}
```

## VnfLinkPortData ▾ {

*description:* This type represents an externally provided link port to be used to connect a VNFC connection point to an externally-managed VL.

resourceHandle\* **ResourceHandle** > {...}

vnfLinkPortId\* `string($uuid)`  
Identifier of this link port as provided by the entity that has created the link port.

}

## FmSubscriptionRequest ▾ {

*description:* This type represents a subscription request related to notifications about VNF faults.

filter **FmNotificationsFilter** > {...}

callbackUri\* `string($uri)`  
The URI of the endpoint to send the notification to.

authentication **SubscriptionAuthentication** > {...}

}

## VnfInfoModificationsSol2 ▾ {

*description:* This type represents attribute modifications that were performed on an "Individual VNF instance" resource. The attributes that can be included consist of those requested to be modified explicitly in the "VnfInfoModificationRequest" data structure, and additional attributes of the "VnfInstance" data structure that were modified implicitly e.g. when modifying the referenced VNF package.

vnfProductName `string`  
If present, this attribute signals modifications of the "vnfProductName" attribute in "VnfInstance".

metadata **KeyValuePairs** > {...}

extensions **KeyValuePairs** > {...}

vnfdVersion `string`  
If present, this attribute signals modifications of the "vnfdVersion" attribute in "VnfInstance".

vnfProvider `string`  
If present, this attribute signals modifications of the "vnfProvider" attribute in "VnfInstance".

vnfConfigurableProperties **KeyValuePairs** > {...}

vnfPkgId `string($uuid)`  
If present, this attribute signals modifications of the "vnfPkgId" attribute in "VnfInstance".

```

vnfdId                string($uuid)
                       If present, this attribute signals modifications of the
                       "vnfdId" attribute in "VnfInstance".

vnfInstanceName       string
                       If present, this attribute signals modifications of the
                       "vnfInstanceName" attribute in "VnfInstance".

vnfInstanceDescription string
                       If present, this attribute signals modifications of the
                       "vnfInstanceDescription" attribute in "VnfInstance".

vnfSoftwareVersion    string
                       If present, this attribute signals modifications of the
                       "vnfSoftwareVersion" attribute in "VnfInstance".

}

```

### MonitoringParameter ▾ {

```

description:        This type represents a monitoring parameter that is tracked
                       by the VNFM

timeStamp*            string($date-time)
                       Represents the point in time when the measurement has been
                       performed, as known to the VNFM.

name                  string
                       Human readable name of the monitoring parameter, as defined
                       in the VNFD.

id*                   string($uuid)
                       Identifier of the monitoring parameter defined in the VNFD.

value*                > {...}

}

```

### InstantiateVnfRequestSol2 ▾ {

```

description:        This type represents request parameters for the "Instantiate
                       VNF" operation.

extManagedVirtualLinks > [...]

flavourId*            string($uuid)
                       Identifier of the VNF deployment flavour to be instantiated.

instantiationLevelId  string($uuid)
                       Identifier of the instantiation level of the deployment
                       flavour to be instantiated. If not present, the default
                       instantiation level as declared in the VNFD is instantiated.

additionalParams      KeyValuePairs > {...}

extVirtualLinks       > [...]

localizationLanguage  string
                       Localization language of the VNF to be instantiated.

}

```

## ScaleVnfRequest ▾ {

*description:* This type represents request parameters for the "Scale VNF" operation.

numberOfSteps `integer($int32)`  
Number of scaling steps to be executed as part of this Scale VNF operation. It shall be a positive number and the default value shall be 1.

additionalParams **KeyValuePairs** > {...}

aspectId\* `string($uuid)`  
Identifier of the scaling aspect.

type\* `string`  
Indicates the type of the scale operation requested.

Enum:  
> Array [ 2 ]

}

## OperateVnfRequest ▾ {

*description:* This type represents request parameters for the "Operate VNF" operation.

additionalParams **KeyValuePairs** > {...}

stopType `StopType string`  
Enum:  
> Array [ 2 ]

gracefulStopTimeout `integer($int32)`  
The time interval (in seconds) to wait for the VNF to be taken out of service during graceful stop, before stopping the VNF. Ignored if changeStateTo=STARTED.

changeStateTo\* `VnfOperationalStateType string`  
Enum:  
> Array [ 2 ]

}

## AffectedVnfc ▾ {

*description:* This type provides information about added, deleted, modified and temporary VNFCs.

addedStorageResourceIds > [...]

changeType\* `string`  
Signals the type of change

Enum:  
> Array [ 4 ]

id\* `string($uuid)`  
Identifier of the Vnfc instance, identifying the applicable "vnfcResourceInfo" entry in the "VnfInstance" data type

```

vduId* string($uuid)
Identifier of the related VDU in the VNFD.

computeResource* ResourceHandle > {...}
removedStorageResourceIds > [...]
}

```

### VnfVirtualLinkResourceInfo ▼ {

*description:* This type represents the information that allows addressing a virtualised resource that is used by an internal VL instance in a VNF instance.

```

metadata KeyValuePairs > {...}
reservationId string($uuid)
The reservation identifier applicable to the resource. It shall be present when an applicable reservation exists.

networkResource* ResourceHandle > {...}
id* string($uuid)
Identifier of this VnfVirtualLinkResourceInfo instance.

vnfVirtualLinkDescId* string($uuid)
Identifier of the VNF Virtual Link Descriptor (VLD) in the VNFD.

vnfLinkPorts > [...]
}

```

### VnfInstance ▼ {

*description:* This type represents a VNF instance.

```

vnfProductName* string
Name to identify the VNF Product. The value is copied from the VNFD.

vnfdVersion* string
Identifies the version of the VNFD. The value is copied from the VNFD.

vimConnectionInfo > {...}
metadata KeyValuePairs > {...}
vnfProvider* string
Provider of the VNF and the VNFD. The value is copied from the VNFD.

_links* > {...}
vnfPkgId* string($uuid)
Identifier of information held by the NFVO about the specific VNF package on which the VNF is based. This identifier was allocated by the NFVO.

vnfConfigurableProperties KeyValuePairs > {...}

```

```

vnfdId* string($uuid)
Identifier of the VNFD on which the VNF instance is
based.

instantiationState* string
The instantiation state of the VNF.

Enum:
  > Array [ 2 ]
vnfInstanceDescription string
Human-readable description of the VNF instance.

extensions KeyValuePairs > {...}
instantiatedVnfInfo > {...}
vnfInstanceName string
Name of the VNF instance.

id* string($uuid)
Identifier of the VNF instance.

vnfSoftwareVersion* string
Software version of the VNF. The value is copied from the
VNFD.
}

```

#### **KeyValuePairs** ▾ {

*description:* This type represents a list of key-value pairs. The order of the pairs in the list is not significant.

```
}

```

#### **VnfcInfo** ▾ {

*description:* This type represents the information about a VNFC instance that is part of a VNF instance

```
vnfcState* string
State of the VNFC instance.
```

Enum:

> Array [ 2 ]

```
vnfcConfigurableProperties KeyValuePairs > {...}
```

```
id* string($uuid)
Identifier of the VNFC instance.
```

```
vduId* string($uuid)
Reference to the applicable VDU information element in
the VNFD.
```

```
}

```

#### **TerminateVnfRequestSol2** ▾ {

*description:* This type represents request parameters for the "Terminate VNF" operation.



```

additionalParams      KeyValuePairs > {...}
terminationType*     string
                      Indicates whether forceful or graceful termination is
                      requested.
                      Enum:
                        > Array [ 1 ]
}

```

```

PmSubscription ▾ {
  description:      This type represents a subscription related to notifications
                      about VNF performance.

  filter              PmNotificationsFilter > {...}

  _links*             > {...}
  callbackUri*        string($uri)
                      The URI of the endpoint to send the notification to.

  id*                 string($uuid)
                      Identifier that identifies the subscription.
}

```

```

VnfLinkPort ▾ {
  description:      This type represents a link port of an internal VL of a VNF

  resourceHandle*     ResourceHandle > {...}

  id*                 string($uuid)
                      Identifier of this link port as provided by the entity that
                      has created the link port.

  cpInstanceId        string($uuid)
                      Identifier of the external CP of the VNF to be connected to
                      this link port.
}

```

```

CreateThresholdRequest ▾ {
  description:      This type represents a request to create a threshold

  objectInstanceId*   string($uuid)
                      Identifier of the VNF instance associated with this
                      threshold.

  subObjectInstanceIds* > [...]

  criteria*           ThresholdCriteria > {...}

  callbackUri*        string($uri)
                      The URI of the endpoint to send the notification to.

  authentication      SubscriptionAuthentication > {...}
}

```

## Report ▼ {

*description:* Information about available reports collected by this PM job.

**readyTime\*** `string($date-time)`  
The time when the report was made available.

**fileSize** `integer($int32)`  
The size of the report file in bytes, if known.

**expiryTime** `string($date-time)`  
The time when the report will expire.

**href\*** `string($uri)`  
The Uri where the report can be obtained.

}

## ProblemDetails ▼ {

*description:* A JSON representation of a "ProblemDetails" data structure according to IETF RFC 7807 that provides additional details of the error

**instance** `string($uri)`  
A URI reference that identifies the specific occurrence of the problem.

**detail\*** `string`  
A human-readable explanation specific to this occurrence of the problem.

**type** `string($uri)`  
A URI reference according to IETF RFC 3986 [5] that identifies the problem type.

**title** `string`  
A short, human-readable summary of the problem type.

**status\*** `integer($int32)`  
The HTTP status code for this occurrence of the problem

**additionalAttributes** > [...]

}

## VnfLcmOpOcc ▼ {

*description:* This type represents a VNF lifecycle management operation occurrence.

**grantId** `string($uuid)`  
Identifier of the grant related to this VNF LCM operation occurrence, if such grant exists.

**\_links\*** > {...}

**operationState\*** `LcmOperationStateType string`  
Enum:

**error** > Array [ 7 ]  
**ProblemDetails** > {...}

```

vnfInstanceId*      string($uuid)
                    Identifier of the VNF instance to which the operation
                    applies.

resourceChanges     > {...}
cancelMode          CancelModeType string
                    Enum:
                    > Array [ 2 ]

operationParams*    > {...}
stateEnteredTime*  string($date-time)
                    Date-time when the current state was entered.

changedExtConnectivity > [...]
startTime*         string($date-time)
                    Date-time of the start of the operation.

id*                string($uuid)
                    Identifier of this VNF lifecycle management operation
                    occurrence.

isAutomaticInvocation* boolean
                    Set to true if this VNF LCM operation occurrence has been
                    triggered by an automated procedure inside the VNFM (i.e.
                    ScaleVnf / ScaleVnfToLevel triggered by auto-scale, or
                    HealVnf triggered by auto-heal). Set to false otherwise.

operation*         LcmOperationType string
                    The enumeration LcmOperationType represents those lifecycle
                    operations that trigger a VNF lifecycle management operation
                    occurrence notification.
                    Enum:
                    > Array [ 9 ]

isCancelPending*   boolean
                    If the VNF LCM operation occurrence is in "STARTING",
                    "PROCESSING" or "ROLLING_BACK" state and the operation is
                    being cancelled, this attribute shall be set to true.
                    Otherwise, it shall be set to false.

changedInfo        VnfInfoModifications > {...}
}

```

### FaultyResourceInfo {

*description:* This type represents the faulty virtual resources that have a negative impact on a VNF

```

faultyResource*    ResourceHandle > {...}
faultyResourceType* FaultyResourceType string
                    Enum:

```

```

                    > Array [ 3 ]
id*                string($uuid)
                    Unique identifier of the Faulty Resource Info object

```

```

}
```

## Alarm ▼ {

*description:* The alarm data type encapsulates information about an alarm.

**isRootCause\*** `boolean`  
Attribute indicating if this fault is the root for other correlated alarms. If TRUE, then the alarms listed in the attribute `CorrelatedAlarmId` are caused by this fault.

**rootCauseFaultyResource\*** **FaultyResourceInfo** > {...}

**alarmRaisedTime\*** `string($date-time)`  
Time stamp indicating when the alarm is raised by the managed object.

**alarmClearedTime** `string($date-time)`  
Time stamp indicating when the alarm was cleared. It shall be present if the alarm has been cleared

**eventType\*** `EventType string`  
Enum:  
> Array [ 5 ]

**alarmChangedTime** `string($date-time)`  
Time stamp indicating when the alarm was last changed. It shall be present if the alarm has been updated.

**ackState\*** `string`  
Acknowledgement state of the alarm.  
Enum:  
> Array [ 2 ]

**managedObjectId\*** `string($uuid)`  
Identifier of the affected VNF instance.

**perceivedSeverity\*** `PerceivedSeverityType string`  
Enum:  
> Array [ 6 ]

**probableCause\*** `string`  
Information about the probable cause of the fault.

**eventTime\*** `string($date-time)`  
Time stamp indicating when the fault was observed.

**faultType** `string`  
Additional information to clarify the type of the fault.

**correlatedAlarmIds** > [...]

**faultDetails** > [...]

**id\*** `string($uuid)`  
Identifier of this Alarm information element.

}

## ResourceHandle ▼ {

*description:* This type represents the information that allows addressing a virtualised resource that is used by a VNF instance. Information about the resource is available from the VIM.

```

resourceId*      string($uuid)
                 Identifier of the resource in the scope of the VIM or the
                 resource provider.

vimConnectionId string($uuid)
                 Identifier of the VIM connection to manage the resource.

vimLevelResourceType string
                 Type of the resource in the scope of the VIM or the resource
                 provider.

resourceProviderId string($uuid)
                 Identifier of the entity responsible for the management of
                 the resource.
}

```

### **PmJob** ▾ {

*description:* This type represents a PM job

```

reports          > [...]
subObjectInstanceIds* > [...]
objectInstanceIds* > [...]
criteria*       PmJobCriteria > {...}
callbackUri*    string($uri)
                 The URI of the endpoint to send the notification to.

id*             string($uuid)
                 Identifier of this PM job.

objectType*     string
                 Type of the measured object.
}

```